LESSON 1 DIFFERENT THINGS TO DIFFERENT PEOPLE

Sustainable farming means different things to different people however they all share a common concern in preventing the degradation of some aspect of the farm.

Some farmers may be primarily concerned with degradation of natural resources (e.g. their land is becoming less productive). Other farmers may be more concerned about degradation of profitability, which could be due to increased labour or material costs, poor planning, or simply changing conditions in the economy. The causes and the solutions to such problems are different in each situation.

Sustainable agriculture is a philosophy: it is a system of farming. It empowers the farmer to work with natural processes to conserve resources such as soil and water, whilst minimising waste and environmental impact. At the same time, the “agro-ecosystem” becomes resilient, self-regulating and profitability is maintained.

Suggested Tasks: ▼

Throughout this course you will be provided with suggested tasks and reading to aid with your understanding. These will appear in the right hand column. Remember: these tasks are optional. The more you complete, the more you will learn, but in order to complete the course in 20 hours you will need to manage your time well. We suggest you spend about 10 minutes on each task you attempt, and no more than 20 minutes.

Consider climate when deciding where and what to farm

What to Do

There are many different ideas about how to be more sustainable. You will find different people promoting different concepts with great vigour and enthusiasm, and in most cases these concepts will have something valuable to teach you. Many are quite similar in approach, often being just variations of a similar theme. Each approach will have its application; but because it worked for someone else does not necessarily mean it will work for you. Some of these concepts are explained below.

Low Input Farming Systems

The low input farming approach is based on the idea that a major problem is depletion of resources. If a farmer uses fewer resources (e.g. chemicals, fertiliser, fuel, money, manpower) farm costs will be reduced. There is also less chance of damage being caused by waste residues or overworking the land and the world is less likely to run out of the resources needed to sustain farming.

Regenerative Farming Systems

Regenerative farming seeks to create a system that will regenerate itself after each harvest. Techniques such as composting, green manuring and recycling may be used to return nutrients to the soil after each crop. Permaculture is currently perhaps the ultimate regenerative system. A permaculture system is a carefully designed landscape which contains a wide range of different plants and animals. This landscape can be small (e.g. a home garden) or large (e.g. a farm), and it can be harvested to provide such things as wood (for fuel and building), eggs, fruit, herbs and vegetables, without seriously affecting the environmental balance. In essence, it requires little input once established, and continues to produce and remain sustainable.

Biodynamic Systems

This approach concentrates on mobilising biological mechanisms. Organisms such as worms and bacteria in the soil break down organic matter and make nutrients available to pastures or crops. Under the appropriate conditions, nature will help dispose of wastes (e.g. animal manures) and it will encourage some predators to eliminate pests and others to dispose of weeds.

Organic Systems

Traditionally, organic systems involve using natural inputs for fertilisers and pest control, and techniques such as composting and crop rotation. In Australia and many other countries, there are schemes which “certify” produce as being organic. These schemes lay down very specific requirements, including products and farming techniques which are permitted, and others which are prohibited. In Australia, you can find out about such schemes through groups such as the Biological Farmers Association (BFA) or the National Association for Sustainable Agriculture Australia (NASAA).

Conservation Farming

Conservation farming is based on the idea of conserving resources that already exist on the farm. It may involve such things as identifying and retaining the standard and quality of waterways, creek beds, nature strips, slopes, etc.

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Suggested Tasks

Write down your own definition of ‘sustainable agriculture’. (only one sentence)

Now go online and search for “sustainable agriculture definition”, “sustainable farming meaning”, or something similar.

Read two or three definitions and compare them to your own.

Hydroponics

The hydroponics approach involves separating plant growth from the soil, and taking greater control of the growth of a crop. This increases your ability to manage both production and the disposal of waste. Hydroponics is not a natural system of cropping, but it can be very environmentally friendly. A lot of produce can be grown in a small area; so despite the high establishment costs, the cost of land is much less allowing farms to operate closer to markets. In the long term, a hydroponic farm uses fewer land resources, fewer pesticides, and is less susceptible to environmental degradation than many other forms of farming.

Matching Enterprise with Land Capability

Some sites are so good that you can use them for almost any type of farming enterprise, and for any period of time, without serious degradation. Other places have poor or unreliable climates, or infertile soils, and may only be suitable for certain types of enterprises or certain stocking or production rates. If you have a property already, only choose enterprises that are sustainable on your land (*see section on Assessing Land Capability later in this lesson*).

Genetic Improvement

The genetic improvement principle involves breeding or selecting animal or plant varieties which have desirable genetic characteristics. If a particular disease becomes a problem, you select a variety that has reduced susceptibility. If the land is threatened with degradation in a particular way, you should change to varieties that do not pose that problem.

Polycultures

Many modern farms practise monoculture, growing only one type of animal or plant. However, when you have large populations of the same organism there is greater susceptibility to all sorts of problems. Diseases and pests can build up into large populations. One type of resource required by the variety grown can be totally depleted, while other resources on the farm are underused. If the market becomes depressed, income can be devastated. A polyculture involves growing a variety of different crops or animals in order to overcome such problems.

High Tech Farming

By embracing modern technologies (eg. mechanisation, computer technology, biotech), farms can improve the quantity and/or quality of farming in many ways. The cost of implementing technologies can sometimes be prohibitive, particularly in the short term, but over time many (not necessarily all) technologies can greatly improve not only economic sustainability, but also environmental sustainability of a farm.

Integrated Management

The integrated management concept holds that good planning and monitoring the condition of the farm and marketplace will allow the farmer to address problems before they lead to irreversible degradation.

Chemical pesticides and artificial fertilisers may still be used, but their use will be better managed. Soil degradation will be treated as soon as detected. Water quality will be maintained.

