

**AT** MICROFICHE  
REFERENCE  
LIBRARY

A project of Volunteers in Asia

Better Farming Series No. 11, Cattle Breeding

Published by:

Food and Agriculture Organization of the  
United Nations

Via delle Terme di Caracalla

00100 Rome

Italy

Paper copies are \$ 1.50.

Available from:

UNIPUB

P.O. Box 433

Murray Hill Station

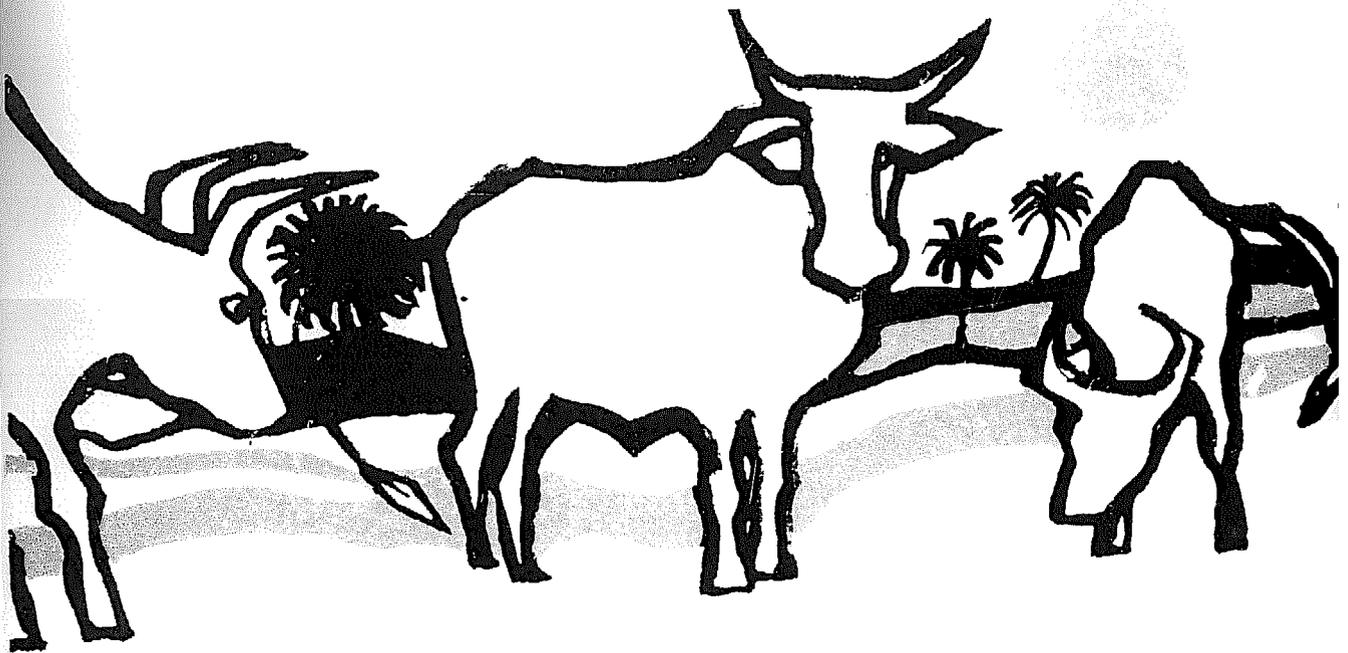
New York, NY 10157 USA

Reproduced by permission of the Food and  
Agriculture Organization of the United Nations.

Reproduction of this microfiche document in any  
form is subject to the same restrictions as those  
of the original document.

1977 edition

# **cattle breeding**



## **BETTER FARMING SERIES**

Twenty-six titles have been published in this series, designed as handbooks for a two-year intermediate level agricultural education and training course. They may be purchased as a set or as individual documents.

### **FIRST YEAR**

1. The plant: the living plant; the root
2. The plant: the stem; the buds; the leaves
3. The plant: the flower
4. The soil: how the soil is made up
5. The soil: how to conserve the soil
6. The soil: how to improve the soil
7. Crop farming
8. Animal husbandry: feeding and care of animals
9. Animal husbandry: animal diseases; how animals reproduce

### **SECOND YEAR**

10. The farm business survey
11. Cattle breeding
12. Sheep and goat breeding
13. Keeping chickens
14. Farming with animal power
15. Cereals
16. Roots and tubers
17. Groundnuts
18. Bananas
19. Market gardening
20. Upland rice
21. Wet paddy or swamp rice
22. Cocoa
23. Coffee
24. The oil palm
25. The rubber tree
26. The modern farm business

# **Cattle breeding**

**Published by arrangement with the  
Institut africain pour le développement économique et social  
B.P. 8008, Abidjan, Côte d'Ivoire**

**FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS**

**Rome 1977**

First printing 1977

ISBN 92-5-100151-0

© French edition, Institut africain pour  
le développement économique et social (INADES) 1971

© English edition, FAO 1977

## **PREFACE**

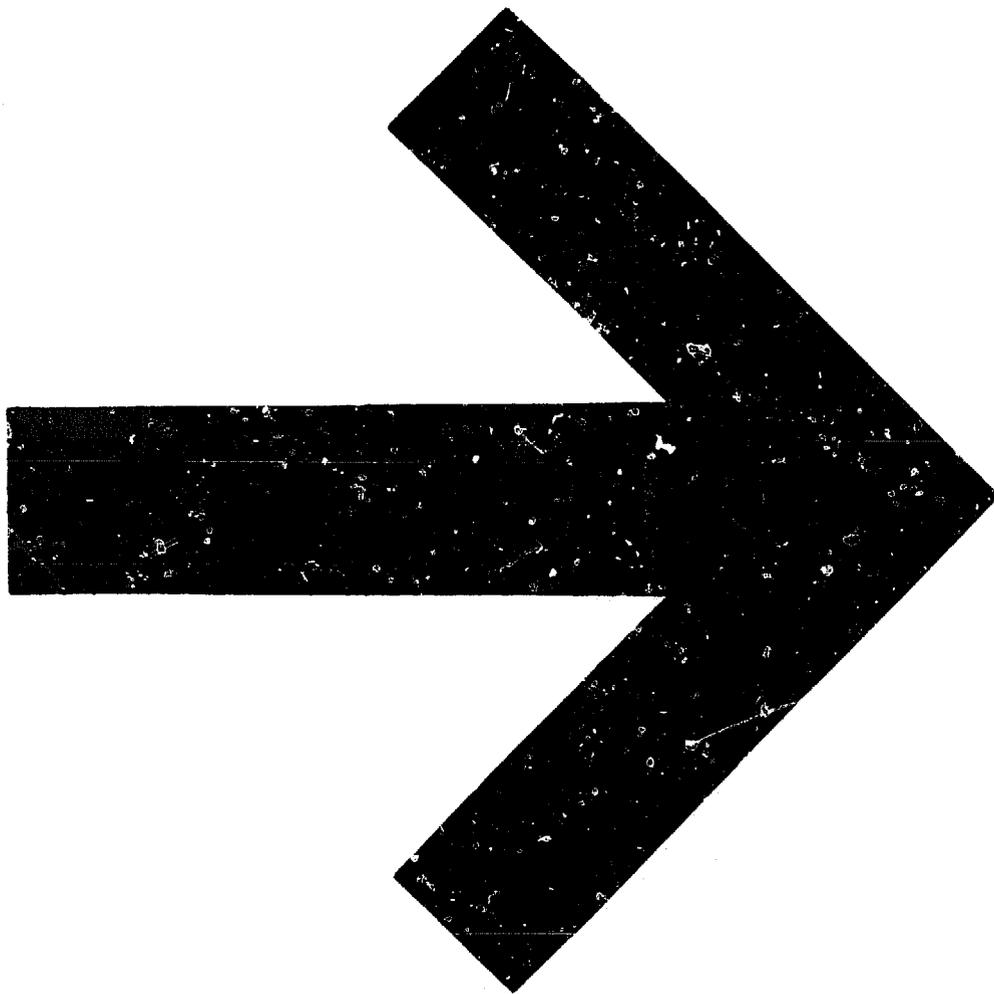
---

This manual is a translation and adaptation of "L'élevage des bovins," published by the Agri-Service-Afrique of the Institut africain pour le développement économique et social (INADES), and forms part of a series of 26 booklets. Grateful acknowledgement is made to the publishers for making available this text, which it is hoped will find widespread use at the intermediate level of agricultural education and training in English-speaking countries.

The original texts were prepared for an African environment and this is naturally reflected in the English version. However, it is expected that many of the manuals of the series — a list of which will be found on the inside front cover — will also be of value for training in many other parts of the world. Adaptations can be made to the text where necessary owing to different climatic and ecological conditions.

Applications for permission to issue this manual in other languages are welcomed. Such applications should be addressed to: Director, Publications Division, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, 00100 Rome, Italy.

The author of this English version is Mr. A.J. Henderson, former Chief of the FAO Editorial Branch.



# OUTLINE OF COURSE

---

<b>Cattle breeding means wealth .....</b>	<b>2</b>
<b>A few words to understand the course .....</b>	<b>3</b>
<b>● Feeding cattle .....</b>	<b>4</b>
How cattle feed .....	5
How to feed cattle .....	9
Improving pasture .....	12
Storing grass .....	13
Feed supplements .....	16
Mineral supplements .....	17
Daily requirements of cattle in feed units and protein .....	18
Watering cattle .....	19
How to feed calves .....	21
<b>● Looking after cattle .....</b>	<b>24</b>
Animals must be watched .....	24
Housing animals .....	27
The health of the herd .....	31
Diseases .....	31
Cattle must be vaccinated .....	37
How to take care of wounds .....	38
What to do about parasites .....	39
<b>● How cattle reproduce .....</b>	<b>41</b>
The reproductive systems .....	42
Pregnancy and birth .....	44
Age of breeding animals .....	46
Castrating bulls .....	47
Choosing breeding animals .....	48
How to know your herd .....	50
<b>● What cattle produce .....</b>	<b>53</b>
Meat production .....	53
Milk production .....	56
<b>● Organizing sales .....</b>	<b>58</b>
Farmers' groups .....	60
<b>● Suggested question paper .....</b>	<b>61</b>

# **CATTLE BREEDING MEANS WEALTH**

## **In traditional breeding**

not much trouble is taken with the herd.

The herd is not a means of earning a living,  
but a sign of wealth and power.

The owner wants to have a lot of animals,  
but many of them are small, ill,  
or very old and thin.

In traditional breeding the herd  
is **wealth that produces little.**

To make the herd produce more,  
a different way of working is needed.

## **A modern farmer**

should learn to

- feed his animals well;
- house his herd well;
- take good care of ill animals;
- make a good choice of breeding animals;
- sell at a good price.

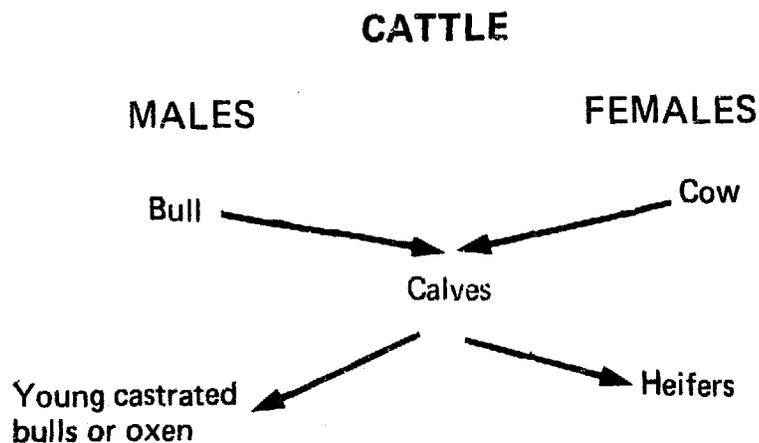
**Cattle breeding is wealth;  
it is capital  
that can produce a lot.**

## A FEW WORDS TO UNDERSTAND THE COURSE

Mamadou is happy to show us his animals.  
He has a fine herd of **cattle**.

