



AN EDUCATIONAL UNIT FOR JUNIOR SECONDARY SCHOOLS



# Investigating key Australian fibre production practices in the cotton, timber and wool sectors

YEARS 7 & 8

Design and Technologies,  
Science and Geography

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Cover photo courtesy  
Cotton Australia

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The material in this Unit of Work is made available for the purpose of providing access to general information about food and fibre production and primary industries in Australia.



*As content of the websites used in this unit is updated or moved, hyperlinks may not always function.*

# Introduction

## Rationale

This resource material aims to help teachers and students in primary schools investigate and understand more about primary industries in Australia.

The objectives of the educational resources are to:

- Support Primary Industries Education Foundation Australia and its members in expanding awareness about primary industries in Australia by engaging and informing teachers and students about the role and importance of primary industries in the Australian economy, environment and wider community.
- Provide resources which help build leadership skills amongst teachers and students in communicating about food and fibre production and primary industries in Australia.
- Develop educational resources that can be used across Australia to provide encouragement, information and practical teaching advice that will support efforts to teach about food and fibre production and the primary industries sector.
- Educate school students on ways food and animals are raised and grown.
- Demonstrate to students that everyone can consider careers in primary industries and along the supply chain of food and fibre products.
- Assist school students to spread this message to their families and the broader community.
- Develop engaging learning programs using an inquiry process aligned with the Australian Curriculum.
- Develop in school communities, an integrated primary industries education program that emphasises the relationship between food and fibre industries, individuals, communities, the environment and our economy.

These educational resources are an effort to provide practical support to teachers and students learning about food and fibre production and primary industries in schools.

An integrated primary industries education program that emphasises the relationship between food and fibre industries, individuals, communities, the environment and our economy.

The approach used, is the inquiry approach through five phases: Engage, Explore, Explain, Elaborate and Evaluate.

Several key principles underpin the theoretical and practical application to this unit.

In providing an *integrated framework for inquiry*, complemented by rich explorations of texts that are, in turn, supported by an emphasis on undertaking a challenge or task, the unit requires students to:

- Search for information using both digital and non-digital means
- Use research techniques and strategies
- Use thinking and analysis techniques
- Present findings to a real audience, and
- Reflect both on the product created and the process undertaken.

Rather than seeing knowledge as something that *is taught* the emphasis in this unit is on knowledge and understanding that *is learned*.

The unit involves students in:

- Working from a basis of their prior knowledge and experience
- Seeing a real task or purpose for their learning
- Being directly involved in gathering information firsthand
- Constructing their knowledge in different ways
- Presenting their learning to a real audience
- Reflecting on their learning.

The approach used, is the inquiry approach through five phases: **Engage, Explore, Explain, Elaborate** and **Evaluate**. The phases of the model are based on the 5Es instructional model (Bybee, 1997). This unit of work containing student activities assists students to raise questions, gather and process data, make conclusions and take action. These phases are:

- **Engage:** The 'Engage' phase begins with lessons that mentally engage students with an activity or question. It captures their interest, provides an opportunity for them to express what they know about the concept or skill being developed, and helps them to make connections between what they know and the new ideas.
- **Explore:** The 'Explore' phase includes activities in which they can explore the concept or skill. They grapple with the problem or phenomenon and describe it in their own words. This phase allows students to acquire a common set of experiences that they can use to help each other make sense of the new concept or skill.
- **Explain:** The 'Explain' phase enables students to develop explanations for the phenomenon they have experienced. The significant aspect of this phase is that explanation follows experience.
- **Elaborate:** The 'Elaborate' phase provides opportunities for students to apply what they have learned to new situations and so develop a deeper understanding of the concept or greater use of the skill. It is important for students to discuss and compare their ideas with each other during this phase.
- **Evaluate:** The 'Evaluate' phase provides an opportunity for students to review and reflect on their own learning and new understanding and skills. It is also when students provide evidence for changes to their understanding, beliefs and skills.

Source: *Primary Connections* <http://www.primaryconnections.org.au/about/teaching>

## Resource description

This is a unit with five inquiry teaching sequences about how fibres are produced, processed and brought to consumers.

This unit encourages students to investigate new and existing production practices used to produce cotton, timber and wool products. Students are given an insight into ways primary producers in the cotton or wool sectors and foresters in the wood sector produce; process and bring their products to consumers.

It includes sections on fibre production, what it is, what it comprises, what it affects, its potential impacts on living things in a variety of ecosystems, and who and what produces cotton, wood and wool products for people in Australia and overseas.

The unit introduces possible scenarios for Australia and factors that have contributed to our developing understanding of the industries, their practices, influences on the environment and approaches to sustainable living.

It invites students to consider what might need to be sustained with regard to 'fibre production systems'...fibre supplies over time...the environmental quality of farm systems and ecosystems affected by fibre production and practices...the cultural integrity of communities producing fibres...fibre quality...fibre diversity...who buys fibres...in what volumes...and where are the markets?

It contains a unit of work with a variety of student activities selected as vehicles to help students:

- Investigate where our cotton, timber and wool come from and explore how primary producers and foresters produce cotton, timber and wool.
- Investigate how different systems and practices are used to produce cotton, timber and wool.
- Investigate concepts and ideas about land management, water management, waste management, revegetation, sustainable farming, and sustainable management of forests, climate adaptation and sustainability.
- Assess the ways in which primary producers and foresters have produced cotton, timber and wool, and how their production methods and systems are influenced by increases in scientific knowledge and developments in technology.
- Select ideas and undertake an inquiry about one sector that produces cotton, timber, or wool, record and collect information about the system used to produce, process and bring the product to consumers; and their chosen sector's management practices.
- Reflect and evaluate the different production systems used by primary producers and foresters to produce cotton, timber and wool.

### Year levels: 7 and 8

*Based on Australian Curriculum, Assessment and Reporting Authority (ACARA) materials downloaded from the Australian Curriculum website in February 2015. ACARA does not endorse any changes that have been made to the Australian Curriculum.*

Investigate new and existing production practices used to produce cotton, timber and wool products.

# Australian Curriculum content descriptions

## Design and Technologies

**Strand:** Design and Technologies knowledge and understanding

Analyse how food and fibre are produced when designing managed environments and how these can become more sustainable [ACTDEK032](#)

**Strand:** Design and Technologies processes and production skills

Generate, develop, test and communicate design ideas, plans and processes for various audiences using appropriate technical terms and technologies including graphical representation techniques [ACTDEP036](#)

## Science

**Strand:** Science as a Human Endeavour: Use and influence of science

Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management [ACSHE136](#)

**Strand:** Science Understanding: Biological sciences

Interactions between organisms can be described in terms of food chains and food webs; human activity can affect these interactions [ACSSU112](#)

## Geography

**Strand:** Geographical Knowledge and Understanding

The classification of environmental resources and the forms that water takes as a resource [ACHGK037](#)

## Cross Curriculum Priorities

### Sustainability

- OI.2:** All life forms, including human life, are connected through ecosystems on which they depend for their wellbeing and survival.
- OI.3:** Sustainable patterns of living rely on the interdependence of healthy social, economic and ecological systems.
- OI.4** World views that recognise the dependence of living things on healthy ecosystems, and value diversity and social justice are essential for achieving sustainability.
- OI 6:** The sustainability of ecological, social and economic systems is achieved through informed individual and community action that values local and global equity and fairness across generations into the future.
- OI.8:** Designing action for sustainability requires an evaluation of past practices, the assessment of scientific and technological developments, and balanced judgments based on projected future economic, social and environmental impacts.

### Asia and Australia's engagement with Asia

- OI.2:** Interrelationships between humans and the diverse environments in Asia shape the region and have global implications.

*Source: Australian Curriculum, Assessment and Reporting Authority (ACARA), downloaded from the Australian Curriculum website in February 2015.*

## Implementing the unit and activities in the classroom

### Using the unit

The unit can be used in a number of ways. It will be of most benefit to teachers who wish to implement a sustained sequence of activities following the inquiry stages identified in the **About the approach** section of this unit and content descriptions in Years 7 and 8 in Design and Technologies, Geography and Science as stated in the Australian Curriculum.

### Selecting activities

At each stage several activities are suggested from which you are encouraged to select the most appropriate for your purposes. Not all activities in each stage of the unit need to be used. Alternatively, you may add to or complement the suggested activities with ideas of your own.

It is suggested that teachers create a hyperlinked unit. Organise the digital resources for your class's use on a website or wiki or provide them on your interactive whiteboard.

### Resourcing the unit

The resources suggested are on the whole, general rather than specific. Schools and the contexts in which they exist vary widely as does the availability of some resources – particularly in remote areas. There is a strong emphasis in the unit on gathering information and data; research and observations also feature strongly as these methods develop important skills and ensure that the exploration of the topics are grounded in a relevant context.




Some YouTube and online videos in addition to Internet based resources are suggested in the unit. You will need to investigate what is available in your school.

### Adapting the unit

The unit is targeted at Year 7 and 8 students. This is a suggested age range only and teachers are encouraged to modify activities to suit the needs of the students with whom they are working.

The unit's topics are based on content descriptions of the Australian Curriculum and on the key cross curriculum priority of sustainability and Asia and Australia's engagement with Asia. They embrace content that we believe is of relevance and significance to all students. We encourage you to explore ways in which the content can be adjusted to the context in which you are working.

Many of the activities contain the following icons offering a suggestion on how many students should be involved:

-  Suggested for individuals
-  Suggested for pairs or small groups
-  Suggested for larger groups or entire classes

Resource sheets are provided for some activities. Most are for photocopying and distribution to students. They are identified within units in bold italic: **Resource 1.1**

The resource sheets are designed to assist teachers to facilitate learning without having to access a range of other resources.

### What about assessment?

Rather than being a task carried out at the end of the unit, assessment is viewed as integral to the entire unit sequence. Each activity should be regarded as a context for assessment of student learning.

When planning and implementing the unit of work make clear decisions on what you will focus on in assessing learning. The unit provides an opportunity for a range of skills and understandings to be observed. We encourage you to devise an assessment plan or assessment rubric that features areas to be assessed over subsequent lessons.

In planning for assessment, student learning in the following areas can be considered:

- Understandings about the topic.
- Development of skills.
- Exploration and clarification of values.
- Use of language in relation to content.
- Ability to use and critically analyse a range of texts.
- Ability to analyse and solve problems.
- Ability to interpret information, perceive its meaning and significance, and use it to complete real-world tasks.
- Ability to work cooperatively with others.
- Approach to learning (independence, confidence, participation and enthusiasm).

For this unit, the following understandings are provided to assist teachers in planning for assessment.

### Assessment strategies

Each stage in the inquiry sequence provides information about student learning. There are, however, two stages in the unit that are central to assessment: the **Engage** stage and the **Evaluate** stage. Work that is undertaken in these stages can assist teachers to monitor growth and observe concrete examples of the way student ideas have been refined or have changed through the unit sequence. Work samples should be retained for this purpose.

This unit contains a 'Student Task' which is well suited for assessment, as it is the summation of the work undertaken by the student in the unit.



## Some questions and possible answers

### **Should I do all the activities?**

At each stage of a unit, a number of activities are listed. You would not be expected to do them all. Instead, the unit is designed so that a selection of activities can be made at each stage. You should select the activities according to the needs and interests of your students and the time, relevance to the existing school curriculum and resources available to you.

