

# Training Notes

For

## Community Animal Health Workers

# Rabbit production

Small Scale Livestock and Livelihoods Program  
PO Box 1604, Lilongwe Malawi



### Session 1: General characteristics of rabbits



#### Session Objectives:

At the end of this training session, each participant should be able to:

1. Understand the general requirements for keeping rabbits in Malawi
2. Understand the advantages and disadvantages of keeping rabbits
3. Know the general characteristics of rabbits
4. Know how to source and select good quality rabbits for breeding

### General requirements for keeping rabbits

#### Exercise:

Discuss and write down what are the things required to keep rabbits under rural conditions in Malawi. Discuss the following:

- Housing - what are the important aspects of housing for rabbits? How much space is required?
- Feeding - what types of feed should be given to rabbits?
- Breeding - how should we breed rabbits?
- Handling of rabbits - how should you pick up a rabbit? How should you pick up a big rabbit?
- How should we select rabbits for purchase - what should we look for? What things should we avoid?
- Diseases - what are the common diseases and health problems of rabbits?

### Why raise rabbits?

- Rabbits are adaptable in terms of feeding. They eat a lot of different feeds, some of which are of little or no value for other purposes.
- Rabbits are a small animal and a small investment. They are easy to handle, easy to house, easy to slaughter, and can be used for smaller occasions such

as visitors and small ceremonies. If they do die, the loss of capital is usually not disastrous.

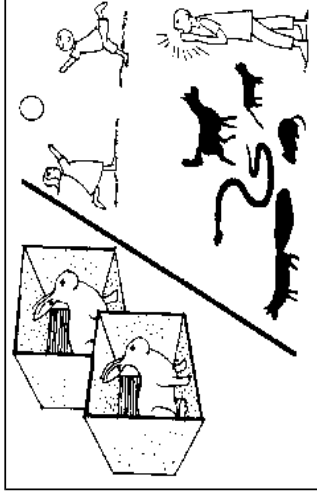
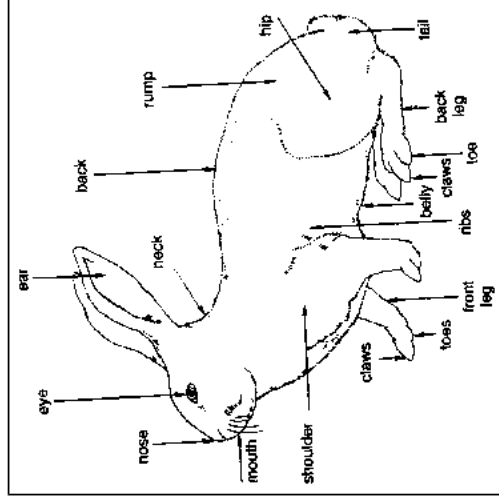
- Rabbits are highly prolific. They breed quickly and produce several litters each year.
- Rabbit meat is highly nutritious.
- The labour to keep rabbits is simple and the costs of labour are low.

#### What are the problems or disadvantages of raising rabbits?

- Rabbits need good housing. Traditional housing is often not well designed and this can lead to disease and deaths in rabbits.
- Rabbits need constant attention. They must be fed and watered every day. Because they need to be housed, they cannot just find food for themselves as chickens do.

#### Characteristics of rabbits

- The domestic rabbit is different from the European hare and the African hare. It is also different from the wild rabbit.



- Rabbits need a quiet place, safe from noises, other animals (especially dogs) and danger.
- Good housing is vital for rabbits. They need protection from the sun, rain, cold, predators, rats, snakes, dogs, cats, hyenas etc.
- Rabbits are excitable animals. It is better if the same person looks after the rabbits all of the time. They need attention every day.

#### Breeds of rabbits

- There are many different breeds world-wide.
- Three breeds are seen in Malawi

- New Zealand white



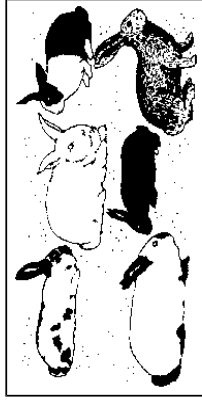
- Californian



- Flemish giant



- But many local rabbits are simply variegated local crosses like these:



- Do not place too much emphasis on trying to select the best breed - no breed can do well without good management and disease control. If management is not good, even a very good breed of rabbit will not do well.

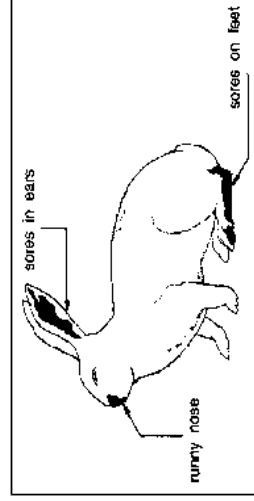
### What do we need to start raising rabbits?

- Rabbits. These are easily available but we need to select carefully.
- A good home. This is important. We will describe housing later.
- Good feed. Rabbits can eat a wide variety of feeds.
- Management of breeding. We should not just leave this to the rabbits. We should manage how and when they breed.
- Daily care and attention. Especially feed and water.

All these requisites are quite feasible under local conditions in rural Malawi.

### Sourcing of Rabbits

- Sources of rabbits include Bunda College of Agriculture, government extension offices, and other rabbit farmers.
- Rabbits bought as a nucleus breeding group should be young, strong, and healthy. Buy only young rabbits. Do not buy rabbits with any defects like these:



- Always think about diseases - do not bring any sick or unhealthy rabbit into contact with your rabbits.
  - Look for a runny nose, sores in ears or feet or genital area.
  - Never buy a rabbit with fur that is rough or dirty or patchy.
  - As far as possible source your rabbits from a reliable disease-free source.
  - Check the teeth of an adult buck - they should be well aligned.

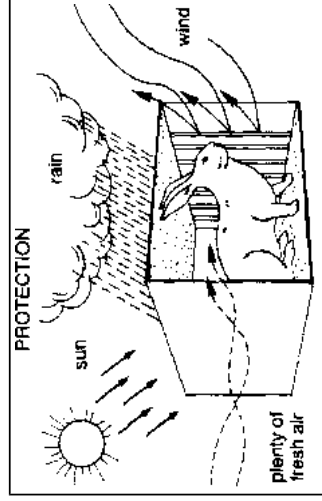
## Session 2: Housing for rabbits

### Session Objectives:

At the end of this training session, each participant should:

1. Understand the importance of good housing for rabbits
2. Know the characteristics of a well made rabbit hutch
3. Be able to design and site a rabbit hutch for a certain number of breeding adults
4. Know different optional types of feeders, waterers, and nest boxes

- A rabbit khola is a "hutch" - several hutches form a "stable".