**His herd of cattle consists of:**

- 1 male: the male is called the **bull**.
- 8 females which have already had young ones:  
the mother females are called **cows**.
- 6 young ones of less than 6 months:  
they are called **calves**.
- 4 young females which have not yet had calves:  
they are called **heifers**.
- A pair of **oxen** for ploughing.  
These animals have been **castrated**;  
they cannot make young ones any more.



## **FEEDING CATTLE**

---

**It is very important to feed cattle well.**

An animal that is badly fed  
grows badly;  
does not produce much meat;  
does not produce good calves;  
is often ill.

**A modern farmer**  
**pays attention to his animals' feeding.**  
He knows the needs (see Booklet No. 8, page 20)  
of all the animals in his herd.  
He gives the cattle food to meet their needs  
and gives it regularly (see Booklet No. 8, pag. 23).

He knows too that all the animals in the herd  
do not use their food in the same way.

**For example:**

He knows that one ox in his herd  
gains weight faster than the others.  
He knows that this ox  
makes better use of the food given to it.

A cow which is expecting a calf  
gets more food.  
It has a pregnancy requirement  
(see Booklet No. 8, page 21).

A working ox  
also needs more food.  
It has a production requirement  
(see Booklet No. 8, page 20).

## HOW CATTLE FEED

Cattle eat chiefly grass.

We shall see **how the grass is used,**  
**how it is digested.**

- Let us watch a cow feeding.

When a cow feeds,

it takes a little grass with its tongue.

It grips the grass between the upper jaw  
and the teeth of the lower jaw.

It jerks its head to pull off the grass.

- Let us look at a cow's mouth.

There are **two jaws** and a tongue.

**The upper jaw has no front teeth.**

**The lower jaw has eight front teeth.**

The older the animal is,

the more the teeth are worn.

You can tell the age of a cow

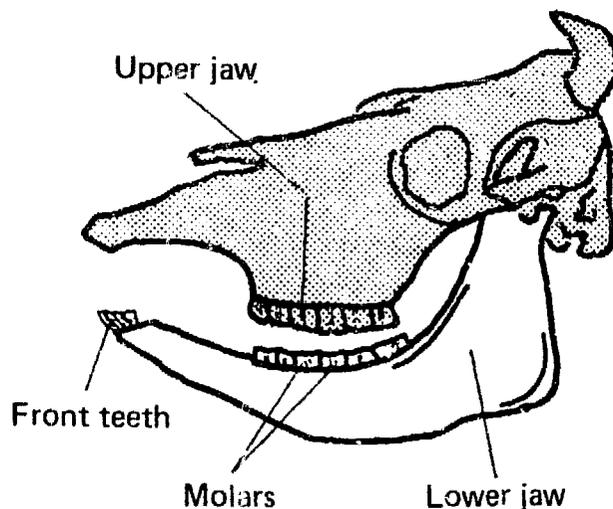
by looking at its front teeth.

Toward the back of the mouth

you can see large teeth.

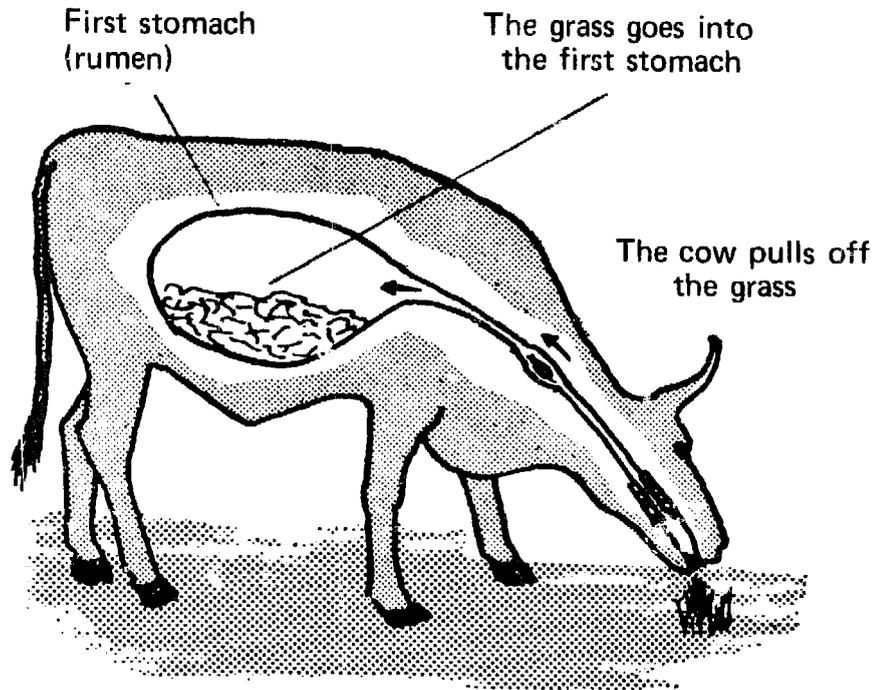
With these the cow chews the grass.

They are called **molars**.



**Bones of a cow's head**

When the cow has bitten off the grass,  
it does not chew the grass  
at once with its teeth;  
it swallows it.  
**The grass goes into the first stomach  
(or rumen).**



**A cow feeding**

A cow can eat a lot of grass;  
there is room for up to 15 kilogrammes of grass  
in its first stomach,  
depending on the size of the breed.

**But a cow needs a lot of time to feed,**  
to fill up its first stomach.  
So you must give a cow,  
and especially working oxen,  
at least 8 hours a day to feed off pasture.

## Cattle ruminates.

When a cow has finished filling its first stomach,  
it often lies down.

But it goes on moving its jaws.

**It is ruminating.**

The cow brings up a little grass  
from its first stomach  
into its mouth.

It chews this grass for a long time with its molars.

**When the grass is well chewed and broken down,**

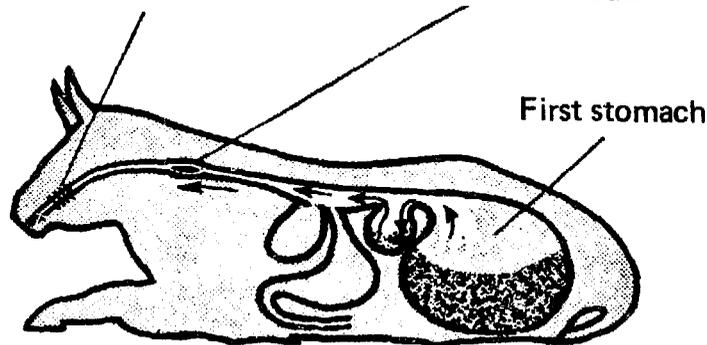
the cow swallows it again.

**But this time the grass does not go into the first stomach,  
but into the second one.**

A cow needs several hours to ruminate.

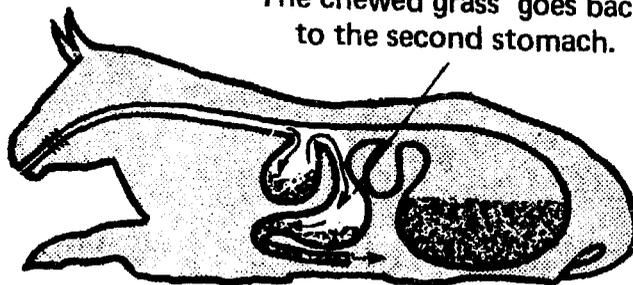
The cow chews the grass  
with its molars

The grass comes  
back to the mouth



**A ruminating cow: the grass comes back to the mouth**

The chewed grass goes back  
to the second stomach.



**A ruminating cow:  
the grass goes to the second stomach where it is digested**

- **A cow can ruminate well**  
when it is quiet,  
and above all **when it is lying down.**

If you make a shelter,  
the cow will be protected from rain,  
wind and sun;  
it will be quiet;  
it will rest;  
it can ruminate well.

- The cow ruminates  
because its digestive system  
is made to digest and transform grass.  
The digestive system consists  
of the **mouth** which takes in the grass,  
of the **first stomach** which stores it,  
of the **molars** which chew it,  
and of the other parts of the stomach  
and **intestine** which digest it.  
This intestine is very long,  
more than 20 metres.

- Animals that ruminate  
are called **ruminants**.  
Goats, cows, sheep and camels  
are ruminants.

**Young calves do not ruminate,**  
**because their first stomach is not yet developed.**  
So they must be given different food.

# HOW TO FEED CATTLE

Cattle must be given  
enough food,  
and rich food,  
all the year round.

- **Enough food**

If an animal cannot find enough food,  
it cannot gain weight.

All the food is needed for its maintenance  
(see Booklet No. 8, page 20).

- **Rich food**

Cattle eat grass.

They find in grass

what they need to build their bodies  
and become strong.

But it is often necessary

to give them a **feed supplement**  
(see Booklet No. 8, page 14).

Cattle that are raised for meat  
must grow quickly.

Then you can sell them faster  
and make money faster.

So give them a **feed supplement**.

An ox that is bred for working must be strong,  
have big muscles and bones.

It will be strong if it is well fed.

So give it a **feed supplement**.

A cow that is producing calves  
needs good feeding.

It has to feed the calf in its womb.

And then it has to give the calf milk.

So give the cow a **feed supplement**.

- **All the year round**

- **In the rainy season**

there is plenty of grass, it grows quicker.  
It is easy to feed cattle then.

- **In the dry season**

it is very difficult to feed animals well.  
Grass becomes hard and scarce.  
The stems are tall, the leaves dry.  
Animals don't want to eat this grass.  
They get thin and sometimes die.

So there are months in the year  
when cattle are well fed.

There are other months in the year  
when cattle are badly fed.  
They get thin, lose the weight  
they have gained during the rainy season.

That is why you have to wait several years,  
often 5 or even 7 years,  
to get cattle for selling.

If the cattle were better fed,  
especially in the dry season,  
they would take fewer years  
to reach the same weight.

**They could be sold when they were younger.**

**A modern cattle breeder**

who hasn't got enough food for his animals  
during the dry season  
should **sell some of the animals**  
at the end of the rainy season.

Then his animals will have enough food  
during the dry season,  
they will not get thin,  
they will stay in good health.

## ● How are cattle fed in traditional animal husbandry?

To give the animals enough food all the year round, people used to move the herd from place to place. When there is no more water and grass in one region, the herd is taken to another region where there is still water and grass. This is called **transhumance**.

During the dry season, grasses are very hard and very tall. They prevent the cattle from walking and they are not good to eat. So they are burned. After the fire the grasses grow again and are better for the animals to eat. But brush fires damage the soil (see Booklet No. 5, page 21) and they destroy useful plants which cannot stand burning as well as grass.

## ● The modern way of feeding cattle

In order to give animals enough good food all the year, farmers

- improve their pastures (see Booklet No. 8, page 24);
- make new pastures and grow fodder crops (see Booklet No. 8, pages 25 and 27);
- store green fodder as silage and hay (see Booklet No. 8, pages 28 and 29);
- give their animals feed supplements (see Booklet No. 8, page 14);
- give their animals enough water (see Booklet No. 8, page 18).

## Improving pasture

A pasture is the field

where cattle find grass to eat.

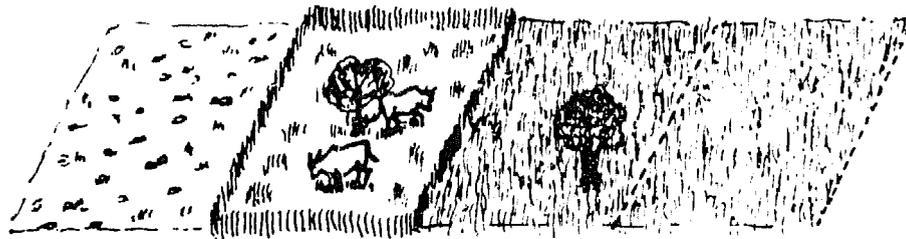
In order to have tender, young grass,  
divide the pasture into four parts.

Each week put the cattle in one part,  
and let the grass grow in the other parts.