While you are encouraged to follow the suggested inquiry sequence for each unit, it is quite possible to pick and choose from the range of activity ideas throughout the unit. It may also be used in conjunction with other programs you use.

### **How do these units fit into my weekly program?**

Although the unit integrates a range of key subject areas, it is not designed to be a total program. It is assumed that regular routines that operate in your classroom will continue to run alongside your unit of work. For example, you may have regular times for use of the library, for maths, physical education etc. These things don't change – although student's writing topics or choice of topics to research in the library or in Information and Communication Technology classes may be influenced by this unit.

### **How long should the unit run?**

This will of course depend on your particular circumstances but generally, a few weeks to a term are suggested.

### **I don't know much about fibre production myself – will I be able to teach it effectively?**

Yes! The unit is designed in such a way that you, as the teacher are a co-learner, and you are therefore provided with teacher notes, plus readily available resources that are mainly web-based. Most importantly, you will find that you learn with the students and make discoveries with them.

# Fast facts about Australian agriculture

## National Farmers' Federation Farm Facts 2012



In 2011, there were 157,000 farmers in Australia.



The gross value of Australian farm production in 2011–12 was \$46.7 billion.

This page provides basic food and fibre production information that may be helpful when you interact with the school students.

- Agriculture plays a vital role in Australia, contributing to our social, economic and environmental sustainability.
- In 2011, there were 157,000 farmers in Australia. Around half of these were mixed crop and livestock farmers (22 percent), beef cattle farmers (20 percent) or dairy farmers (8 percent).

*Sources: Australian Bureau of Statistics, 2010–11 Agricultural Census; Australian Bureau of Statistics, Australian Social Trends, Australian Farming and Farmers, December 2012, Catalogue No. 4102.0.*

- These farmers own or manage Australia's 135,000 farm businesses – 99 percent of which are Australian owned.

*Sources: Australian Bureau of Statistics, 2010–11 Agricultural Census; Australian Bureau of Statistics, Agricultural Land and Water Ownership, December 2010, Catalogue No. 7127.0.*

- Each Australian farmer produces enough food to feed 600 people, 150 at home and 450 overseas. Australian farmers produce 93 percent of Australia's daily domestic food supply.

*Sources: Keogh M, Australian Farm Institute, 2009, "Australia's response to world food security concerns", Address to the 1st National Farmers' Federation Annual Congress – Prime Minister's Science, Engineering and Innovation Council (2010); Australia and Food Security in a Changing World. The Prime Minister's Science, Engineering and Innovation Council, Canberra, Australia.*

- The average Australian farmer is male (72 percent), 53 years old (compared with 40 years old for people in other occupations), and a self-employed owner manager (56 percent).

*Sources: Australian Bureau of Statistics, 2010–11 Agricultural Census; Australian Bureau of Statistics, Australian Social Trends, Australian Farming and Farmers, December 2012, Catalogue No. 4102.0.*

- As of June 2012, there were 290,000 people employed in Australian agriculture. The complete agricultural supply chain, including the affiliated food and fibre industries, provide over 1.6 million jobs to the Australian economy.

*Sources: Australian Bureau of Agricultural & Resource Economics and Sciences (ABARES), Australian Commodity Statistics, 2012; Australia's Farm Dependent Economy: Analysis of the role of Agriculture in the Australian Economy. Modelling undertaken by Econtech.*

- The agricultural sector, at farm-gate, contributes 2.4 percent to Australia's total gross domestic product. The gross value of Australian farm production in 2011–12 was \$46.7 billion.

*Sources: Australian Bureau of Statistics, Value of Agricultural Commodities Produced, 2011–12, Catalogue No. 7503.0; Australian Bureau of Statistics, 2010–11, Australian System of National Accounts, Catalogue No. 5204.0; ABARES, Australian Commodity Statistics, 2012.*

- Australian farmers are environmental stewards, owning, managing and caring for 59 percent of Australia's land mass.

*Sources: Australian Government Department of Agriculture, Fisheries and Forestry, At a Glance, 2012.*

- Farmers are at the frontline of delivering environmental outcomes on behalf of the Australian community, with 94 percent of Australian farmers actively undertaking natural resource management.

*Source: Australian Bureau of Statistics, Natural Resource Management on Australian Farms 2006–07.*

- Australia's primary industries have led the nation in reducing greenhouse gas emissions: a massive 40 percent reduction between 1990 and 2006.
- Source: Australian Government Department of Climate Change, National Inventory by Economic Sector 2006.*

Source: National Farmers' Federation Farm Facts 2012 at <http://www.nff.org.au/farm-facts.html>

## Cotton Industry

Australia's cotton growers produce yields almost three times the world average.

40% less water is needed to grow one tonne of cotton lint compared to 2003.

- Every year cotton farmers make an important social and economic contribution to the nation creating jobs for 8,000 people (in Northern New South Wales and Southern Queensland alone), support for more than 4,000 businesses and over \$2 billion for the national economy in export earnings.  
*Sources: Cotton Australia Pocket Guide to Cotton, Judith Stubbs and Associates Report 2011.*
- In 2013, there were 1,181 cotton farms. 63 percent were in New South Wales and 37 percent were in Queensland. Of those farms cotton makes up 17 percent of land area on farm.  
*Source: Cotton Annual 2014*
- Australia's cotton growers produce enough cotton to provide jeans, socks, underwear and a shirt for 450 million people. The overall yield in 2012 was 10.37 bales per hectare – the first time in history that average yields have exceeded 10 bales per hectare. Australia's cotton growers produce yields almost three times the world average.  
*Sources: Cotton Australia tables (compilation of industry sources), ABARES Crop Report, December 2012, Pocket Guide to Cotton 2014.*
- The average Australian cotton farmer is 39 years old, has a family owned and operated farm, employs on average six or more people, grows other crops like sorghum, soybeans, wheat and canola, has 496 hectares of cotton and is not only a farmer but also a builder, mechanic meteorologist, agronomist, conservationist, scientist and marketer.  
*Sources: Pocket Guide to Cotton 2014, Monsanto audited numbers 20.12.13, 2013 Cotton Practices Grower Survey, Cotton Research and Development Corporation.*
- The Australian cotton crop was worth almost \$2.3 billion at the farm gate.  
*Source: Cotton Australia tables (compilation of industry sources), Cotton Compass.*
- The Australian cotton industry has achieved a 40 percent increase in water productivity over the last decade i.e. 40 percent less water is now needed to grow one tonne of cotton lint, compared to 2003.  
*Source: The Australian Cotton Water Story 2011.*
- The ratio of dryland cotton (rain grown) to irrigated cotton varies depending on the market and conditions. Of the 2011–12 crop 5 percent was dryland and 95 percent irrigated. Favourable grain and sorghum prices meant many dryland farmers opted not to plant cotton at that time.  
*Sources: Cotton Australia tables (compilation of industry sources), ABARES Crop Report December 2012.*
- Australian cotton growers have reduced their insecticide use by 95 percent over the past 15 years. *Source: Monsanto Audited numbers 20.12.2013.*
- Cotton growers are good environmental stewards, owning and caring for native vegetation equivalent to 40 percent of the area of their cotton farms, on average. *Source: 2011 Cotton Grower Survey (Cotton Research and Development Corporation and Cotton Catchment Communities Co-operative Research Centre).*

Source: Cotton Australia <http://www.cottonaustralia.com.au>

## Forestry Industry

Australia has 125 million hectares of forest, equivalent to 16% of its land area.

Forests protect soil and water resources as well as storing carbon.

- Forestry plays a vital role in Australia, contributing to our social, economic and environmental sustainability.
- Forests are also the foundation for a broad range of cultural and spiritual experiences for diverse groups of people. They are a major tourist attraction for Australian and overseas visitors, providing for a vast array of recreational and educational activities.
- In 2010–11, the total turnover of Australia’s forest product industries was more than \$24 billion.
- Australia has 125 million hectares of forest, equivalent to 16 percent of Australia’s land area. Australia has about 3 percent of the world’s forest area, and the seventh largest reported forest area of any country worldwide.
- Australia’s 123 million hectares of native forests are dominated by eucalypt forests and acacia forests.
- 32 percent of all Australia’s native forests (private and public land) are protected for biodiversity conservation. With 73 percent of Australia’s identified old growth forests in formal or informal nature conservation reserves.
- 9 percent (36.6 million hectares) of the native forests were available and suitable for commercial wood production in 2010–11 comprising 7.5 million hectares of multiple-use public forests and 29.1 million hectares of leasehold and private forests.
- Forests protect soil and water resources and are increasingly being recognised for their carbon storage and sequestration capability. The total carbon stored in forests, wood and wood products and paper products was in the order of 400 million tonnes in 2010.
- Australia’s native and plantation forests provide the majority of the timber and a significant proportion of the paper products used by Australians.
- On average, each year, every Australian consumes the equivalent of about 1 cubic metre of harvested log in the form of timber products, including timber for home building, joinery and furniture and paper products.
- Australia’s forest management is among the best in the world in terms of conservation reserves and codes of practice for production forests.
- Australia has two forestry certification schemes that enable users of wood and wooden products to know the source of the wood.
- The sector directly employs 73,267 people in the forest and wood products industry in Australia (2011). This includes full and part time employees with 1.5 percent of all employees being Indigenous.

Sources: <http://www.agriculture.gov.au/forestry>  
<http://au.fsc.org/>  
<http://www.forestrystandard.org.au/>  
<http://www.naturallybetter.com.au/>  
<http://www.forestlearning.edu.au/>

## Wool Industry

- The total wool produced in Australia is 368,330 tonnes (greasy). NSW is the highest producer of wool, with 112,720 tonnes, followed by VIC with 103,910 tonnes and WA with 79,070 tonnes.  
*Source: ABARES, Australian Commodity Statistic, 2011.*
- The gross value of Australian wool (includes value of dead wool and wool on skins) is \$1.9 billion.  
*Source: Australian Bureau of Statistics, Value of Agricultural Commodities Produced, 2009–2010, Catalogue No. 7503.0.*
- Wool production for 2011–12 is forecast to increase by 3 percent, to 355 million kilograms (greasy) from the estimated 2010–11 production period.  
*Source: Australian Wool Innovation Limited, Australian Wool Production Forecast Report, August 2011.*
- In 2010–11, the value of Australian wool exports was \$3.047 billion. The major markets for Australian wool (by value) are China (\$2.235 billion), India (\$209 million) and Italy (\$178 million).  
*Source: Australian Wool Innovation Limited, Australian Wool Production Forecast Report, August 2011 and ABARES, Australian Commodity Statistics, 2011.*

Sources: NFF Farm Facts 2012 at <http://www.nff.org.au/commodities-wool.html>



# Step 1: Engage with the topic

## Getting started

### Purpose

To provide students with opportunities to:

- gather information about their prior knowledge of food production
- pool ideas and share with others
- consider possible scenarios for Australia
- develop their understanding of food systems
- organise the ideas they have about fibre production systems
- develop skills in making connections between ideas
- set directions for an investigation
- collate data for assessment purposes.

### What are fibres?



Present students with the question ‘What is a fibre?’ Invite students to **RECORD** as many words associated with the word ‘fibres’ as they can. **CREATE** word clouds using Wordle to record class ideas.

See: <http://www.wordle.net>



**CONSIDER** fibre crops grown in Australia from plants and animals that can be spun, threaded, woven, knitted, matted or bound like cotton fibres, wood fibres, vegetable fibres or animal fibres.

