A MANUAL ON IMPROVED RURAL PIG PRODUCTION

A project supported by the European Union

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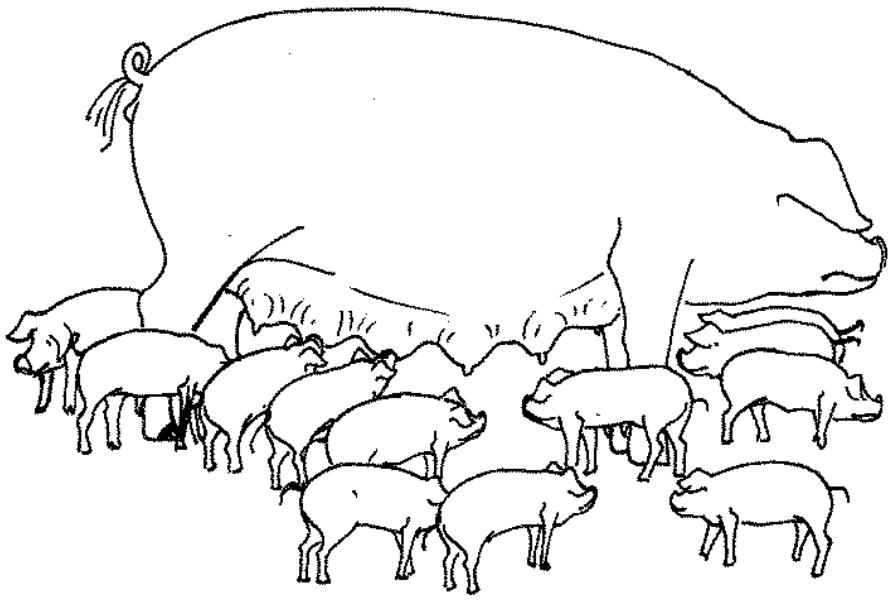

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PREFACE

This manual has been produced as an output of the European Union - Lao PDR Project ALA/96/19 “Strengthening of Livestock Services and Extension Activities”, within the Department of Livestock and Fisheries (DLF) of the Ministry of Agriculture and Forestry.

The manual is meant for trainees attending practical pig courses and for small scale farmers to read at home to improve their knowledgement about pig production. The text has been kept to a minimum and the manual is richly illustrated with drawings by Mongkham Boualavanh and with a series of colour pictures. This manual is also available in Lao language (July 2003, ISBN 974-91433-3-7). In preparing this manual, teaching and extension materials used in similar programs in the region have been incorporated. For general scientific background information, standard pig husbandry handbooks have been used.

Improving productivity of rural pigs will greatly enhance income and diet of resource-poor farmers. Using improved production methods is also essential for farmers who intend to venture later into (semi-) commercial pig production.

Oosterwijk Gerard, Van Aken Dirk, and Vongthilath Sounthone (*Editors*)
Project Management Unit, Vientiane, July 2003

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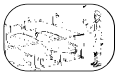


APPENDIX of PHOTOGRAPHS

1. Local pig breeds

Local pig (type 1):

This type of pig can be found throughout the country. It has a small body size compared to other local pig types. Its name varies from region to region, for example: Muchid, Mukadone, Muboua, although it is generally called Muladt.

The age at first heat is around 8 - 9 months with a body weight of 21 - 30 kg. The mature live weight of females is about 42 - 48 kg. The age at first farrowing is 12 months, with a farrowing rate of 1.5 per year and a litter size of 7 - 8 piglets. Piglets are weaned at 2 - 3 months and weigh around 7 - 8 kg. The male pig becomes mature around 6 months at 30 kg.