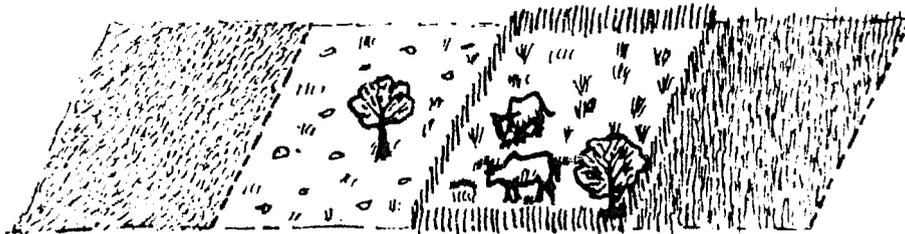
At the end of four weeks  
go back to the first part.



First week



Second week



Third week



Fourth week

After the herd has been through the pasture,  
cut the weeds before they seed,  
so that they won't multiply.

## Storing grass

During the rainy season, grass grows a lot.  
The cattle do not eat all of it.  
Grass can be stored in the form of silage or hay.

### • Silage

Dig a pit 1.50 to 2 metres deep  
and 1.50 to 2 metres wide.

This pit is called a **silo**.

It has to be made rather long,  
so that all the cut grass can be put into it.

At the bottom of the silo put some large stones.

On these stones put the grass to be stored.

Tread the grass well down by trampling on it.

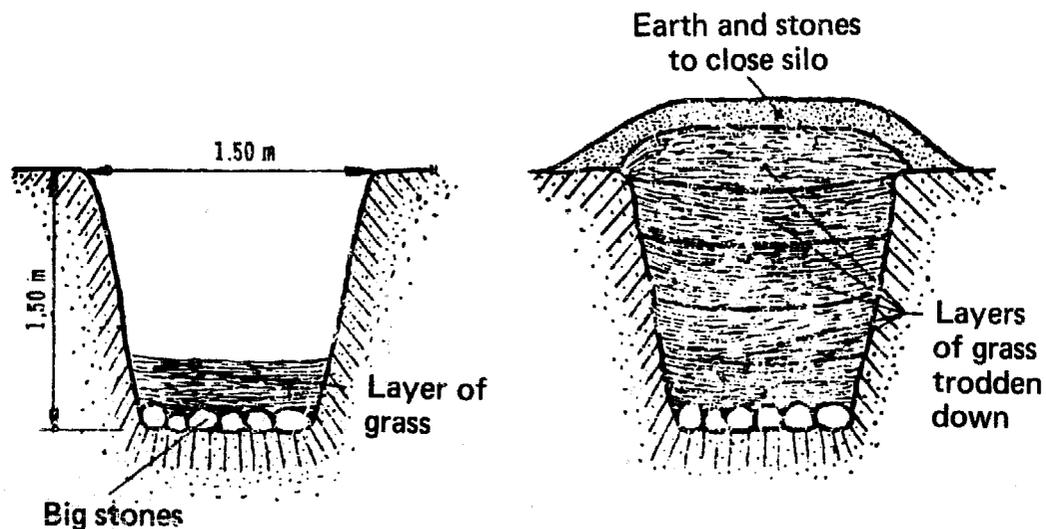
On top of the full silo, on the pressed-down grass,  
put earth and stones.

The silo must be well closed,  
so that air and rain cannot get in,  
and the grass will not rot.

Grass so kept stays good for a long time, for several months.

Animals eat it readily.

So that the grass stays good,  
you must not take more than 2 days  
to fill, tread down and close the silo.



A silo

## ● Hay

You can also dry grass.

Cut the grass when it is green and let it dry.

The dried grass is called **hay**.

Many farmers keep the dried stalks and leaves of groundnuts

in order to feed them to animals.

This is groundnut hay.

**Hay is nearly as good a food as green grass.**

For hay to be good food,

**you must cut the grass when it is still green,**

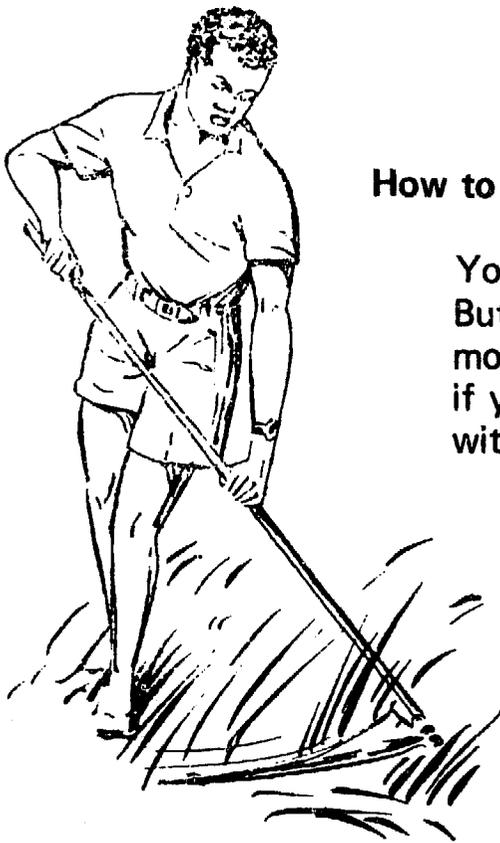
before it starts going to seed,  
and before it becomes too hard.

Cut the grass when it is young,  
and you'll get good hay.

If you wait too long before cutting the grass,  
you will get not hay, but straw.

Animals do eat straw,  
but it is not easy to digest.

Straw is used for making manure.



### How to make hay

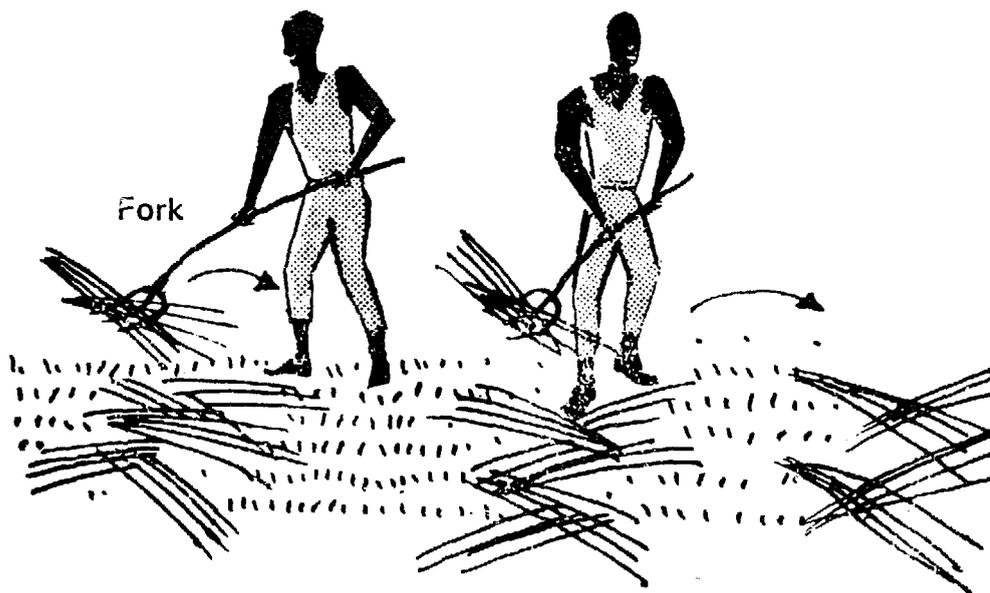
You can cut grass with a machete.

But you will get the work done  
more quickly

if you cut the grass  
with a scythe.

**When the grass is cut,  
let it dry in the sun.  
Then turn it over and leave in the sun  
the parts that are not yet dry.  
This work is done with a fork.  
When all the grass is quite dry,  
make it into a big heap next to the animal shed.**

**Then you can give the animals food during the dry season.**



**When the grass is dry on one side, turn it over  
to dry on the other side**

**Sun is needed to dry grass.**

**So you must wait for the end of the rainy season  
before you make hay.**

## **Feed supplements**

When there is not enough fodder,  
when the grass is very hard,  
give the cattle a **feed supplement**.

When oxen are working,  
when cows are about to calve,  
when cows are giving milk,  
they must be given a **feed supplement**.

You can give them  
**oil cake** made from groundnuts, copra or cottonseed.

You can also buy **cattle meal**.

Some manufacturers make a feed in which  
every 100 kilogrammes contain:

- 50 kg maize meal
- 10 kg copra oil cake
- 38 kg groundnut oil cake
- 2 kg mineral salts (dicalcium phosphate and salt).

For example,  
a cow weighing 300 kg which gives 3 litres of milk  
can be given every day:

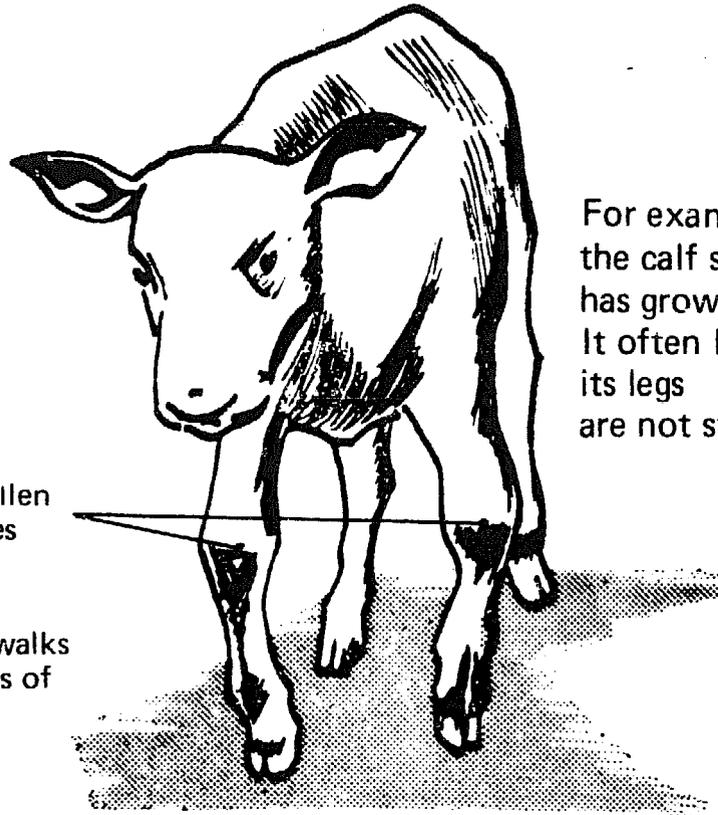
- 15 kg of pasture grass
- 1 kg of palm kernel or copra oil cake.

## Mineral supplements

A mineral supplement  
supplies **mineral salts**.

Animals too need mineral salts.

**If animals do not get enough mineral salts,  
their bones will not grow well.**



For example,  
the calf shown here  
has grown badly.  
It often limps,  
its legs  
are not strong.

Swollen  
knees

This calf walks  
on the tips of  
its hoofs

**This calf has not had enough mineral salts**

You can also give mineral salts  
by putting salt in the water  
or in the hay,

by giving **native soda**  
or a **mineral lick** (licking stone).

A licking stone weighing 1 kg contains:

salt (400 g),

calcium (150 g),

phosphorus (80 g)

and other mineral salts.

**Supplementary note (see Booklet No. 8, pages 20-21)**

**Daily requirements of cattle in feed units and protein**

● Maintenance requirement

Weight (kg)	Feed units	Protein (g)
50	0.7	25
100	1.1	50
150	1.5	75
200	1.9	100
250	2.3	125
300	2.6	150
each additional 50	0.3	25

● Growth requirement

Age	Feed units	Protein (g)
Up to 1 year	1.4	300
1 to 1½ years	2.7	200
1½ to 2 years	3.0	200
2 to 3 years	3.2	200

● Fattening requirement

	Feed units	Protein (g)
	3.0	150

● Pregnancy requirement

	Feed units	Protein (g)
Fifth month	0.3	During the last 2 months double the maintenance requirement
Sixth month	0.6	
Additional per month	0.3	

● Lactation requirement

	Feed units	Protein (g)
Per litre of milk	0.3	60

● Work requirement

	Feed units	Protein (g)
Normal work	0.2	200
Heavy work	0.3	240

## **Watering cattle**

### **Animals need water.**

Animals lose weight in the dry season  
because they are not well fed,  
but also because they do not drink enough.

