Community Based Rangeland and Livestock Management

New possibilities for restoring grassland and prosperity to rural areas

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Collating Author: Wiebke Volkmann, wiebke@mweb.com.na

Language editing: Sally Wood (sallywood@iway.na) & Anna Davis (ad@iway.na)

All line illustrations: Karel Swanepoel, picsapien@yahoo.co.uk
Grass illustrations: Inatu Indongo

Photographs: Colin Nott, Ekkehard Kuelbs, Wayne Knight, Wiebke Volkmann, John Mendelsohn, Bertus Kruger, Heinrich Pielok, Günther Roeber, Johannes van Wielligh
Cover photograph: Colin Nott

Layout: Nico Kopf, solitude@iway.na
Printing: Solitaire Press (Pty) Ltd.

For more information, please contact the lead agency:

GOPA-CBRLM
Tel +264-65-220425 / 220 648
P O Box 328, Oshakati, Namibia
e-mail: heinrich.pielok@gopa.de
www.cbrlm.org.na

Partners in the CBRLM program are:

Ministry of Agriculture, Water and Forestry
Directorate of Extension and Engineering Services
Private Bag 13184, Windhoek, Namibia
Tel +264-61-208 7111

Namibia National Farmers Union (NNFU)
P O Box 3117, Windhoek, Namibia
Tel +264-61-271117
e-mail: munjanu@nnfu.org.na

Millennium Challenge Account (MCA) Namibia
Director Agriculture: Dr. Helmke Sartorius von Bach
P O Box 23005, Windhoek, Namibia
Tel +264-61-410 412
e-mail:hsvonbach@mcanamibia.org
www.mcanamibia.org

Integrated Rural Development and Nature Conservation (IRDNC)
P O Box 24050, Windhoek, Namibia
Tel +264-61-228506
e-mail: canott@iafrica.com.na
www.irdnc.org.na

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Foreword

In Namibia, agriculture is the third largest industry (economic sector) of which livestock farming contributes 80 – 85% of the income generated. Besides this tangible contribution to the livelihood of the people and the economy as a whole, livestock is close to the heart of Namibians and their culture. Namibian people love their livestock not only because of the food they provide but also because of the traditional form of security and wealth status they create. Generally, livestock has been blamed for the overgrazing and the destruction of the rangelands on privately owned land as well as in communal areas, resulting in severe loss of carrying capacity and increase in bush encroachment.

Recognizing that the strategy of reducing animals number alone has not addressed the root causes of land degradation, the Ministry of Agriculture, Water and Forestry has requested farmers organisations, scientists, researchers and other stakeholders to develop a National Rangeland Management Policy and Strategy. The collaboration of these stakeholders led to a significant change in understanding what is needed to bring back the perennial grasses that once covered the land during the eras of our forebears.

Farmers and scientists all over the world have learnt that livestock, when managed well, could help to regenerate the grass land. The book you hold in your hands provides background information on the mutual dependency between grass and livestock. It explains the requirements of perennial grass to grow well and how it can be enhanced by grazing, animal impact and herding of livestock to produce ample forage for domestic and wild animals.

Herding livestock, according to a grazing plan, calls for people with intimate knowledge of the veldt and animals. It calls for skilled and dedicated herders who are able to take responsibility for the health of the grass land and livestock.

This book combines a basic overview of rangeland management, improved livestock production and the business of farming, including the marketing of livestock. It is my conviction that the information and illustrations provided in here prepare and inspire field staff of the Ministry and partner organisations to help farmers understand and implement the principles of sound rangeland and livestock management. The Community Based Rangeland and Livestock Management (CBRLM) is one of the Ministry's programmes aimed at raising the quality of life in rural areas beyond food security, drought and flood preparedness.

I invite all partners in the industry to embrace the challenges and discover the untapped potential that lies in the joint management of the grass lands and livestock.

Ministry of Agriculture, Water and Forestry

Mrs Anna N. Shiweda
Deputy Permanent Secretary
Ministry of Agriculture, Water and Forestry

Summary

This book is organized around the following key messages:

Our elders tell us that our rangelands were productive with many perennial grasses. Now this land is degraded with erosion and bush encroachment and insufficient grass for all the animals. From what we now know it is the management of grasses that caused the degradation.

Farmers and scientists have learnt that the three most important ingredients for improving the productivity of our grasslands are:

- **Giving perennial plants time to recover and rest after they have been grazed;**
- **Managing livestock in such a way that they prepare the soil and the plants for good growth;**
- **Adjusting the number of animals up or down as needed to manage risk and to improve herd size and quality of animals over time. (page 4)**

The roots of perennial grass plants stay alive underground through the non-growing season. Good soil preparation and growing conditions for perennial grass plants include:

- **Breaking the soil capping;**
- **Removing dead leaves from perennial grass plants through grazing and trampling to prevent over-resting of grass plants;**
- **Creating soil cover with grass litter;**
- **Preventing animals from licking up the grass litter**
- **Concentrating and moving animals to fresh grazing every few days so that the plants have time to recover before being re-grazed. (page 26 - 29)**

Covered soils hold water for longer. The growth periods for plants become longer and this produces more forage for livestock. To increase soil cover farmers must make sure that livestock do not eat up all the grass litter on the ground and ensure that fire is prevented. (page 28)

Herding livestock according to a grazing plan is the cheapest and most effective method to increase the productivity of the land and of the animals. (page 31)

Farmers are beginning to say: "I thought I was a cattle farmer. Now I see myself as a grass farmer". (page 39 - 40)

Because livestock can help to improve grazing and water, this will have a positive impact on wildlife, tourism, crop production and safe water supply for the whole community. (page 43)

Stressfull livestock handling reduces the health, growth and reproduction of animals. Low-stress handling is a good business investment by farmers. (page 70)

Herders are the keepers of our rangeland and of the wealth of livestock farmers. They need to be encouraged, recognized and rewarded for work well done. (page 65)

To manage the risks of livestock farming and to make sure that there will always be enough young to replace older animals it is important that farmers keep a balance between the different classes of livestock that are kept for different purposes. (page 83 - 85)

Once the forage has improved through better animal and grazing management, the investment of improved breeding and animal health care will cost less, and will generate better production results. (page 90)

It is important for farmers to observe the health status of their animals regularly so problems can be recognized early. Usually the response or treatment of a problem is easier and cheaper than when the problem has already affected the whole body or too many animals. (page 91)

Adapted breeds usually perform better in the conditions of Namibia's rangeland. (page 113)

Recording household expenses and farming expenses separately is a very important step in understanding where the business of farming can be improved. (page 129)

A business has only a single weak link at a given time. Understanding where the weakest link in the chain of production of their business is at a given time and then investing money and time in that weakest link helps farmers to build their wealth and improves income. (page 141)

Drawing up a budget of projected income and expenses over a whole year helps farmers to have money available when it is needed for both farming and private purposes. (page 139)

To negotiate satisfactory selling conditions and prices farmers must understand the needs of all the people and organizations involved in producing, selling, buying and consuming livestock and meat. (page 157)

Well thought through marketing of livestock is a good opportunity to improve both the income of livestock owners and the quality of the animals the farmer keeps. It also helps to reduce the risk of loosing livestock when there is insufficient forage. Farmers should not leave this important task to buying agents alone, but should get involved themselves to make sure their needs are respected. (page 145 - 150)

Regular monitoring helps farmers to know if their efforts and investments are bringing them closer to the results they desire. (page 172)

Even when the value of money goes down, the value of healthy land and livestock will remain high, because it can help us meet our basic need for food, water and shelter.

Wise decision making asks:

- Is this option good for the people and relationships between people?
- Is it good for the natural environment?
- Does it strengthen the financial situation?

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1 The rangelands today

"Livestock has been blamed for destroying our rangelands.
Now we know that livestock is the best tool available to help bring back the productivity of the land."

Rangeland is land where grass grows and where herds of domestic and wild animals graze and browse[1]. Rangeland includes areas with trees, and most community forests in Namibia are also used by animals for forage[2]. This book aims to show what communities are already doing, and what they can learn and do to improve communal rangelands in Namibia.

People who grew up in the Northern regions of Namibia have seen much change, particularly over the past 50 or 60 years. Loss of perennial grasses led to a decline in the quality and amount of grazing, as well as in numbers of livestock. Crop fields are producing smaller harvests. The changes are causing stress and insecurity for the people and animals living in these regions. Livestock is a very important part of their lives, providing milk, meat, cash income and wealth. It also has significant[3] cultural value. If natural grazing and browse continues to get more scarce, livestock will not have sufficient forage and will become unproductive. Making sure that the rangelands of Namibia do not become deserts is one of the most important challenges in reducing poverty in the rural areas.

One often hears farmers saying "The rains didn't come, so there is not enough grass. We cannot do anything about that. It is the drought that is causing all this suffering."

It is true that we cannot simply 'order' more rain. However we can use the rain more effectively to grow more grass. If the soil is bare and hard with few plants, most of the water runs off, and production is low. With more and better forage, animals will be more healthy and productive, resulting in more secure farming and more income for farmers.

It all starts with the soil surface, or the 'skin' of the earth. If it is loose, soft and covered with healthy grass plants and dead plant litter[4], it can absorb water and produce forage.

Photo 1: Rain brings water, but how we use it determines the success of farming.

1 If animals pick leaves from shrubs and trees this is called browsing, as compared to grazing grass.

2 Forage refers to all plant food that animals can find in the veld.

3 Significant = important

4 Plant litter refers to dead leaves and stalks that lie on the ground.

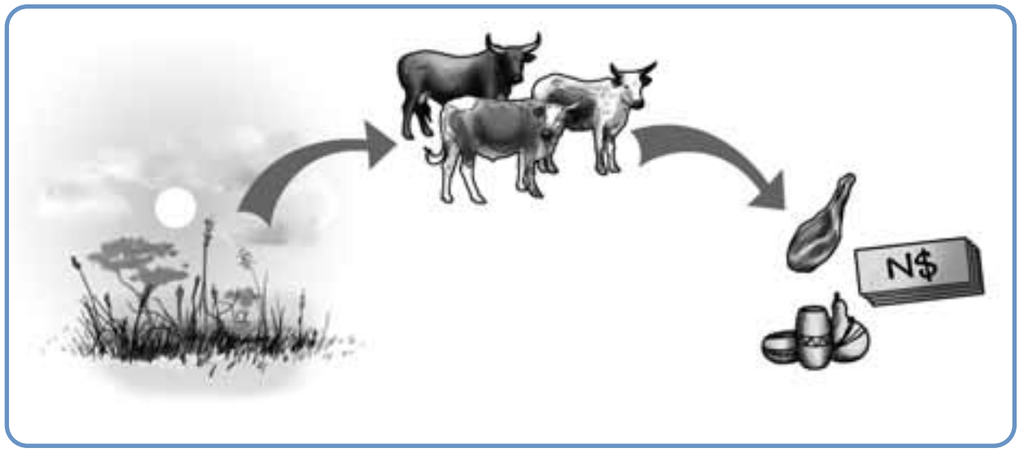


Illustration 1: Healthy perennial grassland produces fat livestock which can produce good quality milk and meat and these can be sold for money to improve the quality of life of people.

The biggest problem in the communal areas is the way livestock is managed. Often, farmers do not have enough understanding of what the plants and soil needs in order to provide sufficient grass and forage over time.

This book focuses on:

1. Concepts, knowledge and actions that will help farmers to become productive grass farmers as well as successful livestock farmers;

2. The importance of animal and herd management;

3. Ways of managing the risks of drought through re-stocking and de-stocking animals, depending on the amount of forage available;

4. Well planned and active marketing to improve people's livelihoods and the quality of livestock;

5. Collecting relevant information from the environment for good decision making.

What is written here is based on the practical experiences of livestock farming communities on Namibia's communal and commercial farm land, as well as in neighbouring countries such as South Africa, Botswana, Zimbabwe, Zambia and Kenya. The farmers who have contributed to this book have tried many different ways of improving their grazing and livestock, and are passing on the approaches that helped them the most. They remember how their ancestors kept and managed livestock, and made decisions about grazing and watering places. They have also looked at modern science and the work of researchers who have done experiments in Namibia and other parts of Africa, and even other parts of the world.

The Government of the Republic of Namibia (GRN) has also asked a group of scientists and farmers to come together to write down what the main points or principles are for improving grassland and for keeping it healthy. The following principles[5] are part of a draft for the National Rangeland Policy and Strategy.

5 The underlying facts and rules

- Understand the soil, grass, trees, plants and water sources;
- Allow plants to recover[6] long enough or even rest for a whole season after they have been grazed;
- Manage for good use of grasses, shrubs and trees;
- Improve the soil condition so that it can take up and hold water and nutrients;
- Address bush encroachment;
- Plan ahead for droughts;
- Observe and keep records of the rangeland and livestock to see what, when and where changes take place;
- Plan the movement and grazing of animals and plan the development of infrastructure.

Farmers and scientists have learnt that the three most important ingredients for improving the productivity of our grasslands are:

- **Giving perennial[7] plants time to recover and rest after they have been grazed;**
- **Managing animals in such a way that they prepare the soil and the plants for good growth;**
- **Managing risk of loss in dry and variable climate by adjusting the number of animals up or down as needed.**

It has not always been understood that grassland in dry climates has to be prepared like a garden. Livestock farmers expected the land to produce forage without realizing that the land needs something in exchange for the food and water it provides. We now know that if we do not manage livestock in such a way that it helps plants to grow, we are mining the soil, taking out nutrients and water like a copper mine takes out ore. If we carry on with these livestock and grazing practices, the land may soon be so poor that there is no more forage and clean water to pump. If farmers manage their livestock and grazing in order to prepare the soil and the plants for growth, the food and water for animals and people will be secured.

The suggestions offered in this book come from a combination of traditional knowledge and modern science. It combines all aspects of farming with livestock and wildlife – from understanding the importance of soil and learning what a grass plant needs, to animal nutrition, animal health and running a business with livestock. It also explains how farmers and communities can work together and support each other for better management of grazing and livestock.

Each community will have to find its own solutions to apply the principles to improve the grazing. It is also important to stress that there is no quick recipe for success. The options given in this book are meant to encourage farmers and land users to consider and come up with their own plans to support the growth of grass and of livestock and wildlife. The principles shared in this book can be used on fenced private farms and on unfenced communal land.

6 To re-grow and get strong again.

7 Perennial plants survive many years. Annual plants live for one year only.

Photo 2: Planning together

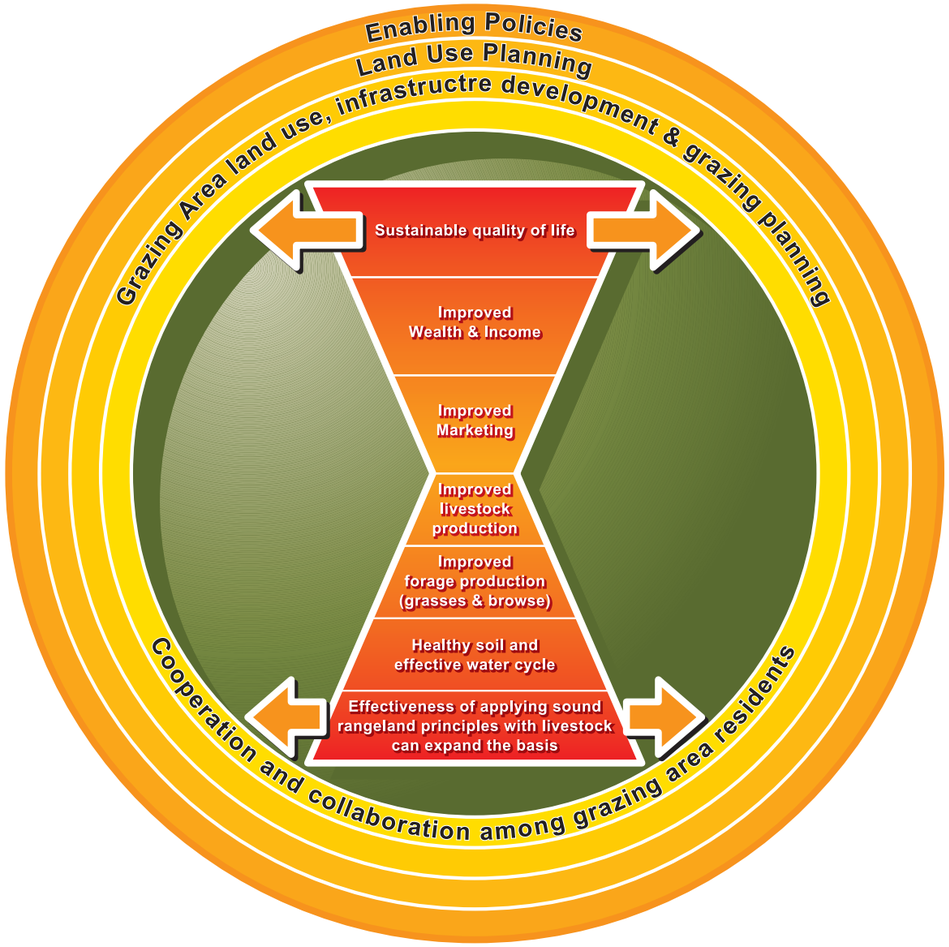
Government and other support organizations can help farmers to solve some specific problems and obstacles. It is the day-to-day decisions and the actions the farmers take in each village that will bring the greatest improvements to the quality of life of rural communities:

- where their animals graze and
- for how long, and
- how they manage the livestock herd.

This is a role that farmers and livestock herders can take pride in. Help from Government or development partners may only come once in a while, but the changes farmers can bring about will provide long-term security and self-governance for their communities, and will contribute to the well-being of the country as a whole.

Farming is a profession that requires many different skills. Attention, money and human labour are needed to accomplish goals, and farmers have to make good choices at the right time for the right reasons. Where should farmers start to improve their management?

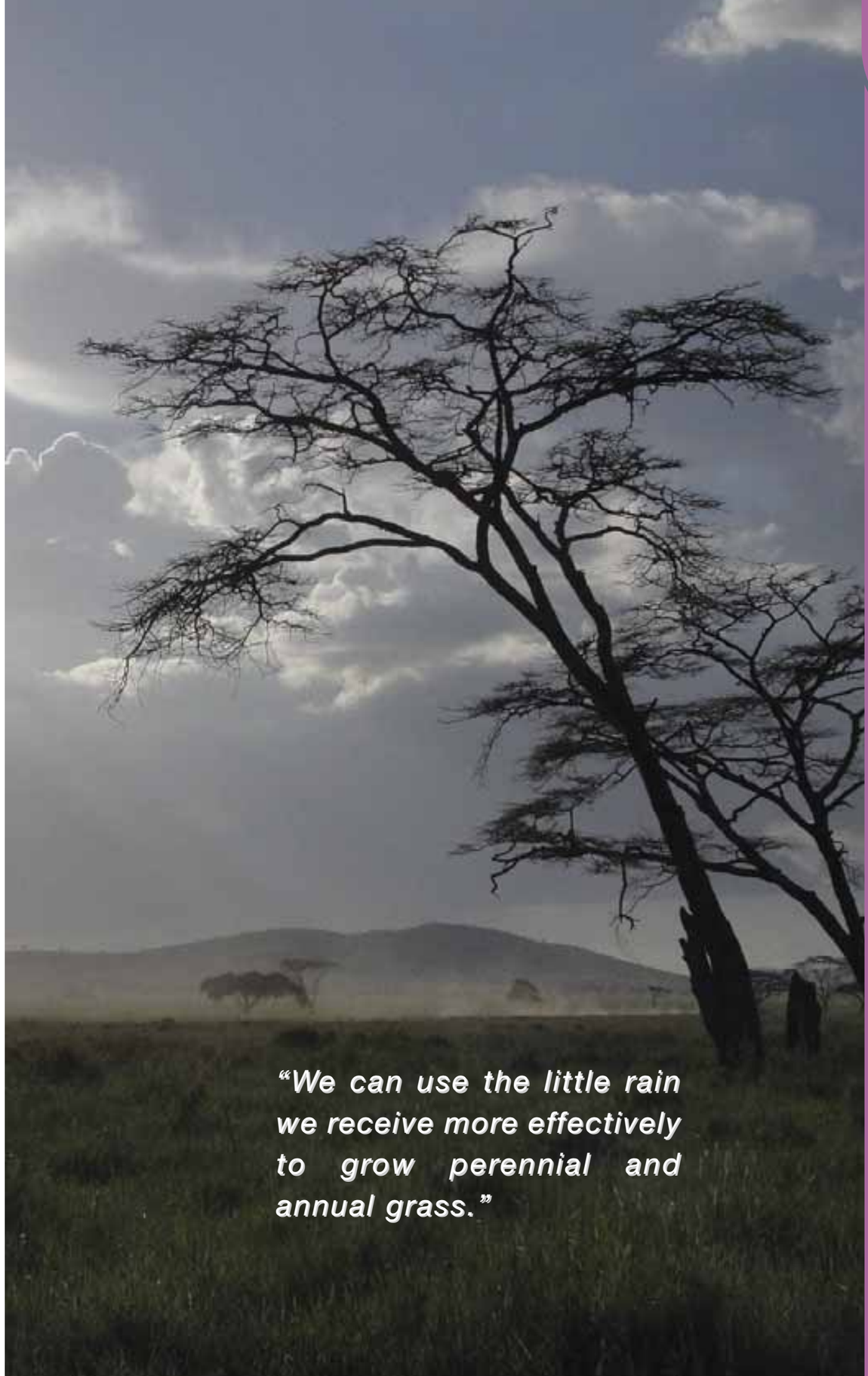
As we have said, it all starts with soil and plants. The following image shows how the success of all farming activities is based on this foundation:



Graph 1: Schematic presentation that illustrates the effects of investing time and resources into sustainable improvement of rural livelihoods.

The above illustration shows the effects of investing time and resources into improvement of rural livelihoods. We need to start at the bottom. By applying sound rangeland management principles we can increase the size of the diagram. If we treat our soils and plants badly the diagram will shrink and we will become less wealthy over time and our quality of life will decrease. To support an improvement of rural quality of life we need cooperation and collaboration, enabling policies and incentives that support land use planning and local level activities.

The first chapters in this book will help you read the signs of the land. “Reading the land” and under-standing what it is telling us is the first step in learning how we can help nature to provide for our needs.



2.1 Looking at soil

Soil is the basis for all plants to grow. If it is loose and mixed with dead plant matter (leaves, stalks, pieces of wood) then water and air can enter into the soil and be held there for use by plants, by animals that live in the ground and by the micro-organisms that decompose[7] dead plant and animal matter. If the soil is hard and has a crust, water will not seep into the ground easily, and will run off.

The most valuable soil is the top soil – that thin layer where sand, clay, stones and dead plant materials meet the air above the ground. It is the 'skin' of the earth, and like the skin of a person, it is sensitive to changes in the environment and can easily be damaged. Like a wound on a human body, it takes a lot of good care and time to heal the surface of the soil if it has been damaged or unprotected for a long time.

What does the soil look like in your area?

Photo 3: Bare soil

Photo 4: Capped Soil
The top layer of the soil forms a hard crust that makes it difficult for water and seeds to penetrate

Photo 5: Sheet erosion
Water and wind have taken away top soil over a broad area. This is called sheet erosion.

Photo 6: Pedastalling
We can see that soil has been washed away by water or blown away by wind when the roots of plants are visible or it looks like the plant is growing on a small hill. This is called pedastalling.

Photo 7: Lichen cover
The black spots on this sandy soil surface are lichen. Lichen is a primitive form of plant that covers the soil like a bread crust, with no visible roots or leaves. It protects the soil from washing or blowing away, but it also prevents water from seeping into the ground easily.

Photo 8
The roots of trees and bushes alone are not effective enough to hold the topsoil.

Photo 9
Gullies cut deep into the landscape.

Photo 10
Litter usually refers to "rubbish" lying around. Around our homes we tend to rake up leaves and grass to make it look tidier. However on rangeland, the plant litter protects the soil surface like a hat for a person out in the sun, or a blanket at night. Here the soil between plants is covered with dead grass. Dung shows that animals have been here to graze and trample old grass.

Photo 11
If there are no grass plants to hold it, twigs and other plant material washes over the bare soil and collects in litter dams.

2.2 Looking at grass

By looking at which grasses grow where and how individual grass plants grow, farmers can learn how to increase the forage production of their grazing land. The differences between annual and perennial grasses are important in this regard.

Grasses that are mainly stalk and produce seeds quickly are called annual grasses. They only live through one growing season and then the whole grass plant dies. The seeds of this grass will only germinate and start growing again in the next growing season given enough rain. Big tufts of grass with many leaves are called perennial grasses. The leaves and stalks with seeds above the ground die off in winter, but the roots stay alive. Sometimes green leaves can even be seen in winter. This grass uses moisture from the roots and the soil, and can start growing before rain has fallen.

Photo 12
Annual grasses dominate most of Namibia's rangeland now.

Photo 13
Perennial grasses with their big tufts provide green leaves for animals to eat before annual grasses have germinated.

Photo 14
Perennial grasses growing many new leaves from the growth points close to the soil surface, even though it has not rained. Dead leaves and grass stalks cover and protect the soil surface.

Photo 15
Perennial grass plants that turn grey and have not been grazed for some years. The dead stalks and leaves prevent the sun from reaching the growth points of the plant. The dead leaves suffocate the plant. The plants will eventually die after some years.

Photo 16
Usually these kinds of grasses grow upright. Grasses that are grazed again and again "lay down" their leaves and stalks to protect themselves from being grazed again. This is a sign of overgrazing, and the plants will die when they are not given time to grow their leaves and roots.

Photo 17
Here the perennial grasses are still alive but they are small. They do not produce many leaves, owing to insufficient water because much of the water runs off instead of entering the soil.

Photo 18: Broad-leaved grass
Broad-leaved grasses produce more forage than narrow-leaved grasses. They usually require less rain to grow but need well treated soil and they tend to increase when grazing management improves. Farming with these grasses reduces the risk to the farmer.

Photo 19: Narrow-leaved grass
Narrow-leaved grasses produce less forage for large herds of livestock. Farming with these grasses only is very risky.

Photo 20: An aristida grass plant with seed that has 'needles' and that can plant itself.

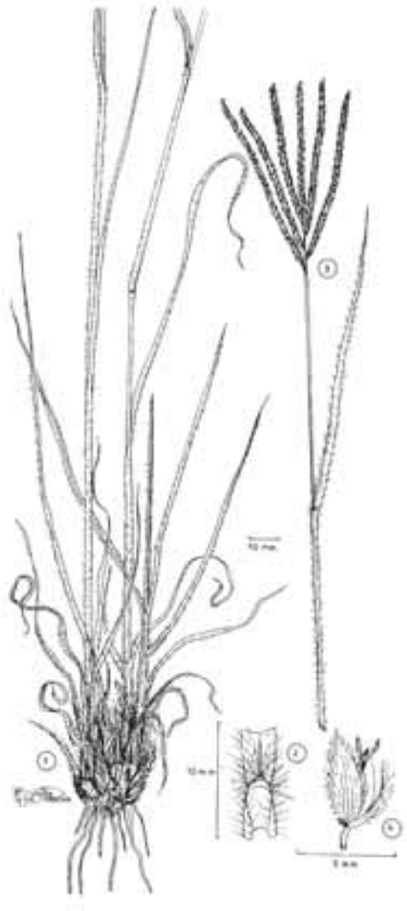


Photo 21: A perennial digitaria plant that has round seed that needs to be covered with soil.

Some grass plants have seeds with one or two “needles”. These seeds can sow themselves. The needles get stuck in small cracks in the ground, or they can even drill themselves into the soil when the seed gets wet.

Seeds that are round and do not have a sharp point need to be planted. A small hole needs to be made, and the seed must be pushed into the hole and covered with soil, as when planting grains[8].

On rangeland, this planting is done by the hooves of livestock and game.

Veld that has many different kinds of grasses, fodder bushes, herbs and trees

8 Grains are plants that produce a big seed like maize, millet and rice.

Photo 22 It is not only grasses, but also herbs, creepers and forbes that make up good forage for livestock. At the moment in most areas most herbs & forbes are not palatable but with good management the palatable ones will come back.

Photo 23: Example of a palatable grass

Photo 24: Example of unpalatable weeds and bushes.

can meet the needs of a mixed herd of animals. Many herbs and bushes bind nitrogen into the ground and have a kind of bean seed which is nutritious[9] for the animals. Even the pods of invader thorn bushes are good winter feed for livestock.

However, if one of these plants outnumbers the others and becomes very dense, we speak of an invasive species. A plant is called invasive when it outnumbers all others. Very often undesirable plants invade the land, when poor management makes the growing conditions for good grasses and herbs difficult. Weeds and unwanted bush often take over on degraded soil.

A grass that is highly palatable tastes good and is easy to tear off, chew and digest. Grasses that have seeds with a sharp point are not liked by livestock as they are painful in the mouth, and also the throat when swallowing. Grasses with round seeds like sorghum are preferred, as well as broader, soft leaves to those with hard, thick stalks and hairy leaves.

9 Nutritious means providing the body with those kinds of food that it needs to be healthy and strong.

Even though some grasses may not be liked in an adult or dry state, their young and sweet leaves are eaten by livestock. In general, livestock are healthier if they can eat many different plants, including the leaves and pods of bushes. Each plant contains a different combination of nutrients[10] and minerals[11] which provides a balanced diet, and this strengthens the immune system of the animals.

Photo 25: Healthy Animals

Photo 26: Livestock in poor condition

Observing the soil condition and the way that plants grow, as well as where rain water goes, are the first steps towards understanding the challenges and opportunities of a community that wants to improve the productivity of rangeland and livestock.

10 Nutrients are those parts of the food that can be digested by the body to replace dead body cells and to grow. Some parts of the food are not nutrious, such as the fibre in a stick of sugar cane.

11 Minerals come from rock and soil and help the body to grow strong bones and to stay healthy

Illustration 2: Memories of the past can inform visions for the future

2.3 Was the land always like this?

Speaking to elders we realize that the land, the soil, the plants and the different animals have changed much over the past few decades. Scientific research also shows that, where previously there was a lot of grass and a variety of fodder plants, and many different wild and domestic animals thrived there, now we have droughts, floods and bush encroachment. The following chapter tells us what perennial grasses need to grow well.

Our elders tell us that our rangelands were productive with many perennial grasses. From what we have now learnt it is the management of grasses that caused the degradation.

2.4 Understanding what we see on the land

2.4.1 What happens to a rain drop when it falls to the earth?

Big rain drops falling onto bare soil are like many small hammers hitting the earth, and if the soil is not covered with leaves and dead grass, a hard crust will form. This makes it difficult for water to soak into the ground quickly. It will collect in vleis, and once these are full it will start to flow in gullies and rivers. Even if there is good rainfall and the dams fill, plants will struggle to grow well because insufficient water has soaked into the ground to their roots. The result is similar to drought. In other areas, landscapes will be flooded because of the high run-off of water.

However, if the soil surface is covered with plant litter, raindrops land softly; the pores[12] in the soil surface stay open and water can soak into the ground. If there is a lot of rain, some water will run off, but will not take top soil along with it.

The pictures below are of an experiment showing what happens if we fill two containers with the same soil, and cover one of them with dead leaves. If we pour the same amount of water on each, we observe that less water runs off the covered soil, and is cleaner. The more water soaks into the ground and is held there, the better the plant growth.

Covered soil also provides better living conditions for dung beetles, other insects and micro-organisms[13]. They are very important in breaking down the dung and dead plant litter which is taken up by the plant roots as nutrients.

Covered soils hold the water for longer. The growth periods for plants become longer and this produces more forage for livestock. To increase soil cover farmers must make sure that livestock do not eat up all the grass litter on the ground and that fire is prevented.

12 Pores in the soil are the spaces between sand kernel and other soil particles.

13 Micro-organisms are living beings (organisms) that are so small we cannot see them without our eyes alone. A microscope is needed to see them.

Photo 27 Covered soil surface

Photo 28 Bare soil surface

Photo 29: Water run-off after rain

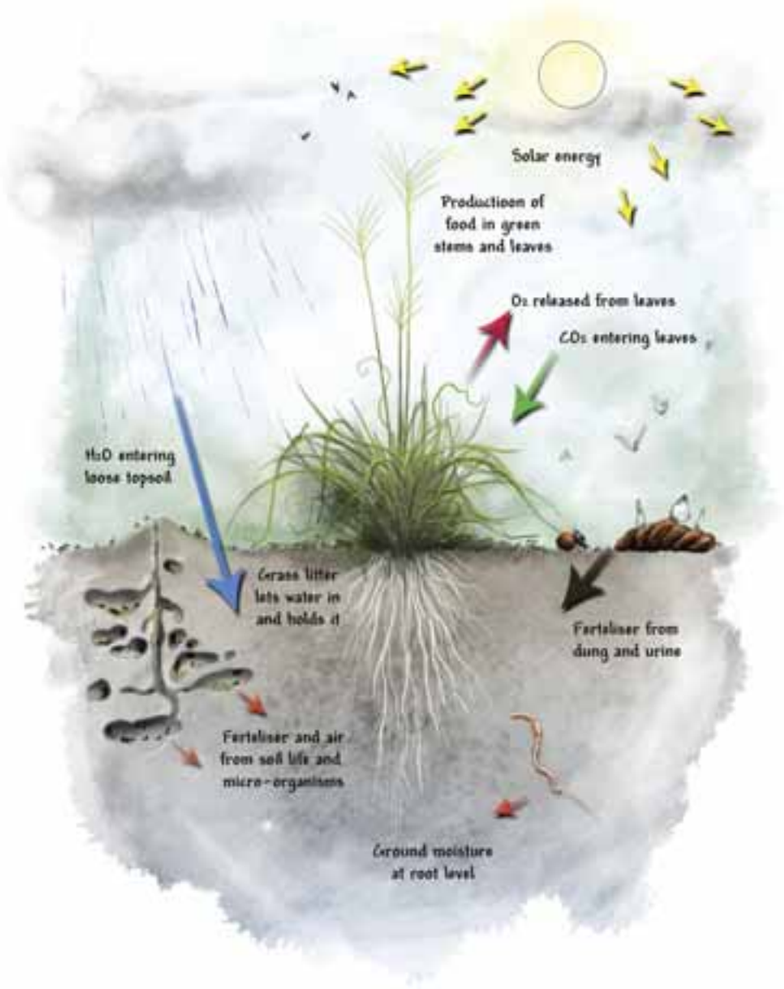


Illustration 3: Photosynthesis

2.4.2 The Food Factory of Nature

The green parts of plants make food by combining carbon dioxide[14] from the air and oxygen[15] from water, using the energy of sunlight. This food is then used to grow more leaves, stalks, seeds and roots. This process is called photosynthesis[16].

The bigger and broader the leaves are, the more food they can provide. Land that has grass plants with wide leaves can usually feed more animals.

Plants produce more food if they have time to photosynthesize and grow. Plants will grow for more days or weeks in a year if they have water in the soil and if they have strong roots. Because perennial grass plants have more and deeper roots, they can produce food over a longer period of time than annual grass plants.

14 Carbon dioxide is that gas in the air which human beings and animals breath out and which is forming when something is burning.

15 Oxygen is the gas in the air which human beings and animals breath in and which fire needs to burn.

16 Photo means light and synthesis means bringing something together or building up something.

Photo 30 Annual Grass roots
The roots of annual grass plants are small and do not hold the top soil so well. Annual plants only need the roots for a few weeks or months until the seeds have formed. These roots are not strong enough to hold the soil when rain falls and the result is often erosion.

Photo 31 Perennial Grass roots
The roots of perennial grasses are deeper and spread widely in the ground. Many very fine roots hold the grains of soil well. They also store moisture and energy for the plant. This stored energy is used by the plant to start growing again after the winter or after the leaves have been grazed. Perennial grasses can get very old, like shrubs or trees. New plants grow from seed or from stolons.

The health and number of roots of a grass plant are just as important to a farmer as the stalks and leaves above ground.

With healthy grazing roots are strong and able to hold the plant firmly in the ground. When new shoots and young green leaves grow some roots die off. However, these roots grow back later again. This die-off and re-growth of roots acts as an underground tiling[17] of the soil.

If the plants are grazed in a healthy way the roots grow deeper and wider again in the rainy season, enabling the plant to grow leaves, photosynthesize and send energy back down to the roots. The healthier the roots of the grass plants, the better they can take up soil nutrients and water. In turn the leaves can grow broader and longer. If the soil is loose and contains dead plant materials and insects, worms and micro-organisms, the roots can grow deeper to take up minerals and water.

17 Tilling refers to moving the soil like when working it with a hoe or a plough

Illustration 4: An annual and a perennial grass plant with their roots

Because they can start growing BEFORE the rains and even after the rains have stopped, perennial grasses can produce food for stock for longer, and yield more forage than annual grasses. If they are healthy, they retain some green leaves even in winter, providing better nutrition for the animals, keeping them in good condition.

It is difficult for roots to grow well if the soil is capped[18], compacted (hard) and dry. If the roots of perennial grasses become weak from overgrazing or over-resting, the plant can easily be pulled up by grazing animals.

18 Capped soil has a hard crust.

2.4.3 How a perennial grass plant is affected by different grazing patterns

Grazing in the non-growing season[19] removes dead leaves so that sunlight can reach the growth points[20] in the coming growing season.

When livestock graze grass plants in the growing season, this can be good for the plants too – they tend to form more leaves which are nutritious for the animals. However, it is very important to remember that some of the roots of the grass plant are sacrificed and die when the leaves start to re-grow. The animals should not graze the plant again until the plant has had enough time for the roots to grow again.

Over-grazing occurs when animals come back to the same plant before it has had a chance to re-grow fully, both above ground and below in the roots. This can take anything from 3 months to 2 years, depending on the rains and the soil condition.

Farmers must therefore watch the perennial grass plants carefully – if the plants are not yet fully-grown or can be pulled out easily, this means that the roots are still weak. Animals should only come back later in the growing season, or during the dry season.

Controlling when and where the animals graze is the best way for farmers to prevent overgrazing. Even a small number of animals can overgraze the grasses in an area if they are left in the same place for too long. They will eat the newly-grown short leaves, the plant will have to 'borrow' energy from its roots again, and it will become weak or even die. Animals prefer to eat these young fresh leaves and will leave the bigger, older grass standing next to it. One plant can die from being over grazed, and the neighbouring grass can die from lack of sunlight to the growth points because it has not been grazed at all.

Different plants from the same species standing next to each other can die from over-rest or from over-grazing. When livestock favors and selects the palatable species again and again the species that are not palatable get sufficient time to recover and they can increase in numbers.

19 The growing season is the whole period of time when plants have enough warmth, sunlight and moisture to grow. This can start before the rainy season and can go after the last rains.

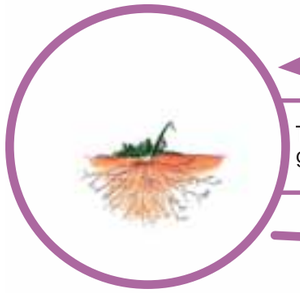
20 Growth points of a plant are those special areas where new leaves and stalks grow from.

Healthy grazing

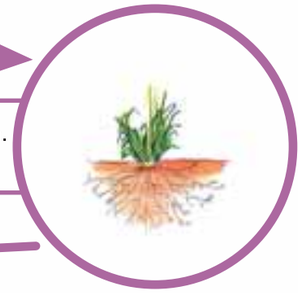
Healthy grazing stimulates perennial grassplant growth

Mature plant ready to be grazed.

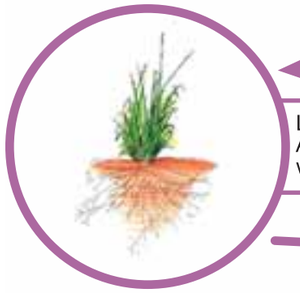
Animal has grazed plant severely. With most leaves removed the plant is unable to transform the sunlight energy it needs to grow.



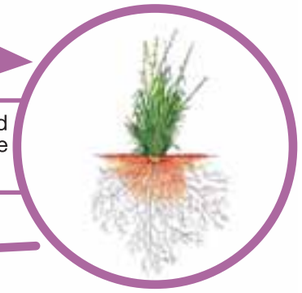
Therefore the plant uses some energy from the crown and roots to grow new leaves and many roots die.



Leaves are beginning to grow on energy from the roots and crown. If animal returned now the plant would be over-grazed.



Leaves are now transforming enough sunlight energy to grow leaves AND to re-establish roots. If animals would return now the plant would still be over-grazed.



Leaves and nearly all roots have fully re-grown. If animals returned now, plant would be stimulated and produce more fodder in the next season.

Grazing and trampling in the non-growing season is important to expose the growth points to sunlight. Repeated grazing during the non-growing (dry) season does not harm the roots, because the plant is not re-growing or only growing very slowly.

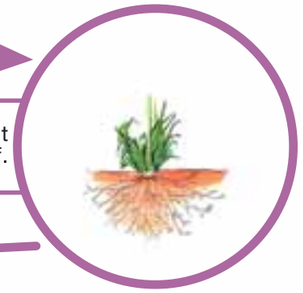
Overgrazing

Overgrazing of a perennial grass plant occurs mainly during the growing season

Mature plant ready to be grazed.

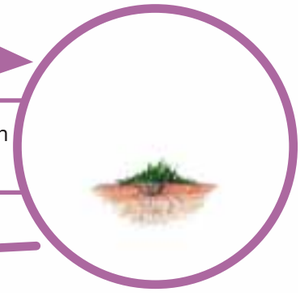
The plant uses some energy from the crown and roots to grow new leaves and many roots die.

Animal grazes the plant before it has grown out completely and before root reserves are built up again.

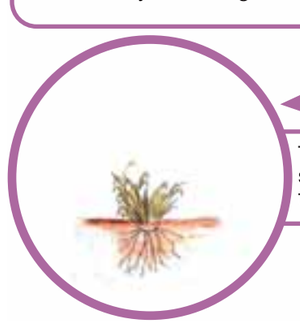


Animal grazes plant again. With all the leaves removed the plant uses energy from the roots and crown again and more roots die off.

Animal comes back to eat the young sweet leaves before the roots have recovered.



Again the plant uses energy from the roots and crown to grow in the last days of the growing season. More roots die off.

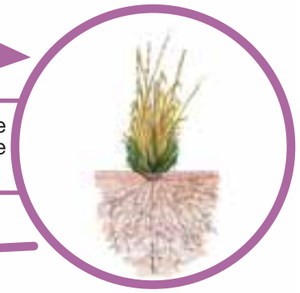


The plant has not many leaves and weak roots when the dry season starts. Animals with teeth (donkeys and goats) can now pull out the whole plant. If this carries on for many years the plant will die.

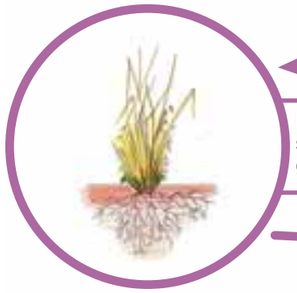
Over-resting

Perennial grasstufts can die from over-rest when they are not being grazed.

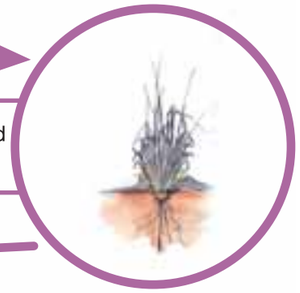
Mature plant was not grazed in the previous dry season. Animals prefer young green leaves, so do not eat from the mature dry grass.



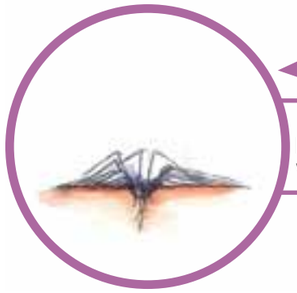
Plant tries to push some new green leaves on the sides of the dense dry and dead leaves and stalks, using energy from the roots and crown.



Because animals do not trample down the old leaves and stalks they will shade the growing points at the crown of the grass plant and it cannot grow. The leaves and stalks of the plant loose quality and dry out further.



The leaves and stalks start to become moribund and grey. The food value of this grass is very low.



If the plants are not grazed for many years most perennial grasses will die.

"Healthy grazing and animal impact at the right time prepare the soil and plants for abundant growth of grass."

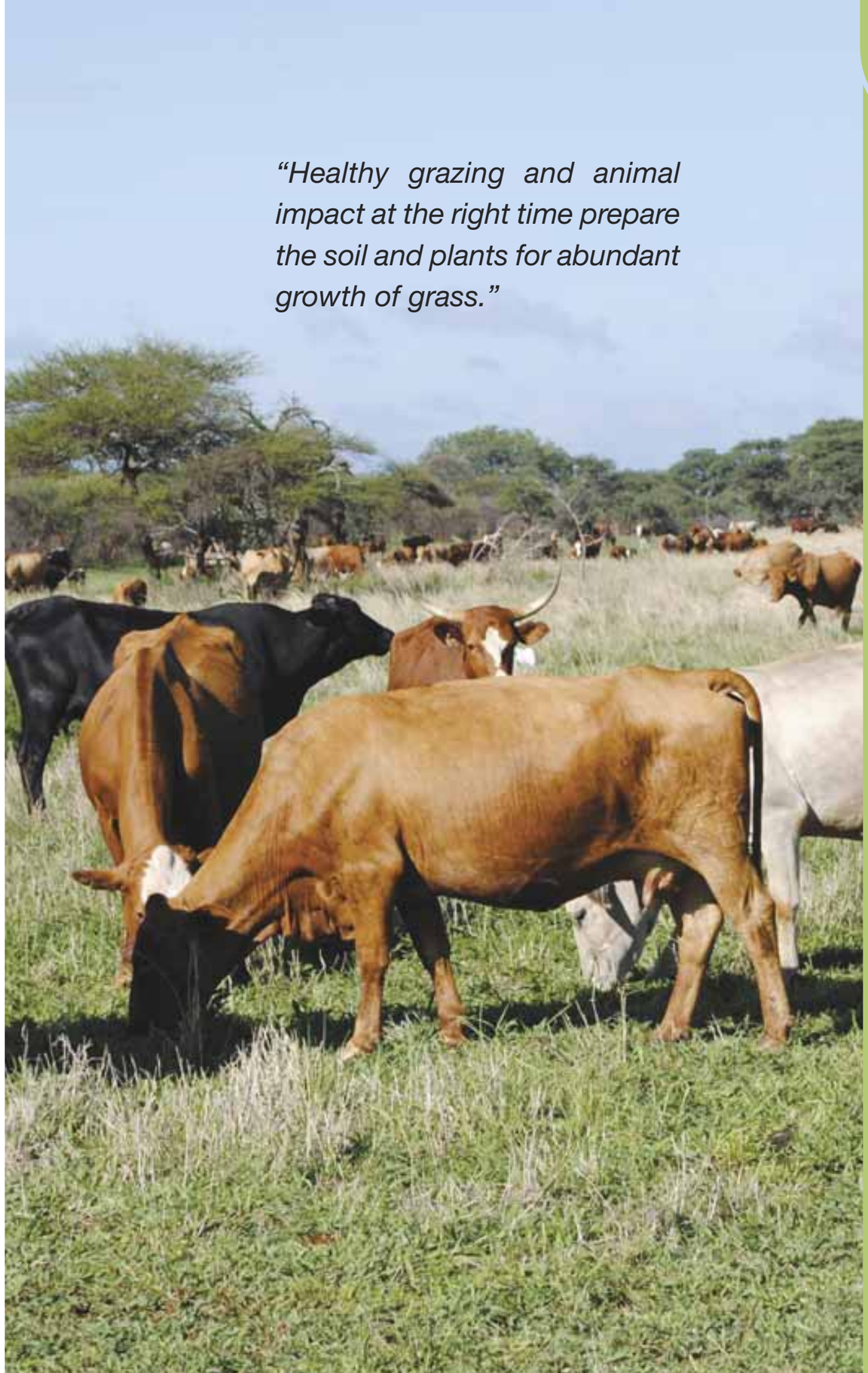


Photo 32: Animals moving in a bunch through herding have a beneficial impact on soil and plants.

3.1 Preparing the soil

Farmers are learning that preparing grazing land is very similar to preparing crop fields. Instead of a hoe or machinery, they let their livestock do the soil preparation. The hooves of herded animals can break the crust and make small impressions in the soil. Seeds fall into these depressions and the hooves cover them with more soil, as we do when planting sorghum or maize. The soil surface is now loose and covered with grass litter, and when the rains start, the water can penetrate the ground. Air can also enter the soil for the insects, micro organisms and plant roots to breathe.

