



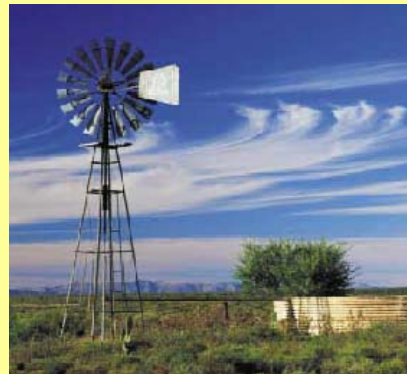
NQF Level: 1

US No: 116165

# Learner Guide

## Primary Agriculture

# Natural Resource Management



My name: .....

Company: .....

Commodity: ..... Date: .....

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agriculture

Department:  
Agriculture  
REPUBLIC OF SOUTH AFRICA



## Before we start...

Dear Learner - This Learner Guide contains all the information to acquire all the knowledge and skills leading to the unit standard:

<b>Title:</b>	Define production and understand the basic activities of production / conversion in the agri-business environment		
<b>US No:</b>	<b>116165</b>	<b>NQF Level:</b>	<b>1</b>
		<b>Credits:</b>	<b>2</b>

The full unit standard is attached at the end of this module. Please read the unit standard at your own time. Whilst reading the unit standard, make a note of your questions and aspects that you do not understand, and discuss it with your facilitator.

This unit standard is one of the building blocks in the qualifications listed below. Please mark the qualification you are currently doing:

Title	ID Number	NQF Level	Credits	Mark
National Certificate in Animal Production	48970	1	120	<input type="checkbox"/>
National Certificate in Mixed Farming Systems	48971	1	120	<input type="checkbox"/>
National Certificate in Pant Production	48972	1	120	<input type="checkbox"/>

Please mark the learning program you are enrolled in:

Are you enrolled in a:	Y	N
Learnership?	<input type="checkbox"/>	<input type="checkbox"/>
Skills Program?	<input type="checkbox"/>	<input type="checkbox"/>
Short Course?	<input type="checkbox"/>	<input type="checkbox"/>

Your facilitator should explain the above concepts to you.

You will also be handed a Learner Workbook. This Learner Workbook should be used in conjunction with this Learner Guide. The Learner Workbook contains the activities that you will be expected to do during the course of your study. Please keep the activities that you have completed as part of your Portfolio of Evidence, which will be required during your final assessment.

You will be assessed during the course of your study. This is called *formative assessment*. You will also be assessed on completion of this unit standard. This is called *summative assessment*. Before your assessment, your assessor will discuss the unit standard with you.

**Enjoy this learning experience!**

## How to use this guide ...

Throughout this guide, you will come across certain re-occurring “boxes”. These boxes each represent a certain aspect of the learning process, containing information, which would help you with the identification and understanding of these aspects. The following is a list of these boxes and what they represent:



**What does it mean?** Each learning field is characterized by unique terms and **definitions** – it is important to know and use these terms and definitions correctly. These terms and definitions are highlighted throughout the guide in this manner.



You will be requested to complete **activities**, which could be group activities, or individual activities. Please remember to complete the activities, as the facilitator will assess it and these will become part of your portfolio of evidence. Activities, whether group or individual activities, will be described in this box.



**Examples** of certain concepts or principles to help you contextualise them easier, will be shown in this box.



This box indicates a **summary** of concepts that we have covered, and offers you an opportunity to **evaluate** your **own progress** and / or to **ask questions** to your facilitator if you are still feeling unsure of the concepts listed.

### My Notes ...

You can use this box to jot down questions you might have, words that you do not understand, instructions given by the facilitator or explanations given by the facilitator or any other remarks that will help you to understand the work better.

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# What are we going to learn?

<b>What will I be able to do? .....</b>	<b>4</b>
<b>What do I need to know? .....</b>	<b>4</b>
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## What will I be able to do?

**When you have achieved this unit standard, you will be able to:**

- Understand the components of the agricultural sector and the term production.
- Understand the basic functions of the production process and the production factors used in the production process in an agri-business.
- In addition they will be well positioned to extend their learning and practice into other areas of agriculture benefiting the industry in terms of efficiency.
- Learners will understand the importance of the application of business principles in agricultural production.
- They will be able to operate farming practices as businesses and will gain the knowledge and skills to move from a subsistence orientation to an economic orientation in agriculture.
- Farmers will gain the knowledge and skills to access mainstream agriculture through a business-orientated approach to agriculture.

## What do I need to know?

No learning is assumed to be in place.

## Learning Outcomes?

**When you have achieved this unit standard, you will have a basic knowledge and understanding of:-**

- The agricultural environment.
- Agricultural production.
- Basic components of production systems.
- Use of inputs to produce outputs.
- The relation between inputs and outputs.
- The relevant actions in the production process.
- Agricultural business environment.
- Basic business principles.
- The relation between agriculture and business principles.
- The purpose of understanding agricultural conversion and production.

# Natural Resource Management in Agriculture

In order to practice sustainable production the production system as a whole has to be taken into account. A number of specific strategies have to be introduced that take into account factors such as:

- The topography (lay of the land);
- Soil characteristics (type etc.);
- Climate (rainfall, temperature etc.);
- Pests (types and numbers of pests as well as timing of pests appearance);
- Local availability of inputs (water availability, distance to suppliers of inputs etc.); and
- Target of the grower (what does the grower want to achieve).

Despite the site-specific and individual nature of sustainable agriculture, several general principles can be applied to help growers select appropriate management practices:

- Selection of species and varieties those are suited to the site and to conditions on the specific farm.
- Diversification of production (crops and including livestock) and diversification of cultural practices to enhance the biological and economic stability of the farm.
- Management of the soil to enhance and protect soil quality.
- Efficient and humane use of inputs.
- The consideration of farmers' goals and lifestyle choices.

## My Notes ...

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## Session

# 1 The Agricultural production environment – rudiments and components

After completing this session, you should be able to:

**SO 1: Describe the rudiments and components of the agricultural production environment.**

**In this session we explore the following concepts:**

- ◆ The Agricultural production sector in general.
- ◆ The historical, demographic and geographic extent of the Agricultural sector.
- ◆ The various types of Agriculture production facilities.

## 1.1 The Agricultural production Sector



### **Agriculture**

Agriculture is the process of producing food, feed, fibre and other desired products by the cultivation of certain plants and the raising of domesticated animals (livestock).

The practice of agriculture is known as farming. The involvement of scientists, inventors and people involved with the improvement of farming methods and farm implements is known as their engagement in agriculture.

The sector of the economy made up of agriculture, forestry, hunting and fishing is known as the Agricultural Sector.

## The Department of Agriculture (DoA)

The Department of Agriculture of South Africa is the Custodian of Agriculture in the country. Their focus and drive are summarised in their Vision and Mission.

### VISION

The vision of the Department of Agriculture is "A united and prosperous agricultural sector".

### MISSION

The Department of Agriculture aims to lead and support sustainable agriculture and rural development through:

- ◆ Ensuring access to sufficient safe and nutritious food
- ◆ Eliminating skewed participation and inequity in the sector.
- ◆ Maximizing growth, empowerment and income in the agriculture sector.
- ◆ Enhancing the sustainable management of natural agricultural resources and ecological systems.
- ◆ Ensuring efficient and effective governance.
- ◆ Ensuring knowledge and information management.

### VALUES

The Department of Agriculture describes their values through six (6) terms or phrases, "Bambanani", "Drive", "Excellence", "Innovation", "Integrity" and "Maak 'n plan". These are defined as:

- **Bambanani:** We believe that the sum of our collective efforts will, and should be greater than the total of our individual efforts.
- **Drive:** We are purposeful and energised in all that we do.
- **Excellence:** We commit to exceeding our customers' expectations for quality, responsiveness, and professional excellence.
- **Innovation:** We motivate and reward creativity, innovation and new knowledge generation that support outstanding performance.
- **Integrity:** We maintain the highest standards of ethical behaviour, honesty and professional integrity.
- **Maak 'n plan:** We always find a way to make it happen.



Agriculture is the process of producing food, feed, fibre and many other desired products by the cultivation of certain plants and the raising of domesticated animals (livestock). The practice of agriculture is also known as "farming", while scientists, inventors and others devoted to improving farming methods and implements are also said to be engaged in agriculture.

Increasingly, in addition to food for humans and animal feeds, agriculture produces goods such as cut flowers, ornamental and nursery plants, timber or lumber, fertilizers, animal hides, leather, industrial chemicals (starch, sugar, ethanol, alcohols and plastics), fibres (cotton, wool, hemp, and flax), fuels (methane from biomass, bio diesel) and both legal and illegal drugs (biopharmaceuticals, tobacco, marijuana, opium, cocaine). Genetically engineered plants and animals produce specialty drugs.