Ideally, diseases will be controlled before they spread. The mix of products being grown will be adjusted to reflect changes in the marketplace (e.g. battery hens and lot-fed animals may still be produced but the waste products which often damage the environment should be properly treated and used as a resource rather than be dumped and cause pollution).

A holistic approach to farming will consider what multiple and integrated benefits different farming activities can have. For example:

- pigs are scavengers will eat food waste and at the same time grow into an animal that can be sold
- poultry can be used to control plant pests
- goats may be used to control weeds
- grain crops can be sold for cash and/or used to feed livestock
- bees can produce saleable honey, but also pollinate crops

Consider the likelihood of flood on low land

Know Your Land

a) Evaluating a Site

Farmers need to know their property as well as possible to ensure the best management decisions are made, and the most suitable production systems and techniques are chosen.

Many site characteristics are seasonal, so observations need to be made throughout the year, and over many years, to gain the ability to predict conditions. Also, changes to a site, such as the removal or addition of vegetation in an area, can alter future patterns.

Useful measurements or indicators may include the following:

Weather Patterns

Rainfall and temperature readings can help determine when to do different things (e.g. planting), and help plan future operations on a farm. Regional records can be a starting point, but they do not show the subtle differences that can occur from one property to the next, or within different parts of the same property. Temperature for instance can vary several degrees from one place to another on the same property; affected by the way the land is managed in different parts of the property.

If possible keep your own records, but be sure to do this on a regular basis. Even a few weeks of missed records can give a distorted picture of local conditions.

Soil pH

Soil pH refers to how acidic or alkaline

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Suggested Tasks

Consider issues that are currently significant in the agriculture industry.

Try doing an internet search for “Agriculture Issues” or “Agriculture Problems”

Issues such as drought, climate change, food miles, and others, may arise in such searches.

Select one of these issues and search for articles or videos on that selected issue - then spend 10 minutes reading or watching what you find.

Get a sense of the issue and think about how it might impact agricultural viability in your region

the soil is. Most pastures or crops have a preferred pH level in which to grow. Simple soil pH tests can allow you to change crops according to their suitability to different pH levels, or to carry out works to alter the soil pH to suit the crop you wish to grow. Failure to do so could result in expensive losses or greatly reduced yields. It is also important that tests are repeated at least every year or two since pH levels can change over time, particularly if acidifying fertilisers are used or the area has been regularly cropped with legumes.

Electro-conductivity

Soil electro-conductivity (EC) is a measure of soil salt levels and provides a good indication of soil health. An EC meter can be used to provide a quick reading of the electro-conductivity of a soil sample. A higher EC reading indicates that electrons are flowing faster through the soil and indicates that there are probably more nutrients available to feed plants. However, extremely high levels indicate toxic levels of chemicals in the soil (salinity). Low readings indicate an infertile soil.

Soil Temperature

Soil temperature can be measured using a portable temperature meter with a probe pushed down to a depth of 10-15cm. This enables farmers to determine when to sow (i.e. when germination temperatures are suitable for a crop or pasture species). However, it is important not to rely on one reading. Several readings in different parts of the field or paddock to be seeded should be taken since temperatures can vary from place to place. One high reading may give you a false outlook on the overall temperature conditions of the site.

Water Conditions

The quality and quantity of water available will determine what crops or animals can be raised. Too much water can be as devastating as too little; and a good supply of water is only valuable if the quality is adequate. Some farming techniques make more efficient use of water than others (e.g. hydroponic produce may require less water than row cropping but water quality must be excellent). Water quality may be gauged by taking simple measurements such as EC (*see the lesson on Water Management for further information*).

Monitoring Soil Moisture

Higher levels of nitrogen will bring an improved growth response in plants if soil is moist, but are wasted when soil is dry. It is useful to make two or more nitrogen applications to a broad-acre crop (e.g. wheat) if and when moisture is appropriate. It is also important to pay attention to soil moisture at critical stages (e.g. sowing, tillering, flowering and pre-harvest). A neutron probe installed and monitored by a licensed operator may be used to make such measurements. Other options which can be monitored by farmers include water potential sensors (e.g. tensiometers, granular matrix sensors), and the more accurate water content sensors (e.g. capacitance sensors, time and frequency domain sensors).

Electromagnetic Characteristics

The electromagnetic characteristics of a site may indicate certain things about

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Suggested Tasks

Search online and watch a short video or two in relation to soil testing.

For example, if you have never used an EC meter try searching for “video, how to use a soil EC meter”.

If you have never tested a soil for moisture using a sensor try searching for “video, how to measure soil moisture using water content sensor”.

crop or livestock production capabilities, such as:

- Sources of underground water
- Natural radiation which can influence growth rates
- Subsurface characteristics, such as certain mineral deposits

Factors affecting electromagnetic conductivity may include:

- Size of pores (porosity or spaces between soil particles)
- Amount of water between pores
- Soil temperature
- Salinity in soil and groundwater
- Mineral material in soil (e.g. clay, rock type)
- Amount of organic material

Electromagnetic characteristics of a soil can be measured by using survey probes. Dual probes measure data from horizontal and vertical electromagnetic fields at the same time. It does take a degree of experience to use and interpret the results from such a probe, so be cautious about who advises you.

Herbicide or Pesticide Resistance

The effectiveness of certain chemicals can decline as weed or pest strains develop more resistance. It is valuable to ascertain if this is happening and change pesticide or weed control practices when it is seen to ensure good control.

One possible benefit of weeds building resistance to a particular chemical is that it may be possible for scientific researchers to isolate genes responsible for resistance and to introduce them into selected crop plants, thus widening the potential use of that chemical.

Proximity to transport is an agricultural advantage