See: <http://www.bcomp.ch/10-0-natural-fibres.html>

### 101 uses for fibre



In groups, invite students to **TALK** about and list anything they see in the class, school surrounds or know of outside the school context that is made from fibre. Sort and **CLASSIFY** these into categories, clothing, medicines, furniture, shelter, fabrics, food etc.



Invite groups to **CHOOSE** selected fibre types and make a three-column **CHART** using the headings:

- How is the fibre used?
- Does it satisfy a need or want?
- What might be used instead?

### A linking survey



Invite students to **CONDUCT** a survey to find out which commodities they use at home that originate from cotton growers, wool growers, and sustainably-managed forests.

Ask students to **CREATE** a data chart or database of the information using the following headings:

- Commodity
- Raw material
- Country of origin
- Nature of exchange (import or export)
- Is this product of benefit to me and if so, how?



### An overview of fibre production



Ask students to **DEVELOP** a concept map describing what they know about cotton and wool farms and sustainably-managed forests, what they are, what they comprise, what they affect, their potential impacts on living things in a variety of ecosystems, and who and what produces cotton, timber and wool products for people in Australia and overseas. **SHARE** with students some facts about fibre production in Australia as is currently understood. See:

National Farmers' Federation Farm Facts 2012 at:

<http://www.nff.org.au/farm-facts.html>

Cotton Australia Cotton Facts (in the **Fast facts about Australian agriculture** section of this unit) or more cotton fact sheets are at:

<http://cottonaustralia.com.au/cotton-library/fact-sheets>

Fast Facts – Forestry Industry (in the **Fast facts about Australian agriculture** section of this unit).

National Farmers' Federation Fast Facts – Wool Production at:

<http://www.nff.org.au/commodities-wool.html>



If questions emerge from this activity, **RECORD** these and **DISPLAY** them for reference throughout the unit.

### Imagine



Ask students to **IMAGINE** that they were born today. In 20 years time, when they have grown into adulthood, many of the world's agricultural systems have changed may have changed.

**CONSIDER** the following three scenarios:

#### SCENARIO ONE

*Many agricultural practices have remained the same. It is based on the assumption that things worked reasonably well in the past and will therefore continue to do so in the future. Similar issues are occurring in the way food and fibres are produced, processed, distributed, retailed, consumed and disposed of and these issues being dealt with in similar ways as to today.*

#### SCENARIO TWO

*Many agricultural practices have been informed by breakthroughs in science and technology. Investments in genetic engineering, artificial intelligence, pollution control, waste management, energy reduction, and greenhouse gas emissions for example are bringing changes to the ways our food and fibres are produced, processed, distributed, retailed, consumed and disposed of.*

*Support students to reflect on how our understanding of agricultural practices might differ to that of our parents' and grandparents' generation. Also, consider what factors have contributed to our changing understanding of the environment and sustainable living.*

Due to climate change, inappropriate use of natural areas, and inadequate waste and water management practices, the resources we grew dependent on have been reduced.



Sustainable agriculture is described as an integrated system of plant and animal production practices having a site-specific application that will, over the long term satisfy human food and fibre needs.

### SCENARIO THREE

Many agricultural practices are experiencing major changes. They are based on the assumption that caring for the environment, other people, and future generations also brings better quality of life in the present. Producers are multi-cropping and inter-cropping where plants, bushes, trees and animals co-exist and interact to give high yields while still maintaining soil nutrients. We understand much better now the ways in which our agricultural practices and our health depend on agriculture and the natural world. Informed producers and consumers are influencing the ways our food and fibres are produced, processed, distributed, retailed, consumed and disposed of.

#### Discussion



Ask students to **DISCUSS** the differences between the two scenarios. Which would they prefer? What factors need to be considered for each to be considered realistic? Ask them to **DRAFT** a fourth scenario based on what they believe is a realistic goal for Australian agriculture in the future.

#### Fibre production systems

**TALK** with students about the meaning of ‘fibre production systems’.

The United States of America’s Department of Agriculture 1977 and 1990 “Farm Bills” describe sustainable agriculture as an integrated system of plant and animal production practices having a site-specific application that will, over the long term:

- satisfy human food and fibre needs
- enhance environmental quality and the natural resource base upon which the agricultural economy depends
- make the most efficient use of non-renewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls
- sustain the economic viability of farm operations
- enhance the quality of life for farmers and society as a whole.

See: Section 1404(17) of the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (7 U.S.C. 3103(17) and the Food, Agriculture, Conservation, and Trade Act of 1990, Public Law 101-624. Title XVI, Subtitle A, Section 1603, GPO, Washington, D.C., 1990 NAL Call#KF1692. A31 1990.

Source: <http://www.usda.gov/oce/sustainable/definitions.htm>



Invite students to **RESEARCH** other meanings of fibre production systems and practices. **RECORD** all ideas.

During the unit, the students will ask many questions. Answers can be found in many different places.



**DISCUSS** the types of source material that might present a good understanding of systems used to produce cotton, wood and wool.

**DISCUSS** how the students might evaluate their sources. They might ask:

- Who is the source’s author?
- Where did they get their information from?
- Why might they be writing this source?
- What language are they using (i.e., is it emotional or informative?)





## Step 1: Engage with the topic

### Learning log



Begin a learning log where students **RECORD** their understandings. This might form part of an assessment plan.

Introduce the learning log and **MODEL** a procedure for maintaining it. The whole class might jointly **CONSTRUCT** the first entry. Students can then make individual entries based on the activities they do and the questions they come up with.

Initial focus questions could include:

- What impact does my perception of fibre production practices have on my choice of fibres purchased and/or consumed?
- What fibre production systems do I know of? Local/regional? National? Global?
- What fibre production systems do we need to clothe and house the world's people?
- If we know about fibre production practices and systems that lead to the long-term health of populations, ecosystems and environmental quality, why don't we use them in all instances?
- Are we going to rely on sustainable fibre production practices and systems more or less in the future?
- What answers might there be to meeting the challenge of efficient, well managed and sustainable fibre production systems?



**ASK** students to come up with their own questions they hope to have answered by the end of the unit and instruct them to **WRITE** them into their log.

### Use song lyrics



**READ** an extract from a song titled 'The Seventh Generation' by Sue Doessel and **REFLECT** on the writer's perspective on the importance of sustainability.

#### **The Seventh Generation**

*"Will it benefit the seventh generation?"  
Is the question that the Hopi dwell upon.  
"Will it help the future people who will walk upon this earth  
Long after you and I are dead and gone?"  
And if the Hopi see that the answer is "No"  
They will drop that new idea, they will simply let it go.  
For the Hopi's ethic means they think not only of themselves  
But of future generations as well.*

*I speak now for that seventh generation,  
For the seventh generation from now on.  
I speak for the people who will walk upon this Earth  
Long after you and I are dead and gone.  
Will they reap a bitter harvest from the things that we have done?  
Will they thank us for the healing that in our time has begun?  
Will there even still be people seven generations on?  
For I fear for the seventh generation.*

*Author: Sue Doessel © Sue Doessel*

Are we going to rely on sustainable fibre production practices and systems more or less in the future?



What makes fibre production systems interesting to study is their wide diversity and commonalities.

**TALK** with students about what might need to be sustained with regard to ‘fibre production systems’... fibre supplies over time... the environmental quality of farm systems and ecosystems affected by fibre production and practices... the cultural integrity of farming and forestry communities producing fibres... fibre quality... fibre diversity... who buys fibres... in what volumes...and where are the markets?



Invite students to **RECORD** ideas and understandings in student learning logs.

**Understanding terms** 



As a class **IDENTIFY** and **DEFINE** terms or key words about which students are uncertain. Once defined, ask students to explain the meaning of the term to others.



At the end of the activities make a class **LIST** of students’ comments and questions using a table like the sample one below.

What we know	What we’re not sure about	What we want to know

**Setting the task** 

*Note: This is a suggested assessment activity.*

What makes fibre production systems interesting to study is their wide diversity and commonalities.



**EXPLAIN** to the class that they will be using a range of activities and websites containing information about cotton, timber and wool production systems to develop an understanding of:

- Where our cotton, timber and wool comes from.
- How primary producers including cotton, wool, and forest growers and foresters produce cotton, timber, and wool.
- How different systems and technologies are used to produce cotton, timber, and wool.
- How the physical conditions of the land and water environments and farming and sustainable forest management practices used might impact on or influence the design of fibre production systems for cotton, timber, and wool.



**REMIND** students that ‘A food or fibre system is made up of the environment, people, institutions and processes by which agricultural (including cotton, timber, and wool) products are produced, processed and brought to consumers’.



**INFORM** the students that after investigating the current practices, they will also be encouraged to **SUGGEST** ways to improve the design of production practices or operations so that these might become more sustainable.

**EXPLAIN** to the class that their task is to work in groups, **SELECT** one sector that produces cotton, wool or timber (noting timber includes farm forestry or agroforestry where landowners plant trees on farms to produce logs for sale and privately owned and public native forests).



They are to **RESEARCH, RECORD** and **COLLECT** information about the system and technologies used to produce, process and bring the product to consumers; and their chosen sector's management practices. They are also to generate ideas and **EXPLORE** options for making production techniques more sustainable. They are encouraged to **SKETCH** a design of the production processes, **GENERATE** ideas and explore options for making a change to the production processes, add these to the design and produce an annotated concept sketch or drawing using technical terms, scale, symbols, pictorial and aerial views to **DRAW** environments and a production drawing to **EXPLAIN** design ideas.

## Explore a sector

### Purpose

To provide students with opportunities to develop their understanding of:

- where our cotton, timber, and wool comes from
- how production methods differ in Australia between cotton and wool primary producers and foresters
- the ways in which primary producers and foresters have produced fibres and how their actions are influenced by increases in scientific knowledge and developments in technology
- how to provide fibre products for the global population
- a focus for the forthcoming experiences in the 'Explain' stage of the inquiry

Introduce students to the concepts about ways Australian primary producers and foresters produce their product.

### RESEARCH TASK: PART 1

#### Investigate the options



**RE-STATE** to the class that they will be using a range of activities and websites containing information about cotton, timber and wool production systems to develop an understanding of:

- Where our cotton, timber and wool comes from.
- How primary producers and foresters produce cotton, timber and wool.
- How different systems and technologies are used to produce cotton, timber and wool.
- How the physical conditions of the land and water environments and farming and sustainable forest management practices used might impact on or influence the design of fibre production systems for cotton, timber and wool.
- How the different species of trees influence the production systems.



**INFORM** the students that after investigating the current practices, they will also be encouraged to **SUGGEST** ways to improve the design of production practices or operations so that these might become more sustainable.

**EXPLAIN** to the class that their task is to work in groups, **SELECT** one sector that produces cotton, wool or timber.



Students are to **RESEARCH, RECORD** and **COLLECT** information about the system and technologies used to produce, process and bring the product to consumers; and their chosen sector's management practices. They are also to generate ideas and **EXPLORE** options for making production techniques more sustainable. They are encouraged to **SKETCH** a design of the production processes, **GENERATE** ideas and explore options for making a change to the production processes, add these to the design and produce an annotated concept sketch or drawing using technical terms, scale, symbols, pictorial and aerial views to **DRAW** environments and a production drawing to **EXPLAIN** design ideas.