In the Western world, the use of gene manipulation, better management of soil nutrients, and improved weed control has greatly increased yields per unit area. At the same time, the use of mechanization has decreased labour requirements. The developing world generally produces lower yields, having less of the latest science, capital, and technology base.

Modern agriculture depends heavily on engineering and technology and on the biological and physical sciences. Irrigation, drainage, conservation and sanitary engineering, each of which is important in successful farming, are some of the fields requiring the specialized knowledge of agricultural engineers.

Hydroponics, a method of soil less gardening in which plants are grown in chemical nutrient solutions, may help meet the need for greater food production as the world's population increases.

The packing, processing, and marketing of agricultural products are closely related activities also influenced by science. Methods of quick-freezing and dehydration have increased the markets for farm products.

South Africa has an essentially dual agricultural economy, comprising a well-developed commercial sector and a predominantly subsistence-oriented sector in the rural areas.



Only about 13% of South Africa's surface area can be used for crop production, of which just 22% can be classified as high-potential land. Some 1,3 million hectares (ha) are under irrigation.

The most important factor limiting agricultural production is the availability of water. Rainfall is distributed unevenly across the country, with almost 50% of water being used for agricultural purposes.



Primary agriculture contributes about 2,6% to the gross domestic product (GDP) of South Africa and almost 9% of formal employment. However, there are strong backward and forward linkages into the economy, so that the agro-industrial sector is estimated to comprise 15% of GDP. For the past five years, agricultural exports have contributed on average approximately 8% (7% in 2001) of total South African exports.

Although the commercial farming sector is relatively well developed, people in some rural areas still survive on subsistence farming. It is the eighth largest wine producer in the world, and the eleventh largest producer of sunflower seed. South Africa is a net exporter of agricultural products and foodstuffs, the largest number of exported items being sugar, grapes, citrus, nectarines, wine and deciduous fruit.

The largest locally produced crop is maize, and it has been estimated that 9 million tons is produced every year, with 7.4 million tons being consumed. Livestock are also popular on South African farms, with the country producing 85% of all meat consumed. The dairy industry consists of around 4300 milk producers providing employment for 60 000 farm workers and contributing to the livelihoods of around 40 000 others.



Please complete Activity 1 in your learner workbook

**My Notes ...**

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**My Notes ...**

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## 1.2 Types of Agriculture

The table below is a summary of types of agriculture found in South Africa, examples of the crops and the provinces where these are grown predominantly.

What kind of Agricultural Sector	Examples of the Crop	Which province
<b>GRAIN, CEREALS AND OILSEEDS</b>	Maize, Grain, Canola, Barley.	Orange Free state & Western Cape.
<b>NATURAL PRODUCTS</b>	Growth in global demand for organic foods is beginning to make an impact on top end South African markets, leading a number of farmers to turn to organic production methods that preserve the soil by crop rotation and natural composting, without the use of synthetic fertilisers or chemical pesticides. Herbs and teas, and crops used in cosmetics, toiletries and health products.	All nine provinces of South Africa.
<b>VEGETABLES</b>	Commercial farmers produce the bulk of vegetables such as onions, potatoes, carrots, beans, cabbages and brassica.	All nine provinces of South Africa.
<b>VITICULTURE</b>	Wine Grapes and Table Grapes.	Western Cape and Northern Cape.
<b>ANIMAL PRODUCTS</b>	Cattle, Sheep, Pigs, Goats, Poultry, Ostrich, Egg production and Dairy production.	All nine provinces of South Africa.
<b>FLOWERS</b>	Floriculture export market.	<i>Gauteng</i> - roses, chrysanthemums, carnations and gladioli. <i>Western Cape</i> - Indigenous flora or "fyn bos", flowers Ferns, proteas, Leucodendrons and greens.
<b>FRUIT</b>	Citrus, deciduous fruits like apples, pears, grapes, and stone fruits such as plums, peaches and apricots, sub-tropical fruit such as pineapples, bananas and mangos.	7 of the 9 provinces of South Africa.



Please complete Activity 2 in your learner workbook

**My Notes ...**

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### 1.3 Concepts in agriculture

The section below deals with concepts within agricultural production. A number of definitions of terms relevant to agriculture are provided.



There are various definitions and concepts that you might encounter in terms of South African agricultural production and conversion that are important to understand. The table below list a few of these concepts.

<b><i>Aeroponics</i></b>	A hydroponics' technique involving the use of sprayers, foggers, or other devices to create a fine mist of solution to deliver nutrients to plant roots.  Aeroponic techniques are used in the cultivation of high value crops and plant specimens that can offset the high set-up and maintenance costs associated with this method of horticulture.
<b><i>Aerial topdressing</i></b>	The spreading of fertilisers such as super phosphate over farmland. For spraying of insecticides and fungicides, by air, also called crop dusting.
<b><i>Agricultural machinery</i></b>	One of the most revolutionary and impactful applications of modern technology. Given the truly elemental human need for food, agriculture has been an essential human activity almost from the beginning, and it has often driven the development of technology and machines. Over the last 250 years, advances in farm equipment have dramatically changed the way people are employed and produce their food worldwide.
<b><i>Animal husbandry</i></b>	The agricultural practice of breeding and raising livestock. As such, it is a vital skill for farmers and, in some countries in many ways, as much art as it is science. Other countries have strict laws on the qualifications needed to treat animals and ensure that scientific methods are used to care for them.

<b><i>Aquaculture</i></b>	The cultivation of the natural produce of water (such as fish or shellfish, algae and other aquatic plants). Mari culture is specifically marine aquaculture, and thus is a subset of aquaculture. Some examples of aquaculture include raising catfish and tilapia in freshwater ponds, growing cultured pearls, and farming salmon in net-pens set out in a bay. Fish farming is a common type.
<b><i>Beekeeping or apiculture</i></b>	The practice of intentional maintenance of honeybee hives by humans. A beekeeper may keep bees in order to collect honey and beeswax, or for the purpose of pollinating crops, or to produce bees for sale to other beekeepers. A location where bees are kept is called an apiary.
<b><i>Crop rotation</i></b>	The practice of growing a series of dissimilar type of crops in the same space in sequential seasons to avoid the build-up of pathogens and pests that often occurs when one species is continuously cropped. Crop rotation also seeks to balance the fertility demands of various crops to avoid excessive depletion of soil nutrients. A traditional component of crop rotation is the replenishment of nitrogen through the use of legumes in sequence with cereals and other crops. It is one component of polyculture. Crop rotation can also improve soil structure and fertility by alternating deep-rooted and shallow-rooted plants.
<b><i>Concentrated Animal Feeding Operation (CAFO, factory farming)</i></b>	In agriculture, a <b>Concentrated Animal Feeding Operation (CAFO)</b> is a farm that raises livestock and seeks to maximize production by making highly efficient use of space and other resources. Operating a CAFO is sometimes negatively referred to as factory farming.  CAFOs hold large numbers (up to hundreds of thousands) of animals, often indoors. These animals are typically cows, hogs, or chickens.
<b><i>Composting</i></b>	The decomposed remnants of organic materials (those with plant and animal origins). Compost is used in gardening and agriculture, mixed in with the soil. It improves soil structure, increases the amount of organic matter, and provides nutrients. Biodegradation is the means by which organic matter is recycled in its environment.
<b><i>Dairy farming</i></b>	A class of agricultural, or more properly, an animal husbandry enterprise, raising female cattle for long-term production of milk, which may be either processed on-site or transported to a dairy for processing and eventual retail sale. Most dairy farms sell the male calves borne by their cows, usually for veal production, rather than raising non-milk-producing stock. Many dairy farms also grow their own feed, typically including corn, alfalfa, and hay. This is fed directly to the cows, or stored as silage for use during the winter season. Additional dietary supplements are added to the feed to increase quality milk production.
<b><i>Detasseling</i></b>	The act of removing the pollen-producing (or "male") tassel from a corn (maize) plant. Detasseling is done to breed, or hybridise, two different varieties of corn; the varieties are carefully selected so that the variety bred will exhibit hybrid vigour. By removing the tassels from all plants of one variety, all the grain growing on those plants will be fertilized by the other variety's tassels.
<b><i>Domestication</i></b>	The occurrence whereby a wild biological organism is habituated to survive in the company of human beings. Domesticated animals, plants, and other organisms are those whose collective behaviour, life cycle, or physiology has been altered as a result of their breeding and living conditions being under human control for multiple generations. Humans have brought these populations under their care for a wide range of reasons: for help with various types of work, to produce food or valuable commodities (such as wool, cotton, or silk), and to enjoy as pets or ornamental plants.