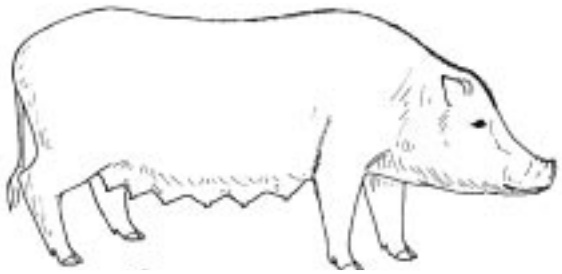
Muladt type 1

Characteristics of this breed are:

- **The body length is around 75 - 92 cm and height about 46 - 54 cm.**
- **The jaw is relatively long and sharp, similar to wild pig.**
- **The size of ear is medium and generally straight.**
- **The skin is black but some pigs have white and/or pink spots.**
- **The hoof color is mainly white.**

Local pig (type 2):

Pig type 2 is larger than type 1. The age of first mating is around 1 year at body weight of about 39 kg. At maturity the weight is about 47 - 61 kg.



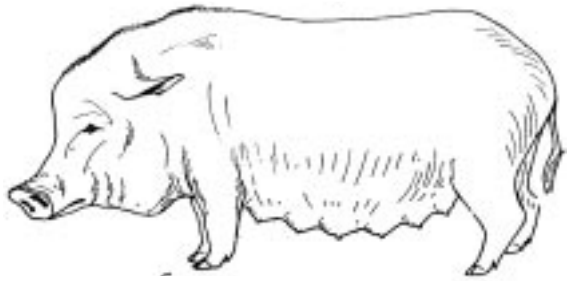
Muladt type 2

Characteristics of this breed are:

- **The body length is around 85 - 100 cm and height about 51 - 70 cm.**
- **The body color is black.**
- **Sometimes the color at lower part is white.**
- **The ears are short and straight.**

Local pig (type 3):

Pig type 3 is big and heavy. Most local people call this breed MuLaoSung. The age at first heat is about 5 - 6 months with a body weight of about 34 - 40 kg. The weight of the mature female is 65 - 85 kg and the age at first farrowing is 10 - 11 months.



Muladt type 3

Characteristics of this breed are:

- **The body length is around 100 - 135 cm and height about 55 - 76 cm.**
- **The body color is mostly black; the abdominal area is mostly black- white colored.**
- **The snout color is white and the face is short**
- **The ears are big and the back is curved.**

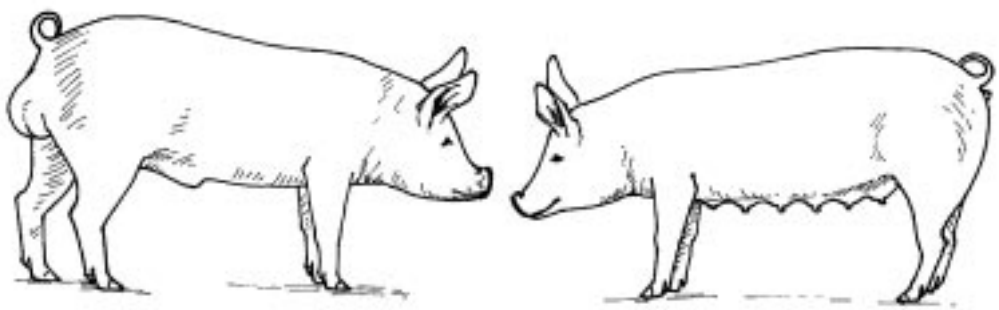
2. Exotic pig breeds

The most common pig breeds for commercial pig production are the Large White, Landrace and Duroc breeds or crosses. These 3 breeds produce lean meat combined with efficient feed conversion (3 kg of good feed is needed to produce 1 kg of pork). Compared to local pig breeds, these commercial breeds are less resistant to diseases and suffer more from hot weather and low quality feeds. Pure exotic breeds generally do not perform well in rural pig production systems.

Large White (Yorkshire):

The Large White breed originates from England and adapts well to Lao conditions. It reaches 80 - 90 kg body weight at 5 - 6 months. The sow is a good mother with a litter size of 10 - 11 piglets and produces healthy piglets for about 4 - 5 years. The pigs grow rapidly and produce good quality lean meat.