During the dry season the leaves and stalks of grasses, shrubs and herbs dry up and the animals can trample them into the ground. This dead plant litter protects the soil and the living organisms and small plants in the soil from drying out, or heating up too much during the day and cooling down too much at night. When the rains start, the drops fall softly on the dead plant leaves and stalks and do not hit the soil directly. This prevents the compaction of soil, and the 'pores' of the soil surface can stay open for more rain and air to enter the ground. The plant litter is then slowly broken down by insects and micro-organisms and becomes humus[26], a source of food for new plants.

Photo 33: Hoof prints with seeds

Photo 34: Seedlings germinating in a hoofprint

26 Humus is dead plant material that is broken down so much that it is part of the top soil already.

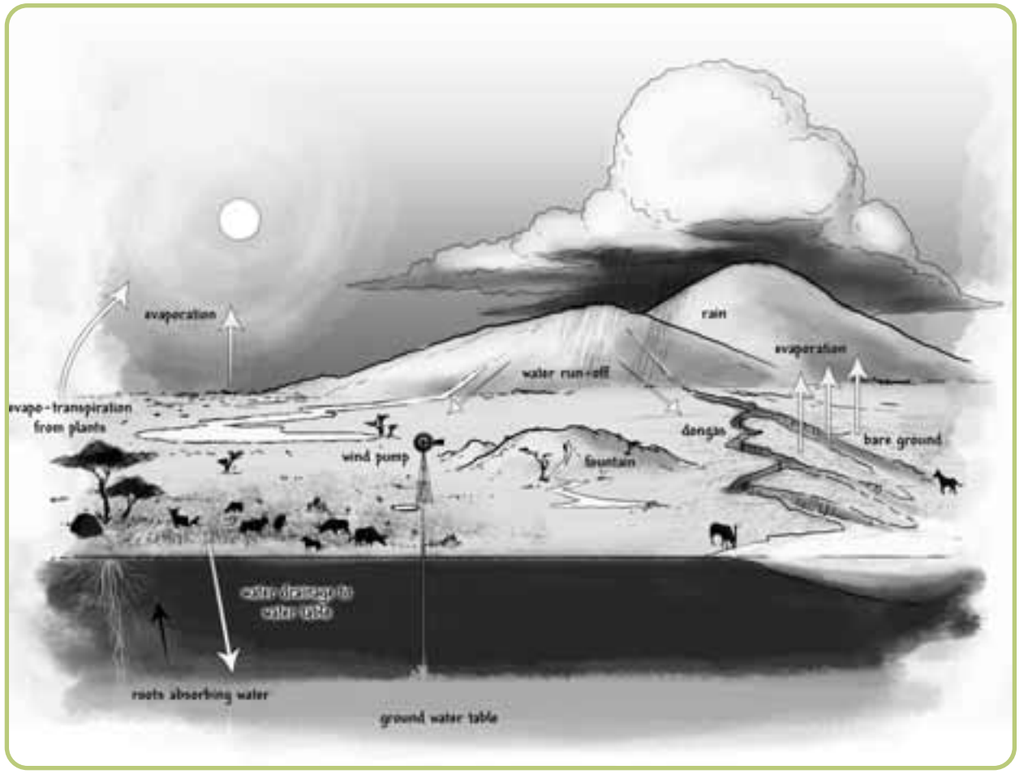


Illustration 5: We speak of an effective water cycle when moisture moves above and below the ground

Even when rainfall is low, most of the water that falls enters the ground and does not run off into rivers and vleis. It is thus available for plants to take up through their roots. If the soil is completely wet, the water can sink further down to fill underground water reserves. People can then fetch or pump clean water through wells and boreholes. Some water will run off if the soil is completely wet, but if there is good soil cover the water that runs off is clean, and the vleis, (oshanas) and rivers will not fill up with so much soil. Flooding will not be so severe because much of the water can go deep into the ground where it will cause less harm, for instance to crops. If the soil becomes totally saturated with water, springs will start to flow even in the dry season. This can be a cheap and healthy source of drinking water for wildlife, livestock and people.

Like with croplands, soil needs fertilization[27], and the livestock can also do this. While they graze and after they lie down to chew their cud, they leave their dung where the grass plants grow. This is the cheapest and most healthy fertilizer for the land. Dung beetles help to bury the dung under the ground quickly. If the soil is hard, it is difficult for the beetles to dig a hole. If the soil is covered with dead plant material and has been loosened by the hooves of animals, the beetles are assisted in their task to bring nutrients into the soil. The dung also contains bacteria (micro-organisms) that help to break down the plant materials in the dung and the plant

27 Fertilization is the addition of nutrients for all forms of life that live in the soil.

Photo 35: Dung Beetles at work

Photo 36: Healthy soil is loose

litter in a way that is beneficial to grass plants. When grassland gets enough manure and urine from grazing animals, there tends to be more grass, and less bush.

Like crops, grass plants use sunlight to produce food. When animals graze a perennial grass or trample it in the dry season, this helps the plant to grow better in the next rainy season because light can reach the growth points. The growth points of most valuable perennial grass plants are close to the ground surface. If the dead leaves and stalks are not laid on the ground, sunlight cannot reach these growth points and the plant will not grow well.

3.1.1 The effects of fire on soil

Some communities and farmers burn the veld to remove old, dry grass so the new leaves can start to grow. However, this practice also removes the protective plant litter on the soil surface. After a fire the soil is bare, and rainwater and wind can easily take away the top soil. Well managed areas do not need fire as a tool to improve grass growth.

Photo 37: This is what herded cattle can create in the winter: grazed perennial grasses with some green new leaves and soil cover on the ground around the plant.

Photo 38: Although the ash of fire contains valuable minerals the soil dries out after a fire.

3.1.2 Soil preparation in the rainy season

During the rainy season the animals can also contribute to the growth of soft nutritious grass. As the soil is moist and the micro-organisms can survive much better, the dung and urine will become even better fertilizers. On clay and hard soils, the hooves of the animals can break the crust more easily than in the dry season, and seeds can germinate[28] quickly.

Good soil and plant preparation in the dry season includes:

- **Breaking the soil capping,**
- **Removing dead leaves from perennial grass plants through grazing and trampling;**
- **Creating soil cover with grass litter;**
- **Preventing animals from licking up the grass litter.**

This all leads to an increase in grass growth.

28 Germination is when a plant starts to grow from a seed.

3.2 Herding for healthy grazing

Farmers have found that if they concentrate their livestock as one big herd, the animals are more effective in tilling the soil with their hooves and breaking down old grass. They also graze the different grasses and shrubs more evenly, so that all grass plants can re-grow fresh leaves and do not die from over-resting. By herding the animals, taking them to a different area nearly every day and not returning too soon, all the grass plants get sufficient time to recover.

The grass plants get what they need to grow well, and the animals also benefit from being led to fresh and clean grazing nearly every day. They can digest the forage more easily, and convert[29] it to meat and milk.

The practice of planned grazing is based on observing the large herds of wild game animals, such as wildebeest, buffalo, oryx, springbok, eland and zebra. Before the building of roads and fences killed off game, these herds comprised many thousands of animals. The principles of good rangeland management are also based on experience on commercial and communal farms that have resulted in doubling of stocking rates sustainably over time.

Livestock herds and people in the past followed water sources and moved on to fresh grazing. Because there were many predators, they moved in tight bunches to protect themselves, and since the animals moved and grazed so closely together, they grazed and trampled the soil and plants.

They did not come back before the grass had re-grown fully. This was nature's plan, giving both the plants and the animals what they needed. Our ancestors followed the wisdom of nature and moved with their animals. The suggestions in this book are based on both the wisdom of nature, and that of farmers, scientists and researchers.

If animals are left to go where they want, they tend to walk along trails. These will become deeper over time, and water can wash away the loose soil. At the same time, the soil surface next to the trail is not trampled, and the crust will prevent rain from soaking into the soil quickly.

Photo 39: Evenly-grazed veld with optimum concentration of animals.

Photo 40: The animals in a large herd of game usually graze closely together. Herds like this still move through large parts of Africa, preparing the soil and allowing grass plants to recover.

Photo 41: Livestock from various owners being herded to move and graze together.

Photo 42: Cattle trail with capped surface on both sides

Herding in communal areas is the cheapest and most effective method to increase the productivity of the land.

29 Converting here means changing or transforming into something else.

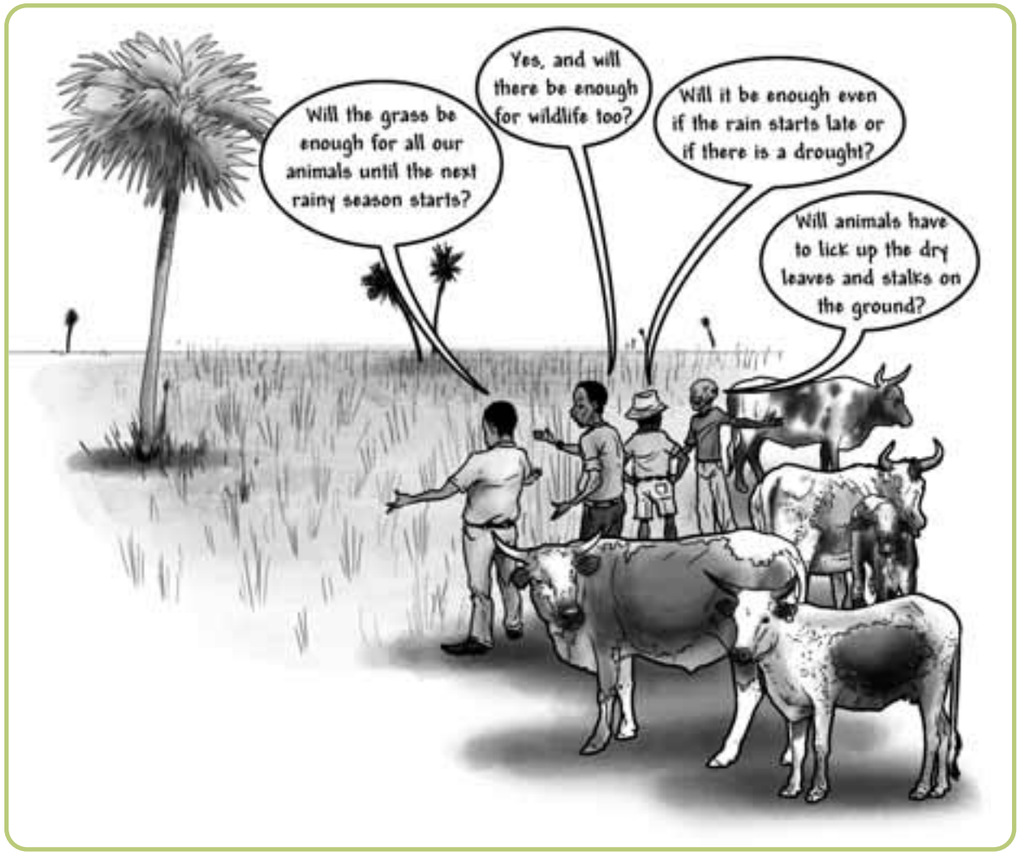


Illustration 6: A group of farmers discussing whether they should de-stock their herd

3.3 Managing risk by destocking and re-stocking animals to build a productive herd and wealth

The previous pages have shown that if livestock is managed well, it can help to grow more grass over time. The two most important principles in this regard are:

- preparing the soil surface so that capping is broken and grass litter covers the soil and
- giving grass plants enough time to recover after they have been grazed.

After a poor rainfall season these principles cannot be applied, if there are too many animals. If the number of animals is too high they will lick the grass litter off the ground because they are hungry. Similarly, in a poor growing season when there is not enough grass for all the animals the herd will have to move faster from one place to the next because the animals will be hungry. This can result in coming back to a place that has been grazed in that season already and before the roots of the perennial grasses have fully regrown. Therefore there are two times in the year when farmers should check whether there is enough forage for the animals they have: At the end of the growing season (around May) and at the beginning of the growing season (November to January). De-stocking, or selling livestock and then re-stocking or buying in more livestock at the right time are ways of managing the risks of drought, especially when there are no other grazing areas to move the animals to.

At the end of the rainy season when the grass starts to dry up, it will not grow further, which means this is all the grass the farmer has for the livestock to eat until the next rains come. Many farmers can estimate how long the current grazing will last their herd of animals. Some can measure the amount and quality of the forage by weighing the grass.

The farmer may be able to judge that if:

- the grass is not enough to feed the animals until the next rains start;
- there is no extra grass standing in case the rains start later than usual (i.e. if there is a drought);
- and the animals will have to lick up the dry leaves and stalks that are trampled to the ground,

then there are too many animals.

Some conservancy and grazing communities are using the monitoring form below to record how long the forage will last.

MONTHLY FODDER AVAILABILITY

Conservancy Name: _____ **Year:** _____

Grazing Area: _____ **Operators names:** _____

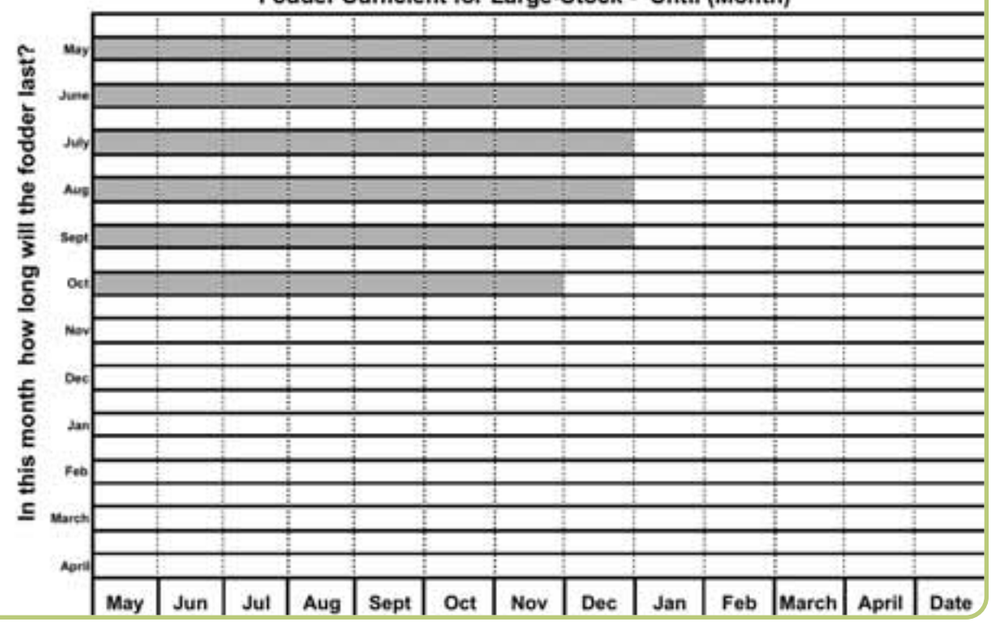


Illustration 7: A Local Level Monitoring form to record how long the forage is expected to last.

Reducing the number of animals early in the dry season by selling them while they are in good condition helps the farmer earn money from good quality cattle, and fewer have to be sold. If the farmer waits until the end of the dry season when the forage is all eaten, the animals will by then have lost condition, and more animals would have to be sold before they die.

Photo 43: Cattle licking up plant litter.

In this scenario, the land and grazing will suffer because the animals lick the leaves from the ground. The soil will be bare and unprotected when the rains come, and water will not be held in the soil for plants to grow well. Farmers who want to provide enough forage for wildlife will also take into account how much grazing and leaves from shrubs should be available for there to be enough for the game as well.

Letting livestock eat the protective plant litter is to the soil like taking the shirt from a person, forcing him to work in the sun and wind and the cold of the night without water or protection, and still expecting that person to live and work for many years. The naked skin will burn, the body will dehydrate and the person will die. Similarly soil can 'die', and stop producing forage.

Illustration 8: When soil is exposed to the sun and wind it is like a person being left without shelter and blanket.

To avoid the risk of losing their animals, farmers can buy and sell livestock at different times of the year and make good profit from this. They can de-stock animals in May and put the income from the sale away in a savings' account. With this money they can then re-stock or buy younger and thinner animals during the next rainy season when they see they will have lots of grass to feed more animals. For this purpose, it is advisable to keep the money in a long term investment account.

Another time to re-assess animal numbers and to cull if appropriate is at the beginning of the growing season, between October and January. If the rains start late and are scant[30] with long intervals between rainfalls, the farmer knows that less grass will grow. In such a situation, it would be better to make the forage available to the most productive animals. The weakest, thinnest animals and those without calves should be sold or slaughtered. In this way the healthiest, most productive animals are able to reproduce, and the grass they eat will bring the farmer another calf. Alternatively if it is an ox, the animal will fetch a good price when sold. With ongoing selection, the productivity and hardiness of all animals in the herd will improve.

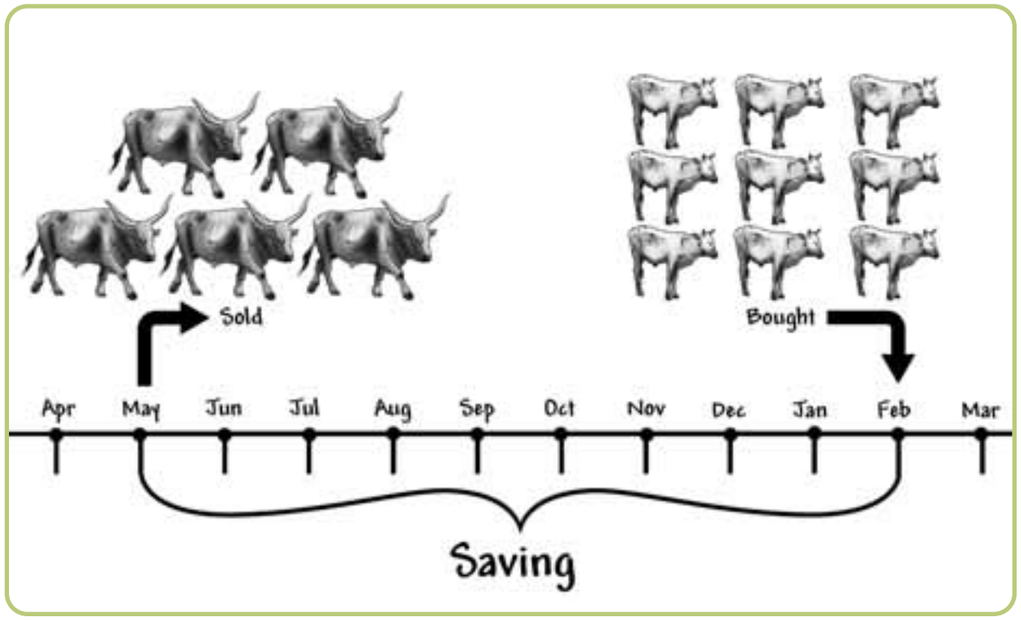


Illustration 9: De-stocking and then re-stocking livestock can help to increase the number of animals. If some animals in good condition are sold when the grazing is poor the money can be saved and if the rainy season has been good the farmer can buy for the same amount of money more and younger animals that weigh less per animal.

30 Scant – poor or not enough

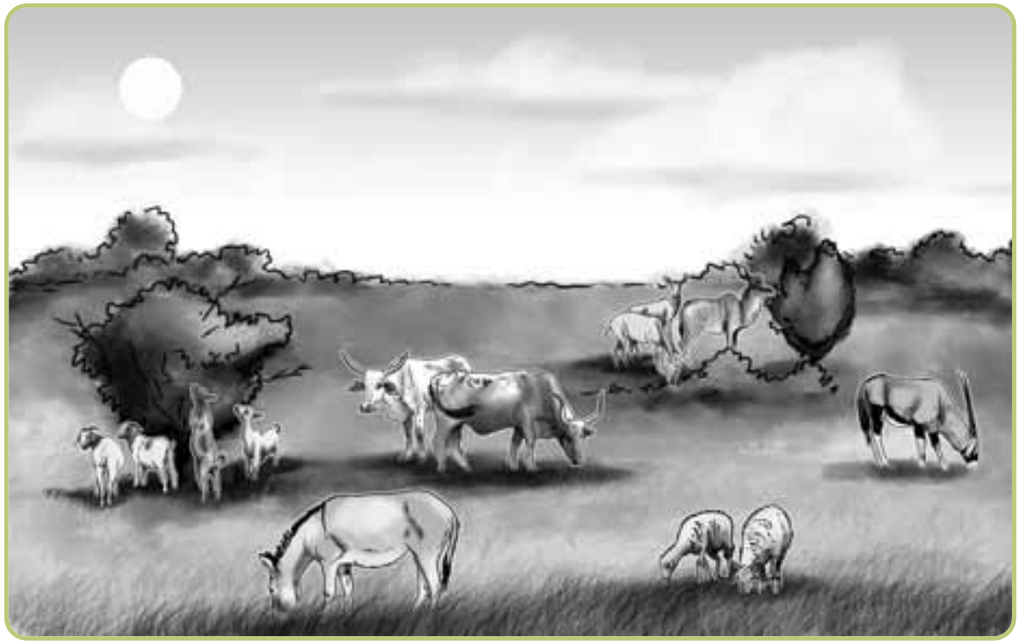


Illustration 10: Different animals eat and help different plants to grow well.

3.4 Welcoming wildlife as part of productive rangeland

Many farmers keep goats, sheep, donkeys, horses, pigs and chicken as well as cattle, and they may manage wildlife for tourism purposes. All of these animals can help to keep the soil, plants and animals healthy. Different game species have different mouths and eat different plants. In this way both the bush and the grasses are eaten and the soil is fertilized.

Natural predators such as guinea fowl or chicken can help reduce disease in livestock. Other fowl and smaller animals eat grasshoppers, which in the absence of natural predators can easily become pests and eat all the grass.

Goats, springbok and kudu browse mainly bush and shrubs. When the young seedlings of bushes in particular are eaten, this can help reduce bush encroachment[31] without using chemicals or fire.

Some communities experience losses in their crop harvests when large flocks of Quelia birds invade their croplands. If the natural grazing areas had more grasses with round seeds for the Quelias to eat, the birds would not come so close to where people live and grow their crops.

Farmers report that when they allow many wild large and small animals and plants to grow in their grazing areas, this provides natural protection against diseases and predation of livestock and crops. This includes predators that sometimes catch calves or lambs. Herding livestock is the best protection against predator losses.

31 Bush encroachment happens when bushes take the place where other plants used to grow

Photo 44: Aardvark

Photo 45: Warthog

Photo 46: Guinea fowl all dig and scratch the ground

Photo 47: Francolin

Photo 48: Cattle egrets

Photo 49: Domestic chicken all eat ticks and other parasites.

Photo 50: Quelia swarm

3.5 Possible approaches towards bush encroachment

Farmers all over Namibia in both commercial and communal areas observe that more thorny and other bush is taking over their land where previously there was valuable grass. While we may think that the bush killed the grass, research has shown that bush usually invades those areas where the perennial grasses have died. The bush is able to spread when the grass becomes weak.

If bush becomes so dense that livestock cannot move through it, it can be thinned with chemicals, by machine or by hand. It can be expensive, but many farmers have turned the wood into an income-generating product. Making charcoal or selling firewood to towns are the most common ways of earning money whilst at the same time thinning the density of bush.

Some farmers observe that bush seedlings germinate only in years with especially good rainfall. They then burn the veld the following winter to kill these seedlings. The CBRLM team can be approached for more information about the best time to burn so the bush seedlings really die, and what farmers can do to avoid losing more grazing than necessary in the fire.

Thinning or removing the bush completely will not in itself improve the growing conditions of grass in the long term. If animals still over-graze newly-established perennial grass plants and are allowed to wander where they like, the soil will not be prepared for water to soak in and be retained in the ground.

Thus concentrating and moving animals according to a grazing plan should be one of the actions farmers take to restore the productivity of the grassland. This can be done by moving animals from one fenced

Photo 51: Charcoal making

Photo 52: Fire wood cut for sale

Photo 53: Livestock in dense dichrostachys cinerea bush

Photo 54: Dense perennial grass stand under dichrostachys cinerea bushes

camp to another, or at lower cost and with better control through herding according to a grazing plan. This plan can be adapted and changed according to the needs of the land, the plants, the animals and the people.

When animals move in a tight bunch they venture more readily into bush-encroached areas to eat the nutritious pods and any grass growing under the bushes. There are many examples where perennial grasses are recovering, and where bushes die when the grazing management provides good soil preparation and enough time for perennial grasses to re-grow after being grazed.

Concentrating all the livestock on a piece of land for a short grazing period, then moving them on (only bringing them back once the grass has had enough time to recover) creates good conditions for grass and fodder bushes to grow and improve. It also is beneficial to the health of the animals, as they get to fresh forage nearly every day.

3.6 The way forward

Having seen the challenges that farmers face in finding enough grazing for their animals, particularly in years of drought, the question is: are we prepared to change the way we farm?

News from all over the world, as well as the flooding and droughts in our own country in the past few years, indicate that we will see more and more droughts and flooding. These are some of the changes in the global climate (the weather patterns of the whole earth).

The following chapters describe what communities can do to better manage their livestock and improve their rangeland.

“I thought I was a cattle farmer. Now I feel I am a grass farmer.”

4
Planning together for a conservancy or community forest

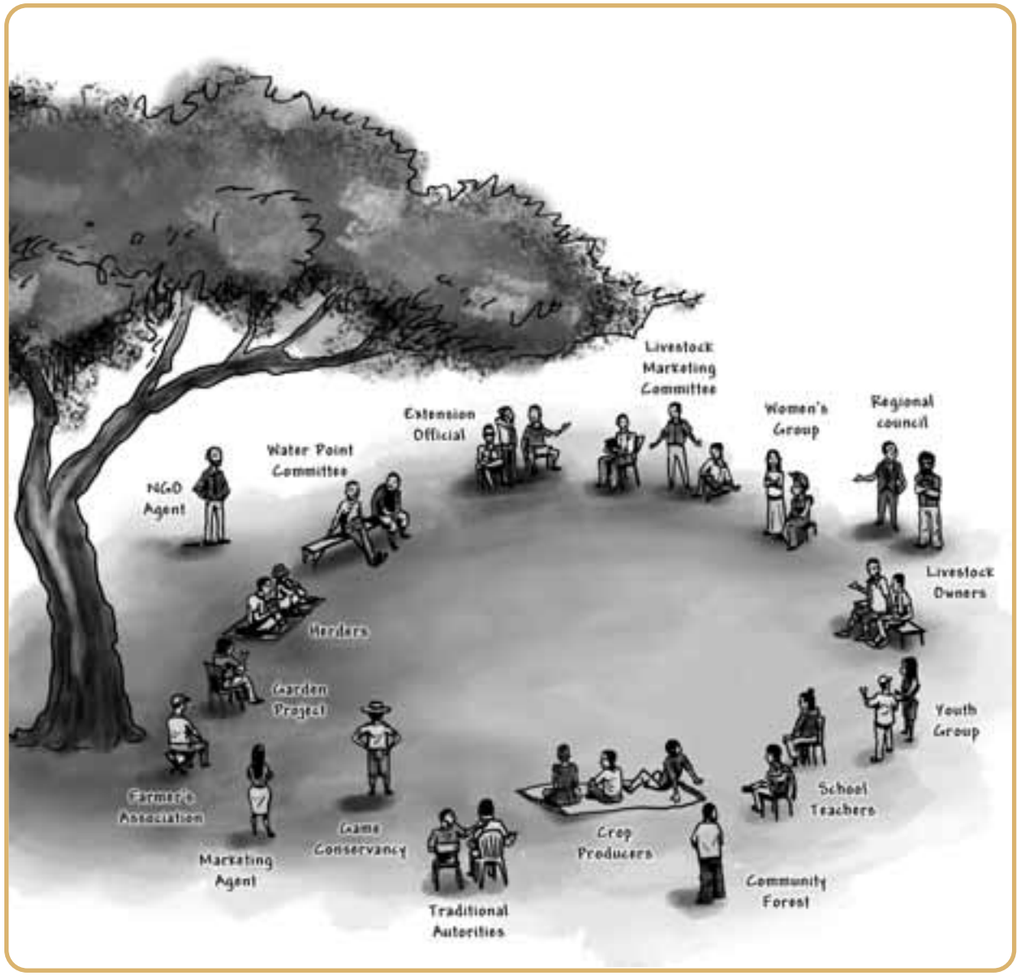


Illustration 11: Participatory planning session under tree

Understanding that soil and water provide the foundation of the wellbeing of everyone in the community, who can contribute to the better management of rangelands and livestock? Livestock farmers and herders must start this process if they want to improve the living conditions of the animals and people in the area. However, they cannot do the work alone and need the active support of their traditional leaders, other community members, Government officials and support agencies.

Land may be used by a number of groups and projects, such as wildlife conservancies, tourism, community forest groups and craft producers. With good planning, these various land users can support and complement each other, instead of competing with each other. A map can be drawn up that shows where the main grazing areas are, and where forestry, community tourism or any other activities are taking place. This is a land-use plan for a whole conservancy or community forest.

Stakeholders should bring existing land-use and zoning maps to such a meeting, so that important plans and agreements from previous meetings are not neglected or forgotten. Some of these previous agreements and plans may change. Everyone in the meeting should be asked how they feel about the changes. Only when all affected people understand the purpose of rangeland management planning will they cooperate and respect the plan.

The overall land-use planning meeting can also inform neighbouring grazing area communities about the new management. When they understand what the grazing area is trying to achieve, they are likely to be more supportive of the endeavour.

In some regions or communities there may not be an existing conservancy or community forest, or it may be very new. Here farmers can start to plan the use of the grazing areas before a conservancy or community forest land-use plan is drawn up, as the grazing plan will take into account other land-uses and will help to improve water management and wildlife habitat.

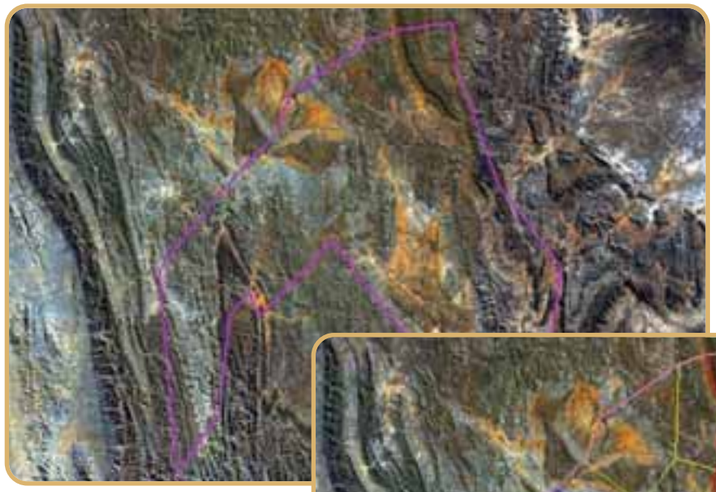


Photo 55: Conservancy Boundary on satellite image

Photo 56: Grazing Area Boundaries within conservancy

Because livestock can help to improve grazing and water, this will have a positive impact on wildlife, tourism, crop production and safe water supply for the whole community.

"By moving livestock in one big herd according to a grazing plan both the plants and the animals benefit."

5 Planned Grazing

Livestock owners, farmers and their helpers and herders are the people who make decisions about livestock and grazing, and they should take the lead in developing a grazing plan for their area.

A single farmer will find it very difficult to herd his or her animals according to a plan without the support of other livestock owners and water-point users. The previous chapters in this book have shown that animals are much more effective if they walk and graze in a big group. Animals will not do this if the livestock owners do not plan together. Improving grazing is thus a collective responsibility.

Some communities may find that a farmer has fenced in an area and does not want to participate in herding his or her animals with those of the other community members. No farmer should be forced to participate in joint planning and management. However, every farmer should be invited to learn from the group, so that they can understand what the group wants to achieve, and that this can benefit everyone in the community. If people feel excluded, they are less likely to respect the grazing management plan.

Successful grazing communities have reported having taken the steps illustrated in the picture below when discussing the situation:

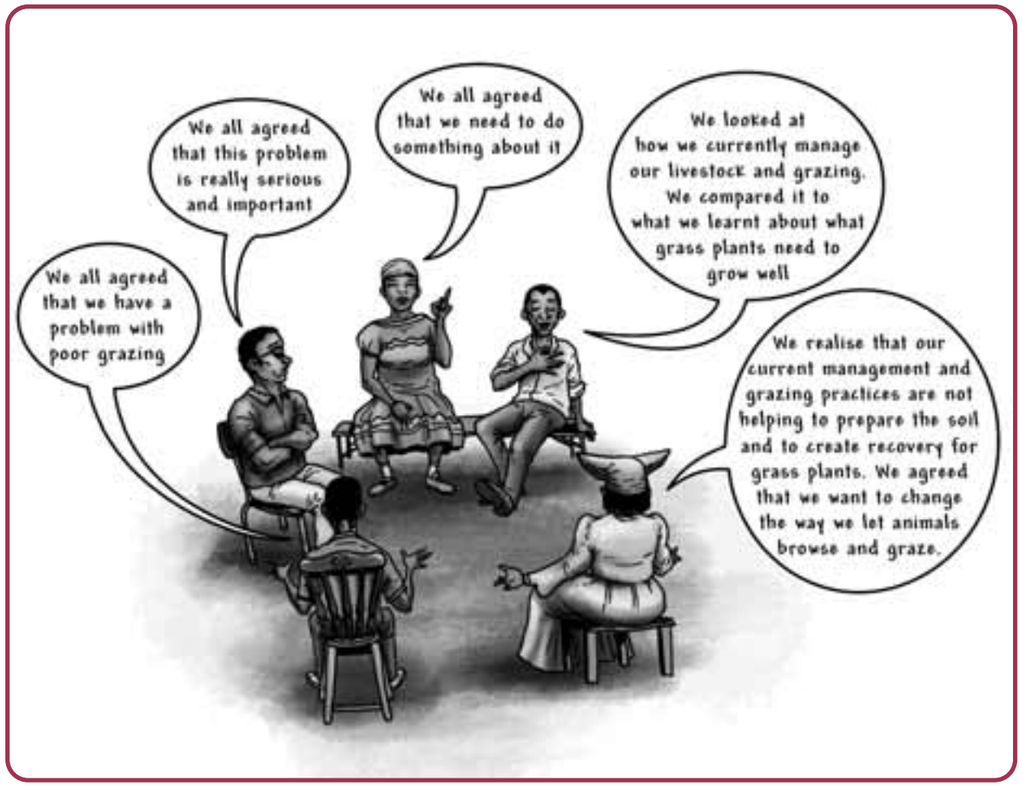


Illustration 12: Experienced grazing communities share their success

A grazing area map shows all grazing area members where water, infrastructure and homesteads are. This kind of plan is more detailed than the land-use plan for a whole conservancy.

The group may discuss who decides where livestock graze, whose livestock grazes in the area, and how many livestock are allowed in the area. They can also discuss what and who influences those decisions. For instance, do the decision-makers have the necessary information about what grass plants need to grow well? Might they make decisions differently if they knew how livestock could help grass plants grow better, or how water can better penetrate the soil? The following chapter explains how the livestock owners and herders can plan the various uses of the land without creating conflict.

The grazing area plan can prevent conflict between two different kinds of land use; for example, crop farmers and livestock owners could agree where and when the livestock will graze.

It is helpful if a grazing area map can indicate other resources, such as where Marula trees grow, who harvests the fruit, where crop fields are, where grazing areas are, or where oshanas and permanent water points are. If a map is drawn up that all grazing area members can see and discuss, they may identify opportunities to plan improvements to their area. For example, the placement of livestock kraals or of water points can be done without harming any of the other projects in the community, such as tourism and wildlife conservation.

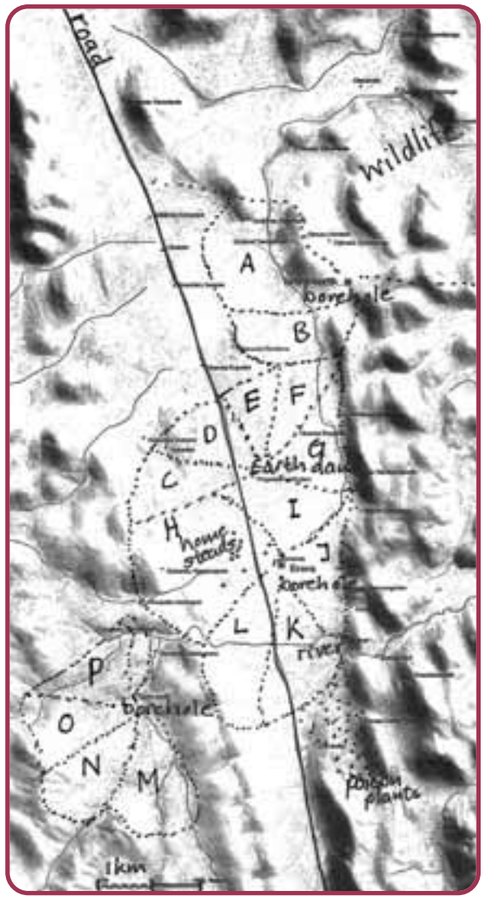


Photo 57: example of a grazing area map

5.1 Developing a grazing plan

A grazing plan is drawn up after the more general land-use plan. The grazing plan shows what activities besides grazing take place, such as protected game areas, as well as when activities happen, like cropping in summer and the harvesting of wild fruit or plants. The grazing planning focuses on the movement of livestock in particular, and is usually done by the livestock owners and herders only. It should be done twice a year, because the condition of grazing and, in turn, the livestock, changes after each rainy and dry season.

When crop farmers plan their field work, they need to ensure the soil is prepared, that seeds are purchased and enough people and tools are available to do the work of planting, hoeing and harvesting. Similarly, livestock farmers can plan where and how their livestock graze, who will be doing the herding, when will animals be sold and when will they be inoculated, branded and tagged.

As the previous chapter has explained, animals can better prepare the soil when they move in a big group than when they wander in small groups. The bigger the herd, the better the impact they have on soil and plants. Small groups of 30 to 50 animals are not as effective in “gardening” their grass forage as large herds of animals. Farmers who have adopted planned grazing combine their animals and let them graze together. They can combine their labour and planning skills, and share the cost of improving the water points to better serve large numbers of animals. Obviously a big herd needs to find water at the same place, and some changes may have to be made to the water points and kraals.

Cooperation and trust among community members may take some time to develop over the course of several discussion or planning meetings. Many farmers and communities who have tried it have found that it makes their farming more successful, with more people to identify potential problems[32] and find solutions. They have also found that it is important to include herders in the planning, as they not only know the animals but also the veld and can suggest practical ways of moving animals from one area to another.

Once the community has drawn up a land-use plan for the grazing area, they will know which areas can be grazed at what times in the year. This is why it is useful to have a map of the grazing areas to refer to when discussing the grazing plan.

Farmers who have many years’ experience say that it is best to plan twice a year, together with the yearly assessment of grazing and livestock condition which is often done at the end of summer, when temperatures are cooling, and grass has stopped growing and is turning yellow. Another good time to plan is at the beginning of the growing season, when the temperatures are rising again and grass is starting to grow. The precise month may differ from year to year because rainfall may start or end late.

A grazing plan is drawn up by livestock owners and herders together to discuss moving animals to the right place, at the right time for the right reasons. It helps to meet the needs of livestock, of wildlife, soil, plants and people.

32 Potential here refers to possible problems.

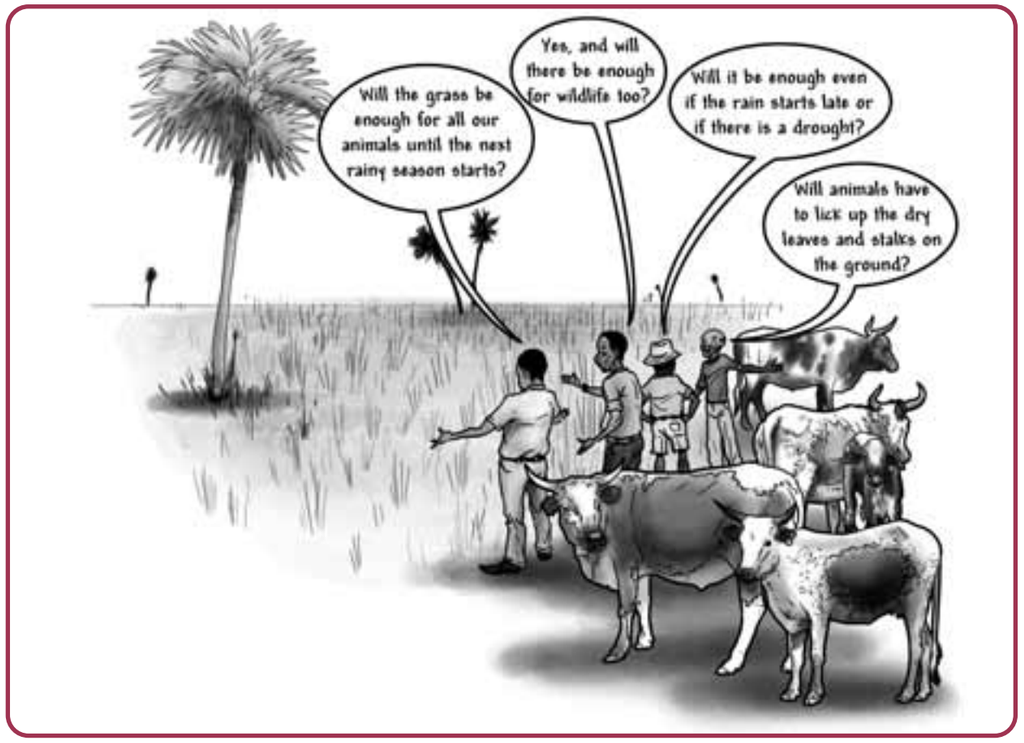


Illustration 13: Farmers considering if the grazing that is available will be enough

5.2 Planning for the non-growing or dry season

5.2.1 Matching available forage to animal numbers

Will the available grass and fodder bush be sufficient for the current number of animals, with new calves still to be born, even if the rains start late or there is a drought?

Consider the rainfall patterns in your area and ask yourself when the rains usually start. When would be the latest date that rains could start in the case of a drought? Will the forage be enough to last the whole herd until the latest point at which new grass will grow? Also, will there be enough forage for the wildlife you want to live in your area, and most importantly: will there be enough grass and leaves left over on the ground to cover the soil surface and protect it from evaporation[33] and erosion? Maintaining all the animals in the hope that the grazing will last, and then letting them eat the plant litter is like robbing the soil of the clothes that protect it, leaving it to turn into a desert.

If it is estimated that the grazing will not last, it is best to reduce the herd size at the beginning of the dry season when the animals are still in good condition from the summer grazing. If they are moved or sold at this time, the farmer will get a good price for the animals. Also, the earlier one sells, the fewer have to be sold, meaning more animals can remain.

33 When or moisture evaporates it changes into a gas and moves into the air.

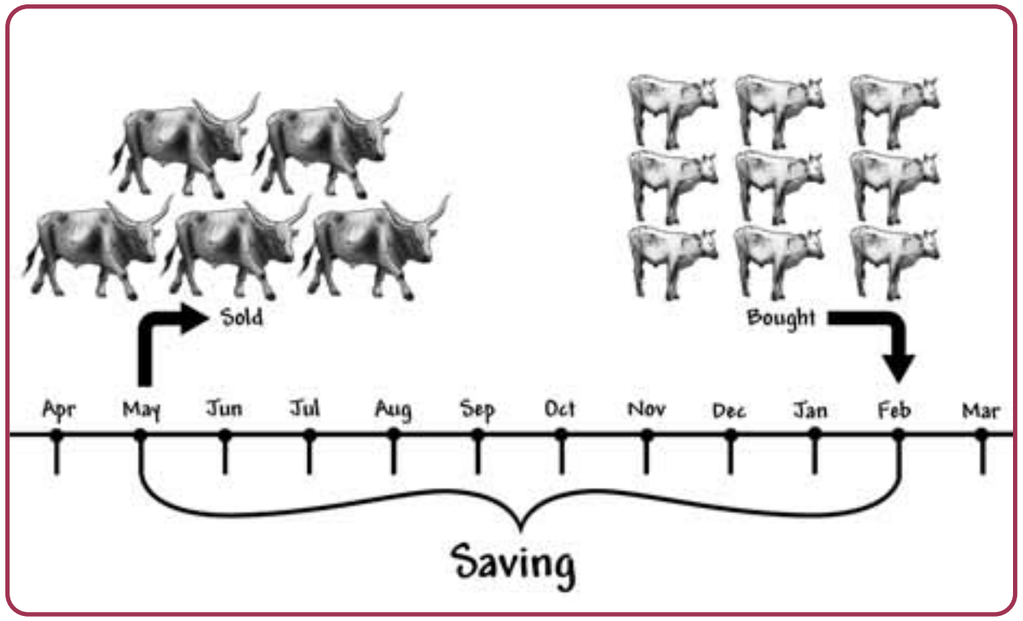


Illustration 14: De-stocking and then re-stocking livestock can help to increase the number of animals. If some animals in good condition are sold when the grazing is poor the money can be saved and if the rainy season has been good the farmer can buy for the same amount of money more and younger animals that weigh less per animal.

5.2.2 Considering the needs of animals and planning the movement of the herd in the non-growing season

Many farmers think that when animals have a greater area of land available that they also get more food or that they can better choose the plants that are best for them. The drawings on the next page show how animals graze if they are scattered across the land.

The effect of continuous grazing in the NON-GROWING season

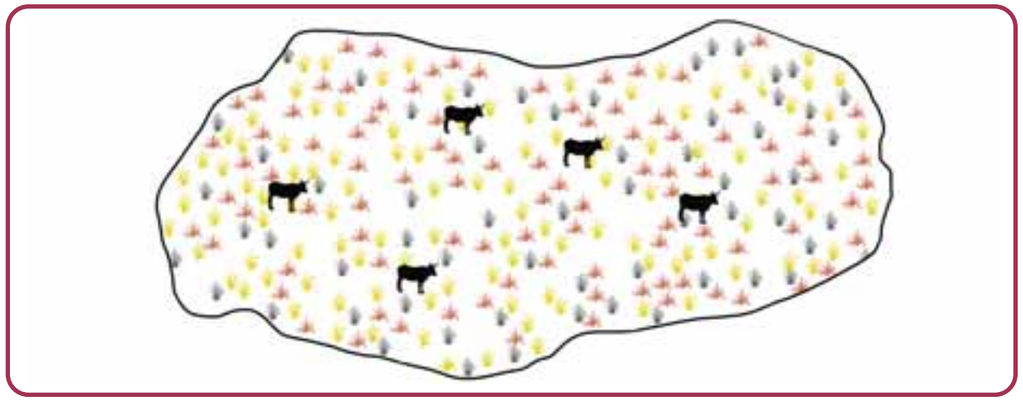


Illustration 15: When animals are allowed to wander around over a large area for many weeks or even months they will first eat all the best forage in terms of protein, energy and fiber.

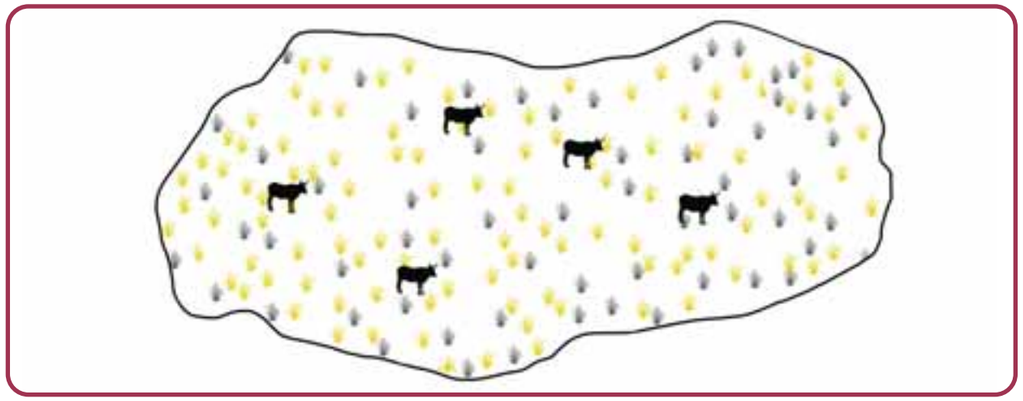


Illustration 16: Next they will choose plants that do not taste so good that do not contain all the different nutrients that the animals need to remain healthy.