<b>Fencing</b>	In agriculture, fences are used to keep animals in or out of an area.
<b>Fertilizers</b>	<p>Are compounds given to plants with the intention of promoting growth; they are usually applied either via the soil, for uptake by plant roots, or by foliar spraying, for uptake through leaves. Fertilizers can be organic (composed of organic matter, i.e. carbon based), or inorganic (containing simple, inorganic chemicals). They can be naturally occurring compounds such as peat or mineral deposits, or manufactured through natural processes (such as composting) or chemical processes.</p> <p>Fertilizers typically provide, in varying proportions, the three major plant nutrients (nitrogen, phosphorus, and potassium), the secondary plant nutrients and sometimes trace elements with a role in plant nutrition.</p>
<b>Greenhouse or hothouse</b>	A building where plants are cultivated. A greenhouse is built of glass or plastic; it heats up because the sun's incoming electromagnetic radiation warms plants, soil, and other things inside the building. Air warmed by the heat from hot interior surfaces is retained in the building by the roof and wall.
<b>Harvest</b>	<p>In agriculture, <b>harvesting</b> is the process of gathering mature crops from the fields. Reaping is the harvesting of grain crops. The harvest marks the end of the growing season, or the growing cycle for a particular crop. <i>Harvesting</i> in general usage includes the immediate post-harvest handling, all of the actions taken immediately after physically removing the crop—cooling, sorting, cleaning, packing—up to the point of further on-farm processing, or shipping to the wholesale or consumer market.</p> <p>Harvest timing is a critical decision that balances the likely weather conditions with the degree of crop maturity. Weather events like frost, and unseasonably warm or cold periods, affect yield and quality. An earlier harvest date may avoid damaging conditions, but result in poorer yield and quality. Delaying harvest may result in a better harvest, but increases the risk of weather problems. Timing of the harvest often involves a significant degree of gambling.</p> <p>On smaller farms with minimal mechanization, harvesting is the most labour-intensive activity of the growing season. On large, mechanized farms, harvesting utilizes the most expensive and sophisticated farm machinery, like the combine harvester.</p>
<b>Hybrid seed</b>	<p>In agriculture and gardening, <b>hybrid seed</b> is seed produced by artificially cross-pollinated plants. Hybrids are bred to improve the characteristics of the resulting plants, such as better yield, greater uniformity, improved colour, disease resistance, and so forth.</p> <p>Today, hybrid seed is predominant in agriculture and home gardening, and is one of the main contributing factors to the dramatic rise in agricultural output during the last half of the 20th century. Hybrid seed cannot be saved, as the seed from the first generation of hybrid plants does not reliably produce true copies, therefore, new seed must be purchased for each planting.</p>
<b>Hydroponics</b>	The growing of plants without soil. A variety of techniques exist.
<b>Integrated Pest Management (IPM)</b>	The pest control strategy that uses an array of complementary methods: natural predators and parasites, pest-resistant varieties, cultural practices, biological controls, various physical techniques, and pesticides as a last resort. It is an ecological approach that can significantly reduce or eliminate the use of pesticides.



<b>Irrigation</b>	The replacement or supplementation of rainfall with water from another source in order to grow crops. In contrast, agriculture that relies only on direct rainfall is sometimes referred to as dry land farming.
<b>Livestock</b>	Domesticated animals intentionally reared in an agricultural setting to make produce such as food or fibre, or for their labour. Livestock include pigs, cattle, goats, deer, sheep, yaks and poultry. The type of livestock reared varies worldwide and depends on factors such as climate, consumer demand, native animals, local traditions, and land type.
<b>Market gardening</b>	<p><b>Market gardening</b> as a business is based on providing a wide range and steady supply of fresh produce through the local growing season. Many different crops and varieties are grown, in contrast with large, industrialized farms, which tend to specialize in high volume production of single crops, a practice known as monoculture.</p> <p>Market gardening also employs more manual labour and gardening techniques, compared to large-scale mechanized farming. Because production is relatively low-volume, sales are often through local fresh produce outlets, such as on-farm stands, farmers' markets, community-supported agriculture subscriptions, restaurants and independent produce stores.</p>
<b>Mechanised agriculture</b>	The process of using agricultural machinery in order to massively increase output. In modern times, machinery has replaced many jobs formerly carried out by men or beasts such as horses, donkeys or oxen.
<b>Monoculture</b>	Describes the practice of relying on a very small number of genetic variants, or cultivars of a food crop for commercial agricultural. Modern agriculture relies on standardization on a single cultivar so that the technology for tilling, planting, pest control, and harvesting, can be used over large geographical areas to obtain an economy of scale.
<b>No-till farming</b>	In no-till farming the soil is left intact and crop residues are left in the fields. Variations of the conservation tillage method involve some working of the soil with attention paid to keeping soil compaction and carbon loss at a minimum. These variations include <b>reduced tillage</b> , in which small strips may be ploughed to allow space for planting seeds. Other terms, such as <b>incomplete tillage</b> and <b>minimal tillage</b> may be used.
<b>Organic farming</b>	A form of agriculture that relies on ecosystem management and attempts to reduce or eliminate external agricultural inputs, especially synthetic ones. It is a holistic production management system that promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity.
<b>Plant breeding</b>	Has been practiced for thousands of years, since near the beginning of human civilization. Government institutions and commercial enterprises now practice it worldwide. International development agencies believe that breeding new crops is important for ensuring food security and developing practices of sustainable agriculture through the development of crops suitable for their environment.
<b>Permaculture</b>	A design system which aims to create sustainable habitats by following nature's patterns. Permaculture can best be described as an ethical design system applicable to food production and land use, as well as community building. It seeks the creation of productive and sustainable ways of living by integrating ecology, landscape, organic gardening, and architecture and agro forestry.



<b>Pollination management</b>	The label for horticultural practices that accomplish or enhance pollination of a crop, to improve yield or quality, by understanding of the particular crop's pollination needs, and by knowledgeable management of colonisers, pollinators, and pollination conditions.
<b>Precision farming or Precision agriculture</b>	<p>An agricultural concept relying on the existence of <i>in-field variability</i>. It requires the use of new technologies, such as global positioning (GPS), sensors, satellites or aerial images, and information management tools (GIS) to assess and understand variations. Collected information may be used to more precisely evaluate optimum sowing density, estimate fertilizers and other inputs needs, and to more accurately predict crop yields.</p> <p>Application of precision farming concepts is usually considered related to sustainable agriculture. It seeks to avoid applying same practices to a crop, regardless of local soil/climate conditions and may help to better assess local situations of disease or lodging.</p> <p>Precision farming may be used to improve a field or a farm management from several perspectives:</p> <ul style="list-style-type: none"> <li>• Agronomical perspective: adjustment of cultural practices to take into account the real needs of the crop rather (e.g., better fertilization management).</li> <li>• Technical perspective: better time management at the farm level (e.g. planification of agricultural activity).</li> <li>• Environmental perspective: reduction of agricultural impacts (better estimation of crop nitrogen needs implying limitation of nitrogen run-off).</li> <li>• Economical perspective: increase of the output and/or reduction of the input, increase of efficiency (e.g.; lower cost of nitrogen fertilization practice).</li> </ul>
<b>Season extension</b>	Refers to anything that allows a crop to be cultivated beyond its normal outdoor growing season.
<b>Seed saving</b>	<p>Open pollination is the key to seed saving. Plants that reproduce through natural means tend to adapt to local conditions, and evolve as reliable performers, particularly in their localities. The modern trend to hybridised plants interrupts this process. Hybrid plants are artificially cross-pollinated, and bred to favour desirable characteristics, like higher yield and more uniform size.</p> <p>However, the seed produced by the first generation of the hybrid does not reliably produce a true copy of that hybrid (it begins to revert to its parents), or is sterile, and is therefore fairly useless for seed saving.</p>
<b>Seed testing</b>	<p><b>Trained and usually certified analysts perform seed testing in dedicated laboratories.</b> The tests are designed to evaluate the quality of the seed lot being sold. Several tests are done:</p> <ul style="list-style-type: none"> <li>• Germination test: Reports the percentage of seed that germinated. Tests are usually made in 200 or 400 seed samples.</li> <li>• Purity test: The percentage of seed described on the label that is actually found in the quantity of seed.</li> <li>• TZ test: A test for viability that involves soaking the seed in a tetrazolium solution, cutting the seed open, and looking for a colour change in the seed embryo.</li> <li>• Weed test: Examines a sample of seed and identifies every seed that is different from the seed that is different from the labeled seed kind.</li> </ul>