## Step 2: Explore how cotton, timber and wool are produced

### RESEARCH TASK: PART 2



**EXPLAIN** to the students that their task is to start researching. Invite students in pairs to initiate their **RESEARCH**, decide on the sector to investigate and **REVIEW** resources to explain where a fibre type comes from, how the primary producer or forester produces the fibre type and the technologies and systems they use to then process, distribute and transport products before they reach us as the consumer. Ask students to **RECORD** information about each source used.

See: **Resource 1.1** to support student investigations or use a Bibliography Framework at: [http://www.globaleducation.edu.au/verve/\\_resources/bibliography\\_frame.pdf](http://www.globaleducation.edu.au/verve/_resources/bibliography_frame.pdf)



Ask pairs to **CONSIDER** the following resources as a starting point and **RECORD** information for each one.

If researching **cotton production**, consider:

- The Australian Cotton Story  
This is a video explaining the basics of cotton farming and how it produces the products we use each day. It includes sections on farm families that produce cotton and each step of the production process from pre-planting of the cotton seeds, to growing the crop to spinning and manufacturing and exporting it overseas. The section on crop maintenance includes information pest management. The section on processing of cotton describes how textiles and cotton seed oil are made from cotton. The resource also includes overseas production rates of growing cotton.  
Link: <http://youtu.be/cbKh1Xtfmao>
- I Grow Cotton and You Wear It  
This is a video about a young cotton farmer. It includes sections on the farm; what it raises and produces; the cotton planting process; watering process; water efficiency; pest and weed control and picking cotton. It also includes sections on cattle, canola and wheat farming.  
Link: <http://youtu.be/2yEpXeBVVg4>
- Cotton Education Kit  
This is a downloadable interactive pdf file that is interactive and tablet friendly. It includes an overview and history of cotton, where it is grown, cotton products, facts and figures, details on growing cotton and processing it after harvest. It includes interactive links to lesson plans, fact sheets, case studies, blogs, reports, videos and charts.  
Chapter 1: The Australian Cotton Industry  
Chapter 2: A Sustainable Cotton Industry  
Chapter 3: The History of Cotton  
Chapter 4: The Cotton Plant (stages in its growth and life cycle)  
Chapter 5: How Cotton is Grown  
Chapter 6: The Business of Cotton Farming  
Chapter 7: Processing from Gin to Fabric  
Chapter 8: Cotton as a Competitive Commodity  
Chapter 9: Cotton as a Consumer Product  
Chapter 10: Cotton Careers  
Link: [http://cottonaustralia.com.au/uploads/resources/Cotton\\_Australia\\_Education\\_Kit\\_-\\_Secondary.pdf](http://cottonaustralia.com.au/uploads/resources/Cotton_Australia_Education_Kit_-_Secondary.pdf)

Review where a fibre type comes from, how the primary producer or forester produces the fibre type and the technologies and systems they use to then process, distribute and transport products before they reach us as the consumer.



## Step 2: Explore how cotton, timber and wool are produced

Learn about what makes the cotton farm sustainable, efficient and prosperous.

- **Interview with Andrew Watson, 2008 Cotton Grower**  
This is a video interview with one of the cotton industry's innovative cotton farmers. It includes sections on learning what makes the cotton farm sustainable, efficient and prosperous. It includes sections on the farm's philosophy; use of integrated pest management; regeneration of bushland; water use efficiencies; production rates and cost benefits.  
Link: [http://www.youtube.com/watch?v=MYiPPAw\\_d0s&list=UUcTsQcz7PRPX1bJ3J3ORvg&index=28](http://www.youtube.com/watch?v=MYiPPAw_d0s&list=UUcTsQcz7PRPX1bJ3J3ORvg&index=28)
- **How to Grow a Pair of Jeans**  
This is an online resource about cotton production and processing. It includes sections on each step of the production process from pre-planting of the cotton seeds, to growing the crop to spinning and manufacturing jeans. The section on crop maintenance includes information about effective watering regimes and integrated pest management. The section on processing of cotton describes how textiles and cotton seed oil are made from cotton. The resource also includes photos of each stage of the production and processing stages.  
Link: <http://cottonaustralia.com.au/cotton-classroom/grow-a-pair-of-jeans>
- **Cotton Australia Fact Sheets**  
This is a suite of 17 fact sheets about cotton. It includes sections on Australian Cotton History; the Australian Cotton Industry; Biodiversity; Biotechnology; Climate Change; Properties and Products; Cotton's Growing Cycle; Cotton Facts; myBMP; Water use; Processing, Exporting and Marketing; Research, Technology and Innovation; the Cotton Plant; the Economics of Cotton in Australia; the World Cotton Market; Water and World Cotton History.  
Link: <http://cottonaustralia.com.au/cotton-library/fact-sheets>
- **The Australian Cotton Production Manual**  
This is a publication about cotton production practices. It includes sections on the cotton industry; cotton plant and its physiology; cotton production; cotton for profit; better farming futures; cotton for the customer and the business of cotton.  
Link: [http://crdc.com.au/?post\\_type=publication&p=3078](http://crdc.com.au/?post_type=publication&p=3078)
- **Cotton Australia's Blog Archive**  
This Blog Archive contains a range of stories about cotton production.  
Link: <http://cottonaustralia.com.au/blog/P60%20Cotton%20for%20Generations%20to%20Come>
- **Cotton for generations to Come by Ben Eagan**  
This is a video about a young man and his desire and passion to grow cotton. The video explains each step involved in the production of cotton and the practices used on the farm.  
Link: <http://www.youtube.com/watch?v=vDR8c3hzm3w>
- **Myer ad for Dri Glo towels**  
This video is about Dri-Glo towels, towels woven in Australia using Australian cotton grown by a farmer in St George. It features interviews with the weaving company and the grower.  
Link: <http://www.youtube.com/watch?v=SAh-thWQaI8>



## Step 2: Explore how cotton, timber and wool are produced

If researching **wood and timber production**, consider:

- Going Bush – Various demand for plantation and native forests  
This is a video about the use and value of native and plantation forests. It includes sections on the role they play providing a valuable source of materials and products; the way timber is sourced from forests; the contributions and benefits of plantation and native forests; types of forests including hardwood, softwood and plantation forests; pine plantations; sustainable timber production and the management of forests. The section on pine plantations includes the many uses of radiate pine and the use of herbicides and pesticides. The resource also includes interviews with experts in the industry sector.  
Link: <http://forestlearning.edu.au/find-a-resource/article/28/going-bush-various-demand-for-plantation-and-native-forests.html>
- Going Bush – South Australia's pine tree experts  
This is a video about South Australian plantation forests. It includes sections on the geographical location of plantation forests in South Australia; the oldest planted forests in South Australia; the history of the plantation industry; plantation species; selective breeding; the science of growing pine trees; selective breeding; innovative harvesters and high tech management processes in the industry. The resource also includes interviews with experts in the industry sector.  
Link: <http://forestlearning.edu.au/find-a-resource/article/33/going-bush-south-australia-s-pine-tree-experts.html>
- Going Bush – Residue from the one tree goes to make fine copy paper  
This is a video about the production of copy paper. It includes sections on timber as the product produced from trees grown in plantation forests; the processes involved in producing copy paper; the role of sawdust and pulp residue in making electricity; the use of low grade logs to produce useable products and plantation management. This resource also includes interviews with experts in the industry and forestry sectors.  
Link: <http://forestlearning.edu.au/find-a-resource/article/34/going-bush-residue-from-the-one-tree-goes-to-making-fine-copy-paper.html>
- Plantations and farm forestry  
This is a fact sheet about plantations and farm forestry.  
Link: [http://www.pir.sa.gov.au/\\_data/assets/pdf\\_file/0019/125083/Fact\\_Sheet\\_19\\_Farm\\_Forestry\\_Contributing\\_to\\_Natural\\_Resource\\_Management.pdf](http://www.pir.sa.gov.au/_data/assets/pdf_file/0019/125083/Fact_Sheet_19_Farm_Forestry_Contributing_to_Natural_Resource_Management.pdf)

If researching **wood production** in particular the **timber family based industries** consider:

- Going Bush - A biodiversity melting pot in northern New South Wales  
This resource is a video about the challenges of forest management, biodiversity and timber production.  
Link: <http://forestlearning.edu.au/find-a-resource/article/23/going-bush-a-biodiversity-melting-pot-in-northern-nsw.html>
- Going Bush – Innovative ways of keeping the home fires burning  
This resource is a video about innovation in the timber industry. It includes sections on a manufacturing pellet mill that turns waste into pellets; the manufacturing process; pellet heaters versus wood heaters; engineered wood products; environmental advantages and rayon production for clothing. The resource also includes interviews with experts in the industry sector.  
Link: <http://forestlearning.edu.au/find-a-resource/article/35/going-bush-innovative-ways-of-keeping-the-home-fires-burning.html>

Native and plantation forests... the role they play providing a valuable source of materials and products; sustainable timber production and the management of forests.



Business challenges in the forestry industry on producers; business management; the production of high quality timber products; products from plantation forests; and innovation in timber production.

If researching **wool production** in particular the **wool industries** consider:

- Australian Wool Innovation Limited  
This is a website about Australian wool, production systems and practices.  
Link: <http://www.wool.com>
- Wool harvesting and quality preparation  
This website contains information about wool production.  
Link: <http://www.wool.com/on-farm-research-and-development/wool-harvesting-and-quality-preparation/>
- The Virtual Farm  
This is an interactive digital learning object that contains video vignettes and supporting fact sheets on three farms in Australia, their farm families, farming practices, challenges and management techniques.  
Link: <http://virtualfarm.mla.com.au/>
- 2012 Wool Young Farming Champion  
This is a video about a young sheep farmer in Australia who talks about the value of producing wool.  
Link: [http://www.youtube.com/watch?v=d\\_\\_P3sCGihQ](http://www.youtube.com/watch?v=d__P3sCGihQ)
- 2013 Wool Young Farming Champion  
This is a video about a young woman and her desire and passion to farm sheep and produce wool. The video explains each step involved in the production of wool.  
Link: <http://www.youtube.com/watch?v=68FFxoNj4vE>
- Plain Paddocks Lamb  
This is a story about sustainable farming practices to produce merino wool and lamb meat.  
Link: <http://www.target100.com.au/Farmer-stories/Anna-Kelly-Plains-Paddock-Lamb>
- Sustainable Farming  
This is a YouTube video about some of the sustainable practices undertaken on a sheep farm.  
Link: [http://www.youtube.com/watch?v=zT2IS2pHf\\_A&list=TLfBnwQBan3nkLsx2iuG2eJ1Ad\\_NI1PRG8](http://www.youtube.com/watch?v=zT2IS2pHf_A&list=TLfBnwQBan3nkLsx2iuG2eJ1Ad_NI1PRG8)
- Target 100 YouTube Channel  
This is a dedicated YouTube Channel with videos about sustainable sheep and cattle farming and production.  
Link: <http://www.youtube.com/Target100AUS>





## Step 2: Explore how cotton, timber and wool are produced

### Framing questions and actions

Encourage the students to **REFINE** their questions and **CLARIFY** how their investigations will be conducted. For example:

In pairs, **FORMULATE** possible lines of inquiry or investigation by:



- **LISTING** and **CATEGORISING** all information related to their investigation under headings – where cotton, wood and wool comes from; how primary producers produce cotton, wool or wood; how primary producers and foresters have produced cotton, wood or wool in the past; the different technologies, systems and practices used to produce cotton, wood and wool.