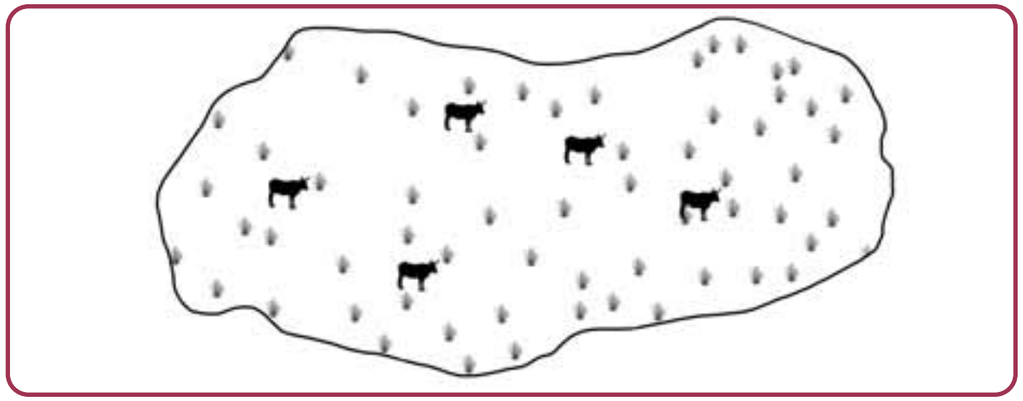


Illustration 17: At the end of the non-growing season only the least nutritious grasses will be left and the animals loose condition quickly. Because animals do not trample them down, over-rested grass plants remain standing and do not become soil cover. Another disadvantage is that during the dry season it is more difficult to see how much forage the animals really have eaten until it is all gone. Animals tend to lick up grass litter lying on the soil surface, making it bare and leading to erosion.

By herding and moving livestock to a different section frequently in the NON-GROWING season the soil surface and the animals benefit

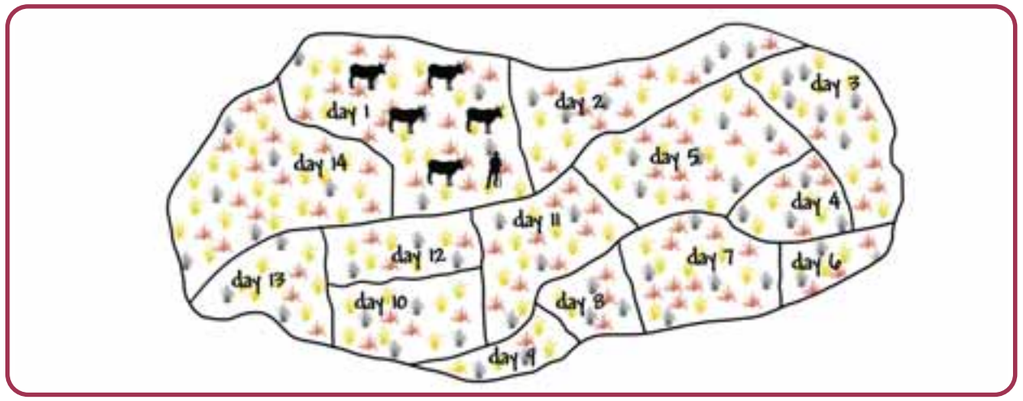


Illustration 18: In each section they eat both rich and poor plants, taking what they need to balance their diets. Old grass that is not nutritious any more is likely to be trampled to the ground because animals are concentrated through herding.

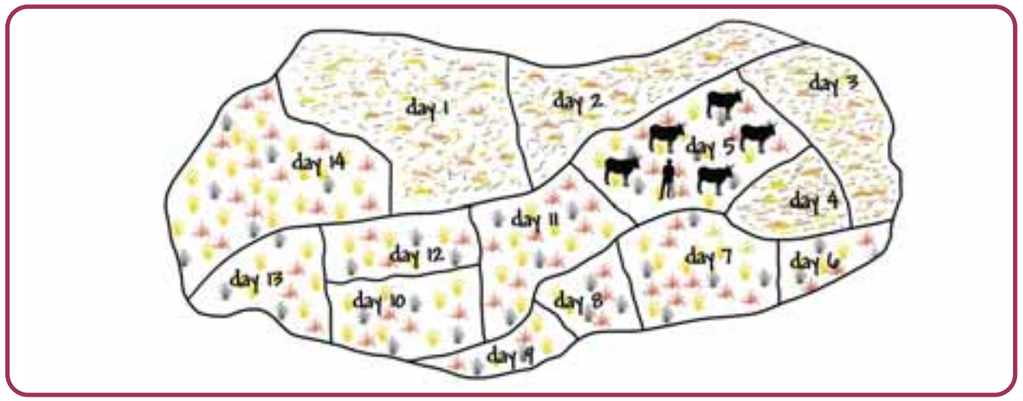


Illustration 19: Very soon, the herders can see if the forage will last until the end of the non-growing season.

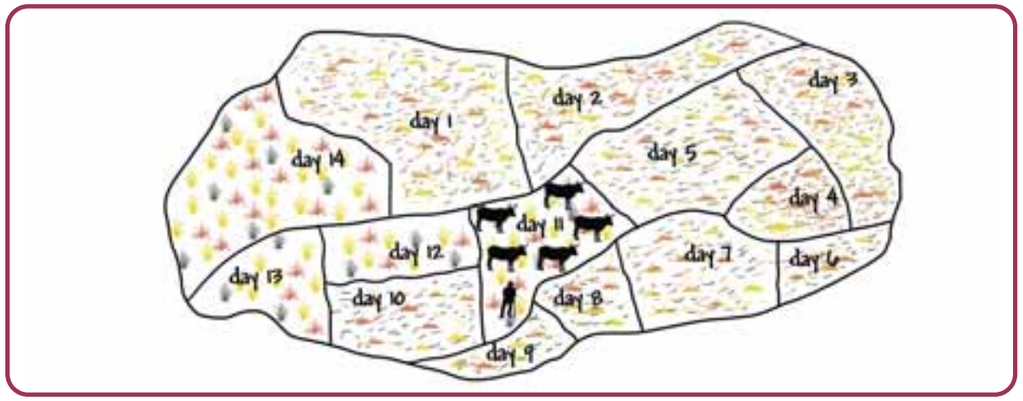


Illustration 20: Even at the end of the non-growing season the animals still will have both the rich and poor plants to balance their diet and this helps the animals to remain in good condition. Herders can control how much grass is trampled to the soil surface and they can move animals before they start licking up grass litter.

Herding the animals according to a grazing plan to a fresh section of land every day helps to avoid the various ways of over-grazing.

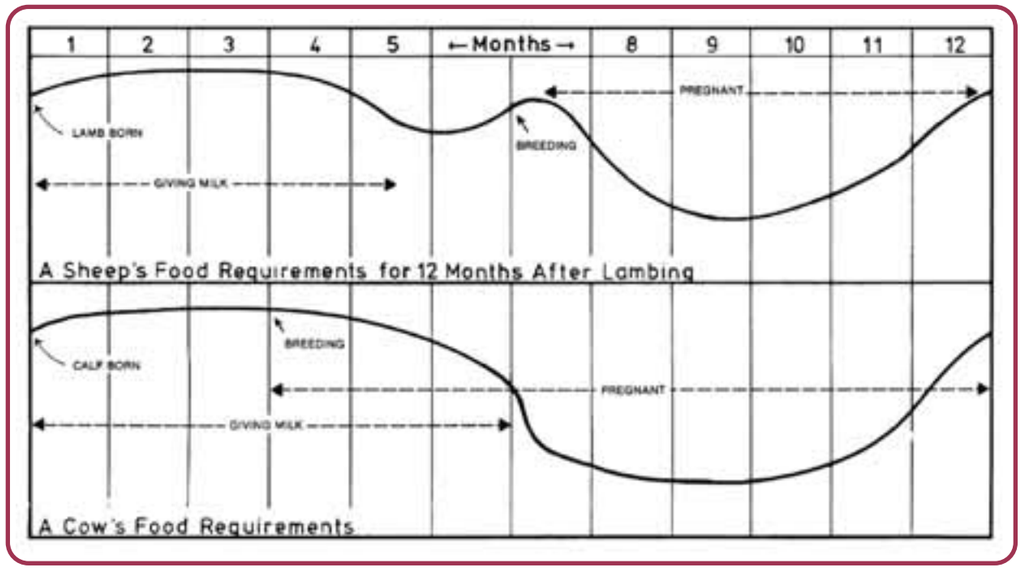


Illustration 21: Nutritional needs of female livestock throughout the year.

Now consider what the animals need at specific times in the non-growing season, and what can be done to make it easier for them to remain in good condition during the dry months. The wellbeing of the cows will be most important to consider.

Many farmers kraal the calves while the cows go out to graze. While this is effective in protecting the calves against predation and theft, it may result in their getting insufficient milk and grazing once they are old enough to eat plants. Also, the cows lose the skill of protecting and defending their calves from predators and people. Farmers have found that when they combine many cows and calves in a big herd, predators are reluctant to attack the group. The cows keep watch and round up the calves into a group which is difficult for the predator to attack. In this way the cows develop good mothering instincts, and the calves get both milk and grazing, and thus grow better. If calves remain at home they get milk less often during the day and they tend to get ill easier. Milking cows and calves can be kraaled separately during the night, to make sure that there is milk for people in the morning. The presence of a herder provides additional protection against predators and theft.

Herding the animals to the areas furthest away from the water early in the dry season is better than in the last hot months before the next rains start. As the animals weaken from October onwards, they then have less far to walk and can graze closer to the homestead or water point. The plan should also include decisions on temporary[34] and permanent water points, and which to use when. Letting the animals drink from the temporary water points while they are still available can help to save on pumping costs.

34 Temporary water points are those natural vleis and oshanas or springs which have water only for part of the year.

Consider when most cows will give birth. One to two months before birth, the herd they graze with should be given the best available grazing, so that the cows are in good condition when they give birth. This will make it easier for them to conceive again and become pregnant with the next calf soon after giving birth.

The plan can also take into account where poisonous plants usually occur. These places should be grazed first in the winter, when there is other grass available for the animals.

Photo 58: Poison leaf

Farmers find that when the perennial grasses are strengthened again, livestock are less likely to eat the poisonous plants. When the soil is trampled, covered with dead leaves, fertilized by herds of animals and the perennial grasses have time to grow, the weeds are much fewer.

Consider which places in the grazing area have hard and bare soil, and would benefit from intensive trampling of old grass and of the soil crust. Plan to take the animals to these places in the middle of winter, or at a time when they do not have to gain weight. The plan should also consider where and when crop fields need to be protected from grazing animals. Early in the dry season and until the harvest is over, it is better to let the livestock graze away from homesteads and crop gardens.

Moving the animals to fresh grazing every second or third day gives the animals a good combination and quality of forage, and helps their digestion. With good digestion, the animals can absorb the nutrients better, enhancing their growth and milk production.

The movement of animals should be planned in such a way that they walk along a few tracks to and from water each day, so that the area close to the water point is not over-trampled or over-grazed. These tracks become bare from the heavy trampling, and thus become a fire break.

Another way to reduce the impact[35] of wild veld fires is to graze those areas first that most commonly experience fires.

Natural signs like big trees or piles of rocks can be used to divide the land into several grazing areas.

A map with a 'time line' is one way of drawing up a grazing plan. This is a record for herders and livestock owners of what they had decided. However, the herders must observe the animals and the grazing in the veld and change the plan if appropriate, if they realise that another sequence[36] of moving the animals is better.

35 Impact here refers to the effect or the result of fire.

36 Sequence – order of where animals go first, where they go next and so on

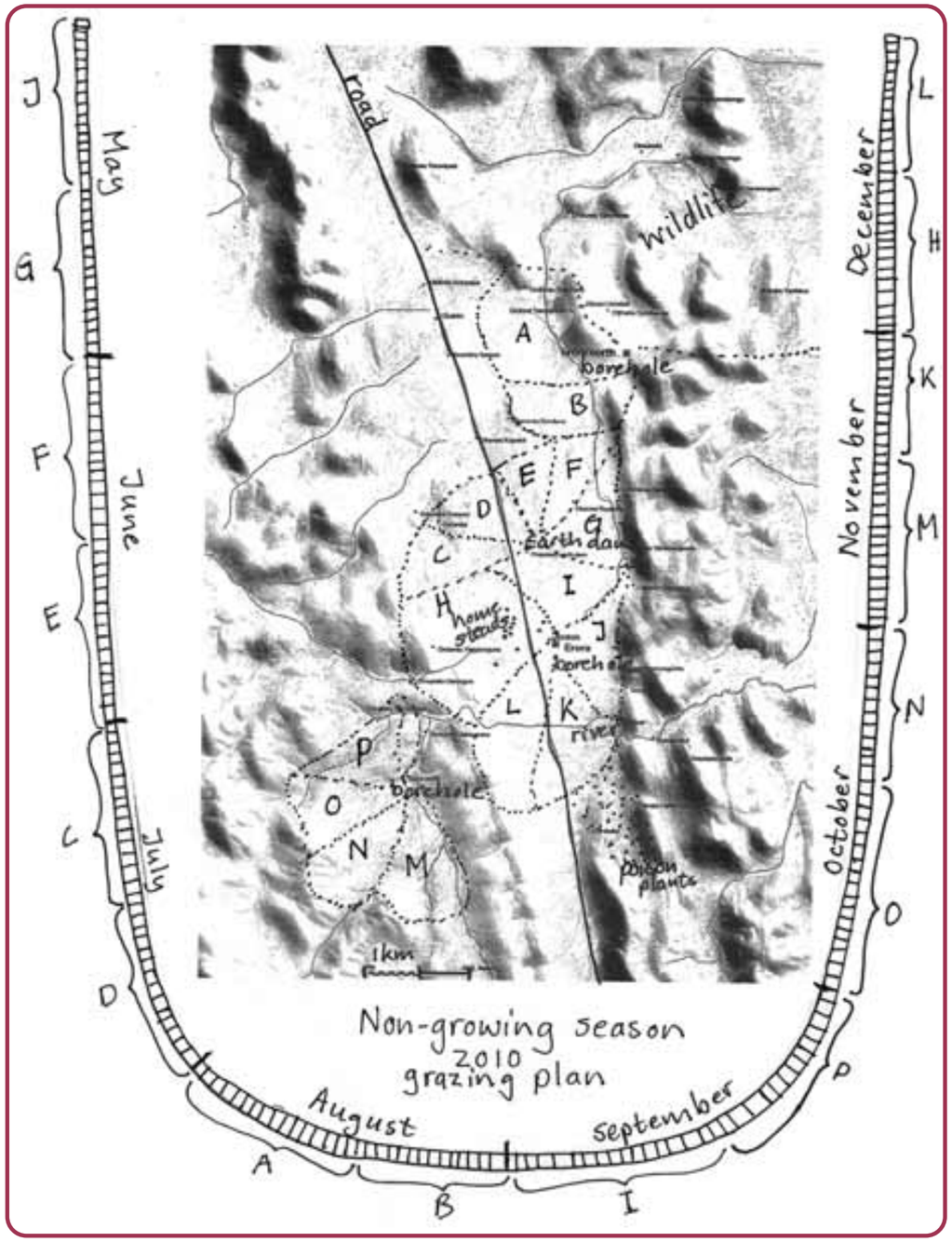


Illustration 22: A grazing area map with a timeline that indicates where animals will graze when.

Photo 59: Desired level of grazing and animal impact on soil. The land should still look like this when the rain starts.

The photo on the left is a guideline of how the ground (the soil surface) should look before the animals move on to the next area. Herders should observe the ground to see when it is time to move the herd on.

Photo 60: Bare soil and animals licking up plant litter.

The photo on the right is an example of a place where the animals stayed too long and start to lick up the plant litter.

Careful herding can bring about precisely the right level of grazing and trampling to create good growing conditions for grass, and to make sure animals get the forage they need in order to perform well.

The most important purpose of planning the movement of animals in the dry season is to make sure they get the best available forage at the times when they need it most (such as giving birth, and late in the dry season when it starts to get hot), and to trample the soil crust and dead plant material to the ground so the soil is fertilized, covered with plant litter, and the seeds are sewn by the hooves of the animals before the rain starts.

5.3 Planning for the Growing Season

When grasses grow is the time that they can be over-grazed and their roots weakened. The following illustrations show what happens, when animals roam around freely for a long period.

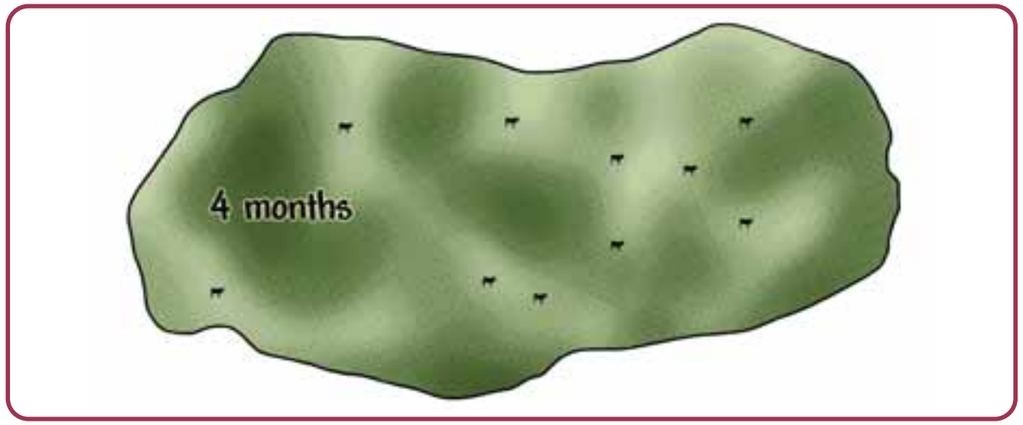


Illustration 23: ***Continuous Grazing***
Ten animals on the veld for 4 months will over-graze many plants as they look for the fresh new leaves that grow back on the plants they have bitten before. Other plants are not eaten and become over-rested.

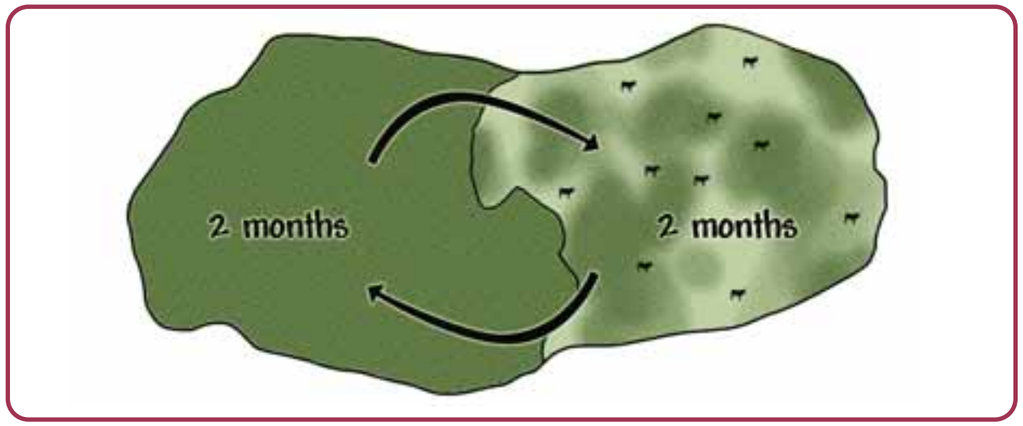


Illustration 24: ***Alternating grazing between two sections – the grazing period is too long and the recovery period is too short***
The veld can be divided into two grazing areas. The ten animals are moved from one to the other side after 2 months. The animals still eat the same amount of grass, but all plants now have at least 2 months of time to grow back. However, because the animals stay on each side for 2 months, the grass tufts are bitten several times and they do not get enough time to fully re-grow.

The following illustrations show what happens, when farmers rotate animals through a small number of sections or camps.

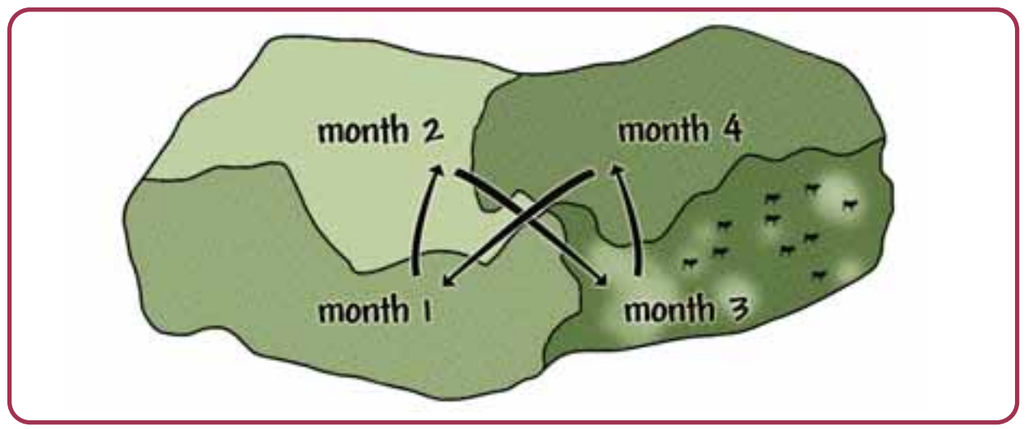


Illustration 25: ***Rotational grazing through four sections – longer recovery, but the grazing periods are too long***
The total area of land stays the same and it is divided into 4 sections. The animals are moved every month to another section. The ten animals still eat the same amount of forage over four months. All the plants have at least 3 months to grow back. However, 4 weeks is too long for the animals to be in any one section and they will re-graze many grass plants before they had a chance to fully re-grow.

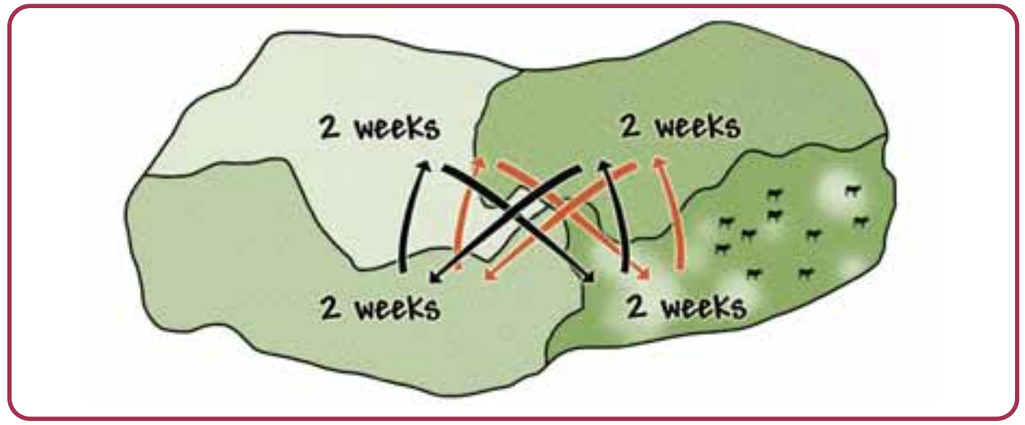


Illustration 26: ***Rotational grazing through four sections – shorter grazing periods, but animals come back too soon***
To avoid over-grazing during the grazing period, the animals are moved every two weeks. This shortens the grazing period and less over-grazing will take place during the grazing period. However, the animals come back after six weeks already to the area that they grazed first and this is too soon. Usually they then rotate through the same set of camps or land sections another time during the same growing season. Six weeks is not enough time for the grass plants to fully re-grow and recover their root reserves.

Herding the animals according to a grazing plan to a fresh section of land every day helps to avoid the various ways of over-grazing.

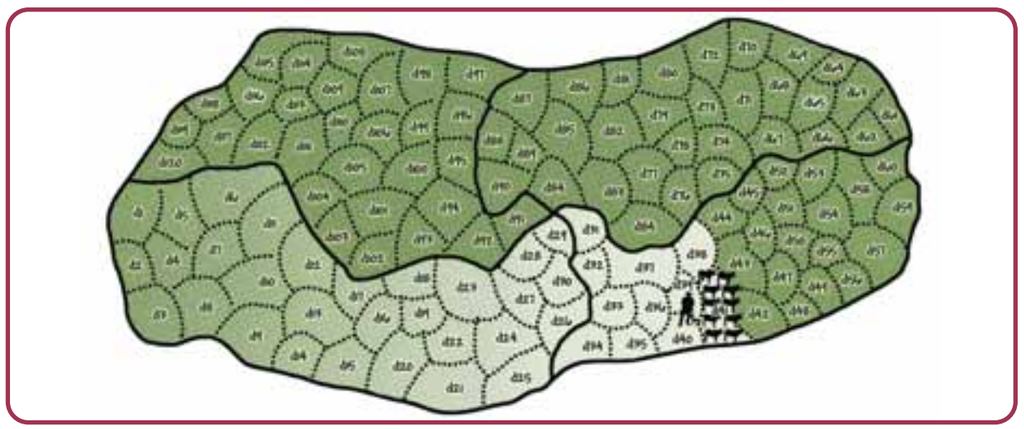


Illustration 27: ***Daily sections with short grazing periods AND a long enough recovery period.***
Herders move the animals to a new site each day over 120 days. All plants in all the sections get 119 days to grow back. This is a recommended average recovery period for most growing seasons in Namibia. Perennial grass plants become strong, animals get fresh grazing every day and the lifecycle of ticks and worms is broken.

When the perennial grasses start to grow again, the livestock owners and their herders should come together to make a new grazing plan. At the same time they should consider the number of animals again to determine whether there are too many for the available forage. If there are many animals with a low body condition score or cows that do not have a calf, this is an indication that there are too many animals for the amount of forage. These animals should be sold or slaughtered at the beginning of the growing season.

When making the grazing plan farmers can determine where the best grazing is when the animals need it most – usually at the beginning of the growing season when many cows give birth (or become pregnant) and the calves need lots of milk. The best is if each section is only grazed once during the whole growing season so that plants have enough time to grow their roots.

Even fenced areas can benefit greatly when livestock is herded within each camp to a fresh small section each day.

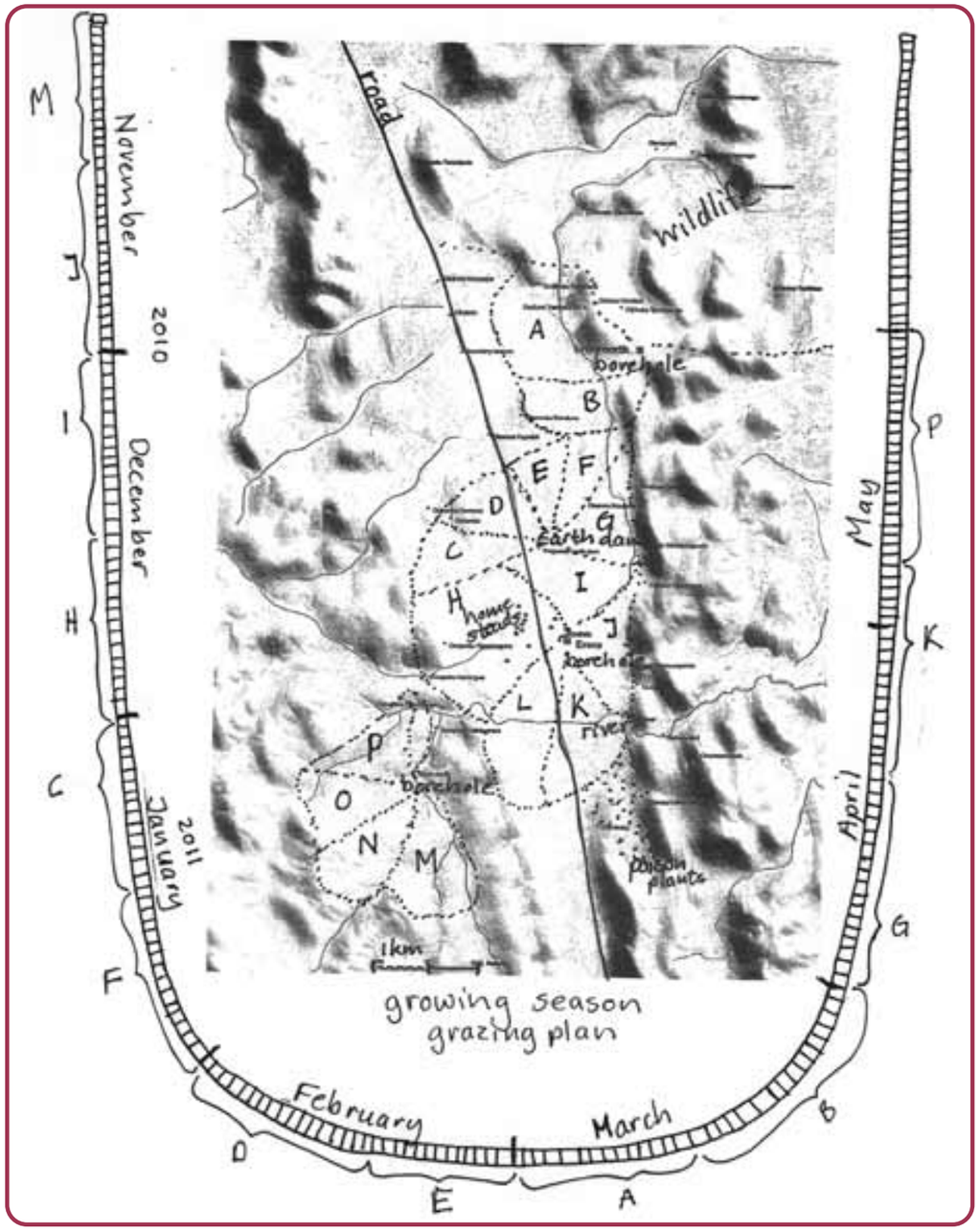


Illustration 28: A grazing plan for the growing season on a map.

By concentrating animals onto small sections of land, the grazing can be planned to give recovery time to grasses. In dry areas recovery periods of 120 days should be aimed for.

Photo 61: Mixed herd – donkeys, cattle, goats/sheep.

Again it is important that animals are concentrated so that their hooves till the soil and their dung and urine fertilize the soil when it is moist. Combining donkeys, goats and sheep with the cattle can help to prevent plants being eaten again where the herd has already grazed.

Another advantage of moving the herd of animals to a new place every few days is that parasites[37] such as ticks tend to cause fewer problems, as they cannot reproduce so quickly. When the animals move to a different place every few days, small newly-hatched ticks cannot find food (the blood of livestock), and will die.

The herders can make sure that animals do not enter the croplands, even if they are not fenced, in accordance with the grazing plan.

The main purpose of moving the animals according to a grazing plan in the growing season is to protect perennial grass plants from overgrazing, and to make sure animals get the best forage when they need it most.

37 Parasites are animals that eat from another animal without killing it first

5.4 What happens if animals are not moved according to a grazing plan?

If animals are kept in one camp or area for the whole season or the whole year, perennial grass plants are grazed again and again without having a chance to re-grow their roots. Sooner or later they will die; there will be less forage, and fewer animals will survive.

Photo 62: Perennial grass plants are dying out, where animals are allowed to graze the whole year.

If animals can find all the different kinds of food they need in the veldt it is the cheapest, most healthy and most independent way of raising livestock.

5.5 Controlling the movement of livestock

A grazing plan can only bring success and improvement of the veld when it is implemented well. As the movement of the herd to a different grazing area is the main part of the plan, farmers may consider using fencing to contain animals in one camp before moving them to the next. In order to allow for short grazing periods and long recovery periods for perennial grasses, there need to be many such camps – a minimum of 16 camps per herd.

While permanent fencing is very expensive and illegal in most communal areas, temporary electric fencing could be used to keep the herd in a specific place before the fence is moved and the animals move on to the next fenced area.

Photo 63: Electric fence

Photo 64: Solar panel, energizer and battery for electric fence

Specialists for electric fencing can provide information on what is needed to install such a system.

When farmers have a small number of camps, they can use herding and planned grazing within these camps to improve the grazing. A cheaper option is to herd the animals according to a plan. The herders discuss and agree what area they will take the animals to each day. Instead of using fence lines to mark the grazing areas, they may use big trees, termite mounds or heaps of rock to mark the corners of areas to be used for a certain period of time. Depending on the size of the herd and the experience of the herders, between 3 and 6 herders are needed to keep the animals together and to move in a desired direction.

Animals are brought from the kraals of individual livestock owners to one meeting place each morning. Very often this is also the watering place. Then the herders take the whole combined herd out to grazing. This should be done as early as possible in the day, to allow animals enough time to graze. During the day the animals will lie down in the veld to chew cud, and the herders can rest too. The afternoon graze will be in the direction of the home kraals, and herders should return with the last light to give enough time for grazing.

Other advantages of herding livestock according to a grazing plan are:

- Herders can see and help those animals that show signs of disease, weakness or birthing problems very quickly;
- They protect livestock against predators and thieves;
- The herders can tell livestock owners exactly where all the animals are and can easily collect them for marketing, inoculation, branding etc.;
- When livestock is herded there is less conflict with other land uses. This can improve crop production, tourism and hunting.
- Livestock movements are controlled in such a way that the animals do not interfere with tourism, hunting activities and with wildlife breeding areas;
- Livestock owners can monitor whether herders are carrying out their tasks correctly by looking at the signs of animals moving on the ground. This can be especially useful in the case of 'weekend farmers';

Appointing herders is a business strategy[38]. The livestock owner can make a greater profit. Herding, if done properly, is thus not a loss to the farmer.

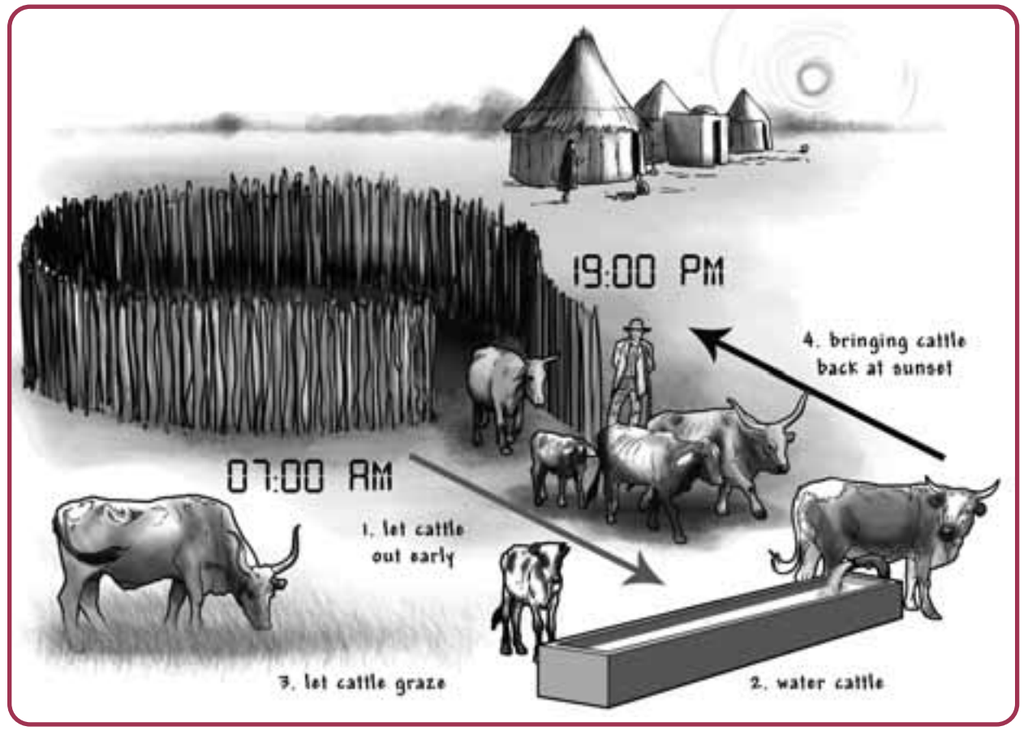


Illustration 29: To give livestock enough time to graze they should not spend time in the kraal during the day

38 A strategy is a plan of action

5.6 The important role of herders

With all the benefits that herders bring to livestock owners and to the wider community, and the demanding nature of their work, they should be treated well. Their contribution should be respected and acknowledged. Good equipment, and incentives such as being allowed to run their own livestock in the same herd they are tending, are ways of increasing their motivation and ensuring good continued service.

If farmers provide for the herders' basic needs of decent shelter, food, money, leave periods and possibly a bonus payment for satisfactory performance, they can attract skilled people to this job.

The herders may need initial training and practice. Farmers should be patient and allow them to gather experience. Listening to the observations, needs and suggestions of herders will be very important to improve the grazing plan.

Illustration 30: The herders' needs: shelter, food, money, recognition, appreciation, respect, social connection, leave time, bonus.

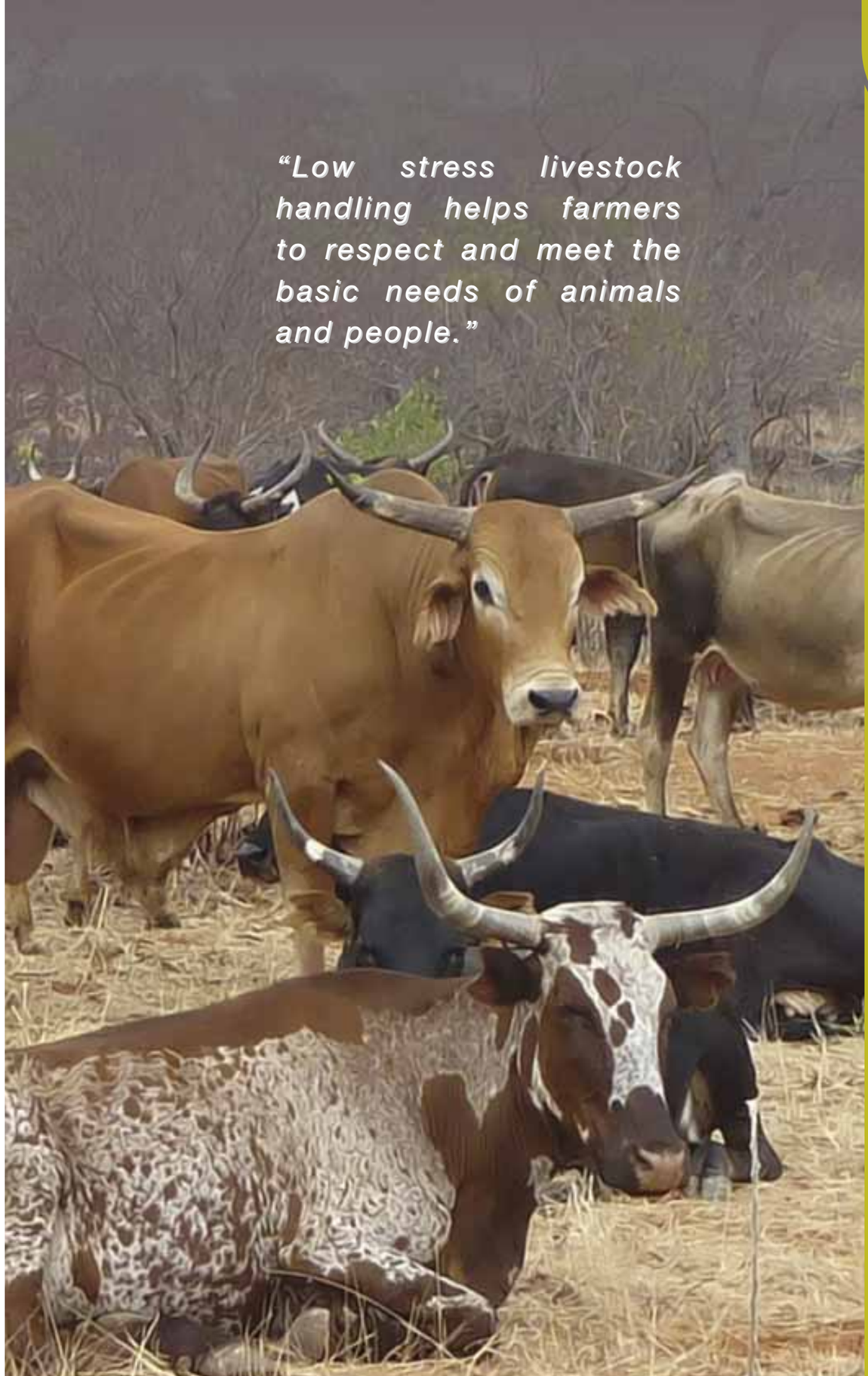
When livestock owners share the costs of herders jointly, they all save and benefit from the good care their animals get.

The impact of animals on the plants and soil helps rain water seep into the ground. Plants can grow well, and some water seeps into underground water reserves.

Moving the animals every few days to a new place protects perennial grass plants from overgrazing and they will multiply. Agreeing to a timetable of where to let livestock graze, when and for how long, as well as combining the animals into one large herd are all powerful tools for farmers to improve their grazing land.

The work the herders do is very important. They are responsible for observing the animals and the grazing, and making decisions that benefit both the rangeland and the livestock.

Photo 65: Herded livestock seen from the air



6.1 The nature of grazing animals

6.1.1 How grazing animals perceive[39] their surrounding

The nature of livestock and their view of the world around them are different to those of humans. Grazing animals' eyes are on the side of the head. They can see almost right around them, but not directly behind them. Grazers also see vertical objects (e.g. a standing person) better than horizontal ones (e.g. a wire). Furthermore, grazing animals see motion[40] very well. Like predators, people have their eyes at the front of their head. Because of this, livestock often see people as a predator and a threat. To establish trust with the grazing animal, we must behave in a way that makes the animal feel comfortable in our presence. Livestock may not cooperate well, for instance when we want them to move in a certain direction, on account of this fear. Because it is so important for the animals to watch our eyes, it is best not to wear sunglasses when working with them.

The ears of grazing animals are much more sensitive than those of humans. They are easily affected by noise, and experience our loud voices as frightening. For grazers, size also plays an important role, since in nature large size is respected. This is reflected in hierarchical[41] herd structures. Therefore if animals are used to be handled by people walking on foot and suddenly they are approached by a car which is much bigger and makes different noises, they tend to be afraid at first. Early cattle handling experiences have a long lasting effect on the behaviour of livestock.

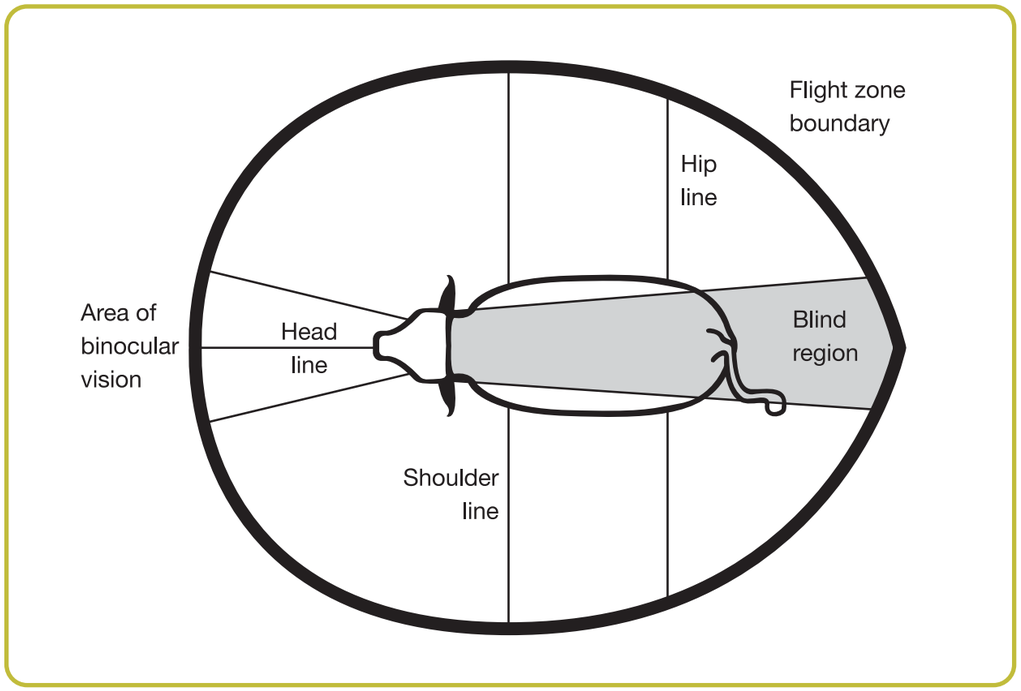


Illustration 31: Animals can best see in front and on the sides.

39 Perceive = to take notice of or to become aware of

40 Motion = movement

41 In a hierarchical structure there is a clear order of who has more power than another individual in a group of animals or people

Animals learn habits and behavior from the way they are handled. The behavior is in response to:

fear, sounds and changes in the environment

They will behave differently depending on how people approach them: on foot, on horseback or in a vehicle. When people build trust with the animals, the flight zone of the animal gets smaller.

6.1.2 Social organization and leadership in a herd

Animals have a particular place in a group, just like human beings in an extended family. The hierarchial structure determines which animal will lead or dominate the other animals. Usually, the bigger and heavier an animal is, the more it is respected by the other animals. The male and female animals will also fight to see who is the stronger one. When new animals join the herd the order of who is dominating has to be sorted out. Once it is clear who is the leader and who is the follower, there usually is no more serious fighting because the animals can recognize the leader by their look and body movement and behaviour.

In a big mixed herd, the strong healthy animals, mostly cows tend to surround the calves to protect them. Weak or old animals tend to straggle behind the herd which makes them easy targets for predators.

At calving cows are looking for dry and soft places where they are not disturbed. Cows should be allowed to remain alone with their calf for some time to lick it but then should be brought to join the herd again, as the cow and the calf can be an easy target for predators if they are alone.

Cattle not only have inborn knowledge about how to behave in their natural environment and what to eat to meet their nutritional needs, but they have a culture, too. They acquire this cultural knowledge and behaviour by observing and learning. Calves observe and imitate[43] their mothers, just as bought-in cattle observe and imitate their experienced local herd-mates. In this way, the young animals as well as the newcomers learn which plants are edible, which are toxic, where in the area or at which time of the year the most palatable plants grow, and so on. When farmers herd large groups of cows together with their calves, they get the benefit of 'well-educated' youngsters that, as they mature, pass this vital information on to their offspring.

6.1.3 Habits and behaviour and how these can change

Cattle require up to 9 hours of grazing. Because they bite and tear off the grass and do not chew it before swallowing, they later lie down to bring up the swallowed forage and chew it. This is also called chewing the cud or ruminating. Usually animals graze for 2 to 4 hours, then rest to ruminate and then get up again to graze. Therefore it is important that animals have enough time out

43 Imitate= to copy the behavior or another animal or person.

in the veld to graze as well as to rest and chew cud and graze again before returning to the overnight kraal. While resting, animals also lick themselves. This is called grooming and is important for their health as well as their social interaction with other animals.

Many farmers agree that livestock follow certain social norms and have particular habits. In small groups and when allowed to move on their own, animals tend to walk in single file on comfortable paths. The soil on these paths is trampled to powder, and easily washed away by rain. The paths can become erosion dongas, while the soil surface next to the paths becomes capped and hard and does not allow water to soak in. To prevent animals from walking in this way, it helps to combine them in a bigger herd, bunched together, rather than in single file.

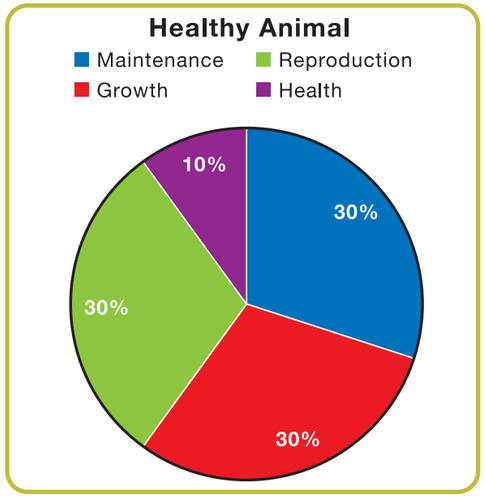
This means the soil will be chipped more evenly over a larger area by the animals' hooves.

6.2 Low stress livestock handling

6.2.1 Benefits & Background to low-stress livestock handling

Farmers may be accustomed to chasing animals with sticks, throwing stones and shouting at them, but the quality of the meat and the ability of the animal to gain weight are affected if the animal is fearful and nervous.

Fear and stress can lead to health problems in animals. Stress also leads to inefficient utilisation[44] of forage. This reduces the reproduction, growth and production potential of the livestock. The following two graphs show how animals use the food they eat when they are healthy animal compared to when they are sick.



Moreover, giving the animals instruction without throwing stones, hitting or threatening them with sticks, electric prodders or pipes prevents damage to the hides and meat.

