



Department of
Primary Industries

Food and fibre production

An Aboriginal perspective

Technology Mandatory



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NSW DPI Schools Program

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Reviewed by the Aboriginal Education Council

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Food and fibre production- an Aboriginal perspective

Please be aware that this resource may contain references to Aboriginal and Torres Strait Islander people who may be deceased.

The following resource and worksheets are developed especially for the 2019 NSW Stage 4 Technology Mandatory Syllabus- Agriculture and Food Technologies Content.

There are cross-curricular links with Stage 6 Investigating Science, Stage 5 and Stage 6 Agriculture and Stage 5 Geography. For those subjects the content is applicable but worksheets are not directly linked to syllabus outcomes.

Teacher Background

Aboriginal and Torres Strait Islander Peoples lived and have been the traditional custodians of the Australian continent for a long time.

The history of our ancient past was passed on through art, songs, artefacts, practices, dance and orally from generation to generation between the many cultural groups and Aboriginal and Torres Strait Islander peoples societies. As a result, the archaeological record of our ancient past is incomplete.

Contributing to this lack of archaeological record is the phenomenon that Aboriginal cultural groups lived across Australia in distinct societies. Cultural groups or nations were based on language groups which occupied clearly-defined country, and were generally limited to between 400 to 1000 individuals. Across their country, they lived in family groups or 'bands' of between 10 and 20, and family bands formed a clan, each speaking their own language and those of surrounding clans.

Social organisation was based not on hierarchy, but Dreaming Law. When the British claimed possession of the Australian continent, they regarded Aboriginal and Torres Strait Islanders as a single race. In fact, there were approximately 200 to 250 Aboriginal language groups and 600 to 700 dialects all with their own spiritual beliefs.

As a result of this misconception, there is a large gap in modern day understanding of Australia's peoples historic past. Archaeologists, anthropologists, palaeontologists, geologists and Aboriginal and Torres Strait Islander Peoples all work together to gather and piece together evidence to give us constant new understandings of the historical footprint.

Key New Understandings:

Aboriginal people were not solely nomadic, rather the contrary. Numerous historical accounts and new archaeological evidence along with oral traditions and ethnographic observations reveal that prior to, and at the time of European arrival, the Indigenous peoples of Australia had well established permanent settlements. They also had agriculture, cultivation, animal management, aquaculture, food and fibre harvesting in place to sustain sometimes massive thriving communities. Aboriginal agriculture was not solely firestick farming, and hunting and gathering practices carried out by nomadic peoples. The perception of these peoples as being solely nomadic was more a result of their displacement post European settlement.

Stage 4 Technology Mandatory- Agriculture

Food and fibre production- an Aboriginal perspective

Glossary

Key Word	Definition
Cultivation	The human practice of tilling or breaking up soil to prepare to grow plants
Enterprise	An individual activity on a farm that can produce an income. For example raising beef cattle, growing apple trees for apples
Fauna	The animals of a particular region or habitat
Flora	The plants of a particular region or habitat
Firestick farming	Firestick farming is a term which has been used to describe the land management tool carried out by Indigenous Australians, whereby they deliberately burn areas of vegetation for a specific purpose.
Holistic management	Holistic management in agriculture is a systems thinking approach to managing the farm as a whole. It identifies that all parts of the farm system are connected and includes economic, social, and environmental variables (particularly movements of grazing livestock) into land management.
System	<p>A set of units that interact, react and depend on themselves and the living and nonliving parts of an environment. For example a natural ecosystem</p> <p>In agriculture, a farm system consists of many interacting units such as plants, animals, climate, soil, weeds, pest and diseases and management practices which operate within a boundary.</p>
Sustainability	The ability of a farm to maintain and improve its environmental resources such as soil and biodiversity and to continue to be profitable
Resources	Materials used within a system to produce a product. In agriculture, the most limiting natural resources include soil and water.

Introduction

Food and fibre production is the fundamental aim of farming in agriculture. Food and fibre is produced for many different reasons.

A number of farming practices used on Australian farms can reduce the long term productive potential of farm enterprises; such as the overuse of chemicals, loss of topsoil through overgrazing or over cultivating to name a few.