- Preparing a table to **OUTLINE** information that needs to be gathered, who is responsible, and where they will seek information, and how it will be gathered.



**ASK** questions like:

- Where might cotton, timber and wool come from?
- What is happening in these places?
- Are the practices overseas as sustainable as those used in Australia?
- Could these places be anywhere else?
- How are cotton, timber and wool produced here?
- What different technologies and systems are used?
- How are these places affected by seasons or climate? By lack of water? By water quality issues? By pests, weeds and diseases? By bushfires, droughts, floods, cyclones, storms?
- How are primary producers and foresters adapting the production systems and technologies used to the environmental issues and changes being experienced?
- What changes to the production system and technologies used could science influence?



**RECORD** all information for later use. **REFLECT** on what has been learned in the student's learning log.

How are primary producers and foresters adapting the production systems and technologies used to the environmental issues and changes being experienced?



## Step 2: Explore how cotton, timber and wool are produced

A food or fibre system is made up of the environment, people, institutions and processes by which agricultural (including cotton, timber and wool) products are produced, processed and brought to consumers.

### RESEARCH TASK: PART 3

Revisit the meaning of the term 'fibre systems' with students.

*'A food or fibre system is made up of the environment, people, institutions and processes by which agricultural (including cotton, timber and wool) products are produced, processed and brought to consumers.'*



**TALK** about who has been able to **COLLECT** and **RECORD** information about the system and technologies used to produce, process and bring the product to consumers; and their chosen sector's management practices. Invite those students to **SHARE** preliminary findings with the class.



As a class **DRAW** flow charts to describe the processes used.



See: [http://www.globaleducation.edu.au/verve/\\_resources/bibliography\\_frame.pdf](http://www.globaleducation.edu.au/verve/_resources/bibliography_frame.pdf) for a flowchart template.

### Global, national, regional and local fibre production systems

Much has been written about both small-scale and large-scale farming and forestry systems.



Invite students to **CONSIDER** both in their chosen sector and **ASK** questions like:

- What fibre systems do we need to support people's needs across the world?
- What fibre systems are not needed to support people's needs across the world? e.g. destruction of forests for palm oil
- If we know about fibre production systems that lead to the long-term health of populations, ecosystems and environmental quality, why don't we use them in all instances?
- Are we going to rely on sustainable fibre systems more or less in the future?
- What answers might there be to meeting the challenge of efficient, well managed and sustainable fibre production systems?



**TALK** with students about the fact that our global population is rising at a fast rate and that by 2050 it is predicted that we will need to clothe, provide shelter and fibre products to a global population of 9.6 billion people.

Talk with the students about how we might achieve the goal of supporting so many people worldwide and where efforts should be directed.



**TALK** about whether efforts should be directed at both small-scale farming systems that primarily meet local and regional demands and large-scale systems that meet global and national demands.



**VIEW** and **READ** case studies about how many global communities with aid support are improving their security with the sustainable production of fibres.

See: Better Cotton Initiative Stories from Pakistan

<http://bettercotton.org/about-better-cotton/stories-from-the-field/>



## Step 2: Explore how cotton, timber and wool are produced



See: Batik Cooperative in Indonesia

<http://www.globaleducation.edu.au/case-studies/batik-cooperative-empowers-women.html>

See: Reversing desertification in China

<http://www.globaleducation.edu.au/case-studies/reversing-desertification-in-china.html>

See: Silk tais production in Timor-Leste

<http://www.globaleducation.edu.au/case-studies/silk-tais-production-in-east-timor.html>

See: Sustainable living from logged forests in Papua New Guinea

<http://www.globaleducation.edu.au/case-studies/sustainable-living-from-logged-forests-in-papua-new-guinea.html>



**RECORD** understandings about both small-scale farming systems that primarily meet local and regional demands and large-scale systems that meet global and national demands in student's learning logs.

Understand how small-scale farming systems primarily meet local and regional demands and large-scale systems meet global and national demands.

# Step 3: Explain different production systems and their effects

## Purpose

To provide students with opportunities to:

- describe existing methods and technologies used by primary producers and foresters to produce cotton, wood and wool
- explore the consequences of production systems and technologies used by primary producers and foresters to produce their products
- explore the concept of offshore manufacturing and its relevance to fibre products
- develop the skills of discussion, negotiation, critical thinking and analysis of multimedia material
- create a number of consequence wheels
- write a narrative
- construct a storyboard.

## Approaches to producing cotton, timber and wool

Invite students to **DEVELOP** a 'consequence wheel' to **EXPLORE** the consequences of decisions and choices primary producers and foresters make relating to the production of their products.

Ask students to **FOCUS** on the methods and technologies used.

For example, if researching **cotton production**, **DEVELOP** a consequence wheel about the methods used to grow and produce cotton including using biotech vs conventional crops, crop rotations, integrated pest management vs reliance on one means of controlling pests, precision farming techniques, water use monitoring, assessment and evaluation practices and integrated weed management.



**LEARN** more about what happens on cotton farms at:

<http://www.youtube.com/watch?v=2yEpXeBVVg4>

<http://www.youtube.com/watch?v=vDR8c3hzm3w>

<http://youtu.be/cbKh1Xtfmao>

<http://www.youtube.com/watch?v=SAAn-thWQal8>

<http://youtu.be/QRwCRGopwHE>



**CHECK OUT** myBMP. This is a web-based system that sets out best practice farming techniques with progress recorded, monitored and audited in 11 key areas of farm operations. It includes sections on soil health; water management and biotechnology.

See: <https://www.mybmp.com.au/home.aspx>



**LEARN** more about the benefits of BMP for farmers and the Australian cotton industry at: <http://youtu.be/E2WE7vmxxCw> and

<http://youtu.be/QgXPMFR6nqY>



**CHECK OUT** the Australian Cotton Water Story. This digital publication brings together the breadth of cotton water related research and development involving cotton plants, fields, farms, catchments and communities. It provides a practical insight into how the 40 percent increase in cotton water productivity has been achieved over the last decade and the research being undertaken and technologies being used to ensure that improvement targets are met going forward.

See: <http://tinyurl.com/ohx6o83>

If researching **timber production**, **DEVELOP** a consequence wheel about by what methods species are grown to produce logs for sale and what technologies are used. For example, consider plantations of trees, both softwood and hardwood species and shelterbelts which are managed to produce wood.



**LEARN** more about the Farm Forestry developments at:

<http://www.daff.gov.au/forestry/australias-forests/plantation-farm-forestry> and

[http://www.farmforestline.com.au/pages/1.1\\_what.html](http://www.farmforestline.com.au/pages/1.1_what.html)

If researching **plantations or native forests** which are planted to produce wood, **DEVELOP** a consequence wheel about by what methods species are grown to produce logs for sale and what technologies are used.



**LEARN** more about plantations at:

<http://forestlearning.edu.au/find-a-resource/article/28/going-bush-various-demand-for-plantation-and-native-forests.html> and

<http://www.forestlearning.edu.au/useful-info/related-websites>



## Step 3: Explain different production systems and their effects

If researching **wool production** and practices and technologies used, **DEVELOP** a consequence wheel about either the use of mustering; shearing; classing the fleece; pressing the wool or practices that are used to grow and raise the sheep and produce wool for consumers.



**LEARN** more about what sheep are grown for wool and by what methods at: <http://www.wool.com/on-farm-research-and-development/sheep-health-welfare-and-productivity/> and <http://www.youtube.com/watch?v=68FFxoNj4vE>

Before developing the consequence wheel, **BRAINSTORM** the types of issues the class thinks might be associated with the technologies used or not used in the ways cotton, wood and wool are farmed, harvested and then turned into products.



**CONSIDER** issues like:

- Water management.
- Animal welfare.
- Management of soils and groundcovers.
- Ethical farming and forestry.
- Use of precision farming techniques.
- Maintaining sustainable forest management practices.
- Unpredictable nature of natural hazards.
- Insect attack, disease and fire damage.
- Land management.
- Use of fertilisers and pesticides.
- Breeding programs.



**READ** more about the issues impacting on the forestry industry read the Risk Analysis of the Australian Timber industry. <http://www.daff.gov.au/SiteCollectionDocuments/abares/publications/clientreports/risk-analysis.pdf>

**READ** more about the issues affecting the sheep industry at: <http://www.target100.com.au/The-Issues>

These issues also affect other primary producers too.

To develop a consequence wheel the issue is written in the centre of a sheet of paper and a series of concentric circles are then drawn lightly around it. The first question asked is “What are the immediate consequences?” See **Resource 1.2** for an example.



Ask groups to **DISCUSS** what the repercussions might be and briefly **WRITE** them around the first circle. Ask groups to **LINK** each statement to the central point by a single line. Next, students **DISCUSS** what consequences may follow on from the first ones. Following on, third and fourth order consequences can be explored and marked in a similar way.



**SHARE** consequence wheels and **EXPLORE** the difference between intended and unintended consequences for a range of issues.

Brainstorm issues that might be associated with the technologies used or not used in the ways cotton, wood and wool are farmed, harvested and then turned into products.



Imagine the fibre's journey from the time it is planted or born to the moment it is placed into a customer's possession.



Encourage the students to **ASK** critical questions of one another's work. For example:

- What do you feel, hope and fear in relation to this particular issue?
- Do you think everybody agrees?
- Why might other people think and feel differently?
- How did the issue come about?
- Who do you think influenced your opinions?
- Who gains and who loses?
- Who has power in this situation and how do they use it?
- Is it used to the advantage of some and to the disadvantage of others?
- How do you feel students in schools should respond to such issues?
- What values can we use to guide our choices in the way the animals and plants are farmed or grown, harvested, used, managed and produced?
- What are the possible courses of action open to primary producers and foresters?
- What are the technologies available to primary producers and foresters?
- What are others already doing?
- How might the industries work together?
- Whose help might they need?
- How do we measure their success?

*(Adapted from 'Education For The Future – a practical classroom guide', D. Hicks, World Wildlife Fund, 1994, page 10)*

### Learn more about the miles travelled



Ask students to **THINK** of the fibre type they are researching. Explain that they are to **WRITE** a narrative of how they'd imagine the fibre type's journey from the time it is planted or born to the moment it is placed into a customer's possession. This narrative should include an estimation of how long the process would take, e.g. 'From the farm or forest to the processing plant, the trip would take... days by road'.

Point out that sustainable options must consider:

- Where is the plant or animal grown.
- What inputs might be needed to grow the plant or animal.
- How the fibre sources are harvested.
- How the fibres or logs are transported and stored.
- How the fibres or logs are processed, manufactured or prepared.
- How the final products are packaged and what fibres are used in the packaging.
- How the fibre source products are displayed.
- How the information about the sustainability of the products is displayed on the products
- How the packaging is expected to be handled after use.



## Step 3: Explain different production systems and their effects

### Decide on what to present and how to do so



Invite students to begin **VISUALISING** their own work sample that includes a design of the production processes used by their chosen sector, inclusive of the student's own ideas and options for making a change to the production processes that enhance its sustainability. Students are to produce an annotated concept **SKETCH** or drawing using technical terms, scale, symbols, pictorial and aerial views to draw environments and a production drawing to explain design ideas.