Large White



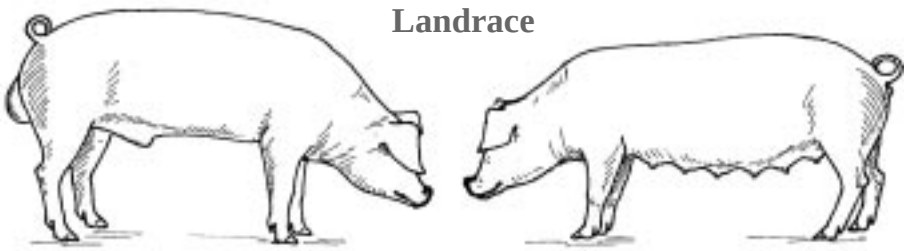
Characteristics of this breed are:

- **The body color is white.**
- **A large head with standing ears.**
- **Big shoulders with a straight back.**
- **A long body and strong legs.**
- **A short snout.**

Landrace:

The Landrace originates from Denmark and adapts well to Lao conditions. It can reach 80 - 90 kg live body weight at 5 - 6 months. The sow is a good mother with litter sizes of 10 - 12 piglets. This breed has a rapid growth and good quality of carcass. The breed is mainly used as dam line crossing as the sows have a long body and udder with many teats.

Landrace



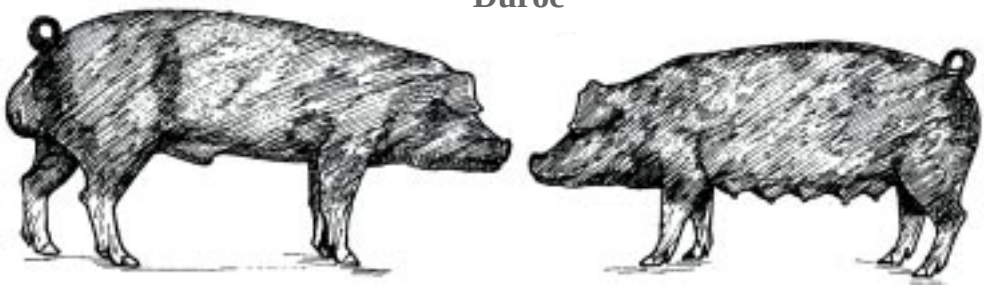
Characteristics of this breed are:

- **The skin and hair are white.**
- **Large ears falling to the sides.**
- **A narrow head and a long snout.**
- **Big hips and a curved back.**

Duroc:

The Duroc breed originates from North America. It has a rapid growth rate and good ability to adapt to varied tropical climatic conditions. The litter size is small: about 7 - 8 piglets per litter. They are used mainly as sire line for producing crossbreed pigs.

Duroc



Characteristics of this breed are:

- **Brown in color.**
- **Medium sized ears and a bit fallen.**
- **A large head with a short snout.**
- **Big hips.**

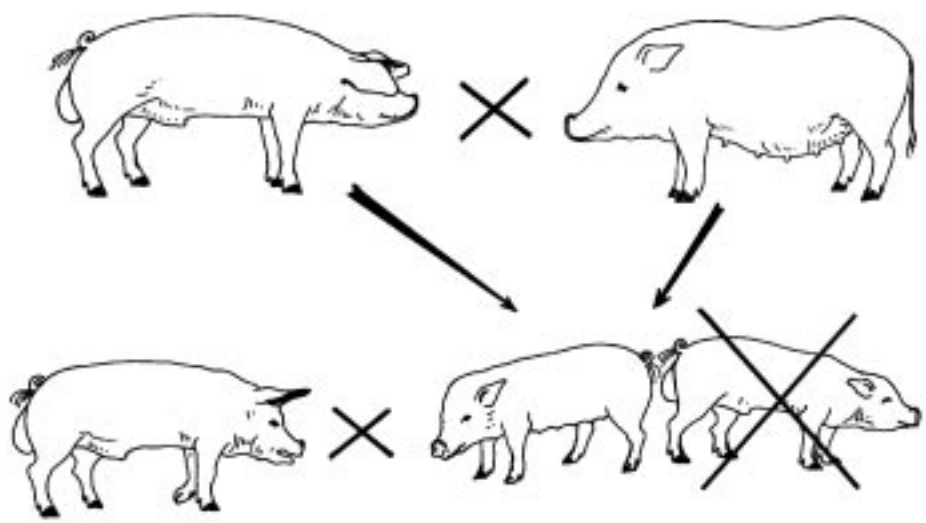
3. Crossbreeds

Improvement of local breeds:

Breed improvement is important in obtaining improved and high yielding animals. The main purpose of breed improvement is to introduce a positive characteristic into a local breed. For example: by crossbreeding an indigenous sow with an exotic boar; the offspring is likely to inherit the body shape and good growth rate from its father and the tolerance to environmental stress from its mother. Inbreeding between father and daughter, mother and son, brother and sister, etc. must be avoided.