An ox can drink 30 to 40 litres of water a day,  
or even more in the dry season,  
if it is very hot and the grass is very dry.  
Oxen do not need to drink as much  
if it is not very hot  
and if the food contains plenty of water,  
such as green grass or silage.

### **Animals drink**

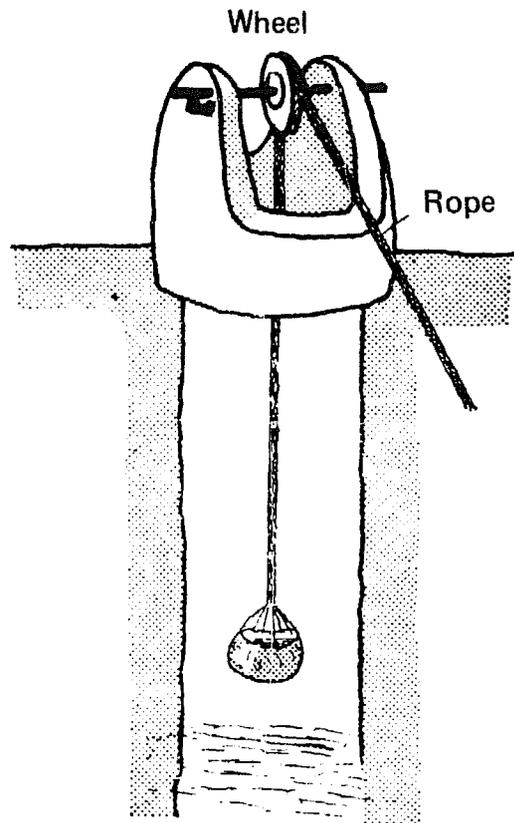
- **at the cattle shed,**  
from a hollowed-out tree trunk,  
or from a barrel cut in half,  
or from a concrete basin,  
all of which must always be kept very clean.
  
- **from a river or stream.**  
But you must be careful,  
because the water is often dirty  
and may give the animals some disease.  
Their water must always be clean.  
You can build a little dam (see Booklet No. 6, page 16)  
to store up water.

- at a well.

Wells are sometimes very deep and it takes a lot of work to draw water from them.

It is quicker with a hand pump or a motor pump, or with a rope and wheel.

You can use an ox or a donkey to pull the rope.



**So, remember, it is important:**

- to give every animal every day all the water it needs, even in the dry season. It is best to let the animals drink two or three times a day.
- to give them water that is as clean as possible. Many diseases come from dirty water.
- not to let the animals stand in the water after they have drunk. They make the water dirty.

It is good to add a little salt to the water. We have seen that mineral salts are good for animals.

## HOW TO FEED CALVES

- **At the beginning, with mother's milk**

The first stomach of a young calf is not fully developed.

It cannot ruminate.

If it is fed grass,

it cannot digest it (see page 8).

But milk is digested without ruminating.

**So the best food for a young calf  
is the mother's milk.**

But too often the cows

do not have much milk

and the calves cannot drink enough.

Never feed two calves

with the milk of only one cow.

The cow gives too little milk

to feed two calves.

A two-month-old calf

fed with its mother's milk

needs 4 to 6 litres of milk a day.

**During the first 2 months**

**leave all the mother's milk  
for the young calf.**

During this period

do not milk the cow.

Keep all her milk

for the calf.

It pays better to do that.

If you sell milk during these first 2 months,  
you earn a little money.

But the calf will not be well fed,

it will not put on weight.

It may die.

In that case you will lose a lot of money.

- **Later, with grass**

For 2 months the calf  
drinks its mother's milk.

At the age of 3 weeks,  
it can be given a little green grass.  
Its stomach develops and it begins to ruminate.  
At 3 months it can digest grass.  
The calf, we say, is then **weaned**.  
It no longer needs all its mother's milk.  
The cow can then be milked.

**After weaning,**  
**the calf no longer drinks its mother's milk**  
**and feeds on grass.**

Weaning is often the time  
when calves die. It is difficult for calves  
to change from one food to another.

To help a calf at weaning,  
give it a **feed supplement**  
as well as grass.  
If you mix this feed supplement  
with water,  
the calf will digest it better.

Do not forget to give calves  
a mineral supplement (see page 17).  
If a calf lacks mineral salts  
its bones will be badly formed.

## FEED SUPPLEMENTS AT WEANING

You may give the calf any of the following:

- **Cereals**

Millet, sorghum, maize, rice are good feed for calves.

Crush these cereals so that they are well digested.

1 kg of crushed millet feeds a calf as well as 2 kg of whole millet grain.

These feeds are costly.

They are food for people, but you can give animals grain that is broken or damaged by insects, and the part that people do not eat, that is, the bran of rice, maize or millet.

- **Oil cake**

This is the name for what remains when the oil has been taken from groundnuts, copra, oil palm kernels or cottonseed.

Oil cake is good food, rich in protein.

- **Meal for calves**

Dealers sometimes sell meal for animals.

This meal is a mixture of crushed grain and oil cake.

For instance, to make 100 kg of meal, the following mixture is used:

62 kg of crushed sorghum  
35 kg of groundnut oil cake  
3 kg of mineral supplement.

The 3 kg of mineral supplement contain:

0.6 kg lime  
0.3 kg salt  
2.5 kg bone ash.

# LOOKING AFTER CATTLE

---

## ANIMALS MUST BE WATCHED

A farmer who leaves his animals to roam freely,  
who does not watch them,  
has not much work to do.

**But his cattle:**

- **do not make good use of the grass.**

They eat the good grasses first  
and leave the poor ones.  
The good grasses are always eaten  
before they make seeds,  
and so they cannot multiply.  
On the other hand,  
the poor grasses which are not eaten  
grow well and make many seeds.  
So they multiply  
and the pasture becomes poor.

- **may have accidents and get diseases.**

They may go near streams  
where they are bitten by tsetse flies  
and catch sleeping sickness.  
If an animal is bitten by a snake  
or has some accident,  
nobody knows about it,  
and nobody looks after the animal.  
The oxen can also be stolen more easily.

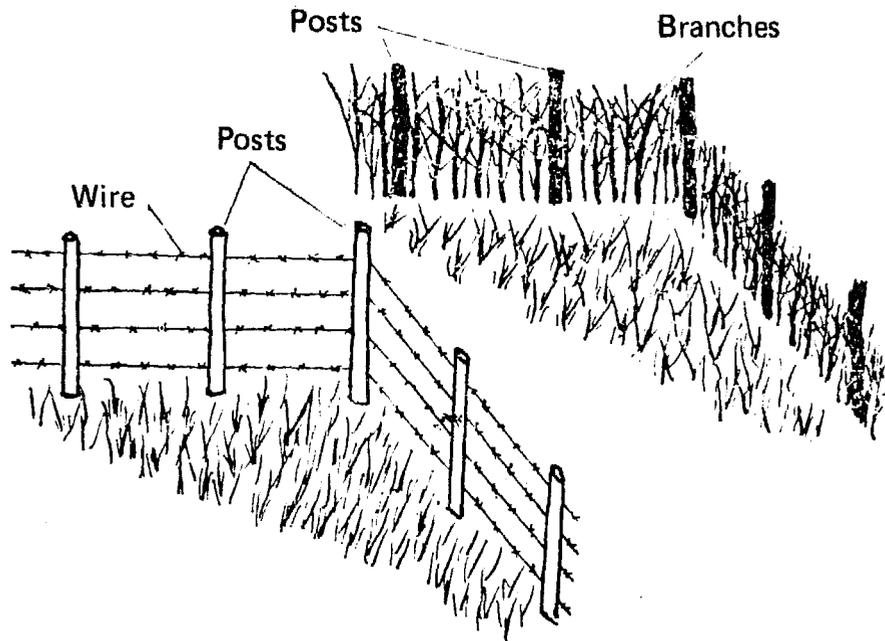
- **damage crops.**

To prevent animals from damaging crops,  
fields must be surrounded by fences,  
or else fields a long way from the village  
must be farmed.  
Then the farmer loses a lot of time  
going to his fields.

# How to watch over animals

## ● In a paddock

To make a paddock,  
put a **fence** around the pasture  
so that the animals cannot get out.  
The fence is made with wire and posts.  
But wire is costly.



**Two kinds of fence**

There are cheaper ways of making a fence.

You can plant a row of small trees very close to one another,  
or two rows of sisal or thorns.

You can also use millet stalks.

It takes a lot of time and work  
to make fences and keep them in good repair.

## **In the paddock**

it is easier to keep the animals under watch.

They can't get out and damage the crops,  
and they make better use of all the grass of the pasture.

### **Making fences**

requires money and work.  
It is useless to spend money  
unless at the same time  
you improve the animals' food,  
and house them better  
and look after them better.

### ● **With a herdsman**

It is best for the farmer himself  
to watch over his animals.  
He can also get some member of the family to do it.  
Or several farmers who know one another well  
can put their cattle together, and pay a herdsman.  
In any event, the farmer must keep an eye on the herdsman  
to make sure he is doing his job well.

To do his job well, a herdsman  
must know about animals,  
look after them well,  
and lead them to good pastures.

A good herdsman  
does not cheat the farmers;  
for example, he does not sell the milk  
which the calves are supposed to drink.

To help the herdsman,  
a dog can be trained  
to lead the animals,  
to prevent them from leaving the herd  
and to bring them back when they do.  
A well-trained dog is very useful to the herdsman.

# HOUSING ANIMALS

## Why shelter is needed

To protect the animals from wild beasts,  
from wind, sun and rain,  
and from diseases.

- **In a traditional enclosure  
there are often too many animals.**

The cattle stand on a mixture of earth,  
excrement, urine and water.  
They can't lie down.  
They can't ruminate well,  
and do not make good use of their food.

They are very dirty.  
When animals are dirty  
they get more diseases,  
their wounds do not heal well,  
especially those of the feet.

The calves are in danger.  
Parasites and diseases attack them more easily.  
Many calves die.  
Each time a calf dies you lose a lot of money.

### **Good manure cannot be made.**

instead you have only  
a mixture of earth and excrement.  
This mixture  
is not as good for the fields  
as real manure.

**The traditional enclosure must be improved  
by making a shed and a manure heap.**

## **How to make a cow shed and manure heap**

Animals must not be left to stand on  
a mixture of earth, excrement and water.

**Choose a dry place.**

If you put up the shed in a hollow,  
the rainwater will collect there and will not run off.

You can greatly improve the animals' housing  
without spending too much money,  
by using wood, earth and straw which you can find  
on the spot.

Animals must be **protected from wind.**

Build a wall on the side from which the wind usually blows.

Animals must be **protected from sun and rain.**

Put up a straw roof.

When the shed is built,

spread straw on the ground.

This straw, mixed with excrement and urine,  
rots and makes **manure.**

When the straw is rotted,

put clean, dry straw on top of it,

so that the animals are always on clean straw.

**When there is a lot of manure, take it away.**

You can either take it straight to the field  
and mix it at once with the soil by ploughing it in,  
or else you can make a manure heap near the shed.

Then you can take the manure to the fields  
when you are ready to plough.

- **The animals must not be too crowded in the shed.**

If they are too crowded,  
they have no room to lie down,  
and may hurt themselves.

A cow needs 5 to 6 square metres space (3 metres by 2).

