

ABOUT THE BOOK

A Guide to Raising Rabbits is a Comprehensive Guide to Successful Rabbit Production. The book offers information about every aspect of rabbit production including:

- * *Choosing the right breeds*
- * *Feeding and housing*
- * *Heath Maintenace and Disease Preventions*

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A Guide To RAISING RABBITS

Care Facilities Management
Breed Selection



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EBENEZER UDOFIA

A Guide to
Rabbit Production
and
Management
(for Self-reliance)

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PREFACE

Agriculture in Nigeria is characterized by an imbalance in crop production to animal production: it has been estimated that crops constitute about 80% of our agricultural output while only 20% are livestock. This imbalance is reflected in extremely low animal protein intake of average Nigerian. There has been a very rapid growth in human population without a corresponding increase in livestock production. There is therefore an urgent need to explore many new avenues in livestock production if the existing gap between animal-protein supply and demand in Nigeria is to be bridged.

The superiority of animal protein to plant protein in terms of nutritional values, is quite obvious. (Ibeawuchi and Fayuyitan 1986), because animal proteins are more digestible, the essential amino-acids are complete and balanced to meet human nutritional needs than from plant origin.

It has long been realized that low protein in-take is the most important factor responsible for high incidence of retarded growth, high rate of kwashiorkor and marasmus, high rate of child mortality, low level of human productivity and short-life span among many African communities.

Livestock development is the only way of tackling the problems of protein deficiency as plant protein source alone cannot meet the body's physiological needs. It is important that animals which possess a high level of biological and economic efficiency be involved in the expansion of meat-protein supply;

Factors to be considered include: maturity-rate; generation interval; production cost etc. Rabbit being a short-cycle animal can satisfy these needs.

Rabbit efficiency in conversion of waste food and surplus garden produce into edible meat can hardly be over-estimated. Hence the author intends to share his experience and those obtained from other authors, leaflets and booklets, agencies and Organizations trying to exploit the rabbit characteristics and potentials in the tropics to present the domestic rabbits as an excellent source of animal-protein for human consumption in Nigeria. Furthermore, he intends to make this collective experience available to the Nigerian youths who could take a better advantage of it by being self-employed through rabbit production.

EBENEZER UDOFIA.

TABLE CONTENT

Preface	-----	
Acknowledgement	-----	
Introduction	-----	
Prospect of rabbit production	-----	
CHAPTER ONE		
Origin and domestication history	-----	12
Breeds of rabbit	-----	12
CHAPTER TWO		
Housing and equipment	-----	16
Types of hutch, hutch construction	-----	17
Siting of hutch and		
maintenance of hutch equipment	-----	
CHAPTER THREE		
Feeds and feeding	-----	25
Nutrient requirement	-----	26
Feeding systems	-----	29
Voluntary feed-in-take	-----	30
CHAPTER FOUR		
Handling and transportation of rabbits	-----	33
Rabbit environment	-----	34
Recycling of rabbit nutrients	-----	
CHAPTER FIVE		
Management operations	-----	36
Observation and examination	-----	36

- Identification -----	37
- Weighing and record keeping -----	38
- Production evaluation -----	40

CHAPTER SIX

- Reproduction management -----	41
- Sexing, mating -----	41
- Pregnancy -----	44
- Kindling -----	44
- Weaning -----	46
- Rabbit breeding -----	47

CHAPTER SEVEN

- Health and Diseases management -----	49
- Preventive measure -----	49

CHAPTER EIGHT

- Rabbit meat and rabbit processing -----	54
- Cooking and skin treatment -----	55
- Reference -----	56
- Glossary -----	57

Introduction

Food and Agricultural organization (FAO 1987) has estimated animal increase of five to seven percent (5-7%) growth-rate for meat consumption. Such increase cannot be met easily by large animals because of slow production cycles. They may however be met by short life cycle animals like poultry, pigs and rabbits. Poultry and pigs require food sources which are in serious competition with man.

Rabbit can be produced on forage alone although production can be improved by addition of other food by-products. Increase rabbit production could bridge the supply and demand protein gap and it is far the most appropriate type of production system for subsistence meat-production.

Rabbit *Corylologus cuniculus* is in the group of animals that exist in the border line between ruminants and monogastric (non-ruminant) animals. Hence they are regarded as "Monogastric-ruminants" due to the fact that they feed on both vegetables and concentrates.

Prospects of Rabbit Production

Rabbits are medium size hopping animals with long legs, long ears and short tail. They are noiseless and easy to manage; they require small compartments due to their body conformation unlike cattle and other small ruminants which requires a large area of land and are mostly located at the outskirts of the entire surrounding due to their pungent odour and continuous noise making.

The production of rabbit is less expensive compare to other livestock production which requires a lot of finance. The rabbit rearers can handle the business solely within the limit of their resources without any external source of funds. Thus expansion of the litter from six to ten does or more and obtain about double of the net returns is possible and easy.

The normal breeding programme for rabbit starts five (5) month of age, while cattle, sheep and goat may reach up to one to three years before mating. A doe (female rabbit) is ready for mating immediately after kindling (giving birth).

Rabbits convert grain food and vegetable to meat more efficiently. They exhibit a phenomenon called coprophagy recycling their soft faecal pellets thereby supplementing protein quantity, quality and B-vitamins by recycling the soft faeces they also improve the digestibility of the food that was undigested the first time.

The meat of domestic rabbit is outstanding both for its dietary constituents and its chemical composition when compared to others rabbits incorporate more protein in its body than broilers. Roa et al (1979) stated that because of its extremely low cholesterol and sodium levels (136 mg and 393 pp respectively), rabbit meat plays an important role in the prevention of vascular diseases. Furthermore, rabbit meat is low in fats and the fat is unsaturated type. Beef, pork and chicken contain 230, 230 and 220 mg per 100g respectively. (Roa et al 1979).

Rabbit meat also serve as a source of protein for coronary heart patients and reduces the incidence of hypertension in human because it is richer in protein and lower in fat content than any other livestock.

Apart from meat supply, rabbit still play an important role in the development of livestock production in the country at large. By-products like the skin can be used for making jackets and other house hold decorative. The skin has a high quality products (Sigh et al 1984) observed that wool for spinning can be obtained from Angora rabbit whose raw wool has pure wool content of 99% compared to sheep which has 50% wool.

The bones which contains high amount of calcium can be used for making feeds for poultry and other livestock.

Rabbit manure is very important in improving the fertility of the soil because of its high content of nitrogen and phosphoric acid.

The common disease incidence observed in rabbits are minimal compared to other livestock. Their diseases are sore-hocks, caused as a result of injury sustained from objects such as hutches of the rabbits, pains caused by coccidia, pneumonia, colds and snuffles as a result of damply environment or when they are exposed to cold environment. All these diseases are mild as compared to tuberculosis, anthrax, brucellosis etc which are zoonotic in nature and are mostly found in cattle, sheep and goats.

On the whole, intensive production of rabbit in this country (Nigeria) is an alternative at present to solve the problem of animal protein deficiency in our diets.

Thus, if you are looking for livestock that is inexpensive to buy, easy to manage, prolific, of high protein content and low in fat (cholesterol) and salt, then it must be rabbit.

The potential of rabbit production are enormous, particular when considering the high cost of feeding other livestock. In rabbit production, forage feeds are in the farms, housing materials are not expensive, it does not require any formal skilled knowledge in the production, it can be incorporated with other livestock thereby increasing the farmers' income.

CHAPTER ONE

ORIGIN OF RABBIT

Introduction:

Good husbandry depends upon knowing the animal you are keeping, its origin and behaviour. This section will deal on the origin, domestication and breeds of rabbits.