**BRAINSTORM** the Web 2.0 tools available today that might assist. Check out:

- Google SketchUp <http://sketchup.google.com/download> a 3D modelling software.
- Flickr [www.flickr.com](http://www.flickr.com) a database for images and videos.
- PicArtia [www.makeuseof.com/dir/picartia](http://www.makeuseof.com/dir/picartia) where you can create photo mosaics.
- Google Earth <http://earth.google.com> where you can locate places.
- Google Maps <http://maps.google.com> where you can find places of interest.
- Glogster [www.glogster.com](http://www.glogster.com) where you can mash up media.
- Voice Thread <http://voicethread.com> where you can upload video, record audio, add still images and create a digital story.



**RE-STATE** the purposes of the investigation and ask students to **CONSIDER** how they are going to bring their information together and present it so that the main points come across clearly. **MODEL** the construction of the storyboard genre. Students now use the information they have gathered to construct a storyboard for the research being undertaken.

See: <http://www.slideshare.net/slayas/storyboard-genre-ideas> for ideas.

### Bringing it all together

Focus student's attention on:

- What we know.
- What we want to find out.
- What the class now knows.
- What other things we would like to find out.

Use 'What we know' as a source for class, small group discussion and use other prompts to plan the way forward.

See: <http://office.microsoft.com/en-au/templates/kwlh-chart-TC101887896.aspx>

Student's visualise ideas and options for making a change to the production processes that enhance sustainability.



## Step 4: Elaborate on concepts and ideas

### Going further in understanding production systems

#### Purpose

To provide students with opportunities to:

- explore approaches that primary producers and foresters are taking for improving production systems
- research how primary producers and foresters have produced fibres and how their actions are influenced by increases in scientific knowledge and developments in technology
- identify the environmental, social, economic and political factors that influence the ways in which primary industry's production practices might impact or affect the farm or forest, its products, budgets and consumer's perceptions
- apply what they have learned and plan how to communicate the fibre production system to an audience
- plan their presentation about their chosen fibre production system
- share investigation findings.

#### The challenge ahead

The challenge for the 21st Century is to develop fibre production systems in a way that will support rural communities, enhance yields, utilise inputs effectively (especially water and any added nutrients), minimise environmental impacts and provide quality cotton, timber and wool for people to use.

**EXPLAIN** to the students that they will be **EXPLORING** approaches that primary producers and foresters are taking for reducing environmental impacts and sustainability managing fibre production systems and animal welfare as well as adapting to climate change, in the next sequence of activities.

#### New approaches



Invite students to **SEARCH** through electronic and print media such as YouTube videos, the web, newspapers and magazines for contemporary information that include ideas about how primary producers or foresters in their chosen sector might be required to or have developed new approaches to manage environmental impacts, utilise inputs effectively, enhance yield growth, manage pests and diseases or manage climate related risks.



Suggest they can go online and **SEARCH** through:

- CSIRO's Ecos magazine at: <http://www.ecosmagazine.com/>
- An ABC news report about water efficiency in the cotton industry at: <https://www.youtube.com/watch?v=QRwCRGopwHE>
- An ABC news report about 'green' cotton at: <https://www.youtube.com/watch?v=QgXPMFR6nqY>
- Target 100's Farmer Stories at: <http://www.target100.com.au/100-Initiatives>
- Young Farming Champions videos at: <http://www.art4agriculture.com.au/yfc/yfc2013.html>
- Braidwood farmers carrying out sustainability improvements on video at: [http://www.youtube.com/watch?v=W6ilho4\\_aYY&list=UU7JiYqky3cUgBg06dPmOYbQ](http://www.youtube.com/watch?v=W6ilho4_aYY&list=UU7JiYqky3cUgBg06dPmOYbQ)
- Monaro graziers adopting sustainable ways of grazing sheep and cattle on their properties on video at: <https://www.youtube.com/watch?v=tb4gGypBoFw>
- What is sustainable forestry at: <http://www.forestlearning.edu.au/forests-sustainability/sustainable-forest-management>



Ask students to **SEARCH** through the sources for one or two key messages that summarise the angle of the item. **DISCUSS** whether they think the sources reflect a positive theme (i.e. beneficial approaches, discoveries, communities coming together) or a negative theme (i.e. drought, environmental degradation, increasing costs).





## Step 4: Elaborate on concepts and ideas



**ASK** students to address the following points about their source(s):

- Who are the people involved?
- What impacts – environmental, social, economic, cultural, and political – might result from the story in the source material?
- How might those impacts affect meat, seafood and fish products in the future?

### Compass rose



**TALK** with the students about how all ideas, approaches, methods, processes and actions, or lack of them, carry a range of implications. Some can affect places/environment, people/society, economies and policies.



Then, **DRAW** a compass in the centre of the class's board, use **Resource 1.3** or access compass images from: <https://www.google.com.au/search?q=compass+rose+worksheet&hl=en&prmd=imvns&tbn=isch&tbo=u&source=univ&sa=X&ei=pBzUKa7LMitiAeH4YCYAQ&sqi=2&ved=0CC0QsAQ&biw=1270&bih=544> or [http://www.globaleducation.edu.au/verve/\\_resources/dev-compassrose.pdf](http://www.globaleducation.edu.au/verve/_resources/dev-compassrose.pdf)

Instead of naming the four compass points north, south, east and west use:

- **N**atural environment/ecological questions.
- **S**ocial and cultural questions.
- **E**conomic questions.
- **W**ho decides? Who benefits? i.e. political questions.

*Note: Diagonal points represent relationships between the four main points. For example, North East depicts ideas and questions about how economic considerations might impact on natural environments; South East depicts ideas and questions about economic considerations and people's lives.*



Using this 'compass' in nominated groups, **IDENTIFY** the environmental, social, economic and political factors that influence the ways in which the group's chosen primary industry's or forestry production practices might impact or affect the farm or forest, its fibre products, budgets and consumer's perceptions.



Alternatively use a flow chart to **LIST** a series of events that might happen, sequentially as a result of the production practice. Other boxes could be added to show related events.

See: [http://www.globaleducation.edu.au/verve/\\_resources/flow\\_chart.pdf](http://www.globaleducation.edu.au/verve/_resources/flow_chart.pdf) for a template to use.

Identify the environmental, social, economic and political factors that influence production practices.



There have been many changing farming and forestry methods due to increases in scientific knowledge and developments in technology.

### RESEARCH TASK: PART 4

Remind students that part of their research is to **SUGGEST** ways to improve the production practices or operations so that they are more sustainable.

There have been many changing farming and forestry methods due to increases in scientific knowledge and developments in technology. Ask students to **REFLECT** on the sources read or viewed and reflect if any increases in scientific knowledge and developments in technology were highlighted.

### Reflect on research



Ask students to **CONSIDER** how they are going to bring their information together and **PRESENT** it so that the fibre production system and practices involved in producing, processing and bringing their chosen fibre to consumers can be communicated to an audience at the school, within the local community or via social media outlets like YouTube.



As a class **LIST** the main processes involved and the main messages to be given about cotton, timber and wool and their fibre production system and decide on ways to share this information.

Ask students to decide on a way of **REPRESENTING** the processes and main messages, data and research collected from their investigations about fibre production systems.

### Going further with the preparation of the presentation



Invite students to confirm the idea planned for their presentation that includes a **DESIGN** of the production processes used, inclusive of the student's own ideas and options for making a change to the production processes that enhance its sustainability. In small groups, **DISCUSS**



the possible ways to present the chosen fibre production system in an interesting and engaging format.



Ask students to create a final plan for completing the presentation. Students may need to **DOCUMENT** their key messages, create an image bank and collate references and acknowledgements for their work sample. Invite them to summarise these and the learning achieved in their learning log.

### Review and submit



Invite students to **REVISE** and **FINE-TUNE** their presentation. **CONSIDER** hosting a series of student presentations to showcase the students' work to the school community and beyond.



## Step 4: Elaborate on concepts and ideas

### Edward de Bono's Six Thinking Hats

Invite students to **EXPLORE** any issues raised during their investigations into current cotton, timber and wool production practices, using Edward de Bono's Six Thinking Hats technique. In six groups, students discuss and document the issues according to the perspective of their assigned hat and then come together to share ideas.

#### Red Hat

##### Feelings

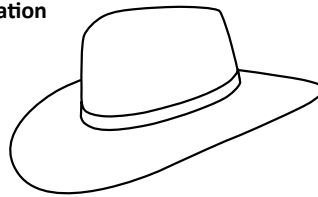


What are the emotions and feelings associated with a fibre production system.

How do you feel?

#### White Hat

##### Information



List the facts that you know about present fibre production systems and how it affects the environment.

#### Blue Hat

##### What thinking is needed?



What has happened so far?

What should happen next?

What questions should we consider?

#### Green Hat

##### New ideas



How could the problems related to fibre production systems be solved?

What needs to be done?

#### Black Hat

##### Weaknesses



What are some of the negative aspects and outcomes of seeking new fibre production systems?

#### Yellow Hat

##### Strengths



What are some of the positive aspects and outcomes of seeking new fibre production systems?

### Share investigations

*Note: This is a suggested assessment activity.*

Encourage students to **SHARE** their investigation with other classes or **CREATE** a display of findings within the school or a community venue.



## Step 5: Evaluating

### Think back and evaluate

#### Purpose

To provide students with opportunities to:

- reflect on their own learning
- collate data for assessment.

To provide teachers with:

- insights into students' understanding and attitudes, as well as their perceptions of their own strengths and weaknesses.

#### Learning log

**PROVIDE** students with a set of focus questions for their writing:

- Write about something new you learnt in this unit in particular ways primary producers produce cotton, timber and wool.
- What is one thing I have learned about my own values when it comes to producing fibres?
- How might I help others know more about how the cotton, timber and wool industries are producing fibres in systems that are reducing impacts for the benefit of the animals and plants involved and the environment and its resources?
- What have I learned about technologies, innovation and sustainable fibre production systems?
- What have I learned about offshore manufacturing and how much fibre travels before it is used in Australia?
- What have I learned about the increases in scientific knowledge and developments in technology for cotton, timber and wool production?
- What would I still like to find out about the ways cotton, timber and wool are produced, processed and brought to consumers?
- How well did I/we participate in any group/class learning activities?
- What questions do you have about the topic at the moment?
- What piece of work am I most satisfied with?

# References

- Australian Academy of Science (2005) *Primary Connections*, Canberra, Australia.
- Cecil, N. (1995) *The Art of Inquiry: questioning strategies for K-6 classrooms*, Peguis, Canada.
- Cross, J. (1994) *Long ago and far away: Activities for using stories for History and Geography at Key Stage 1*. Development Education Centre, Birmingham.
- De Bono, E. (1992) *Six Thinking Hats for Schools, Books 1 & 2*, Hawker Brownlow Educational.
- Doessel, S. (1995) *The Seventh Generation*, Brisbane, Australia.
- Gardner, H. (1985) *Frames of Mind: the theory of multiple intelligences*, Basic Books, New York.
- Hamston, J. and Murdock, K. (1996) *Integrating Socially: units of work for social education*, Eleanor Curtin, Melbourne.
- Hicks, D. (1994) *Education For The Future – a practical classroom guide*, World Wildlife Fund.
- Hill, S. and Hill, T. (1990) *The Collaborative Classroom*, Eleanor Curtin, Melbourne.
- The Gap (1994) Issue 5, Global Education Centre, Adelaide.
- Wilks, S. (1992) *Critical and Creative Thinking: strategies for classroom inquiry*, Eleanor Curtin, Melbourne.

## Websites (viewed February 2015)

This is a list of websites used in this unit for teacher use. As content of the websites used in this unit is updated or moved, hyperlinks may not always function.