<b>Subsistence farming</b>	A mode of agriculture in which a plot of land produces only enough food to feed the family working it. Depending on climate, soil conditions, agricultural practices and the crop grown, it generally requires between 1,000 and 40,000 m <sup>2</sup> (0.25 and 10 acres) per person.
<b>Succession planting</b>	<p>In agriculture, <b>succession planting</b> refers to several planting methods that increase crop availability during a growing season by making efficient use of space and timing.</p> <p>There are four basic approaches, that can also be combined:</p> <ul style="list-style-type: none"> <li>• <b>Two or more crops in succession:</b> After one crop is harvested, another is planted in the same space. The length of the growing season, climate, and crop selection is key factors. For example, a heat-loving summer crop could follow a cool season spring crop.</li> <li>• <b>Same crop, successive plantings:</b> Several smaller plantings are made at timed intervals, rather than all at once. The plants mature at staggered dates, establishing a continuous harvest over an extended period. Lettuce and other salad greens are common crops for this approach.</li> <li>• <b>Two or more crops simultaneously:</b> Non-competing crops, often with different maturity dates, are planted together in various patterns. Intercropping is one pattern approach; companion planting is a related, complementary practice.</li> <li>• <b>Same crop, different maturity dates:</b> Several varieties are selected, with different maturity dates: early, main season, late. Planted at the same time, the varieties mature one after the other over the season.</li> </ul>
<b>Sustainable agriculture</b>	<p>Integrates three main goals: environmental stewardship, farm profitability, and prosperous farming communities. These goals have been defined by a variety of disciplines and may be looked at from the vantage point of the farmer or the consumer. To some it is a means of continuing agriculture as usual with increased care for these three factors, while for others it is a deeper commitment to practicing agriculture in a manner those accords with natural flows.</p> <p>The latter is considered the only real form of sustainability while the former is a practical approach for gradual improvements, which in themselves introduce other negative factors that require further modifications.</p>
<b>Vegetable farming</b>	Has traditionally been done in long rows. This allows machinery to cultivate the fields, increasing efficiency and output.
<b>Tillage or cultivation</b>	<p>The agricultural preparation of the soil to receive seeds. Primary tillage loosens the soil and mixes in fertilizer and/or plant material, resulting in soil with a rough texture. Secondary tillage produces finer soil and sometimes shapes the rows. It can be done by a using various combinations of equipment: plough, disk plough, harrow, dibble, hoe, rotary tillers, sub-soiler, ridge or bed forming tillers and roller.</p> <p>Tillage can also mean the land that is tilled.</p>
<b>Weed control</b>	A botanical component of pest control, stops weeds from reaching a mature stage of growth when they could be harmful to domesticated plants, sometimes livestock, by using manual techniques including soil cultivation, mulching and herbicides. Prevention of weeds from growing is desirable, but often difficult to achieve, due to the resilient fertilization and growth patterns of weeds.

## 1.4 What is a farming system?

Farming is an example of a primary industry. Like a factory, a farm is a system of inputs, processes and outputs.

The inputs can be divided into human and physical factors. Human inputs include labour, capital (money), machinery, seeds, fertiliser and young stock. Physical inputs include climate and weather, soil, relief (shape of the land) and slope.

The processes are the happenings that link with one another on the farm. These may include harvesting, ploughing, rearing animals and milking.

Classification of agricultural facilities



Farms can be classified arable land, those with pastures, mixed farms and market gardens.

Farms with arable lands are used to grow crops. The farms containing primarily pastures specialise in the rearing of animals. Mixed farms are normally those that contain both pastures and arable fields. The term mixed farms may however also refer to those where more than one product is produced.

Farming systems that require a high level of inputs are called intensive systems. Intensive farming is normally associated with high yields. An example would be table grape farming in the de Doorns area of the Western Cape.

Farming systems that require a lower input and provide lower output per hectare are called **extensive systems**. An example of extensive farming systems would be sheep farming in the Karoo where sheep are grazing in the open veldt.

Farming systems can also be classified according to their outputs.

In Subsistence the farmer himself consumes farming the produce. The farmer would usually grow enough produce for own consumption only. Subsistence farming, by definition, produces only enough food to sustain the farmers through their normal daily activities. It is a harsh way of living. Good weather may occasionally allow subsistence farmers to produce a surplus for sale or barter, but surpluses are rare.

Because surpluses are rare, subsistence farming does not allow for growth, the accumulation of capital or even for much specialization of labour. The farming family is left almost entirely without implements or goods that it cannot produce by itself.

Where the majority of the produce is sold for to generate and income for the farmer, these are known as commercial farms.

	<b>Extensive</b>	<b>Intensive</b>
<b>Commercial</b>	Sheep farming in Karoo. The poor soils and harsh climate make this area ideal for sheep farming.	Market gardening in the North West Province. Good Soils and a mild climate make for good conditions.
<b>Subsistence</b>	Nomadic pasture farming in Eastern Cape.	Pen Pig or chicken farming.



Please complete Activity 3 in your learner workbook

**My Notes ...**

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## 1.5 Farming systems of South Africa

### ■ Dry land farming

Dry land farming is an agricultural technique for cultivating land, which receives little rainfall. In such cases there are no dams or irrigation systems installed on the farm allowing the farmer to irrigate his crops.

Dry land farming is normally practiced in areas that receive sufficient rainfall to sustain the crop through sufficient soil moisture and so no irrigation system is necessary.

### ■ Irrigated Farming

Irrigation is a key contributor in the agricultural economy of many parts of the world. Irrigation farming refers to a system where water is moved from a water source to an area where farming activities are taking place. Water can be moved trough furrows, pipes or other systems. The water is then applied to the farming crop via sprinklers systems, drip systems or furrow irrigation.

## ■ Hydroponics Farming

Hydroponics farming is a term that is used to refer to crops that are grown:

- ◆ In a water medium without soil.
- ◆ Nutrients are added to this water medium.

It is probably the most productive way of growing plants. Plants that grow in this way generally show maximum yields, flavour, vitamin and essential oil content. It is however very expensive to set up a hydroponics' system, and it is labour intensive. A variety of specialised hydroponics techniques are applied.

## ■ Cooperative farming

Cooperative farming is a system, in which farmers pool their resources for cooperation and cooperate. The two main fields in which the farmers cooperate are:

- ◆ Agricultural supply cooperatives - purchase of supplies (seeds, fertilizers, etc.) and services.
- ◆ Agricultural marketing cooperative - transformation, packaging, distribution and marketing of produce.

Cooperative farming is not the same as **collective farming**. In a collective farming system farmers pool nearly all resources, including labour, land or produce itself. At the same time some economists consider collective farming as a special, although extreme, case of cooperative farming.

The first farmers' cooperatives were created in Europe during the second half of the nineteenth century. Their systems spread to North America and the other continents. This has become one of the tools of agricultural development in emerging countries.

## ■ Collective farming

Collective farming is an organizational unit in agriculture in which the labour is not paid wages. The labour rather receives a share of the farm's net output. The process of establishing collective farms is called collectivisation. An example of this type of farming system is the internationally known Kibbutz system found in Israel.

## 1.6 The history of agriculture

### ■ From Hunting to Farming

For millions of years, our ancestors have been hunters and gatherers that is why they were organised in small bands and followed the wild animals as they moved and plants matured with the changing seasons. Radical changes began to develop some 10,000 years ago when, in different parts of the world, societies began to develop farming skills. This so-called agricultural revolution through which the domestication of animals and breeding of plants occurred was fundamental to the development of history.

### ■ History of Agriculture in South Africa

South Africa has a proud history in Forestry and Agriculture. Commercial Agriculture dates back to the early European settlement in the Cape Peninsula where gardens were established to replenish supplies of fresh produce for ships travelling via Cape Town to Asia. Forestry was also one of the first Industries to be developed in South Africa as almost no natural forests occur in this country. South Africa is generally recognised as one of the first countries to have established plantations of exotic species, required to satisfy the need for wood products.

Both Forestry and Agriculture represent a major resource for South Africa. Production of food, fibre and fruit is essential to the well being of South Africa. The Forestry and Agricultural Industries have a long and successful history in South Africa. This sector has seen major accomplishments in a country plagued by intermittent drought and a relatively little arable land. Self-sufficiency in food production has been the norm for the country while solid wood and fibre products have been produced for more than 100 years.

In recent times, both the Agriculture and Forestry Industries have become internationally recognised as important exporters of high-quality products. In this regard, the export of fruit and fibre (paper and pulp) is perhaps best recognised. Today, it is common to see South African fruit and fruit products on shelves in virtually every part of the world. Similarly, South African Forestry Companies are recognised as leaders in the production of high-quality paper and pulp.

The development of export industries based on Forestry and Agriculture was severely curtailed by boycotts aimed at damaging the viability of the previous Apartheid regime in South Africa. The dawn of a new and Democratic Government and the emergence of the African Renaissance have brought South Africa squarely into the international arena of traders. At the same time, world competition for markets has increased considerably, and aggressive and novel strategies will, increasingly, be a feature of successful business.



## 1.7 The history of the South African Department of Agriculture

The history of the Department of Agriculture dates back to before the Union of South Africa. In 1909 there were still four colonial departments of agriculture. They were joined together in a single body in 1911, a year after unification. At its inception in 1911 the Department of Agriculture consisted of 18 divisions:

- A Secretariat; Veterinary Services; Veterinary Research; Sheep and Wool; Dairying; Entomology; Grasses and Botany; Plant Pathology and Mycology; Tobacco and Cotton; Horticulture; Oenology; Chemistry; Publications; Co-operative Associations; Brand Marks and Fencing; Dry land Farming; Grain Inspection and Guano Islands.