Domestication History

The story of domestication of the wild rabbit is not fully known. Although, the Romans kept rabbits in big colonies, it seems that true domestication only began in the 1600s as a result of the work of religious groups.

All domesticated rabbits today are the result of enthusiastic and careful selection over many years. Sailors leaving Europe to explore the world in the 1800s, took rabbits on their ships and often released them in the countries where they landed. The purpose of this was that the rabbit would breed and multiply and the resulting offsprings would be available as a source of fresh meat when the sailors next returned to that country. In this way, rabbits were introduced to many parts of the world including Nigeria (Aduku and Olukosi 1990).

Breeds of Rabbit:

According to Aduku and Olukodi 1990 there are many breed rabbit in the world. The following are commonly recognized in Nigeria:

New Zealand White: This bred is the most widely used throughout the world for meat production. It is all-white in colour with red shining eyes, it is a medium size

animal and usually weighs 4.1 – 5.4 kg at maturity. The average kitten per doe per year is 50. (Some New Zealand white are also either black or red in colour).

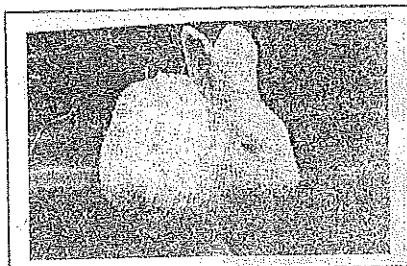


Fig (1) A New Zealand white rabbit

Flemish Giant:

As the name suggest, this is a giant breed eighing between 5.5 – 7.3 kg at maturity. It is light-grey, sandy-blue or white in colour. The average kitten per doe per year is 40.

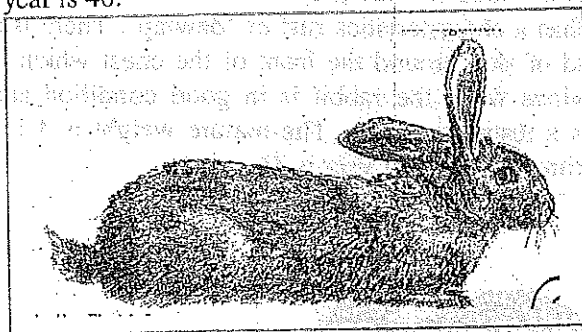


Fig 2: A Flemish giant rabbit

California Rabbit:

This breed is white with black colour at the nose, ear, feet and tail. It weighs 3.5 – 5 kg at maturity, the kitten per doe per year is 48.

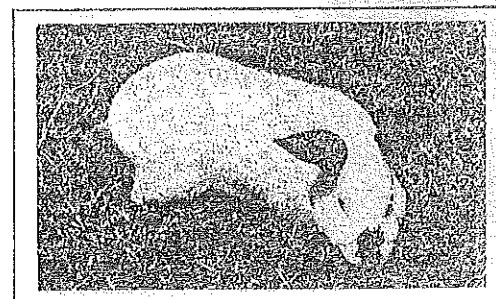


Fig 3: A California Rabbit

Chinchilla

This breed is blue-grey in colour with a white belly. It has a characteristics ruff or 'dewlap'. There is a thick fold of skin around the front of the chest which is very obvious when the rabbit is in good condition and sitting in a resting position. The mature weight is 4.1 – 5.5 kg, kitten per doe per year is 38.

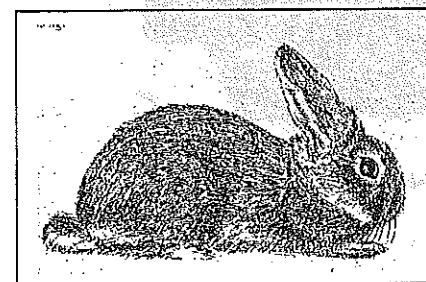


Fig 4 American Chinchilla Rabbit

Dutch

The Dutch is a small breed with a mature live weight of 2.5-3.5 kg. it has a wide white band of fur around its body at the shoulders as well as a white stripe down the middle of its face. Its front feet fall within the white band, the tip of its back feet are also white.

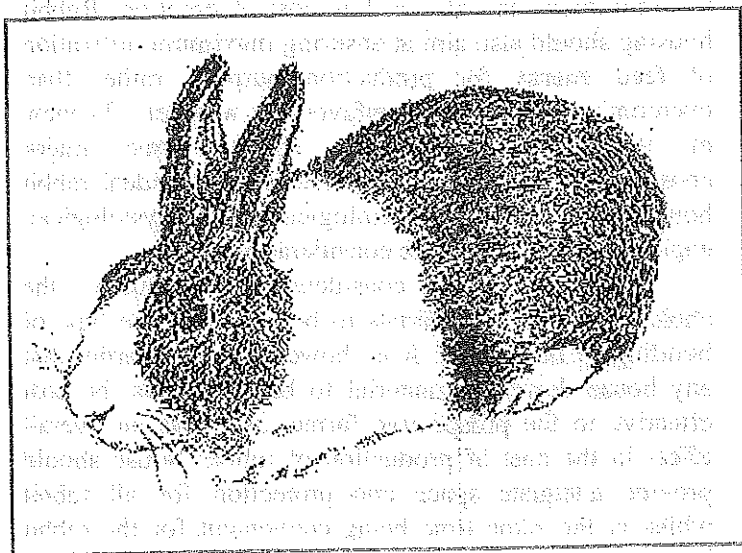


Fig 5: Dutch

CHAPTER TWO

HOUSING AND EQUIPMENTS

Rabbit Housing (Hutches and cages) should be aimed at providing adequate shelter, a healthy and comfortable environment and reduce labour requirements to a minimum and also at low cost of erection. Rabbit housing should also aim at ensuring maximum utilization of feed energy for production purpose rather than overcoming the effect of unfavorable weather. In view of the requirement listed above, three major considerations are vital in the erection of an ideal rabbit house. These include biological and physiological, engineering and economic consideration.

The economic consideration determines the choice of building materials to be used and the type of building to be erected. It is, however, note worthy that any house design or material to be used must be cost effective to the prospective farmer as it has an overall effect in the cost of production of rabbit: house should provide adequate space and protection for all rabbit whilst at the same time being convenient for the rabbit keeper.

Space

The rabbit spend its entire life in its hutch and needs sufficient space to avoid the stress caused by restriction of movement. Vertical space is as important as horizontal space if the rabbit is to carry out its normal activities including stretching upon its hind legs. Space is also critical ensuring good ventilation and temperature control within the hutch. This requirement is important

for the rabbit comfort and in avoiding conditions which favour disease outbreaks.

The minimum dimensions for a one rabbit hutch, as recommended by the Royal Society for the Prevention of Cruelty to Animals, are as follows: 48inc. X 24inc. X 24inc. (1.2m X 0.6m X 0.6m). For two females the overall length should be increased to 60inc. (1.5m). (Phil Drabble 1986)

Protection

Protection is required from injury within the hutch, from rain, direct sunlight, direct and indirect wind, sudden noises, predators such as dogs, cats, rats, snakes and very importantly poachers.

Convenience and Ease of Management

If the rabbit is to be well managed, the hutch should be designed to assist the keeper to carry out activities such as observation, handling, feeding; Mating; cleaning and disinfection. Male and Female rabbits from three to four months old should be kept in separate hutches. Ideally every fully grown rabbit should have its own hutch.

Type of Hutches

There are basically two types of rabbit hutches:

- (1) Indoor Hutches – where rabbits are kept inside a house or open shade.
- (2) Outdoor Hutches – where rabbits are kept outside all the time. These hutches have advantages and disadvantages as follows:

Indoor Hutches

Advantages:

- It provides good conditions for the rabbits and the rabbit rearing.
- Rabbits are more easily observed;
- Individual hutches are easier to be kept clean.
- It is particularly useful when many rabbits are kept.
- It is easier to protect rabbits from predators.