44 Inefficient utilization = the food that the animal eats is wasted or not used in an optimal way

Other advantages of a smooth, careful animal handling include the following:

- Less stress for the people working with the animals;
- Less stress for the animals, and hence healthier animals in general;
- Increased milk production;
- Higher conception rates, as stress can reduce fertility of bulls and cows;
- Higher income for the farmer.

The least stressful approach to animal handling is one that takes into account the nature of the animals. It is the responsibility of the farmer to know their nature in order to be able to handle them animals care and low stress. Our attitude towards animals needs to take into account their habits and reactions, and we should follow some of the principles of low-stress livestock handling. We need to start however with our own attitudes, our behaviour and our thinking:

- A herder needs to love working with animals, and try to think and feel like the animals he or she is working with;
- The more reliable and calm we are, the more the animal will trust us, and for this reason we should be quiet and patient when handling them;
- We should give the animals time to figure out what is being asked of them. When forced, they may make a choice that is not the one we want;
- We should ask ourselves what we may have done to cause a certain reaction, since much of what they do is in reaction to what we do;
- Animals normally proceed in the direction they are already headed, or the direction their mates are taking;
- They want to see the herder at all times, as well as their herd-mates.

6.2.2 Basic principles

Herders and livestock-handlers can learn how herd animals communicate with each other, and how animals understand our behaviour. Training is available for 'communicating with animals'. Traditionally we tend to chase or 'push' animals from the back, which frightens them because they cannot see us. When walking at the side or in front of them, they can see us and, with a little practice, become much easier to guide.

The learning process is twofold: the handlers/herders have to build their skills in reading the animals; and the animals need positive experience to trust the people working them. Grazing animals observe our bodies and the way we look at them for a possible threat. Our eyes are very important tools: looking at a specific animal or turning our eyes from it makes a big difference to the individual animal. Looking at and moving towards an animal increases pressure and this will result in a reaction, because it generates a need in the animal to get rid of the threat. They will move in a direction they assume to be safer. Understanding this, the herder/handler uses the release[45] of pressure to reward[46] the animal for a certain action, i.e. moving

45 Release – to take away

46 Reward – to give something back in return for the right behavior

in the desired direction. Animals learn from the release of pressure – and not from the application of it. The faster a herder is able to remove pressure as a reaction to the desired movements of his animals, the more the animals trust the herder and the faster the animals will learn. Pushing, shouting and the use of sticks becomes unnecessary.

In order to build up this trust, and to apply the right amount of pressure at the right place in the right manner and at the right time, a herder needs to know about the three zones[47] around an animal. The same zones exist around a whole herd, because the whole herd reacts to people like a single animal. The animals in front are like the head with eyes of a single animal and the rest of the herd follows what the front sees. The animals in the middle of the herd also pass on information to those in front of them through the way they move.

The recognition[48] zone is the area where the individual animal or the most alert[49] animal in the herd becomes aware of the presence of the herder and it wonders what the person will do to it. The flight[50] zone is the area around an animal or herd where they start to move away from the person. Closest to the animal is the fight zone, where the person has got too close or applied too much pressure and the animal feels so threatened that they will attack the person. The aim is to work at the border between the recognition and the flight zone, because this is where we can vary the application and release of pressure to bring about movement in the desired direction.

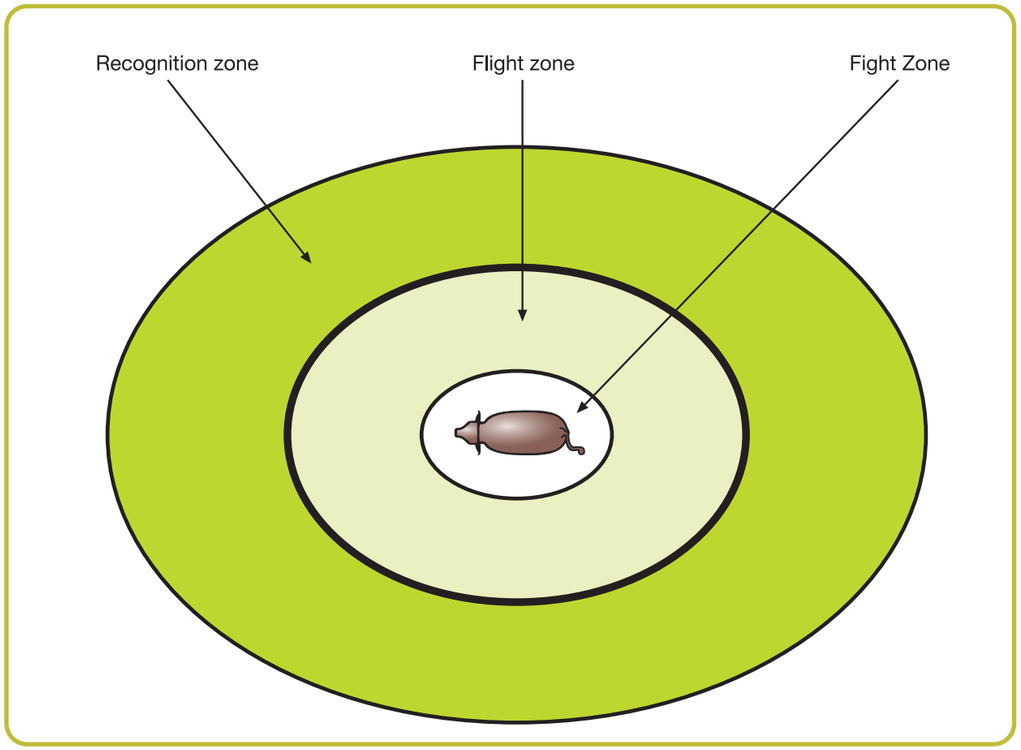


Illustration 32: The three zones around an animal, and around a herd

47 Zones- specific areas with specific qualities

48 To recognize something is to become aware of it and to know what it is

49 Alert – to be awake and watchfull

50 Flight – is the action where an animals runs away or flees from something

To approach[51] animals in a non-threatening manner we avoid walking in a straight line towards them. Instead, we walk in a zigzag pattern, with hands behind us, eyes down, shoulder first, showing the side of our body and if at all, we only make soft noises. As soon as we enter the flight zone, the animals will start to move. This is when we stop or even back up immediately to reward the movement. Then we approach again. Motion creates motion. We can use this as a tool to achieve the desired results with the animals. For example, if we have put too much pressure on the animals and cause them to start running, we would make it worse if we also started running. All this would achieve would be to make the animals go even faster. If possible we should move in the opposite direction, which would result in the animals stopping, so we could start again. If things are going well they would move off slowly swinging their tails, and start chewing if they have a mouthful of forage.

When talking about movement we refer to two different things: the single animal and the herd. When working a single animal it is all about the position of the person in relation to this animal. We approach, and then step back as soon as we have created movement. We immediately release the pressure as soon as the animal reacts in the right way. Knowing how a single animal reacts and behaves is very important to be able to work the whole herd.

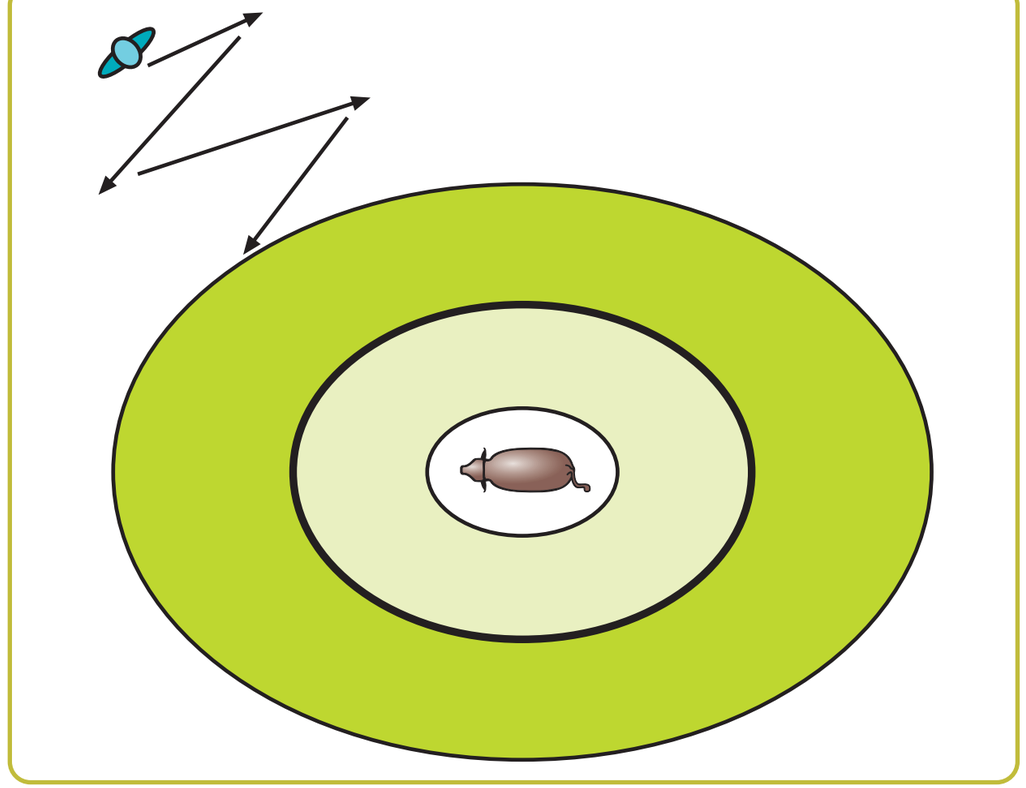


Illustration 33: Approaching an animal in a zig-zag movement

51 Approach – to come closer to

6.2.3 Handling bigger herds

When working a herd, no matter how big it is, we stop looking at single animals and start regarding the herd as one animal. The herd then is one animal that:

- Is rewarded by release of pressure;
- Has three zones around it - the recognition zone, the flight zone and the fight zone.
- Needs to be approached in a non-threatening manner;
- Reacts to our position towards it, and our movement will bring about movement in the herd.

When a herd of cattle is spread widely whilst grazing and a few cattle are heading in the right direction, the herder can walk in large side-to-side swings behind the whole herd to initiate movement. In doing this, the herder continually moves in the field of vision of the animals and gets them started.

In theory, herding is extremely simple. There are only four things we must be able to do:

- **Get the herd moving;**
- **Keep it moving;**
- **Turn the herd; and**
- **Stop it.**

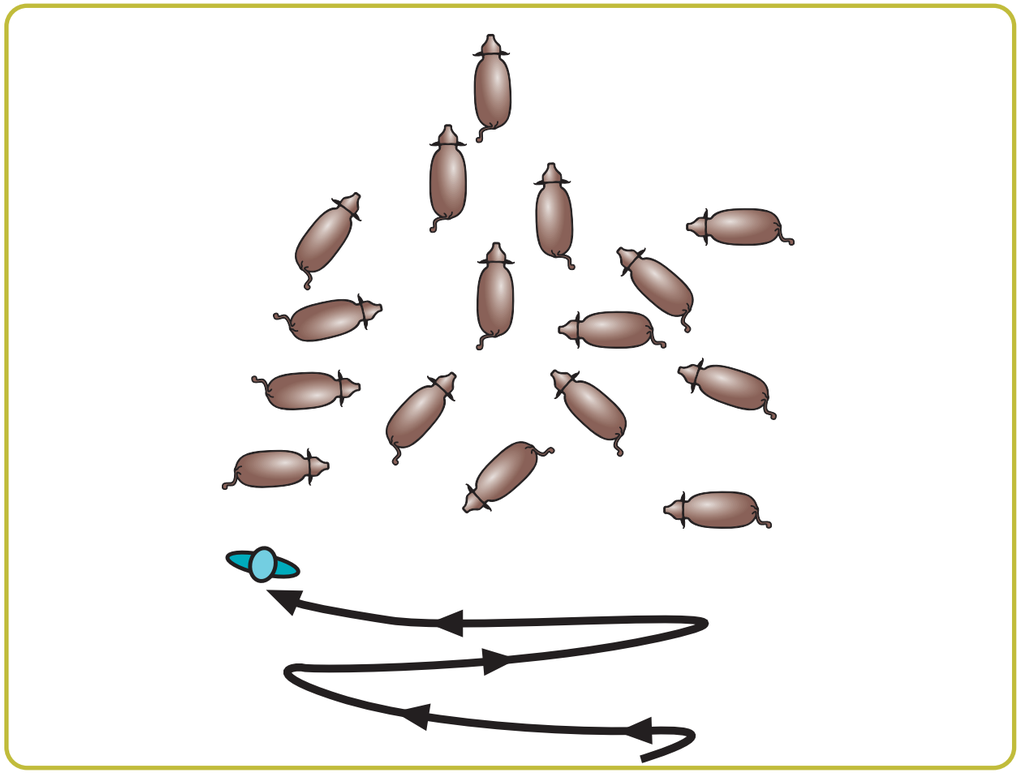


Illustration 34: The herder's path to start the herd moving

As the group gets closer together and some of the animals at the front are moving in the right direction, the herder can use one of the most powerful tools to maintain that movement: the so called 'triangle' movement.

The triangle is applied to the side of the herd, where the animals can clearly see the herder and are not threatened. Starting with the lead (or 'head') animals, the herder approaches them to one side, and as soon as those animals start moving forward, he turns in a 90-degree angle in the opposite direction in which the herd moves, towards the 'belly' of the herd. In doing so, he keeps his eyes down, walking along the belly until he reaches the 'hip' or even the 'tail' of the herd, and then turns off again to come back to the head, completing the triangle. This triangle is walked until the whole herd is moving. Then the herder walks along with them, getting a little further away all the time. If they stop again, the herder follows the same process until the herd's movement is right. They will learn to move off with less pressure and from further away, each time. It is important to allow the animals time as well. They cannot all go at once, and it takes time for the leaders to get far enough away for those followers to have enough room. The back of the herd should not be forced to run into the leaders. All of this is important in building trust, and should be done not only in the veld, but even more importantly in front of gates or kraals.

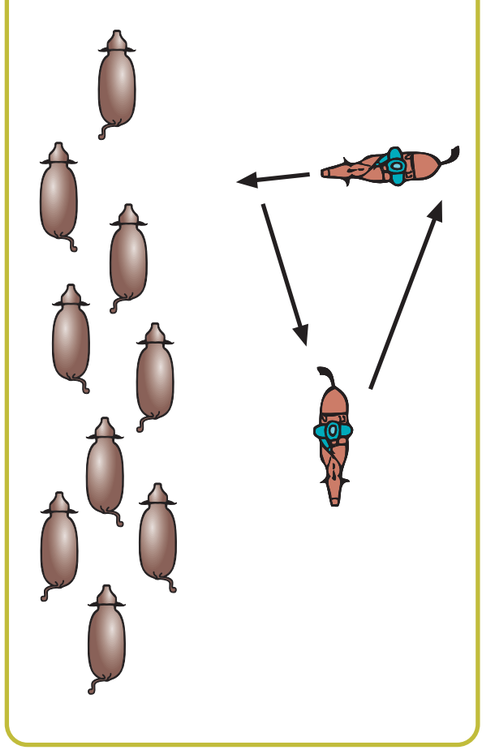


Illustration 35: The basic triangle movement of the herder – This is the same if the herder is on horseback

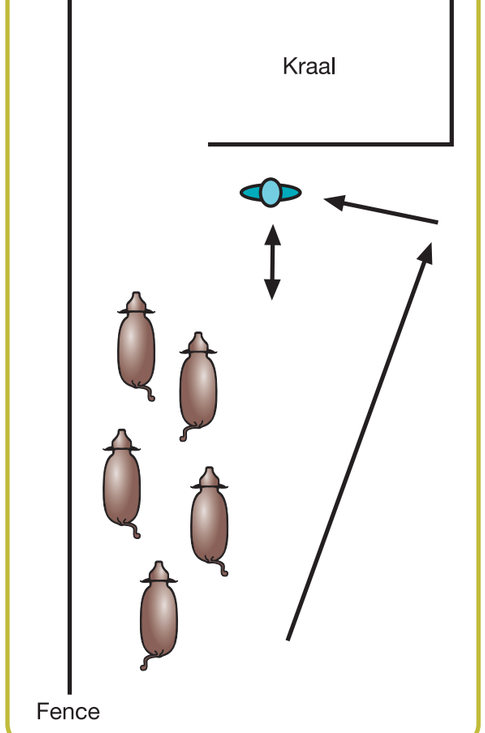


Illustration 36: The triangle movement in front of a gate or a kraal

Depending on the herd size and circumstances, several herders may be needed. The principle of the triangle-movement does not change, but the walking distances for each herder will differ. For example with three herders, one herder can work the head and shoulder of the herd; the second herder can work the belly, and the third walks the triangles from hip to tail. When the herd is moving at a good steady pace in the right direction, pressure is taken off and the herders simply walk alongside the animals.

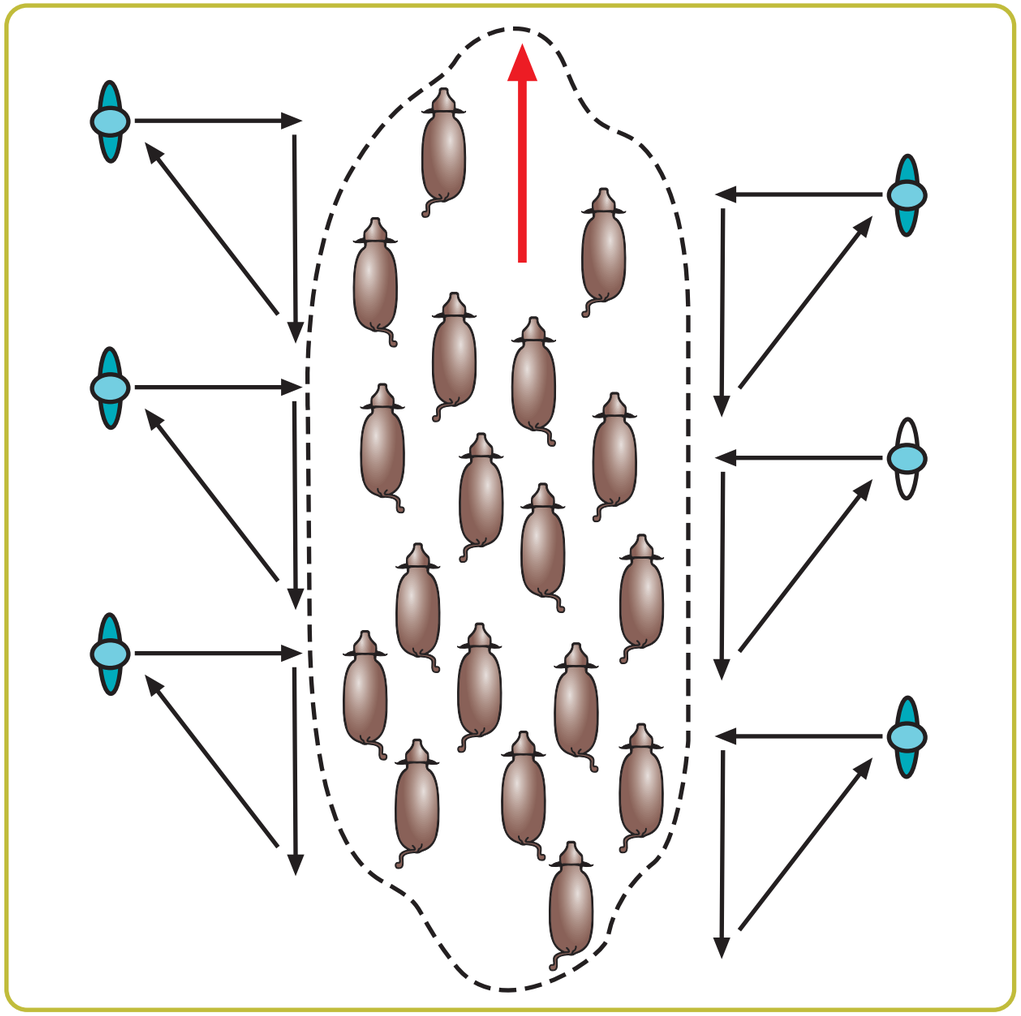


Illustration 37: The triangle movement carried out by several herders

Stressfull handling reduces the health, growth and reproduction of animals. Low-stress handling is a good business investment.

6.3 Combining Herds

Farmers may be concerned that when they combine their animals, there will be more stress on the animals. It is true that when animals from different places and owners are brought together, they need some time to get used to and accept each other. They may be restless, and even fight a little to establish a new hierarchal structure. However, farmers who have combined their animals have found that the animals do adjust and find a new social order with minimal loss of condition.

When combining herds it is advisable to do it step by step and not all at once. The respective farmers should try to find the best way to do it from the animals' point of view. For example, six fellow farmers of the same community, or even six neighbouring communities, can follow a steady combining process over a period of time. To reduce the stress to the animals, it is better to combine two herds at a time. The six neighbours can thus build three herds from their six, and once the three have settled, two of them can be put together. Having given enough time to this new herd, the last herd can be brought in to the big herd.

Sometimes it is not possible to slowly add more cattle from different owners to the larger herd. In this case it is important that there are many herders to make sure no animals can break away.

To ease the process of combining, farmers can follow these guidelines:

- First, combine groups of animals that use a region or area of the available grazing where the ecological[52] circumstances are the most similar;
- Allow space at the beginning for animals to get used to each other.
- Combine herds without changing the grazing area at the same time;
- Concentrate on combining groups that are already familiar with each other, such as those that have encountered each other before at water points;
- Give the animals time to settle before adding a new group or before changing the grazing area;
- When changing the grazing area with the newly formed (but socially settled) herd, make sure that at least some of the cattle have experience of the new area to help the others adapt – remember the learned cultural behaviour!;
- When changing the grazing region, try to make sure the area has as much plant diversity as possible to provide as much nutritional balance as possible. The more plant diversity there is, the more able the animals will be to meet their protein, energy, and mineral needs.

Livestock like to be herded. They may loose some condition at the beginning, but soon they will feel comfortable and long-term production will increase.

52 ecological - the relationship between all things in nature create the ecological circumstances

6.4 Infrastructure for bigger herds and low stress livestock handling

6.4.1 Improving water points

Sometimes it is necessary to improve the water points if a large herd comes to water at the same time rather than small groups. If animals have to wait to get their fill of water, this is stressful for them. If the water comes from boreholes, farmers can improve the water situation by having enough water stored in reservoirs above ground. The water tank or reservoir and the trough should be connected through a short pipe with a big diameter[53] so that the trough fills up quickly as the animals drink. If the pipe between the reservoir and the trough is too narrow, it takes a long time to refill the trough, animals will fight for space, and the weakest animals will not get enough water.

To get support for establishing new water points, livestock owners may negotiate with Government for help. For example if the Government pays for the drilling of the boreholes, the farmers may opt[54] to pay for the installation of the pump, the water reservoir, the troughs and pipeline. In this way they can build the water point exactly as they need it. The community will build trust if the water point and the grazing around it are managed well. If water points that were installed for the purposes of watering livestock are used for households only and no herding of livestock is done, the grazing will not improve. People may have easier access to water for a while, but they will not have better income and healthier grazing and animals in the long term. It is important that water points are used for the intended purpose and are not abused.

Photo 66: Up to 1500 cattle can drink from a 5m-long trough if the trough re-fills quickly

Photo 67: Troughs refill quickly if the diameter of the pipes and the distance between reservoir and trough is short. Also notice that the ball valve is not in the trough, but in a separate box in a fenced area so that animals cannot damage it.

Quick re-filling of water troughs and easy access for livestock to the troughs is important so that the herd can drink quickly and go out to graze early in the day.

53 The diameter of a pipe is an expression of the thickness of the pipe.

54 To opt for something is to choose something.

6.4.2 Adjusting and building kraals and mangas

Kraals and mangas can be built in such a way that makes it easier for people and animals to work together peacefully, to work big herds with less stress and to apply the techniques of low stress livestock handling more easily.

The positions of gates in the kraal facilities are crucial[55]: animals should be able to enter into the next kraal right next to where we want them to exit from. In order to allow horn movement in a manga, the upright posts should be diagonal instead of opposite to each other.

A curved layout of kraals and handling facilities makes handling easier and quicker: the animals cannot see the end of the manga, and they do not see people and other objects in front of them. As the animals go around the curve, they think they are going back to where they came from and they feel more comfortable. It also takes advantage of the natural circling behaviour of cattle and sheep.

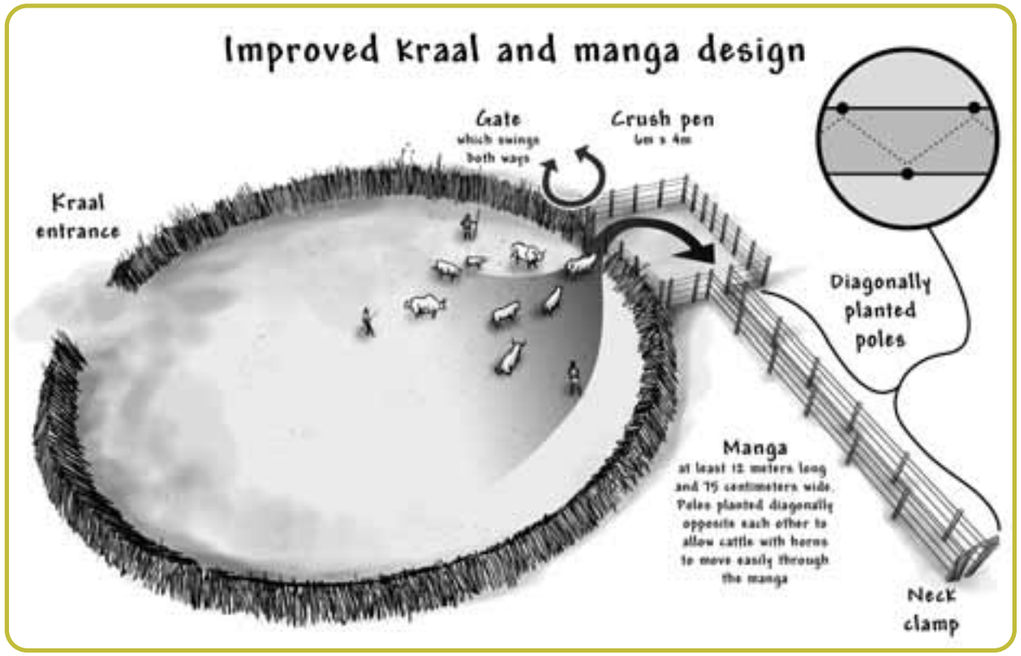
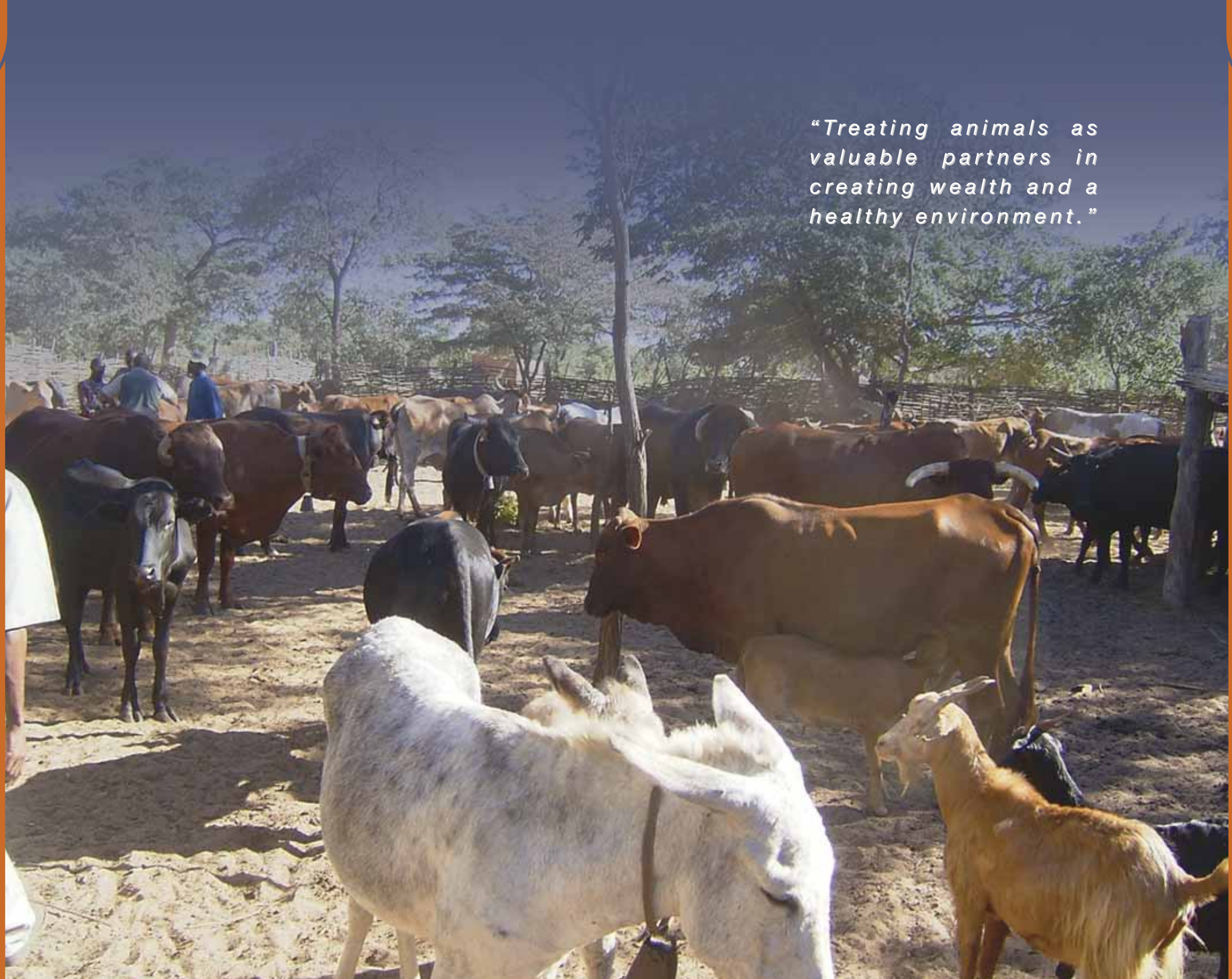


Illustration 38: The above sketch is a suggestion for building new or for changing existing kraals with a manga.

More important than strong kraals and mangas is the skill that people have in handling the animals. If the animals have previously had bad experiences with people in a kraal, they will not want to enter it, or may even damage it. If they have previously experienced trusting and calm handling from people, they tend to move into and through the handling facility more willingly and without problems.

55 Crucial = very important



"Treating animals as valuable partners in creating wealth and a healthy environment."

7
Looking after livestock

Livestock owners in Namibia are very knowledgeable about livestock, because generations of them have lived with animals for hundreds of years. However, conditions have changed a great deal over the past hundred years. Farmers a hundred years ago or more did not sell livestock or meat to people of different cultures and countries, for instance, and did not have to know how to produce livestock for foreign markets.

Namibians are also noticing changes in the weather, which is happening all over the world and known as global climate change. Rainfall and flooding often damage grazing areas for a whole season. In the past there were more plants and a greater variety compared to what can be seen in the veld now. Another change in farming is that animals used to die of diseases that farmers did not know how to prevent. Modern communal farmers can learn how to manage certain diseases, and have access to information that helps them adapt to these changes. Farmers may try to treat diseases but not know the right treatment. Good training manuals and other books on animal health and livestock handling are available in Namibia.

Many communal farmers keep livestock like other people save money. As long as the animals survive, the owners are satisfied. When the number of animals increases the owners are thankful for good rains. Many farmers do not want to reduce the number of animals by selling them because they already anticipate[56] losing some of them through drought. They see it as a kind of insurance against losing all their animals. However, when the rains fail this can lead to overstocking and a shortage of forage for all the animals, and large numbers may die. This can lead to livestock-rich farmers losing much of their wealth in a very short time. Farming in this way is very risky, but this risk can be reduced with good management.

This book focuses on understanding the nutritional needs of animals, and what they need to stay healthy, reproduce well and remain in good condition for marketing.

Suggestions are given on how to prevent disease through planned grazing, on the culling of weak animals and careful animal handling. The medical treatment of diseases will not be dealt with in this book.

The following two books provide valuable information for diagnosing and treating illness in animals:

Basic Veterinary Manual for Communal Livestock Farmers of Namibia
– compiled by Dr Muradzikwa with Dr Alexander Toto and Dr Flavie Goutard for the Ministry of Agriculture, Water and Forestry, Directorate of Veterinary Services, Namibia

Animal Health
– compiled by Dr Axel Hartmann for the Joint Presidency Committee (Namibia Agricultural Union and Namibia National Farmers Union)

7.1 The purpose of keeping livestock

People have different reasons for keeping livestock, and these reasons will determine how the animals and grazing are managed. Most farmers farm with livestock for a combination of the following reasons:

- Milking for human consumption;
- Meat for own consumption;
- A source of good cash income;
- As a form of saving;
- As draught animals;
- Holy cattle (oxen with big horns);
- Cattle given as a gift at a wedding;
- To impress other people with a great number of animals;
- Wealth & status
- To enjoy the look of the animals and for companionship.

A mixed herd is made up of different classes of livestock. Animals of a certain age and sex group belong to a certain class of animal that is given a name. For example “cows without calf” are sometimes called “dry cows” or “oxen between one and two years” are sometimes called “tollies”. If keeping and selling many healthy animals is part of the purpose for farming with livestock, the animals in the herd should be productive. They should do more than simply survive: they should grow, become fatter and provide milk. New calves, kids or lambs must be born and grow up in the herd. At the same time, the land and grazing must remain healthy so that the wealth of the farmer can stay constant, or even grow. Keeping animals that do not grow or produce young can mean that they deprive more productive animals of forage. Farmers can ensure their herd is made up of animals that meet their needs, by selling or slaughtering those animals that are not producing what they need.

For example, if a farmer wants to have many new calves each year, keeping old oxen in the herd deprives the cows that could gain condition and re-conceive each year. Keeping cows that do not conceive every year means they eat grass, drink water and cost money to vaccinate without giving the farmer a calf in return. If, on the other hand, the cows in poor condition are allowed to reproduce, they will pass on their weakness to their calves. In this way the whole herd will not grow as successfully as when only the strongest cows are kept, that can produce a calf even in difficult years.

On the following pages a comparison can be seen when the herd is made up of more oxen than cows. On the right hand side one can see how much more the herd can grow when the older oxen are replaced by cows and that many more animals can be sold or given away as gifts.

If the purpose of keeping livestock is to raise old oxen with big horns for use at traditional festivities, the farmer may keep more oxen and sacrifice some cows. The cows will lose condition first in a drought, because they have to feed not only themselves but also a calf.

To manage the risks of livestock farming and to make sure that there will always be enough young to replace older animals, it is important that farmers keep a balance between the different classes of livestock that are kept for different purposes.

56 Aniticipate = to expect

7
Looking after livestock

Comparing the productivity of one ox and one cow

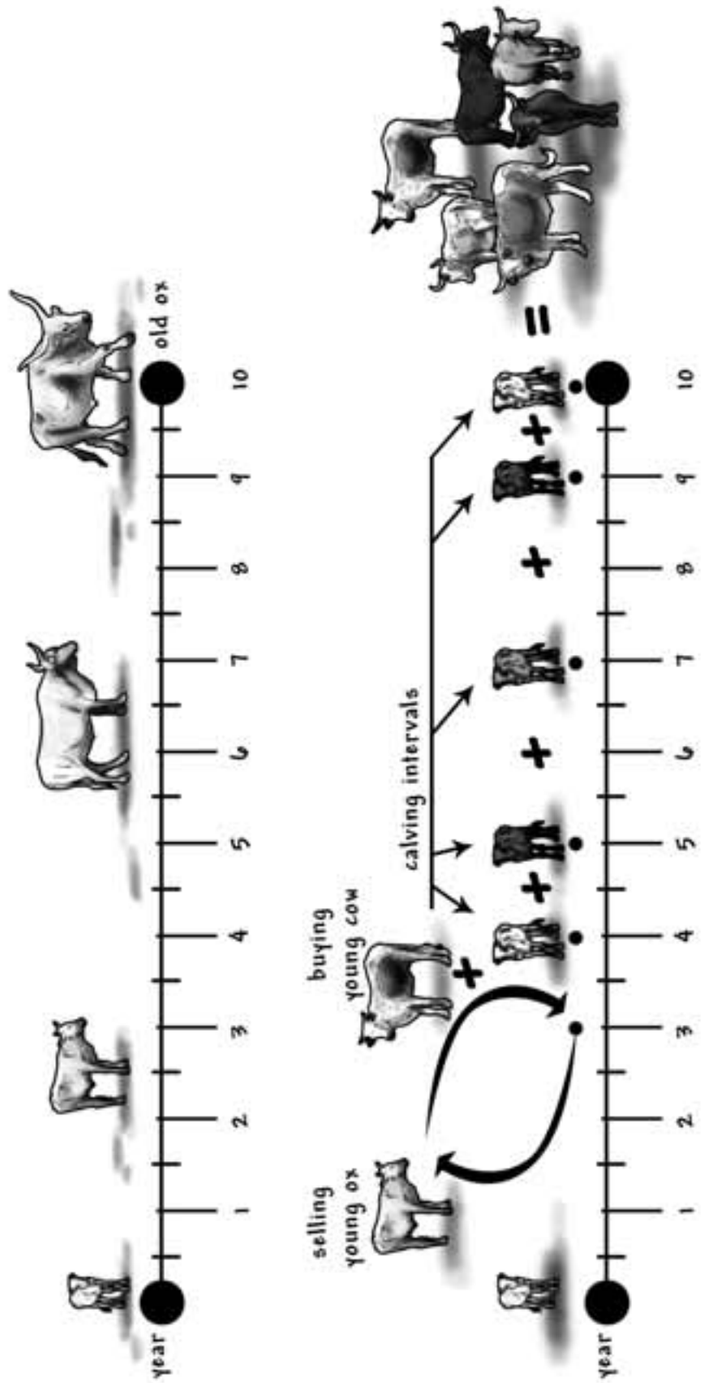


Illustration 39: One ox that grazes for 10 years can be replaced by one cow that can produce 5 calves or more over 10 years.

Comparing the productivity of different herd compositions

Herd growth from a composition of equal numbers of highly productive and of poorly producing cows and of old oxen:

	20 Highly productive cows	20 Cows with weak production	20 old oxen
2011			
2012			sell or give away 10 oxen
2013			
2014			
2015			
2016			
2017			
	14 offspring x 20 = 280	7 offspring x 20 = 140	10
Total nr of animals after 7 years, provided there is enough grazing:			**430**

Herd growth, after 5 oxen and 5 poorly producing cows are sold and replaced with 10 highly productive cows:

	20 +10 = 30 Highly productive cows	20 - 5 = 15 Cows with weak production	20-5=15 old oxen
2011			
2012			
2013			sell or give away 7 oxen
2014			
2015			
2016			
2017			
2018			
	14 offspring x 30 = 420	7 offspring x 15 = 105	7
Total nr of animals after 7 years, provided there is enough grazing:			**532**

7.2 Are farmers happy about the condition of their animals?

Farmers are generally proud of their animals, and criticising them can be a great insult to the farmer. On the other hand many farmers are worried when they look at their animals and consider their sale value. Let us look at some of the problems farmers observe:

Frequent problems with cattle

- The farmer does not get a good price when selling animals.
- Too many cows do not give birth to a calf every year.
- Cows produce little milk for their calves and for people to drink.
- After a low-rainfall season there are more oxen than cows left in the herd, cows die more easily from drought starvation.
- Oxen are old and on the formal market fetch a low-paying grade when they are ready to be slaughtered – they eat for many years before the farmer earns an income from them.

Frequent problems with small stock

- Small stock herds do not grow due to stock theft and predator kills.
- Too many ewes do not give birth often enough – malnutrition leads to abortion.
- Animals are thin when they are marketed and the farmer does not get a good price for them.
- Young ones can over-drink water when their mothers are not there to provide milk – they tend to drink less milk and grow slower.
- Ewes produce little milk for their lambs or do not return frequently enough to suckle their lamb as they have to walk long distances to find forage.

7.3 Measuring success

Farmers have different ways of measuring their success at livestock farming. Some look at the individual animal and measure how big, fat and heavy it is and what the body form ('conformation') looks like. Often the biggest animals are judged favourably over the small ones as farmers need strong oxen for ploughing. Many farmers think they will have more meat or milk to sell if the individual animal is big and fat. Most farmers also want as many animals as possible.

However, the most important way of measuring production and wealth is by looking at the weight of the entire[57] herd on a specific piece of land. Because it is harder now to move animals to another grazing area, farmers are starting to measure the productivity of the land they can effectively use for farming.

The more kilogrammes (kg) of meat produced on the same piece of land without moving to another grazing area and without buying in fodder, the more productive the rangeland is. It is not the number of animals or the weight of the individual animals that is the indicator of success, but the total kg of meat that the herd has gained or produced in a particular grazing area.

"Production" is not the same as the total weight of the animals that live from that piece of land, but rather how many kg were **added** to the herd through the birth of calves and the growth of younger animals over one year. We look at production over a year because it covers the whole production cycle of the animals, through the rainy and the dry seasons.

To calculate the weight gain or production of the whole herd, the following formula is used:

Calculate weight gain / production of herd:

Total weight of the animals at the end of the year

-

total weight of the animals at the beginning of the year

+

the weight of the animals sold, slaughtered for own consumption or that left the area

=

weight gain / production of herd

Farmers have observed and scientists have measured that animals with a larger build ('large-frame' animals) need more food per animal to stay alive and even more food to reach heavy weights.

When the grazing is poor, these poorly-adapted[58] larger frame animals tend not to grow well and they lose condition, while the better-adapted smaller animals find enough food to stay healthy and remain in adequate condition to calve. Farmers sometimes provide special licks to help the larger animals retain[59] condition. These licks cost money, and such production costs should be subtracted from the farmer's income from selling the animals. Medium and smaller-framed animals are less likely to need licks to maintain their condition, as they get what they need from the plants they eat even when the rains are poor.

57 Entire = the whole herd

58 Adaptation means to change in a way that fits a specific situation. Poor adaptation means not well adapted.

59 Retain = keep

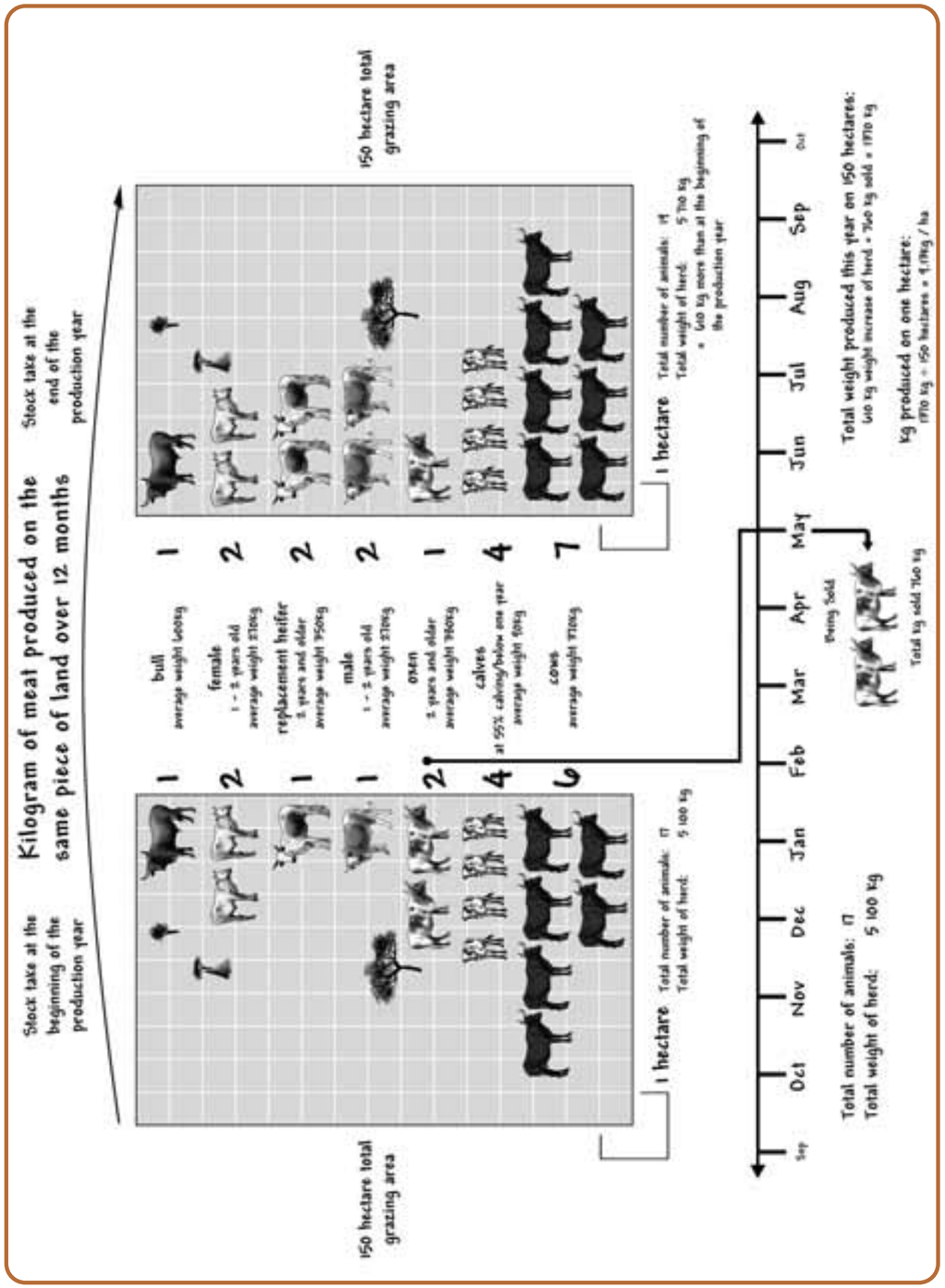


Illustration 40: Production per hectare over one year

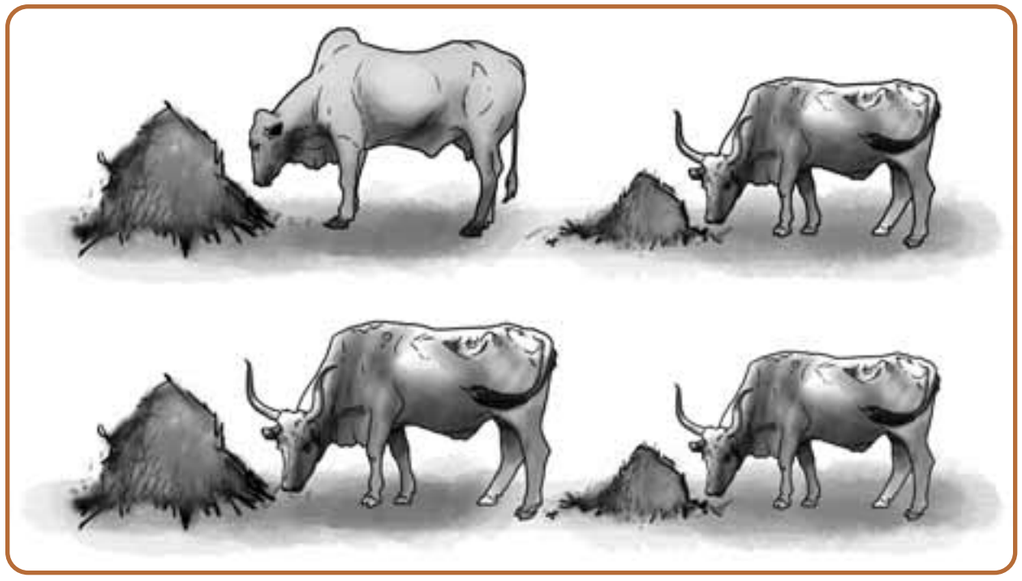


Illustration 41: A larger animal requires more food than a smaller, whether from the same breed or different breed.

If the rangeland has many perennial grasses and fodder plants, animals will produce more meat and milk and will be healthier, resulting in more income for the farmer. However, if the rangeland is poor with only annual grasses and much bare and hard soil, even smaller-framed animals will suffer; their productivity will decline, and people will have less milk and meat to consume and sell.

Livestock farmers are now learning that grazing and access[60] to water are the foundations for the health and productivity of their animals.

If we improve breeding and market access but neglect[61] the forage and soil, the investment could be wasted if the animals do not have decent grazing and their quality is not assured.

Once the forage has improved through better animal and grazing management, the investment of improved breeding and animal health care will cost less, and will generate better production results.