The first re-organisation followed in 1912 when agricultural education - with the colleges of agriculture at Elsenburg, Cedara, Potchefstroom and Grootfontein (Glen would follow in 1919) as service points - was transferred from Education to Agriculture.

Control of the Faculty of Agriculture at Stellenbosch - amalgamated with the Elsenburg College of Agriculture in 1926 - was transferred from Education to Agriculture in the same year. In 1940 the Faculty of Agriculture at the University of Pretoria was also transferred to the Department, and the Natal Research Institute followed in 1948. The need for local training of veterinarians was provided for in 1922 with the foundation of the Faculty of Veterinary Science in collaboration with the former Transvaal University College (later the University of Pretoria).

While the emphasis during the first 12 years of expansion of departmental services was mainly on agricultural education, it shifted to extension services in 1924. To affect closer liaison with the farming community and coordination with extension work of the colleges and divisions, a new division, Extension, was instituted in 1924. Its first project was the Agricultural Demonstration Train that traversed the country.

The year 1924 also saw the introduction of a new Division of Animal Husbandry and Agronomy, which took over part of the work of Sheep and Wool. It was also decided in 1924 that the five colleges of agriculture should concentrate more specifically on the branches of farming predominating in their various service areas.

The late twenties were characterised by accelerated re-organisation. The new Division of Economics and Marketing was introduced in 1925. In 1926 the agricultural colleges came under the control of Extension, which was then reconstituted as the Division of Agricultural Education and Extension, and into which the Division of Publications was incorporated.



In 1927 Veterinary Research and Field Services were amalgamated and a year later the functions of Agronomy and Animal Husbandry were divided between the enlarged Division of Veterinary Services and Livestock Industry and the new Division of Botany.

Expansion in the thirties and forties included refinement of the plant industry functions when full divisions were established for Horticulture (including oenology and fruit inspection), Entomology, and Botany and Plant Pathology. In the same year the Division of Agricultural Education made way for the revival of the Division of Animal Husbandry and Agronomy, which included Education and Extension.



<b>Concept (SO 1)</b>	<b>I understand this concept</b>	<b>Questions that I still would like to ask</b>
<ol style="list-style-type: none"><li>1. General knowledge about the Agricultural production sector is demonstrated.</li><li>2. Knowledge on the historical, demographic and geographic extent of the Agricultural sector is demonstrated.</li><li>3. Knowledge about the various types of production facility within Agriculture is demonstrated.</li></ol>		

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Session

# 2 The Components and Purposes of basic Production Systems

*After completing this session, you should be able to:*

**SO 2: Identify the components and purposes of basic production systems.**

**In this session we explore the following concepts:**

- ◆ Different inputs applied in an agri-production process with reference to specific systems.
- ◆ The use of production inputs.
- ◆ The Occupational Health and Safety Act.
- ◆ Components of agricultural production systems.
- ◆ Products produced in agricultural production systems.

## 2.1 Identification of different inputs applied in an agri-production process with reference to basic specific systems

In order to farm commercially, profitably and scientifically, it is important to obtain the correct inputs (materials, tools and chemicals).

Most farm inputs are purchased and include:

- Crop protection chemicals.
- Fertilisation chemicals.
- Farming equipment such as vehicles, tractors, spray-pumps, etc.
- Farm tools such as spades, shovels, forks, hoe's pickaxes, etc.
- Feed.

- Seed.
- Energy such as diesel, gas, electricity etc.

The costs of all of these items together make up the production cost of commercial farming. Production costs are susceptible to economic conditions.



Please complete Activity 4 in your learner workbook

**My Notes ...**

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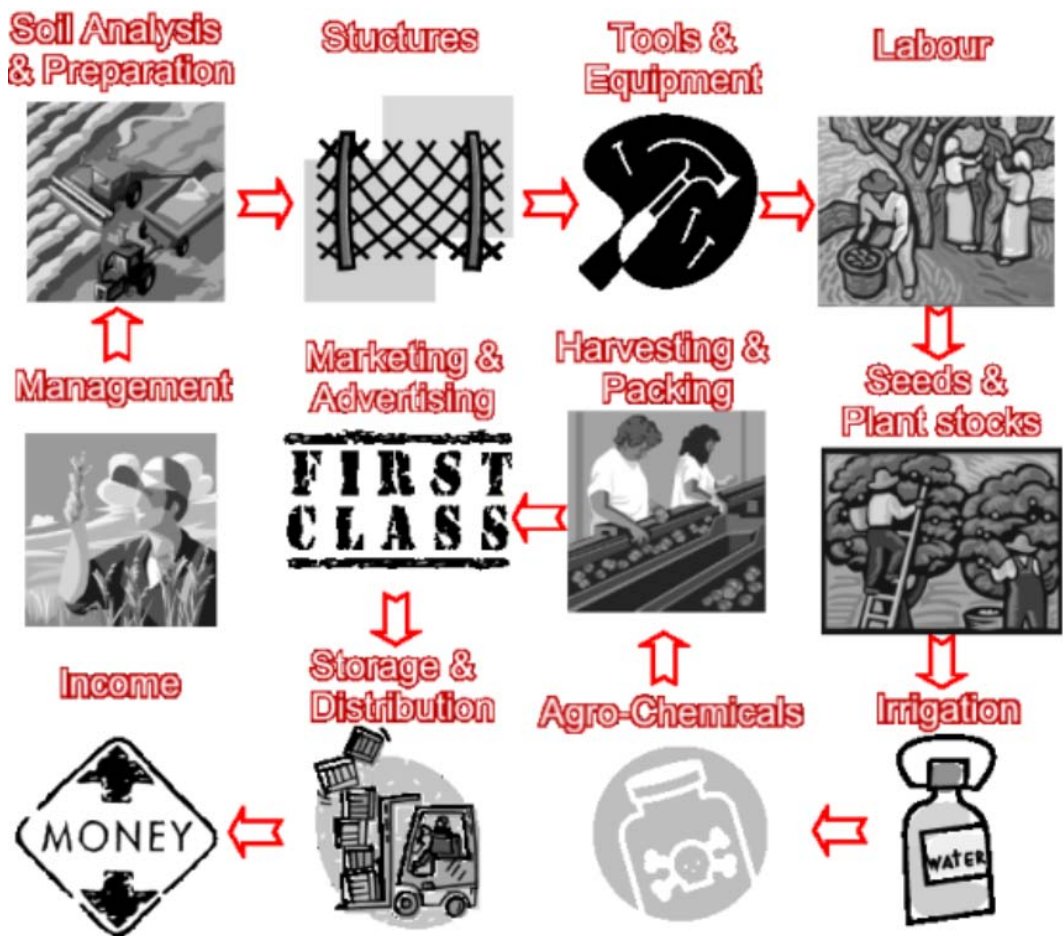
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## 2.2 The inputs and outputs of farming





Please complete Activity 5 in your learner workbook

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## 2.3 Responsible use of Agriculture production inputs

Production inputs are costly. They also determine the success of production and therefore also the margin of profit that you will make from your crop. It is thus critical that the inputs are handled with care and used correctly.

Inaccurate measurement of crop protection chemicals and fertilisers could lead to too much or too little of the compounds being applied. This means that you could be spending money on compound that has been wasted. Similarly you may think you will save money by using less fertiliser, but when too little chemicals are applied they could be ineffective. In this way your crops could sustain long-term damage or death due to incorrect applications.

**Chemicals** are hazardous, and handling chemicals incorrectly could hold health hazards to personnel. This could cost the farm dearly in terms of medical fees, fixing of equipment and loss of labour.

**Vehicles and tools** are expensive and have to be managed, maintained and used in such a way that the maximum use is made thereof. Use the correct tool for the job. Keep to maintenance schedules and store equipment properly.

**Feed** is essential to your animals. If feed is stored incorrectly, losses occur if animals die, are poisoned or have insufficient food.

**Seed** is essential to the production of crops on the farm. If seed is ordered incorrectly, the wrong crop or wrong cultivar will be planted. This could mean that the incorrect crop will be produced or the cultivar is not suited to the area of production. Seed stored or handled incorrectly could lead to losses due to lower germination rates and thus lower crop yields.

**Energy** is a non-renewable resource. We have a responsibility to the economics of the farm as well as the environment to use energy sparingly and efficiently.



Please complete Activity **6** in your learner workbook

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## 2.4 Occupational Health and Safety Act and warning signs is demonstrated

The Occupational Health & Safety Act prescribes certain workplace regulations that are meant to ensure a safe working environment that protects both the employees and the employers. It also contributes indirectly to ensuring food safety.

