

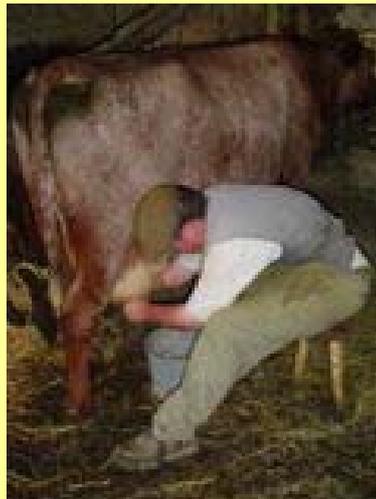


NQF Level: 1 US No: 116198

Learner Guide

Primary Agriculture

Harvest Animal Products



My name:

Company:

Commodity: Date:

Before we start...

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

Title: Harvest animal products
US No: 116198 NQF Level: 1 Credits: 5

The full unit standard will be handed to you by your facilitator. 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"/>

Please mark the learning program you are enrolled in:

Your facilitator should explain the above concepts to you.

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"/>

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.



The following box indicates a **summary** of concepts that we have covered, and offers you an opportunity 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?

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What will I be able to do?

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

- ◆ Understand and identify the readiness of animal products for harvesting and explain the procedure for harvesting of specific products.
- ◆ Understand and describe the origin of animal products for harvesting and use.
- ◆ Understand and describe the indicators and their status used to describe the readiness of the animal products for harvesting.
- ◆ Understand and describe the names, identification and potential of various animal products to be harvested.
- ◆ Describe and demonstrate correct procedures for the harvesting of specific animal products.

Learning Outcomes

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

- ◆ Animals that produce animal products to be harvested.
- ◆ The origin of animal products.
- ◆ The using of animal products for the benefit of both animals and man.
- ◆ Sensory observation and evaluation of animals and their products and their readiness for harvesting.
- ◆ Observation of animal production cycles over time.
- ◆ Animal classification, nomenclature and common name terms.
- ◆ The purpose of learning about animal production and products.

What do I need to know?

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

- ◆ No learning is assumed to be in place

Session

1

The origin of animal products for harvesting and use

After completing this session, you should be able to:

SO 1: Understand and describe the origin of animal products for harvesting and use.

In this session we explore the following concepts:

- ◆ The origin and purpose of animal products used by man in the animal before harvesting are identified and illustrated
- ◆ The animal products used by man are described and understood
- ◆ The use by man of the animal products to be harvested is described and understood

1.1 Introduction

From the very early years of the history of mankind, animals were used for different applications. Honey was harvested in biblical stories and animal skins and pelts were used for clothing. Animals were used for transporting goods and preparing the soil for planting.

These activities are still going on today. Animal products such as honey, milk, eggs, meat, skins, fibres, bones, feathers, marine animal products and even manure were used in the past and are still used every day.

It will be an impossible task to cover all the animal products used by mankind, therefore only some of the important products will be looked at. In South Africa there are a variety of animals used in farming enterprises for the products they produce.

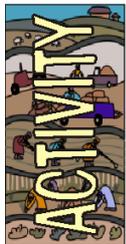
The biggest farming enterprises are the meat, wool, milk, eggs, fish and feather farming industries. However there are also many smaller industries such as honey, silk, exotic birds, exotic fish, dogs, cats and a lot of smaller farming enterprises.

For the purpose of this unit standard we will look at meat, wool, mohair, milk, eggs and feathers as well as a few of the byproducts of products of animal origin.

1.2 The origin of animal products for harvesting use

The most well-known product of farm animal origin is most certainly parts of the animal itself. Products such as meat, skins, tripe (offal), bones, horns and even the hooves, hair or wool can be used.

Meat production is a developed big farming industry and is growing all over the world. Cattle, sheep, pigs, goats and chickens are reared primarily for their meat. The fish-harvesting industry is also a big industry.



Please complete Activity **1 & Self test** in your learner workbook

My Notes ...

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1.3 Animal products most frequently used

The diet of most humans includes one or other animal product (unless they are vegetarians or vegans). Think of milk, eggs, meat, fish, honey and butter. Even certain medicines such as antibiotics are derived from animals (micro-organisms). Many items of clothing and shoes are made of animal fibres or leather.