Art 4 Agriculture. The 2013 Young Farming Champions

<http://www.art4agriculture.com.au/yfc/yfc2013.html>

Australian Curriculum, Assessment and Reporting Authority. Australian Curriculum

<http://www.australiancurriculum.edu.au>

Australian Forestry Standard

<http://www.forestrystandard.org.au/>

Australian Government Department of Agriculture

<http://www.agriculture.gov.au/forestry>

<http://www.agriculture.gov.au/forestry/australias-forests/plantation-farm-forestry>

<http://www.daff.gov.au/SiteCollectionDocuments/abares/publications/clientreports/risk-analysis.pdf>

Australian Wool Innovation Limited

<http://www.wool.com/on-farm-research-and-development/sheep-health-welfare-and-productivity/>

<http://www.wool.com/on-farm-research-and-development/wool-harvesting-and-quality-preparation/>

Better Cotton Initiative

<http://bettercotton.org/about-better-cotton/stories-from-the-field/>

BComp

<http://www.bcomp.ch/10-0-natural-fibres.html>

Commonwealth of Australia Global Education Website

[http://www.globaleducation.edu.au/verve/\\_resources/bibliography\\_frame.pdf](http://www.globaleducation.edu.au/verve/_resources/bibliography_frame.pdf)

<http://www.globaleducation.edu.au/case-studies/batik-cooperative-empowers-women.html>

<http://www.globaleducation.edu.au/case-studies/silk-tais-production-in-east-timor.html>

<http://www.globaleducation.edu.au/case-studies/sustainable-living-from-logged-forests-in-papua-new-guinea.html>

[http://www.globaleducation.edu.au/verve/\\_resources/dev-compassrose.pdf](http://www.globaleducation.edu.au/verve/_resources/dev-compassrose.pdf)

[http://www.globaleducation.edu.au/verve/\\_resources/flow\\_chart.pdf](http://www.globaleducation.edu.au/verve/_resources/flow_chart.pdf)

Cotton Australia

<http://cottonaustralia.com.au/cotton-library/fact-sheets>

[http://cottonaustralia.com.au/uploads/resources/Cotton\\_Australia\\_Education\\_Kit\\_-\\_Secondary.pdf](http://cottonaustralia.com.au/uploads/resources/Cotton_Australia_Education_Kit_-_Secondary.pdf)

<http://cottonaustralia.com.au/blog/P60%20Cotton%20for%20Generations%20to%20Come>

<http://cottonaustralia.com.au/cotton-classroom/grow-a-pair-of-jeans>

Cotton Catchment Communities Co-operative Research Centre

<http://tinyurl.com/ohx6o83>

Cotton Research Development Corporation

[http://crdc.com.au/?post\\_type=publication&p=3078](http://crdc.com.au/?post_type=publication&p=3078)

Creative Commons

<http://creativecommons.org/licenses/by-nc-sa/3.0/au/>

## References

CSIRO

<http://www.ecosmagazine.com/>

Farm Forest Line

[http://www.farmforestline.com.au/pages/1.1\\_what.html](http://www.farmforestline.com.au/pages/1.1_what.html)

Flickr

[www.flickr.com](http://www.flickr.com)

Forest Learning

<http://forestlearning.edu.au/>

<http://forestlearning.edu.au/find-a-resource.html>

<http://forestlearning.edu.au/about/forest-information.html>

<http://forestlearning.edu.au/links.html>

Forest Learning. Going Bush – A biodiversity melting pot in northern New South Wales

<http://forestlearning.edu.au/find-a-resource/article/23/going-bush-a-biodiversity-melting-pot-in-northern-nsw.html>

Forest Learning . Going Bush – Innovative ways to keep the home fires burning

<http://forestlearning.edu.au/find-a-resource/article/35/going-bush-innovative-ways-of-keeping-the-home-fires-burning.html>

Forest Learning. Going Bush – Residue from the one tree goes to make fine copy paper

<http://forestlearning.edu.au/find-a-resource/article/34/going-bush-residue-from-the-one-tree-goes-to-making-fine-copy-paper.html>

Forest Learning. Going Bush – South Australia’s pine tree experts

<http://forestlearning.edu.au/find-a-resource/article/33/going-bush-south-australia-s-pine-tree-experts.html>

Forest Learning. Going Bush – Various demands for plantation and native

<http://forestlearning.edu.au/find-a-resource/article/28/going-bush-various-demand-for-plantation-and-native-forests.html>

Forest Stewardship Council

<http://au.fsc.org/>

Glogster

<http://www.glogster.com>

Google

Google Earth <http://www.google.com/earth/>

Google Images

<https://www.google.com.au/search?q=compass+rose+worksheet&hl=en&prmd=imvns&tbn=isch&tbo=u&source=univ&sa=X&ei=plBzUKa7LMitiAeH4YCYAQ&sqi=2&ved=0CC0QsAQ&biw=1270&bih=544>

Google Maps <https://www.google.com.au/maps?source=tldsi&hl=en>

Meat and Livestock Australia

<http://virtualfarm.mla.com.au>

MyBMP

<https://www.mybmp.com.au/home.aspx>

Microsoft

<http://office.microsoft.com/en-au/templates/kwlh-chart-TC101887896.aspx>

National Farmers’ Federation

<http://www.nff.org.au/commodities-wool.html>

<http://www.nff.org.au/farm-facts.html>

PicArtia

[www.makeuseof.com/dir/picartia](http://www.makeuseof.com/dir/picartia)

Primary Connections

<http://www.primaryconnections.org.au/about/teaching>

Primary Industries and Regions South Australia

[http://www.pir.sa.gov.au/\\_data/assets/pdf\\_file/0019/125083/Fact\\_Sheet\\_19\\_Farm\\_Forestry\\_Contributing\\_to\\_Natural\\_Resource\\_Management.pdf](http://www.pir.sa.gov.au/_data/assets/pdf_file/0019/125083/Fact_Sheet_19_Farm_Forestry_Contributing_to_Natural_Resource_Management.pdf)

Slideshare

<http://www.slideshare.net/slayas/storyboard-genre-ideas>

### Sketchup

<http://www.sketchup.com/download>

### Target 100

<http://www.target100.com.au/Environment>

<http://www.target100.com.au/100-Initiatives>

<http://www.target100.com.au/Farmer-stories/Anna-Kelly-Plains-Paddock-Lamb>

### United States Department of Agriculture. Definitions of Sustainable Agricultural Development

<http://www.usda.gov/oce/sustainable/definitions.htm>

### Voice Thread

<http://voicethread.com>

### Wood, Naturally Better

<http://www.naturallybetter.com.au/>

### Wordle

<http://www.wordle.net/>

### YouTube videos:

ABC News – BMP Cotton by Sarah Clarke <https://www.youtube.com/watch?v=QgXPMFR6nqY&feature=youtu.be>

ABC News – Fine Cotton by Sarah Clarke <https://www.youtube.com/watch?v=QRwCRGopwHE&feature=youtu.be>

Art4Agriculture. Agriculture is the place for you and me says Young Farming Champion Adele Offley <https://www.youtube.com/watch?v=68FFxoNj4vE>

Art4Agriculture. Cotton for Generations to Come by Ben Egan <https://www.youtube.com/watch?v=vDR8c3hzm3w>

Art4Agriculture. I Grow Cotton and You Wear It Says Richie Quigley <https://www.youtube.com/watch?v=2yEpXeBVVg4&feature=youtu.be>

Art4Agriculture. Young Farming Champion Lauren Crothers asks DO EWE? [https://www.youtube.com/watch?v=d\\_\\_P3sCGihQ](https://www.youtube.com/watch?v=d__P3sCGihQ)

Australian Weaving Mills. Myer Television Dri Glo Australian Cotton Aug 2011 <https://www.youtube.com/watch?v=SAh-thWQal8>

Cotton Australia. Cotton Australia Video Series – Andrew Watson [https://www.youtube.com/watch?v=MYiPPAw\\_d0s&list=UUcTsQcz7PRPX1bl3J3ORv-g&index=28](https://www.youtube.com/watch?v=MYiPPAw_d0s&list=UUcTsQcz7PRPX1bl3J3ORv-g&index=28)

Cotton Australia. The Australian Cotton Story Primary Version update <http://youtu.be/cbKh1Xtfmao>

Fitzroy Basin. Cotton best practices with the Austin Family <https://www.youtube.com/watch?v=E2WE7vmxxCw&feature=youtu.be>

Target 100 <https://www.youtube.com/user/Target100AUS>

Target 100. 'Sustainability in farming is critical' with NSW Farmers – Farmer Stories [https://www.youtube.com/watch?v=zT2IS2pHf\\_A&list=TLfBnwQBan3nkLsx2iuG2eJ1Ad\\_NI1PRG8](https://www.youtube.com/watch?v=zT2IS2pHf_A&list=TLfBnwQBan3nkLsx2iuG2eJ1Ad_NI1PRG8)

Southern Rivers Catchment Management Authority. Braidwood farmers in for the long haul [https://www.youtube.com/watch?v=W6ilho4\\_aYY&list=UU7JiYqky3cUgBg06dPmOYbQ](https://www.youtube.com/watch?v=W6ilho4_aYY&list=UU7JiYqky3cUgBg06dPmOYbQ)

Southern Rivers Catchment Management Authority. Monaro Graziers protecting native grasslands

<https://www.youtube.com/watch?v=tb4gGypBoFw>

## Resource 1.1

### The research process

In science, researching what other people have communicated about a concept is called a 'review'. Undertake your review of the resources used in this unit.

To do a review, go through the following steps:

- **DEFINE** the topic.
- **DEFINE** key words that might be associated with that topic.
- **LIST** the places that information has been found on that topic, and decide how to search through them.
- **SEARCH** for the key words and decide whether the resource is useful or not. Keep a **RECORD** of the text, including: author's name, the name of the resource, the year it was produced, the name of the publisher and the sections you found most useful.
- **WRITE OUT** the information you think is important.