Sustainable farm management aims to make sure that resources can continue to be available and productive in the future.

The farming approach that focuses on looking after natural resources is sustainable farming. It is a holistic approach which involves the farmer managing their farm as a whole with a focus on making a profit without overusing and negatively degrading any of the natural resources on the farm.

[Complete Worksheet 1](#)

Aboriginal Agriculture

Indigenous knowledge is the local knowledge that is unique to a culture or society. This knowledge is passed from generation to generation, usually by word of mouth and cultural rituals including art, songs, artefacts, practices and dance between the many cultural groups. Sharing of knowledge underpins the development of agriculture, food preparation, health care, education, conservation and the wide range of other activities that sustain societies in many parts of the world.

The idea that we should protect our environment rather than just exploit it is a relatively new concept in Australia and most Western civilisations. Indigenous people have a broad knowledge of how to live sustainably. In Australia, the Aboriginal and Torres Strait Islander Peoples have lived and have been the traditional custodians of the Australian continent for a long time. Scientists estimate this to be between 60 000 and 120 000 years ago, which makes them one of the oldest continuous cultures in the world.

In this time, their knowledge of living sustainably and conserving country meant that they sought to use and protect resources in the environment. Their approaches to farming and agriculture including firestick farming techniques have helped change the Australian landscape, in particular, the distribution of different ecosystems.



Figure 1 Aboriginal Rock Art, Anbangbang Rock Shelter, Kakadu National Park, Australia, Source: [Thomas Schoch](#)

There is much diversity amongst the Aboriginal peoples of Australia, despite their shared ancestry. It has been established that at the time of European colonisation, there were approximately 200 to 250 Aboriginal language groups and 600 to 700 dialects all with their own beliefs, laws, rituals, traditions and territory. A central belief shared amongst all groups was The Dreaming which was the basis of their society.

Indigenous Australians had and still have systems of inherited responsibility for looking after the land. They have a deep spiritual connection with “caring for country”. To Aboriginal people ‘country’ refers to the land

to which they belong, or the land of their Dreaming. The Dreaming is a common belief that explains and instructs all the cultural traditions and spiritual beliefs between all the different regional groups, clans and societies across the continent. Dreaming explained creation and the nature of the world, the importance of place, ritual and tradition. The Dreaming also taught people about their country and where water, food and shelter were found. Caring for country means being involved with the land, using it as a rich resource supplying food, fibre, shelter, medicines and tools; and caring for and maintaining a knowledge of the resources, the balances and changes it undergoes.

Aboriginal people understood the low productivity of our old infertile soils and limited, unpredictable rainfall. Aboriginal people maintained a nomadic based lifestyle, rather than solely settling to intensively cultivate one area of land. They were taught not to catch more food than they needed and each tribe had a totem animal that was not eaten and therefore protected. They settled and survived on expansive areas of Australia utilising firestick farming.

Australia is a very old continent with very diverse landforms, local geography, climates, soils, flora and fauna. As a result, the diverse Aboriginal groups across the continent had many different customs, traditions, languages and ways of carrying out agriculture including the following practices.

Firestick Farming

Firestick farming describes the practice of deliberately burning selected areas of vegetation. Indigenous Australians used fire to encourage growth of food, plants and young shoots. The burns were managed with firebreaks, and were dependant on seasonal conditions so that fires did not get out of control.

Repeated burning of the grasslands, suppressed weed and tree growth.

Many Australian plants require fire to stimulate flowering or seed germination. Selected areas of land were burned with low intensity fire in alternating blocks over a number of years, which created a mosaic of vegetation at different stages of growth. Grazing rotations carried out today in agriculture have similar results.



Figure 2 Epicormic regrowth after fire

The managed burns also encouraged birds, herbivores and marsupials to graze or forage amongst the fresh regrowth. This made the areas important for reliable hunting and food gathering.



Cultivation and growing of crops

Recent investigations have revealed evidence of many permanent settlements with established agriculture, disproving the traditional view of Indigenous Australians as solely nomadic hunters and gatherers.