Vegetarians Eat some animal products like cheese or milk

Vegans Eat no animal products at all

In the meat and fibre industries many people are involved in the process of production before the product is ready for use by the consumer.

At first, the animal must be fed and cared for so that it can grow to an acceptable stage where it can be slaughtered for its meat or sheared for its wool or hair. The same will happen with an ostrich or chicken: It will be fed till it reaches a certain stage then it will be slaughtered and used for feathers or meat. The ostrich or chicken can also be used for egg production in the adult stage.

Lambs are slaughtered when the carcass mass and quality is at a stage that is preferred by the customer. The quality and classification of the carcass will be determined by rules and recommendations lay down by the meat industry (the classification and grading system). After the carcass is classified and graded at an abattoir it is sold to the butcheries where it is presented to the end user as certain grades of lamb or mutton.

For wool and mohair production there are also guidelines and norms for the best time to shear the wool. The wool and mohair from young animals are, most of the time, the most sort-after and of the best quality. The reason for this is that, for both wool and mohair, the diameter of the fibre is directly responsible for the softness of the garment that is produced from it. The fibre must also grow for a certain time because the length plays a very important role in the manufacturing of textile material.

Wool, mohair and ostrich feathers need a certain amount of time to grow to a stage where it is ready for the market.

The production of eggs and milk are more complicated. The animal must first reach puberty (age where the animal can commence breeding), then, in the case of milk production, the female animal (milk producing animals include cows, goats or sheep) must mate with a male to conceive and produce a calf or lamb. Then the young will drink some of the milk and the "extra" milk is extracted from the cow or doe for human use.

In the case of chickens and ostriches the hen must reach puberty and then the daylight length plays an important role in the production of eggs. Through very careful selection over many decades breeders and farmers have successfully bred chickens that are able to lay an egg per day over long periods. The farmer controls the daylight length by means of artificial lights to stimulate egg production. The laying season of the chickens are then scientifically controlled. Other egg producing birds such as ostriches will have a breeding season when their eggs can be harvested.

1.4 Animal by-products used by mankind

There are many products and byproducts that are well known such as milk, wool, skins, honey and eggs. Then there are other byproducts that are not so well known such as medicines, pigment for the color in paint, glue and gelatin used for making jelly. These byproducts are normally manufactured in well-equipped processing and manufacturing plants.

The processing of skins starts on the farm or where the animals are slaughtered. The skin must be well-prepared before it is stored either in the dry or wet form. The skin is salted and sometimes dried. Then it is taken to a tannery where it is processed for different uses from the manufacturing of clothing and shoes to a variety of other uses.

Animal bones, horns and hooves can also be used in manufacturing of a variety of goods such as glue, gelatin and even ornaments. Fat is used to make soap. The bone itself is ground into a fine powder and used as bone meal. Bone meal is rich in calcium and phosphorous and is used in animal feed rations and as plant food to supplement phosphorous.



Concept (SO 1, AC 1-3)	I understand this concept	Questions that I still would like to ask
The origin and purpose of animal products used by man in the animal before harvesting are identified and illustrated		
The animal products used by man are described and understood		
The use by man of the animal products to be harvested is described and understood		

Session

2 The readiness of animal products for harvesting

After completing this session, you should be able to:

SO 2: Understand and describe the indicators and their status used to describe the readiness of the animal products for harvesting.

In this session we explore the following concepts:

- ◆ The indicators used to identify the readiness of the products to be harvested in an animal are described and understood
- ◆ The various levels of the status of the indicators of animal product readiness are described and understood
- ◆ The effect of the indicator on the product is described and understood

2.1 Introduction

Most of the products of animals cannot be harvested any time of the year or season. As explained in the previous session the harvesting of most products depends on their readiness for harvesting. This readiness is influenced by several factors.



Please complete Activity **2 & Self test** in your learner workbook

My Notes ...

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As explained in Session I, milk, eggs and many other products can be harvested only after puberty or after lambing or calving. That is because the animal is only capable of producing such products at that stage.

2.2 The readiness of wool and mohair for harvesting

The animal produces wool, mohair, cashmere and other fibres from birth, but the fibre diameter and length plays an important role in the quality and price of the final commodity. The wool and hair produced by the young merino lamb or Angora kid, respectively, will attain better prices at auctions than that of older animals.