Disadvantages:

- It requires a major initial investment and usually too costly for the beginners.

Out – Door Hutches

Advantages: It is relatively cheap and appropriate for a starter.

Disadvantages:

- It is impossible to meet all the protection requirements all the time.
- The outdoor hutches are difficult to clean and keep dry.

Hutch Construction

In constructing an outdoor hutch, the requirements of space, protection and ease of management can be achieved through appropriate design, construction and siting. An ideal hutch for any purpose should have the following recommended dimensions:

- Approximately 1m above the ground;
- Height of hutch: 60cm (0.6m)

- Width: 50 – 60 (0.5 – 0.6m)
- Length 90 – 120cm (0.9 – 1.2m)
- Floor space:- Small scale semi – intensive system
1m² per-adult, no extra for the litter.
- Large scale intensive system:
0 –4kg live weight, 0.35m²per rabbit:
4– 6kg live weight, 0.5m² per rabbit; 0.2m² extra for the litter

Floor design: Floors should slope outwards.

- Wire floor should have 1 – 1.5cm² and be made of Galvanized wire: (Tropical Agriculturist series)

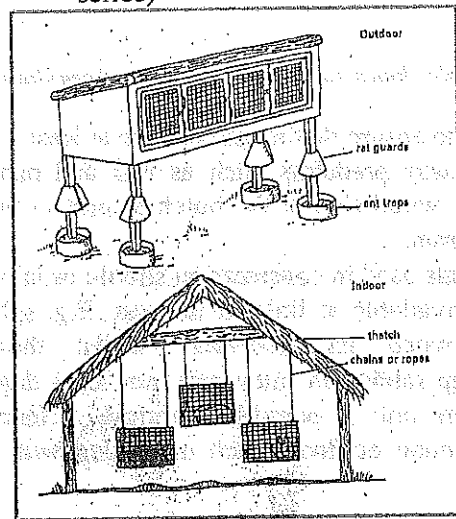


Fig 6: Outdoor and indoor hutches

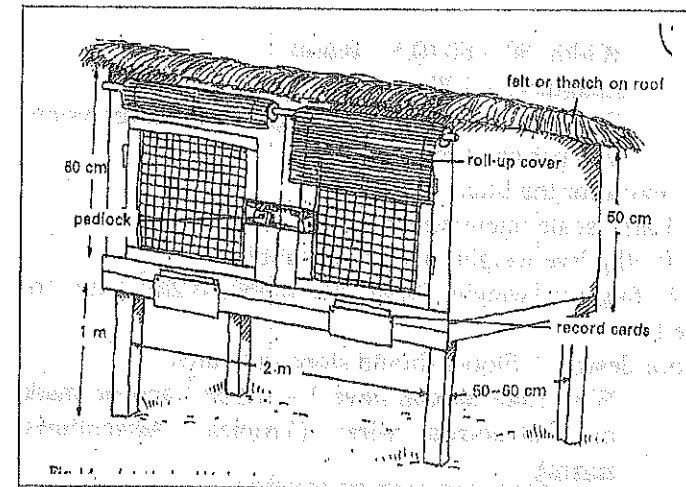


Fig 7: A typical rabbit hutch (dimension; Tropical Agriculturist series)

It is important to ensure that hutch legs are at least 1m high to keep away predators such as rats and hang over any slatted or wired side of the hutch to protect the rabbit from heavy rain.

The materials used in construction should usually be those that are available at little or no cost. E.g. split bamboo, mud, wood e.t.c. However, whilst these materials may keep rabbits in, they may not keep dogs and other predators out: If possible therefore, a fence should be built around outdoor hutch and fitted with a padlock gate.

Siting of Rabbit Hutch

With only one or two outdoor hutches, it is relatively easy to site them as experience and circumstances

dictate. Common aspect to be considered in siting outdoor hutches are:

- Placing them next to a house-wall or fence gives shade and protection from sunlight, rain and wind; too much sunlight is stressful and too little sunlight is also undesirable because the hutch may become damp; there will also be reduced disinfection by the sun's ultraviolet rays.
- Security against thieves and predators is usually best achieved when hutches are next to the keeper's house, except for the frequent stressful noise and disturbance; rabbits are easily frightened and will not do well if in a constant state of fear.

Indoor Hutches

The hutches within the house can be much simpler than outdoor hutches and simple boxes made from wired frames can be used. These can be hung in different forms within the house.

Floor Methods of Housing

This involves keeping the rabbits on the ground in a fenced area provided with boxes for shelter. Several does may be kept in the same area. An alternative is to make a deep layer (about 3inc.) of dried straw, rice husk or wood-shavings. Mud or wooden shelters that can be secured at night can be constructed to provide protection from predators.

Rabbits may be allowed to burrow in floor system

and may rear their young in these burrows. Bucks should be kept separate from the does and young rabbits unless there is plenty of space; fighting among the does can as well be reduced by providing enough space (about 1m² per doe). For floor method of rearing to be successful, there must be constant cleaning and avoidance of overcrowding.

Hutch Equipment

The following equipments are required for any successful rabbit production operation:

- Water trough
- Feed trough
- Kindling box.
- Transport box and storage facilities.

The basic requirements for the above equipment are as follows:

Water and feed trough –

- It should not be tipped over;
- It should discourage scratching – out of content.
- It should be of adequate size and depth
- It must not cause injury to the rabbit
- It should be cost effective or be constructed locally.

Kindling boxes should provide a secure, draught-proof dry container in which the doe can kindle;

- Prevent the young rabbits from leaving until they are at least 2 weeks old.

Water trough can be made of tin, and care should be made to prevent it from becoming fouled with faeces or Urine. Simple bowls or pots can be used.

Feeding troughs can be made of heavy deep clay bowls. Light-weight tins or bowls will not be adequate unless fastened to the hutch. Kindling boxes can be made of wood or split bamboo. Both close and open boxes can be successful.

The roof of a closed box can act as a resting area for the doe when she wants to escape from the milk demands of her litter.

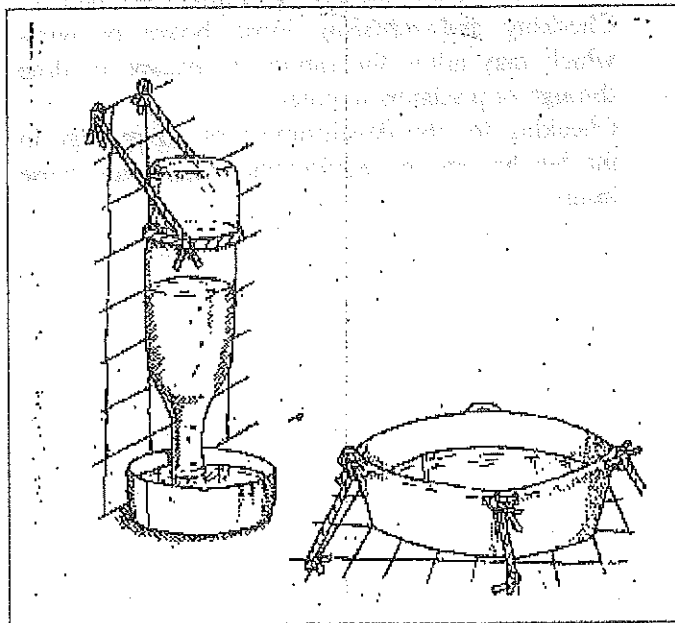


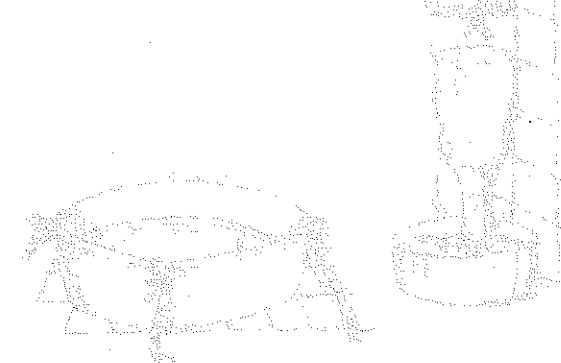
Fig 8a. locally made water trough

- b. Open and close kindling boxes
- c. Kerosene tin (Tropical Agriculturist series)