■ **Health, hygiene, uniforms and food safety.**

Uniforms are not only designed to be smart, but also to provide the wearer with the necessary protection. For example: a uniform is designed in such a way as to protect your arms, chest, legs and feet from injury as a result of chemical burns.

■ **Uniforms and protective clothing should always be:**

- ◆ Clean and freshly laundered.
- ◆ In good condition.
- ◆ Closed, flat, safety shoes only.
- ◆ Shoes must be clean, polished, in good condition.



Please complete Activity **7** in your learner workbook

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**Hygiene challenges in the agricultural industry**



Jobs within the agriculture industry are varied and often physically demanding and it is likely that staff will become hot and sweaty when working, resulting in bad body odour. This can be uncomfortable or offensive to other people they work with. Personal hygiene is about keeping the body clean and healthy. This is important because the body carries bacteria on the skin and in body fluids that can be transferred to surfaces or areas

that are touched, especially food.

**Health**

Personal hygiene is an important aspect of how you take care of and demonstrate your respect for yourself. Good personal hygiene is an important aspect of taking care of your health, and also influences how people respond to you in a working and social situation.

*In the table below you will find guidelines to the various categories of personal hygiene and reasons why they are important*

Category	Reasons
<b>Regular Bathing/Showering</b>	All staff should at least wash, bath or shower once a day to diminish body odours that is caused by the breakdown of sweat. Hair should also be washed regularly.
<b>Deodorant</b>	<ul style="list-style-type: none"> <li>Some agri-processing establishments have strict rules on the use of perfume in certain areas. It is the responsibility of staff to find out the organisation’s requirements with regards to this aspect of personal presentation.</li> <li>Be aware that some people may be sensitive to strong smelling perfumes especially in areas where food is being processed.</li> <li>Strong perfumes can contaminate food.</li> <li>Do not use perfume to cover up bad body odour this can only be removed by showering everyday.</li> </ul>
<b>Washing Hands</b>	<p>Hands carry bacteria and because hands are used for almost every activity, they should be washed before handling food, coming on duty or entering the pack store and after any activity that could contaminate them.</p> <p>These activities include:</p> <ul style="list-style-type: none"> <li>touching or scratching any part of the body including areas such as ears, mouth, nose or hair,</li> <li>blowing noses or using a handkerchief or tissue,</li> <li>touching dirty equipment or work surfaces,</li> <li>handling food,</li> </ul>



	<ul style="list-style-type: none"> <li>• handling money,</li> <li>• smoking a cigarette, and</li> <li>• using the toilet</li> </ul> <p><b>Washing hands properly:</b> Hands should be washed thoroughly in a hand basin using hot water and anti-bacterial soap; it is not enough to rinse them under running water. A food sink should not be used as it is used for washing equipment. When washing hands follow the steps below:</p> <ul style="list-style-type: none"> <li>• Water should be warm.</li> <li>• Use an anti-bacterial soap.</li> <li>• Wet hands and arms thoroughly and lather both the hands and arms up to the elbows.</li> <li>• Scrub the hands thoroughly and use a brush to remove any dirt from under the nails.</li> <li>• Rub hands with soap for at least 20 seconds.</li> <li>• Rinse hands thoroughly under hot running water.</li> <li>• Dry hands using a paper towel. Never dry hands on aprons or wiping cloths, with cloth towels or under electrical hand dryers, as this promotes the growth and spread of bacteria.</li> </ul>
<p style="text-align: center;"><b>Smoking</b></p>	<p>Staff may under no circumstances smoke in the food-processing unit. Smoking is prohibited because :</p> <ul style="list-style-type: none"> <li>• saliva comes into contact with the fingers and can spread ;</li> <li>• Saliva particles, or cigarette ash and butts can land in the food.</li> <li>• smoking encourages coughing;</li> <li>• smoking may result in an unsatisfactory work atmosphere for non-smokers;</li> <li>• there is a risk of contaminating production areas from fingers touching the lips while smoking; and</li> <li>• Cigarette ends, contaminated with saliva are placed on work surfaces.</li> </ul>
<p style="text-align: center;"><b>Cleaning Teeth</b></p>	<p>Teeth that are not brushed regularly lead to bad breath, tooth decay and gum disease.</p> <p>Badly looked after teeth and bad breath are noticeable and will affect the personal image of the staff member and the image of the establishment.</p> <p>In order to care for teeth properly, follow these general rules:-</p> <ul style="list-style-type: none"> <li>• Brush teeth each morning and evening.</li> <li>• Visit a dentist at least once a year.</li> </ul>

### ■ Actions to take when you or other staff are sick

If any of the staff have an illness or infection, report this to the Foreman or Manager, who will decide if they may continue to work. If the condition is sensitive, staff may discuss it with the Human Resources Manager, who will take it up with the Production manager.

A doctor's certificate must be obtained if staff have an illness which prevents them from working or which is infectious. It is not advisable to work if you have an infectious stomach illness.



The table below summarises common illnesses or diseases that may contaminate food with viruses or bacteria. It is thus important to avoid these in the interest of food safety:

Illnesses	Interaction Steps
<b>Tuberculosis, Colds &amp; Flu</b>	Diseases like tuberculosis, colds and influenza are very infectious diseases that are passed onto other people by the germs released into the air when staff cough or sneeze. Each time staff cough, sneeze or blow noses into a handkerchief or tissue, staff must wash their hands thoroughly. If staff find out that they have any of these illnesses they must tell their supervisor immediately and see a doctor, who will then determine the severity and whether there is a risk to the safety of other staff members and food product. These types of illnesses fall into a high-risk area in terms of food product and human safety.
<b>Mumps/ Measles/ Chicken Pox</b>	These are infectious illnesses and can be contagious to other staff members as well as contaminating the product. Staff should therefore not work, even if they feel well enough, nor interact with others but rather be booked off by a doctor.
<b>Headache</b>	<i>Depending on the severity of the condition, staff may be able to interact with others due to the fact that this is not contagious. Should staff require medication to rectify the condition, the medication should be one that does not include drowsiness as a side effect, as it might be detrimental to their own, other staff members and to the safety of the food product.</i>
<b>Migraine</b>	This is a condition, although not contagious, can be very dangerous for food safety. It can cause vomiting and nausea. Staff suffering from this condition should therefore not work. Noise and bright lights should also be avoided as this can intensify the situation.
<b>Diarrhoea</b>	It is a symptom of another type of illness which might be detrimental to food safety. Staff should see a doctor who will decide on the seriousness of the disease and who will assess the risk to the safety of the food product. If it is a virus, staff should not interact, nor work with others, as this could be contagious. It is preferable that staff with this condition refrain from working with the food product.
<b>Other</b>	Other illnesses that will not allow staff to interact with others are for example, hepatitis and certain skin conditions. HIV, although infectious, is only infectious under certain circumstances, e.g. contact with blood or through sexual transmission. It is important to the possible risk to food safety. Care should be taken not to victimise HIV/AIDS sufferers. Extra precaution must be taken in the form of providing disposable protective gloves as part of uniform and ensure that all staff are well informed on HIV/Aids.

## 2.5 Health & Safety Warning Signs that pertain to Food Safety Practices

■ **Danger signs**



Please complete Activity **8** in your learner workbook

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Fruit is not necessarily always used in its raw form. Sometimes the fruit is processed and a secondary product is sold.

Processing includes:

- ◆ **Juicing**; e.g. making juice from oranges.
- ◆ **Drying**; e.g. drying peaches.
- ◆ **Canning**; e.g. canned fruit salad.
- ◆ **Pulping**; e.g. using granadilla seeds and flesh around seed to make pulp.
- ◆ **Freezing**; e.g. frozen berries.
- ◆ **De-seeding of edible seeds**; e.g. harvesting sunflower seed or nuts.
- ◆ **Expressing oil**; e.g. obtaining oil from the pressing of grape seed.
- ◆ **Fermenting and distilling**; e.g. adding yeast to fruit juice to make fruit wines and possibly distilling it into alcohol



# Session **3** Production factors in Agriculture

After completing this session, you should be able to:

**SO 3: Identify basic production factors used in the agricultural production process.**

**In this session we explore the following concepts:**

- ◆ The term production.
- ◆ The interaction between inputs and outputs.
- ◆ The transformation / conversion process.
- ◆ The activities of elementary production management.

## 3.1 Understanding the term production



**Production:**

Manufacturing or mining or growing something (usually in large quantities) for sale; "introducing more efficient methods of production". Making goods available.

In the case of a fruit farm, the fruit is the product that is produced to sell to the consumer in order to make a profit. To produce fruit (the output), we require infrastructure and inputs.

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## **3.2 The interaction between inputs and outputs**

There is usually a direct link between the inputs and outputs. What you put in is what you will get out. If you for example have grown a crop of high quality fruit such as apples, your inputs would have had to be high. You then export these fruit and receive a high price for the exported fruit (you achieve a high output). If on the other hand you minimise the inputs to the bare minimum, you can expect a crop of low quality. In such a case the fruit cropped may only be suitable for juicing which return with a much lower price.