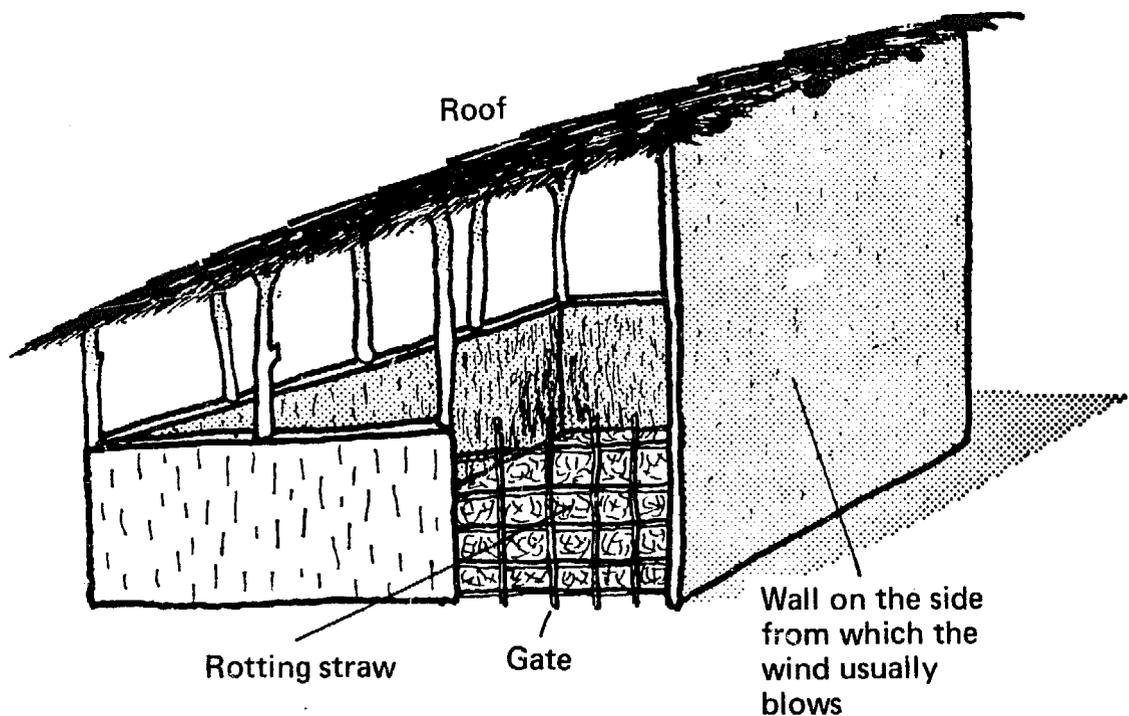
**For example:**

there is room for 6 cows  
in a cow shed 5 metres wide and 7 metres long.

- **The shed should be disinfected.**

once a month  
to kill disease germs.

Put the shed so that the wind will carry the smell  
away from the house.



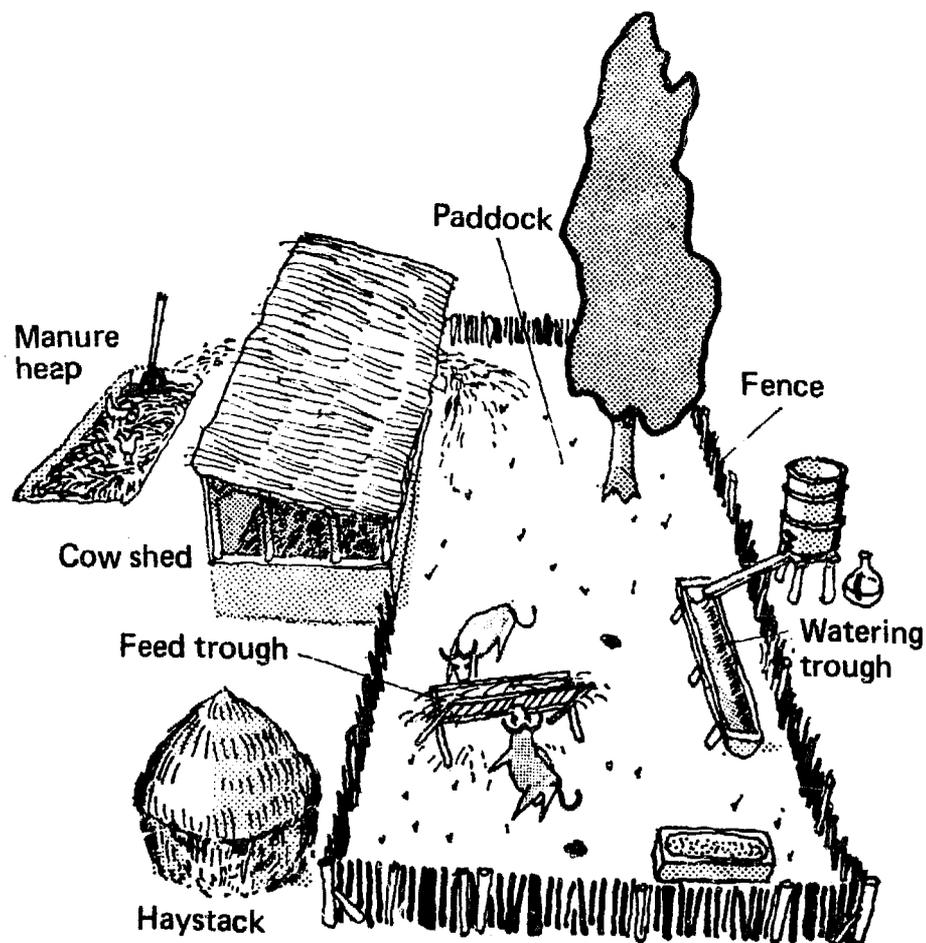
**Side view of cow shed**

- **Next to the shed, make a paddock where the animals can walk about.**

Surround it with a strong fence made out of posts, branches or thorns. Leave a few trees to give shade.

Inside the paddock, put **feed troughs** where you can give the animals their feed supplement, and **watering troughs** where the animals can drink. The feed troughs and the watering troughs can be made with hollowed tree trunks or barrels cut in half.

The gates of the shed and paddock must be big enough for a cart to enter.



# THE HEALTH OF THE HERD

An animal can be in **bad health**.

An animal in bad health **loses weight**,  
and may even die.

A good breeder  
looks after the health of his herd.

An animal can be in bad health  
because of

- **diseases**
- **injuries**
- **parasites.**

## **Diseases**

There are many diseases  
which prevent animals from growing  
and may even kill them.

The animal husbandry services  
have done a lot of work on diseases.  
Nowadays rinderpest and other serious diseases  
are much less common.  
All the same, there are still many diseases to treat.

These diseases can make a farmer lose a great deal of money.

A good way of controlling diseases  
is **vaccination** (see Booklet No. 9, page 10).  
So too is feeding the herd well and housing it well.

A good breeder  
looks after the health of his herd.

- **When an animal is ill,  
you must go and see the veterinary surgeon.**  
He will tell you what medicine to give the animal.
- **You must keep the animal alone, by itself.**  
Why? **Because of the danger of infecting other animals.**

There are two kinds of diseases:

- **contagious diseases:**

These are diseases  
which can pass from one animal to another.  
If one animal in a herd is ill,  
it can give this disease to all the other animals.  
For example, rinderpest (see page 34)  
and anthrax (see page 35)  
are contagious diseases.

- **noncontagious diseases :**

These are diseases  
which do not pass from one animal to another.  
If one animal is ill with such a disease,  
this disease is no danger to the other animals.

- **When an animal has a contagious disease,  
it must be kept by itself.**

Do not leave the animal with the rest of the herd.  
In this way you avoid contagion for the rest of the herd.

**Do not eat the meat of animals  
that have died  
from certain contagious diseases  
such as tuberculosis.  
This disease can be passed on  
from animals to people.**

**Do not mix your herd  
with herds passing through,  
especially if they come from far away.  
Passing herds may bring diseases with them.**

**Do not mix with your herd  
an animal you have bought  
or which comes from somewhere else  
unless you are sure it has been **vaccinated**.**

**To make a country's animal husbandry modern,  
a veterinary service is necessary,  
and all farmers  
should follow the advice of this service.**

**If an animal dies of a contagious disease,  
burn the body,  
or bury it 2 metres deep  
with quicklime  
to kill the germs.**

## THE CHIEF DISEASES OF CATTLE

### Rinderpest

The disease begins with a high fever.

The animal is tired;  
its breathing gets faster;  
it shows lesions on the mucous membranes,  
first on the genitals,  
later on the lips, the nose, and around the eyes;  
pus oozes from the lesions;  
the animal slobbers.

During the first few days of the disease,  
the animal is very constipated.

Later, it has severe diarrhoea  
in which blood can be seen and which stinks very badly.  
After a few more days, the animal dies.

This disease is highly contagious.

It can cause the whole herd to die  
within a few weeks.

Contagion comes through drinking water  
being dirtied by pus  
or the excrement of sick animals.

There is a vaccine for this disease.

### Pleuropneumonia

At the beginning, this disease is hard to recognize.

The sick animals cough in the morning;  
they have a slight fever and eat less.

The disease may go on like that for several months.

Later, the cough becomes more severe;  
the animal can even be made to cough  
by tapping its chest;

breathing becomes faster and faster;  
the animal stops eating and dies.

Its lungs are ravaged by the disease.

Pleuropneumonia is not highly contagious;  
it passes from one animal to another  
only by means of prolonged contact.

Vaccination against this disease is recommended,  
and often even obligatory.

## **Anthrax**

This disease often takes a very rapid course.

It begins with a high fever,  
followed by diarrhoea with blood.

The animal dies within two days.

The blood of the dead animal is thick and black.

Animals that die of this disease must be burned.

If a man eats the meat of animals dead of anthrax,  
he can catch the disease.

If the dead animals are buried,  
the disease stays in the soil,  
and other animals which graze grass at that spot  
catch the disease.

There is a vaccine against this disease.

## **Black-quarter**

Animals which have this disease limp;  
they have swellings on their muscles;  
they die quickly.

Their meat is full of black swellings  
which have a very bad smell.

Animals dying of this disease must be burned.

This will avoid infecting the pastures.

There is a serum for treating this disease,  
and a vaccine for protecting healthy animals.

## **Trypanosomiasis (sleeping sickness)**

Trypanosomiasis is a disease that greatly weakens animals, because it attacks their blood. Some animals may die of the disease. The disease is transmitted by a fly which lives in hot and humid regions, especially where there are woods. This fly is called the **glossina** or **tsetse fly**.

Some animals are fairly resistant to this disease, others such as zebu cattle, asses and horses are not. Oxen are resistant, zebras are not; animals obtained from crossing the two are more resistant than pure zebras. Some goats are resistant, others are not.

All animals are more resistant when they are well fed and well looked after.

In certain regions, the tsetse fly occurs only in the neighbourhood of stagnant water and during certain months of the year. Local herdsmen should know where to take their herds, to places without flies.

There are remedies for treating this disease.

### **Other diseases**

Many other diseases may attack cattle, such as piroplasmiasis (Texas fever), which is transmitted by ticks, tuberculosis, which can be passed on to people, enteritis, contagious abortion, and others.

**Only the most important diseases have been mentioned here.**

## **Cattle must be vaccinated**

Children are vaccinated  
before they are ill  
in order to prevent them from becoming ill.

**Animals should be vaccinated  
before they are ill  
in order to prevent them from becoming ill.**

All animals must be taken for vaccination.

Usually vaccination is compulsory  
and free of charge.

If all farmers do not take their animals for vaccination,  
the animals which have not been vaccinated  
may catch the disease,  
and it stays in the region.

Even if there has been no contagious disease  
in a region for a long time,  
vaccination is still necessary.  
The germs of diseases still exist.

But with the vaccine  
the germs are not dangerous.  
If you do not vaccinate,  
the disease comes back.

Vaccination tires animals a little,  
but it is not dangerous  
if the animals are well housed and well fed.

## **How to take care of wounds**

### **The wounds of animals**

**need to be attended to carefully.**

If you see an ox or a cow  
that has difficulty in walking (that limps),  
that bleeds after a fight with another animal,  
or that has hurt itself,  
lose no time in looking after it.

If you wait, the wound may get worse.

**It may get infected.**

An infected wound does not heal quickly.

It may prevent the animal from walking,  
from going to the pasture,  
from working  
and from giving milk.

**A cow in pain gives less milk.**

### **Find out how the animal got hurt.**

Has it a thorn in its foot?

Has a piece of wood or iron  
torn the skin?

Has the rope, the collar or the yoke  
rubbed too much, or has it been too tight?

Is there a vicious animal in the herd?

Once you have discovered how the animal got hurt,  
remove whatever has caused the wound.

Do not work the animal;

it is better to lose a few days' work  
than to lose the animal.

### **Take care of the wound.**

Clean the wound with hot water.

Add to the water some disinfectant  
that will prevent the wound from becoming more  
infected.