60 Access – being able to reach or get to

61 Neglect = not to pay attention to

Photo 68: Livestock in good condition

7.4 When is an animal healthy?

1. Appearance of the animal: The healthy animal is alert and aware of its surroundings. It is active and holds its head up watching what is happening around it. It should stand on all of its feet. The separation of an animal from the others in its group is often a sign of a health problem. An animal which is not interested in its surroundings and does not want to move has health problems.

2. Movement: The healthy animal walks easily and steadily with all of its feet taking its weight with regular steps. Irregular movement results from pain in the feet or limbs. If you go near an animal that is lying down it should stand up quickly otherwise it has health problems.

3. Eyes: The eyes should be bright and alert with no discharge[62] at the corners.

4. Ears: Most animals have erect ears which move in the direction of any sound. Ear movements will also be quick to get rid of flies.

5. Nose and Muzzle: The nose should be clean with no discharge. The muzzle should be moist not dry in cattle. In sheep and goats the nose should be cool and dry. Healthy animals frequently lick their noses with their tongues.

6. Mouth: There should be no saliva[63] dripping from the mouth. If chewing is slow or incomplete there must be a problem with the teeth.

7. The coat: In short-haired animals, e.g. goat and cattle, the hair or coat of the healthy animal will be smooth and shiny. Healthy cattle lick their coat and the lick marks will show. Horses should not sweat when resting.

62 Discharge = some body fluid coming from an opening in the body

63 Saliva = the fluid in the mouth that starts the digestion of food

8. Behaviour: If a horse, cow or goat keeps looking at its flanks[64] or kicks at its belly it has a pain in the stomach.

9. Breathing: Breathing should be smooth and regular at rest. Remember that movement and hot weather will increase the rate of breathing. If the animal is resting in the shade it should be difficult to notice the chest moving as it breathes.

10. Droppings or dung: The droppings of the healthy animal will be firm. Very soft droppings (diarrhoea) are a sign of ill health. If the animal has difficulty in defecating (constipation) this is also a bad health sign.

11. Urine: The urine should be clear and the animal shows no signs of pain or difficulty in urinating. Horses, mules and donkeys can have thick yellow urine which is normal.

12. Appetite and rumination: Failure to eat is an obvious sign of ill health. If forage is available the healthy animal will have a full belly. Ruminants chew the cud (ruminate) for 6 to 8 hours each day. It is a sign of ill health when these animals stop ruminating.

13. Milk: Sudden change in the amount of milk produced can mean a health problem. Any sign of blood or other matter in the milk points to infection in the udder. There should be no swelling of the udder and no sign of pain when it is touched. There should be no injury to the teat.

It is important for farmers to observe the health status of their animals regularly so problems can be recognized early. Usually the response or treatment of a problem is easier and cheaper than when the problem has affected the whole body or too many animals already.

64 Flanks = the thighs of animals

7.5 Understanding the digestion of animals

The well-being and productivity of livestock depends mostly on what forage they eat, and how that food is broken down so that it can be used by the body for milk production, for growing muscle (meat), for reproduction, for working and for protection from sickness. How well forage is changed into nutrition is also called feed conversion.

The digestive system consists of the teeth, mouth, gullet (oesophagus), stomach, liver, intestine, pancreas and rectum. Digestion begins in the mouth with animals producing saliva to soften the food, chew and then swallow.

Cattle, sheep and goats are called ruminants because they have four chambers of the stomach. This allows them to eat quickly and fill the first chamber, so that when they rest they can bring the food back up into the mouth for chewing again. In the stomach, food is mixed with digestive juices to form a soft paste. These juices contain millions of bacteria that ferment[65] the food. When the food moves to the intestine, bile from the liver and juices from the pancreas are added. The action of these juices is to break down the food and allow the nourishment it contains to be absorbed by the blood in the walls of the intestine.

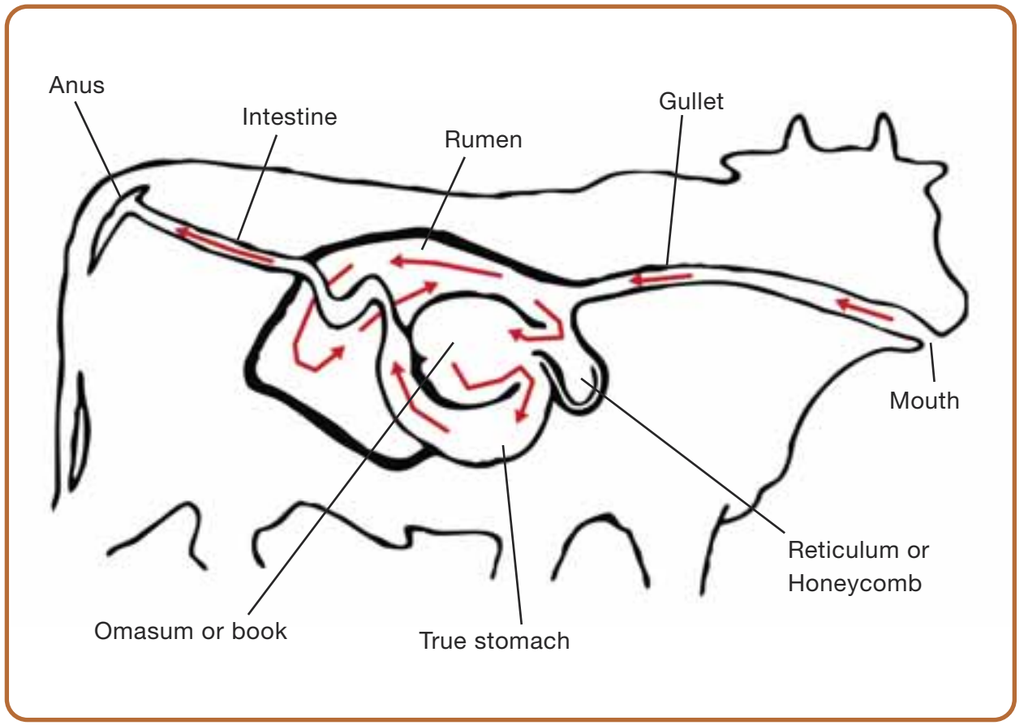
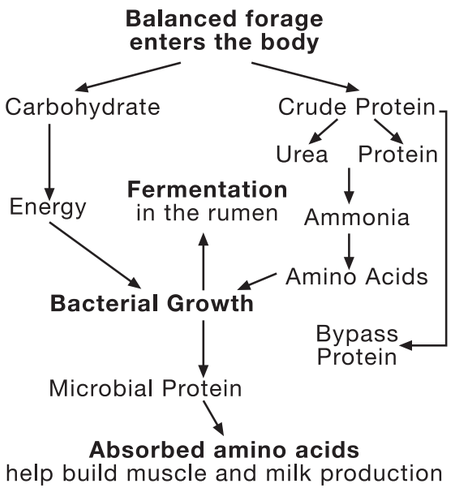


Illustration 42: A ruminant's digestion of forage

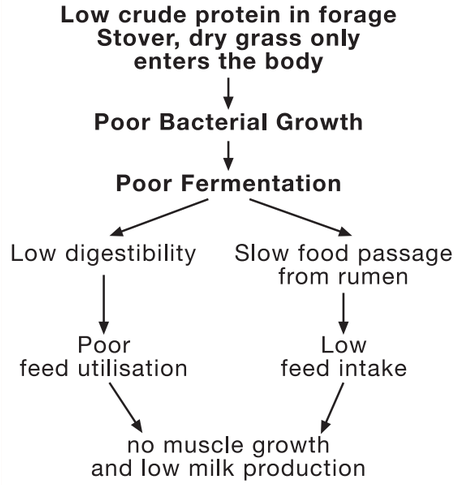
65 Ferment = good bacteria change the food so it becomes easier to digest

Waste matter collects in the rectum and passes out of the body through the anus as dung. Fluid waste matter collects in the bladder and is passed out of the body as urine. Like people, animals need a balance of different kinds of nutrient groups: starch (also called energy or carbohydrates), protein, fats, and vitamins and minerals. Dry grass contains mainly energy and fibre (or roughage) which is important for digestion. Green grass and the seed pods from trees and bushes and some herbs contain the building blocks for protein, which is used to grow muscle.

Conversion of balanced forage in the rumen:



Poor ruminal function as result of unbalanced forage:



If animals only eat energy (for example from dry grass and leaves) they will survive but cannot grow much muscle, fat and bone. On the other hand, the sudden change to too much green leaves and too little starch and fibre can cause diarrhoea in early spring. Each different food group requires a different combination of bacteria to break down the forage the animal eats. If animals are moved to a new grazing area where there are different plants to the area where they grazed before, the bacteria in the stomach have to adjust[66]. Livestock usually need much less protein than they need energy (starch). If animals can eat some green leaves and mostly dry grass in the winter, that is sufficient for them to remain in good condition, produce milk and even gain weight. Some farmers feed a lick with urea if there are no green leaves in the veld. Urea contains nitrogen which is taken up by the bacteria in the stomach of the animals, allowing them to break up the dry fibre in the forage. Through this the animals get a combination of energy and protein in their diet.

If farmers do not want to buy urea lick (sometimes also called winter lick), there are other ways of improving the nutrition of the animals, such as giving perennial grass plants a chance to multiply and grow, and making sure the soil surface around the grass plants is covered with plant litter. This helps the grass to grow longer into the dry season. The perennial grasses and fodder bushes, and some herbs and seed pods can provide enough protein for the animals in the winter time.

Another important factor for animal wellbeing is access to water. If the animals are not sure they will get enough water when they are thirsty or if they have to fight for a place at the water trough, this puts stress on the animals and they may lose condition due to that stress. Water should also not be contaminated[67] with disease organisms.

It is not only the quality of the grazing that is important, but also allowing the animals time to graze, to rest and chew the cud for them to make the best use of the forage they eat. Leaving animals in the kraal after sunrise or bringing them into the kraal when they could still be eating in the veldt prevents them from getting the food they need for good growth.

To grow and maintain strong bones and to fend off[68] diseases, animals need minerals. Most of these minerals are in the plants the animals eat, as the plant also needs them and takes them up through the roots from the soil and water. However some minerals are scarce in the soil and the plants do not contain enough of them. For example, in some grazing areas salt occurs in pans and animals lick the soil to get salt. In other areas there is not sufficient salt, and farmers put out rock salt or roughly-ground salt. One of the most important minerals for strong bones and producing milk is phosphate. When farmers see that their cattle are weak and thin because they cannot walk long distances to graze, or if they are chewing on bones lying in the veldt, it may be because they are not getting enough phosphate. Feeding them a simple phosphate lick can help.

Balanced forage and good digestion supports the growth of muscles and bones and milk production in animals.

66 Adjust = change to a new situation

67 Contaminated = when some harmful substance enters

68 Fend off= to fight

7.6 Reproduction in Livestock

If farmers can replace old animals with young ones from their own herd, and if there are many animals to sell, livestock farming is productive. Therefore reproduction is the most important factor in the success of a herd.

7.6.1 Cattle

Cows are pregnant for 9 months. It takes 28 days after giving birth for cows to come on heat again to be mated. If the cow is mated by a bull but does not conceive , she will be on heat again every 21 days.

Heifers can reach sexual maturity when they are 15 to 18 months old, though this depends greatly on their weight and condition. Bull calves reach sexual maturity from 14 months. Although the sperm count will be low in these young animals, they can start to mate.

7.6.2 Small Stock

Sheep and goats are pregnant for 5 months. They come on heat every 17 days if they have not conceived after mating. Farmers say that a productive ewe should produce at least 3 lambs in 2 years. This can mean one lamb every 8 months, or twins in one year. If the young ewes have good forage they can conceive for the first time at the age of 5 months already.

A male sheep or goat reaches sexual maturity from 5 months of age. Although the sperm count will be low in these young animals, they can start to mate.

7.6.3 Ways of improving reproduction rates

7.6.3.1 The power of nutrition

Female animals will only come on heat if they are in good condition. That means their weight should not drop after giving birth. This is a challenging time for the animal, as she must produce milk for the calf (or lamb, or kid) and must still gain weight. In the natural order, most animals give birth when there is plenty of forage, and preferably green grass too. Farmers can plan the grazing movement of the herd in such a way that it grazes the best forage just before, during and just after the time when most females give birth. This will ensure cows will cycle soon after giving birth to produce a calf every year.

If heifer calves get enough milk and good nutrition from forage they can be mated before the age of two years. Live mass for mating should be 60 to 70% of their mature body weight. If heifers are mated at weights that are lower than 60% of their body weight they are likely to have problems when growing out fully and when giving birth and will need a long time to recover before conceiving a second calf.

Heifers that are three years or older when they conceive for the first time also tend to have problems.

Good nutrition for cows is the most important factor to ensure that they give birth to a healthy calf each year.

7.6.3.2 Selecting productive females

Parent animals pass on to their young their own fertility and ability to raise healthy lambs, kids or calves. This is called the genetic inheritance of fertility and mother qualities. Mother animals who take a long time after giving birth to become pregnant again will produce fewer offspring over the course of her life. One cow may produce 7 calves in her life, and another only 4. They will however both eat the same amount of grass and require the same health care, but the one with fewer calves will bring less income to the farmer.

Farmers can help ensure that all or most female animals in their herd produce a calf every year (or 3 lambs in 2 years). They can do this by observing each female animal, and only keeping those who regularly produce and raise healthy young. If they do not re-conceive after giving birth and do not have young at their side when all the other cows or ewes do, it is best to sell or slaughter her then. If she is allowed to be without a new calf for a whole season and only to become pregnant during the second year, and if her female offspring is kept in the herd, these are also likely to give birth on an irregular basis. Selecting only those animals for breeding who regularly produce and raise young can contribute significantly to the growth of the herd.

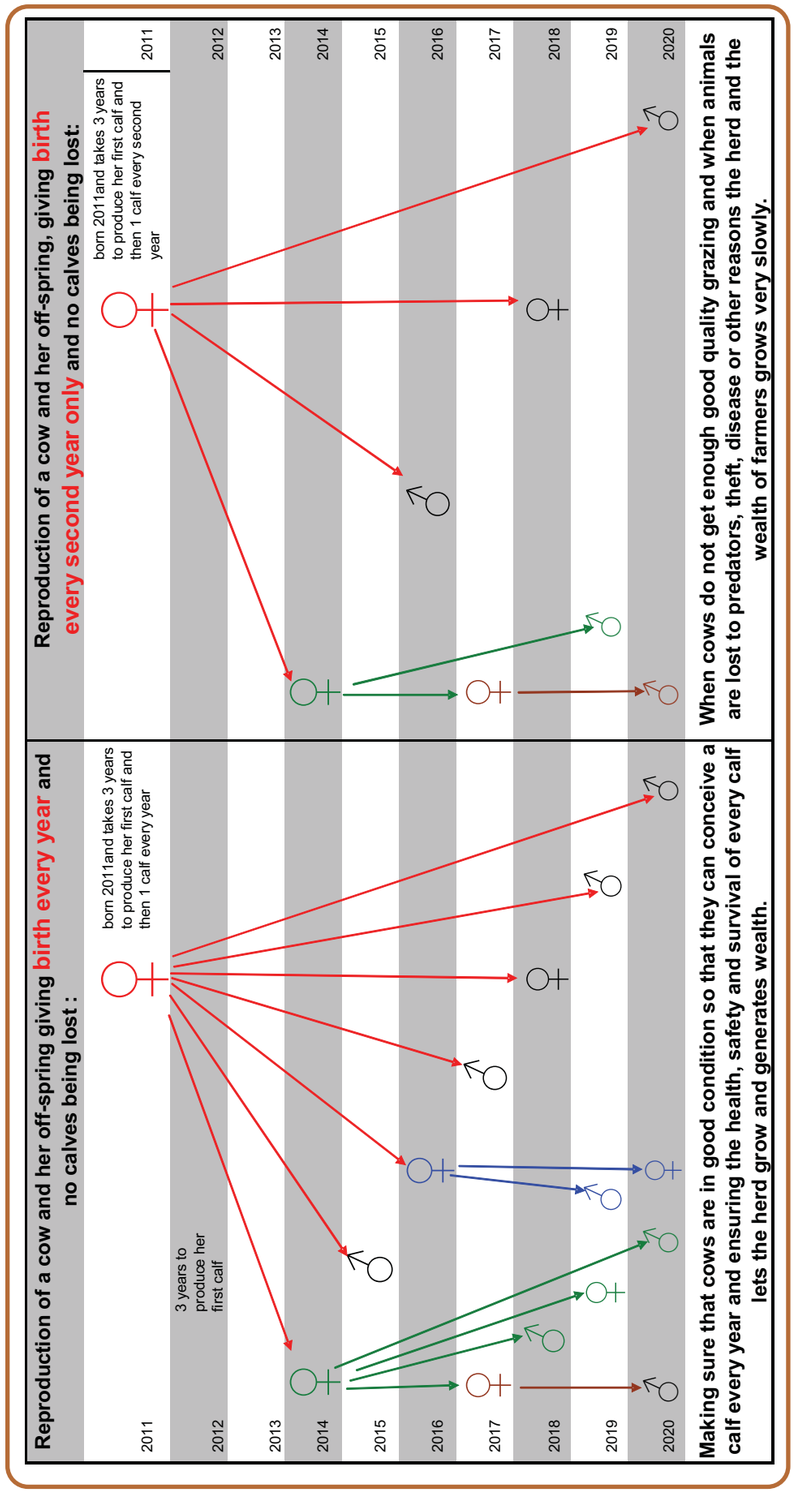


Illustration 43: Comparison of the number of off-springs of two cows.

7.6.3.3 Selecting productive bulls

Bulls are the most important animals in the herd because they constitute half the herd size in terms of function. For example if a farmer has twenty cows and one bull, the bull equals the function of twenty because the cows cannot produce a calf without the bull.

The nutrition of bulls is as important as with cows and heifers. The amount and the quality of semen is reduced when bulls are in a poor condition and they tend to loose interest in mounting cows that are on heat. This is called lack of libido. Bulls must also walk long distances to find those cows that are on heat and therefore need a lot of energy and they tend to loose weight during the time of mating. Therefore it is important that bulls are in excellent condition especially at the beginning of the mating season.

The fertility of bulls is equally important for good growth of animal numbers and productivity in a herd. In a herd where there is more than one bull and the bulls look very different, farmers can look at the calves in the herd to see which bull was most likely the father. In this way they can know which bull impregnates the most cows. If a bull has only fathered a few calves, it should be replaced by another more successful one.

Bull calves that are heavy at the time of weaning have a mother who produced enough milk, and by the same token, lighter calves often come from a cow unable to provide sufficient milk and other nurturing care. Selecting heavy male weaners to become bulls is a good way of passing on the mother's genes for good milk production and maternal care. However, the very large, heavy bull calves will require a lot of food to survive in years when the grazing is poor, and for this reason should not be selected to be breeding animals, as they can reduce the resilience[69] of the offspring to perform on the grazing which changes from year to year.

In a herd of more than 350 cows, the chances of in-breeding are low. However, if a herd has both female and male adults with low fertility and the farmer has made sure that none of them are diseased, a new bull can be brought in. This bull should come from a nearby area where the grazing conditions and management are similar, as the bull will then be well-adapted to produce under the new conditions. He will also pass on this ability to produce well in the veld conditions where his offspring will be reared. If the bull comes from another area with different grazing and management, he may pass on abilities not suited to the new environment.

In a big herd or when animals from different owners are not separated by fences, it is not always possible to know who the father or the mother of the bull was. In this case the farmer can look at the whole herd from which the bull comes. If most cows give birth regularly and raise healthy calves it is likely that the bulls from this herd will pass on good fertility and mothering qualities. If the bull looks strong but comes from a herd where many cows only produce a calf every second year, it may well be that the bull will pass on weak fertility to his offspring. If one sees the bull at the age of weaning, many of the qualities he will pass on can be observed – quick and good growth and good milking and mothering ability from his

69 Resilience = to survive in difficult times

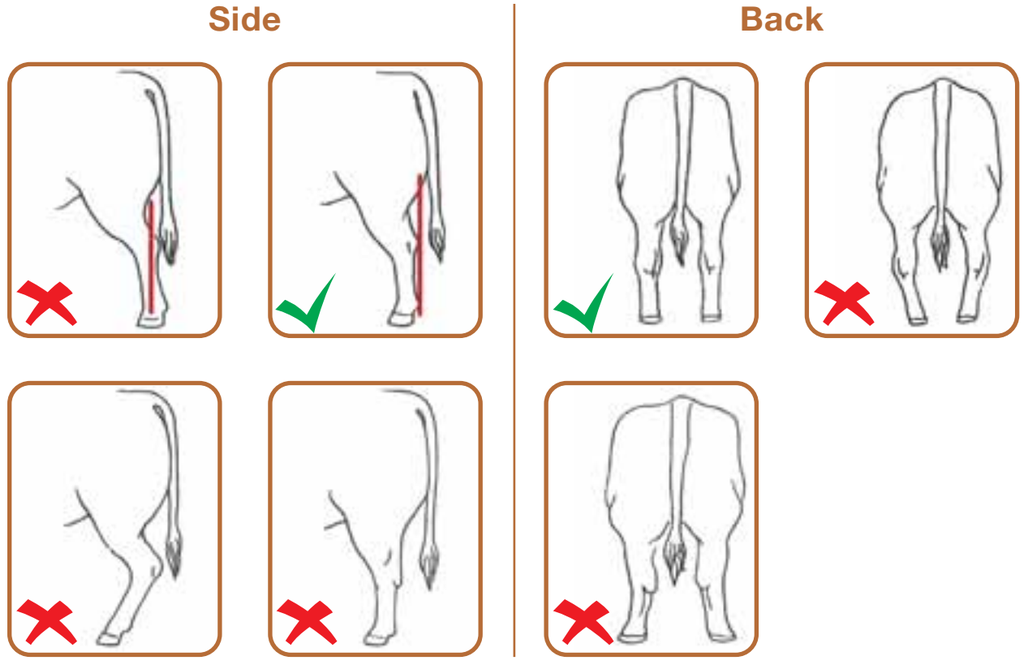
mother. Bulls that join a herd at a young age and who mingle with older bulls tend to fight less than bulls reared only with others of the same age.

Bulls are not always bought for money. There are farmers and farmers' associations that ex-change bulls and pass them on to another community.

Semen can be tested for fertility. A sample of semen is taken from the penis, and a veterinary doctor uses a microscope to count the amount of sperm in the semen and the life strength of the sperm. Sometimes the bulls may have a disease that lowers sperm count and health, and this can be treated. However, sometimes it is the genetic (natural) ability of the bull to produce more or to produce less healthy sperm. Those bulls that produce the most calves should be kept, and the weaker ones sold or slaughtered. As with the female offspring, bull calves inherit the ability of their fathers to produce calves, and they also pass on to their female offspring the abilities of their mother, for example to produce lots of milk.

One of the most effective ways to build a herd with improved quality is to cull (sell or slaughter) those animals that do not perform well. This does not cost the farmer money, as buying in animals does, and the animals left in the herd are already adapted to the local conditions, grazing and handling techniques of the farmer. The offspring of the animals remaining after culling are the ones that will bring the farmer more satisfaction and more money.

Selecting for strong hind legs, looking at the animal from:



The following three photos show three bulls at different ages. Each of these bulls was selected for breeding in their home herd for the following reasons:

- The animal has a general masculine appearance, eye banks and a small hump
- The penis sheet is short and not too loose
- When looked at from the back the legs are straight and there are no growths or knobs anywhere on the legs. The legs are rather skinny, not meaty, and the skin is taught
- The coat has short shiny hair – as an indication of good adaptation to hot weather conditions
- The animal is long (distance between front and back legs, with a straight back) and the chest is "deep" (the distance between the top of the shoulder and the bottom of the chest).
- Generally the body appears stout and compact – not tall and gangly. Some people call this "pony type" (a pony is a small, short horse).
- There is good scrotum development – the bigger the scrotum, the better

One year old bull calf

One and a half year old bull

Two year old bull, clearly ready for mating

The principle of selecting animals that perform best in the local conditions is called 'form follows function'. This means that the shape and performance of the animal depends on the ability to survive and bring best production (function) in the specific landscape the farmer has available.

7.6.3.4 How many cows for one bull?

If bulls are only with the cows for 2 or 3 months, this is called a mating season. Even when the bulls remain with the herd the whole year round, the cows tend to give birth around the same time because they conceive when the nutrition available is good. The bull must find those cows that are on heat, follow and mate them. Although the bull can smell and see the signs of a cow on heat for more than a day, there are in fact only a few hours that the egg is ready to be fertilized. Sometimes, if there are too many cows on heat at the same time or if the landscape is rocky and there is dense bush, it is difficult for the bull to find and mate them all. Also, if the rangeland is much degraded and animals have to walk long distances to find grazing, some cows may not be reached by a bull in the short time that she can conceive. If the bulls are only in the herd for a limited mating season, the number of cows to be mated by a single bull can be 35 cows, depending on the landscape. Some farmers who have very large herds and who have mating seasons prefer to have more bulls, because of the difficulty for the bulls to find those cows on heat among a large number. This also allows for more variation in the genes that are passed on.

The best way to prevent any male calf from spreading its genetic characteristic is to castrate all bull calves except those with the most desired characteristics. There are various ways of castrating at different ages. CBRLM staff, veterinary technicians and extension agents can be asked for advice and demonstrations.

7.6.3.5 Weaning to improve re-conception of cows

It is easier for a cow to conceive again if she is in good condition at the time of giving birth. Many cows start to push away their suckling calf when they are 6 to 8 months pregnant. If the calf stops suckling, the cow stops producing milk, and the energy that had been used to produce milk is used to put on weight. If the calf suckles on the mother until the new calf is born, the cow will struggle and be weaker and leaner. Sometimes the new calf and the older calf both suckle, and the cow will then get even weaker. With low body weight, she will not come on heat and cannot conceive a new calf.

Farmers can select the cows who wean their calves themselves by not allowing them to drink anymore. These cows have good natural mothering qualities, making sure that they are strong enough to provide milk for the new born calf and that their own bodies are ready to come on heat and become pregnant again. Farmers can also help those cows who do not have the natural instinct to push away their calves by separating them for some weeks, until the cows stop producing milk.

The exact time of weaning does not have to be when the calf is 8 months old. If the grazing is very poor in a certain year, the calf can be weaned earlier. The calf will not grow and gain weight as quickly once it is not getting milk, but the cow gets the chance to maintain her condition and fall pregnant again.

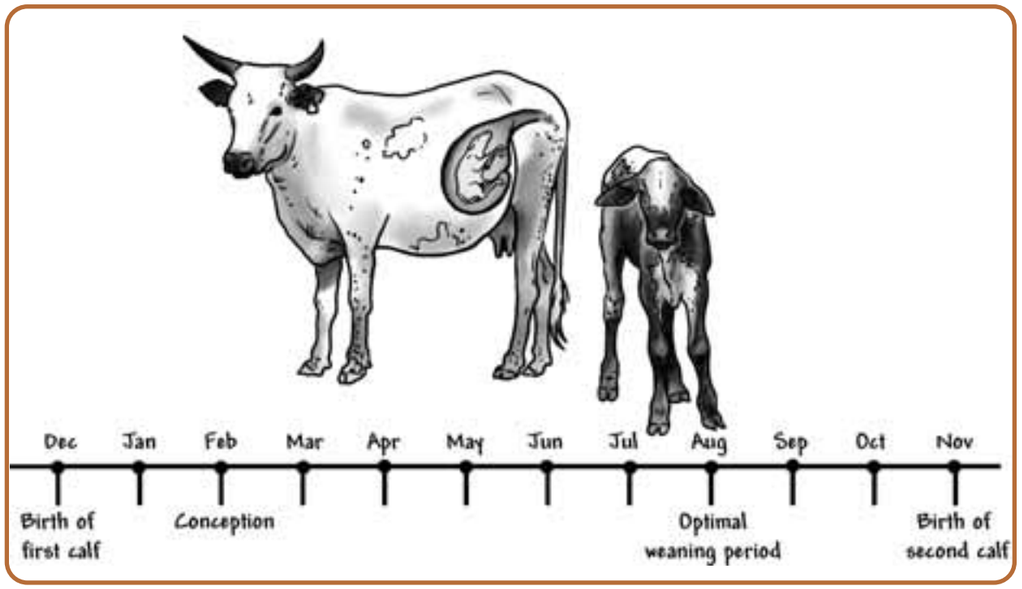


Illustration 44: Weaning can help the cow to remain in good condition for calving and re-conceiving the next calf.

Weaning is stressful for both the cows and calves, and they often lose weight at this time. Also, if the calves are separated from their mothers, they need to graze in a different place and this can cause over-grazing (see the first part of this book). Another way of stopping the calves from drinking from their mothers is to fit a nose ring or a nose plate on the calves that prevents them from reaching the mother's teats, or that hurt the mother in such a way that they push the calf away. In this way the cows and calves can stay together, but the cow can stop producing milk and can put on some weight before giving birth.

There are also nose-rings available for small stock, and the same principles of weaning are true for goats and sheep.

Photo 69: Noserings can be fitted for some weeks to stop the calf from suckling

Photo 70: A handmade nose plate

7.7 The age of animals

The age of animals can be read by looking at the teeth. The lower front teeth are used to cut grass which the animal takes into the mouth with the tongue and lips. This is why they are called incisors. They change as the animal grows older and can reveal the approximate age of the animal. The molars or back teeth grind the food for swallowing. The number of incisors are used to estimate the age of the animals. The growth of the incisors depend on the breed and on the growth rate of the animals. For example some animals may grow quickly (mature early) and their teeth can emerge at a younger age than with other animals that mature later.

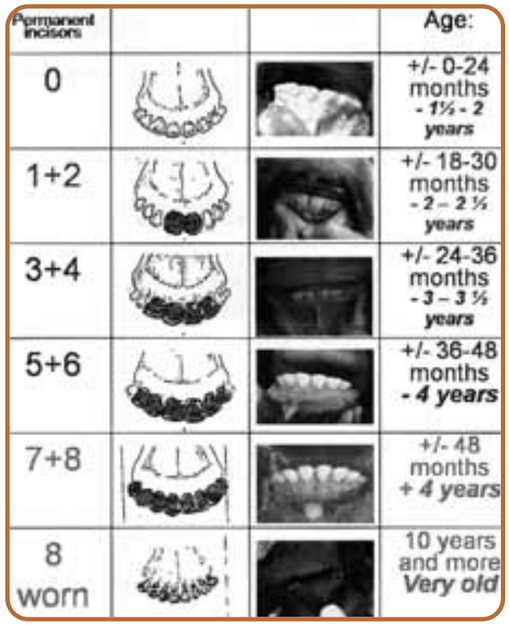


Illustration 45: by looking at the teeth of cattle their approximate age can be determined

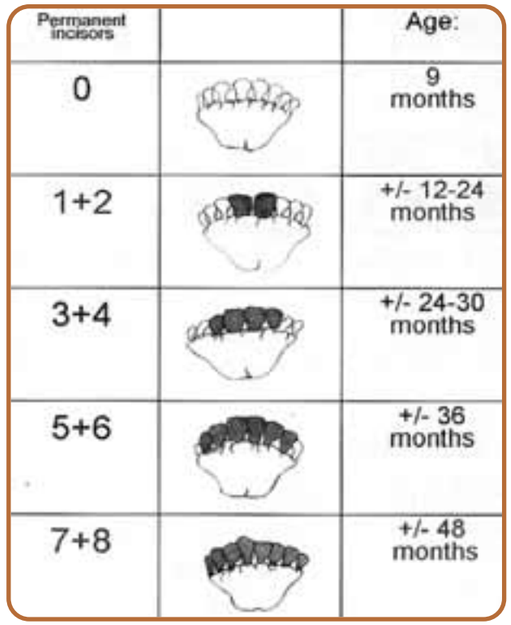


Illustration 46: The approximate age of small stock can also be estimated by looking at their teeth.

7.8 The prevention of illness in livestock

Animals become weak or sick for a variety of reasons, including the following:

- The forage they eat does not contain all the different food groups they need. For example a deficiency of the minerals calcium and phosphate causes weak bones;
- The animals do not get enough water and the waste products are not washed out of the body through the kidneys and urine quickly enough;
- Parasites on the skin (such as ticks) or in the body (such as worms) or other small organisms take away some of their nutrition or some of their blood;
- Parasites, bacteria or viruses infect them with a disease that spreads from one animal to the next;
- Animals eat food which has bacteria, viruses or parasites on it;
- Bacteria or viruses enter the body when the animals stand in wet mud and dung, or when they touch dirty, infected objects;
- Bacteria or viruses are passed from one animal to the other when they mate;
- Injury from fighting, an attack by a predator or bruises from being hit or bumping into sharp corners during animal handling and transportation can make animals very ill;
- Injury or difficulty during mating, pregnancy and giving birth can cause animals to become sick.

Whenever animals are struggling to find enough food, have to walk long distances without water and food, or when they are uncomfortable when they want to chew the cud or to rest, their immune systems[70] will be weakened and they get ill more easily.

In this book we focus on what the farmers can do to prevent[71] diseases.

Like human beings, animals are less likely to get ill from bacteria and viruses if they are well fed, if they get enough rest, are not stressed and if the weather is mild.

70 The immune system of the body makes it possible that some disease organisms can enter the body without the body becoming ill.

71 To prevent here means to take action BEFORE something goes wrong

7.8.1 Kraal hygiene

Animals, especially small stock, often suffer infection or rotting of their hooves. Diseases and parasites such as worms and ticks spread more easily in wet dung and mud. To prevent this, farmers can remove dung from kraals regularly and spread it in the sun and veld. Another way of avoiding animals standing and lying in mud is to build kraals where the ground is on a slope. In this way the water can run off to one side.

Illustration 47: Farmers cleaning out a kraal prevents the spread of disease.

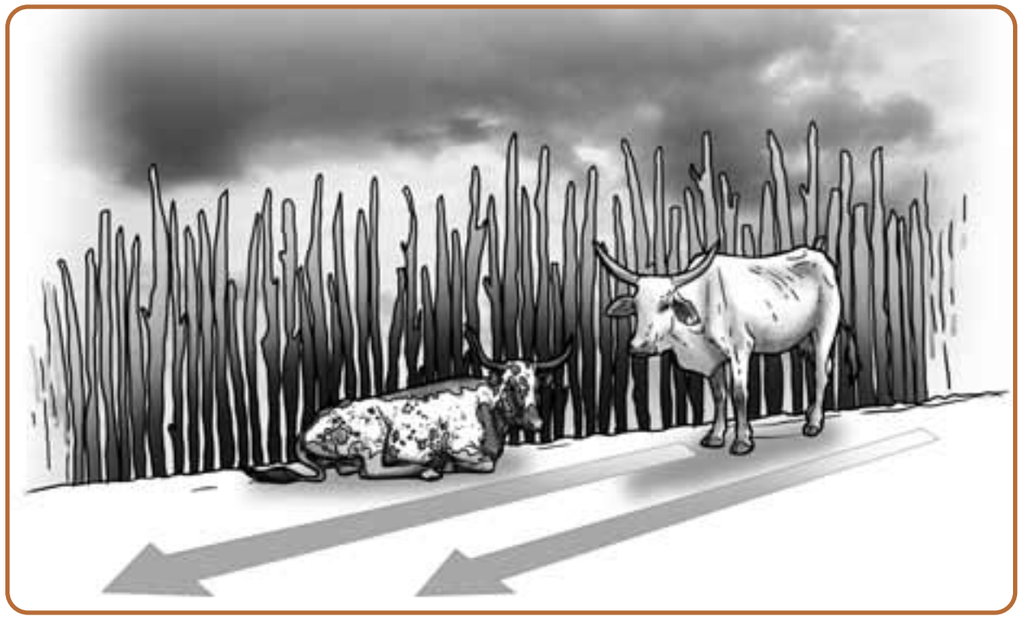


Illustration 48: Positioning kraals on a slight slope makes sure that water can drain away and there is less chance of foot rot and the spread of other diseases.

7.8.2 Diseases linked to parasites, and different approaches to parasite control

Parasites are small insects or organisms that suck blood or food from other animals. In livestock, ticks (external parasites that live on the skin) and worms (internal parasites that live in the intestines) are the most common parasites. Livestock can live comfortably with a few of these parasites on and in their bodies, and this helps them become immune to the diseases caused by the parasites. However, if the parasites become too many, the animals can become weak. They are irritated by the bites of ticks on soft parts of their hides, and they lose blood and food. However, ticks and worms can also cause or spread diseases, such as sweating sickness. Animals in good condition do not get sick easily. Therefore it is important to sell or slaughter the weaker animals quickly so that the disease organism does not find another body to invade and spread in.

Ticks and worms can be killed by applying medicine to the hides or coats (for external parasites such as ticks), by dosing animals (for internal parasites), or through injections. Especially with small stock it is important to only treat those animals that show symptoms of internal parasites. If all animals in the herd are treated the parasites can easily become resistant[72] to the medication. Community Animal Health agents can suggest suitable medicines and methods of administering them.

Another way of preventing the reproduction and growth in numbers of parasites is to keep chicken near the kraals, and not to kill wild birds and fowl that come to eat the ticks and move with the livestock.

Parasites go through stages of growth (egg, larvae, adult). During each stage they need different food and places to live. One of the most effective ways of reducing their numbers is to remove their source of food. For example, young ticks have to find blood from warm-blooded animals such as livestock within a few days of hatching.

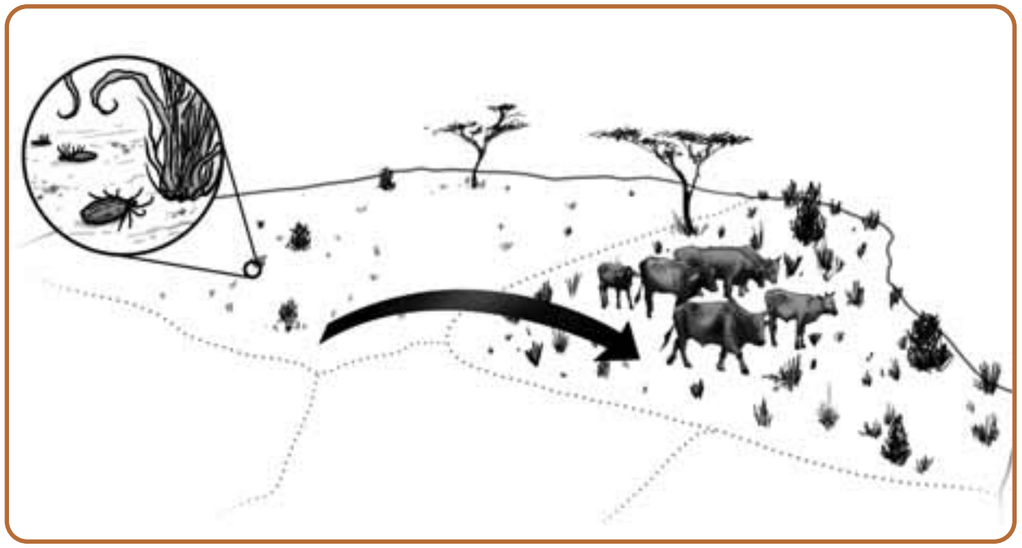


Illustration 49: When livestock moves from one place to the next, ticks do not have a host for blood when they need it and they die.

72 resistant - when bacteria or viruses that cause disease do not die from certain medication or treatment

Because the blood of livestock is such an important source of food for them, moving animals to new places starves the young ticks and they will die. The new place where livestock is brought to graze should not have been grazed recently by other animals, because then young ticks would have had some source of blood to survive.

Some worms are passed from one animal to the next when the eggs of worms leave the body of sick animals via the dung. The worms then hatch in the grass, and other healthy animals eat them when they graze. Moving animals frequently to another area for grazing leaves those small worms without food, and they die.

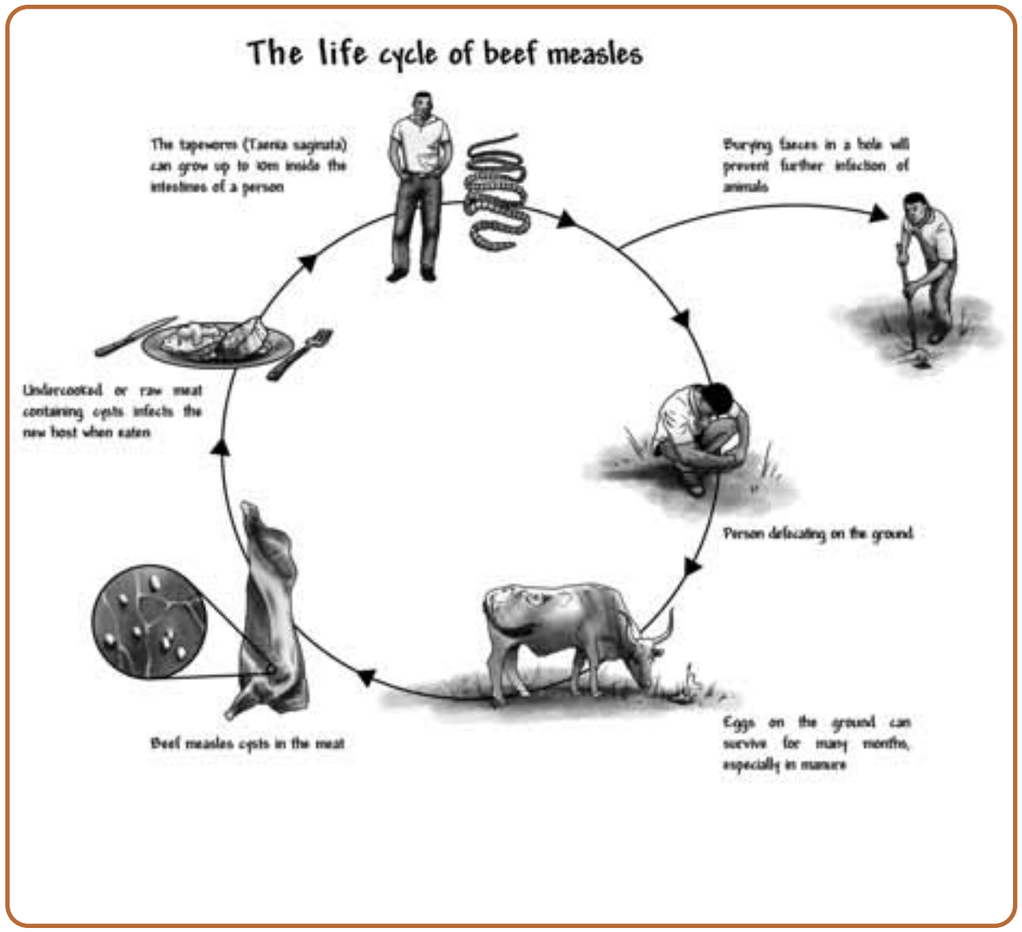


Illustration 50: The life cycle of beef measels

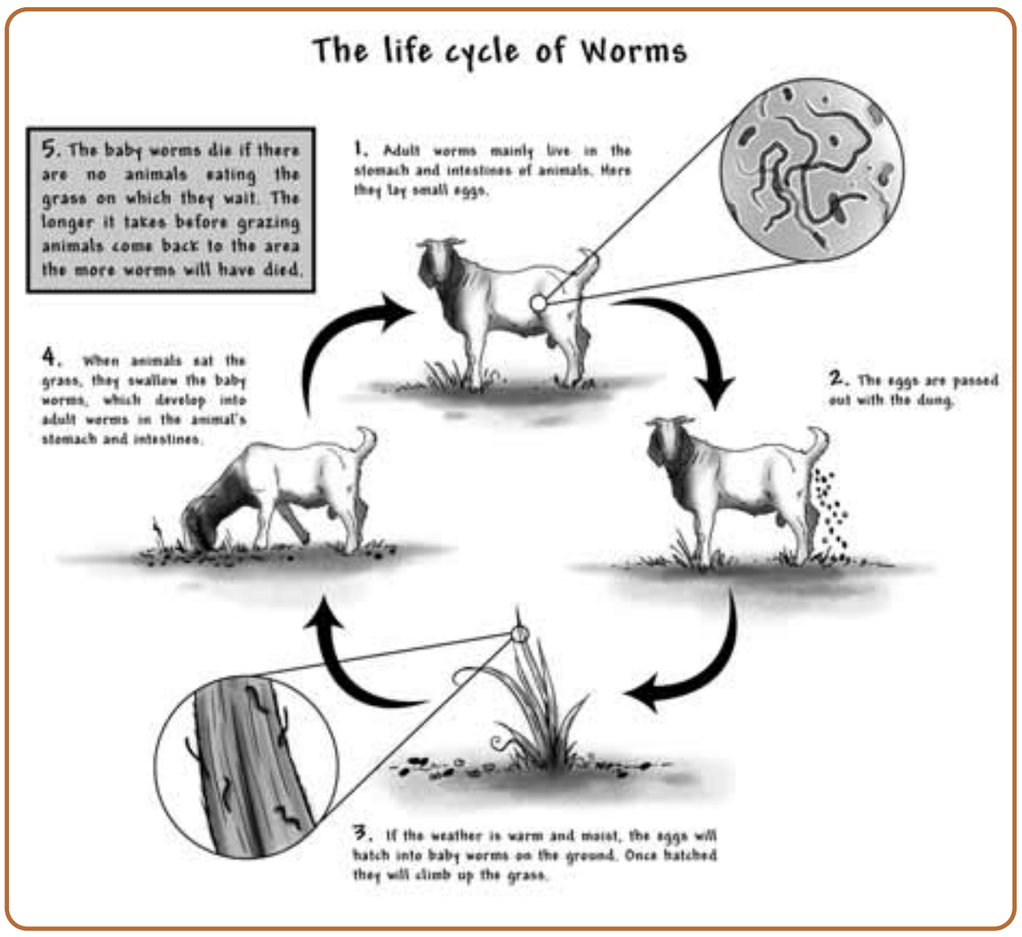


Illustration 51: The life cycle of worms

Farmers who move their animals every few days to fresh grazing find that their livestock seldom become diseased or ill from ticks and parasites. This saves the farmers the cost of medicine, and helps keep the animals in good condition.

7.8.3 Problems & diseases of the reproductive system

Good reproduction is one of the most important ways of growing a healthy herd. Heifers and cows can contract[73] diseases that affect their ability to become pregnant, or that affect the growth of the unborn calves. They may give birth before the calf is fully grown (abortion). Bulls and rams can be infertile, or contract diseases of the penis that infect cows and heifers, in turn making them infertile or causing abortion. Heifers can be inoculated against some diseases that cause abortion.

Farmers can prevent the spread of these diseases by making sure that sick animals are treated quickly and kept separate from healthy animals until they have fully recovered. The time of recovery varies from one disease to another. Animals may carry the disease without appearing to be ill, and pass it on while mating. The problem may only become visible when cows abort or give birth to a dead calf.

Veterinary health workers can provide more information about the signs of various diseases of the reproductive system.

If farmers bring animals from another area, it is a good practice to have them inspected by a veterinarian to test them for a sexually transmitted disease.

7.8.4 What to do when animals are weak or sick

The signs of illness in most animals will give an indication what kind of disease they are suffering from. This book only mentions how diseases can be prevented by better management of grazing, water and kraals. If farmers see signs of illness on their animals they are advised to report these to the veterinary services in their neighbourhood. Treatment methods can also be found by learning from and working with community animal health workers or agricultural extension officers.

73 Contract here means to “get“ a disease or to become ill

7.8.5 Innoculation against contagious diseases

Inoculation is not the same as treating sickness in animals. Both may be done by means of an injection, and the containers of medicine to treat an illness look similar to the containers of vaccine used for inoculation. Some diseases can be prevented by injecting livestock with a small amount of the virus so that the body is able to fight the disease when the actual virus enters the body.