- A good hutch needs:
  - A dry, clean environment which will minimise disease.
  - Sunlight, but not excessively so. There should be shady cool areas available at all times.
  - Open air but not excessive wind.
  - A quiet location so that the rabbits do not get frightened or over excited.
  - Protection from predators.
  - Appropriate materials and construction.
- We will look more closely at hutch construction later.
- Permanent rabbit housing should be constructed **before** the arrival of the first rabbits
  - There are lots of different designs
  - The principles of good housing apply to all designs

So, what do we need to consider to ensure the principles of good housing?

1. Siting;
2. Floor design;
3. Roof design;
4. Construction materials;
5. Waterers, feeders and nesting boxes;
6. Overall space requirements and the number of individual hutches.

### Exercise:

As small groups or individuals, discuss all the principles of good housing for rabbits. First, write down what is needed, under each of the above six headings, and then discuss your findings.

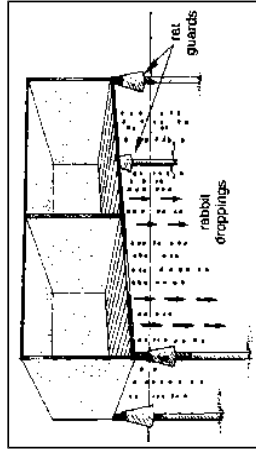
### Siting requires careful consideration

- Avoid wet muddy areas; if it is the dry season, think ahead and avoid areas which will later be inundated.
- Choose a quiet location away from dogs, noisy music etc.
- Ensure there is good ventilation but protection from excessive wind; perhaps close to the house or near a fence, or a wall or shrubs.
- Choose an open, well lit location but one which is not excessively hot.
- The site and design should ensure safety from predators and thieves.

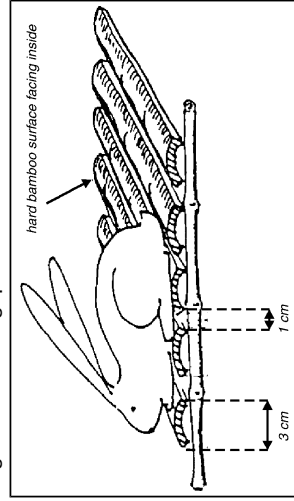


### Proper floor design is essential

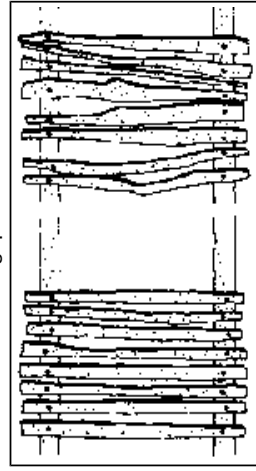
- Several options for flooring design are available.
- The most important aspect is to keep the floor dry. This is very important to avoid diseases, especially coccidiosis and vent disease.
- Earth floors are difficult to keep dry. Also, rabbits will dig burrows if they can.
- On raised floors, the spacing between the slats or the size of wire mesh is important. It should be wide enough to allow faeces to fall through but narrow enough to avoid foot injury.



- Droppings must not accumulate on the floor. A slatted or mesh floor is therefore used. The gaps should be of a size which permits the droppings to fall through.
  - The correct size of gap for a slatted floor is 1 cm. Some books recommend gaps of 1.5 cm but that is too wide for small rabbits - they will get their legs stuck in the gap.

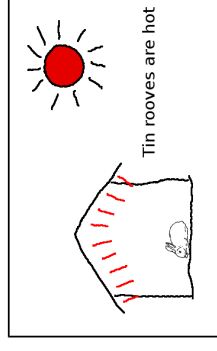
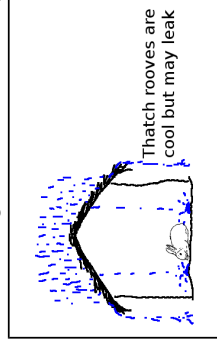


- The gaps should be even. This diagram shows good even gaps compared to poorly constructed uneven gaps.



## Roof design

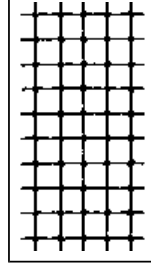
- The roof must provide protection from both sun and rain.
- Plastic lining can be used to rain proof thatch roofs.



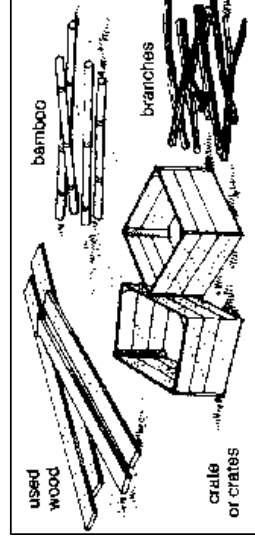
## Construction materials

Most rabbit hutches are raised off the ground. Ground based hutches are more prone to disease risks because it is difficult to keep the floor dry.

Wire mesh at least 10 x 10 mm can be used. It is very practical but somewhat expensive. Mesh floors should be of woven or flat construction avoiding any sharp edges on the top surface. The mesh size should not exceed 19 x 19 mm for adults and 13 x 13 mm for kittens. The thickness of the wire of the mesh should not be less than 2.5 mm diameter. Finer wire tends to cause sores on the feet especially of larger rabbits.

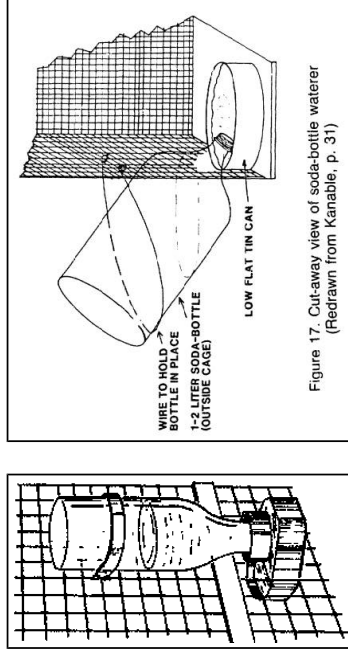


Other cheap materials include timber, boxes, bamboo etc.