At the time of the British colonisation of Australia at least 19 different species of plant were being cultivated by at least 21 different identifiable indigenous groups. These included species of yam, sweet potato and its relatives the bush potato, native millet, ngardu- nardoo plant, bush tomatoes and bush onions.

In some instances, these species were the principal source of sustenance. Different explorers noted large tracts of cultivated yam fields extending as far as the eye could see in Western Australia and in Queensland extensive native millet production. Some local Aboriginal groups never dug a yam out, without [replanting the crown](#) which would regrow a replacement plant.

All the species of plant cultivated and harvested by the Aboriginal peoples, were native to the landscape and so did not require extra resources like fertiliser and water to grow.



Aquaculture

Along the coast and in many river and water systems of Australia there is much evidence of Aboriginal peoples carrying out aquaculture. In Victoria and NSW there is evidence of infrastructure, with kilometres of [fish trap systems, fish weirs, and artificial eel canals](#). The respectful and sustainable approach meant that plants, birds, insects, fish, frogs, eggs, eels, shellfish, molluscs etc. were only harvested when numbers were plentiful. Anything too small was thrown back to breed. The fish traps and eel traps were designed so that only the larger animals were caught and the smaller ones swam through the channels.

In times of drought, Aboriginal peoples' dammed waterways to maintain water for aquatic flora and fauna that otherwise would perish to drought. In doing so they sustained natural ecosystems allowing various marsupials, birds, aquatic plants, insects, and aquatic animals to survive.



Figure 3 Brewarrina Fish Weirs, Source: [S Strachan](#)

Complete [Worksheet 2](#)



Farming and Living to the calendar

The diverse and ever changing landscape, food sources and climate of Australia, required Aboriginal people to develop many methods of hunting and managing their challenging natural environment. This was possible due to an enormous knowledge of the land accumulated over thousands of years and a holistic approach to resource management.

Many cultural groups across the continent developed calendars which provided the people with an understanding of when to sustainably harvest or hunt different food and fibres from their environment. The many seasonal calendars used by the different language groups and tribes have similar features in that they divided the year into seasons dependent on their local environment, and what resources were readily available at that time. The calendars demonstrate the wealth of traditional knowledge that Aboriginal people in Australia hold about the environment and remain in use to this day.

Watch the clip on "[Aboriginal water values and management in northern Australia](#)", to gain a greater understanding then [complete Worksheet 3](#)

Environmental Impacts of Firestick Farming

Over time, naturally changing climatic conditions, along with the Aboriginal peoples use of firestick farming, have transformed Australia's ecosystems by:

- Encouraging fire-resistant and fire-dependent plants. For example Eucalypts (regrowth/ epicormic shoot growth), and Banksia (seed pods need smoke to open).
- Changing the landscape from forested areas to grassland.
- Potentially contributing to the extinction of Australia's megafauna.
- Decreasing moist rainforest areas- some isolated fragments remain in remote, high rainfall areas.

Aboriginal people managed the land

successfully for thousands of years using sustainable and conservative practices. They believed that the land was alive with gifts from their ancestors and felt deeply connected to every bush, tree and waterway in a way most people find hard to imagine. This connection remains strong for many Aboriginal people today.



Figure 4 Aboriginal man & child collecting oysters - Port Macquarie area, NSW, Source: [State Library of New South Wales](#)

Summary

Although Aboriginal practices varied between different communities around the continent, there were many similar features including:

- Aboriginal people lived in harmony with the environment
- They understood the limitations of the land and its resources
- The Dreaming gives the people a deep religious connection and respect for the land and all the things in it
- Population size was dependent on food supply
- They never depleted an area, for example, they replanted crops and plants from roots and shoots and they never overhunted animals
- They burned to promote new growth (firestick farming)
- They carried out sustainable agricultural practices including irrigation, animal management, cultivation and aquaculture
- Aboriginal people used their vast knowledge of the land and seasonal calendars to determine which food fibre and medicines they could harvest at a point in time.