Imported (exotic boar) with high meat production.

Local good sow, well adapted to local conditions.



Imported (exotic) boar

Off-spring boars produce more meat. They should be castrated, fattened and slaughtered.

Selected sows of the offspring can be mated with the imported boar breed-line. Commercial piggery uses this breeding system for 4 - 5 generations to reach the desired improved breed.

Singji pigs from China:

The Singji pigs originate from Southern China. They are an improved cross-breed; crossed between local breeds of China and exotic breeds (mainly the Duroc). Singji pigs are suitable for keeping under village conditions with improved husbandry practices (using clean pig pens, strict vaccination control and good home-made feeds mixed with commercial feeds). With these improved husbandry practices they can withstand the hot and wet Lao climate much better than the exotic breeds. Although the initial crossbreeds are black, mating between Singji sow and Singji boar can produce a litter with many black piglets but also some of other colors like brown, spotted or striped.

The other main characteristics are:

- **The back is long and straight with light convex.**
- **The hams are full and the limbs are strong.**
- **The head is big and short with a wrinkled forehead.**
- **The ears are big and hanging.**
- **The sow has mostly 7 pairs of teats with a litter size between 9 – 13 piglets.**
- **The piglets are strong, grow fast and can be slaughtered at early ages.**
- **The adult sow reaches 100 - 150 kg of body weight in 1 - 1.5 years.**
- **The adult boar weighs 120 - 180 kg.**
- **Gilts are mated at 8 - 9 months, weighing at least 80 kg.**

The Singji pigs have two main disadvantages:

1) **They seem more vulnerable than local pigs to mange infection. Strict control of mites with drugs like Ivermectin must take place every 3 months.**
2) **We need to bring in new Singji boars regularly to avoid inbreeding and not loose the good characteristics of the typical Singji pig that was originally crossed between local Chinese breeds and exotic breeds (Duroc).**

1. Pig raising systems in the Lao PDR

On smallholder farms in the Lao PDR there are 4 common pig raising systems:

1. **free range scavenging,**
2. **semi-intensive (confined within a large area),**
3. **intensive (confined to a pig pen),**
4. **integrated pig and fish farming.**

Free range scavenging:

This kind of pig raising system is most common in rural areas for keeping local pig breeds.

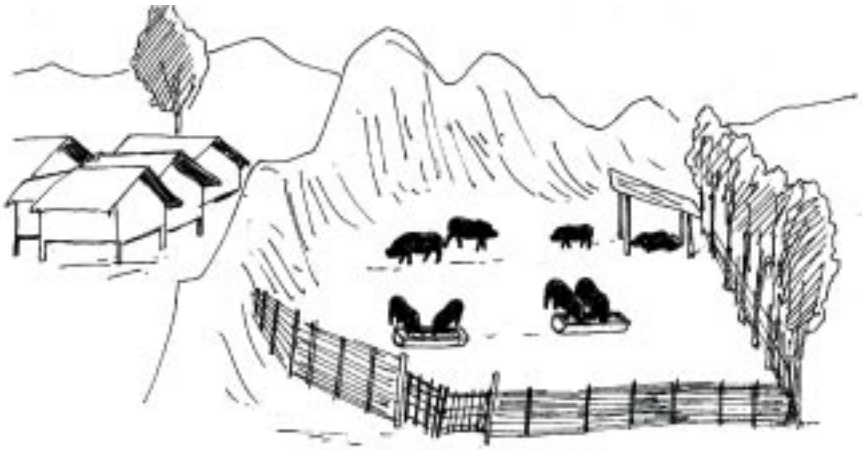
Advantages:

- **Low cost of inputs and low use of labor.**

Disadvantages:

- **Requires a large area and may destroy cash crops.**
- **Pigs are difficult to control and can be infected easily with diseases.**
- **Low output and public nuisance.**

Semi-intensive (confined within a large area):



The semi-intensive system (confined within a large area) can be found in suburban areas or with communities specialized in fattenning local pigs.