Wool and mohair is sheared at certain stages. Wool will be sheared, most of the time between eight to twelve months of growth. That will produce a fibre with a length of between 50 – 60 mm for eight months of growth and 80 – 90 mm for twelve months of growth. Depending on the breed, it will either produce wool with a fibre diameter less than 20 μ for fine wool, between 20 μ and 21 μ for medium wool and more than 22 μ for strong wool. The fibre diameter of merino wool will be determined by the age of animal, breed of the merino, whether it is fine, medium or strong wool animal as well as the diet it receives during the wool growth period.

The length of hair growth in Angora goats is determined by the growth period but the fibre diameter is influenced primarily by the age of the goats. Young kinds up to 6 months of age will produce hair that grows approximately 25 mm a month depending on the availability of adequate, nutritious food. The fibre diameter of the hair will be in the range 20 μ to 25 μ and will be the most sort-after hair on the market. The next 6 months will produce hair with more mass but also with a thicker fibre diameter of between 25 μ and 30 μ . The length grown will be more or less the same: 25mm per month of growth. The growth rate will vary very little if a constant feed supply is given. The fibre diameter will increase up to 34 – 38 μ in the peak adult stages depending on the breed and nutritional level of the goat.

2.3 The readiness of meat for harvesting

Both beef and mutton can be harvested at different stages. Breeding stock is slaughtered only at the end of their productive lives, but their offspring are slaughtered when they will produce the best quality meat. For most mutton sheep breeds this is when they reach a body mass of between 35 and 45kg depending on the breed.

Breeds that tend to put on fat at an early age such as the Dorper, Persian and fat-tailed breeds will be slaughtered at between 35 – 42kg. At this stage the lambs will have very little fat and tender meat.

The mass of the carcass is approximately 45% of the live body mass of approximately between 17 – 20kg. This will give a high quality carcass.

Other breeds such as the S A Mutton Merino, the Dormer and other breeds that put on fat later will produce carcasses with weights between 20 – 25kg with the same characteristics as the lighter carcasses.

Young cattle vary more and are mostly fed in a feedlot (a place where animals are fattened for slaughtering) until they reach the correct slaughter stage. They are then slaughtered depending on their fatness and depending on the breed. The carcass mass can vary a lot. The carcass is also classified in the same manner as that of sheep and pigs on age, fat distribution and body conformation or condition score.

2.4 The readiness of feathers for harvesting

Feather production in geese and ducks will depend on the growth stage of the feather. As long as the feather grows, it will be unsuitable for plucking. If the feather-stem is dry it is an indication that the feather is mature and then the feathers can be plucked as well as the down. The down is used to make very light commodities like sleeping bags and light, puffed-up blankets like eiderdowns and comforters.



Down The **down** is very soft and light. These are the soft feathers that are found among the bigger feathers

Ostrich feathers are harvested at the mature stage. The feathers are either plucked or cut with a side cutter depending on the type of feathers. Feathers from the wings are more sort-after than the body feathers.



Concept (SO 2, AC 1-3)	I understand this concept	Questions that I still would like to ask
The indicators used to identify the readiness of the products to be harvested in an animal are described and understood		
The various levels of the status of the indicators of animal product readiness are described and understood		
The effect of the indicator on the product is described and understood		

Session

3

Names, identification and potential of various animal products

After completing this session, you should be able to:

SO 3: Understand and describe the names, identification and potential of various animal products to be harvested

In this session we explore the following concepts:

- ◆ The names, identification and potential of various animal products to be harvested.
- ◆ The effect of harvesting the product on the animal is described and understood.
- ◆ The specific animal products to be harvested and their parameters are described and understood.
- ◆ The potential of animal products that can be harvested are described and understood.

3.1 Introduction

As already mentioned, man uses many animal products. Some of the products are very scarce such as royal jelly produced and used by the bees to feed their queen and used by man for cosmetic purposes. Then there are products such as pigment (red pigment) which is harvested from a parasite that lives on prickly pears with the name of cochineal. This pigment is used in certain paints.

Animal products such as meat, milk, eggs, wool, mohair and honey can be produced nearly anywhere in the world. The previously mentioned products harvesting infrastructure are well researched and developed. The modern dairies are equipped with very modern equipment and the milk is produced in a very hygienic way. The same can be said of egg production.