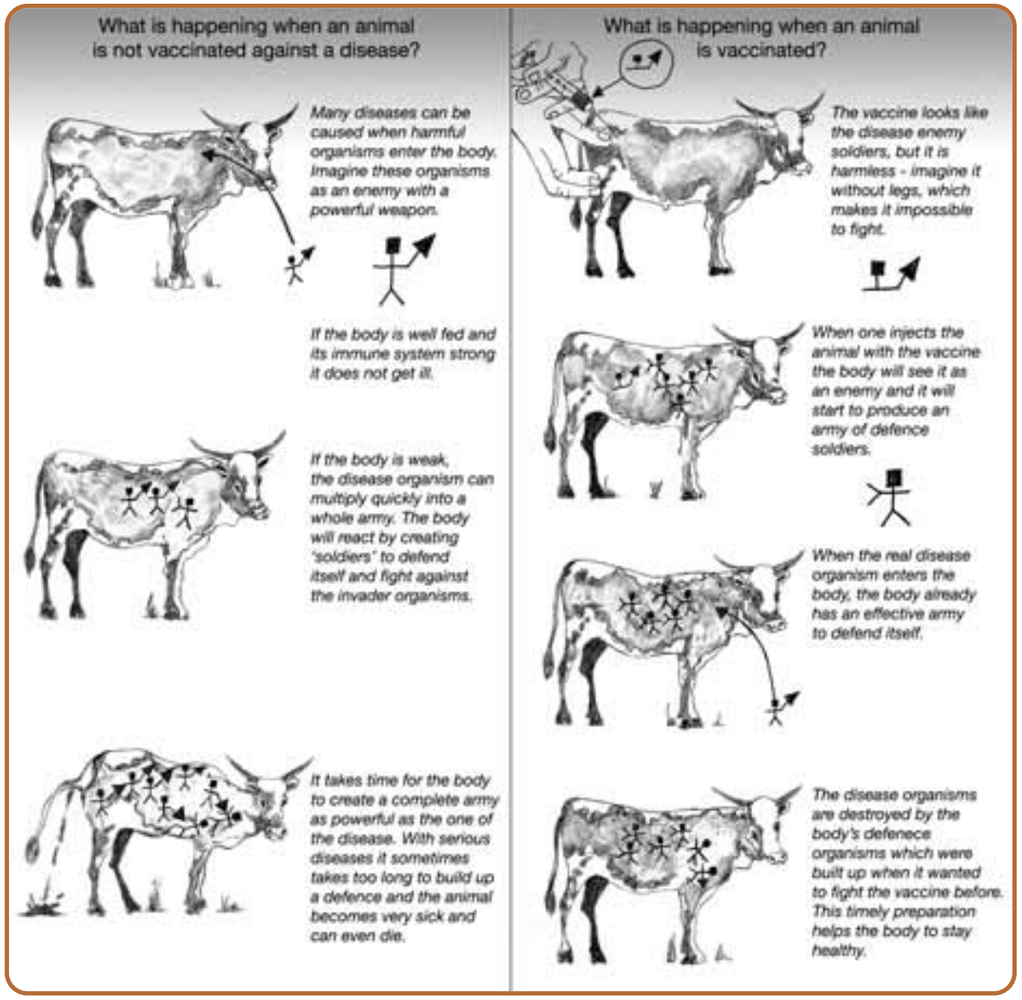


Illustration 52: Vaccination and how it works

Recommended vaccinations are:

Disease to be prevented	Species of livestock	Timing and notes about innoculation
Botulism	Cattle and goats	March to May Disease prominent during the dry season due to pica Repeat vaccination after 21 days for first time It is better to give Suppervax or duovax (for cattle
Contagious Bovine plueropnemonia (CBPP)	Cattle	Covered by the DVS because it is a notifiable disease Farmer is only responsible for notifying DVS of the disease if it occurs
Foot and Mouth	Cattle	Covered by the DVS because it is a notifiable disease
Anthrax	Cattle	At beginning of rains (Jan- February)
Black Quarter	Cattle	Before the rains
Lumpy skin Disease	Cattle	At beginning of rains (Jan- February)
Pastuerallosis	Goats and Sheep and calves	Feb- Mar or before winter strike
Pulpy Kidney	Goats	Feb- Mar
Mange	Parasite of goat and sheep sometimes calves	Before Winter in May The treatment is necessary because its possible to eliminate it

Graph 4: Diseases and notes on vaccination

7.8.6 Handling of medicines and vaccines

Some vaccines must be kept cool from the moment they are bought to the moment they are injected into the animal. This is not always an easy task for a farmer. One effective way is to wrap the bottles immediately in many layers of paper or cloth, or to put them into a cooler bag (for cold drinks) along with a pack of dry ice. Farmers should take such containers with them when buying or collecting the vaccine.

People can get ill if they accidentally inject themselves with an animal vaccine or medication whilst trying to administer[74] it. It is important that the animals are kept calm when being injected to minimise the risk of accidental injection of the person administering. Children should never be allowed to handle vaccines or medicines.

Antibiotics are powerful medicines which can be used for many different diseases. They can bring about a rapid[75] improvement in the animal. However, sometimes the bacteria or viruses get used to the medicine and do not die when the animal is injected with the medicine again. The disease becomes resistant to the medicine. Anti-biotics also kill many good bacteria in the stomach and intestines of the animals, and this may make it difficult for the animal to digest food. Therefore farmers should use antibiotics only when there is no alternative option in terms of treatment or prevention.

7.8.7 Restraining Animals

When animals have to be treated with medicine, or when they are castrated or dehorned, there are different ways of making them stand still or lie down. In this process they should not get hurt or unnecessarily distressed.

Mangas can be built from tree poles. Chapter 7 shows a special design for a manga for animals with horns.

Where there is no manga, and when animals must lie down, a rope can be used to throw the animal to the ground gently.

Healthy animals produce better than those that struggle with disease. Animal production refers to how many calves are born and raised, how well the animals grow and put on weight, and how easy it is to handle them.

Good health starts with good grazing and water, and the careful, safe handling of animals. Noticing when an animal is ill and treating it correctly and quickly prevents death and the spread of disease.

7.9 Choosing a cattle breed

Many support programmes for communal farmers advise them to improve their animal breed in order to improve the production of the animals. It is important that farmers first consider what 'improved performance' or 'better quality' means for them. It is also important to know that each breed requires different grazing and environmental conditions to grow and produce well. The policy of the Ministry of Agriculture, Water and Forestry (MAWF) recommends that farmers improve the traits[76] of indigenous breeds to ensure that animals are well-adapted to grazing conditions in the communal lands.

With animal breeding we can use the saying 'form follows function'. Indigenous animals in the arid land of Namibia have adapted over many hundreds of years to the conditions of low rainfall and the type of grassland we have. Their form follows the function of surviving on land with inconsistent[77] rainfall.

Currently Meatco prefers to slaughter animals with a carcass weight of 230 kg or more. This means the live animal will weigh between 450 and 480 kg. Big carcasses are preferred because the clients of Meatco have become used to big cuts of meat. Also there is less labour involved in slaughtering a few heavy carcasses than many smaller carcasses. The quality of the meat is the same whether from a large or small carcass.

Because Meatco prefers big carcasses, they offer a premium price for animals heavier than 230 kg and a penalty for animals lighter than 215 kg. However, the price difference is relatively small.

If the farmer wants to sell heavy 3-year old oxen to Meatco with a carcass weight of 230 kg or more and a B grading, this is difficult to achieve with Sanga breed animals. These animals have a smaller frame and will not grow as quickly as Brahman, Simmentaler, Brown Swiss or Charolais animals, for instance.

They will not be as big and heavy when they are three years old, but they can keep

74 Administering a medicine means to give it to the animal or person

75 Rapid = quick

76 Trait = characteristics

77 Inconsistent here means constantly changing rainfall

their condition without supplementary feeding. The Sanga, Boran, Afrikaaner, Beefmaster or Bonsmara breeds will not lose weight so quickly, and can even remain fat when the grazing is poor or the weather is very hot and the distance between water and grazing is great. The medium frame animals require less forage to feed their own bodies, and so can still feed a calf and become pregnant. The cows of larger-framed animals struggle to produce calves during periods when grazing is poor. When the grazing is good they put on weight quickly and produce many calves.

Commercial farmers who farm with medium- and smaller-framed animals and sell them to Meatco, and who have recorded all their income and expenses have found that they do not earn less from selling smaller animals than farmers who sell larger ones, because they can sell more of them. The number of commercial farmers now breeding with medium- and small-framed animals is increasing.

As the frame size of animals increases the greater the need for management becomes and the risk of production loss in poor rainfall years increases.

7.9.1 Understanding the requirements for cross breeding between two breeds

Some farmers cross-breed indigenous breeds with exotic breeds. The calves from such crosses, for example an Nguni cow with an Afrikaner bull, are often heavier and bigger than the pure Nguni would be. If farmers can afford to buy and provide lick regularly, and if they are prepared to keep fewer animals to have enough grazing for the larger-framed animals, larger breeds may be successful in the Northern Communal Areas.

It is the first cross only that results in the desirable combination of traits from both breeds. This means that a cross bred heifer should not be mated with a bull of either her mother or her father's breed. Therefore, cross breeding requires that cows of a specific breed are kept separate and crossed with a specific breed of bull only and that a separate herd must be formed for the daughters of this cross to be mated with another breed. Separating cows and bulls presents a special challenge for herding which is most effective when all animals graze in one combined herd. While cross breeding may result in improvement of off-spring it comes with the cost and effort of running separate herds and with that the risk of reduced improvement of forage.

If farmers want to improve the milk production of their cows, they are sometimes advised to get a bull from a breed that is characterised by good milk production. It is important to remember that for any cow to produce more milk, she must also eat more and better forage. If the grazing is not improved, the better breeds may suffer from poor nutrition and may not perform as well as the farmers had hoped. They may require the feeding of lick and even extra fodder.

Another way of improving milk production is to select from the herd of indigenous cattle those cows that have big udders, healthy teats and produce heavy calves. They are able to digest the grazing that is available and turn it into milk and meat without needing licks or extra forage.

When choosing the best breed of animal to farm, the farmer should take into account what the animals need to perform well. The cost and effort of providing better nutrition should be calculated and weighed against the better income farmers expect.

Farmers should be guided by the total kg of meat they can produce on the same area of land with animals of different breeds. Because in Namibia our rainfall and the growing conditions vary so much from one year to the next, it is important to farm with a type of animal that can survive and even perform well in poor rainfall years. Small-framed animals need less forage and fewer supplements, and a greater number of animals can be kept. Their total growth and reproduction is usually more than that of a smaller number of large-framed animals. The same applies to small stock. Farmers are often advised to get bulls from outside their own herd to prevent in-breeding, which happens when bulls mate with their own daughters and granddaughters or with their sisters. To get "fresh blood" or genetic variation farmers do not have to buy or get bulls from an area far away. In fact it is easier for the bull to adjust to the new conditions and he will perform better if he comes from an area that is similar to the area he is brought to.

Adapted breeds usually perform better in the conditions of Namibia's rangeland.

7.10 Herd management for easier control and national livestock laws

Because livestock is the wealth of the farmer, it should be marked in a way that makes it clear who the owner is and where the animal was reared. This is important for the owner in the case of theft, and also when the animals are being marketed. Consumers nowadays often want to know where animals come from, so that they can be sure it isn't an area with serious disease. They may also want to know the animal comes from an area and owner who raised the animals in a healthy manner. This is particularly important with exported meat. All farmers in Namibia must now mark their animals according to the 'traceability law'.

7.10.1 Branding

All livestock owners must register with the Directorate of Veterinary Services (DVS), where they are given a specific code which does not change. Animals must be branded with this registered code. The branding is done with a hot iron on particular parts of the animal's body. Farmers' associations and the Directorate of Veterinary Services can be asked for guidelines on how and where to brand animals.

7.10.2 Tagging

Namibia has agreed to an international law that livestock (cattle, pigs, goats and sheep) will have two ear tags. The main purpose of ear tags is to be able to isolate[78] specific animals if they are found with Foot-and-Mouth, Lung Sickness or other

78 Isolate = to take out and keep apart from the rest of a group

contagious diseases which are dangerous to people when they eat the meat of an infected animal. Another danger is that the disease can spread to livestock in a different country, when meat from a sick animal is exported[79]. Animals from the Northern Communal Areas (NCAs) are not allowed to be exported to Europe and America because of this fear of the spread of disease.

The programme that introduced and manages the ear tag system is called the Namibia Livestock Identification and Traceability System (NamLITS).

The animals in the NCAs are generally healthy, and there are only occasional outbreaks of disease. In such an instance with a diseased animal, there is a chance that the rest of the herd could be infected. To help stop the spread of the disease, animals from this herd may not move or be sold until all the animals are healthy again. If one cannot say exactly where a sick animal came from, it becomes much more difficult to contain the outbreak. With the ear tag system, the Directorate of Veterinary Services can quickly identify the area where the disease came from, inspect all the neighbouring areas, and treat and isolate only those herds which show signs of disease.

Ear tags are like an identity (ID) card for each animal. Like the ID cards that people carry, ear tags have a number which is registered with the Directorate of Veterinary Services in the Ministry of Agriculture, Water and Forestry. The ID number includes a code indicating in which area the brand of the owner is registered. The numbers are written so that one can read them and there is a radio frequency sensor in one of the ear tags. This radio frequency sensor can be 'read' by a special machine that stores the ID number of the animal in a computer. In this way, human error when writing the number by hand can be avoided.

Every farmer must have tagged all their cattle by the time the animals are six months old. Sheep and goats can also be marked with an ear tattoo. DVS staff can assist farmers in the beginning. Farmers must keep a list of all their animals, where they record when animals were sold or moved to another area. When animals are moved from one area to another, the DVS must be informed and the farmers given a permit.

7.10.3 Castrating

As mentioned before, the castration of male calves makes it possible to keep animals together in one big herd without the fear that sons will mate with their mothers or sisters, and only bulls with specific characteristics are able to breed.

7.10.4 Dehorning

Farmers wanting to transport their animals by truck to an auction or abattoir are often advised to de-horn the animals, as it is believed that they will injure each other with their horns. Other farmers say that cows with horns are more effective in defending their calves and themselves against predators. Yet other farmers observe that the animals need the horns to see and feel which animals are the strongest, and to find a social place in the herd. Calves can be de-horned when they are very young, using a hot iron or by cutting off the soft small horns.

79 Exporting = to take or sell to another country

7.11 Monitoring and record keeping

Some livestock owners know their animals well from being with them every day, and can recount the history of each individual animal. They monitor the production and condition of the animals closely to make good decisions concerning their management. However, not all owners are with their animals every day, and may forget from one year to the next how the herd is evolving or changing. Observing and noting the condition of livestock can help the farmer to see the results of livestock management. It also makes it easier for neighbours and community members to understand how changes help to improve the land and the livestock.

An advantage of the NamLITS ear tags is that farmers can record information on each animal. This can help when selecting those animals with high performance for further breeding, and culling poor performers.

Some conservancies and grazing groups have started to write down their observations of animals on forms every month. When they meet for grazing planning, they transfer the notes on to a summary sheet for the whole year. In this way they can see whether the land is supporting as many animals as the previous year. Also, the farmers always know exactly what animals, and how many they have. They can plan in advance when and which animals to market, how many calves they can expect the following season, and whether there will be enough bulls to cover the number of cows they have in the herd.

Some farmers keep records of each individual cow to note when she has produced a calf. They write down the ear tag number of the cow and the ear tag numbers of all the calves she has produced. This can be helpful for farmers who have so many animals that it is difficult to know them all individually, or if the livestock owner does not live and work with the animals directly. The herders can learn to list the numbers of the animals, and the owners can make decisions about which animals to keep and which to sell even when they are not with the animals.

Advantages of keeping animal records are:

- Writing down the number of cattle, goats, sheep, donkeys, horses and game helps the farmers have a better idea of how many animals require forage from the land and water from the water points;
- Information about what and how many animals are living on the land can help the community plan for water points, communal mangas and loading facilities;
- This information can help the farmer in planning and doing business with tourism and other markets;
- Observing and writing down the condition of livestock helps the farmer make management changes more quickly and efficiently than simply waiting for animals to die.

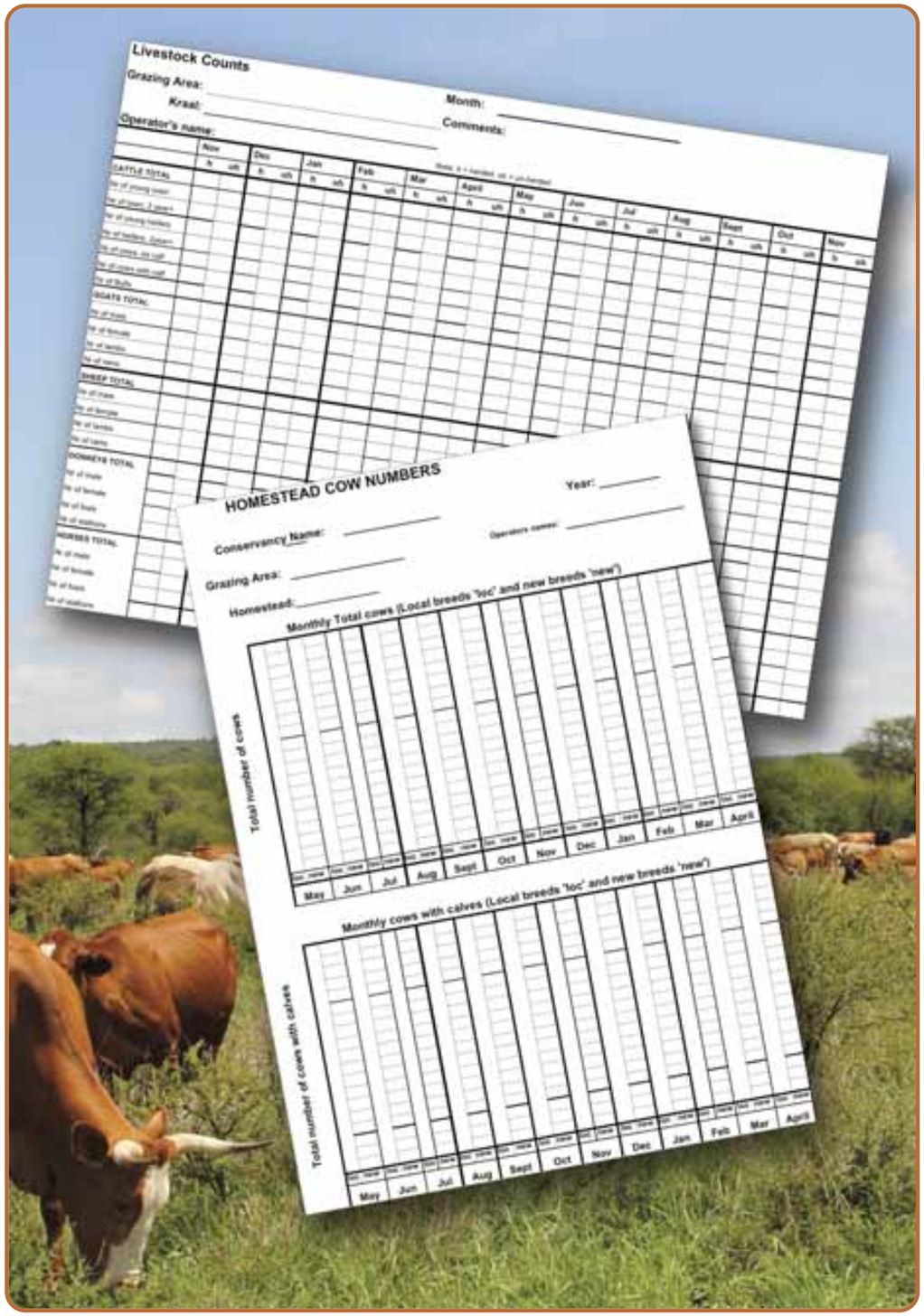


Illustration 53: An example of a form that farmers in the communal areas use to record the animals in their herd.

7.11.1 Livestock Condition Scoring

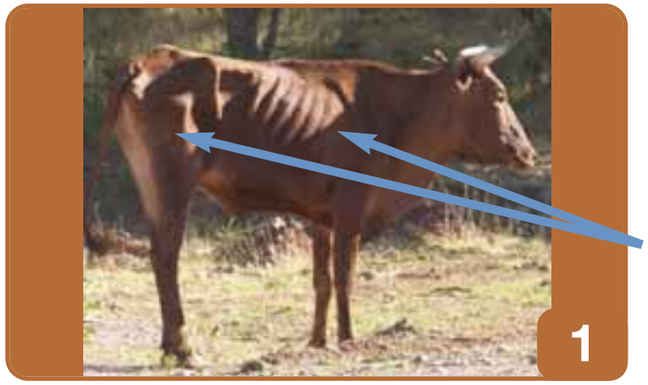
Farmers can use score the body condition of livestock from one to five. A body condition of one is the weakest and a score of five indicates a very fat healthy animal. The scoring can help to make decisions about changes in the herding or when to market animals and which animals to market. The information can be documented on record sheets and compared from one year to the next to see if the management efforts of farmers are leading to better or to worse livestock condition. Following is a photo guide to the five condition scores of cattle and of small stock and sample record sheet for documenting the scores. More suggestions for recording and monitoring livestock condition scores can be found in a booklet called *Guidelines for Rangeland and Livestock Production Local Level Monitoring for Communal Grazing Areas* (commissioned by the Country Pilot Partnership Program of the Ministry of Environment and Tourism, Namibia).

Cattle Condition Scoring Guide

Pick any 25 animals from the herd and match with the most appropriate picture.

Condition 1

This animal is very lean and shows signs of extreme malnutrition.



Notice the prominent hip bones and ribs on the animal.

Condition 2

This animal is still lean but in a relatively better condition than in ‘Condition 1’ above.

Ribs and hip bones prominent but fleshier than in ‘Condition 1’.

Condition 3

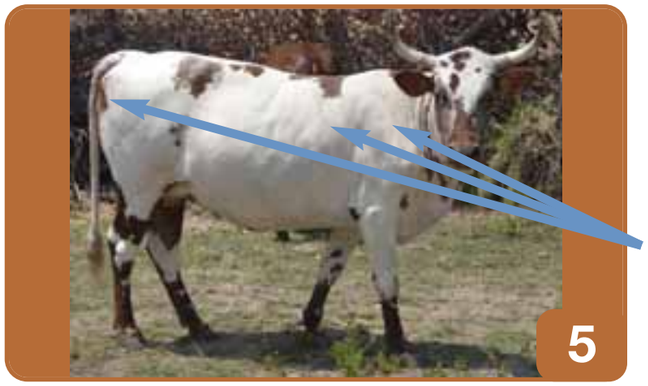
Animals classified as ‘Condition 3’ are healthier looking than those in ‘Condition 1 and 2’, with less pronounced bones and rounder appearance.

Notice the faint ribs and hip bone structures.

Condition 4

Animals in the ‘Condition 4’ category show almost no bones underneath the meaty skin.

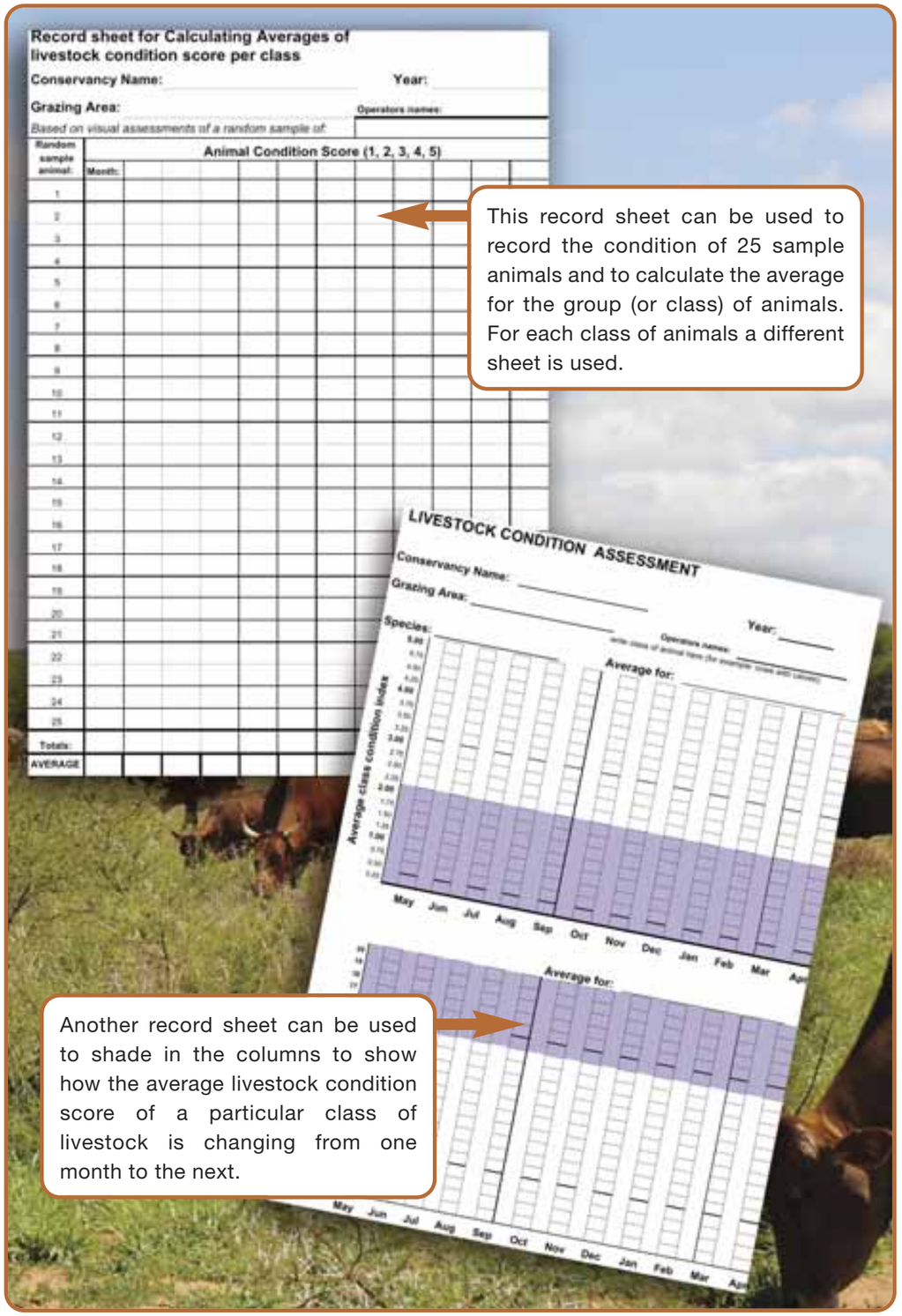
Condition 5



No ribs or hip bones are apparent and there are prominent fatty areas at the base of the tail.

Livestock Condition Scoring Guide for Goats

As with cattle look out for protruding hib bonesand fat around shoulders and the tail.



"Beyond being a draft animal,livestock can help prepare croplands."

Synnergies between livestock and crop production 8

Livestock are usually regarded as a potential[80] threat to crop harvests as they can break into a crop field and destroy young plants, or eat the crop before it is harvested. One way of preventing such losses is to plan the movement of the herd in such a way that it is grazing in areas further from the homesteads and crop fields while the crops are growing and until they are harvested. The techniques of conservation farming can improve the production of the crop fields, especially when dung from the overnight kraal is used to fertilize the fields.

Livestock can help to improve the growth and yield of crops, which is especially important in areas where both grazing and cropping take place. Traditionally farmers collect dung from kraals to distribute on their crop fields as fertilizer, but this can actually be done by the animals themselves. The herders can kraal the animals inside a crop field, preferably overnight and any time after harvesting and before planting the next crop. If animals are bunched close together they will eat some of the stover, but will also trample some of it down and into the ground. After sleeping or lying down to chew cud they will get up, defecate and urinate, and in this way fertilize the soil. This fertilization with fresh dung is more effective than when dry dung is placed on the crop lands without urine. When crop fields are too large, they may have to be subdivided with a temporary fence. Animals should not spend more than 7 nights on each patch, to prevent compaction and over-fertilization of the soil.

Photo 71: Overnight kraal made from stick mats

Photo 72: Maize, pumpkin and beans were planted in the area where the overnight livestock kraal had been in the veld. No weeding was done.

Photo 73: The maize harvested in the veld crop field was much bigger than maize harvested on traditional crop fields in that year.

80 Potential = possible

Farmers in Zimbabwe plant crops in overnight kraals outside traditional crop lands, without even chopping trees and bushes or ploughing the land. Into the trampled soil they sow maize, sorghum, and a cover crop of pumpkin and beans which reduces the growth of weeds. The grass that comes up with the mixed crop is also allowed to grow, as it helps to cover the soil surface and reduce evaporation. The area is protected with a trench or with a fence to prevent wildlife and livestock from destroying the crop field. After harvesting, all the stover is left on the land to cover the soil and to prevent erosion. Livestock is herded in the crop fields to eat some of the stover and to break up the rest, though they are taken out before they have eaten all of it. This saves a lot of work for the farmers and can be an important support to households, particularly where labour is in short supply, for instance in households where people may be weak and ill with HIV and AIDS.

Photo 74: A field that was planted after a herd of livestock was kraaled overnight for 7 nights on the crop field. The plants grow much stronger than on the neighbouring field.

Photo 75: The neighbouring crop field was prepared and planted in the traditional way.

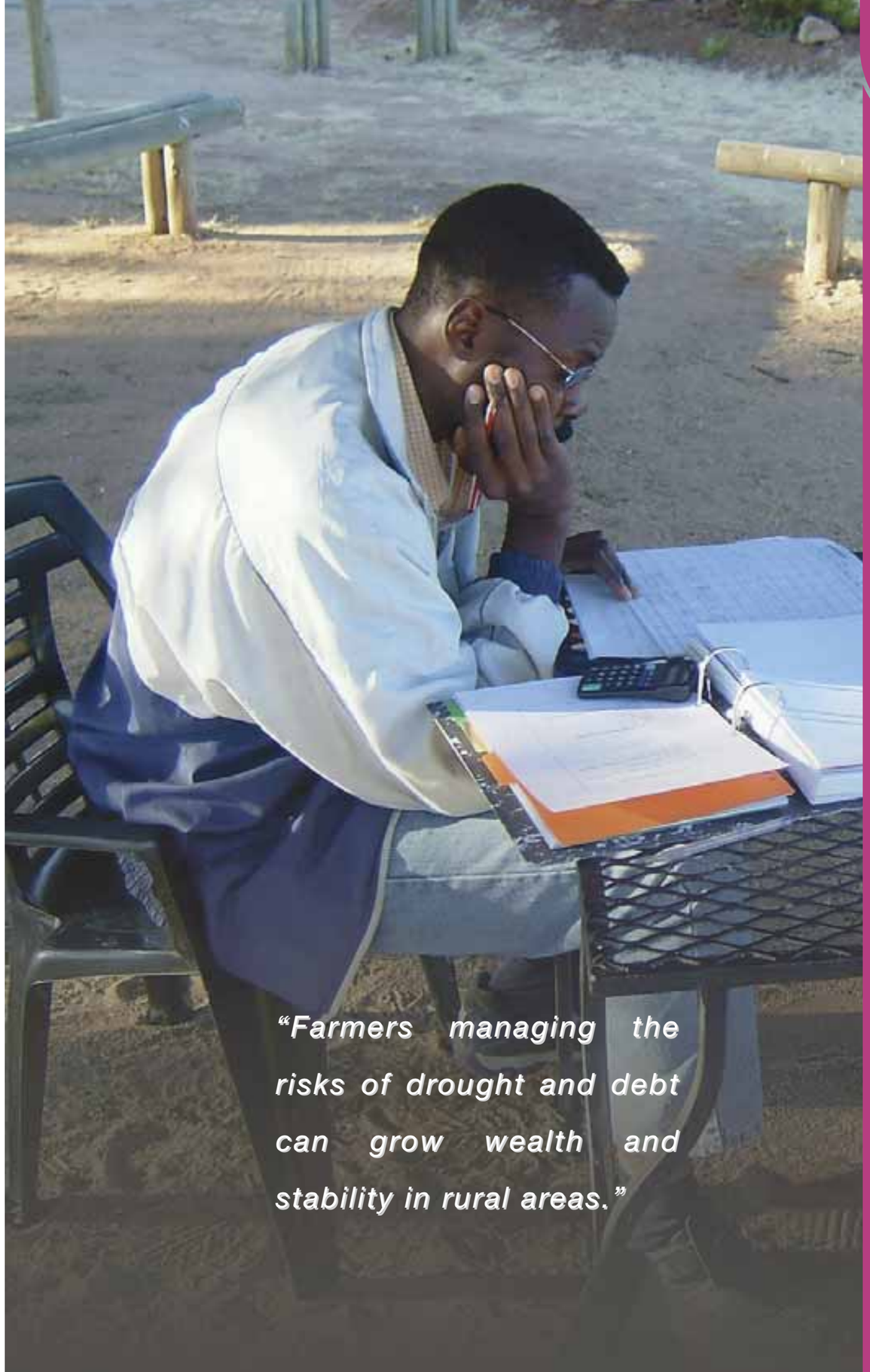
Photo 76: Cropfield prepared by livestock with stover left as ground cover.

Photo 77: Ploughing with no ground cover to protect the surface will dry out the soil.

Using livestock to prepare crop fields could even be a service that livestock herders and owners are paid for.

Even on traditional crop fields near the homesteads, the impact of kraaling animals inside the crop fields can improve the fertility of the soil and the yield of the crop.

When livestock is kraaled overnight in cropfields, the animals prepare the soil through trampling, dunging, urinating and breaking up the stover to create soil cover. This can save labour and improves soil fertility and can lead to better crop yields.



9.1 Money and the cost of living

Most rural families struggle to pay for all the things they need or want to buy.

Households grow much of their own food, but some things cannot be produced, and need to be bought. Prices are increasing; numbers of children and young people in each village are growing, and all people need food, clothes and education. Many young family members are unemployed. Some are moving to towns and cities to look for work and a different kind of life. Very often they do not find employment there, and return to the rural area.

What can be done in order for there to be enough food, clothing, education and housing for everyone?

Many people in rural areas think of starting a new business or looking for a paid job, and livestock farmers may think that if they could get a better price for their meat they could become richer.

However, when people have more money, they are also likely to spend more. Even though they earn more, they may find that they still do not have money left over when they want to build a house, when there is an emergency, or when a sick family member needs medical care.

What can be done?

Each household is different. A household could look at where they spend the most money, and then consider ways of reducing expenses[81].

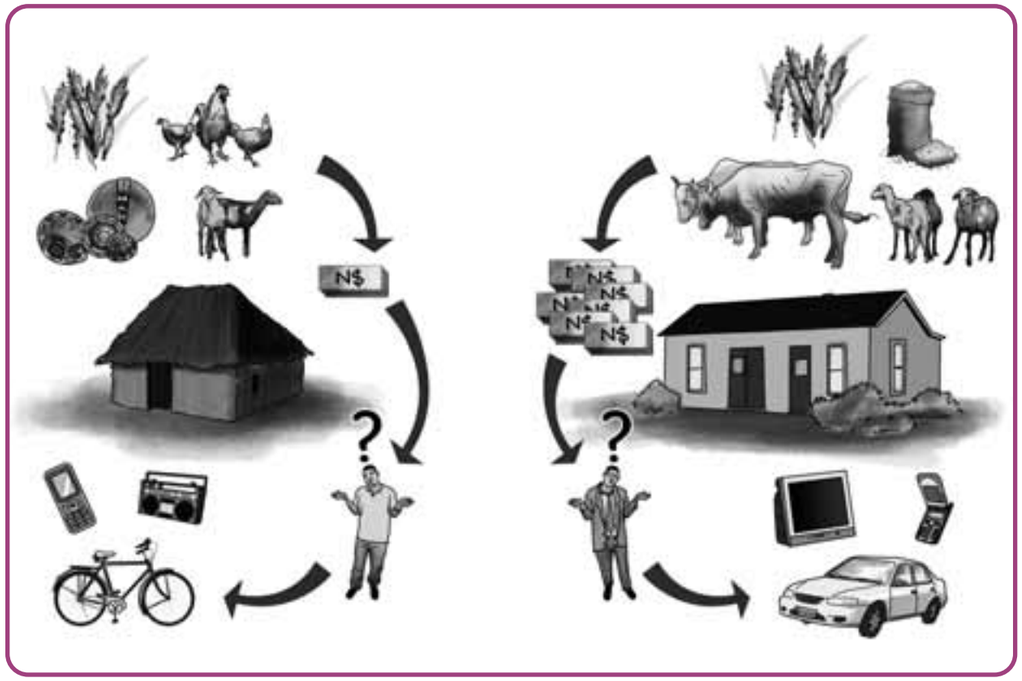


Illustration 54: Low income and higher income household often experience the same challenge of not having money left over for savings.

81 An expense usually means that we buy something that we consume or use up. This can be compared to an investment where we also buy something, but it improves our income or it gains in value.

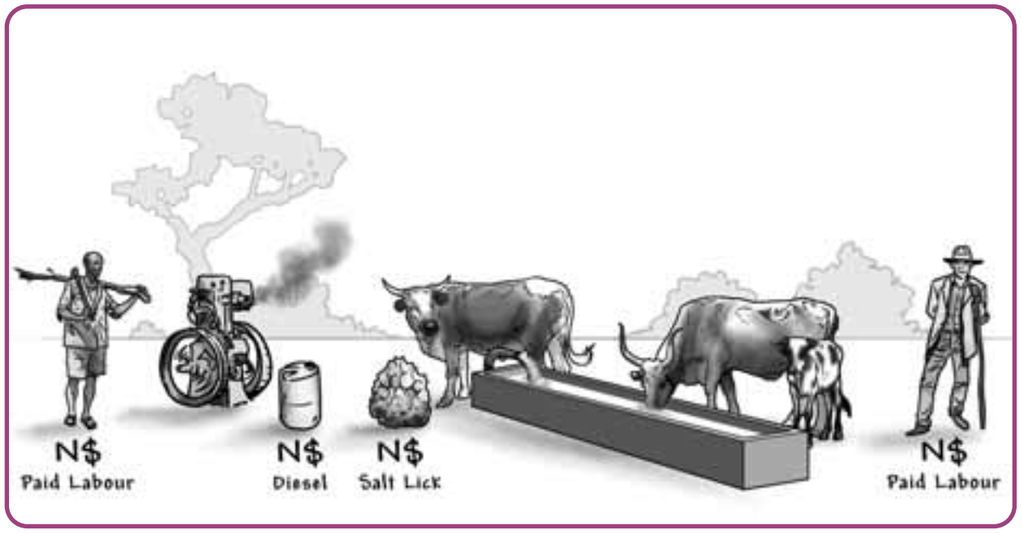


Illustration 55: Livestock farming inputs cost money, but this helps to generate an income.

9.2 Living expenses and business expenses

How much money is used to pay for living expenses, and how much for the business of farming?

Separating household (or living) expenses and farming expenses is an important step in understanding how a farming business can be improved. It is also good practice to save some money for unexpected living expenses, for unexpected business expenses or for buying major items such as building materials for a new house, or a solar pump for a borehole. If money that had been saved for the business is used for personal expenses, the business “starves” and the income from the business will be lower.

Any business, including farming, needs money to pay for the ’inputs’, which may be tools and seeds for crop production, diesel for pumping water, lick, ear tags, the transporting of diesel or animals, vaccines and medicines, a new bull or ram, or young animals for breeding.

Where does the money come from to pay for these inputs? Successful business people say that money for the expenses should come from selling the products being pro-duced. If money has to be borrowed from another business, person or the bank, this is an indication[82] that the business is not strong.

Successful commercial and communal farmers say that selling livestock and using that income to pay for improving and maintaining water points and other expenses is the best way of improving the success of livestock farming.

Income from farming and marketing livestock must provide money for all the following expenses:

82 Indication = sign of

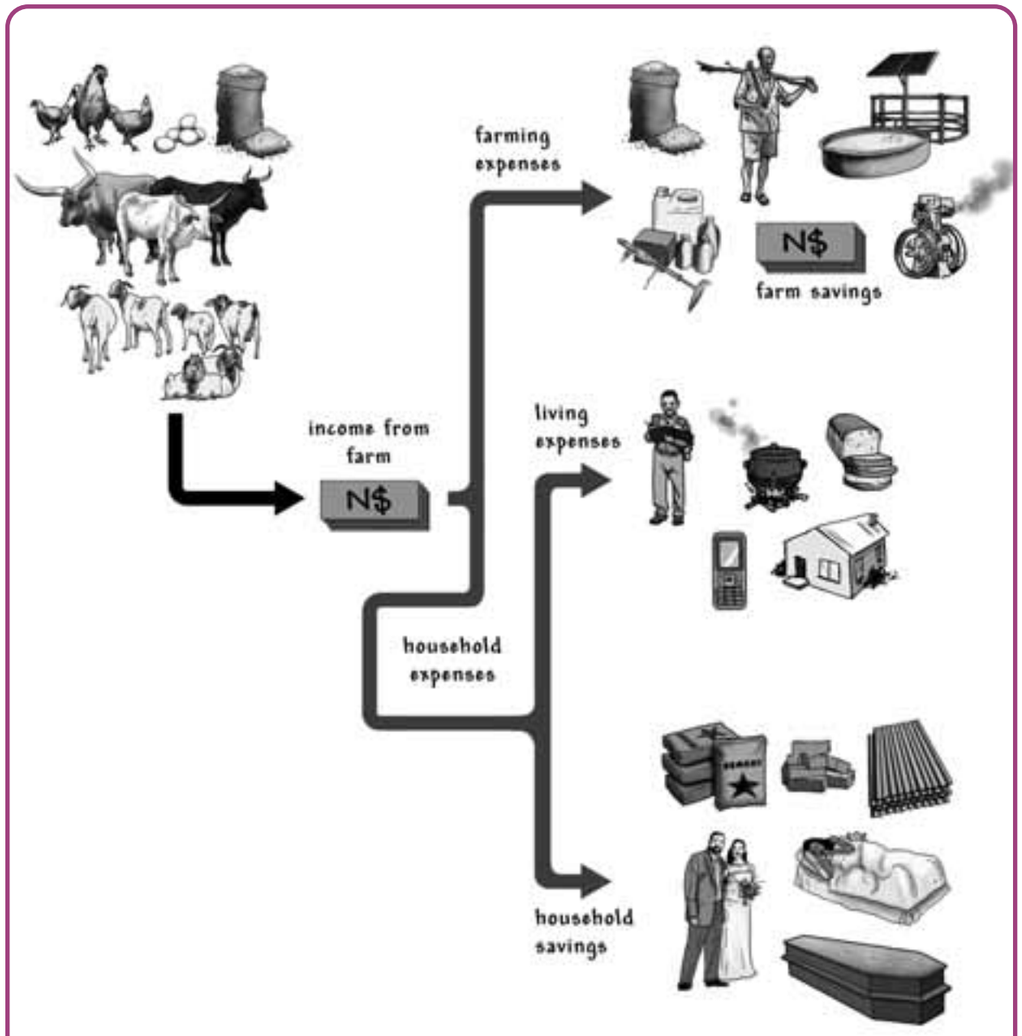


Illustration 56: For farmers who do not have an additional income the income from selling livestock must cover farming (business) as well as household expenses and contribute to savings

Separating household or living expenses and farming expenses is a very important step in understanding where the business of farming can be improved.

Farmers may feel overwhelmed when they see how many expenses they have, and obviously hope that they will get a good price for the livestock they sell. Clearly the selling price makes a difference, but the businesses that buy livestock also have to consider what the consumer[83] is prepared to pay, and what kind of meat they want.

83 Consumer = the person who buys a product to use it, like a piece of soap to wash. A consumer does not sell the product to someone else.

The consumers' notion[84] of good quality meat may differ from the farmers'. Agents[85] that buy and sell meat, such as Meatco, try to find out what the consumer wants and how much they are willing to pay for it. They also try to inform the consumers of the superior quality of the meat produced in Namibia and the fact that our meat is healthy. It is not always easy to influence consumers who can choose meat from all over the world, however, and it is a fact that Namibian farmers have to compete with farmers from other countries.

On the informal market the producer (farmer) often gets paid directly by the consumer. Therefore as farmers we should look at those places where we have the most influence, if we want to improve our businesses.

9.3 Borrowing money

People may borrow from family members and friends, or take out loans to pay for big items such as a refrigerator or a car. Some shops sell items such as furniture, clothes and cars on 'lay-by' or on credit. This is actually more expensive because the shops add interest to the price, so while we are given time to pay off the debt, we pay a lot more than the cash price of the items.

This is called 'compound interest', and means that the person who borrows money is paying interest on the original amount (the capital) and on the interest. This is an example of the calculations of compound interest:

Calculating monthly compound interest:

The interest rate is usually expressed 'per year' or as 'annual' interest rate. For example, an annual (or yearly) interest rate of 18% means that each month the interest is the annual interest rate divided by 12. For example, if the annual interest rate is 18%, the monthly interest rate is 18 : 12 = 1.5%. 'Percentage' means 'out of 100'. To arrive at a percentage we therefore divide the loan amount by one hundred.

Simplified method to calculate compound interest:

- Step 1: Look at the amount of money the borrower has taken from the lender (capital amount). If the cents after the comma are less than 50c use only the figure for the full Dollars. If they are more than 50c add one Dollar to the amount (for example N$ 213.70 becomes N$ 214). This we do so the mathematics become easier.
- Step 2: Move the comma which stands between the Dollars and cents two places to the left. This is the same as if one divides the figure by 100.
- Step 3: Multiply the amount from Step 2 by the figure of the monthly interest on the loan.
  This calculation results in the amount of the interest on the loan this month.
- Step 4: Add the interest to the original loan amount (capital with the original cents) or to the amount that is outstanding. This is the total amount that the borrower now still owes the lender - the 'outstanding balance'.
- Step 5: If the borrower now pays back some money, subtract the amount from the figure that was calculated in Step 4. For the following month's interest use the new total to start the calculation in Step 1 and follow up to Step 4 again.

To calculate the total amount of the interest that a borrower pays the lender over the months, all the different interest amounts have to be added up.

Chart 6: Guidelines and formula for calculating compound interest

84 Notion = perception or way of looking at something

85 Agent = a person standing in for someone else to carry out a specific task.

Example of monthly compound interest calculation

Annual interest rate: 18%
Monthly interest rate: 18 :12 = 1.5 %
Loan amount at beginning (capital): N$ 5000

Repayments every month: N$ 1000

Month	Capital amount		Interest & Repay-ment		Outstanding Balance
March	5000.00				
April	5000.00	+	75.00	=	5075.00
re-payment	5075.00	-	1000.00	=	4075.00
May	4075.00	+	61.13	=	4136.13
re-payment	4136.13	-	1000.00	=	3136.13
June	3136.13	+	47.04	=	3183.17
re-payment	3183.17	-	1000.00	=	2183.17
July	2183.17	+	32.75	=	2215.91
re-payment	2215.91	-	1000.00	=	1215.91
August	1215.91	+	18.24	=	1234.15
re-payment	1234.15	-	1000.00	=	234.15
September	234.15	+	3.51	=	237.67
re-payment	237.67	-	237.67	=	0.00
	loan fully paid off				
Total Interest paid:			237.67		

Re-payments only when money is available:

Month	Capital amount		Interest & Repay-ment		Outstanding Balance
March	5000.00				
April	5000.00	+	75.00	=	5075.00
re-payment	5075.00	-		=	5075.00
May	5075.00	+	76.13	=	5151.13
re-payment	5151.13	-		=	5151.13
June	5151.13	+	77.27	=	5228.39
re-payment	5228.39	-	500.00	=	4728.39
July	4728.39	+	70.93	=	4799.32
re-payment	4799.32	-	1000.00	=	3799.32
August	3799.32	+	56.99	=	3856.31
re-payment	3856.31	-		=	3856.31
September	3856.31	+	57.84	=	3914.15
re-payment	3914.15	-		=	3914.15
October	3914.15	+	58.71	=	3972.86
re-payment	3972.86	-	500.00	=	3472.86
November	3472.86	+	52.09	=	3524.96
re-payment	3524.96	-	500.00	=	3024.96
December	3024.96	+	45.37	=	3070.33
re-payment	3070.33	-		=	3070.33
January	3070.33	+	46.05	=	3116.39
re-payment	3116.39	-		=	3116.39
February	3116.39	+	46.75	=	3163.13
re-payment	3163.13	-	500.00	=	2663.13
March	2663.13	+	39.95	=	2703.08
re-payment	2703.08	-		=	2703.08
April	2703.08	+	40.55	=	2743.63
re-payment	2743.63	-		=	2743.63
May	2743.63	+	41.15	=	2784.78
re-payment	2784.78	-	500.00	=	2284.78
June	2284.78	+	34.27	=	2319.05
re-payment	2319.05	-	1000.00	=	1319.05
July	1319.05	+	19.79	=	1338.84
re-payment	1338.84	-	1000.00	=	338.84
August	338.84	+	5.08	=	343.92
re-payment	343.92	-	343.92	=	0.00
	Loan fully paid off				
Total Interest paid:			843.92		

Chart 7: Example of the effect when a borrower does not pay back a loan in the agreed instalments

The Agricultural Bank of Namibia offers low interest rates to communal farmers who borrow money to buy livestock, or for other farming expenses. However, if the farmer does not pay it back within the time agreed, he or she has to pay more interest than was originally calculated, and the total cost of the loan can be very expensive. Because of the risk that the borrower will not pay back the loan, the bank requires security, also called collateral. Collateral may be an asset such as a house, land, or an insurance package that the bank can claim and sell to recover some of the loan if the borrower fails to pay back the instalments. Livestock is not accepted as security for a loan. If farmers do not own a house, land or life insurance, they cannot borrow money from Agribank.