Figure 5 Aboriginal rock art at Ubirr Art Site, Kakadu National Park, Northern Territory, Australia, Source [L Durkin](#)

[Complete Worksheet 4](#)

References and Further Reading:

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Laffan, J & Archer, C 2004, '[Aboriginal Land Use at Tocal- The Wonnarua Story](#)', NCP Newcastle, Australia

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Explainer: the seasonal 'calendars' of Indigenous Australia

The Conversation, 2018 '[Explainer: the seasonal 'calendars' of Indigenous Australia](#)'

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Aboriginal water values and management in northern Australia

CSIRO, 2013, '[Aboriginal water values and management in northern Australia](#)', <https://youtu.be/XMKYybtUJ-o>, viewed 23 January 2018



Figure 6 Aboriginal children in canoe spearing fish - Port Macquarie area, NSW,
Source: [State Library of New South Wales](#)

Syllabus Outcomes

Technology Mandatory- Stage 4

Outcomes	Content
<p>TE4-1DP designs, communicates and evaluates innovative ideas and creative solutions to authentic problems or opportunities</p> <p>TE4-5AG investigates how food and fibre are produced in managed environments</p> <p>TE4-2DP plans and manages the production of designed solutions</p>	<p>Identifying and defining</p> <ul style="list-style-type: none"> investigate how food and fibre production is managed in environments as a system and how sustainability can be improved, for example: (ACTDEK032) <ul style="list-style-type: none"> plants and/or animal species grown in managed environments land management by Aboriginal and/or Torres Strait Islander Peoples boundaries, inputs, outputs, processes and feedback occurring in a managed environment investigate the way Aboriginal and/or Torres Strait Islander Peoples use engineered solutions to serve community needs including those of cultural identity Investigate how food and fibre production is managed in environments as a system and how sustainability can be improved, for example: (ACTDEK032) Investigate ideal conditions for growth and development of an agricultural plant or animal (ACTDEK032) Develop a schedule or calendar for ongoing care of a plant or animal species associated with an agricultural project (ACTDEP039)

Cross curricular Outcomes

Agriculture Stage 6 Prelim

Outcomes	Content
<p>P1.1 describes the complex, dynamic and interactive nature of agricultural production systems</p> <p>P1.2 describes the factors that influence agricultural systems</p>	<p>Describe how Indigenous Australians managed the land prior to the arrival of Europeans</p>

Investigating Science Stage 6

Outcomes	Content
<p>INS11/12-1 Develops and evaluates questions and hypotheses for scientific investigation</p>	<p>Assess ways in which Aboriginal and Torres Strait Islander Peoples use observation to develop an understanding of Country and Place in order to create innovative ways of managing the natural environment, including but not limited to:</p> <ul style="list-style-type: none"> firestick farming

Science Stage 5

Outcomes	Content
<p>LW2 Conserving and maintaining the quality and sustainability of the environment requires scientific understanding of interactions within, the cycling of matter and the flow of energy through ecosystems.</p>	<p>Assess ways that Aboriginal and Torres Strait Islander peoples' cultural practices and knowledge of the environment contribute to the conservation and management of sustainable ecosystems</p> <p>Evaluate some examples in ecosystems, of strategies used to balance conserving, protecting and maintaining the quality and sustainability of the environment with human activities and needs</p>

Geography Stage 5

Outcomes	Content
<p>GE5-5 assesses management strategies for places and environments for their sustainability</p>	<p>discussion of successful sustainability strategies that minimise environmental impacts</p>



Worksheet 1- Introduction

1. Match the terms with their definitions to complete the table.

Terms		
Flora	Resources	Firestick farming
Enterprise	Fauna	Cultivation
System	Holistic	Sustainability

Term	Definition
	Materials used within a system to produce a product. e.g. soil
	Ability of a farm to maintain and improve its environmental resources such as soil and biodiversity and to continue to be profitable
	An individual activity on a farm that can produce an income, for example raising beef cattle, growing apple trees for apples
	Plants of a particular region or habitat
	Describes the land management tool carried out by Indigenous Australians, whereby they deliberately burn areas of vegetation
	Management in agriculture is a systems thinking approach to managing the farm as a whole
	Animals of a particular region or habitat
	A set of interacting units that interact and react with the living and nonliving parts of an environment.
	Human practice, tilling or breaking up soil to prepare to grow plants

2. Food and Fibre production is the fundamental aim of farming in agriculture. Make a list of different food and fibre products farmed in Australia.