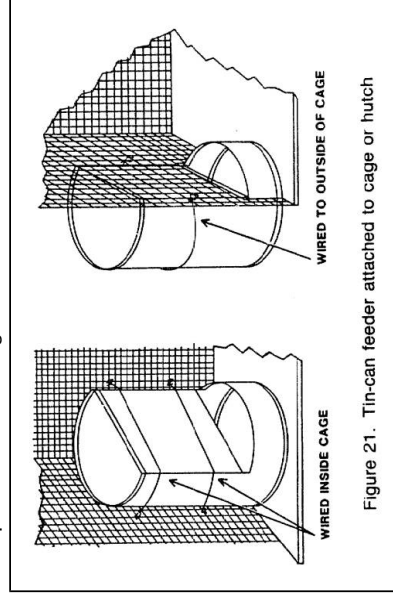


## Waterers, feeders

- Two examples of waterers are shown here:

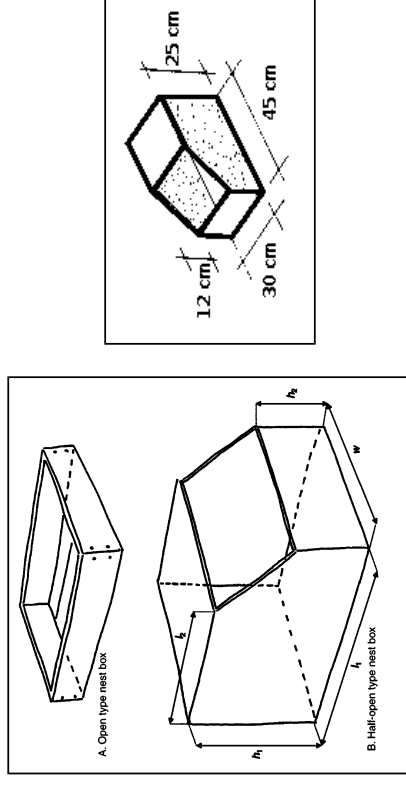


- Some examples of feeder designs are shown below:



## Nesting boxes

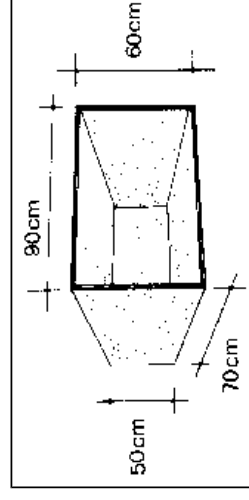
- Nest boxes are important. Do not fail to provide them. They provide a safe separate place where the baby rabbits start growing.
- Open or closed designs exist. Here are some examples:



- Nest boxes like these are not often used in Malawi, but they should be.
- They are placed inside the hutch when the doe is going to give birth.
- Dry material like soft dry grass or matting should be placed inside the nest box.

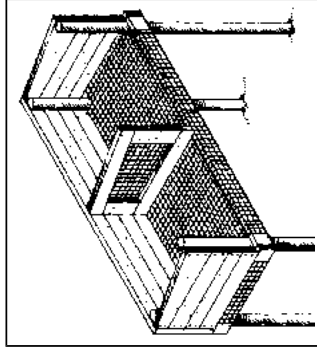
## Overall space requirements and the number of individual hutches

- How much space do we require for a rabbit hutch? A good size for a rabbit pen is 70 centimetres wide by 90 centimetres long and 50 to 60 centimetres high.

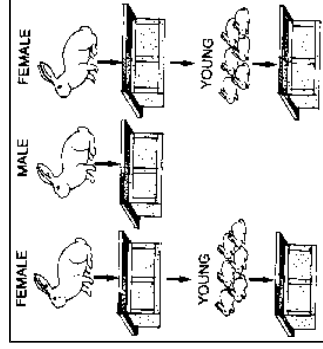
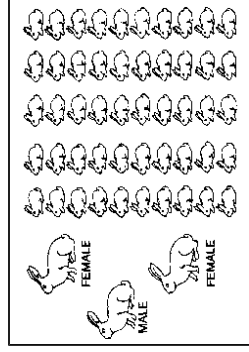


- However many farmers in Malawi add an open area at the front so that thieves cannot easily grab the rabbits inside.

- Here is an improved design with a mesh floor. The roof will be added later. Again, there is no front open area but this could easily be added on.



- But how big a home do we need? How many rabbits do we need to cater for? How many hutches do we need?
- A good start for a rural farmer is two does and one buck. However we must allow for the offspring as they breed. Therefore we need to plan ahead and have sufficient hutches.



**Do not put all of the rabbits together! Use internal dividers.**

**One of the most common mistakes in Malawi is to have just one big hutch for all the rabbits.**

- One buck - one hutch.
- One doe (and her litter if she has one) - one hutch.
- One litter - one hutch. Do not mix rabbits from different litters.

### Session 3: Feeding of rabbits

#### Session Objectives:

At the end of this training session, each participant should:

1. Know the approximate amount of feed which rabbits need
2. Understand the different requirements for pregnant and lactating does
3. Understand the types of feed and main food groups which rabbits can eat
4. Know about the digestive process of coprophagy in rabbits

#### Exercise:

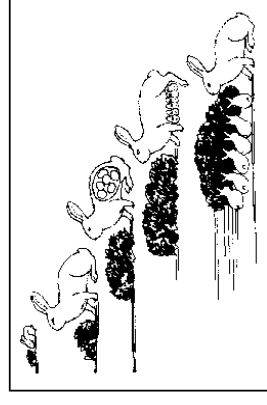
What are some of the common feeds which can be fed to rabbits?

How often should rabbits be fed?

How often should rabbits be given access to water?

#### Basic requirements

- The most important feed component for rabbits is ... Water!
  - A doe and her litter may consume up to two litres of water a day.
- When do rabbits need water?
  - All the time - they should always have water available, day and night.
- How much food does a rabbit need? This depends very much on how big the rabbit is and whether she is pregnant or lactation. The diagram below illustrates how important this is.
- The average daily requirement of commercial pelleted feed for rabbits of different ages is:
  - Does 100g
  - Pregnant does 160g
  - Lactating does 350g
- In short, female rabbits that are going to have babies need more food, and after their babies are born they need much more food.
- Once you know that a female is going to have babies, give her as much food as she wants to eat.



