



Interactions Between Subsystems on a Farm



Sheep grazing beside a farm forestry shelter belt at Yan Yan Gurt Farm, SE Victoria.

Teacher Overview

Students will be able to identify the inputs, processes, outputs, boundaries, subsystems and interactions on a Forestry Farm, and learn some practical examples of how this enterprise operates. Students will be able to gain skills in representing farming systems and subsystems by constructing a model.

Stage

Year 11 Agriculture

Syllabus Links

Outcomes. A student:

P1.1 describes the complex, dynamic and interactive nature of agricultural production systems.

P1.2 describes the factors that influence agricultural systems.

P2.3 describes the farm as a basic unit of production.

Students learn about:

- The interaction between a subsystem on a farm, resources, plants, animals, microbes and management.

Students learn to:

- Describe agriculture as a system which is made up of inputs, outputs, boundaries, subsystems, processes, interactions, feedback and monitoring.
- Simulate, construct or represent an appropriate model showing inputs, outputs, boundaries, subsystems, processes & interactions between subsystems on a farm.



Lesson Overview

Activity 1 – Approx. 10 minutes

Students initially complete a tabulated activity identifying the components of a Beef Cattle enterprise. The teacher should lead students through this task to ensure that they are able to correctly identify the components of a subsystem and express their ideas about the relationships between them.

Activity 2 – Approx. 40 minutes

In groups students will then view a series of online videos and links that contain relevant content on the Forestry industry and its subsystems. Students must select what they believe to be the most relevant and important examples within this subsystem and complete a worksheet on this information. In an allocated resource table (Table 4) there are hints for students as to which information relates to which category. There are many examples that can be used in answering the questions and students should choose those which they believe to be the best examples.

Activity Three – Approx. 20 minutes

Finally, as individuals, groups or as a class, students need to complete/construct a representation of their forestry subsystem and show the interactions between the components. They should combine all the information that they have collected to compile this model in many cases select the best example between interactions. There will be many answers that can be used to respond this model.

Resources

- a) Student Worksheet.
- b) Series of videos and web links (also included in the worksheet). **Resource List**
 1. [Various demand for plantation and native forests \(5.21\)](#)
 2. [How the timber from our forest is used \(9.41\)](#)
 3. [Going Bush Peace Talks Part 2 \(watch until 2.20 minutes\)](#)
 4. [Going Bush Seed Centre \(watch until 2.00 minutes\)](#)
 5. [Forestry and timber pests](#)
 6. [Microbes and Invertebrates \(use for activity 3\)](#)
- c) Sample answers (below).



Sample Answers

For a beef cattle operation complete the following interactions in the tables below:

Table 2:

Animal subsystem:	interacts with the plant subsystems by:	Deposit manure that decomposes to return nutrients to the soils that are important for plant growth and development. (positive interaction)
Plant subsystem:	interacts with animal subsystem by:	Providing cattle with nutrition for muscle, bone and fat formation. (positive interaction for animal)

Table 3:

Resource subsystem:	interacts with the animal subsystems by:	Water (resource) is consumed by cattle to maintain health. (positive interaction)
Animal subsystem:	interacts with resource subsystem by:	Animal's faecal matter is deposited in the waterways and can cause eutrophication. (negative interaction)



Activity 2 – Sample Answers

Group Work Case Study of a Farming Subsystem: The Forestry Industry

Table 5:

<p>Inputs The raw materials that are needed to make the product</p>	<p>Processes and Interactions The actions or stages a producer or organism uses to undergo turning the raw materials into the final product/s</p>	<p>Outputs The final products on the farm</p>
<p>Hardwood plantations (alpine and mountain ash) Softwood plantations Native Forests Plantations trees for pulp grown with herbicides and fertilisers</p>	<p>Tress harvested mechanically Products trucked to mills Chip milling, pulp mill, paper machine Staining of finished product for furniture Natural regeneration of the forests Reseeding of original areas (seeds collected transported to kilns, heating, cleaned and into cold store, replanted in same coop)</p>	<p>Furniture (ash) Flooring Structural timbers Pulp wood Pine plantation House framing, Toilet paper Saw logs Saw dust used to fire boilers and generate electricity</p>
<p>Measures of Performance/s The elements/factors that producers are measuring to highlight their value or success in producing the intended/most desirable product.</p>	<p>More timber to work within one tree (high yields) Low levels of stress in the tree Lots of fibre (pulp wood trees) High yields in short times (pulp)...maximum volume per hectare Durability, sustainability, accessibility (furniture)</p>	



<p>Limitations/Boundaries Factors that can negatively impact the producers, the inputs, the processes etc in achieving the intended quantity and quality of the product.</p>	<p>Fertilisers and herbicides are used to control soils deficiencies for fast growth and weeds for competition Don't produce enough <i>Radiata pine</i> plantations to meet demand Competing interests of industry and environmentalists Financial cost of installing pulp mills</p>
<p>Feedback and Monitoring Aspects that are recorded and studied to ensure that the measures of performance and outputs are achieving the expectations and value that they are expected to. This can be done during the production phases and at the conclusion.</p>	<p>Studies on <i>Radiata pine</i> plantations show that it is renewable, stores carbon, energy efficient to produce compared to steel, concrete and aluminium. Scientists study genetic diversity and maintenance in areas Biodiversity studies of areas.</p>

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