**A wound that is always kept clean heals quickly.**

**So wash the wound often.**

## **What to do about parasites**

Parasites are little animals  
that live on the skin  
or in the bodies of other animals.

### ● **Parasites that live on the skin**

Chief among the parasites that live on the skin of cattle  
are the **ticks**.

Ticks stick to the skin of the animals  
and suck blood.

If an animal has many ticks,  
it can lose up to half a litre of blood a day.  
After a time it may become very weak.

### **Ticks wound animals.**

Often you can see an animal's ears damaged by ticks.  
Often you can see animals walking with difficulty  
or with wounds on the udder.

In that case the cows are difficult to milk,  
and they will not let their calves suck.

### **Ticks may also bring serious diseases.**

They spread fevers, typhus,  
brucellosis and piroplasmiasis.

Ticks can be killed with a pesticide  
such as toxophene.

Ticks can also be killed with paraffin oil.  
Soak a piece of cloth in paraffin oil  
and rub the places on the body  
where there are ticks.

The veterinary services can tell you what pesticides to use,  
and can help you to apply the treatment.

This must be done over and over again.

- **Parasites that live in the body**

Generally parasites live in the digestive tract.

Many are **worms**:

tapeworms, roundworms, pinworms.

Sometimes they live in the muscles or the lungs,  
as for instance strongyles.

They injure the digestive tract  
and the animals cannot digest properly.

Animals that have worms  
lose weight and sometimes die.

To kill these parasites,  
the animals are given **medicine**  
such as phenothiazine.  
There are traditional medicines  
that can also be used.

**A good way to control parasites  
is to let pastures rest.**

Why?

The eggs of the parasites  
fall on the pasture with the animals' excrement.  
They grow in the grass,  
and then they can attach themselves  
to the skin of the animals,  
or the animals may eat them  
together with grass (ticks, worms).

If you let the pasture rest long enough,  
the parasites cannot feed on the skin  
or in the bodies of the animals.  
So they die.

To control parasites, rest your pasture.  
**Do not put the animals always on the same pasture.**

# **HOW CATTLE REPRODUCE**

---

- We shall now study  
how cattle reproduce.

**It is very important to study this,  
in order to improve cattle breeding.**

When you have a good knowledge  
of how cattle reproduce,  
you can make a good choice of breeding animals,  
and of the right time for breeding.  
Then you will get bigger animals,  
animals that grow faster and are stronger,  
that produce more milk, meat and work.

- To understand  
how animals reproduce,  
**the reproductive organs of the females and males**  
must be studied.

We have already studied the digestive system,  
in order to understand digestion  
and to know how to feed animals.

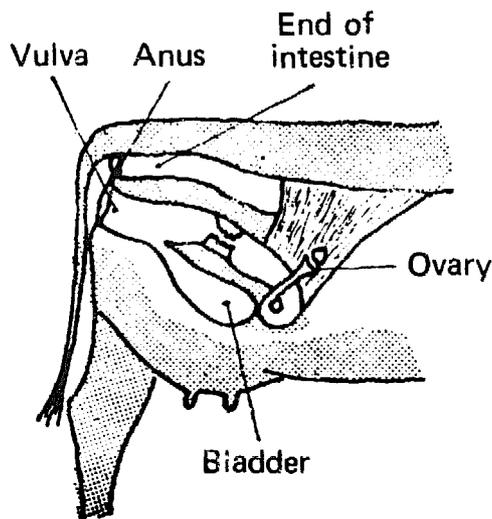
We shall now study the reproductive system  
of the cow and bull,  
in order to understand reproduction  
and to know how to improve the herd.

## THE REPRODUCTIVE SYSTEMS

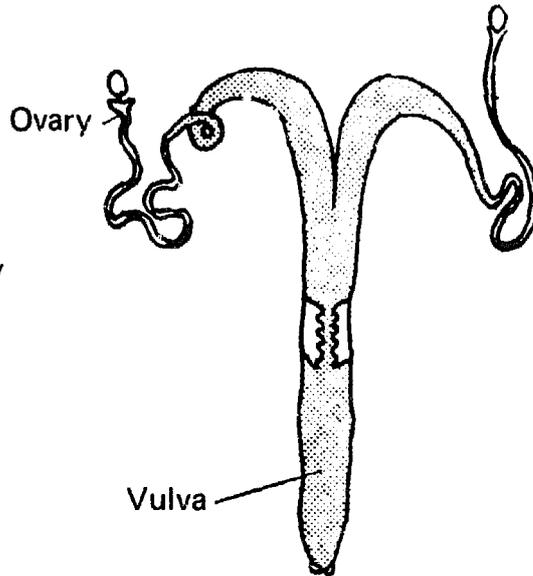
### ● The reproductive system of the cow

The reproductive organs of the cow  
are all inside the animal.

You can see only the entry to the system  
which is called the **vulva**.



Genital organs of the cow



Genital organs  
removed from cow

Flowers have ovaries  
which contain ovules  
(see Booklet No. 3, pages 7 and 11).  
When the ovules are fertilized by pollen,  
the ovules become seeds.

The cow has **two ovaries**.

Every three weeks the ovaries produce an **ovum**.  
(In animals, the female reproductive cell  
is called **ovum**, plural **ova**).

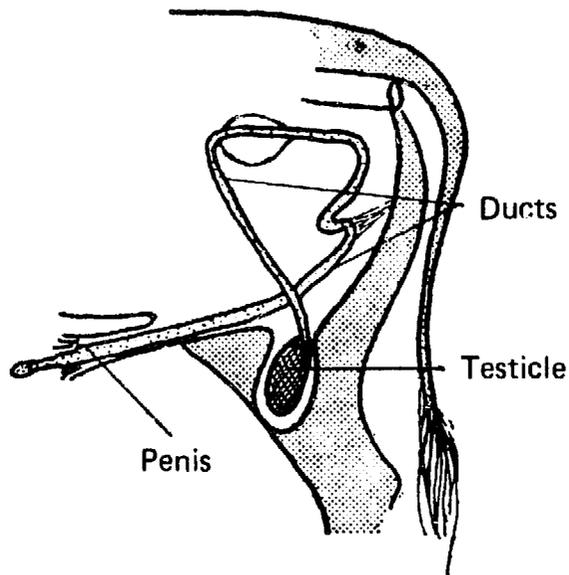
If the cow is served by the bull at this time,  
the ovum is fertilized.

It develops and becomes a calf.

- **The reproductive system of the bull**

This system consists of:

- **two testicles**  
which hang between the hind legs;
- **the penis;**
- **two ducts**  
which connect the testicles with the penis.



**Reproductive organs of the bull**

Stamens give the pollen  
that fertilizes the ovule in a flower  
(see Booklet No. 3, page 10).

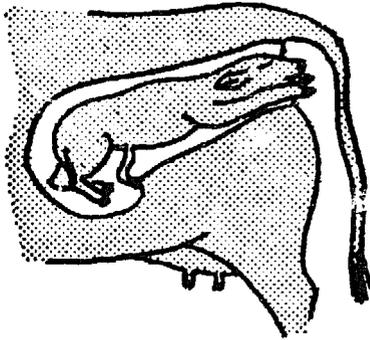
Testicles give the **semen**  
**that fertilizes the ovum.**

The fertilized ovum becomes a calf.

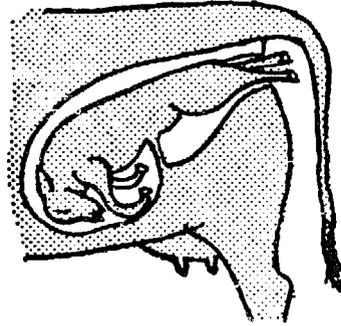
## PREGNANCY AND BIRTH

- When a cow carries a calf in its womb,  
we say she is **pregnant**.  
Pregnancy begins with fertilization  
and ends with the birth of the calf.  
It lasts about 9 months.  
When a cow gives birth to a calf,  
it is called **calving**.
- If the cow has already had a calf,  
she must not feed this calf more than 5 or 6 months  
after the new fertilization.  
The calf she is carrying needs more food.  
**The cow cannot feed the calf in the womb  
and give milk at the same time.**
- Some days before the birth,  
the cow's udder swells.  
At the time of birth,  
part of the membranes  
which cover the calf in the womb comes out.  
These membranes contain water.  
Next you see the legs of the calf come out,  
either the two forelegs  
or the two hind legs.  
Sometimes it is necessary to pull downward a little  
on the calf's legs,  
to help the birth.  
After the calf has come out,  
if the umbilical cord still joins the calf to the cow,  
cut it and **clean it well**.  
You can use a little iodized alcohol.  
After the birth,  
the rest of the membranes come out.  
All the membranes must come out.  
Otherwise they may rot inside the cow  
and cause her to die.

The calf comes out  
forelegs first



The calf comes out  
hind legs first



**At birth the calf may come out in two ways**

When the calf is born,  
the cow rubs it with her tongue.  
She licks it.  
Let the cow lick her calf.

At this time the cow is often thirsty.  
Give her water to drink.

During the first few days after the birth,  
the mother's milk is thick and yellow.

The calf must drink this milk  
which will clean its digestive tract.

**Take great care of calves.**

They are delicate.  
They easily catch parasites.  
To protect them, give them a medicine  
to get rid of internal worms  
at the age of 3 weeks and of 10 weeks.  
They easily catch diseases.  
To protect them, have them vaccinated.

At 3 weeks, the calf begins to eat grass  
with a little cooked cassava.

**Look after young calves well.**

Feed them well, give them good housing.  
If you do not, they may die  
and you will lose a lot of money.

## **AGE OF BREEDING ANIMALS**

### **Heifers**

The ovaries begin to produce ova (see page 42)  
when a heifer is 9 or 10 months old.  
From that time, heifers can be fertilized.

But do not have a heifer served by a bull  
when she is too young.

The heifer cannot go on growing herself  
and feed the calf she is carrying.

In fact you may have accidents  
when the calf is born, at calving.

So wait until the heifer is big and strong enough,  
until she is about 2 years (24 months) old,  
before having her served.

### **The bull**

The testicles of young bulls  
begin to produce semen  
when the bulls are about 8 months old.

But do not have cows served by too young a bull.

The bull will get tired,  
will not grow well,  
will not eat well  
and will become a poor breeding animal.

Do not have the bull serve cows  
before it is 18 months old.

To make sure that heifers are not fertilized too young,  
and that bulls do not serve cows  
before the age of 18 months,  
do not put heifers that are too young together with bulls,  
or bulls that are too young with cows.

## **CASTRATING BULLS**

A herd of 25 cows  
needs only one good bull,  
a good breeding animal.  
The other males in the herd must be castrated.  
**A castrated male is called an ox or bullock.**

- **How to castrate a bull**

Either remove the testicles (see page 43)  
or crush the ducts  
which connect the testicles to the penis.  
The animal husbandry service and the livestock assistants  
have instruments for castrating bulls.

- **Why castrate bulls?**

After castration  
bulls are quieter,  
they are not vicious,  
and it is easier to harness them.  
They put on weight more quickly,  
the meat is better.  
They cannot fertilize the cows;  
in this way you prevent poor breeding animals  
from reproducing,  
and can leave them in the herd.

- **At what age should bulls be castrated?**

At about 10 months  
if you want to sell them to the butcher.

At about 18 months  
if you want to make working oxen.

If you wait until 18 months,  
the ox is stronger for work,  
but in that case it must be kept away from the herd,  
so that it cannot cover the cows.

## **CHOOSING BREEDING ANIMALS**

**Bulls and cows must be carefully chosen  
because the calves take after their parents.**

- **Cows that give a lot of milk usually produce females that will also give a lot of milk.  
This quality is passed on  
from mother to daughter.**

**Cows that grow and put on weight quickly  
usually produce males and females  
that will grow and gain weight quickly.  
This good quality is passed on  
from the mother to her calves.**

- **Bulls that grow and gain weight quickly,  
that have well developed bones and muscles,  
that are not vicious,  
usually produce calves  
that grow and gain weight quickly,  
that have well developed bones and muscles,  
and are not vicious.  
Calves often have the good qualities of the bulls.**

**Bulls born from a cow that gave a lot of milk  
often produce females that will also have a lot of milk.  
The good qualities of the bull's mother  
are often passed on to the bull's daughter.**

## **Choose breeding animals**

- **that are well formed.**

Sell all poorly developed animals.  
Keep animals with plenty of muscle,  
especially of the back and rump,  
because they give the best meat.  
This quality will be passed on to the calf.