#### What are the basic components of feed?

- Energy
- Protein
- Vitamins and minerals
- Water

- Rabbits are mono-gastric animals - they only have one stomach. They are not ruminants like goats or cows. Their digestion is similar to the horse. They can achieve a remarkably good feed conversion ratio. This means they can increase their body weight more than some other animals for the same amount of feed consumed. They are also able to utilise feeds which are of little use to man.

- Rabbits can eat a wide variety of feeds. Here are some:

- Grains and seeds
  - Maize, wheat, rice, sorghum, sunflower, soy-bean (5-7% of ration), cotton seed, lupins (beans), peas

- Forages

- Lucerne (alfalfa), grasses, Gliricidia, Leucaena, Albizia, Sesbania, Napier grass/nsanjere, pawpaw leaves, sugar-cane, sunflower leaves, sweet potato leaves

- Miscellaneous

- Banana leaves, cotton-seed cake, soya cake, cassava tubers, groundnut tops, groundnut cake, various vegetable leaves and tops.

- What feeds should be avoided:

- Any food that is mouldy or spoiled
- Potato leaves (but sweet potato leaves are good)
- Tomato plants (but the fruit is okay)
- Egg plant leaves
- Rhubarb plants
- Cassava leaves

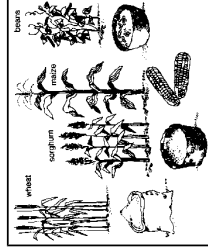
- Avoid sudden changes in the diet. If you know one feed component is in short supply and has to be changed, do the changeover gradually, over a few days.

- Don't forget - feed twice daily, morning and evening.

#### Coprophagy

- The rabbit practices coprophagy (it eats its own faeces) from an age of about 4 weeks.
  - Many rabbit owners do not realise this.
  - It happens at night, not during the day.

- It is normal.
- The faeces produced at night are softer and different from the pellets produced during the day. They contain nutrients which can be utilised by the rabbit, in particular high levels of microbial protein and several B vitamins.
- The practice is similar to rumination in goats and cattle. It probably helps in digestion.



## Session 4: Breeding in rabbits

### Session Objectives:

At the end of this training session, each participant should:

1. Understand the rabbit's reproductive cycle
2. Know how to sex rabbits
3. Know how to manage and record breeding in rabbits
4. Know how to manage does with kittens
5. Know what precautions to take in selecting new animals for breeding

### Exercise:

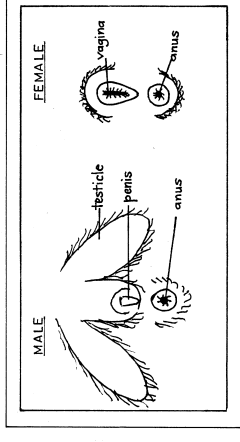
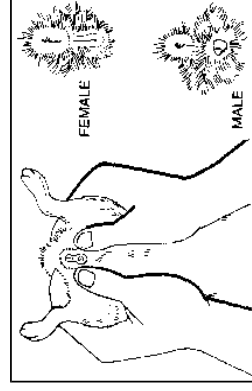
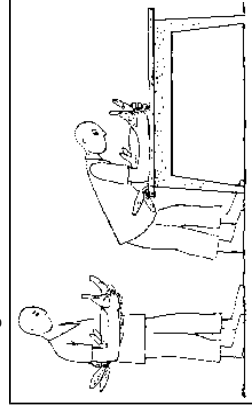
Discuss how breeding of rabbits is done under normal conditions in Malawi.

What are some of the problems of the conventional method of breeding and how might we overcome those problems?

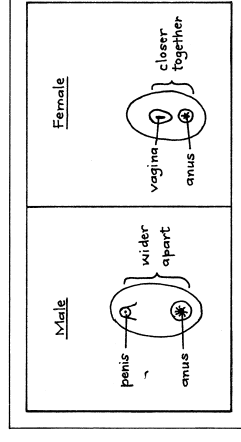
How many teats does a female rabbit have? (The answer is below but have a guess before you look).

### Management of breeding in rabbits

- Does and bucks should not be kept together full-time. They should be kept in separate hutches until they are ready for mating.
- How can we tell the difference between does and bucks? The following diagrams illustrate:



Reproductive Organs - Adult Rabbits



Reproductive Organs - Young Rabbits

### Management of bucks

- Bucks will fight if kept together beyond about 16 weeks of age
- One buck can serve about 10 does. If you have several does, let him breed not more than 2-3 times per week for up to 4 weeks - less if he is young - then give him a break.
- New Zealand bucks mature at about 5-6 months;
- Flemish mature later - up to about 9-12 months

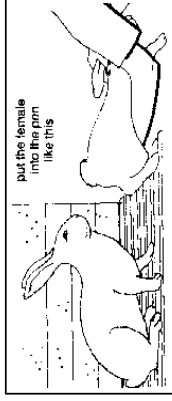


### Management of does

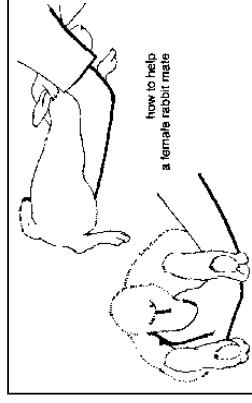
- Does also are territorial - they need to be kept separate from each other from about 16 weeks (the same as for bucks). Each doe needs a separate hutch.
- Rabbits do not have a regular oestrus cycle like other animals. They remain in heat for long periods unless pregnant. They will mate at any time if they are not pregnant.
- Ovulation is triggered by mating.
- This is the reason it is possible to keep the buck in a separate hutch until the doe is ready for mating.

## Mating

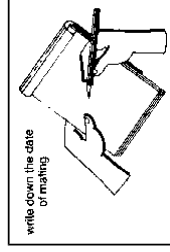
- Take the doe to the buck's cage, not vice versa. If the doe is ready, they will mate within minutes. Do not leave the doe in the cage with the buck.
- Put the doe into the buck's cage as shown in the diagram below.



- If the doe is not ready, she may hide in a corner. If she doesn't mate within 2-3 minutes, take her out and try with another buck or try with the same buck some days later.
- Sometimes the doe needs encouragement to mate. To assist the doe to mate, hold the female by the neck with one hand; put the other hand under her with one finger on each side of her tail and push gently backwards as shown in the following diagram.