There is an extensive industry built around milk and dairy products. Big manufacturing plants are erected to process milk into powder milk, cheese and other dairy products.



Please complete Activity **3a & b** in your learner workbook

My Notes ...

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3.2 The effect of harvesting on the animal.

Animals can be divided into two groups in this regard.

- ◆ Animals slaughtered when harvesting:

When harvesting meats an animal must be slaughtered

- ◆ Animals not slaughtered for their products to be harvested

Most animal-products are however harvested with very little if any effect on the animal's health. Such harvesting includes wool, mohair, honey, milk, semen & ova, eggs, feathers etc. It is however very important to handle and manage animals well to ensure good health and to reduce injury during the harvesting process. Dairy cows have to be fed well during lactation and has to undergo a dry period to ensure sufficient recovery before their next lactation period



Lactation:

When a female animal produce milk from their udders or teats

Dry period:

A dairy cow will continue to produce milk as long as she is regularly milked by the farmer, but she will produce less and less after a period. The farmer must then stop milking and give her a chance to recover as lactation will deplete her body reserves in the long run. (she goes on holiday for 2-3 months)

3.3 Less well-known animal by products

There are many byproducts that are produced by animals and used for different applications. Animal manure is one of the products produced by farm animals that are well-known as an animal byproduct because it is used by many farmers to fertilize their land and gardens. What is not so well-known is that farmers can also utilize bird manure. There are people that harvest seabird manure on remote islands and sell it to farmers for fertilizer. This bird manure is called **guano** and is very rich in nitrogen, a macro plant nutrient.

Some farmers also use manure gathered from broiler houses as cattle feed. The manure is rich in protein and energy and can be used as a cheap supplement instead of more expensive protein feed.

In South Africa there are fertilizer companies that process broiler and other chicken manure into a balanced pelleted fertilizer that is well utilized as an organic fertilizer.

3.4 The potential of use of animal products



Cream and butter

Today, milk is separated by large machines in bulk. The cream is processed and reduced variously to produce consumer products with varying names depending on the thickness of the cream and its suitability for uses in the kitchen in various countries. Some cream is dried and powdered, some is condensed (by evaporation) and mixed with varying amounts of sugar and canned. Most cream from New Zealand and Australian factories is made into butter. This is done by churning the cream until the fat globules coagulate and form a monolithic mass. The butter mass is washed and, sometimes, salted to improve keeping qualities. The residual buttermilk goes on to further processing. The butter is packaged (25 to 50 kg boxes) and chilled for storage and sale. At a later stage these packages are broken down into home-consumption sized packs. Butter sells for about US\$2200 a ton on the international market.

Skim milk

The product left after the cream is removed is called skim, or skimmed milk. Reacting skim milk with rennet or with an acid makes casein curds from the milk solids in skim milk, with whey as a residual. In some countries a portion of cream is returned to the skim milk to make *low fat milk* for human consumption. By varying the amount of cream returned producers can make a variety of low-fat milks to suit their local market. Other products, such as calcium, vitamin D (in northern hemisphere countries) and flavoring, are also added to appeal to consumers.

Casein

Casein is the predominant [phosphoprotein](#) found in fresh milk. It has a very wide range of uses from being a filler for human foods, such as in ice cream, to the manufacture of products such as fabric, adhesives, and plastics.

Cheese

Cheese is another product made from milk. Whole milk is reacted to form curds that can be compressed, processed and stored to form cheese. In countries where milk is allowed to be processed without [pasteurisation](#) a

wide range of cheeses can be made using the bacteria naturally in the milk. In most other countries the range of cheeses is smaller and the use of artificial cheese curing is greater. Whey is also the byproduct of this process.

Whey

In earlier times *whey* was considered to be a waste product and it was, mostly, fed to pigs as a convenient means of disposal. Beginning 1950, and mostly since 1980, lactose and many other products, mainly food additives, are made from both casein and cheese whey.

Yoghurt

Yoghurt (or yogurt) making is a process similar to cheese making, only the process is arrested before the curd becomes very hard.

Milk powders

Milk is also processed by various drying processes into powders. Whole milk and skim-milk powders for human and animal consumption and buttermilk (the residue from butter-making) powder is used for animal food. The main difference between production of powders for human or for animal consumption is in the protection of the process and the product from contamination. Many people in the world today drink milk reconstituted from powdered milk because milk is about 88% water and it is much cheaper to transport the dried product. Dried milk powder is worth about US\$2300 a [tonne](#) on the international market.



