



Interactions Between Subsystems on a Farm



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

Year 11 Agriculture

Forestry Case Study

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.



Activities and Lessons

Introduction

In any production system a producer should be attempting to optimise their outputs with the highest level of sustainability (ongoing profits, minimal effect on the environment with the greatest consideration to the welfare and ethics involved in their production).

The subsystems in any farm are all connected and therefore, if a producer considers how they interact, then they can anticipate both the positive and negative relationships between the components and endeavour to inhibit the negative aspects and promote the positive relationships. This understanding will assist producers in improving the quality and quantity of their outputs. This method of thinking and representation also allows producers to examine and anticipate the effect of change in their enterprise/s.

You may have already studied a farming system and are familiar with the components of subsystems and production systems.

For example: Beef Cattle farming system.

The **inputs** may include: breeding cattle (cows and bull/s), feed and labour.

The **outputs**: beef and saleable stock.

Plant subsystems could include: Lucerne pasture to promote muscle growth, hay during drought periods, grain crops fed in a feedlot to ("finish") increase fat content in meat.

Animal subsystems would be: the breed of cattle and type of cattle on the farm.

Resources for the production system could include: water, water troughs, soil for plant growth, ear tagging gun, NLIS tags, race and scales, etc.

Management components could include: timing of operations of vaccinations and breeding, culling poor performing stock and feed ration calculations.

Microbe and Invertebrates could include any pest or disease that impacts the cattle in the area they live e.g.; tetanus, blackleg.



Image: Jim Bowden

It is important to identify the elements of a sub system, however it is more important is to understand how these elements interact with each other back and forth. For example:



Table 1:

Animal subsystem:	interacts with the Management subsystem by:	Providing a yield of meat from the carcase that allows the producer to assess their feed ration.
Management subsystem:	interacts with Animal subsystem by:	Designing a ration plan over the life of the animal to maximise their weight gain and growth and therefore their profit.

ACTIVITY 1

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

Table 2:

Animal subsystem :	interacts with the plant subsystem by:	
Plant subsystem:	interacts with animal subsystem by:	

Table 3:

Resource subsystem :	interacts with the animal subsystem by:	
Animal subsystem:	interacts with resource subsystem by:	



ACTIVITY 2

Group work: Case study of a farming subsystem: The Forestry Industry

Another way of representing a farming system is by using the table below. Divide the following resources list between your group members and collect the required data regarding the Forestry system. **Table 4** contains hints on which resources are linked to which component of the system.

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 \(use for activity 3\)](#)



Table 4:

Inputs The raw materials that are needed to make the product (include at least 3)	Processes and Interactions The actions or stages a producer or organism uses to undergo turning the raw materials into the final product/s (include at least 3)	Outputs The final products on the farm (include at least 3)
1 4	2 4	1 2
Measures of Performance/s The elements/factors that producers are measuring to highlight their value or success in producing the intended/most desirable product. (include at least 3)	1 2	
Limitations/Boundaries Factors that can negatively impact the producers, the inputs, the processes etc in achieving the intended quantity and quality of the product. (include at least 2)	1 3 5	
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. (include at least 2)	1 4 6	



Table 5:

Inputs The raw materials that are needed to make the product (include at least 3)	Processes and Interactions The actions or stages a producer or organism uses to undergo turning the raw materials into the final product/s (include at least 3)	Outputs The final products on the farm (include at least 3)
Measures of Performance/s The elements/factors that producers are measuring to highlight their value or success in producing the intended/most desirable product. (include at least 3)		
Limitations/Boundaries Factors that can negatively impact the producers, the inputs, the processes etc in achieving the intended quantity and quality of the product. (include at least 2)		
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. (include at least 2)		



ACTIVITY 3

Simulation/Model of the Forestry Subsystem

Using the information you have collected and the additional resources (and any others you think may be useful to research), your group needs to construct a model to show the inputs, outputs, boundaries, subsystems (plant, animal, management, resources, and microbe/ invertebrates), processes and interactions between the subsystems of a forestry farm.

A template has been provided for you, but you could choose another way to visually represent the interactions. The template is designed to annotate over the top and you will need to draw lines/2-way arrows to link the components within the subsystem.