- **that gain weight quickly.**

- **that are resistant to disease.**

If a cow has little resistance  
to sleeping sickness (see page 36)  
her calf will also have little resistance.

- **that give plenty of milk.**

Such cows can easily feed their calves.  
You can also milk the cow  
and drink the milk or sell it.

The good qualities of the bull and the cow  
are often passed on to their calves.

The bad qualities of the bull and the cow  
are also passed on to their calves.  
So it is very important  
to make a good choice of bull and cows.

**It is easier to improve the herd  
by a good choice of bull.**

A cow passes on her good qualities  
to only one calf each year.

A bull passes on his qualities  
to all the calves of the herd.

## HOW TO KNOW YOUR HERD

We have seen how important it is to make  
a good choice of breeding animals.

In modern animal husbandry  
we look for breeding animals of good quality.

But we also look for animals  
from parents and grandparents  
that were of good quality.

The family qualities are passed on to the young.  
This is what we mean by **selection**.

### RECORD OF A FEMALE

No. of animal .....	Year of birth .....
No. of sire .....	No. of dam .....
<b>SERVICE</b>	
1st No. of sire .....	.....
Date of service .....	.....
No. of offspring .....	.....
No. of deaths before weaning .....	.....
2nd No. of sire .....	.....
Date of service .....	.....
3rd	
4th	
5th	

Two pages of the herd book which records each female in the herd.

Modern farmers keep a **herd book**.

**Give a number to each animal in the herd.**

This number is the animal's name.

Mark the number on the animal's rump,  
for instance, by branding.

Use a double page of the book for each animal.

Write in the book everything you need to know  
about your animals (see Booklet No. 9, pages 22-24).

<b>Feed</b>	<b>Production (milk, weight)</b>
<b>Vaccinations and disease</b>	<b>Remarks</b>

## RECORD OF A MALE

No. of animal ..... Year of birth .....	
No. of sire ..... No. of dam .....	
<b>SERVICE</b> No. of female ..... 1st ..... 2nd ..... 3rd ..... 4th ..... 5th ..... 6th ..... 7th .....	Date ..... ..... ..... ..... ..... ..... .....

**First of two pages of herd book in which each male is recorded.**

The second page is the same as for females (see preceding page).

# WHAT CATTLE PRODUCE

---

## MEAT PRODUCTION

A farmer can sell animals every year,  
especially **young bulls, oxen and old cows**.  
These animals are sold for slaughter.

A farmer should sell fat animals.  
Then he will earn a lot of money.  
**Young bulls, oxen and old cows that you want to sell  
should be well fed and looked after.**

**You will sell many fat animals  
if the herd has a good yield  
(see Booklet No. 9, page 29).**

That is to say:

- **If the animals are of a good breed.**  
The animal husbandry service is finding out  
which breeds produce most  
and thrive best in each region.
- **If all the animals grow quickly.**  
On the same pasture, all the animals  
do not gain weight as quickly as each other.  
You should keep only the calves of bulls and cows  
that have grown quickly.
- **If there are many cows which calve each year.**  
You must sell the old cows:  
they do not produce calves,  
they do not gain weight any more  
and they eat a lot.  
You must also sell the surplus bulls:  
they eat but are of no use.  
**You must keep the most fertile cows  
and make them breed.  
A fertile cow calves each year.**

## THE MEAT YIELD OF CATTLE

All cattle do not yield the same amount of meat.

For example:

Two cows each weigh 250 kilogrammes.  
They are slaughtered.  
The blood, skin, hoofs, head  
and everything in the belly are removed.

What remains is called the **carcass**,  
that is, **the meat with the bones**.

Now let us weigh the carcass of each cow.

One weighs 115 kg;  
the other weighs 134 kg.

So the carcass of one cow weighs  
19 kg more than the other:  
the yield in meat of the two cows is different.  
All cows do not give the same amount of meat.

**The meat yield of cattle**

**is the relation of the carcass weight  
to the weight of the live animal.**

If a cow weighs 250 kg  
and if the carcass weighs 115 kg,  
the yield is:  $\frac{115 \times 100}{250} = 46\%$

If a cow weighs 250 kg  
and if the carcass weighs 134 kg,  
the yield is:  $\frac{134 \times 100}{250} = 54\%$

If an ox weighs 350 kg  
and if the carcass weighs 180 kg,  
the yield is:  $\frac{180 \times 100}{350} = 51\%$

**The meat yield of cattle is about 50 %,**  
that is, the weight of the carcass  
is about half the weight of the live animal.

**All cattle do not give the same quality of meat.**

The meat of an old thin cow  
does not fetch such a high price  
as the meat of a young, fat bullock,  
because it is not of such good quality.  
The meat of a young fat bullock  
is of very good quality.

So all cattle are not worth the same price.

**The price changes with the amount of meat  
and with the quality of meat.**

For example, in some places  
a thin cow is worth about 7 500 francs,  
but a fat cow of the same age  
is worth about 15 000 francs.

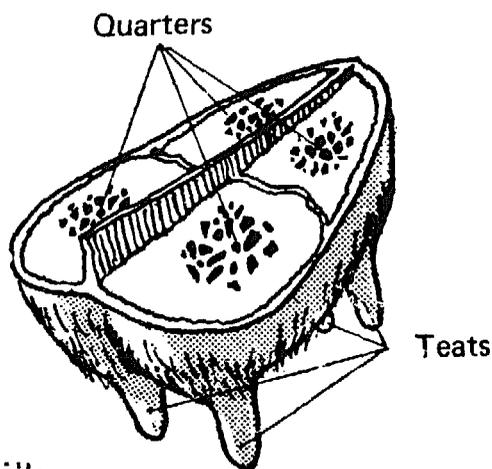
It is better to make 30 000 francs  
with two cows of 15 000 francs each,  
than 22 500 francs  
with three cows of 7 500 francs each.

**You can earn more by selling fewer animals,  
if each animal is sold at a very high price.**

## MILK PRODUCTION

**Milk is formed in the cow's udder.**

The milk comes out through the **teats**.  
Squeezing the teat makes the milk come out.  
The milk is produced by the blood that circulates in each **quarter** of the udder.  
If plenty of blood circulates in the udder, plenty of milk is produced.



Emptying the cow's udder of milk may take 5 to 10 minutes.

**The cow's udder**

For good milking, the cow must be calm; if you strike her or she is frightened, she will not let herself be milked easily.

**Make sure you always empty the udder.**

If all the milk is taken away the udder can develop.  
A well developed udder can give more milk.  
Often a cow gives more milk after her third calving than after the first.

Milking must be done **every day at the same time**, for example, in the morning, before going to the pasture.  
The cow gets into the habit of giving her milk at the same time every day.

A cow with large blood vessels can have a lot of milk.

## **Milk production changes greatly according to:**

- **breed**  
Some breeds yield more milk than others.
- **health**  
Cows that are ill give little milk.
- **age**  
At the first calving, cows have little milk;  
afterwards they produce more.  
When they are old, production is less.
- **time of calving**  
If the cow calves in the rainy season,  
when there is plenty of good grass,  
she gives a lot of milk.
- **feeding**  
A well fed cow gives more milk  
than a badly fed cow.  
A cow in milk needs a feed supplement  
and plenty of water.

## **Use of milk**

- **Milk is food for calves.**  
To grow, a calf needs to drink  
a lot of milk.  
If you milk the cow  
there is not enough for the calf,  
and the calf cannot gain weight;  
it will be less resistant to diseases.  
Many calves die because they lack milk.  
When the calf has finished drinking  
you can milk the cow  
if there is any milk left in the udder.  
You can also milk the cow after some months,  
when the calf has begun to eat grass  
and feed supplements.
- **Milk is food for people.**  
Cow's milk is very good  
for both children and adults.

# ORGANIZING SALES

---

To earn more money,  
it is not enough to **work well**,  
you must also **sell well**.

**A farmer should think carefully to decide:**

- **When to sell an animal**
  - You should sell sterile cows  
which do not produce calves.  
You should feed them well for several months  
and sell them when they are really fat.
  - You should sell a cow  
before it is too old.  
If you wait too long before selling,  
maybe you will get one more calf,  
but the cow will be too old to fetch a good price.  
By keeping a cow that is too old,  
you lose more money than you can earn  
from the calf she may produce.
  - You should sell oxen  
as soon as they no longer gain weight.  
It is useless to keep them for 5 or 6 years.  
Sell oxen at 4 years.  
If you keep them longer,  
the ox eats food that would have enabled you  
to raise another animal.
  - Sell some animals  
at the end of the rainy season.  
Then you will be able to feed the herd well  
in the dry season (see page 10).
  - You know when meat is bought at a high price,  
for example, at festivals  
and at the end of the dry season.  
Organize your breeding  
so as to have animals for sale at that time.

- **Where to sell animals and milk**

Should animals be sold  
in the village,  
at the market,  
in the town?

Where will you earn most?

A modern farmer should know how to work out  
what is the **cost** of taking the animals  
from the village to the town  
if he wants to know where to sell his animals.

- **How to sell animals**

A farmer can sell

- **for slaughter**, for meat,  
when his animals are really fat.

- **for breeding**  
If he has fine young bulls  
of a good breed, of a good family,  
well selected,  
they can be sold at a higher price.

- **for fattening**  
If he has too many young calves  
and not enough grass to feed his animals  
he can sell some calves  
to another farmer who will fatten them.

**A farmer should think before selling.**

## **FARMERS' GROUPS**

**It is to the advantage of farmers to form groups**

(see Booklet No. 9, page 31)

to buy a bull together;  
to pay a herdsman together;  
to sell their milk together;  
to sell their animals together.

**Farmers in a group can  
organize their work better,  
organize their sales better.**

For a group to succeed, it must

- decide the aims of the group in advance;
- settle who is in charge of the group;
- not be too big;
- have members who trust each other.

# SUGGESTED QUESTION PAPER

---

## FILL IN THE MISSING WORDS

A modern animal breeder has a fine .....

He gives his animals enough .....  
and ....., especially in the dry season.

For this he makes ..... and .....  
with pasture grass at the end of the rainy season.

He gives pregnant cows a feed .....

He also gives oil cake to cows which give .....

So that his cattle will have well formed bones he also gives them a .....

The animal breeder builds a .....

His herd is protected from sun and rain, and the animals make .....  
for the fields.

To keep his animals in good health, he protects them against diseases by .....

He has only one ..... in his herd,  
but a very fine bull because he wants to have ..... calves.

For each animal he keeps a record in a .....

A cattle breeder should ..... before selling.

With his friends he forms a .....

## **ANSWER THE FOLLOWING QUESTIONS**

At what age can a bull serve cows?

What is a mineral supplement?

How much water does an ox need?

Why must a cow which has a calf be well fed?

What is weaning?

How many bulls should you keep in a herd?

Why must cattle be vaccinated?

How is hay made?

What do you do when an animal is injured?

Where you live, how do you make a shed for cattle?

What must you do when an animal is ill?

## EXERCISE

A cow weighs 300 kg.

Its **maintenance requirement** in feed units is .....  
(see the table on page 18).

This cow gives 4 litres of milk a day (to produce 1 litre of milk 0.3 feed unit is required). The cow's **production requirement** in feed units is:

$$4 \times \dots = \dots \text{ feed units.}$$

The cow's **total requirements** in feed units are:  
maintenance requirement plus production requirement,  
... feed units plus ... feed units = ... feed units.

The farmer has some groundnut hay which gives 0.4 feed unit per kg.

How many kilogrammes of groundnut hay must the farmer give the cow?

$$\frac{\dots}{\dots} = \dots \text{ kg of groundnut hay.}$$

When should animals be sold? .....

.....  
.....

Why? .....

.....  
.....

How will you choose bulls and cows for breeding? .....

.....  
.....

Why? .....

.....  
.....