The same rule applies to fruit that is packed. Fruit of lower quality will receive a lower price per ton than a better quality crop.

## **3.3 The transformation / conversion process:**

Transformation of the produce occurs when the final product, which is marketed, differs completely from the original produce. It will likely contain the original produce fruit as an ingredient but will look different. Examples are:

- ◆ Maize meal from maize.
- ◆ Ice cream with banana flavour.
- ◆ Fermented cider.
- ◆ Muffins containing fruit as an ingredient.

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## 3.4 Production management

**Production Management:**

Coordinating and controlling all the activities required to ensure successful production of the crop.

Production management refers to the process of coordinating the different aspects of the farming operation. The idea is to manage it in such a way that the maximum output benefit will be gained for the farm.

**A production manager typically has the following duties and corresponding skills:**

- ◆ **Verbal Communication** - Talking to others to convey information effectively
- ◆ **Management of Personnel Resources** - Motivating, developing, and directing people as they work, identifying the best people for the job
- ◆ **Negotiation** - Bringing individuals together in an attempt to reconcile differences
- ◆ **Management of Financial Resources** - Determining how money will be spent to get the work done, and accounting for these expenditures
- ◆ **Coordination** - Adjusting actions
- ◆ **Critical Thinking** - Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems
- ◆ **Management of Material Resources** - Obtaining and ensuring that appropriate use of equipment, facilities, and materials are adhered to
- ◆ **Written Communication** - Communicating effectively in writing as appropriate for the needs of the audience
- ◆ **Judgment and Decision Making** - Considering the relative costs and benefits of potential actions to choose the most appropriate one
- ◆ **Mathematics** - Using mathematics to solve problems





# Session 4 Production and conversion in Agriculture

*After completing this session, you should be able to:*

**SO 4: Define the production and conversion process in terms of an agricultural business environment.**

**In this session we explore the following concepts:**

- ◆ The basic agricultural business environment.
- ◆ The Agricultural production process in terms of business concepts.
- ◆ Production and conversion in terms of business concepts.

## 4.1 The basic agricultural business environment

No matter how well you run your business or how good your product is, you won't achieve success if you don't understand the business environment in which it operates. You need to plan your production accordingly. You need to be aware of the forces driving your industry and know your competition as well as your customers.



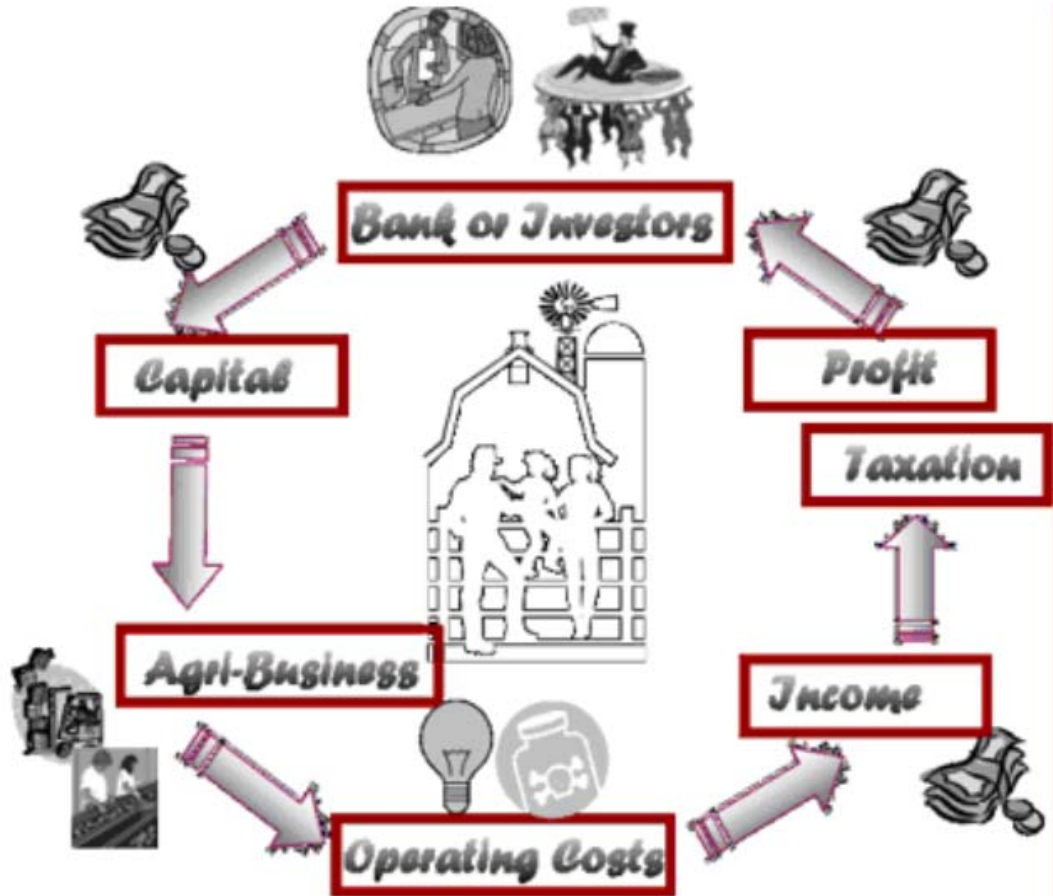
### ***Agricultural Business:***

Agricultural Business: Agricultural businesses focus on the application of business concepts to the agriculture industry.

It refers to all the economic activities associated with the production and processing of agriculture from the provision of farm inputs, farming and value addition.

Any business organization that supplies farm inputs or services, or that processes, distributes, or wholesales agricultural products, or retails them to consumers.

**The production cycle:**



Please complete Activity **10** in your learner workbook

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## 4.2 The Agricultural production process in terms of business concepts



### ***Production in the agriculture sector:***

The sector of the food production and marketing system in which purchased inputs, natural resources, and managerial talent come together to produce crop and livestock products.

**Each agricultural business will supply and require the following in their business:**

- Services.
- Goods.
- Needs.
- Wants.
- Marketplace.

**The services that a farm might offer include:**

- Transportation of the fruit directly to the door of the wholesaler.
- On-farm accommodation.

**The services that a farm might need include:**

- Specialist advice on pesticides.
- Telecommunication.
- Financial institution's assistance.
- Irrigation specialists.

**The goods that a farm might offer include:**

- The fruit that has been produced.
- A processed version of the fruit that has been produced such as dried fruit or juice.

**The goods that a farm might require include:**

- Agro-chemicals.
- Vehicles.
- Packaging.
- Parts.
- Office furniture.

**The needs that a farm might fulfill:**

- The consumer's hunger.
- The consumer's request for a specific type of fruit.
- The consumer's request for a specific fruit product such as jam, dried fruit, etc.

**The needs that a farm has are:**

- Financial.
- Structural.
- Infrastructure.
- Human Resource related.
- Natural resource related.

The needs of a farm are centralised around making the maximum profit. The needs that the consumer has are for high value products at reasonable prices, of consistent quality and that is not damaging to their health.

**The marketplace to which the farm supplies can be:**

- Direct to the consumer via farm stalls or direct sales.
- To the pack house for packing, grading and sorting.
- To the wholesaler if the farm has its own pack house.
- To the export market if the farm has its own pack house.

**Certain marketplaces also supply the farm of goods. They are numerous, but examples are:**

- Agro-chemical suppliers.
- Packaging suppliers.
- Transportation companies.

## 4.3 Production and conversion

Many end users of agricultural products have limited appreciation and understanding of the production processes. In addition, the consumers of the food products may not fully understand the purpose of the processes used to convert the raw materials into safe, convenient and nutritious foods.

■ Various different conversion systems in agriculture exist:

- ◆ Animal production systems, such as farm processing techniques.
- ◆ Storage and transportation of raw commodities.
- ◆ The most recent developments in precision agriculture.
- ◆ Unit operations associated with food processing such as heating, cooling, freezing, thermal and non-thermal preservation, drying, and packaging.
- ◆ Regulatory requirements for cleaning and sanitation of equipment.
- ◆ The handling and treatment of food wastes.
- ◆ Unique processes for biological materials including fermentation and separation.

An example to explain this: The fruit produced on the farm is the product. It wasn't always there. It had to be produced in the orchard with trees that had flowers that were fertilised to form fruit. To get the tree to grow, the orchard had to be established, fertilised, irrigated and to obtain the fruit, someone had to harvest it.