A sample resource record is shown below:

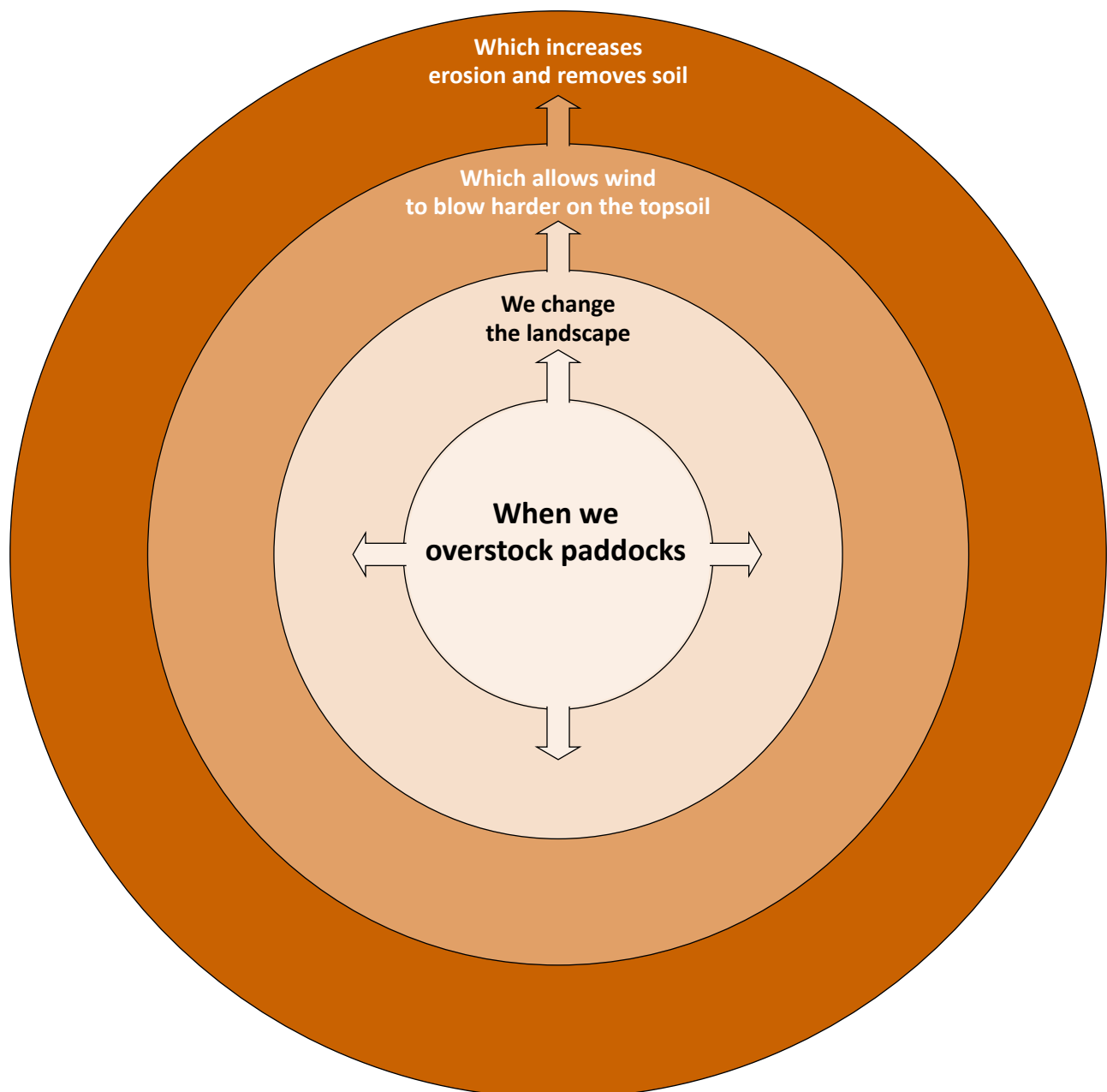
My topic:
Key words:
List of resources:
Author's name: The name of the resource: The year it was produced: The name of the publisher: The sections found most useful:
Important information:



## Resource 1.2

### Consequence wheel

Consequence wheels are used to explore wide ranging consequences that can follow from actions, issues or trends in the present. Look at the example below.



**DECIDE** on an issue that affects changes to the land by the growing or production of a food or fibre source.

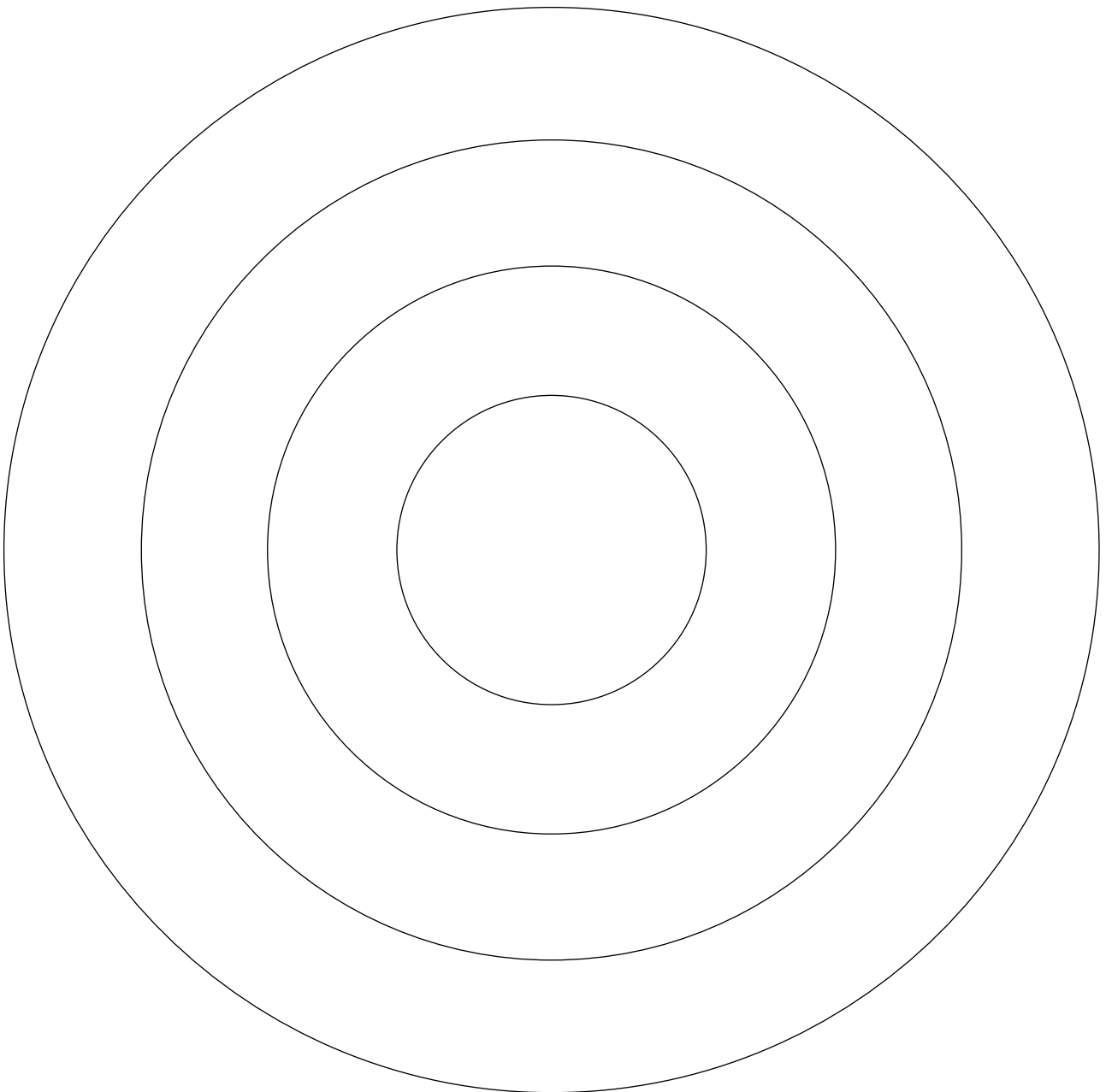
**PLACE** the focus in the centre of the consequence wheel.

Then, **EXPLORE** the focus by asking the question "What are the immediate consequences?"

**WRITE** the immediate consequences in the inner ring around the main idea.

**LINK** each consequence to the main idea with a single line. This indicates that they are first order consequences. Continue exploring second, third and fourth order consequences using the outer circles.

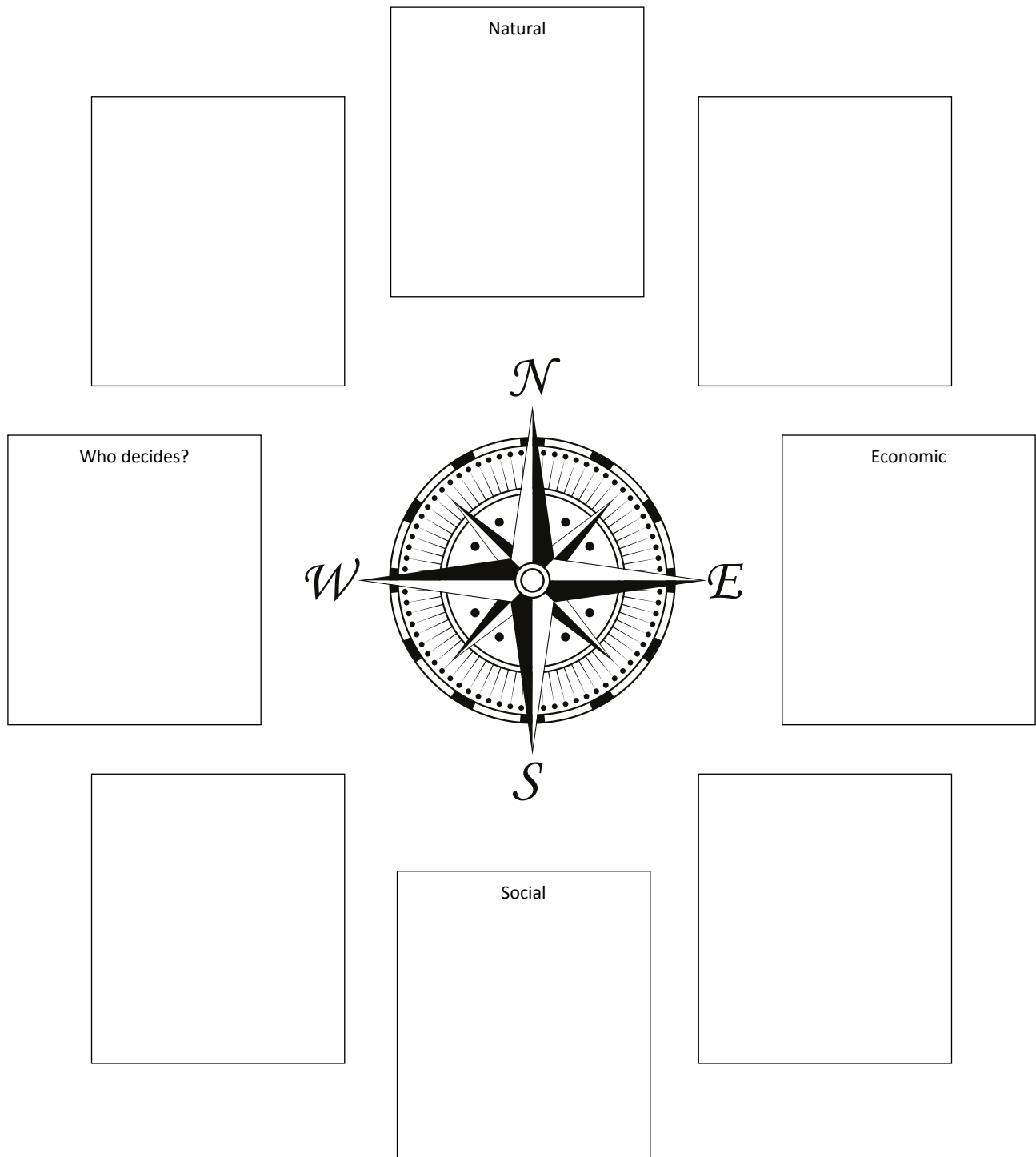
Use the four concentric circles below to **EXPLORE** the consequences of an action, issue or trend relevant to the changes affecting the land when food or fibre is produced.



### Resource 1.3

#### Compass rose

Use the compass rose to **EXAMINE** your chosen primary industry and its use of sustainable production practices from a variety of perspectives – the 'natural', 'economic', 'social' and 'who decides (power)'.



Source: *Long Ago and Far Away* ISBN: 0 948838 28 0



**primezone**  
The place for all your primary industry resources  
[www.primetimezone.edu.au](http://www.primetimezone.edu.au)