Advantages:

- **Simple pig housing (only shelter against rain and sun).**
- **Low cost of inputs as by-products and kitchen waste are used for feeding the pigs.**

Disadvantages:

- **Low output and requires a large area.**
- **Pigs are difficult to control (e.g. catching for veterinary treatments).**
- **Pigs can easily be infected with diseases (especially when new pigs are introduced into the same area).**

Intensive (confined to a pig pen):

This system is adapted by farmers with a sense for improved pig production. Often these farmers can be found in areas where they have access to commercial feeds. Usually these farmers are in semi-urban areas and raise exotic and crossbreed pigs for the local market.

Advantages:

- **Easy to handle (feeding, water supply, monitoring health, detecting heat, farrowing, etc).**
- **Easy to undertake vaccinations and treatments.**
- **Low risk of diseases when the farmer adheres to good sanitation practices.**
- **The environment is kept clean and crops are not destroyed by scavenging pigs.**
- **The manure can fertilize fish ponds or fertilize the field crops (or garden) of the farmer.**

Disadvantages:

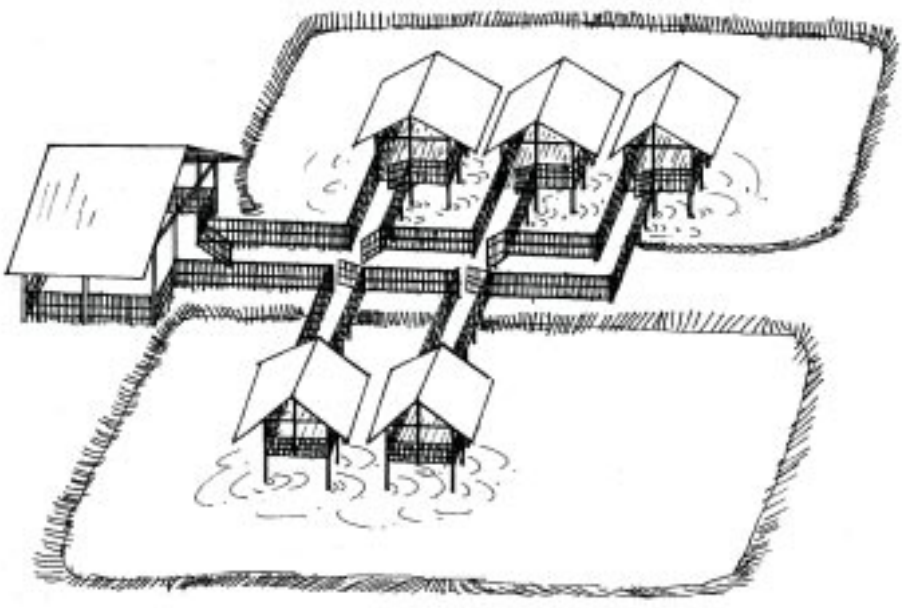
- **High costs of inputs (housing material, feeds and labor).**
- **Farmer requires more management skills.**

Integrated pig and fish farming:

Fish ponds can be fertilized with pig manure; algae are produced which can be utilized by the fish. As long as sufficient water is available for the ponds, pig sties can either be constructed above the pond so that the manure can drop straight into the water, or nearby the pounds so that the slurry can be channeled into the ponds. The various species of Tilapia are the most commonly used fish, often mixed with a small population of carp and catfish.

Sixty pigs produce enough manure for one hectare of fishpond, which, if stocked at around 40,000 fish can produce fish yields of up to 4,000 kg per year . If pig manure is insufficient, ducks can be used to add more manure to the pounds. Water hyacinth can be used to harvest nutrients from the fish pond and fed back to the pigs.