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4. [www.wikipedia.com](http://www.wikipedia.com)

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# Acknowledgements

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**SOUTH AFRICAN QUALIFICATIONS AUTHORITY****REGISTERED UNIT STANDARD:****Demonstrate an understanding of the importance of marketing**

<b>SAQA US ID</b>	<b>UNIT STANDARD TITLE</b>		
116164	Demonstrate an understanding of the importance of marketing		
<b>SGB NAME</b>	<b>NSB</b>	<b>PROVIDER NAME</b>	
SGB Primary Agriculture	NSB 01-Agriculture and Nature Conservation		
<b>FIELD</b>		<b>SUBFIELD</b>	
Agriculture and Nature Conservation		Primary Agriculture	
<b>ABET BAND</b>	<b>UNIT STANDARD TYPE</b>	<b>NQF LEVEL</b>	<b>CREDITS</b>
Undefined	Regular	Level 1	2
<b>REGISTRATION STATUS</b>	<b>REGISTRATION START DATE</b>	<b>REGISTRATION END DATE</b>	<b>SAQA DECISION NUMBER</b>
Registered	2004-10-13	2007-10-13	SAQA 0156/04

**PURPOSE OF THE UNIT STANDARD**

A learner achieving this unit standard will be able to demonstrate an understanding of the importance of marketing within the agricultural production process.

Learners will understand the importance of the application of business principles in agricultural production with specific reference to marketing and delivery.

They will be able to operate farming practices as businesses and will gain the knowledge and skills to move from a subsistence orientation to an economic orientation in agriculture. Farmers will gain the knowledge and skills to access mainstream agriculture through a business-orientated approach to agriculture.

**LEARNING ASSUMED TO BE IN PLACE AND RECOGNITION OF PRIOR LEARNING**

No learning assumed to be in place.

**UNIT STANDARD RANGE**

Whilst range statements have been defined generically to include as wide a set of alternatives as possible, all range statements should be interpreted within the specific context of application.

Range statements are neither comprehensive nor necessarily appropriate to all contexts. Alternatives must however be comparable in scope and complexity. These are only as a general guide to scope and complexity of what is required.

**UNIT STANDARD OUTCOME HEADER**

N/A

**Specific Outcomes and Assessment Criteria:****SPECIFIC OUTCOME 1**

Understand what is meant by "marketing concept".

**OUTCOME RANGE**

The marketing concept includes, but is not limited to supply and demand, pricing, information and regulations and standards as well as the distribution channels.

## **ASSESSMENT CRITERIA**

### **ASSESSMENT CRITERION 1**

An understanding of the "marketing concept" is demonstrated.

### **ASSESSMENT CRITERION 2**

The role of price is demonstrated.

### **ASSESSMENT CRITERION 3**

The role of demand and supply within marketing processes is demonstrated.

### **ASSESSMENT CRITERION 4**

The importance of quality of products/services within the marketing process is identified.

### **ASSESSMENT CRITERION 5**

An awareness of the legal environment that impacts within the marketing process is demonstrated.

## **SPECIFIC OUTCOME 2**

Understand the differences between and the value of demand and production driven farming practices.

### **OUTCOME RANGE**

Demand and supply and the context of the specific agricultural commodity /service e.g. price, quality and consumer preferences.

## **ASSESSMENT CRITERIA**

### **ASSESSMENT CRITERION 1**

The ability to identify and define the relevance and relationship between demand and supply for a specific agricultural commodity is demonstrated.

### **ASSESSMENT CRITERION 2**

An awareness of the dangers involved within production-driven agricultural production is demonstrated.

### **ASSESSMENT CRITERION 3**

An awareness of the need for and advantages of demand-driven agricultural production is demonstrated.

### **ASSESSMENT CRITERION 4**

The importance of and the need for quality products and services are defended.

## **SPECIFIC OUTCOME 3**

Identify the principles and factors of demand and supply and therefore basic price formulation.

### **OUTCOME RANGE**

The factors influencing both demand and supply (internal and external factors - climatic, economic, shifts in demand, population growth, soil restraints, organic produce, etc) should be dealt with and how it impacts on price.

## **ASSESSMENT CRITERIA**

### **ASSESSMENT CRITERION 1**

An ability to identify internal and external factors impacting on supply (production side) is demonstrated.

**ASSESSMENT CRITERION 2**

An ability to identify internal and external factors impacting on demand (needs of clients) is demonstrated.

**ASSESSMENT CRITERION 3**

An understanding of how the factors impacting on the demand and supply of agricultural products and services, may impact on prices is demonstrated.

**ASSESSMENT CRITERION 4**

How price changes may impact on the production process are demonstrated and understood.

**SPECIFIC OUTCOME 4**

The principles of marketing as demonstrated by the needs of customers/clients.

**OUTCOME RANGE**

The learner should be aware of the importance of the marketing mix (product, packaging, promotion, price, place and people).

**ASSESSMENT CRITERIA**

**ASSESSMENT CRITERION 1**

The role of the quality of the product/service within the demand for the product/service is recalled.

**ASSESSMENT CRITERION 2**

The role of the packaging of the product within the demand for the product as well as pricing of it is recalled.

**ASSESSMENT CRITERION 3**

The role and value of promotional aspects within the marketing process are recalled.

**ASSESSMENT CRITERION 4**

The role of the pricing of the product/service within the marketing process is recalled.

**ASSESSMENT CRITERION 5**

The role of `place` or distribution of the product/service within the marketing process is recalled.

**ASSESSMENT CRITERION 6**

The importance of quality and dedicated people within the marketing process are recalled.

**UNIT STANDARD ACCREDITATION AND MODERATION OPTIONS**

The assessment of qualifying learners against this standard should meet the requirements of established assessment principles.

It will be necessary to develop assessment activities and tools, which are appropriate to the contexts in which the qualifying learners are working. These activities and tools may include an appropriate combination of self-assessment and peer assessment, formative and summative assessment, portfolios and observations etc.

The assessment should ensure that all the specific outcomes; critical cross-field outcomes and essential embedded knowledge are assessed.

The specific outcomes must be assessed through observation of performance. Supporting evidence should be used to prove competence of specific outcomes only when they are not clearly seen in the actual performance.

Essential embedded knowledge must be assessed in its own right, through oral or written evidence and cannot be assessed only by being observed.

The specific outcomes and essential embedded knowledge must be assessed in relation to each other. If a qualifying learner is able to explain the essential embedded knowledge but is unable to perform the specific outcomes, they should not be assessed as competent. Similarly, if a qualifying learner is able to perform the specific outcomes but is unable to explain or justify their performance in terms of the essential embedded knowledge, then they should not be assessed as competent.

Evidence of the specified critical cross-field outcomes should be found both in performance and in the essential embedded knowledge.

Performance of specific outcomes must actively affirm target groups of qualifying learners, not unfairly discriminate against them. Qualifying learners should be able to justify their performance in terms of these values.

- Anyone assessing a learner against this unit standard must be registered as an assessor with the relevant ETQA.
- Any institution offering learning that will enable achievement of this unit standard or assessing this unit standard must be accredited as a provider with the relevant ETQA.
- Moderation of assessment will be overseen by the relevant ETQA according to the moderation guidelines in the relevant qualification and the agreed ETQA procedures.

#### **UNIT STANDARD ESSENTIAL EMBEDDED KNOWLEDGE**

The person is able to demonstrate a basic knowledge of:

- The marketing concept and what it entails within agricultural production.
- The differences between production versus demand driven agricultural production.
- The components of the marketing mix and how it may impact on prices.
- The role of demand and supply within price formulation.

#### **UNIT STANDARD DEVELOPMENTAL OUTCOME**

N/A

#### **UNIT STANDARD LINKAGES**

N/A

### **Critical Cross-field Outcomes (CCFO):**

#### **UNIT STANDARD CCFO IDENTIFYING**

Problem Solving: relates to specific outcomes:

- Understand what is meant by "marketing concept".
- Understand the differences between and the value of demand and production driven farming practices.
- Identify the principles of demand and supply and therefore basic price formulation.

#### **UNIT STANDARD CCFO WORKING**

Teamwork: relates to all specific outcomes.

#### **UNIT STANDARD CCFO ORGANIZING**

Self-management: relates to all specific outcomes.

### **UNIT STANDARD CCFO COLLECTING**

Interpreting Information: relates to specific outcomes:

- Understand the differences between and the value of demand and production driven farming practices.
- Identify the principles of demand and supply and therefore basic price formulation.

### **UNIT STANDARD CCFO COMMUNICATING**

Communication: relates to all specific outcomes.

### **UNIT STANDARD CCFO SCIENCE**

Use Science and Technology: relates to specific outcome:

- Identify the principles of demand and supply and therefore basic price formulation.

### **UNIT STANDARD CCFO DEMONSTRATING**

The world as a set of related systems: relates to specific outcome:

- Identify the principles of marketing as demonstrated by the needs of customers/clients.

### **UNIT STANDARD CCFO CONTRIBUTING**

Self-development: relates to specific outcome:

- Identify the principles of marketing as demonstrated by the needs of customers/clients.

### **UNIT STANDARD ASSESSOR CRITERIA**

N/A

### **UNIT STANDARD NOTES**

N/A

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