Concept (SO 3, AC 1-4)	I understand this concept	Questions that I still would like to ask
Understand and describe the names, identification and potential of various animal products to be harvested.		
The effect of harvesting the product on the animal is described and understood.		
The specific animal products to be harvested and their parameters are described and understood.		
The potential of animal products that can be harvested are described and understood.		

Session

4 Correct procedures for harvesting of specific animal products

After completing this session, you should be able to:

SO 4: Describe and demonstrate correct procedures for the harvesting of specific animal products.

In this session we explore the following concepts:

- ◆ The various procedures used for harvesting specific animal products are described and understood.
- ◆ The reasons for performing the specific procedures to harvest animal products are described and understood.
- ◆ The potential dangers to the animal and/or to the harvester of the animal products are described and understood.
- ◆ The preparatory, emergency, closing and procedural safety steps to be taken during the harvesting of animal products are described and understood.
- ◆ The equipment required to perform the procedures of the harvesting of animal products including safety equipment is described and understood.

4.1 Introduction

Some skills are needed to harvest certain animal products. It is impossible to demonstrate all the different ways that animals are put to use for mankind. Not all animals have been utilized by man but some like the horse and cattle have been used extensively in the past and even today. Horses are used to ride on, or as a traction animal. Bees are natural pollinators of fruit-bearing trees.

4.2 Harvesting milk

■ History

Historically, the milking and the processing took place in the same place: on a dairy farm. People milked cows by hand, in some countries small numbers of cows are still milked by hand. Hand-milking is accomplished by grasping the teats (tits) in the hand and expressing milk by either squeezing the fingers, progressively, from the udder end to the tip or by squeezing the teat between thumb and index finger then moving the hand downward from udder towards the end of the teat. And repeat using both hands for speed. Both methods result in the milk that was trapped in the milk duct being squirted out the end into a bucket that is supported between the knees (or rests on the ground) of the milker who usually sits on a low stool to accomplish the milking task.

In early times the cow, or cows, would stand in the field or paddock while being milked. Young stock, heifers, would have to be trained to remain still to be milked. In many countries the cows were tethered to a post and milked. The problem with this method is that it still relies on quiet animals because the milking end of the cow is not restrained. In northern countries where cows are kept in barns in winter, and much of the rest of the year, they are still tethered only by the neck or head, particularly where they are kept in small numbers.



■ Dairy processing

When it became necessary to milk larger numbers of cows, the cows would be brought to a shed or barn that was set up with bails (stalls) where the cows could be held from moving about while they were milked. One person could milk more cows this way, as many as 20 for a good milker. But having cows standing about in yard and shed waiting to be milked is not good for the cow as she needs as much time in the paddock, grazing, as is possible. It is usual to restrict the twice-daily milking to a maximum of an hour and a half each time. It makes no difference whether one milks 10 or 1000 cows, the milking time should not exceed a total of about three hours each day for any cow.

As herd sizes increased, or as machine-milking became more common and larger herd sizes were possible, there was more need to have efficient milking machines, milking sheds, milk-storage facilities (vats), shed cleaning capabilities and the means of getting cows from paddock to shed and back. Farmers, early, found that cows would abandon their grazing area and walk towards the milking area when the time came for milking. This is not surprising really as, in the flush of the milking season, cows must get very uncomfortable with udders full of milk and the place of relief for them is the milking shed.

As herd numbers increased so did the problems of animal health. In New Zealand two approaches to this problem have been used. The first was improved veterinary medicines that the farmer could use (and the government regulation of the medicines). The second was the generation of *veterinary clubs* where groups of farmers would employ a veterinarian full-time and share those services throughout the year. It was in the veterinarian's interest to keep the animals healthy and reduce the number of calls from farmers, rather than to ensure that the farmer needed to call for service and pay regularly.