- This will make the female lift her tail so that the male can mount her.

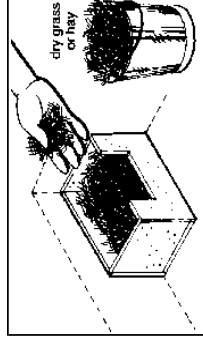


- Keep a record of the date of mating.

## Pregnancy

- There is no easy way to detect pregnancy in rabbits. Experts can palpate the abdomen, but this should be done only by experienced operators. Do not try it yourself. If not done properly, the palpation may kill the embryos.

- Does will sometimes mate while pregnant but this is not usual. Therefore, one way to check for pregnancy is to test mate at about 18 days after mating. If the doe is already pregnant she may refuse to mate and make a "growling" sound.
- If she does not mate, you should assume she is already pregnant from the previous mating.
- If she does mate, you should assume she will get pregnant from this mating.
- The gestation period in rabbits is 30-32 days. If the doe has been mated twice and still does not get pregnant, you should consider replacing her.
- The nest box should be put in with the doe at about day 25 of pregnancy. Some soft nesting material, eg dry grass, should be placed in the nesting box.



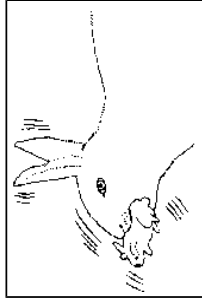
## Kindling

- Giving birth in rabbits is called "kindling".
- Close to kindling, the mother will make a nest using the grass and her own fur. She will kindle soon after.
- Stay away at this time. It is important not to excite or agitate the doe at this stage.
- The young rabbits are called "kittens".
- New born kittens are helpless, have no fur, and cannot walk. It is best not to touch them unless necessary.



- The kittens should be all together or the mother may not feed them all.
- Remove any dead or deformed kittens soon after birth. Otherwise do not interfere.

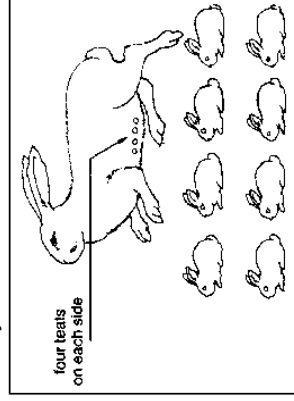
- Some rabbits make good mothers, others do not. The mother may kill her kittens or not feed them.



- If this happens and all the kittens die, give the mother one chance and try to breed from her again. If she repeats the same behaviour, slaughter her and find a replacement to breed from - she is likely to do the same thing again.

### Nursing

- Rabbits do not suckle their young frequently like other animals. The doe nurses her young only twice a day, once in the morning and once in the evening. This is normal.
- The doe has 8 teats. If she has more than eight kittens, cull the excess young at birth - otherwise they will not survive.

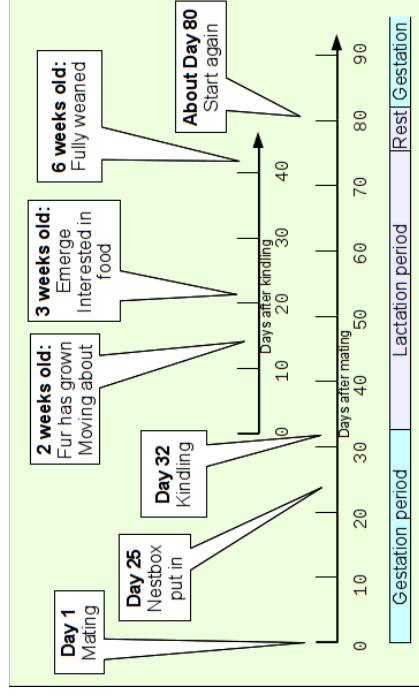


### Weaning

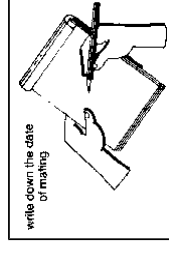
- At two weeks after birth, the kittens have grown some fur and start moving about.
- Three weeks after birth, they emerge from the nesting box and start to show interest in food other than milk.
- At 40 days (six weeks) after birth, they are fully weaned. At this stage, they can be removed from the mother.
- The mother should not be mated immediately. She should be allowed at least five days of recuperation to recover her body condition following lactation. If she is in poor condition, she should be allowed more time before the next mating.

### A Breeding Calendar

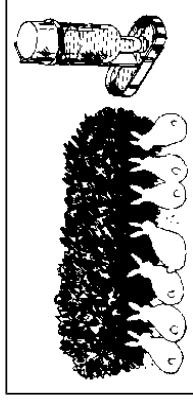
- We will look at four stages in the breeding cycle
  - Mating and gestation
  - Birth and nursing
  - Weaning
  - The rest period before the next mating



- Once again, keep good records. **Keep a book.** Record the date of mating, the date of kindling, the number of kittens born, and the number of kittens weaned. (See the recording form in Annex 1. If necessary, copy it into your book)



## Management of young rabbits



- It is okay to keep up to 6-8 young rabbits in one hutch. Make sure the grower hutch has been built and is ready in good time.
- Remember, avoid mixing rabbits from different litters in one hutch. They may fight.
- Feed and water young growing rabbits well so that they grow fast and can be sold or slaughtered.
- You should aim to get four litters from a doe each year. You will only be able to know this if you keep records. Keep a record of how many kittens were born, the date, and the number which were weaned from that litter.

## Management of growers and breeders

- Aim to sell young rabbits by about 4 months (18 weeks) of age.
  - After this age, they will start to fight and lose condition.
  - Also, when they are older, they are eating a lot of food but not growing as fast.
- Cull does and bucks when they are weak or diseased, Generally this is necessary by the time they are about three years old.
- Bucks may be exchanged to minimise in-breeding. However, care must be taken when selecting new rabbits for replacement. When sourcing new rabbits, only young, strong, healthy rabbits should be selected (see page 5).