Maintenance of Hutches and Equipment

Hutches and equipment may not last long if it is not given adequate regular maintenance. Thus it is necessary to carry out the following:

- Cleaning of hutch and equipment every 2-3 day;
- Complete cleaning between litters using soap and water and if possible disinfectant. This should be followed by complete drying in direct sunlight;
- Checking and repairing loose board or wires which may allow the rabbits to escape or drop through or predators to enter;
- Checking for the development of sharp edge in the hutches and on equipment which may cause injury.



CHAPTER THREE

FEEDS AND FEEDING

The success of any livestock venture depends largely on feeding. Animals need food for the maintenance of their body and for production. Food is vital for the physiological or biological functions performed by the animals e.g. respiration, excretion, reproduction e.t.c both the quantity (level of production) and the quality of livestock product are directly influenced by the state of nutrition. The quantity and quality of feed required by the animal is influenced by several factors such as age, physiological state (pregnancy, lactation etc) and growth rate of the animal. When animals are not properly fed, their productivity in term of meat, milk e.t.c is adversely affected.

Poor feeding may also result in disease condition and animal need feed for the maintenance of good health and to ensure resistance against disease and parasites. The greatest proportional cost in livestock production is expended on animal feed stuff. The cost of feeding rabbit is about 65% of the total cost of production.

Nutrient Requirements

Water may not technically be a nutrient but is however an essential requirement. Water consumption in rabbits is greater than might be anticipated. This is especially so for the lactating doe.

Rabbits like all animals need four groups of nutrients;

- (1) Carbohydrate
- (2) Protein
- (3) Minerals
- (4) Vitamins

- Carbohydrates and fats provide energy. Energy is the rabbits stimulant, without a stimulant, a tissue cannot react to an impulse; similarly without energy a rabbit will soon die. Energy is used to contract muscles which enable the rabbit to move. It is also used to join substances together to build up rabbits' body and to make products such as hair and milk.

Note: Rabbits fed only on forages cannot obtain as much energy as rabbits fed on concentrate feed such as maize grain or cereal brains. For breeding rabbits, a general recommendation is that the food should contain 65 – 66 % TDN (Lufadeju 1988).

Proteins

All the body tissue other than bones, teeth and fat are proteins; including Enzymes and hormones. Proteins are made up of many different amino – acids, in a variety of combination. The rabbit makes its own particular protein from the proteins and amino-acid it obtained from its food. Lysine and methionine are the two most important amino-acids as these are usually the amino-acid which are most likely to be deficient in rabbit diets.

Crude protein is an appropriate measure of the total amount of amino-acids. For rabbits, the recommended crude protein level in the dry-matter of the ration is:

- Over 18% for newly weaned rabbits;
- 16 – 18% for rabbits from 12 – 24 weeks.
- 15 – 17% for breeding does
- 12 – 14% for all other stock. (Tropical Agriculturist series).

Minerals

The minerals that are required for rabbits are divided into major and trace minerals. Major minerals are required in relatively large amount while the trace minerals are those required in small quantities (see table below).

Major Minerals

Calcium and phosphorus help to give the bones their hardness. They are also involved in maintaining the acid alkaline balance in the blood.

- Phosphorus is also involved in energy transfer within the body cells. Calcium, phosphorus and Vitamin D are often considered together because they interact with each other.
- Magnesium is also a component of bones and is important in chemical reaction involving enzymes.
- Sodium, Potassium and chlorine are very important in maintaining the alkaline balance in the body.

Note: Rabbits are born with high level of iron in their liver-sufficient for their pre-weaning growth.

Table 1:

Major mineral	Trace minerals
Calcium	Iron
Phosphorus	Copper
Magnesium	Sulphur
Sodium	Cobalt

Potassium	Zinc
Chlorine	Manganese
Selenium	Iodine

(Farrell 1984)

Vitamins

These are chemicals that are required in very small amount to speed up chemical reactions within the animals body.

Note: A balance diet is that which provides all the nutrients the body needs at the right proportion. A variety of forages should satisfy the need for different minerals and vitamins and using young forages should ensure a reasonable level of energy and crude protein. It is important to avoid old plant and grasses when looking for rabbits feed. Kitchen waste such as uncooked vegetables and cereals, remains of meal can be fed to rabbits provided the waste is still fresh and unsoured. Also the waste must be removed after a few hours if it is not eaten by the rabbit; the waste should also represent less than half of the rabbits' daily ration. Salt-licks may be provided for the rabbits. For better understanding; rabbit food may be grouped as follows:

- (1) **Hay**: well cured green legume hay such as cowpea, groundnuts, mucuna, soyabeans and stylo are palatable and make the rabbit grow well.
 - Grass-hay such as gamba are less palatable but valuable where legumes are not readily available.
- (2) **Succulents**: carrots, potato-leaves, lettuces, cabbages and similar vegetables should be fed only to adult

rabbits and in small quantities if fed to young rabbits- they may cause diarrhea.

- (3) **Starches and Grains:** potatoes, if feed should be boiled; Rice-bran etc.
- (4) **Protein supplements:** Groundnut-cake, cotton seed cake and Soya beans-meals are rich in protein.
- (5) **Mineral salt and water:** about 5% of common salt should be mixed into the ration, fresh water should be provided all the time.
- (6) **Miscellaneous feed:** Dry bread, other table and kitchen waste except meat and greasy or sour food are acceptable to most rabbits. They eat variety of the diet when used to supplement grain roughages or pelleted rations. (Aliyu 1990)

Feeding Systems

There are basically three (3) systems in feeding rabbits:

- (1) **Extensive System:** Involving total dependence on forages and kitchen wastes.
- (2) **Intensive System:** this involves the total dependence of rabbits on prepared concentrate feeds from feed mills.
- (3) **Semi-Intensive system:** this is the use of forages supplemented with prepared concentrated feeds.

The above systems of feeding have their advantages and limitations:

Extensive System

Advantages:

- it is cheap to operate
- easy to provide the quantity of feed required

Limitations:

- Everything depends on the keeper to choose the correct feed.
- Supplies of forage may vary throughout the year;
- Quality is variable and is often too low for reasonable production.
- Needs a lot of labour and may introduce disease and health problems.

Intensive System

Advantages:

- Needs little time for feeding
- High level of production can be obtained
- Little risk of diseases being brought in with the food.

Limitations

- it is very expensive to operate
- depends on the supply(ies) from the feed mills which may not always be available or of good quality.

Semi-Intensive System

The semi-Intensive system of rabbit feeding falls between the extensive and intensive system in terms of advantages and disadvantages. It is also the system that is most suitable for the small-scale producers because it can make the best use of forage but also make good use of concentrates at the critical times i.e. the last trimester of pregnancy, lactation and post weaning.

Voluntary Feed Intake

According to Aremu (1988), voluntary feed intake is

important as rabbit need food for their survival and maintenance of its body, the extra food consumed will go to support production; (milk, growth and reproduction). This feed intake is affected by several factors such as: availability of water; health condition; temperature; physiological state of the rabbit; feed quality e.t.c.