Most dairy farmers milk their cows with absolute regularity at a minimum of twice a day, with some high producing herds milking up to four times a day to lessen the weight of large volumes of milk in the udder of the cow. This daily milking routine goes on for about 300 to 320 days per year that the cow stays in milk. Some small herds are milked once a day for about the last 20 days of the production cycle but this is not usual for large herds. If a cow is left unmilked just once she is likely to reduce milk-production almost immediately and the rest of the season may see her dried off (giving no milk) and still consuming feed for no production. However once a day milking is now being practised more widely in New Zealand for profit and lifestyle reasons. This is effective because the fall in milk yield is at least partially offset by labour and cost savings from milking once per day. This compares to some intensive farm systems in the United States that milk three or more times per day due to higher milk yields per cow and lower marginal labour costs.

Farmers who are contracted to supply whole milk for human consumption often have to manage their herd so that the contracted number of cows are in milk the year round, or the required minimum milk output is maintained. This is done by mating cows outside their natural mating time so that the period when each cow in the herd is giving maximum production is in rotation throughout the year. Northern hemisphere farmers who keep cows in barns almost all the year usually manage their herds to give continuous production of milk so that they get paid all year round. In the southern hemisphere the cooperative dairying systems allow for two months on no productivity because their systems are designed to take advantage of maximum milk production in the spring and because the milk processing plants pay bonuses in the dry season to carry the farmers through the mid-winter. Some year-round milk farms are penalised financially for over-production at any time in the year.

Artificial insemination is common in all high-production herds.

■ Simple dairying

When few cows were kept, up to about the beginning of the 20th century, the milk was usually consumed by the family keeping the cow(s). When people wanted cream, or butter, they would place the milk in a shallow pan in a cool part of their house—the "dairy"—and allow the butterfat portion of the milk to rise to the surface. After a day or so, usually in the cool of the morning, the surface of the milk was skimmed to remove the cream. The cream could then be churned so that the particles of butterfat would coagulate in the form of butter, leaving buttermilk. Butter is used as a spread on bread, as a cooking fat, as an addition to baked food such as cakes, as a shortening agent for pastries and a thickening in sauces and roux. It can also be purified and used as a heating and lighting oil.

When cheese is to be made the milk it is brought to the right temperature in a vat and then some form of "starter" (rennet, acid or bacteria, see skim milk below) is added to make curds set. The curds are removed and set in moulds or trays (depending on the cheese) and the excess whey is drained. The cheese may be compressed and the exterior may be treated with a variety of preparations, to hasten curing or to form a rind. After the required storage and processing the cheese is sold or consumed by the family.

In some countries this sort of family production is still the norm and the products made from milk vary widely depending on the animal that is milked and the traditional ways of consuming the products made from the milk. For example, today, butter is made in Tibet mainly for candles in monasteries. Desert people still process camel milk in goat-skin bags hung off the side of the camel, using the gait of the beast to process the milk.

■ Milking machines

Milking machines are used to extract milk from cows when the herd is larger than about 4 cows. The milking unit is the portion of a milking machine for removing milk from an udder. It is made up of a claw, four teatcups, long milk tube, long pulsator tube, and pulsator. The claw is manifold which connects the short pulse tubes and short milk tubes from the teatcups to the long pulse tubes and long milk tubes. Claws are commonly made of stainless steel or plastic. Teatcups are composed of a rigid outer shell (stainless steel or plastic), which holds a soft inner liner or inflation. Transparent sections in the shell may allow viewing of liner collapse and milk flow. The annular space between the shell and liner is referred to as the pulsation chamber.

Milking machines work in a way that is different from hand milking or calf suckling. Continuous vacuum is applied inside the soft liner to withdraw milk from the teat by creating a pressure difference across the teat canal (or opening at the end of the teat). Vacuum also helps keep the machine attached to the cow. The vacuum applied to the teat causes congestion of teat tissues (accumulation of blood and other fluids). Atmospheric air is admitted into the pulsation chamber about once per second (the pulsation rate), to allow the liner to collapse around the end of teat and relieve congestion in the teat tissue. The ratio of the time that the liner is open (milking) and closed (massaging or resting) is called the pulsation ratio.



The four streams of milk from the teatcups are usually combined in the claw and transported to the milklime or collection bucket (usually sized to the output of one cow) in a single milk hose. Milk is then transported (manually in buckets) or with a mechanical pump to a central storage vat or bulk tank. Milk is refrigerated on the farm in most countries either by passing through a heat-exchanger or in the bulk tank.