## FAO SALES AGENTS AND BOOKSELLERS

<b>Antilles, Netherlands</b>	Boekhandel St. Augustinus, Abraham de Veerstraat 12, Willemstad, Curaçao.
<b>Argentina</b>	Editorial Hemisferio Sur S.R.L., Librería Agropecuaria, Pasteur 743, Buenos Aires.
<b>Australia</b>	Hunter Publications, 58A Gipps Street, Collingwood, Vic. 3066; The Assistant Director, Sales and Distribution, Australian Government Publishing Service, P.O. Box 84, Canberra, A.C.T. 2600, and Australian Government Publications and Inquiry Centres in Canberra, Melbourne, Sydney, Perth, Adelaide and Hobart.
<b>Austria</b>	Gerold & Co., Buchhandlung und Verlag, Graben 31, 1011 Vienna.
<b>Bangladesh</b>	Agricultural Development Agencies in Bangladesh, P.O. Box 5045, Dacca 5.
<b>Barbados</b>	Cloister Bookstore Ltd., Hincks Street, Bridgetown.
<b>Belgium</b>	Service des publications de la FAO, M.J. De Lannoy, rue du Trône 112, 1050 Brussels. CCP 000-0808993-13.
<b>Bolivia</b>	Los Amigos del Libro, Perú 3712, Casilla 450, Cochabamba; Mercado 1315, La Paz; René Moreno 26, Santa Cruz; Junin esq. 6 de Octubre, Oruro.
<b>Brazil</b>	Livraria Mestre Jou, Rua Guaipá 518, São Paulo 10; Rua Senador Dantas 19-S205/206, Rio de Janeiro.
<b>Brunei</b>	MPH Distributors Sdn. Bhd., 71/77 Stamford Road, Singapore 6 (Singapore).
<b>Canada</b>	Renouf Publishing Co. Ltd., 2182 Catherine St. West, Montreal, Que. H3H 1M7.
<b>Chile</b>	Biblioteca, FAO Oficina Regional para América Latina, Av. Providencia 871, Casilla 10095, Santiago.
<b>China</b>	China National Publications Import Corporation, P.O. Box 88, Peking.
<b>Colombia</b>	Litexsa Colombiana Ltda., Calle 55, N° 16-44, Apartado Aéreo 51340, Bogotá.
<b>Costa Rica</b>	Librería, Imprenta y Litografía Lehmann S.A., Apartado 10011, San José.
<b>Cuba</b>	Instituto del Libro, Calle 19 y 10, N° 1002, Vedado.
<b>Cyprus</b>	MAM, P.O. Box 1722, Nicosia.
<b>Denmark</b>	Ejnar Munksgaard, Norregade 6, Copenhagen S.
<b>Dominican Rep.</b>	Fundación Dominicana de Desarrollo, Casa de las Gárgolas, Mercedes 4, Santo Domingo.
<b>Ecuador</b>	Su Librería Cia. Ltda., Garcia Moreno 1172, Apartado 2556, Quito.
<b>El Salvador</b>	Librería Cultural Salvadoreña S.A., Avenida Morazán 113, Apartado Postal 2296, San Salvador.
<b>Finland</b>	Akateeminen Kirjakauppa, 1 Keskuskatu, Helsinki.
<b>France</b>	Editions A. Pedone, 13 rue Soufflot, 75005 Paris.
<b>Germany, F.R.</b>	Alexander Horn Internationale Buchhandlung, Spiegelgasse 9, Postfach 3340, Wiesbaden.
<b>Ghana</b>	Fides Enterprises, P.O. Box 1628, Accra.
<b>Greece</b>	« Eleftheroudakis », 4 Nikis Street, Athens.
<b>Guatemala</b>	Distribuciones Culturales y Técnicas « Artemis », Quinta Avenida 12-11, Zona 1, Guatemala City.
<b>Guyana</b>	Guyana National Trading Corporation Ltd., 45-47 Water Street, Georgetown.
<b>Haiti</b>	Max Bouchereau, Librairie « A la Caravelle », B.P. 111B, Port-au-Prince.
<b>Honduras</b>	Editorial Nuevo Continente S. de R.L., Avenida Cervantes 1230-A, Apartado Postal 380, Tegucigalpa.
<b>Hong Kong</b>	Swindon Book Co., 13-15 Lock Road, Kowloon.
<b>Iceland</b>	Snaebjörn Jónsson and Co. h.f., Hafnarstraeti 9, P.O. Box 1131, Reykjavik.
<b>India</b>	Oxford Book and Stationery Co., Scindia House, New Delhi; 17 Park Street, Calcutta.
<b>Indonesia</b>	P.T. Gunung Agung, 6 Kwitang, Djakarta.
<b>Iran</b>	Iran Book Co. Ltd., 127 Nadershah Avenue, P.O. Box 14-1532, Tehran; Economist Tehran, 99 Sevom Esfand Avenue, Tehran (sub-agent).
<b>Iraq</b>	National House for Publishing, Distributing and Advertising, Rashid Street, Baghdad.
<b>Ireland</b>	The Controller, Stationery Office, Dublin.
<b>Israel</b>	Emanuel Brown, P.O. Box 4101, 35 Allenby Road and Nachlat Benyamin Street, Tel Aviv; 9 Shlomzion Hamalka Street, Jerusalem.
<b>Italy</b>	Distribution and Sales Section, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, 00100 Rome; Libreria Scientifica Dott. L. De Biasio « Aeiou », Via Meravigli 16, 20123 Milan; Libreria Commissionaria Sansoni « Licosia », Via Lamarmora 45, C.P. 552, 50121 Florence.
<b>Jamaica</b>	Teachers Book Centre Ltd., 96 Church Street, Kingston.
<b>Japan</b>	Maruzen Company Ltd., P.O. Box 5050, Tokyo Central 100-31.
<b>Kenya</b>	Text Book Centre Ltd., P.O. Box 47540, Nairobi.
<b>Korea, Rep. of</b>	The Eul-Yoo Publishing Co. Ltd., 5 2-Ka, Chong-ro, Seoul.

## FAO SALES AGENTS AND BOOKSELLERS

<b>Kuwait</b>	Saeed & Samir Bookstore Co. Ltd., P.O. Box 5445, Kuwait.
<b>Lebanon</b>	Dar Al-Maaref Liban S.A.L., place Riad El-Solh, B.P. 2320, Beirut.
<b>Luxembourg</b>	Service des publications de la FAO, M.J. De Lannoy, rue du Trône 112, 1050 Brussels (Belgium).
<b>Malaysia</b>	MPH Distributors Sdn. Bhd., 9A Jalan 14/20, Section 14, Petaling, Jaya.
<b>Mauritius</b>	Nalanda Company Limited, 30 Bourbon Street, Port Louis.
<b>Mexico</b>	Dilitsa, Puebla 182-D, Apartado 24-448, Mexico City 7, D.F.
<b>Morocco</b>	Librairie « Aux Belles Images », 281 avenue Mohammed V, Rabat.
<b>Netherlands</b>	N.V. Martinus Nijhoff, Lange Voorhout 9, The Hague.
<b>New Zealand</b>	Government Printing Office: Government Bookshops at Rutland Street, P.O. Box 5344, Auckland; Mulgrave Street, Private Bag, Wellington; 130 Oxford Terrace, P.O. Box 1721, Christchurch; Princes Street, P.O. Box 1104, Dunedin; Alma Street, P.O. Box 857, Hamilton.
<b>Nicaragua</b>	Incusa-Culturama, Camino de Oriente, Apartado C105, Managua.
<b>Nigeria</b>	University Bookshop (Nigeria) Ltd., University of Ibadan, Ibadan.
<b>Norway</b>	Johan Grundt Tanum Bokhandel, Karl Johansgt. GT 41-43, Oslo 1.
<b>Pakistan</b>	Mirza Book Agency, 65 The Mall, Lahore 3.
<b>Panama</b>	Distribuidora Lewis S.A., Edificio Dorasol, Calle 25 y Avenida Balboa, Apartado 1634, Panama 1.
<b>Peru</b>	Librería Distribuidora Santa Rosa, Jirón Apurimac 375, Lima.
<b>Philippines</b>	The Modern Book Company, 928 Rizal Avenue, Manila.
<b>Poland</b>	Ars Polona-Ruch, Krakowskie Przedmiescie 7, Warsaw.
<b>Portugal</b>	Livraria Bertrand, S.A.R.L., Apartado 37, Amadora; Livraria Portugal, Dias y Andrade Ltda., Apartado 2681, Rua do Carmo 70-74, Lisbon-2; Edições ITAU, Avda. República 46A c/v-E, Lisbon-1.
<b>Romania</b>	Illexim, Calea Grivitei N° 64-66, B.P. 2001, Bucarest.
<b>Saudi Arabia</b>	University Bookshop, Airport Road, P.O. Box 394, Riyadh.
<b>Senegal</b>	Librairie Africa, 58 Av. Georges Pompidou, B.P. 1240, Dakar.
<b>Singapore</b>	MPH Distributors Sdn. Bhd., 71/77 Stamford Road, Singapore 6.
<b>Somalia</b>	« Samater's », P.O. Box 936, Mogadishu.
<b>Spain</b>	Mundi Prensa Libros S.A., Castelló 37, Madrid 1; Librería Agrícola, Fernando VI 2, Madrid 4.
<b>Sri Lanka</b>	M.D. Gunasena and Co. Ltd., 217 Norris Road, Colombo 11.
<b>Switzerland</b>	Librairie Payot S.A., Lausanne et Genève; Buchhandlung und Antiquariat, Heinemann & Co., Kirchgasse 17, 8001 Zurich.
<b>Surinam</b>	VACO nv in Surinam, P.O. Box 1841, Domineenstraat 26/32, Paramaribo.
<b>Sweden</b>	C.E. Fritzes Kungl. Hovbokhandel, Fredsgatan 2, 103 27 Stockholm 16.
<b>Tanzania</b>	Dar es Salaam Bookshop, P.O. Box 9030, Dar es Salaam.
<b>Thailand</b>	Suksapan Panit, Mansion 9, Rajadamnern Avenue, Bangkok.
<b>Togo</b>	Librairie du Bon Pasteur, B.P. 1164, Lomé.
<b>Trinidad and Tobago</b>	The Book Shop, 111 Frederik Street, Port of Spain.
<b>Turkey</b>	Güven Bookstores, Güven Bldg., P.O. Box 145, Müdafaa Cad. 12/5, Kizilay-Ankara; Güven Ari Bookstores, Ankara Cad. No. 45, Çağaloğlu-Istambul; Güven Bookstore, S.S.K. Konak Tesisleri P-18, Konak-Izmir.
<b>United Kingdom</b>	Her Majesty's Stationery Office, 49 High Holborn, London WC1V 6HB (callers only); P.O. Box 569, London SE1 9NH (trade and London area mail orders); 13a Castle Street, Edinburgh EH2 3AR; 41 The Hayes, Cardiff CF1 1JW; 80 Chichester Street, Belfast BT1 4JY; Brazennose Street, Manchester M60 8AS; 258 Broad Street, Birmingham B1 2HE; Southey House, Wine Street, Bristol BS1 2BQ.
<b>United States of America</b>	UNIPUB, 345 Park Avenue South, New York, N.Y. 10010; mailing address: P.O. Box 433, Murray Hill Station, New York, N.Y. 10016.
<b>Uruguay</b>	Juan Angel Peri, Alzaibar 1328, Casilla de Correos 1755, Montevideo.
<b>Venezuela</b>	Blume Distribuidora S.A., Av. Rómulo Gallegos esq. 2a. Avenida, Centro Residencial « Los Almendros », Torre 3, Mezzanina, Ofc. 6, Urbanización Montecristo, Caracas.
<b>Yugoslavia</b>	Jugoslovenska Knjiga, Terazije 27/11, Belgrade; Cankarjeva Založba, P.O. Box 201-IV, Ljubljana; Prosveta Terazije 16, P.O. Box 555, 11001 Belgrade.
<b>Other countries</b>	Requests from countries where sales agents have not yet been appointed may be sent to: Distribution and Sales Section, Food and Agriculture Organization of the United Nations, Via delle Terme di Caracalla, 00100 Rome, Italy.