## Session 5: Daily care and attention

### Session Objectives:

At the end of this training session, each participant should:

1. Know the various methods to pick up a rabbits of different sizes (and how not to pick up a rabbit)
2. Know what are the necessary routine steps for care and management of rabbits
3. Understand the basics of hygiene and health in the hutch
4. Know the routine treatments to maintain healthy rabbits

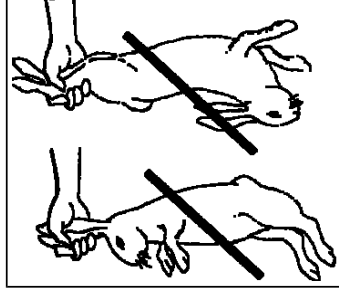
### Exercise:

Discuss:

1. How do farmers normally pick up a rabbit? How **should** you pick up a rabbit?
2. What routine steps would you take to maintain strong and healthy rabbits?

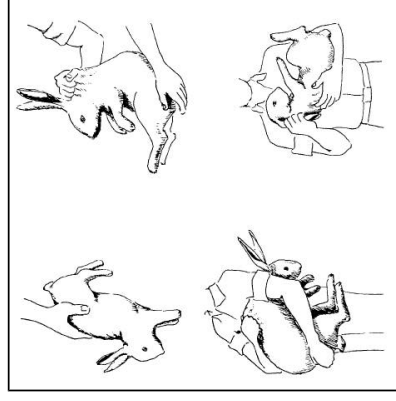
## How to handle rabbits

- Be aware that most people do **not** know how to pick up a rabbit. This diagram shows two wrong ways to pick up a rabbit. Both of these are cruel and can harm the rabbit. But unfortunately, both are commonly seen here in Malawi.



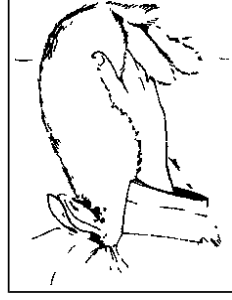
How NOT to pick up a rabbit:

- The proper way to pick up a rabbit depends on its size and on how excitable it is. The following diagrams show the proper way to pick up a rabbit.

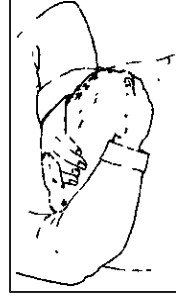


The proper way to pick up and hold a small or medium size rabbit:

The proper way to pick up and hold a full grown rabbit:



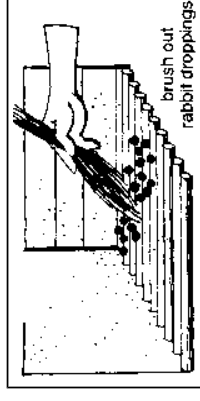
How to hold a larger quiet rabbit:



How to hold a larger excitable rabbit:

## Hygiene in the hutch

- Keep the pens clean. Brush out any remaining droppings regularly.



- Make sure all stale food etc is removed. Stale food, especially mouldy food, can harm rabbits. Always ensure that only fresh food is available. Any food remaining after a few hours should be cleaned out.
- Give the hutch a thorough clean between litters.
- If a rabbit begins to ruin its pen by chewing the wood of the walls or the floor give it a piece of wood to chew on.



- Check your rabbits every day. Keep an eye out for signs of sickness. The common signs of sickness include:

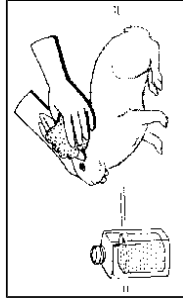
- Inappetence - the rabbit is not eating
- Weight loss
- Dirty fur around the tail
- Lack of agility - depression
- Rough, dry fur



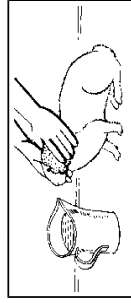
- If you suspect an infectious disease, remove the sick rabbits from contact with healthy ones.
- Burn or bury any rabbits which have died of disease.

### Some common routine treatments

- Ear washing for ear mites. Gently wash the inner and outer parts of the ear using a cloth soaked with either soapy water or a solution of medicine.



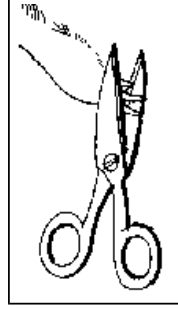
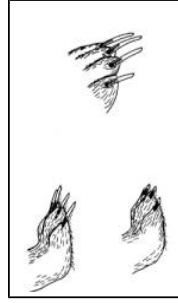
- Washing of eyes and nose. If the eyes and nose are weeping or runny, you can wash them gently using a wet cloth.



- You can wash sore feet and rub with vegetable oil.



- Rabbits in confinement grow long claws which must be trimmed. Trim carefully avoiding the red part - avoid causing pain and bleeding. If the nail bleeds, you have already cut too far. About 2 mm of the white non-living part of the nail should remain.



### Session 6: Diseases of rabbits

#### Session Objectives:

At the end of this training session, each participant should:

1. Know the general indicators of health and disease in rabbits
2. Know the general layout of the rabbit's digestive system

#### Exercise:

Visit an establishment where rabbits are raised. Make an assessment of the health and management of the rabbits you see. Take notes and discuss your findings afterwards.

#### General indicators of health or disease

- What should we look for to assess the health of our rabbits. First, we should do routine checks on the rabbits, every day.
  - Are they dull or inactive?
  - Check nose and eyes for discharges. Look at the colour of the discharge. If it is clear, there is no infection with bacteria. If it is yellow or greenish, an infection might be present.
  - Check the eye-lids and ear edges for little crusts (mange) and inside the ear for crusts. This can be a disease caused by ear mites.
  - Check the hutch for smells; diarrhoea often causes a foul smell.
  - Take note of the consistency of the droppings. Normal droppings are fairly firm dark pellets which should be reasonably dry and not particularly smelly.
- Keep hutches clean and dry, clean them every day.
- Check the food and water.
  - Is it dirty - contaminated with droppings or urine?
- Separate any rabbits you suspect are ill. Put them in another hutch out of contact with the healthy rabbits.
  - If possible, build a hospital hutch away from the main stable.
- During routine cleaning and management, deal with the healthy animals first. If there are any sick ones, handle them and their hutches last. This way, you may avoid transferring diseases from the sick ones to the healthy ones.
- Clean fresh air in the hutch is important - if you cannot stand the smell in the hutch, the rabbits probably cannot either.
- Do not give rabbits excessive wet food. Their droppings should be dry.