In the photo above is of a bucket milking system with the stainless steel bucket visible on the far side of the cow. The two rigid, stainless steel teatcup shells applied to the front two quarters of the cow are visible. The top of the flexible liner is visible at the top of the shells as are the short milk tubes and short pulsation tubes extending from the bottom of the shells to the claw. The bottom of the claw is transparent to allow visualization of milk flow. When milking is completed the vacuum to the milking unit is shut off and the teatcups are removed.

Milking machines keep the milk enclosed and safe from external contamination. The interior 'milk contact' surfaces of the machine are kept clean by a manual or automated washing procedure implemented after milking is completed twice or three times per day. Milk contact surfaces must comply with regulations ensuring that they are food grade materials (typically stainless steel and special plastics and rubber compounds) and are easily cleaned.

Most milking machines are powered by electricity but, in case of electrical failure, there can be an alternative means of motive power, often an internal combustion engine, for the vacuum and milk pumps because milking cows cannot tolerate delays in their scheduled milking without suffering serious milk production reductions.



Please complete Activity **4** in your learner workbook

My Notes ...

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Now that you have finished this unit standard, let's summarize:

- ◆ You must be able to understand and describe the origin of all the animal products that you listed in the first activity.
- ◆ You must understand how the product is harvested and describe the harvesting process.
- ◆ You must be able describe the indicators used to describe the readiness of the animal products you studied for harvesting. That includes the rules laid down by the end-user of the animal product. The readiness for harvesting includes the use of animals to perform tasks and services such as traction by horses or oxen or pollination by bees.

- ◆ You must understand and describe the names, identification and potential of various animal products to be harvested.
- ◆ You must know several scarce animal products discussed in Activity IIIA. Some of these products can have great potential as animal products.
- ◆ You must be able to understand what makes the product worthwhile to produce and how it is harvested.
- ◆ You must be able to describe and demonstrate the correct procedures for the harvesting of specific animal products like wool and milk.



Concept (SO4 – AC1-5)	I understand this concept	Questions that I still would like to ask
The various procedures used for harvesting specific animal products are described and understood.		
The reasons for performing the specific procedures to harvest animal products are described and understood.		
The potential dangers to the animal and/or to the harvester of the animal products are described and understood.		
The preparatory, emergency, closing and procedural safety steps to be taken during the harvesting of animal products are described and understood.		
The equipment required to perform the procedures of the harvesting of animal products including safety equipment is described and understood.		

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Acknowledgements

■ Project Management:

M H Chalken Consulting

IMPETUS Consulting and Skills Development



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**SOUTH AFRICAN QUALIFICATIONS AUTHORITY
REGISTERED UNIT STANDARD:**

Harvest animal products

SAQA US ID	UNIT STANDARD TITLE		
116198	Harvest animal products		
SGB NAME		REGISTERING PROVIDER	
SGB Primary Agriculture			
FIELD		SUBFIELD	
Field 01 - Agriculture and Nature Conservation		Primary Agriculture	
ABET BAND	UNIT STANDARD TYPE	NQF LEVEL	CREDITS
Undefined	Regular	Level 1	5
REGISTRATION STATUS	REGISTRATION START DATE	REGISTRATION END DATE	SAQA DECISION NUMBER
Registered	2004-10-13	2007-10-13	SAQA 0156/04

PURPOSE OF THE UNIT STANDARD

The learner achieving this unit standard will be able to understand and identify the readiness of animal products for harvesting and explaining the procedure for harvesting the specific products. In addition they will be well positioned to extend their learning and practice into other areas of animal production and agriculture ensuring profitability of agricultural enterprises.

Learners will gain specific knowledge and skills in harvesting of animal products and will be able to operate in an animal production environment implementing sustainable and economically viable production principles.

They will be capacitated to gain access to the mainstream agricultural sector in animal production, impacting directly on the sustainability of the sub-sector. The improvement in production technology will also have a direct impact on the improvement of agricultural productivity of the sector.

LEARNING ASSUMED TO BE IN PLACE AND RECOGNITION OF PRIOR LEARNING

No learning is 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 and describe the origin of animal products for harvesting and use.

OUTCOME RANGE

Animal products include but are not limited to bee products (such as wax, honey, propolis, bee venom, brood, royal jelly), manure, urine and other excretions of animals, meat, horns, bones, skins, feathers, snake venom, silk, fibre, cochineal, whole (live or slaughtered) animals such as marine molluscs and crustaceans and insects such as mopane worms or animals for use in medical science and research, animal derivatives such as semen and ovaries (including eggs), glandular and endocrine products (including hormones and milk), animal body parts, animal work and services such as traction, pollination, guiding, as relevant to the context of application.