3. Identify and describe two ways the resources soil and water can be degraded (damaged).

4. What would happen if the farmer only concentrated on growing a crop, but didn't consider the soils and water on their farm?



Worksheet 2- Aboriginal Agriculture

1. How was The Dreaming passed down to successive generations of Aboriginal peoples?

2. Identify what The Dreaming explained and taught the Aboriginal people of Australia.

3. List resources the land provided the Indigenous peoples .

4. Why is Aboriginal management considered to be holistic?

5. Identify two consequences of no longer using Firestick Farming?

6. Grazing rotation is a farming practice where the farm is divided into multiple paddocks of pasture for livestock to graze (eat). Grazing rotations occur when livestock (sheep, cattle etc.) are moved from paddock to paddock in a sequence after they graze a paddock. Complete the table to contrast five similarities and differences between grazing rotation and firestick farming.

Similarities	Differences



7. What discoveries have made us understand that Indigenous Australians were not just nomadic (travelling) hunters and gatherers?

8. Describe two sustainable agriculture cropping practices used by Aboriginal people.

9. Describe two sustainable aquaculture practices used by Aboriginal people.

Follow this link ["Rethinking Indigenous Australia's agricultural past"](#) to investigate and complete question 10

10. List 5 Australian Aboriginal engineered solutions or products. For each product or solution explain the problem. The first example has been given for you.

Solution or product	Problem
Budj Bim Eel traps	Eels and fish are needed for food. Eel oil is used as fuel for heating and eel oil is used as an insect repellent.

Worksheet 3- Farming and living to the calendar

1. Follow this link to watch the clip on "[Aboriginal water values and management in northern Australia](#)" and answer parts a)- f).
 - a) List at least 10 of the Bush tucker food products talked about throughout the clip:

 - b) Why is water use important to the Aboriginal peoples?

 - c) What are the CSIRO indigenous seasonal calendars based on?

 - d) Identify and describe one of the seasonal indicators that signifies a food or fibre is ready to be harvested.

 - e) Identify the 5 main groups concerned with water usage?

 - f) If farmers use too much water for irrigation in the dry season, what impact will that have on the Daly River catchment?