- (a) **Availability of water:** it is important that rabbits have a supply of fresh, clean water that is renewed daily. Insufficient water will reduce feed intake.
- (b) **Health Condition:** one of the first signs of ill-health in rabbit is a fall in feed intake. Occasionally, where there is a deficiency of a nutrient, rabbit will chew excessively at their hutch (a depraved appetite). If fiber is lacking, the rabbits may chew each others' fur.
- (c) **Temperature:** rabbits are very sensitive to temperature, as the surrounding temperature rises the rate of food intake declines.
- (d) **The State of the Rabbit:** pregnancy and lactation tend to stimulate feed intake, although in the last days of pregnancy food intake may decrease as the size of the fetuses increases and the doe experience increasing discomfort.
- (e) **Food quality:** rabbits can only eat more food when the already eaten ones pass quickly through the digestive system. Rate of passage depends upon food quality. The higher the quality of the food, the more feed intake.
- (f) **Freshness of food:** stale food will reduce intake. Especially if it is contaminated with urine and faeces.

Dirty grasses will be ignored yet the rabbit may be hungry, therefore feed little and often!!

NOTE: Do not feed very wet forages to rabbit or placing feed on the floor of the hutch. But always wash dusty foods collected at the roadside and allow them to dry before feeding. Also feed at the same time each day; feed at least three times per day and have proper troughs (for food and water). It is very vital to ask about how a rabbit was fed when you are buying and try to carry on feeding in the same way for the first one or two weeks whilst you change gradually to your system of feeding.

(Ibeawuchi and Fajuyetan, 1986) observed that poultry chick mash and layers mash are best concentrate for rabbits, it has all the ingredients of a good feed, last long and is well liked by rabbit, this added to the advantages of rabbit production over other livestock in towns and cities or in the face of forage scarcity.

CHAPTER FOUR

HANDLING AND TRANSPORTATION OF RABBITS

The importance of a skillful handling of rabbit cannot be overstated; the skeleton of rabbit is not as strong as for example that of a similar sized cat, its backbone is easily damaged often leading to paralysis if it is dropped; more over rough handling is a cause of stress to the rabbit.

Most domesticated rabbits are easy to handle but some can be aggressive, grunting and even biting. Handling should be purposeful and firm. Simply holding the base of the ears whilst covering the face and eyes will usually cause the rabbits to be still.

Rabbits should never be lifted by their ears because it is very painful to them. It may also cause stretching of the ears at their base and may begin to drop when they should be erect. It is equally important to always talk to rabbits in a soothing voice when handling them. Rabbits can either be handled by scruff or by pelvis. Points to note when handling rabbits by scruff:

- the handler must have short finger nails.
- The rabbit should be lifted by the skin behind the ears (Scruff).
- The rabbit should be held and supported by placing the other hand under the hind quarters.
- Do not hold the back-legs as this will cause the rabbit to struggle and kick.
- Holding rabbit against your body will also discourage struggling.

Fig 9. The correct way of holding a rabbit by its scruff.

Handling rabbits by pelvis. This method is usually used when handling young rabbits only. Young rabbits being transferred quickly from hutch to hutch may be lifted by the pelvis or the skin on their back.

TRANSPORTATION

When carrying rabbits for some distance, it is easier and comfortable for the rabbit if it is held close to the handler's body. If rabbits have to be move over long distance, a "transport box" is advisable. The box should be dark inside but well ventilated; a woven basket is ideal. It is sensible to allow the rabbit to get accustomed to the box before it is used (may be by placing it in the rabbit's hutch for few hours before using it).

RABBIT ENVIRONMENT

Every rabbit lives in a particular environment and interact with it, the most important factors to be considered very necessary are: temperature, humidity and ventilation in the hutch; the floor and hutch space available per rabbit;

The presence and number of other rabbit; parasite and disease organism; other things near the hutch like noise, children, dogs, cat, rats, snakes e.t.c.

RECYCLING OF RABBIT NUTRIENTS

Coprophagy is a very important part of the rabbit digestive processes. It recycles some unabsorbed nutrients as well as returning protein and vitamin- B rich bacteria for enzyme digestion in the small intestine.

Coprophagy is a unique digestive process whereby rabbit eat-back their soft faeces for further digestion.

Rabbits engaged in this unique phenomenon mostly at night when they are completely undisturbed. Highly stressed rabbits (e.g. those frightened by dogs or unfamiliar noise and sick rabbits) may stop engaging in coprophagy and these uneaten faeces may be seen on the floor of their hutches.

CHAPTER FIVE

MANAGEMENT OPERATIONS

Rearing of rabbits require some skills and the effective application of these skills will determines the success of any rabbit unit although these skills may come with practice and can as well be developed through questioning from other experienced rabbit rearers or livestock extension workers. The required skills include:

- Observation and examination
- Weighing and recording (record keeping)
- Identification
- Reproduction management
- Culling
- Identification of un-healthy stock.

Observation and Examination

When all the conditions for rabbit rearing have been met e.g. Housing and equipments, as the stock are brought in a full examination and observation of the rabbits is required and this involve looking carefully at the animals individually and seeing their reactions, including their feelings. Observation of the rabbits is a frequent and continuous process; the rearer has to check if everything is well; does the rabbit look frightened? Have they eaten all their food? Are their hutches looking normal? Is the water trough full with water or it has been tipped over? What about their fur? Are there any signs of watery faeces e.t.c These are some questions that could guide the rabbit keeper for effective – observations. Then he can take the rabbit from the hutch if he has observed any

abnormalities and place it on a flat surface at chest-height in a well lit-place. He can run his fingers gently over its body. Also he should examine whether the rabbit's abdomen is swollen or distended; is the fur coarse and rough to touch? Are there patches of skin with no hair? Are the nostrils clear or running with fluid; are the eyes dull and running? Are there any scabs on the skin? Are there any sore in the ears?

While holding the rabbit in a sitting position, examine the fur around the anus: is it dirty with faeces? Is there any sore on the bottom of the feet? If yes is the answer to any of the above questions then the examination shows that your animal is sick so consult a veterinary officer or a livestock extension agent.

IDENTIFICATION

Identification of rabbit is the act of marking the animal in order to allow for easy differentiation; this is necessary when a rearer keeps a more than three rabbits. Identification marks will ease the management of these rabbit (observation, examination, and recording e.t.c.).

Some methods of Identification include:

(1) Ear tattooing (2) Neck and leg tagging (3) Ear notching.

EAR TATTOOING

This is a process where inks of prominent colours are use in writing either numbers alphabets or name inside the rabbit ears. This should always be renewed at least twice a month.

NECK/LEG TAGGING

This method involves fitting of rings or bands into either the neck or leg of a rabbit for identification purpose, but care should be taken that it does not injure the rabbit in the process. Moreover the legband should always be fitted to one of the rabbits back legs.

EAR NOTCHING

This process of identification involves clipping little pieces of the rabbit's ear at different locations in order to indicate different numbers. Notching is a permanent and effective means of identifying rabbits, but it requires a special notching instrument which may be obtained from a livestock extension agent.

WEIGHING AND RECORD KEEPING

Weighing of rabbit is very important as this provide data regarding their growth and general performance. Pan scale or spring-balance can be used in weighing rabbits. In using pan-scale, the rabbit should be made to sit comfortable in the pan. While using spring balance, a weighing bag can be used; although this will be more stressful for the rabbit therefore great care in handling is required. Weighing may be carried out in a weekly interval.

Record keeping is also very important therefore the result of the weighing should be recorded down and every other data concerning the production as some could easily be forgotten if not recorded immediately. Usually in animal production, record keeping is done in two

forms. Thus (i) financial recordings (ii) animal recordings.