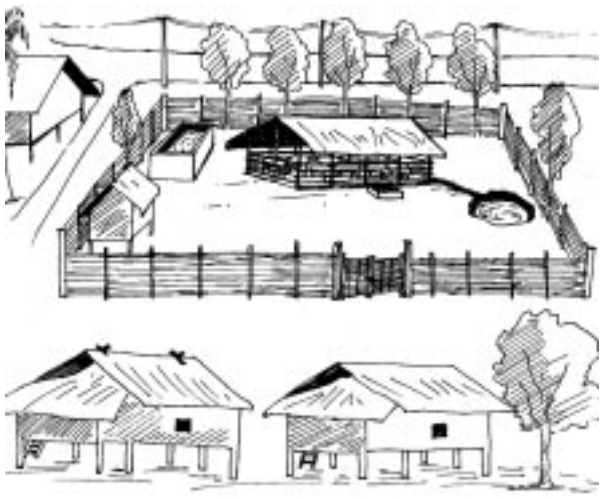
Special care is needed when Ivermectin is used to control mange or internal parasites. Small residues of Ivermectin excreted through the manure can kill the fish in the pond. Take care that the manure of treated pigs does not enter the pond for one week (e.g. use gunny bags to cover slats and shovel away manure). Or alternatively, wash pigs with mange problems outside the pen with Neguvon.



2. Pigsty buildings

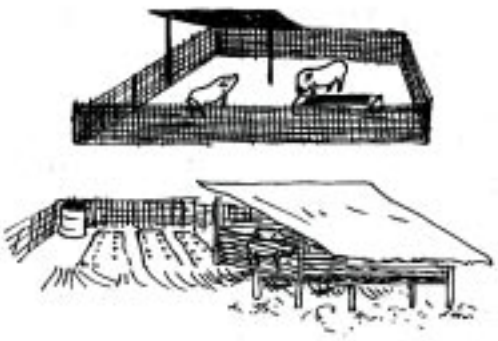
Site selection:

- **The site should be at an elevated place that can not be flooded by rain water.**
- **The site should be protected from the sun (shade from trees) and have ample fresh air.**
- **Away from residences (around 8-10 meter away downwind).**
- **In case of a large scale pig farm, the site selected needs also to be:**
  - **well connected to roads throughout the year,**
  - **suitable for manure disposal,**
  - **connected to reliable water and electricity sources.**



Low input - low output pig farming.

Investment in pigsty buildings depends on the level of pig management and inputs (low input versus high input systems).



High input - high output pig farming.

Pigsty building and materials:

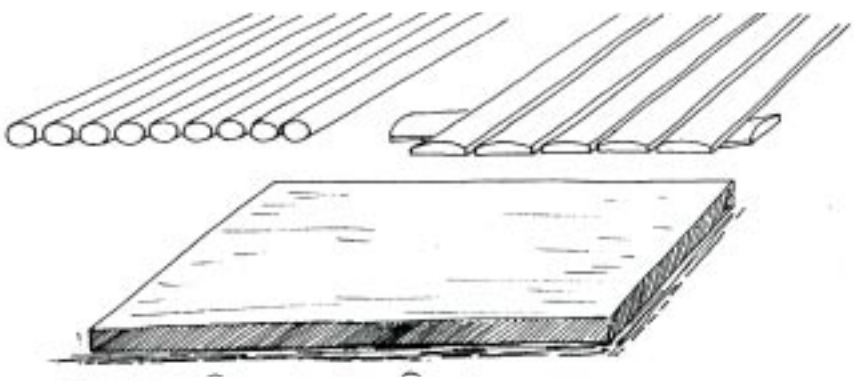
A pigsty can be constructed cheaply by using locally available materials. It needs to be constructed according to climatic conditions and according to the pig production system. The following matters need attention:

1. **The pigsty should be comfortable for the pigs: good ventilation and ample shade, no overheating, no smells, no draft and no dampness.**
2. **The building should be constructed with its length axis in an East-West direction (protected from sun and rain).**
3. **The pig building needs to be divided into different pens for each phase of the production cycle. The number and the size of the pens depend on the expected numbers of pigs to be housed in each production phase.**
4. **The costs of constructing the pigsty should fit the pig production systems. An efficient pig production is required to cover high construction costs.**