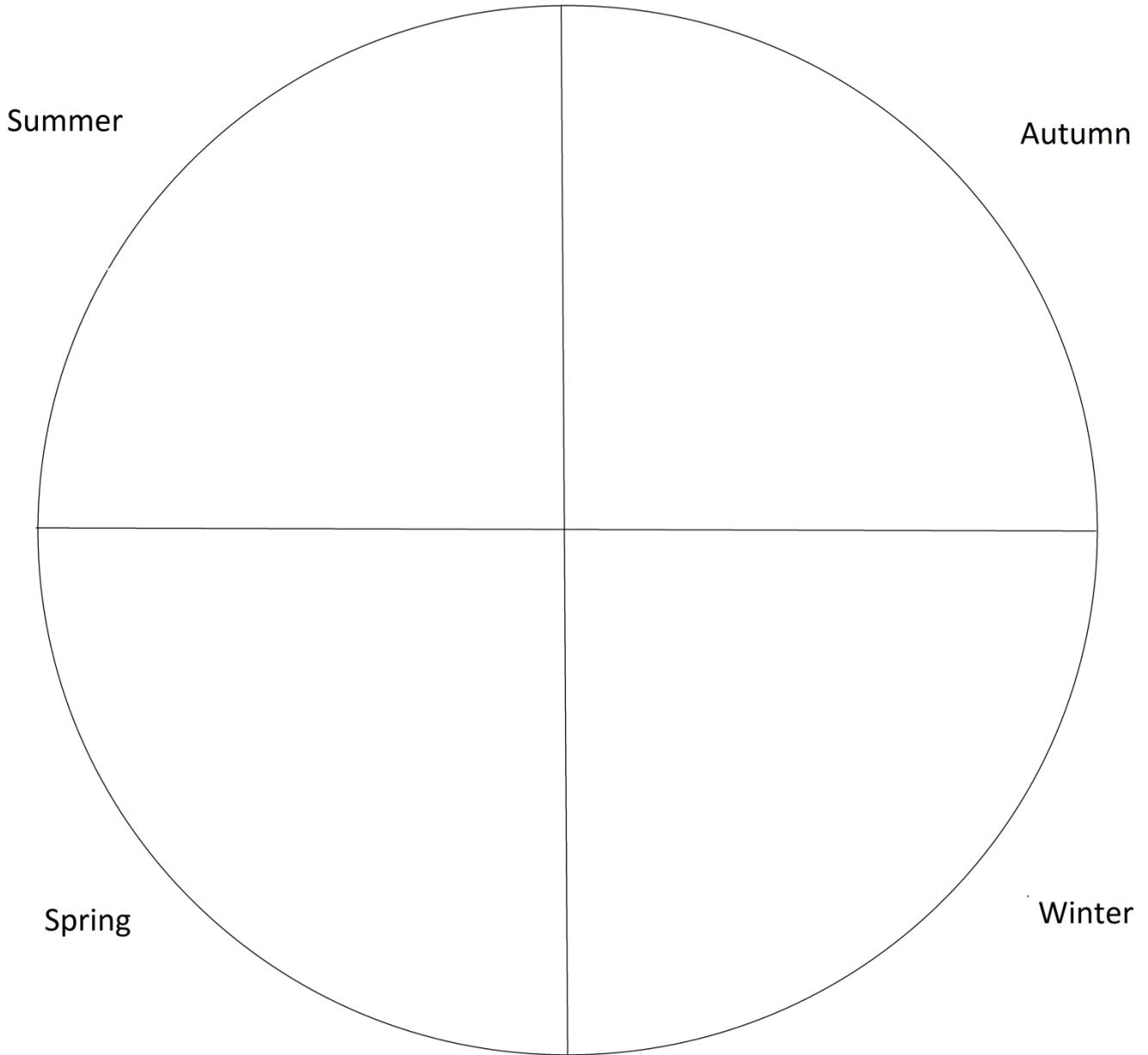
2. Go to CSIRO '[Indigenous seasons calendars](#)'. Look at the different Aboriginal Language groups Indigenous seasons calendars, to complete the following activity.

DESIGN BRIEF: Design your own seasonal calendar for a garden at your school.

Your seasonal calendar must have at least 2 Australian native bush tucker plants and 2 introduced Australian agricultural plants; and At least 2 Australian native fauna and 2 introduced Australian agricultural livestock species.

- Research to choose 2 native species of flora and 2 native fauna species to include in your seasonal calendar.
- Research to choose 2 types of Australian agricultural plants and 2 species of Australian livestock
- Consider the time of season that the food or fibre has to be harvested, joined, sown, watered, fed etc. in the design of your calendar
- Consider and include explanations of the food and/or fibre harvested- when, what and how.
- Use the following template to help with ideas for the seasonal calendar design.

Seasonal Calendar Design Task Template



Worksheet 4- Summary

1. Fill in the blanks to complete the Summary

Although Aboriginal practices varied between different communities around the continent, there were many similar features including:

- Aboriginal people lived in _____ with the environment.
- They understood the _____ of the land and its _____
- _____ gives the people a deep religious connection and respect for the land and all the things in it.
- Population size was dependant on _____.
- They never _____ an area for example- they _____ crops and plants from roots and shoots and they never _____ animals.
- They _____ to promote new growth (firestick farming).
- They carried out _____ practices using irrigation, animal management, cultivation and aquaculture.
- Aboriginal people used their vast _____ and seasonal calendars to determine which food fibre and medicines they could harvest at a point in time.

2. Use your knowledge of sustainable aboriginal agricultural practices, to explain what you could do to increase sustainability for the following farms. The first example has been given for you.

Cattle and Sheep Farm- divide the farm into many paddocks and make a grazing rotation system to achieve weed free pastures of different growth stages, similar to the effects Aboriginal people achieved through firestick farming. Rotation grazing reduces the amounts of weeds and ensures that pasture isn't grazed to the point where damage occurs and the plants can't regrow.

- Irrigation farm-

- Eucalypt Tree Farm (forestry)-

- Vegetable farm-

- Fish farm (aquaculture)-