FINANCIAL RECORDS

Financial records are usually made in terms of income and expenditure (i.e.) every money you spend in the production process is recorded in the expenditure column while the money earned in the process including rabbits you eat, calculate the amount you would have sold it and record all at the income column (even those rabbit you have given out as gift).

ANIMAL RECORDS

Animal records are those records that you keep the performance of the animal; it has many columns in which at a glance you can easily evaluate their performance. The column includes for example a doe; when she is mated, the buck used, the date kindles, and the number born alive and dead e.t.c. there is also a column for other husbandry and health details.

Animal record also provide data for growing litters to monitor their live-weight gain per week and for bucks to monitor their weight and to record how often they have been used for mating.

Table 2: An example of a doe record

Doe name: ----- Date of Birth: -----

Date mated	Buck used	Date kindled	Number alive	Number dead	Date weaned	Number weaned	Notes

Table 3: An example of a buck record book

Buck name: ----- Date of Birth: -----

Date mated	Buck used	Date kindled	Number alive	Number dead	Date weaned	Number weaned	notes

PRODUCTION EVALUATION

At the end of six months or twelve (12) months as the case may be, it is required that the rabbit keeper should evaluate his financial record by summing up the figures on the expenditure column and those on the income, then he should subtract the expenditure from the income. Whatever remains becomes his profit. It is worth mentioning however that there may be little or no profit in the first production year because of the much expenditure in establishing the rabbit unit.

Furthermore, animal record can be evaluated as follows:

- average number of litters per doe per year (4)
- average size of litter at birth (over 6)
- average size of litter at weaning (over 5)
- average litter mortality (less than 20%)

the figures in the brackets are an indication of the levels of performance that one might expect. However this should only be used as an indication of probable performance.

CHAPTER SIX

REPRODUCTION MANAGEMENT

Introduction: This section will consider particularly those aspects of rabbit production that have bearing with the process of bringing-forth young ones (i.e. from the stage of weaning till the stage of giving birth) the following aspects will be considered: sexing; mating; pregnancy; kindling and weaning.

SEXING

Sexing is the process by which sex of young rabbit is determined (i.e. male or female). This is usually done immediately after weaning. When the rabbits are 6 – 8 weeks old; following the sexing, male rabbits are separated from the females. The technique involve are: hold the rabbit in a flat surface, the skin around the genital opening should be gently pushed back with the finger and thumb.

- In the male, this will reveal the penis as a rounded tube like structure
- In the female, the vulva will be exposed as an oval opening to the reproductive tract.

Depending on the level of feeding, rabbits attend puberty stage (sexual maturity) between the ages of 4 – 5 months. But the rabbit may be too small at this stage in semi-intensive management to breed successfully and need to be grown on to a heavier weight for mating at about 8 months.

MATING

Mating is the copulation of male and female in order to produce the young one. Before a buck is mated to a doe, the following selection criteria should be considered:

- Always selects those with heavy live weights.
 - Give selection preference to rabbits from the largest litter if there are enough litters to select from.
 - Only healthy rabbits should be mated.
 - In selecting bucks, confirm that each of them has two testicles in its scrotum; and that the testicles descend from the body cavity into the scrotum at around 12 weeks of age.
- Does are usually ready for mating at the age of 8-10 months while bucks are normally ready as early as 6-8 months depending on the system of production. Literature give the mating ratio of does to buck as 10:1; but it is safer and more effective in practice to mate at a ratio of five does to one buck (5:1). Experience suggest that mating rabbits in a very hot atmosphere is not effective, therefore it should be avoided, rather rabbits should be mated early in the morning and evenings respectively. Moreover, does should always be taken to the buck's hutch in order to avoid fighting and attack by the doe. It is equally important to note that if the doe is ready to be mated, she will stay still within a few seconds, stretch out and slightly raise her hindquarters so as to allow the buck to mount and mate. Successful mating is always signaled by the buck thrusting forward and falling off the doe. If the buck slid backwards off the doe and does not fall, then mating has not taken place.

Once mating has occurred, the doe should be removed from the buck's hutch.

The doe may be returned after an hour or so for a second mating. (Especially for new rabbit rearers). If the doe does not stand for the buck or if she attacks him, it is useless to persist. Return the doe to her hutch and try again the next day. In most cases, mating will be successful at this second attempt. If the doe is unreceptive, never leave her with the buck unsupervised or overnight as they will probably fight.

Fourteen days after mating, a pregnancy test can be conducted to confirm the doe's pregnancy; this is done by allowing the doe to be at a relaxed and naturally sitting position; then the rearer gently run his fingers along the abdomen - between the back legs, small bead-like lumps can be felt if the doe is pregnant. These are the developing fetuses.

The second pregnancy test is usually carried out on the twentieth (20th) day after mating; this offers opportunities for the new rabbit rearers to detect pregnancy as by this stage the fetuses are easy to identify.

By around 28th days, the mammary glands will have developed significantly and this can be regarded as final confirmation of pregnancy. At around 29th days, the doe will begin to remove fur from her abdomen to make a nest.

As there is fibroid in humans, so also is false pregnancy in rabbits. False pregnancy may result from simple presence or attempted mounting of a buck or from the mounting of a doe by another doe. No eggs are fertilized, but the situation stimulates hormonal changes usually

associated with a normal pregnancy. Does under this circumstance cannot conceive for 17- 19 days (Tropical Agriculturist series).

The end of the false pregnancy is always signaled by the doe plucking the fur from her abdomen and making a nest as she would at the end of normal pregnancy. False pregnancies often occur when does are housed together. A doe which has more than one false pregnancy should be culled.

PREGNANCY

The gestation (pregnancy) period of rabbit is 31 -32 days. At this time, the doe should be well fed and protected from all kinds of stress. After 20-25 days of pregnancy, the doe's hutch should be cleaned; a clean and disinfected kindling box containing fresh litter (dry-grass- straw or wood-shavings) will keep the newly born rabbits in the nest and together during the first critical days of life.

At about 29th days, the doe will make a nest from the fur that she plucks from her abdomen. This will reveal her teats in preparation for suckling. It is necessary to provide fresh and clean water for the doe to ensure that she does not become dehydrated. Then you just wait and expect the arrival of the young rabbits.

KINDLING

Kindling is the process of giving birth in rabbits, the doe usually kindles at night once she has finished giving birth, and the doe will pluck more fur from her abdomen and cover the young rabbits. The young rabbits may not suckle for the first 24 hours; thereafter the doe only

allows them to suckle once daily; therefore it is important not to disturb doe for the first few days of birth as not to make the young rabbits missed their daily suckle for if it happens it will be very critical for the survival of the young rabbits.

Rabbits are born without any fur and with their eyes closed. Their eyes open at about 10-11 days after. Does are sensitive to odours other than that of her offspring, therefore do not use your bare hands to touch the young rabbits because if you do so, your odour will be left on the young rabbit and the mother will reject them. Rather, when you want to examine the litter, firstly, remove the doe (mother) from the hutch; then rub your hands in the damp litter so that they smell odour of doe. Or you can keep two sticks or hand glove in the hutch, this will therefore have the odour of the does; to push aside the side of the nest to examine the young rabbits. If there are any dead rabbits, use the same technique above to remove them and do not clean-out the kindling box until the rabbits can leave and return without assistance, this will always occurs at about 14 days after kindling.

In most cases in rabbit husbandry especially those in extensive system of rearing, some doe normally have a large litter size (large number of young rabbits per kindling) while others have small, when such situation arises, a rearing skill called "Fostering" is employed (i.e.) getting a doe to accept a young rabbit or rabbits from another litter, while doing this, the husbandman must be careful of the following;

- (1) That not more than two rabbits should be foster onto a litter.