Session 7: Specific diseases of rabbits

Session Objectives:

At the end of this training session, each participant should:

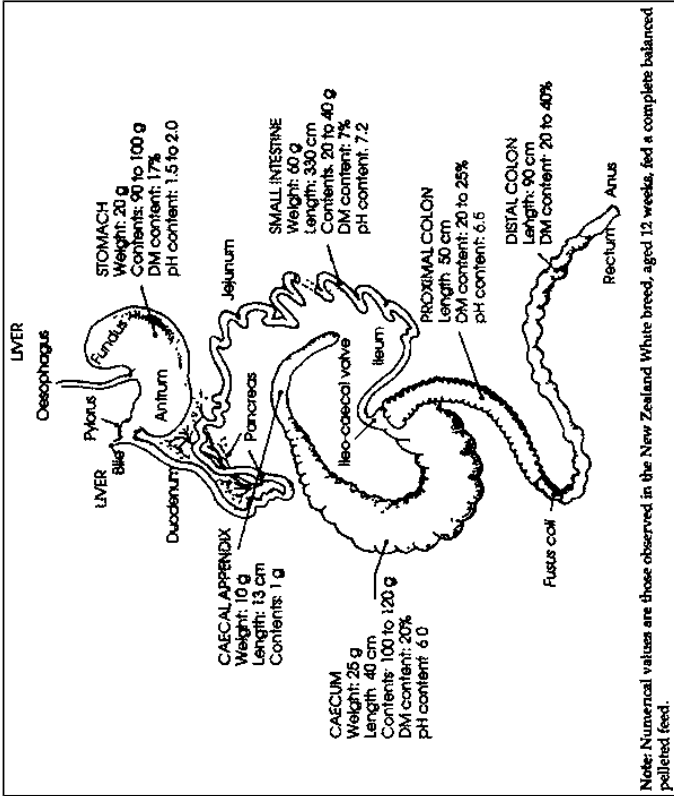
- 1. Know the common diseases which affect rabbits in Malawi
- 2. Know the symptoms and causes of these diseases
- 3. Know the basics of treatment and prevention of these diseases

Some common diseases of rabbits

- Rabbits suffer from a lot of different diseases but some are more commonly seen in Malawi. The diseases we will look at are:
  - Diarrhoea
  - Coccidiosis
  - Respiratory disease
  - Ear mange
  - Ringworm
  - Hutch burn or vent disease
  - Sore hocks (pododermatitis)

Basic anatomy of the digestive system of a rabbit

- The diagram below shows the main components of the digestive system of a rabbit.
- A rabbit is not a ruminant like a cow or a goat. The digestion of a rabbit is similar to a horse or a donkey.



|                    |                                                                                                                                                                                                                                                                              |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Diarrhoea</b>   | Diarrhoea is common in rabbits. It is often called scouring. It causes slow growth, loss of condition, and death.                                                                                                                                                            |
| Cause              | Feed: Poor feed, mouldy feed, or a sudden change in diet can cause diarrhoea.<br>Coccidiosis can cause diarrhoea - see below.                                                                                                                                                |
| Signs and symptoms | <br>The droppings are watery and foul smelling.<br>The anal area is wet and soiled.<br>There is poor growth, and listlessness.<br>There can be severe diarrhoea and death after 2-3 days. |
| Prevention         | Clean hutch, proper feeding, avoid sudden changes in diet.                                                                                                                                                                                                                   |
| Treatment          | Antibiotics are usually not effective for non-specific diarrhoea.<br>Feeding with high fibre feeds like grass hay can assist.                                                                                                                                                |

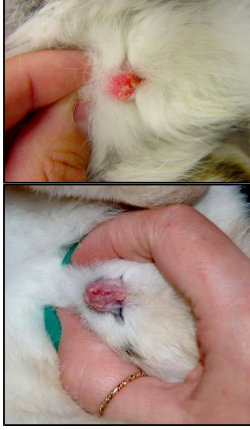
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| <b>Coccidiosis</b> | Coccidiosis is by far the most common and important disease of farmed rabbits.                                                                                                                                                                                                            |
| Cause              | A tiny germ called a protozoa. The germ is spread with the droppings and spreads to other rabbits when they ingest food. There are two types of coccidia, one which infects the intestine and another which infects the liver.                                                            |
| Signs and symptoms | The coccidia germs often affect young rabbits 4-10 weeks of age more than adults. They cause diarrhoea with a white mucus discharge.<br>At first, infected rabbits eat and drink less than normal and consequently lose weight. After some days they suffer from diarrhoea and often die. |
| Prevention         | Management is probably more important than drugs for control of coccidiosis. A clean hutch is always very important. Droppings should fall through the mesh or slats leaving a reasonably clean interior in the hutch.                                                                    |
| Treatment          | There are anti-coccidial drugs which can be given to rabbits in feed or water. Examples are decoquinat, amprolium, and sulpha drugs. If you cannot get these drugs, ask an extension officer where you can get them.                                                                      |

|                       |                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Mphutsi larvae</b> | This is common in young rabbits where the bedding material is damp.                                                                                                                                                                                                                                                                                                                            |
| Cause                 | <br>Mphutsi maggots are the larvae of a fly. The fly is sometimes known as tumbu fly. The adult fly is attracted by urine and lays eggs in damp areas such as damp bedding. Tiny maggots hatch out after a few days.                                                                                          |
| Signs and symptoms    | <br>The maggots are very small at first and burrow into the skin causing itching and reddening of the skin. Over 2-3 days, they grow to about 5-10 mm in length. As they grow larger, they cause more pain and itchiness. The wound looks like a boil. The end of the maggot can be seen at the skin surface. |
| Prevention            | The best prevention is to ensure that housing is clean and dry.                                                                                                                                                                                                                                                                                                                                |
| Treatment             | <br>Vaseline can be smeared over the wound. This prevents the maggots from breathing and they will emerge a little trying to get air. They can then be squeezed out of the wound.                                                                                                                             |

|                            |                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                     |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Respiratory disease</b> | Again, respiratory disease is common in rabbits.                                                                                                                                                                                                                                                                                                                                                  |                                                                                     |
| Cause                      | There are several different types of germs (bacteria) which can cause respiratory disease.                                                                                                                                                                                                                                                                                                        |                                                                                     |
| Signs and symptoms         | <p>There is discharge from the nose and watery eyes.</p> <p>There is snuffles and sneezing, and symptoms of a 'cold'.</p>  <p>The front legs are often dirty (they are used as handkerchief).</p> <p>There is weight loss because the rabbit does not eat.</p> <p>There can be death without any symptoms.</p> |  |
| Prevention                 | It is important to have a spare hutch to keep sick animals separate from healthy ones.                                                                                                                                                                                                                                                                                                            |                                                                                     |
| Treatment                  | Antibiotics such as oxytetracycline can be given in the water. Ask an extension officer about where you can get this medicine.                                                                                                                                                                                                                                                                    |                                                                                     |