For farmers it is important that they manage the flow of money very carefully. Income may only be available three or four times a year, when livestock or crops are sold, but expenses still have to be paid every month. To have enough money to pay for all the regular expenses as well as special purchases like a new bull or water pump, it is much better to save money beforehand. If one does not have the full amount, borrowing the balance is safer than borrowing the whole amount over a long time. The interest on small amounts borrowed over a shorter period of time is much less costly to the farmer.

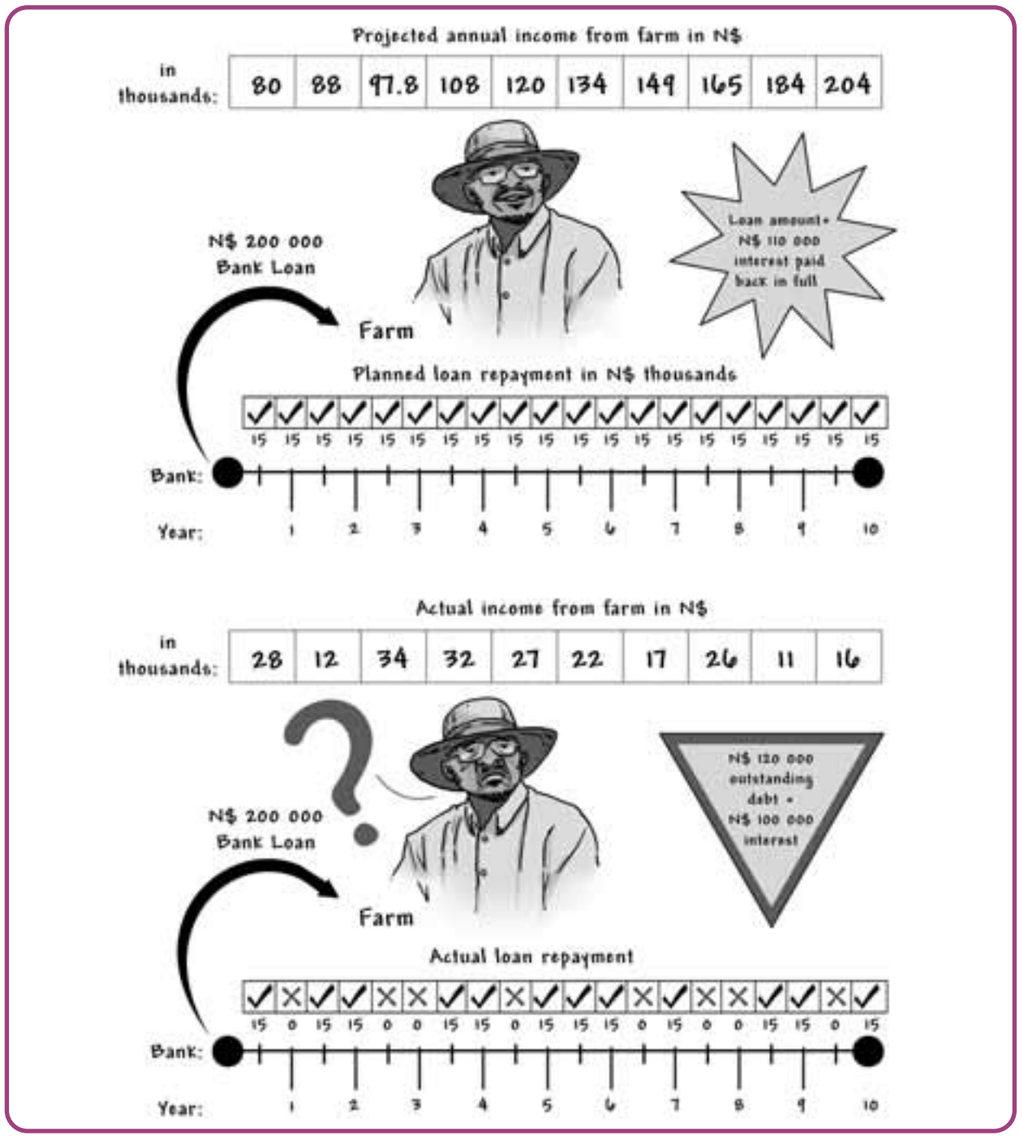


Illustration 57: Long term loan worries

Being unable to repay a loan can be extremely stressful or embarrassing, and may lead to violence or even suicide. Farmers may seek assistance, and hope that aid organizations or the Government might help with free services to make up for the shortage of money.

However, if farmers do not save money to pay for unforeseen or large expenses they can become dependant on outside help. Often the Government or other aid organizations have strict rules, and the community may have to wait for the assistance to come.

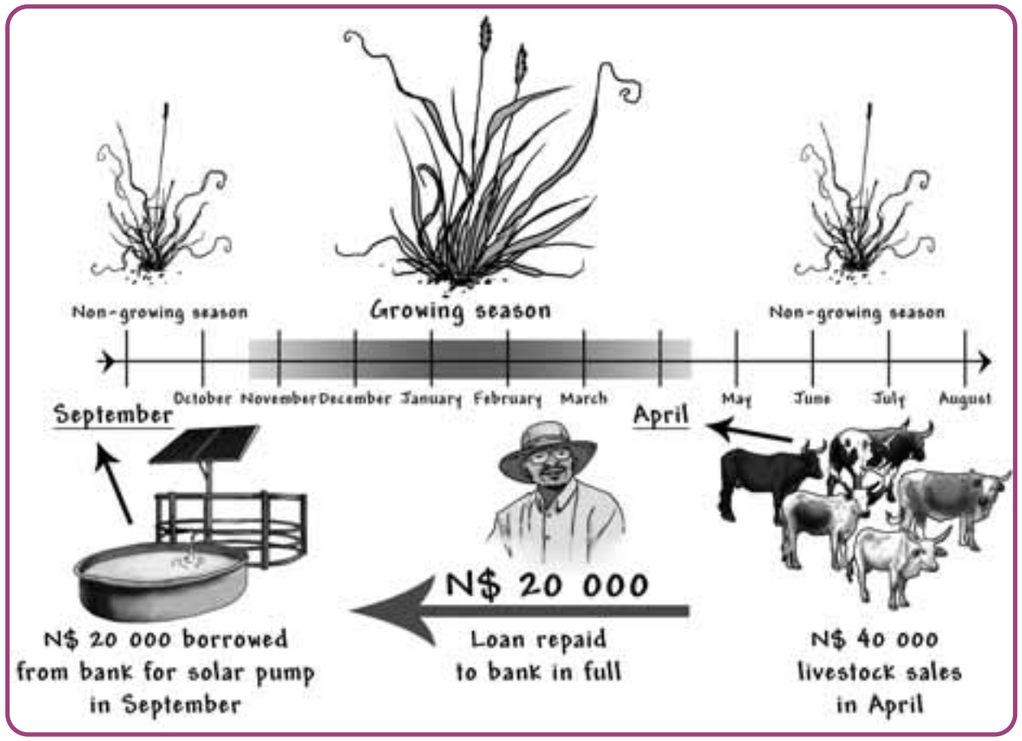


Illustration 58: A carefully planned short term loan that can be paid back with the income from one year's production usually carries a lower risk.

Borrowing over a long time (more than 2 years), even when the interest rate seems low, is a very expensive and risky way of obtaining money to buy something. We cannot always predict where our income will come from 10 years from now.

9.4 What can be done to become self-sufficient?

Farmers who manage to save money can come together and agree that they do not want to wait for outside help to improve the development of their area. For example, they might pay for the herders who guide the livestock to different areas and ensure they do not return to an area they have already grazed that season. This will help the grass to recover, which in turn means the animals will be in better condition and that more kilograms of meat can be sold, resulting in increased incomes. The farmers invest some of their income to increase their income in the following year. Farmers will feel proud and confident when they can rely on their own planning skills and ability, and cooperation with other community members and neighbours. Furthermore, if farmers can show that they are willing to pay some of the costs of the things they need to buy (such as water infrastructure), the Government and other aid organizations are often more willing to assist, or contribute in the form of 'match funding'.

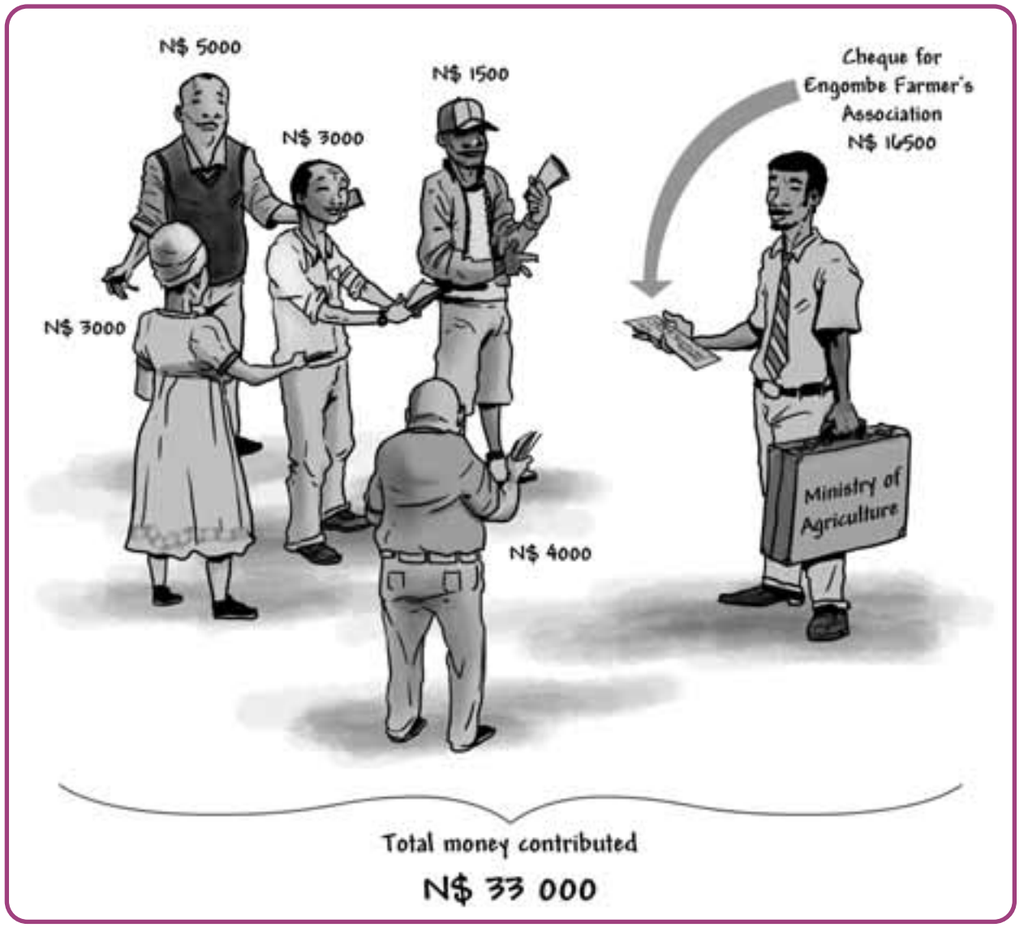


Illustration 59: Match funding can attract willing support from government and aid organizations

9.4.1 More security through different kinds of products

Having different lines of income or producing different products on a piece of land is a good way of protecting oneself when one product fails in a particular year. For example, a farmer may grow mahango, keep goats and cattle, and sell charcoal. If one year there was too much rain at the wrong time and the mahango harvest was poor, it could be that the sale of livestock and of charcoal could generate sufficient income to compensate for the poor harvest.

In a way this is like insurance. Livestock seldom completely fails in a drought in the way crops do.

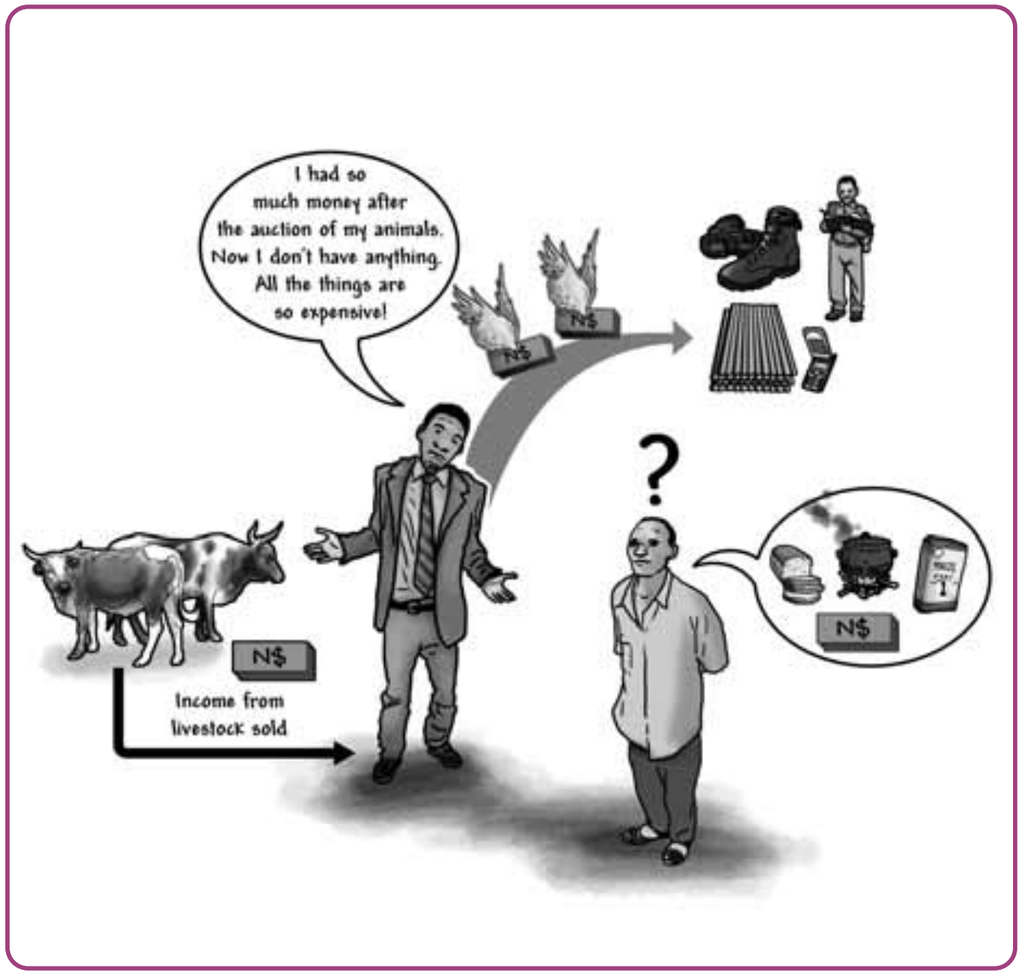


Illustration 60: Because farmers do not get a regular salary it is special challenge to keep money to pay for the regular expenses.

9.5 Taking control over our money

Without money, people often feel powerless. If there is money, life seems easy. We tend to spend it without thinking ahead to the time when there may be no income.

How can we learn to control our spending, so that we have money all the time for all the things we need?

A person may decide not to spend the money, and save it for later. However, if for example we do not buy diesel to pump water, or salt for the livestock, the animals will try to find it elsewhere, and may walk long distances searching for water or salt, losing condition in the process. This would lower their value, in turn reducing our income.

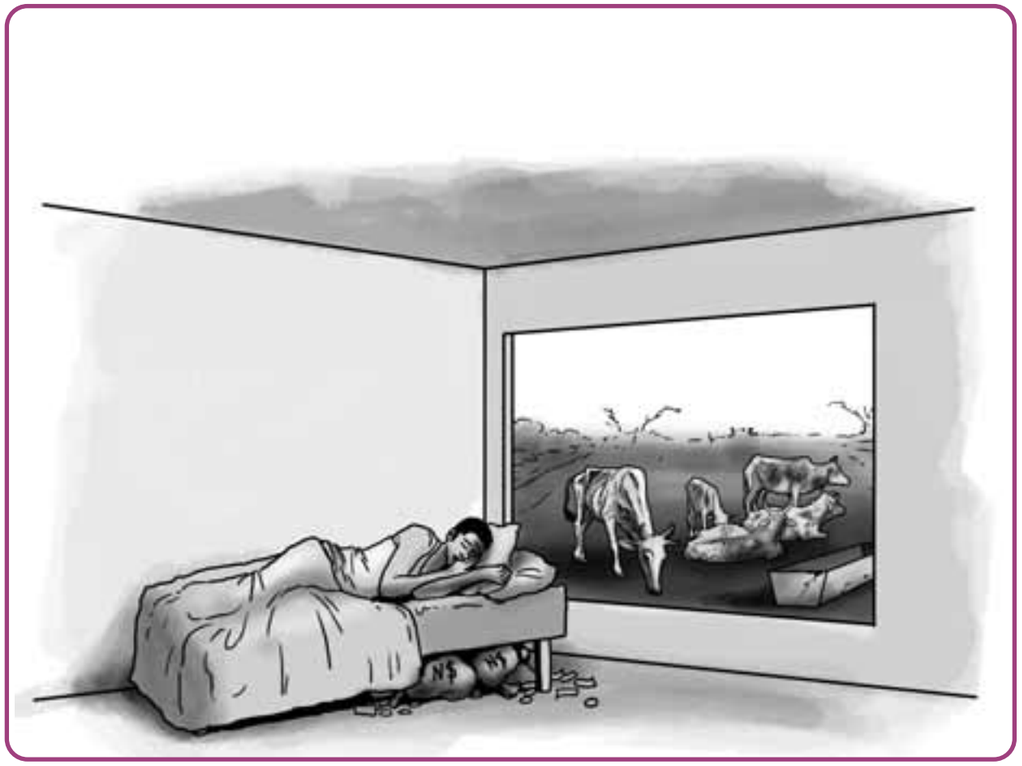


Illustration 61: "Saving under the mattress" and letting animals suffer is not good business

9.5.1 Keeping records of actual income and expenses

One way of managing money more effectively is to write down when we receive income, and how much. Next we write down when and what expenses we have. Many people report that just writing down their actual income and their actual expenses makes them seriously consider whether they really need a particular item, or simply want it. In this way they can reduce the amount of money spent on things that weren't planned for.

An exercise could be to write down all the times you use money to buy something, every time you receive money, and what it was received for. This can be done in a simple school exercise book. Family members who are good at writing or at mathematics can help those who are not used to writing.

In this way we can see where we waste money, and where we earn the most money. This allows us to plan how much money we want to save or have left over as profit. This profit can then be used to pay for the bigger purchases, such as a goat ram, or solar panels for a water pump.

Writing down all expenses and income helps farmers to get to know their farming business better. This helps with drawing up a budget which in turn reduces the need to borrow money.

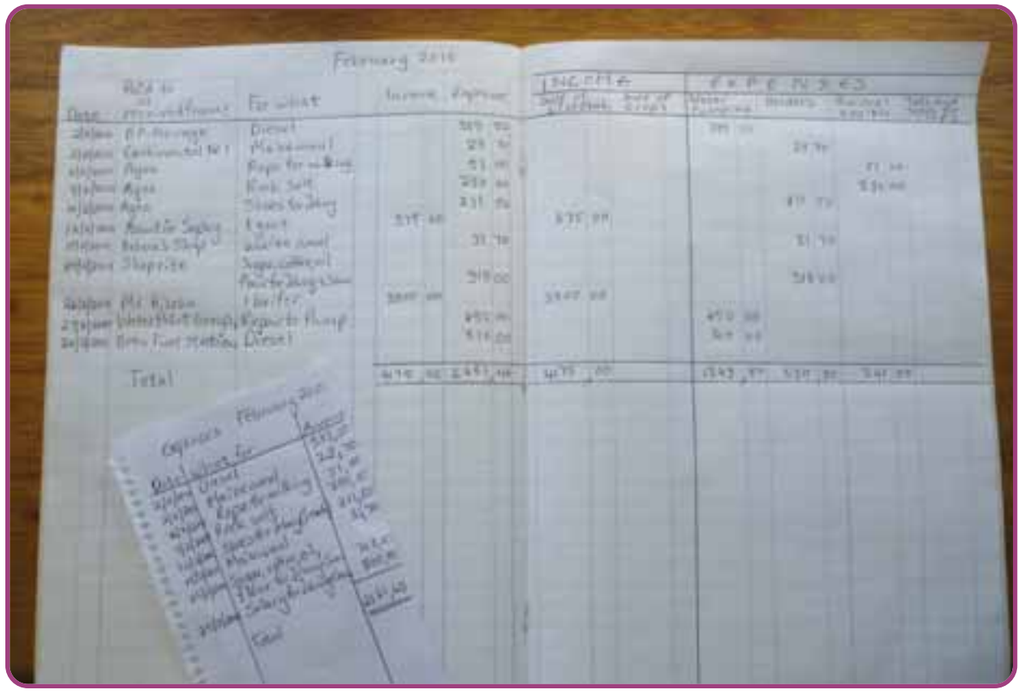


Photo 78: Simple recording of expenses can be done in a small note book. For book keeping with different colums for income and expenses it is easier to buy a "journal book"

9.5.2 Planning expected income and expenses

Even more effective than writing down our actual income and expenses is to think ahead to the future, and to write down what income and expenses we expect to have, and when. This is called a budget. It is important that this budget is combined with a production plan that takes into account the realistic growth of the herd of livestock or crops. This growth is usually determined by the weather seasons, and farmers should therefore budget their income and expenses over a whole year. The aim of such a budget is to plan ahead to have enough money for all the expenses when they occur, and to avoid having to borrow.

One way of drawing up a budget could be to use a calendar that shows when animals and other farming products will be ready for sale. On the same calendar we can write down what farming expenses are expected, and in which month.

Once the farming expenses have been planned, the living and household expenses and income from other sources (such as salaries) can be added to the plan. In this way, all needs of the farming business and of the household are taken into account. This reduces the chance of unexpected expenses that could force farmers to use money planned for farming for other purposes.

Drawing up a budget of projected income and expenses over a whole year helps farmers to have money available when it is needed for both farm and living expenses.

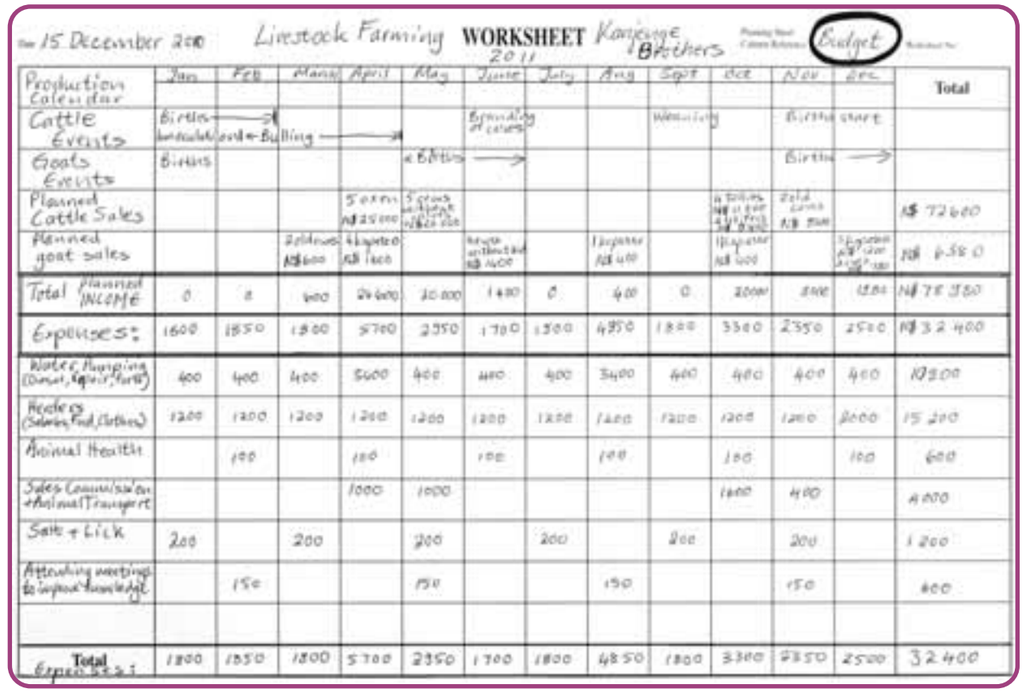


Photo 79: Budgeting planned income and expenses helps to see when money is available and must be saved to pay for the expenses occuring in later months

9.6 Investing in the livestock business

Buying livestock can help us “store” money safely so that we do not spend it on living expenses. Buying livestock can also be an investment, meaning that it generates more income, like interest earned when money is invested in a long-term investment account at a bank. The animals grow or produce young, and the added weight of meat or new calves are like interest earned.

In the same way that an animal needs food in order to produce food for people, businesses need re-investment in order to produce income. And knowing where to invest attention or money is crucial, because if we invest it in the wrong place the business may still become weaker.

Investing in livestock may earn us more interest than if we invest money with a bank. However, it also has a much higher risk, because if animals are not well looked after they may die, lose value from disease or may be stolen.

Investing money in livestock should be approached carefully. Some farmers may think that buying more animals will earn them more income, and thus make them richer. However, it may be better to improve the quality and the value of the animals the farmer already has.

It is important to first improve the weakest aspects of the business. Consider this example: A farmer may be advised by a friend to take his livestock directly to the slaughterhouse instead of selling the animals to an agent who collects the animals and pays cash. It may appear[86] that the slaughter-house is offering a better price. The farmer decides to ask his friend to drive the animals to the abattoir in his truck. The truck has a problem with the gear box, and first has to be repaired. The friend asks the farmer to contribute to the repair costs. To fill the truck the driver goes to two other farmers before driving to the slaughterhouse, and the animals are without water and food for two days, causing them to lose weight. The farmer discovers that with these unforeseen problems, he does not get a better price at the slaughterhouse after all, and is disappointed.

When making an investment decision, it is good to imagine the farming business as a chain.

Only when the weakest link is strengthened will the whole chain be strong, and the profits good. If we improve another link that is not the weakest, the chain will still be weak, and the profit low.

Many farmers in the commercial and in the communal areas think that low meat prices are the biggest problem in their livestock business. Sometimes this is true, but much of the time the problem is that the animals are not in sufficiently good condition to get a good price, or that the farmer does not sell enough animals.

86 Appear = it may look like

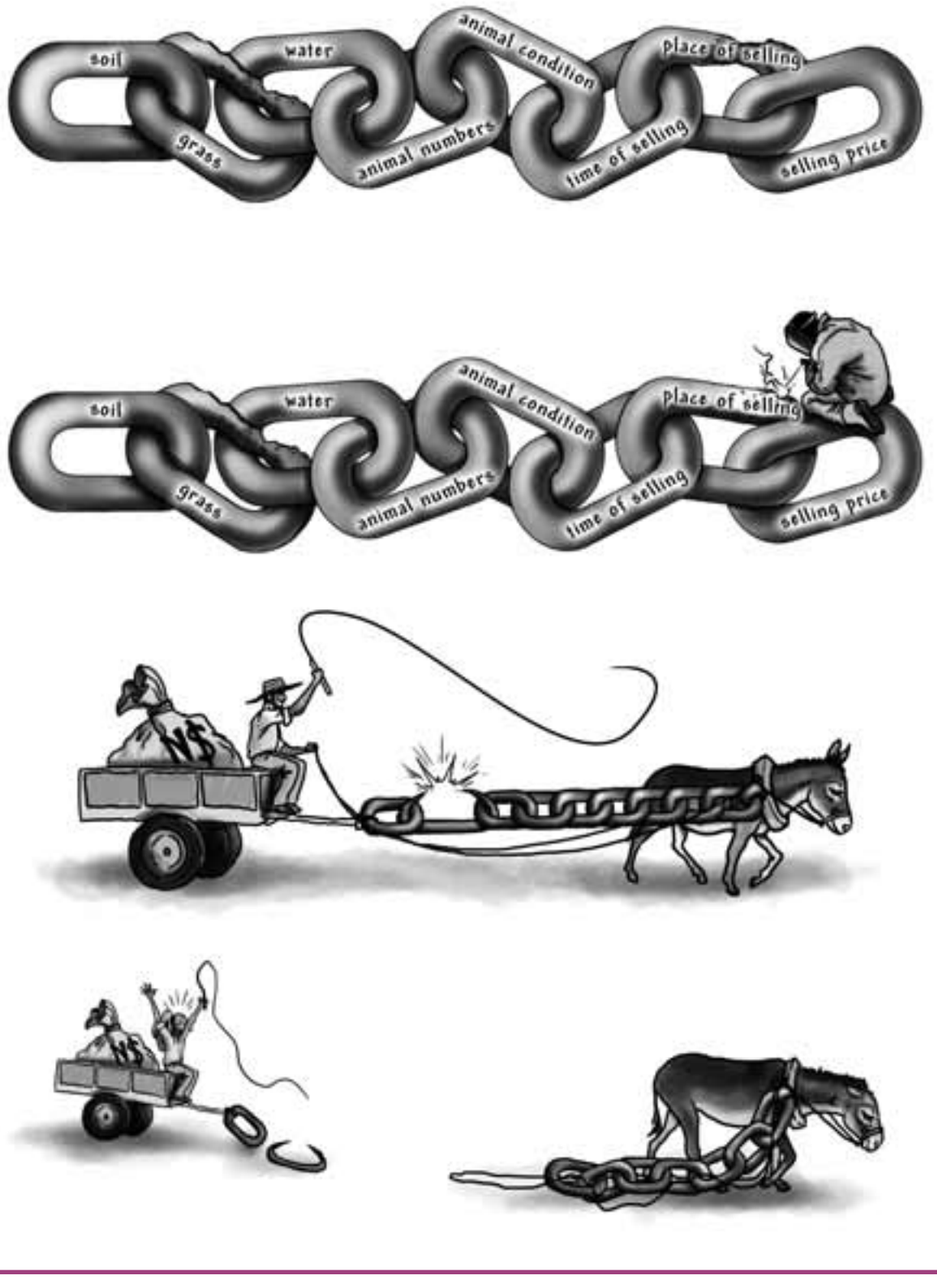


Illustration 62: Knowing which link in the chain of production is the weakest is crucial for the farmer to know in order to make sure that the money and effort invested is really strengthening the whole chain.

“The secret lies in knowing when to turn livestock into money and when to invest money in livestock.”

10
Selling livestock

Livestock has always been traded for other things that people need. Even today, people trade oxen for heifers if they want to increase the number of female animals in their herd.

10.1 The formal and the informal market

Currently farmers in the communal areas often wait for buyers to come to them. To improve their income from farming, farmers should get involved more actively in the business of selling livestock. Selling can happen on an informal basis. The farmer finds his or her own client and negotiates payment. The prices can fluctuate depending on the needs of the owner of the animal and the ability of the customer to pay. If the customer needs the animal urgently and can afford to pay a lot, the price may be high. If the owner needs money urgently, he may sell the animal for a lower price in order to get the money quickly. Payment in the informal market sometimes happens in instalments, on credit, while other sellers may demand full cash payment. Selling on the informal market requires that the farmer is prepared

Illustration 63: Selling on the informal market has many advantages but also some disadvantages

not only to produce the animal, but also to be in the business of selling. The advantages of selling on the informal market can be that the farmer knows the consumers personally, and that they are nearby. The customer can tell the producer (farmer) whether they are happy with the quality of the meat. The farmer may get a higher total price for the animal, and the sale can be conducted[81] without much preparation. Another way to earn more money than when selling only the live animal is for farmers to slaughter the animals themselves, cutting it up and selling it. This is called “adding value” to the livestock.

The disadvantages are that it can be time-consuming for the farmer; that they may not find a customer close by, or that the buyer might not pay as promised.

Many customers nowadays prefer to buy meat from a shop because it is cut differently and packaged in such a way that prevents the meat spoiling (or rotting) quickly.

There are formal markets that make it their business to buy and sell live animals, or buy and slaughter animals and sell the meat, such as Meatco or butcheries. To be able to sell to these formal markets, the farmer has to understand and follow the requirements of the customer. Prices are usually fixed for the whole country. The prices may change somewhat over the year, but they are more predictable, and the number of animals that can be bought through formal markets is usually much higher than on the informal market. Because the formal market can cool and freeze meat, they can buy and pay the farmer immediately upon delivery of the animal, even if the meat is only sold to the retailers later. Selling to the formal market has some advantages because it can reduce effort and uncertainty.

The Namibia National Farmers’ Union and Meatco have both written very good training manuals on all aspects of selling livestock to the formal market. In this book we will only look at the most important points that link the management of grassland and animals. Farmers must decide for themselves where they get the best conditions and prices when they want to sell their animals. The conditions in the informal market can change from one place to the next, and from one year to the next. In the following chapters we will focus more on the formal market, because it can buy many more animals, because the rules are the same in each of the regions, and are the same for communal and commercial farmers.

10.2 Reasons for selling animals

The most common reason for selling animals is to make money in order to pay for living expenses. There are however many other good reasons why farmers can sell animals, including:

- Selecting and culling non-productive animals to improve the genetic quality of the herd;
- Culling non-productive animals to leave more grazing to the productive ones, even though the price may be lower at the time of selling;
- Selling market-ready animals for cash to buy vaccines, lick and medication

- Selling oxen to buy more cows or young animals;
- Selling old cows to provide grazing for young heifers;
- Selling excess animals in time of insufficient fodder, overstocking and drought.

Farmers can also use the money to make investments into their farming business, such as:

- Selling animals to pay for infrastructure development;
- Selling animals to pay herders and buy a tent and other things a herder needs.

Illustration 64: There are many reasons for selling animals, not only to get an income to pay for living expenses

When culling non-productive animals, the price per kg is often not as good as when we sell a market-ready animal. However, in the long run the quality of all animals in the herd will improve if the weaker ones are not taking grazing from those who perform well.

10.3 What animals to sell?

Keeping oxen until they are fully-grown however requires that there is enough grazing for them, for the cows that produce new calves and for all the younger animals as well.

If we keep the entire[87] herd in a year of poor grazing, all the animals will suffer. Each of them will have less grass, as they have to share it. The cows in particular will suffer, because if they have a calf or are pregnant, it is more difficult for them to walk to the grazing areas that are far from water. The oxen and young animals that do not have to feed a calf can get to the best grazing first. Many of the cows may die, so that after a drought we often see more oxen in a herd. It will then be difficult to grow the herd again, because oxen cannot produce a calf.

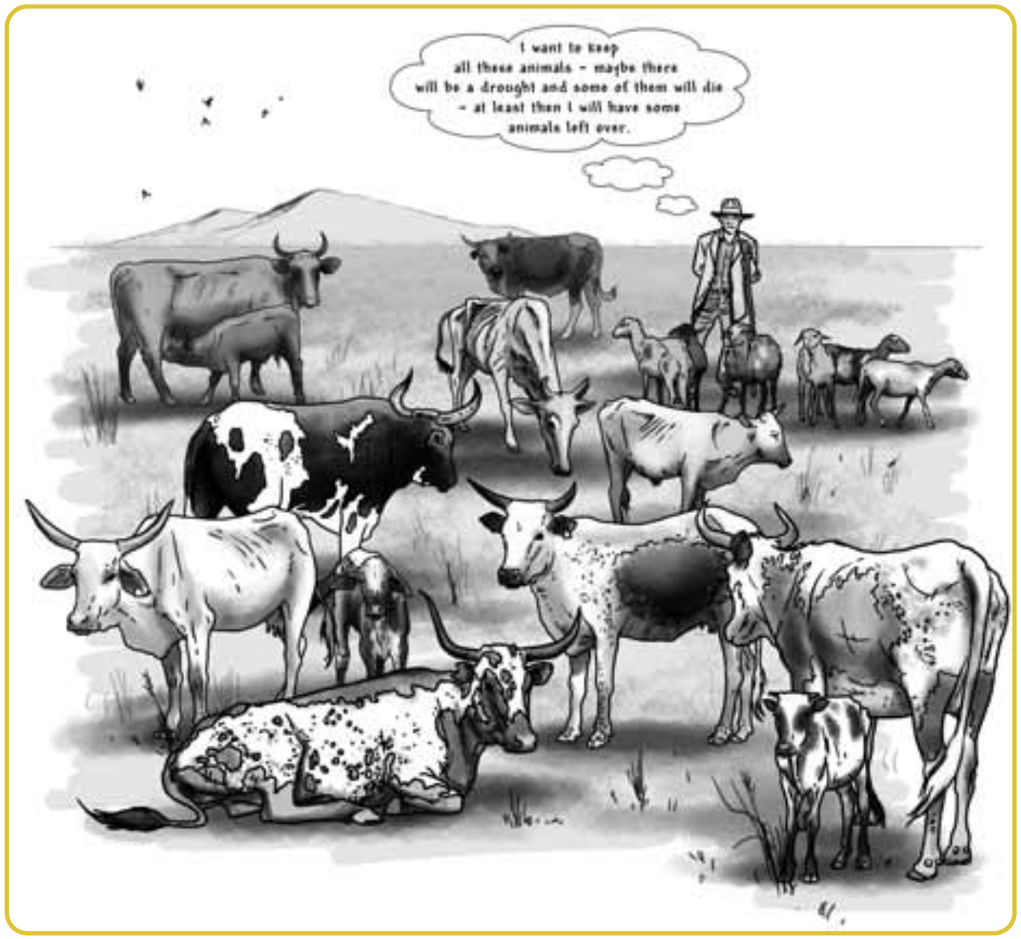


Illustration 65: Traditionally communal farmers tried to keep as many animals as possible but now there is a different option of de-stocking and re-stocking

87 Entire = the whole herd

Therefore, in a year when there is not enough grazing and some animals must be sold, it is best to keep the heifers and those cows that have produced a calf every year so far. These are the animals that know best how to produce a calf, even in difficult years. The oxen should be sold, as they will mostly eat grass, but will not put on much weight and cannot produce a calf to grow the herd. If many animals have to be sold, the next priority group to be sold are the cows that do not regularly calve, as they are most likely to lose condition when the grazing is poor and will not conceive again.

Even in good years, many farmers want to sell only those animals which are in a good condition because they want to get a good price. This is understandable. However, some animals never pick up weight and they do not look good. The calves and kids of these animals will probably also not perform well, because they inherit the genes and abilities of their parents.

It is much better to slaughter and eat or sell weak animals, so that only those who perform well remain in the herd and pass on their abilities and genes. We may get less money for these weak animals, but at least the remaining ones get a better chance to grow and breed. This is the cheapest way of improving the quality of the whole herd.

10.4 When to slaughter and sell animals to reduce risk?

Traditionally farmers hope that all their animals survive until the next rains start, even if the grazing is poor. “Thin, not pregnant, but at least they survive” is what the farmers hope for.

However, in modern times, farmers do not only want their animals to survive, but to bring money when sold and to produce calves every year. If we want animals to perform well even in a year of low rainfall, it is important that we select those that we definitely want to keep, and sell the others **early in the dry season**. As soon as we see that the grass will not be enough to feed all our animals through the winter, those we want to sell are still in good condition and will bring a higher price than if we wait and sell them at the end of the winter, when they are in poor condition.

Another important reason to sell excess animals early is that there will be more grass left over for the rest of the dry season. This means not as many animals have to be sold as if we wait until July, for example.

Farmers often only sell animals when they need money, for example at the end of the year with celebrations coming up, or at the beginning of the year when school fees are due. This is usually a time when animals are not in good condition and they will not fetch such a good price. It would be better to sell the animals in May or June and keep the money in a savings account until the end of the year. The challenge with this is to not use the money before the end of the year, so that it will indeed be available for the end-of-the-year purchases, and also so that it can earn interest in the meantime.

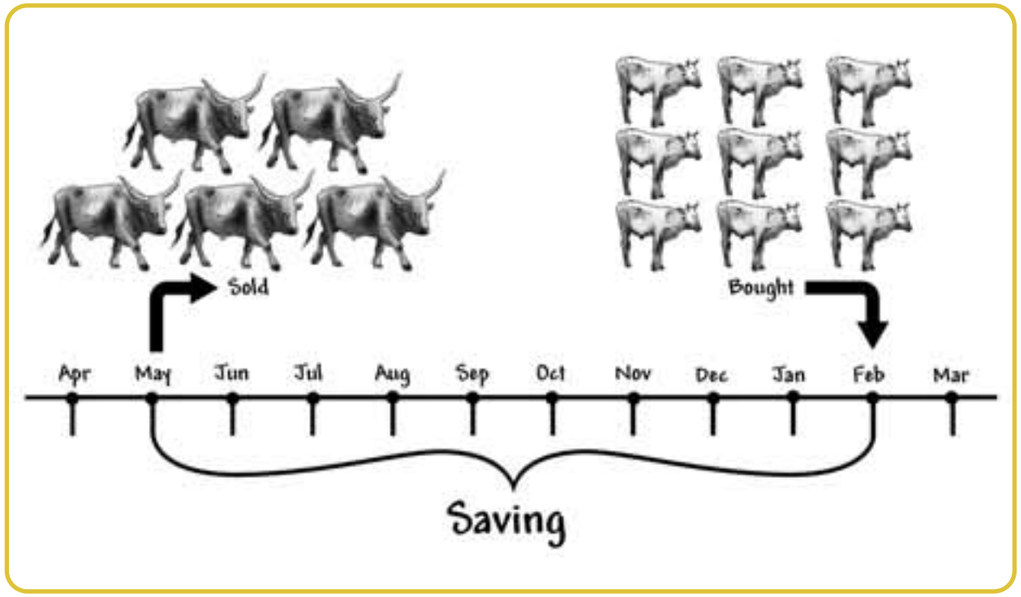


Illustration 66: De-stocking and re-stocking makes it possible to be in the livestock business with less risk

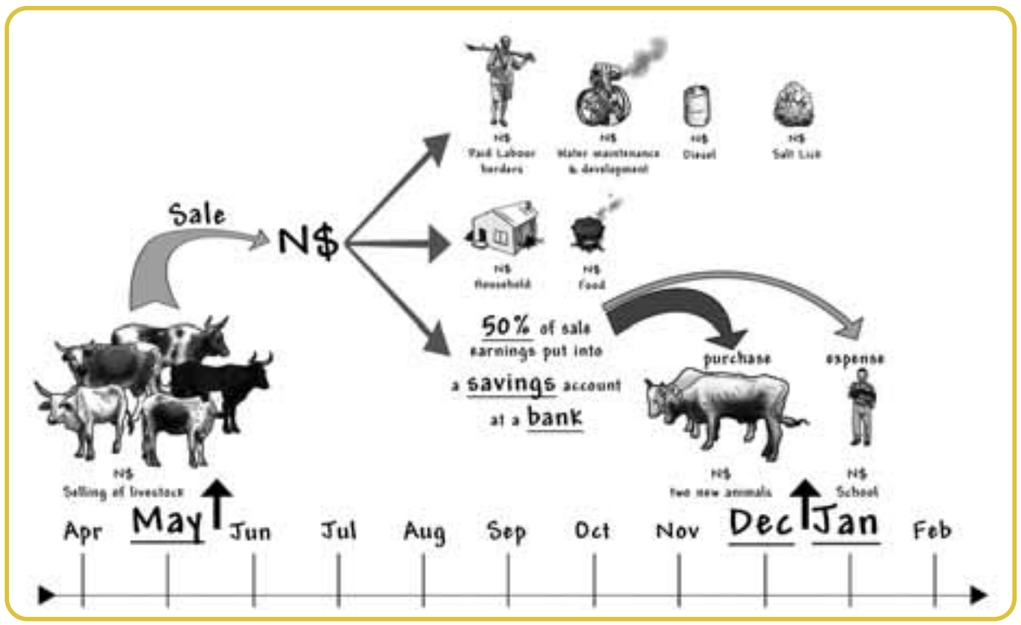


Illustration 67: It is important that farmers save some money when they sell some animals to de-stock so that they have money to pay for new animals later and for other expenses.

10.5 Who should sell first and how much?

The above paragraphs explain the advantages for individual farmers to reduce their animals in time when there is not sufficient forage for all the animals. If a group of farmers practice communal rangeland and livestock management the risk of over-stocking in years of poor rainfall can be very high and there could be some conflict over destocking and re-stocking animals. Grazing communities with years of experience in managing their grazing together say that it helped them to draw up rules for determining how many animals each livestock owner must reduce by when, when it comes to de-stocking. They consider who has very few animals and who has many; how easy it will be to re-stock with new animals later, and the impact on household security.

To avoid conflict all livestock owners of a grazing area should come together to discuss rules for de-stocking and re-stocking that take into account how de-stocking and re-stocking affects basic household security.

10.6 Where to sell animals?

Currently animals are sold in the following ways and places:

- Slaughter animals to small abattoir or butcher;
- Slaughter animals delivered to Meatco in Oshakati, and farmer paid after slaughtering;
- Slaughter animals bought by Meatco at local community loading facility and paid in cash;
- Individual slaughter animal (cattle and goat) sold alive to bush butcher or neighbour for cash;
- Heifers and cows and young oxen sold at community auction pen;
- Live animals sold at a permit day organized by a farmers' association;
- Live female animals sold from one person to another at the homestead kraal for breeding.

With so many options, each farmer has to calculate where they can get the best price, and the cheapest transport and sales commission. Each of these places has different customers (people who buy meat and sell it again) and consumers (people who buy meat and eat it). Each of the customers prefers a different type of meat and animal. Therefore it is necessary to understand what each customer is looking for, and how they value the animals.

10.6.1 Selling live animals

People who buy animals to graze on their land and to breed want healthy animals. They will also choose specific breeds, and will look at body shape (also called the 'build' or the conformation of the animal). If the animal looks sick or if they do not like the build, the buyers will offer a low price. Some farmers will also look at the udder of a cow to see if she produces enough milk, and if the teats are healthy so the calf can drink easily.

10.6.2 Selling for slaughter

The buyers from the formal wholesale businesses (such as Meatco) and butcheries and supermarkets usually grade the animal carcass by looking at three factors:

- Age of the animal (looking at the teeth);
- Fat on the carcass;
- Conformation or body shape.

The carcass is the dead animal body after the intestines, head, hooves and skin have been removed.

Photo 80: On the informal market the meat can be dark in color and the fat yellow and the meat is usually cut into pieces with an ax or panga

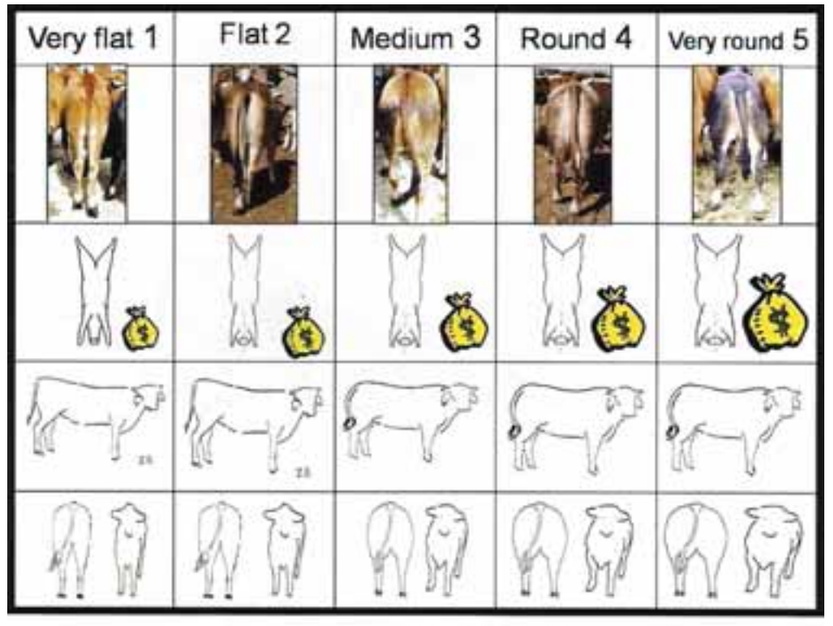
Younger animals usually get a higher grade and price per kg, and older animals a lower grade and lower price per kg. The supermarkets that sell to the consumers in big towns and cities in Namibia and South Africa usually want young animals that have soft, tender meat, not too much fat and meat that is pale red in colour. Local consumers in the communal areas and informal businesses often prefer fat, and do not mind if the meat comes from old animals with darker meat. They will pay more for this kind of meat, while a supermarket consumer will pay less for meat from an old, fat cow.