- (2) That the does are mated on the same day;
- (3) That the litters involved are born within 3-4 days of each other;
- (4) That rabbits to be fostered are not more than 5 days old;
- (5) That both the foster doe and the donor doe are removed from their hutches.
- (6) That the rabbits to be fostered are carefully removed from their nest without disturbing or touching any of the rabbits that are not being fostered; then return the donor doe;
- (7) Rub a cloth in the damp litter of the foster doe's hutch and wipe each rabbit to be fostered with the cloth;
- (8) Introduce the rabbits to be fostered, disturbing the foster nest as little as possible.
- (9) Leave the newly mixed rabbits for a few hours so that they all take on the same smell.
- (10) Return the recipient doe to the hutch while at the same time giving her some food you know she likes best.

If all the above steps are carried out carefully, there is every chance of successful fostering.

WEANING

Weaning is the separation of doe and the young. This should be done around 6-8 weeks after kindling. There are two major methods of weaning rabbit:

- (1) Weaning by taking the doe away from the litter. This is the best method of weaning as taking the young rabbits away from the doe and suddenly introducing them to a strange hutch would be critical for the young rabbit's survival. In case of heavy milkers, some of the young rabbits (2-3) are carried along with the doe to avoid caking of the doe's udder.
- (2) Another method of weaning is by gradually taking the biggest rabbits from the doe every two days over a week or so; until all are weaned.

Immediately following weaning, some concentrate feed is necessary to be made available to the young rabbits as this will enhance both their survival and growth. Likewise the doe should be well-fed and allowed to recover her body condition before re-mating (probably 4 weeks). All things being equal, does will continue to reproduce up to the age of 3-4 years.

RABBIT BREEDING

Rabbit breeding is the planned mating of rabbits based on their performance. It enables the breeder to select the best rabbit for further breeding so as to improve the average performance of the animals in the subsequent generation. The best rabbit can be selected by comparing them with their contemporaries (ie those of the same age and the same environment). Also, considering the physical conformation (without any physical abnormalities). furthermore, performance records and progeny testing can be use to select the best rabbits for breeding.

Some of the traits to be considered while selecting breeding rabbits are: body weight, litter size at birth, number of litter born dead and those alive, weight at weaning, willingness to mate/mothering ability, health status, growth rate e.t.c. when the above parameters have been thoroughly determined, it can then be possible to evaluate from the best performing rabbit to the worst. When this is done, the best doe and buck can be selected for breeding, while the worst animals are culled. Specifically selection of bucks is done based on their growth rate and physical conformation while female rabbits are selected based on their growth rates, litter-size and their performance.

Culling is the removal of poor-performing rabbit from the flock; they can either be eaten or sold. When the best male and female rabbits have been selected they are allowed to breed.

CHAPTER SEVEN

HEALTH AND DISEASE MANAGEMENT

Rabbit rearing is very interesting when the animals are healthy as they appear very attractive, beautiful, alert and curious; their furs are always smooth and shiny with clear bright eyes and nostrils without discharges, while opposite will be the case when rabbits are sick as it always signifies by loss of appetite and rough appearance. In view of the above circumstance, it is required that adequate disease preventive measures be taken in order to reduce the rate of disease outbreak.

The knowledge of preventive disease control measures by the rabbit rearers is essential to reduce losses from disease outbreak and increase productivity. The rabbit keepers should always seek for professional advice whenever there is abnormal observation from the stock. The cost of disease control measure in rabbit is about 15- 20% of the total cost of production, but it is a vital determinant factor in any livestock business and must be given consideration in planning and execution of rabbit units.

Preventive Measures

The preventive measures against disease outbreak include: Provision of a comfortable environment.

- Adequate feeding with balance diet;
- Adequate sanitation.

In rabbit's environment, there should be elimination of all those things that will make the

rabbit frightened; the routine management to avoid heat-stress should be carried – out.

Disease outbreak can as well be prevented by designing hutches to ensure good ventilation without drought and allow faeces and urine to fall away from the rabbits;

- any sick animal should be separated from the healthy ones
- The rabbits hutches should be cleaned and disinfected regularly and be dried, then keep it for 2-3 weeks before restocking it with rabbits.

Although prevention and observation of ill-health will make healthy-rabbits to resist to a great extent most diseases; some conditions may not be avoided.

The following according to Philip (1986) are some disease conditions in rabbits:

(1) *MANGE*

This is an infection caused by external parasites such as mites. With an ear-mange condition, the whole of the ear may become filled with crusty scabs. If this condition is not urgently treated, it could spread unto the face. Therefore it is required that all rabbits be inspected regularly particularly the ear for mange and skin sores. If the mange is localized (i.e. ears and face) acaricide drops and creams can be use in controlling the condition; also, sulphur powder can be lightly administered into the ears daily till the animal is healed. If the mange is a generalized condition (i.e body mange), the animal will

be required to be dipped in an appropriate acaricide-solution as may be recommended by a veterinary officer.

(2) **SORE HOCKS**

Sore-hocks occur as a result of limb (hands and legs) injuries, it is a bacteria infection of limb-sores. Limb-injuries may arise from rough hutch of the rabbit.

Treatment: The wounds should be cleaned, dried and treated with any antibiotic ointment.

Also, the rough hutch should be repaired.

(3) **INFLAMMATION OF THE EYES**

This occurs from dusty food or eye irritant resulting in bacterial-inflammation of the eyes leading to watery and pussy secretions.

Treatment: The eyes should be bathed and treated with antibiotic ointment, drops or eye-powder.

(4) **MASTITIS**

Mastitis is another bacterial infection affecting only the lactating female rabbits. It usually occurs in the first few days after kindling. The condition is difficult and sometimes too late before it is detected.

The symptoms are: The infected mammary glands becomes swollen, red, painful to touch and hot. Little milk is often secreted; the young rabbits may starve to death.

Rabbits from does with mastitis must not be fostered onto another doe as they will spread the disease to her. Female rabbits that suffer from mastitis once, usually repeat the condition the next lactation, and if possible should be culled after the first occurrence.

The condition can be prevented by proper

sanitation.

(5) **SNUFFLES**

This condition is a bacterial infection of the respiratory system, the most likely causes include: (a) Lack of ventilation (b) Over crowding

© Building-up of ammonia from accumulating urine.

Symptoms for snuffles are:

(a) Sneezing (b) Noisy breathing

© Runny nose and matted fur on the face and the inside of the front legs as a result of the rabbit using its front legs to wipe its nose and face.

Affected rabbits should be isolated from other.

Treatment: The condition can be controlled by treating it with antibiotics; but mortality may be high and those that survived, if exposed to a similar adverse management conditions may be re-affected.

COCCIDIOSIS

The most common internal parasites of rabbit are coccidia. Most species of this parasite attack the lining of the intestine and may cause lack of appetite and dullness followed by severe diarrhea. The diarrhea may be blood-stained. Young rabbits are most frequently affected with coccidiosis just after weaning. The disease can develop very quickly and high mortalities are common. In older rabbits, there may be chronic coccidiosis resulting in dullness and stunted growth.

Treatment: coccidiostats may be bought and added to the drinking water to prevent or cure coccidiosis as required. Hutch cleanliness is an important preventive measure. Also wire-floor which allows the faeces to drop

out of the hutch is used to achieve a good level of sanitation aimed at limiting coccidiosis outbreak.

Note: Many other organisms can cause diarrhea as well as coccidia, so can irregular feeding and giving of over-wet and soured food. At the first sign of any diarrhea, rabbits should only be offered dry forage and fresh clean water.