|                    |                                                                                                                                                                                                                                                                                                                                                                                                                  |  |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Ear mange (canker) | This disease is common in older rabbits. It causes itchiness around the ears and thickening of the skin of the ears.                                                                                                                                                                                                                                                                                             |  |
| Cause              | Mange is caused by mites, tiny insects which bite the skin. There are several different types of mites. They are too small to see.                                                                                                                                                                                                                                                                               |  |
| Signs and symptoms | <div></div> <p>Because of the itching, infected rabbits shake their head and scratch their ears.</p> <p>There are scabs or scaly crusts, especially on the inside part of the ears. The mites can sometimes spread to other areas of skin.</p> |  |
| Prevention         | Mange is difficult to prevent. Chronically infected rabbits should be separated from young uninfected rabbits. If they do not respond to treatment they should be culled.                                                                                                                                                                                                                                        |  |
| Treatment          | Insecticides such as malathion can be used. Ivermectin injection is effective, especially in less chronic cases. The dose is 200 µg/kg twice, one week apart.                                                                                                                                                                                                                                                    |  |

|                    |                                                                                                                                                                                                                                                                       |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ringworm</b>    | This is a skin infection which affects rabbits of any age. It is somewhat similar to ringworm in humans.                                                                                                                                                              |
| Cause              | A certain type of germ which infects the skin.                                                                                                                                                                                                                        |
| Signs and symptoms | <p>Circular patches of hair loss with inflamed reddened skin.</p> <p>Ringworm can be severe in young rabbits, especially around the nose, ears, eyelids and feet.</p> <p>It can infect humans - this depends on which type of germ which is causing the ringworm.</p> |
| Prevention         | You can remove the rabbits from the hutch and disinfect it with chlorine bleach (Jik). Wait until the hutch is dry before replacing the rabbits.                                                                                                                      |
| Treatment          | You can treat the skin lesions with ointments which are used for treatment of ringworm in humans. These will not harm the rabbits. The hutch should be disinfected with bleach at the same time.                                                                      |

|                                   |                                                                                                                                                                                                                                                                                                  |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Hutch burn or vent disease</b> | This is a bacterial infection of the skin around the anus and genital area caused by urine and faecal contamination.                                                                                                                                                                             |
| Cause                             | <p>'Vent disease' is a specific venereal disease sometimes called 'rabbit syphilis'. It is caused by a specific germ.</p> <p>Hutch burn looks similar but might be caused by several other germs.</p>                                                                                            |
| Signs and symptoms                | <div data-bbox="384 286 635 714">  </div> <p>At first there are small blisters. These rupture forming yellow or brown scabs. Pus may be present. The disease is usually associated with dirty hutch floors.</p> |
| Prevention                        | <p>Cleanliness in the hutch is very important.</p> <p>Don't buy infected animals - check before accepting.</p> <p>Do not loan bucks for others to breed from.</p>                                                                                                                                |
| Treatment                         | <p>Antibiotics may help if used early (penicillin injection).</p> <p>Clean and disinfect the affected area daily. Lanolin ointment may be useful.</p> <p>Infected rabbits should recover in 10-14 days. If they do not, consider culling them.</p>                                               |

|                                       |                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Sore hocks</b><br>(pododermatitis) | These are sores on the hocks where the skin is infected and sore.                                                                                                                                                                                                                                                     |
| Cause                                 | This condition can be caused by wet floors, or floors that cause irritation because they are too rough. Some rabbits are nervous "stompers" because they keep beating their feet on the floor.<br>Sometimes, this condition has a genetic cause and it is seen more often in the offspring of certain parent rabbits. |
| Signs and symptoms                    |  <p>Sores appear on the rear feet and in severe cases on the front feet as well.<br/>There are inflamed bare spots, lameness, and soreness. The example in this photo is very severe.</p>                                          |
| Prevention                            | Good floor design is important. Wet floors must be avoided.                                                                                                                                                                                                                                                           |
| Treatment                             | Treatment is often difficult. You can try moving the rabbits to a softer floor. If they do not improve, you should consider culling them.                                                                                                                                                                             |

### Review questions

1. What are some of the advantages of raising rabbits?
2. What are the basic housing needs of rabbits ie what sort of environment do rabbits need?
3. What do we need to start raising rabbits?
4. What do we need to consider to ensure good housing for rabbits?
5. What is the recommended spacing between floor slats? What is the recommended size of mesh for a wire floor?
6. Why are nesting boxes important?
7. What is the recommended floor size for a single hutch?
8. If we have one buck and two does, how many hutches will we need?
9. What is coprophagy? What possible advantages does this have for rabbits?
10. Up to what age can we keep rabbits together after which they tend to fight?
11. When does a rabbit come on heat?
12. For mating, how long do we leave the doe in with the buck? What do we do if they do not mate?
13. How do we check for pregnancy in rabbits? How long is the gestation period?
14. How many kittens should we allow as a maximum in one litter? Why?
15. How many times a day does a doe feed her kittens?
16. At what age should kittens be weaned?

17. When you purchase new or replacement rabbits, what do you check for?

18. What are two ways you should not pick up a rabbit?

19. What are some common routine treatments to keep rabbits healthy?

20. What is the most common disease of farmed rabbits?

21. Name some other common diseases of rabbits.

A sample recording form for rabbit production.

Use one page like this for every kindling. You can copy the form into a note book so that the records are not lost. Later you will be able to see how many rabbits you have bred in total.

| Recording form for rabbit production                               |  |
|--------------------------------------------------------------------|--|
| Name of doe:                                                       |  |
| Date mated (1):                                                    |  |
| Date mated (2 - if any):                                           |  |
| Date nest box put in:                                              |  |
| Date kindled:                                                      |  |
| Number of kittens born:                                            |  |
| Date of weaning:                                                   |  |
| Number of kittens weaned:                                          |  |
| Remarks (eg reason for any deaths, any problems encountered, etc): |  |