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1

The origin and purpose of animal products used by man in the animal before harvesting are identified and illustrated.

ASSESSMENT CRITERION 2

The animal products used by man are described and understood.

ASSESSMENT CRITERION 3

The use by man of the animal products to be harvested is described and understood.

SPECIFIC OUTCOME 2

Understand and describe the indicators and their status used to describe the readiness of the animal products for harvesting.

OUTCOME RANGE

Sensory indicators relating to the readiness of animal products include but are not limited to measurements against standards, market demand, indicators in parts of the animal or its products or in the entire animal of chemistry, strength, size, colour, smell, physical product attributes, production of sound or by using time or the presence or position of the animal's products or the animal itself or behaviour as an indicator as relevant to the context of application.

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1

The indicators used to identify the readiness of the products to be harvested in an animal are described and understood.

ASSESSMENT CRITERION 2

The various levels of the status of the indicators of animal product readiness are described and understood.

ASSESSMENT CRITERION 3

The effect of the indicator on the product is described and understood.

SPECIFIC OUTCOME 3

Understand and describe the names, identification and potential of various animal products to be harvested.

OUTCOME RANGE

Animal products include but are not limited to bee products (such as wax, honey, propolis, bee venom, brood, royal jelly), manure, urine and other excretions of animals, meat, horns, bones, skins, feathers,

snake venom, silk, fibre, cochineal, whole (live or slaughtered) animals such as marine molluscs and crustaceans and insects such as mopane worms or animals for use in medical science and research, animal derivatives such as semen and ovaries (including eggs), glandular and endocrine products (including hormones and milk), animal body parts, animal work and services such as traction, pollination, guiding as relevant to the context of application.

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1

The effect of harvesting the product on the animal is described and understood.

ASSESSMENT CRITERION RANGE

The effects on the animal include but are not limited to nothing whatsoever, relief, death (slaughter or use of whole animal), and stress.

ASSESSMENT CRITERION 2

The specific animal products to be harvested and their parameters are described and understood.

ASSESSMENT CRITERION 3

The potential of animal products that can be harvested are described and understood.

SPECIFIC OUTCOME 4

Describe and demonstrate correct procedures for the harvesting of specific animal products.

OUTCOME RANGE

Animal products include but are not limited to bee products (such as wax, honey, propolis, bee venom, brood, royal jelly), manure, urine and other excretions of animals, meat, horns, bones, skins, feathers, snake venom, silk, fibre, cochineal, whole (live or slaughtered) animals such as marine molluscs and crustaceans and insects such as mopane worms or animals for use in medical science and research, animal derivatives such as semen and ovaries (including eggs), glandular and endocrine products (including hormones and milk), animal body parts, animal work and services such as traction, pollination, guiding as relevant to the context of application.

ASSESSMENT CRITERIA

ASSESSMENT CRITERION 1

The various procedures used for harvesting specific animal products are described and understood.

ASSESSMENT CRITERION RANGE

The various procedures for harvesting animal products include but are not limited to extraction, milking, plucking, collecting, cutting, shearing, removing, stripping, picking, preparing places where products may be deposited by the animal, scraping, application of heat or other physical intervention, using the whole animal or slaughter) as relevant to the context of application.

ASSESSMENT CRITERION 2

The reasons for performing the specific procedures to harvest animal products are described and understood.

ASSESSMENT CRITERION 3

The potential dangers to the animal and/or to the harvester of the animal products are described and understood.

ASSESSMENT CRITERION 4

The preparatory, emergency, closing and procedural safety steps to be taken during the harvesting of animal products are described and understood.

ASSESSMENT CRITERION 5

The equipment required to perform the procedures of the harvesting of animal products including safety equipment is described and understood.

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:

- Basic comprehension and understanding of the specific animals producing animal products to be harvested.
- Origin of animal products.
- Use by animals and man of animal products.
- Sensory observation and evaluation of animals to evaluate their readiness of their products for harvesting.
- Observation of animal production cycles over time.
- Evaluation of the potential of animal production.
- Animal classification, nomenclature and common name terms.
- The purpose of learning about animal production and products.