Meat	Dry matter %	Protein %	Fat %	Energy MJ/KG
Rabbit	20-23	20-22	10-12	7-8
Chicken	20-23	19-21	11-13	7-8
Turkey	38-42	19-21	20-22	10-12
Beef	40-50	15-17	27-29	11-14
Lamb	40-50	14-18	26-30	11-14
Pork	50-55	10-12	42-48	17-20

CHAPTER EIGHT

RABBIT-MEAT AND RABBIT PROCESSING

Rabbit meat has some important characteristics which make it a particularly good meat for consumption by humans. Its composition in comparison to some other meats is as shown in the table 4. below:

Table 4. the chemical composition of rabbit and some other meats

Meat	Dry matter %	Protein %	Fat %	Energy MJ/KG
Rabbit	20-23	20-22	10-12	7-8
Chicken	20-23	19-21	11-13	7-8
Turkey	38-42	19-21	20-22	10-12
Beef	40-50	15-17	27-29	11-14
Lamb	40-50	14-18	26-30	11-14
Pork	50-55	10-12	42-48	17-20

(Tropical Agricultural Series, Undated)

The above table indicates that rabbit meat is especially high in protein and low in fat. Also, the fat in rabbit meat is mainly unsaturated, which is believed to be a more healthy type of fat than saturated fat which is common in other meats, which is also believed to be health promoting characteristic.

Rabbits attend a slaughtering weight of 2.5kg in about 6-7 months of age. They should be given only water without food 12 hours before slaughtering as this will partly empty the digestive system and reduce the risk of it breaking during cleaning of the carcass.

Killing should be carried out as quickly and as efficiently as possible, with minimum of pain to the rabbit. Rabbit may be killed either by first, neck breaking or stunning.

In neck breaking, the method use is the same as that used for killing hens. In stunning method, it involves making the rabbit unconscious. This is obtained by holding the rabbit upside down by its back legs with the left hand. It should be held so that the base ears fall forward exposing the back of the head. The point at the base of the ears should then be hit sharply with a good sized piece of wood or metal. The rabbit should then be immediately hung up and its head should be cut off to allow bleeding. Skinning and cleaning follows and the carcass is ready for cooking.

COOKING

Rabbit meat is a relatively soft meat which needs little cooking. It is ideal for cooking in a dry heat or for frying. It can be used in stews but it should not be overcooked as it may disintegrate. It is ideal for people who have had digestive upsets!

Smoking can be used to preserve the rabbit meat in the same way that it is used to preserve other meats.

TREATMENT OF THE SKIN

Locally, the skin of rabbit can be preserve by tanning using tree bark by drying, this prevent the skin from rotting. It is better done slowly under the shade to avoid cracking and loss of value. Salting method can also be employed to preserve the skin by rubbing finely ground salt into all parts of the skin to bond all the moisture chemically and make it unavailable for the rotting process.

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GLOSSARY

ACCLIMATISATION: the process of becoming accustomed or harden to a new climate.

ALFALFA: A leguminous plant use in feeding rabbit and other livestock.

AMBIENT: the temperature of the surrounding or environment

AMINO-ACID: they are the building block of protein

ARID REGION: areas with little or no rain

BREED: group of animal with the same characteristics

BREEDER: a person who breeds animals

BREEDING: planned mating of animals on performance

BUCK: Adult male rabbit

BURROW: home of a wild rabbit, made by digging a hole in the ground.

BY-PRODUCT: A substance that is produced during the process of making or destroying

COPROPHAGY: the practice of eating a special type of faecal pellet produced in the caecum of the large intestine.

CAECUM: part of the large intestine of rabbit

CAGE: same as hutch

CARCASS: Body of animal after dressing

CHRONIC: lasting for a long time; difficult to cure or get rid of

COLONIES: Group of rabbits that live together

CONCENTRATE: are those foodstuff that are high in energy or high in nutrient density.

CULLING: removal of poor animals from a population

Diet: a mixture of feed stuff used to supply nourishment to animals

Digest: to change food eaten into substance that the body can use.

Disease: ill-health or deviation from normal functioning of the body system.

DOE: adult female rabbit

Domestication: the process of a wild rabbit becoming tame

Embryo: a young animal in the very early stage of development before birth

Feed: means the same as food but commonly applied to animal feed than human food (an edible material that nourishes the body)

Fertility: ability to produce young animals;

Fluid: a substance that can flow

Footud: a young animal before it is born

Forage: the green edible material from grasses, bushes, and trees, it may be conserved

Fostering: taking another animal's young one and giving it to another mother to take care till weaning

Fur: soft thick mass of hair that grows on rabbit's body

Generation Interval: average age of parents when their offsprings which produces the next generation are born.

Genital Opening: connected with the outer sexual organ of an animal

Gestation Period: Pregnancy; the period from conception to birth.

Gnaw:

Hay: grass that has been cut and dried and is used as food for animals.

Heat-Stress: physical or mental pressure as a result of heat.

Herbivorous: Animals that eat only plants

Heterosis: the term used to describe any departure of offspring performance, favourable or unfavourable from the mid-parents performance.

Hind-Quarters: the parts of four footed animals situated at the back

Husbandry: careful farming of animals

Husbandman: a person that rears or farm's animals

Hutch: a special built house or cage for rabbit

In-breeding Depression: Decrease in the average performance of the individual in the population resulting from increase in homozygosity of gene.

Ingredients: Any material made into or used as food

Infection: entrance or invading of the tissue by a disease causing organism

Intake: amount of food or drink that animal can take into its body.

Lactation: the process by which female animals produce milk from the breast to feed young animals

Legume: plants with seeds in long pods e.g peas and beans

Lethal Gene: dead gene

Limb: an arm or a leg
 Kindling: act of giving birth in rabbit
 Kindling box: a special box where kindling take place; as artificial nest.
 Litter: a number of young rabbits that one mother gives birth to at the same time.
 Livestock: domestic animals or the animals kept on a farm
 Mating: sex between male and female animal.
 MJ/Kg mega Joules per Kilogram (unit of energy)
 Monogastrics: animals with simple stomach
 Mortality: the number of deaths in a particular situation or period of time
 Mounting: getting unto the back of a female animal in order to mate
 Notching: the process of identifying an animal by making a small V-shape or circular cut in the ear.
 Nutrients: chemical elements or compound required in the diet of a given animals to permit normal functioning of life.
 Nutrition: the process by which living things receives the food necessary for them to grow and be healthy.
 Offspring: the young of an animal
 Parasite: a disease causing agent that lives in or on the host
 Physiological: to do with the body processes.

Predator: an animal that lives by catching and killing other animals
 Progeny: the young of animals (see offspring)
 Prolific: producing a lot of young ones
 Ration: a daily supply of food
 Recessive Gene: genes which have no observable effects unless present in both member of a chromosome pair
 Roughages: the part of food rich in fibre and helps in keeping the body healthy by keeping the bowels working and moving other food quickly through the body.
 Ruff: same as dew-lap; a thick fold or folds of skin hanging from the throat and found around the chest, found in some breeds of rabbits e.g chinchilla.
 Ruminant: animals with four stomach compartment e.g goat, sheep or animals that bring back their food from stomach and chew again.

Scab: skin disease of animals
 Scruff: the loose skin over the shoulders of the rabbit
 Stock: Farm animals that are kept for their meat, wool etc
 Stunning: making animals unconscious for easy killing and proper bleeding
 Stunted Growth: unable to grow to the normal size.
 Tanning: the treatment of skins to make them into leather
 Tattoos: permanent identification mark made on the skin of animals
 TDN : total digestible nutrients
 Trait: a characteristics e.g growth rate
 Udder: the mammary gland of animals
 Weaning: separation of doe from the litter.
 Zoonosis: disease that can be transferred from animal to human