In supermarkets and for the export market, meat is sold in special cuts. Some consumers do not want bones with the meat, while others may prefer a whole piece of meat from the hind leg or the back muscle, to roast or cook in one piece. Others prefer only the meat from the back muscle with bones, but cut into T-bone steaks. These are called 'prime cuts'. Meat from the front legs and shoulder, the neck and the ribs is not generally sold in the supermarket.

Steaks with the loin (back string) and the fillet must have a lot of meat and some fat. This is why the shape or the form of the animal is graded as well. This is called the 'conformation' of the animal. If one looks at an animal from the back, it must not be too flat or thin because then the steaks will have lots of bone but not enough meat. The broader and rounder the animal looks from behind, the better the conformation and the price paid for the animal.

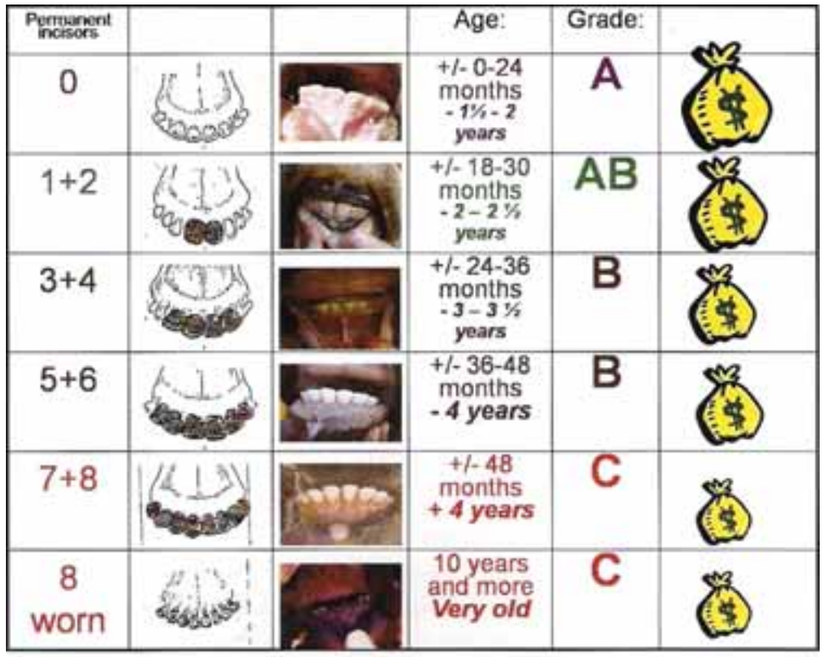
Many consumers in Namibia do not judge the conformation (the shape of the animal from the back) as particularly significant, but will look at the amount of bones and of meat. If there is too much bone and not enough meat, the quality of the carcass is less satisfactory.

If farmers want to sell livestock to the formal market the quality must be according to the customer's standards.



(source: Cheetah Conservation Fund)

Photo 81: A picture from the Livestock Marketing Training Manual published by the Namibia National Farmers Union explains the difference of conformation in cattle.



Grading of large stock (source: Cheetah Conservation Fund)

Photo 82: A picture from the Livestock Marketing Training Manual published by the Namibia National Farmers Union explains the grading and corresponding kg price for animals based on their age.

10.6.2.1 Subtractions

On the formal as well as informal markets, buyers look for injury or damage from having been hit with sticks, having had stones thrown at it, or from being bumped against the side of a truck. This meat has to be removed and cannot be sold to the consumers. Money is therefore subtracted for such injury. This is why it is important that we learn new ways of working with livestock so that it is not necessary to hit them, throw stones at them or make them afraid so they bump against hard surfaces.

All carcasses that are slaughtered in municipal and formal abattoirs are inspected by veterinarians who look for signs of disease that can cause illness in people. The most widespread disease is measles (a type of tape worm). The veterinarian can see small clusters of tape worm on the muscle of the carcass, and the meat surrounding it must be removed to make sure that people will not eat the parasite. Tapeworms are spread by people who use the bush as a toilet instead of pit latrines. The eggs of the worms survive on the grass, which is then eaten by livestock. The eggs hatch inside the animals' bodies. For this reason, people should use toilets with a deep hole to prevent the spread of disease to animals.

Because of the loss of meat that can be sold to the consumers, the wholesaler subtracts some money from the amount they pay the producer.

10.6.2.2 Carcass weight and price

Live animals are usually sold at a price per live kg weight, and slaughter animals for a price per carcass weight. The carcass or slaughter weight is roughly half the live weight, after the intestines, lung, head, hooves, skin and blood are removed from the body of the animal.

It is not only the fat, but also the total weight of the carcass that determines the price. Because it takes the same amount of work to remove the head, skin and intestines and other steps in slaughtering and packaging the meat of an animal, the labour and packing cost for each carcass is the same. However, the income for the trader in the wholesale business and in the retail shop is less, because meat is sold by kg and not by number of steaks or other cuts. Traders therefore judge that the farmer who delivers a smaller carcass of less than 215 kg should get less money per kg. In the past, the difference of price paid per kg for smaller carcasses and carcasses weighing more than 230 kg was considerable. Since 2008 though, this difference has become smaller. Now farmers who deliver smaller animals but with a good grading (not too old, and with some fat and good conformation) are not losing total income any longer, if they sell more animals.

Thus it is the total kg of meat that the farmer sells that determines his total income and profit, not the size and weight of the individual animal.

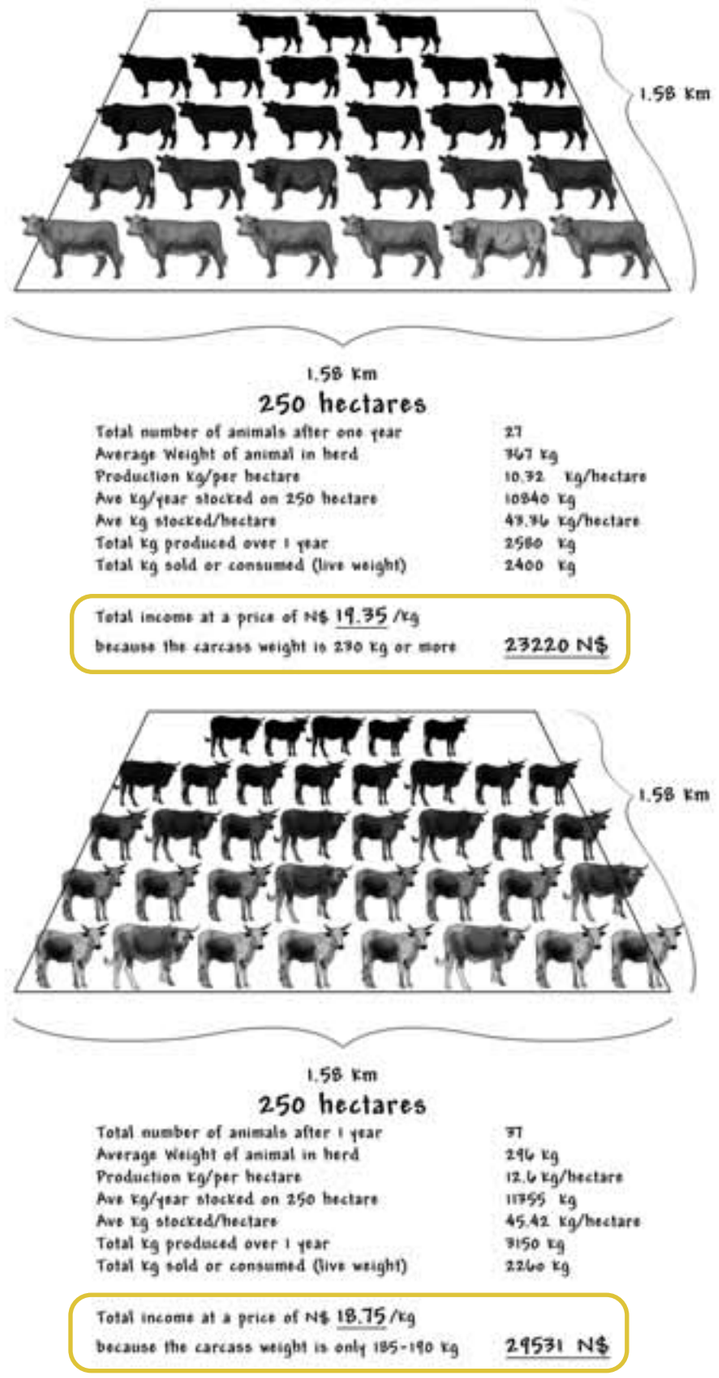


Illustration 68: The income from larger framed animals is not necessarily greater than when one farms with smaller framed animals. Because more animals can live from the same area of land more animals can be sold, even if the price per kilogram is lower.

10.6.2.3 How much money does the farmer actually get when selling livestock

At an auction, the seller and the buyer usually have to pay a commission for using the facilities and to pay for the services of the agents who arrange the sale. The buyer has to pay for the transport from the auction pen, but the seller has to bring the animals to the auction pen on foot or by truck. All these costs must be deducted from the sales price in order to calculate the real income.

10.7 What other markets can be found?

If farmers feel that they do not receive a fair price for their animals, they can look for new customers. However, it is important not to neglect old customers because they have many years of experience.

It is not only important to consider the price, but also the timing of payments. Some agents who buy animals promise to pay once they have sold the meat, but it may be a very long time before they pay the farmer.

The cost of organizing the sale of animals and transporting them is normally cheaper per animal and per farmer if many farmers bring their animals together on the same day and to the same place. Working together can save farmers a lot of money and effort, and they will also attract better customers. Farmers' associations can come together to form a marketing cooperative that offers similar services to formal organizations such as Meatco.

It is more important to know that someone will definitely buy the animals than to hunt for the best price at a particular time. Marketing businesses such as Meatco and Agra, as well as small butchers, need a regular supply of animals. If farmers chop and change between customers depending on the price offered, the customers can't be sure of supply. Shops selling meat to end consumers have to be sure that they always have meat for people to buy and eat. They will then buy from those farmers and butchers who regularly and reliably deliver animals and meat. This is why some marketing organizations like Meatco offer farmers a bonus payment if they sign a contract in which they promise that they will deliver their animals to them and not to another agent.

10.8 Adding value to animals

All these ways of selling only pay the farmer money for the animal. The further slaughtering and processing of the meat is done by people outside the farmers' community. More money could be earned by the community if they slaughtered the animals themselves and sold and processed some of the meat. Processing meat can mean cutting it into smaller portions for the consumer; cooling and packaging it so it can be stored; making dried meat (biltong); making sausages, or cooking meat and selling it 'ready-to-eat' to customers.

The place where meat is cut and prepared as different products must be very clean so that germs cannot multiply. If people eat meat with germs they can become very ill and even die. Therefore there are strict rules for shops and for small factories that process meat. These are called 'food safety regulations'.

To provide hygienic conditions for preparing meat as a safe, ready-to-eat product, it is best if a group of farmers and community members come together to start a business. The building and the tools are often more expensive than a single household or farmer can afford. Investing together in the start-up of the business, and sharing the work and the profits, are good ways of bringing employment and income to the community.

To obtain satisfactory selling conditions and prices farmers must understand the needs of all the people and organizations involved in producing, selling, buying and consuming livestock and meat.

10.9 Transporting animals to different markets

If farmers are paid by weight of the animals, it is important to look at how much weight the animals lose while walking or riding by truck to the place of sale where they are weighed. Animals lose weight when they are stressed or uncomfortable. Lack of water, lack of grass and standing in pens for a long time all can lead to weight loss. It is therefore sometimes better to trek the animals on foot. However, here it is also important that the animals get enough water at least once a day and that they have enough time to graze while walking.

The farmers should choose a route where the neighbouring communities know that the herders and animals are coming through and will not chase them away.

It is also important that the herders do not use sticks or stones to drive the animals, because this will lead to muscle damage, and farmers will get a lower price.

Wealthy farmers often make use of trucks. However, one should consider that the price of diesel is expected to increase in the years to come. If communities want to be less dependent on big trucks, they should re-learn the art of trekking animals over a distance. Even commercial farmers in Namibia trek animals to save on transport costs.

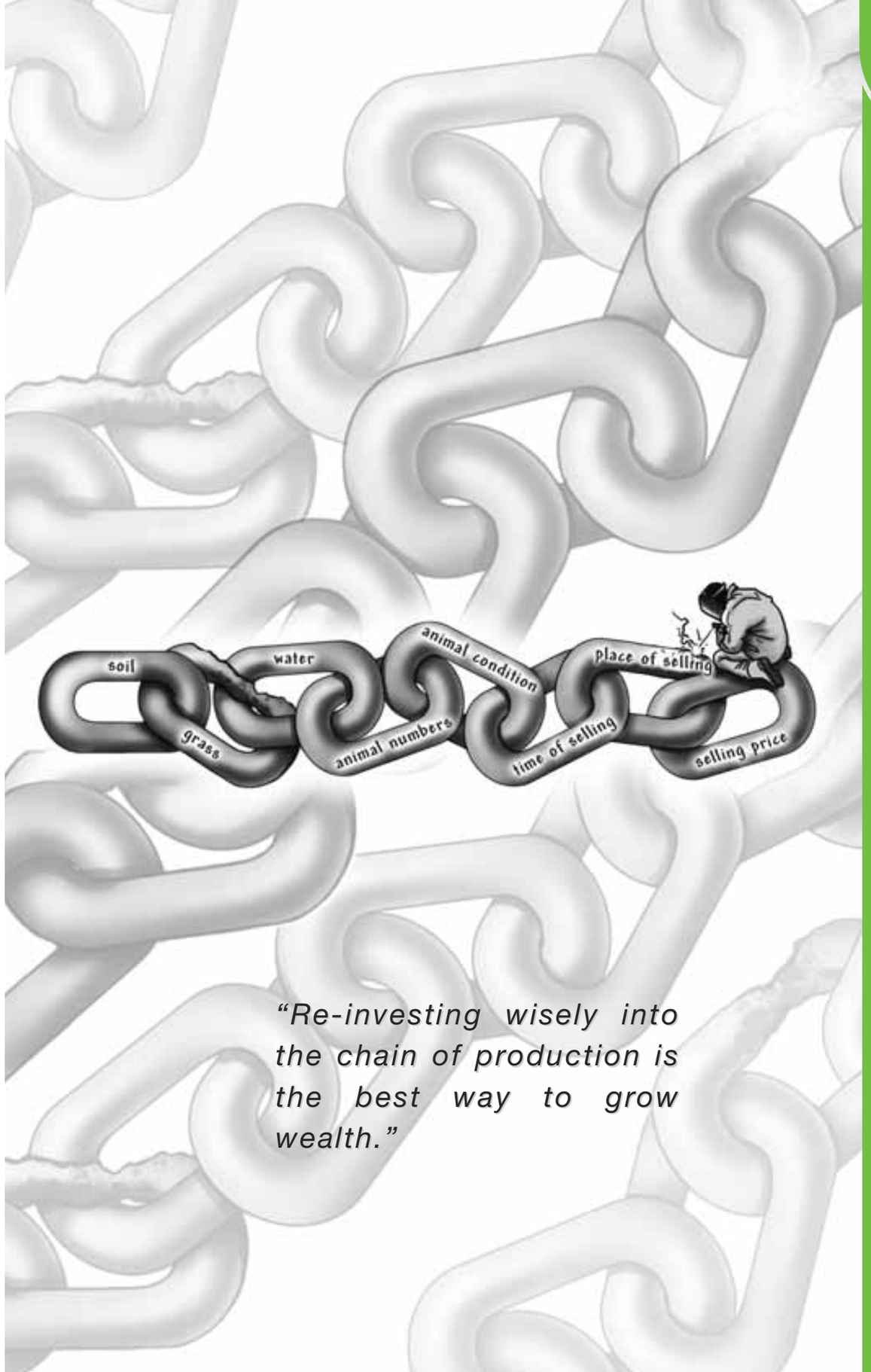
Farmers who plan the grazing in their area can prepare for trekking animals to the market place by keeping animals away from a wide strip of grazing to be used during a trek. They can offer this path to their neighbours as well, and when they

need a similar favour the neighbours will be more likely to help.

If the distance is not too great, farmers may even offer to trek the animals from the kraal where they are sold to the new owner's farm or to where the animals will be slaughtered, and can charge a fee for this trekking service. In this way the community can earn an extra income that otherwise would be spent on diesel and truck services.

Illustration 69: The decision to trek animals or taking them to the auction or abbatoir by truck requires the comparison of many different factors.

Well thought through marketing of livestock is a good opportunity to improve both the income of livestock owners and the quality of the animals the farmer keeps and it helps to reduce the risk of loosing livestock when there is insufficient forage. Farmer should not leave this important task to buying agents alone, but should get involved themselves to make sure their needs are respected.



Each person, household and culture may have a different idea of what it means to be wealthy. Let us agree that wealth means having enough of all the things we need, want and like, and that we do not have to worry that we will not be able to pay for something we may need in the future.

People may be afraid to keep a lot of money at home, and may choose to save it with a bank or buy things they can sell one day for lots of money. However, the value of money and of things does not stay the same – it usually goes down. The following is an example of how the price of unsifted maize meal has increased from 2001 to 2010:

	2001	2004	2010
10 kg unsifted maize meal	N$ 16.28	N$ 24.55	N$ 46.30

Because the value of money changes, we must look at the other assets we have that support us. As farmers we have many valuable things that help us to have a good quality of life and that make our business strong. Therefore we measure our wealth not only by the financial profit we make, but also by looking at what we own, such as livestock. The size and composition of the herd can change from one year to the next according to rainfall, but how we manage the animals and the grazing can remain similar. We can give a money value to the livestock to see if the total production value of the herd is growing over time or not. To measure the success of our management (and not the market price trends) the same average value is taken for each class of animals at the beginning and at the end of the period of measurement.

The formula to calculate the change in value of all our livestock can be done by counting the animals each year at the same time, comparing the number and classes of animals, and giving a value to each of the classes. This is called stocktaking. With individual livestock the value should be the same, even if the market price for meat changed during the year. This is purely to measure the effect of grazing and livestock management and not the actual financial value of the animals, as this depends on the market situation which changes over time.

Formula:

End stock in different classes

-

beginning stock in different classes

=

number of animals in different classes.

If the result is negative, this means that there were fewer animals at the end of the year than at the beginning of the year.

To see the money value of the livestock business, we can use the formula on the next page:

Money alone is no guarantee for happiness, health and success. If we do not have supportive friends, neighbours and relatives, healthy land, enough fresh water, good grazing and wildlife, we, our children and grandchildren will suffer. Our quality of life is a bit like a three-legged pot: for a good life now and in the future, it is important that all three legs of the pot are strong.

- The relationships with other people, our family, relatives, employees, neighbours and community members can support us to survive difficult times and to become more successful in good years.
- Nature, soil, plants, animals can help us to produce food and water and air for which we do not have to pay money.
- Money and trading.

Illustration 70: A balanced life is supported by social, economic and natural resources

If one of the legs is shorter because it receives less attention or because it is badly managed, the whole pot will fall over regardless of how strong the other legs are.

As well as managing our money well, we also have to learn what nature needs, and particularly what soil and grass plants need to provide food and water every day for animals and people. We need to understand that we can change the circumstances of how much grass grows and how well the animals perform.

Example calculation of the money value of a herd of cattle

	Beginning of the year			End of the year			
Class of cattle	**Nr of animals in this class at the BEGINNING of the year**	**Average Value of each animal in this class in N$**	**Value of all animals in this class in N$**	**Nr of animals in this class at the END of the year**	**Average Value of each animal in this class in N$**	**Value of all animals in this class in N$**	**Gain or loss in value of animals in this class in N$**
cows	50	4,000	200,000	58	4,000	232,000	**32,000**
heifers 2 years and older	13	3,000	39,000	15	3,000	45,000	**6,000**
heifers 1-2 year old	17	2,000	34,000	18	2,000	36,000	**2,000**
oxen 2 years and older	14	3,500	49,000	18	3,500	63,000	**14,000**
oxen 1-2 year old	18	2,000	36,000	16	2,000	32,000	**-4,000**
calves up to 1 year	36	1,500	54,000	39	1,500	58,500	**4,500**
Bulls	2	6,000	12,000	2	6,000	12,000	**0**
Totals:	**150**		**424,000**	**166**		**478,500**	**54,500**

The herd has grown and is worth N$ 54 500 more than at the beginning of the year.

Even when the value of money goes down and it costs more to buy bread or new tyres for a car, the value of healthy land and livestock will remain high, because it can help us meet our basic need for food, water, shelter and more.

11.1 How can farmers increase profit and wealth?

If farming is our business, the money we use for buying telephone credit, materials to build a house or school fees comes from the profit of the produce we sell. To keep the business healthy however, it is not the income, but the profit of each of these enterprises that we should use to pay for household expenses.

The example on the this page is of a household where people are not paid for their labour. Therefore the production (or input) costs are low. If they want to make sure they have enough money to pay for the production costs of the following year, it is important that they do not spend their

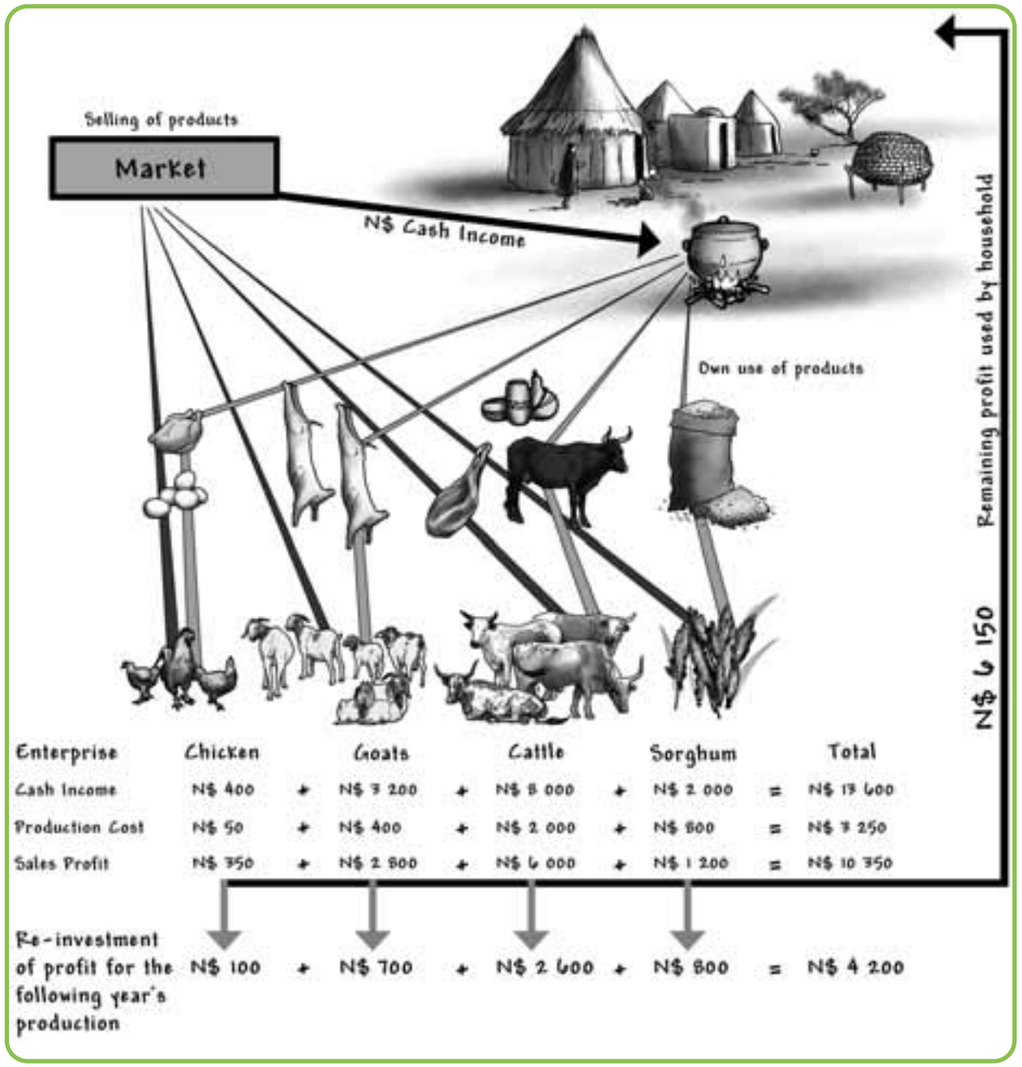


Illustration 71: Re-investing a part of the profit into next year's production strengthens the business of farming

total income, or even their total sales' profit, on household costs.

Some of the sales profit can be used to pay for farming improvements to increase the income next year, such as the herder's salary, to make sure more goat kids survive and can be sold. These improvements in our own businesses are not merely expenses, but are an investment.

We may think if we bought more animals, herd production (and our income) would increase. However, this is not necessarily the case. We would spend more money, but another problem could be making overall production weak. Spending money on improving the manage-ment of the animals and the grazing could increase the natural production of the female animals we already have.

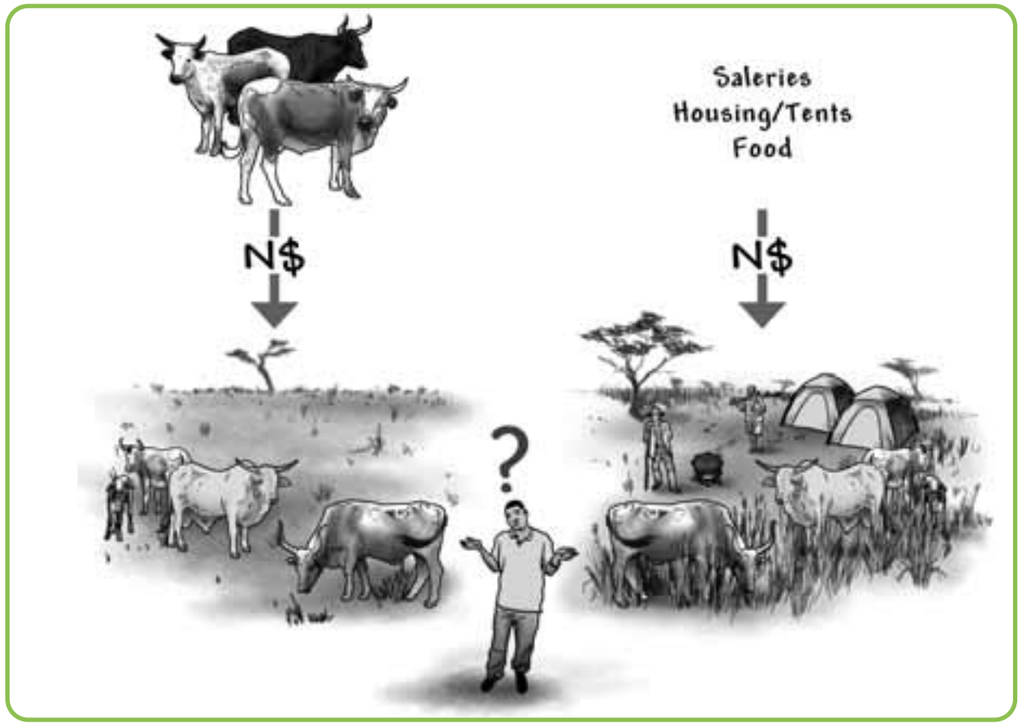


Illustration 72: Investing money in the livestock business requires carefull thinking of what the natural environment needs to support livestock.

When the grazing has improved and the farmer sees that there are not enough animals to eat it all, then is the time to increase numbers of livestock.

"We can all benefit if we work together."

While all people have the same basic human needs – for food, shelter, water, security, respect, achievement, community and joy – each person, household or community chooses different ways to meet those needs. Some people grow their own food, others buy it in shops and still others go to restaurants to get food. Everything we do is an attempt to meet a need, and there are several strategies to meet the need for food.

Livestock farmers who want to meet their need for security and wealth can choose from a variety of strategies.

One farmer may want to keep all his livestock every year, even the weak and non-performing animals, to make sure that as many animals as possible survive a bad year.

Another may want to look at how much grass is available after the rainy season, and if there is not enough forage to last the animals through the winter, he may decide to sell some early in the dry season when the animals are still in good condition.

A farmer may want to keep all her animals and to buy hay and pods when there is not enough food for the animals anymore.

Another farmer may want to ask a relative if he can take some of his animals to the relative's grazing area when there is no longer enough forage.

Each of these farmers chooses livestock to provide security and wealth. They each want a strategy for keeping their animals alive. But each farmer wants a different strategy for keeping as many animals as possible alive through the winter and the drought. These different strategies can create tension or even conflict when farmers are practicing communal rangeland and livestock management. Therefore many farmers are looking for ideas from outside.

Many commercial and communal farmers follow tradition. Others seek advice from agricultural extension services, or study agriculture and follow suggestions found in books and magazines. Some farmers have been on exchange visits and have seen new ideas implemented by other farmers. These are all good ways of collecting ideas for different ways to improve life.

While we hope to find good advice, as human beings we also do not like being told what to do, and prefer to make our own plans and decisions.

Also, the advice or the best practice that worked very well in somebody else's life or in another community may not always be the best option for another community. So, what can farmers do to make sure they choose a strategy that will work well in their circumstances?

In Namibia each region has its own soil, rainfall conditions and plants. The people in each of these areas have specific traditions that serve them well. Working together can offer further improvement to the individual strategies that farmers have developed.

12.1 Working together

When farmers decide to work together to improve the rangeland and livestock in their area, it is possible that they will disagree on the best strategy. It is not necessary that the strategy is perfect for each person. The strategy or action must be acceptable enough so that everyone can at least live with it. Sometimes a lot of discussion and learning is necessary to understand what the advantages are for all the various members. Also those things that do not have a voice, but that support people have to be considered: the soil, the plants and the animals. If people listen to the needs and support nature, nature can support people so much better.

This way of coming to agreement in a group is called 'consensus':

not necessarily agreeing on everything, but everyone being comfortable enough with the strategy to live with it and not to fight it.

12.1.1 Roles & responsibilities

People who are responsible for livestock and grazing on a daily basis can make the most practical decisions for everyday management. They need the support of traditional authorities, community leaders and other stakeholders. Thus when farmers make decisions they should inform their traditional authorities, in order that a deeper understanding can grow between farmers and traditional authorities, as well as other representatives such as the conservancy committee in the community, if there is one.

Traditional authorities and other stakeholders can then take the needs of the grazing area members into account when they make decisions that affect the conservancy or community forest. In this way every group manages their own responsibilities and takes into account the needs and impacts of their decisions on others, without everyone having to do everything together.

There is a way that groups and individuals can make sure they are considering all the various aspects that are important and that support them. The following is an example of evaluating actions and strategies that has helped thousands of farmers in commercial and communal lands:

12.1.2 Maintaining the balance

As said earlier a good quality of life is supported by three main resources:

- supportive relationships with people;
- a healthy environment; and
- enough money.

These resources are like the three legs of a pot in which food is prepared. Every household or community may like different meals, but each of them uses a pot for it.

Making wise decisions is like making sure that the right ingredients are sifted and only those that serve the good life of that specific household are put into the pot. To make sure that this good life is well supported, any strategy or decision a farmer takes should strengthen all three legs of the pot at the same time. People can ask themselves:

- Does the plan or the strategy strengthen the relationships between people in the community?
- Is it good for the environment?
- Does it satisfy our need for enough money to buy the things we need?

It is also important that the people who take the decisions agree on what they want to achieve. Being clear about the purpose of farming helps farmers compare different strategies and see which strategy will bring them closer to the quality of life they want.

This is like agreeing what meal to prepare. The people cooking the meal must choose the right ingredients for what they want to cook. To test if an ingredient is the right one for their dish, they can ask each other questions to make sure they think of everything that is important.

By considering how an action will affect the resources and what is important to the people, decisions can be taken that create satisfaction and good quality of life for all involved, now and in the future.

12.1.3 What to do when there is disagreement and conflict

Conflict is more likely to come from deciding how to do something than from deciding what we want to achieve.

In a grazing area it may be that all livestock keepers except one want to cooperate and manage the livestock and grazing together. The one farmer is not prepared to join the group. She may feel the need to make her own decisions. Even if her animals are not in the best condition, she cannot see how working with the other farmers will be in her interest.

It can help to remind ourselves that often when there is a conflict, the various groups probably want the same thing but may choose a different way to get it. Listening to the other person and trying to hear what they need can greatly improve understanding. When people feel that another person has really heard them and understood what they have said, they are much more likely to amend their strategy for getting what they want.

Often people cannot hear these needs when they feel angry, hurt or disappointed. Groups can invite a facilitator or mediator who does not take sides and who has the skills to listen and help people express what they need in a way that does not offend the other person. Together they can then work out strategies that serve everyone. The facilitator can be a local leader or elder, or a trusted person from outside the community. An effective facilitator is not afraid when people are angry or frustrated, or when they do not want to speak out. It is the role of the facilitator to help people express what they need in a way that does not threaten or scare other people.

If a livestock owner does not want to cooperate, there is always a reason, and it is fruitless to force them to join the group. With the help of the traditional authority and local leaders, the group should negotiate grazing and water-use rights with them, and explain that they can join the group at a later stage.

Experienced grazing groups have found it useful to draw up rules when new people want to join them. These rules could include what time of year animals may join the group herd. During exchange visits with experienced grazing communities, more rules can be discussed and each grazing area can then adapt them to their own situation.

When people understand that these rules are there to support nature and to make everyone's work easier, they seldom resist. Reaching an understanding requires a lot of patience and calm communication. It is not possible to demand ongoing cooperation from others.

Ongoing cooperation usually comes naturally when people understand, accept and trust that their needs are met by working together. In communities it is important that some rules are made and enforced in the interests of the majority.

"Reading and recording what we observe on the land, in our relationships and on our financial records helps us to know where our next efforts are needed."

13
Learning from experience – monitoring what is happening

The question is: what can farmers observe to give them early signs of success, or warnings of possible problems? How do farmers know that an improvement has been made to their quality of life, their rangeland or their livestock? In the previous chapters various ways of monitoring were mentioned. Collecting information and comparing it to the previous year can help farmers to ask the right questions about what needs to change in order to come closer to their goals.

Change on the land and with the livestock does not happen overnight. It may be years before we really see the level of success achieved. Working with nature requires patience.

We may blame poor rains for weak production in our animals. Some farmers have started to measure and note rainfall to make decisions about how many animals they will keep.

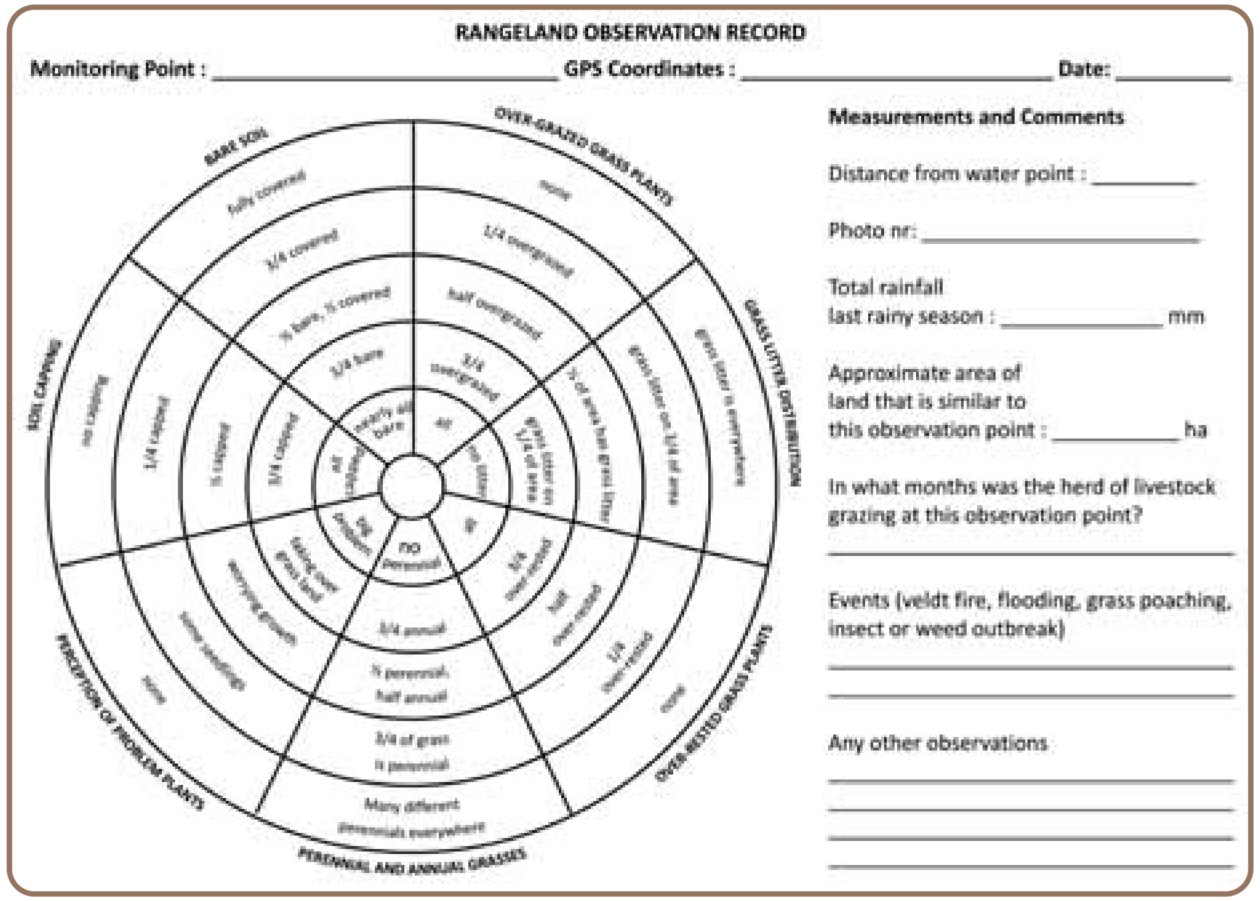
While knowing the amount of rainfall is important, there are farmers who realize that even when rains have been good, grass hasn't grown as well as they expected.

Other farmers have observed that after they started to herd their animals according to a grazing plan, the grass grew well even when rainfall had been below average for the area.

Looking at the soil surface is an indication or sign of what is likely to happen with the water that has soaked into the ground from the last rainy season. If the soil is covered with dead plant material and live plants, less water will evaporate from the ground and it can support growth even in winter or before the next rainy season. The soil cover will also be an indication of what is likely to happen to the water that comes with the next rain. Will it run off from bare soil, or will it fall softly on plant litter and soak into the ground?

Photo 83: Rainfall gauge

Photo 84: Not only looking at but feeling the soil can help farmers monitor the early changes on rangeland.



Rangeland observation records can be documented in this form.

13.1 Rangeland observations at fixed points

The above is a monitoring form that helps farmers, on which they write down the amount of bare ground and covered soil surface they see. The CALLC (Capacity through Local Level Coordination) program in the Ministry of Agriculture, Water and Forestry and the Ministry of Environment and Tourism can assist with guidelines on how to use the record and monitoring forms. The observations should be done at fixed points. Every year the farmers would go to the same place, marked by a metal pole for example, to observe the environment, take measurements and write these down. They compare these observations with those from previous years. The comparisons can tell the farmers if they are moving closer to the kind of landscape they are hoping to create, or if the land is becoming poorer.

Looking at the different kinds of plants, and recording new ones and how they grow is another important way of noting changes in the environment. For instance, when farmers start to concentrate their animals together and move them frequently, there may be more annual grasses and weeds such as paper thorns. The hooves of the animals plant the seeds, and the rain water and dung supports the first growth. However, the condition in the soil still has to be improved before perennial grasses can survive. Farmers can take photographs and fill in forms to compare one year to the next.

Illustration 73: Marking fixed observation points by driving a painted metal post into the ground

Illustration 74: Taking photographs at the marker in the same direction every year helps us to see if and how the plant composition is changing.

The following pictures were taken on the left and the right side of a road.

Photo 85: Area on the one side of the road where herd was not concentrated.

Photo 86: Area on the other side of the road where livestock moved between the grazing area and the waterpoint.

The following example shows the same place in the veld in three consecutive years, and how it changed.

Photo 87: Fixed point photograph of a piece of land before it had animal impact.

Photo 88: Fixed point photograph of the grass growth after the place had a lot of animal impact when it was used to kraal animals for a few days.

Photo 89: Fixed point photograph after the second growing season after the place had been used as a temporary kraal.

Comparisons provide information for making changes in land management. For example, if there is no plant litter on the ground, there will be less water available to perennial grasses to grow early the next spring. It may mean that animals are not only eating the standing grass, but also the dry leaves on the ground. This is usually an early sign that there are too many animals searching for food. To prevent the animals starving and the soil from becoming bare, the farmers can decide to reduce the number of animals. Rather than only looking at the condition of animals and waiting until they become thin, the farmers can reduce their numbers early because they have already seen the signs on the ground, with dry plant litter eaten and bare soil between plants. Reducing the number of animals early in the dry season can help

with keeping some dead grass, to be trampled and form a protec-tive blanket on the ground before the next rain falls.

Farmers may observe that the number of perennial plants at the observation point is declining over the years. The reason could be that the plants have been overgrazed; that animals have stayed too long in the same area, or that they returned too soon after having grazed there. The herders can then see that they need to allow more time before returning.

When livestock owners and herders observe the soil, plants and animals and consider the possible reasons for any changes they see, they are more likely to find a solution to the problem. They will more easily understand each other and co-operate, having seen the warning signs in nature. Comparing results from one year to the next can be very encouraging for farmers when they are not convinced that their efforts are worthwhile. Making these observations and recording them is a very powerful way of becoming more confident about the choices made, and in this way, farmers become less dependent on outside help or advice.

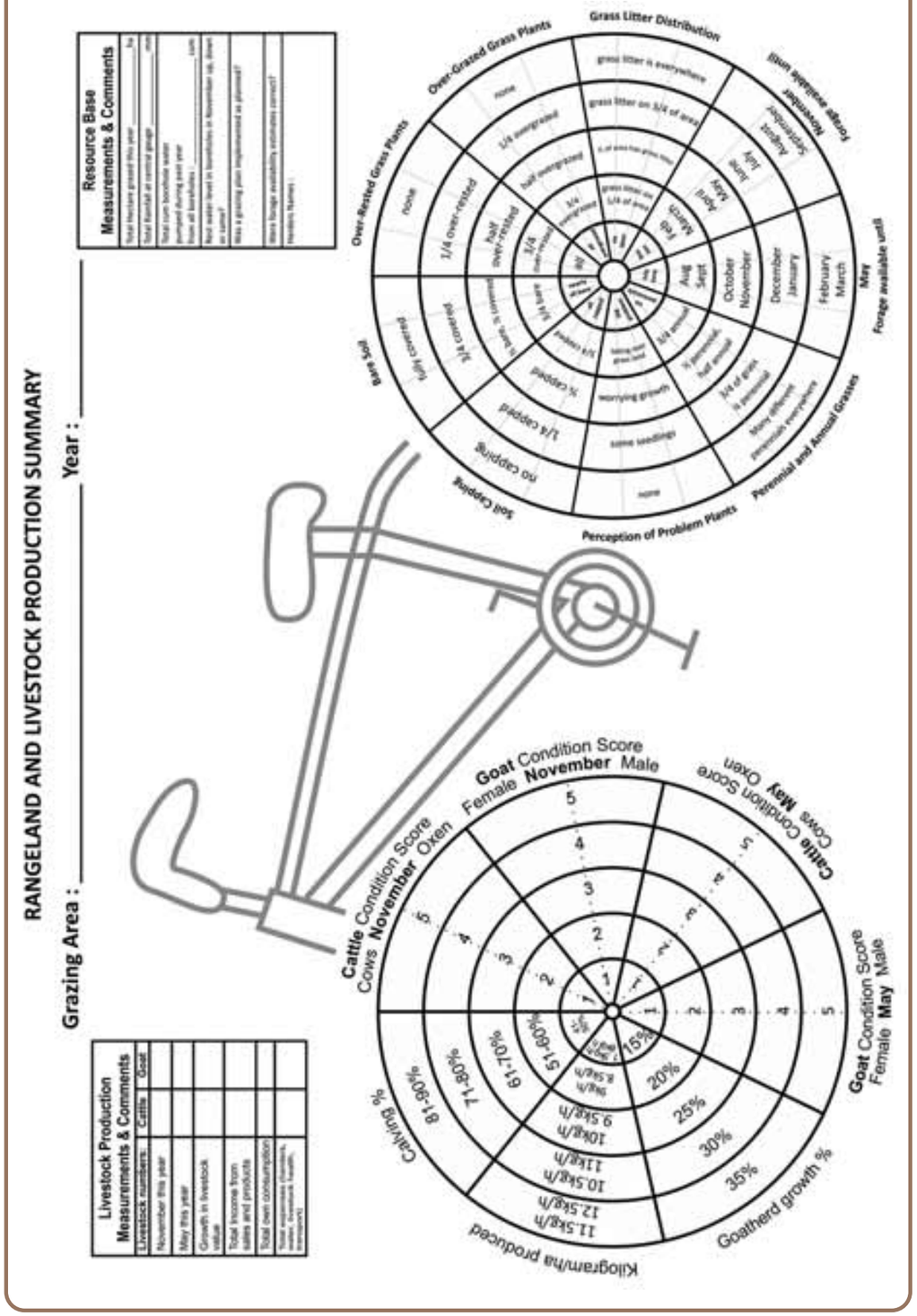
Basic local level monitoring should include at least the following:

- **Rainfall**
- **Soil surface condition**
- **The health and number of perennial grass plants**
- **The number and condition of livestock.**

13.2 Integrating rangeland, livestock and financial records

The following monitoring form was designed to help farmers assess the progress they made through Community Based Rangeland and Livestock Management. Guidelines for using this form can be obtained from agricultural extension technicians in the Ministry of Agriculture, Water and Forestry.

Rangeland and livestock improvements take time. Successful farmers report that they made several mistakes to begin with, and that they continually find better ways of farming. It is important not to give up when something does not work immediately, but to learn from the mistakes, to plan and to record all changes so that the next generation can also learn. By combining observations of social and economic factors and of the health of the land and of animals we can see where improvements in planning and management are needed. It is also a good way to see and to celebrate progress!



The following books have been used to inform content and illustrations:

Grass Roots Restoration
– Holistic Management for AfricanVillages, written by Sam Bingham, co-published by Africa Centre for Holistic Management and Holistic Management International 1997

Living from Livestock
– written by Sam Bingham, Eddie Lee, Rex Lee Jim and the Rock Point Range Management Project, USA, 1984

Holistic Management – A new Framework for Decision Making
- written by Allan Savory with Jody Butterfield, Island Press, 1999

Community-Based Training in Holistic Land Management - Master Trainer's Guide 2010
- produced by Africa Centre for Holistic Management

Basic Veterinary Manual for Communal Livestock Farmers of Namibia
– compiled by Dr Muradzikwa with Dr Alexander Toto and Dr Flavie Goutard for the Ministry of Agriculture, Water and Forestry, Directorate of Veterinary Services, Namibia

Animal Health
– compiled by Dr Axel Hartmann for the Joint Presidency Committee (Namibia Agricultural Union and Namibia National Farmers Union)

Grass-fed cattle – How to produce and Market Natural Beef
– written by Julius Ruechel, Storey Publishing, 2008

The Holistic Alternative – A guide to cattle farming in South Africa
– written by André Mentz, Pula Books, 2009

For the Love of Land – Global Case Studies of Grazing in Nature's Image
– written by Jim Howell, Booksurge, 2008

Training Manual – Livestock Marketing in Namibia
– written by Bertus Kruger and Laura Lemmerts-Imbuwa for Namibia National Farmers Union, 2008

Local Level Monitoring for enhanced decision-making: Farmers Field Guide
- written by Bertus Kruger. Desert Research Foundation of Namibia. Windhoek, Namibia 2005

Monitoring Rangeland Health, A Guide for Pastoralist Communities and Other Land Managers in Eastern Africa Version II
– written by Corinna Riginos and Jeffrey Herrick

Grasses of South West Africa / Namibia
- written by M. A. N. Müller with illustrations by B. Loutit.

Low Stress Cattle Handling
- written by Guy W. Glosson, 2007

Sample Designs of Cattle Races and Corrals
- written by Dr Temple Grandin, 2010

Moving 'Em - A Guide to Low Stress Animal Handling
- written by Burt Smith, Ph.D. (College of Tropical Agriculture and Human Resources, University of Hawaii) 1998

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