Generally, there are 2 types of pigsty buildings:

- **Elevated pens with flat floors (often used for fattening pigs on large scale farms).**
- **Pens with raised slatted floors (suitable for all pig systems, especially on small scale farms).**

wooden slatted floor



cemented floor

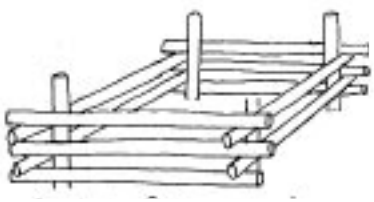
Floor systems:

Distance between the slats should be 0.5 - 1.0 cm. A slatted floor should preferably be sloping for easy cleaning.

Partition:

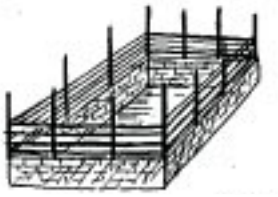
Many types of partitions can be used like wood, bricks, iron pipes, etc. Partitions should prevent piglets from escaping and still allow easy manure removal.

different partitions



round poles

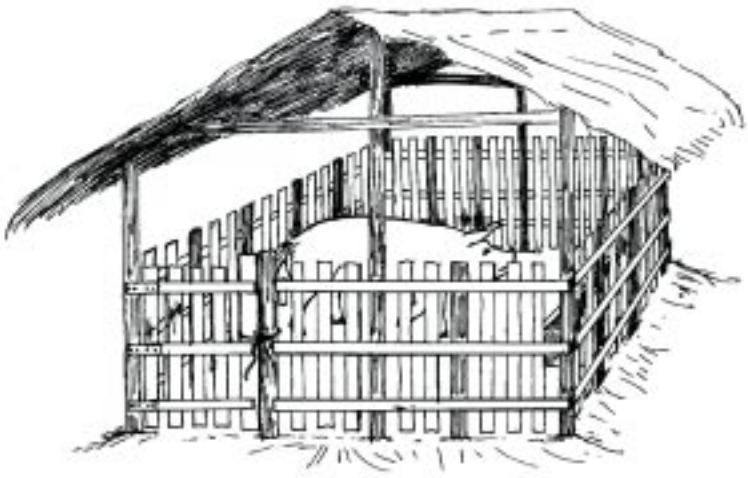
wooden slats



brick wall

The partition must have strong poles firmly anchored in the ground. A network of horizontal and vertical beams or slats should connect these poles with each other. It is not recommended to have a horizontal beam as the highest partition as mature pigs might climb over such a beam. This is especially valid for a boar-pen; the boar will make every effort to get close to a sow in heat.

Keep the boar alone in a pen, close to the sow pen to stimulate sows to become in heat.

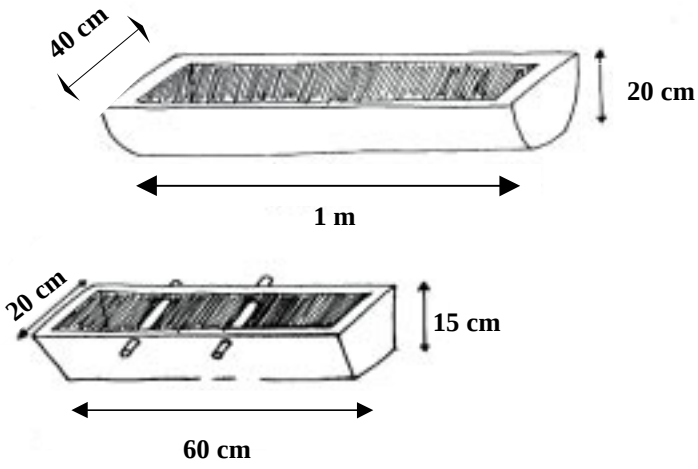


Feed trough size:

Pig categories	Length	Width
Suckling piglet	15-20 cm per pig	20 cm
Fattening pig	30-35 cm per pig	20 cm
Pregnant sow	40-50 cm per pig	35-40 cm
Lactating sow	40-50 cm per pig	35-40 cm
Breeding boar	40-50 cm per pig	35-40 cm

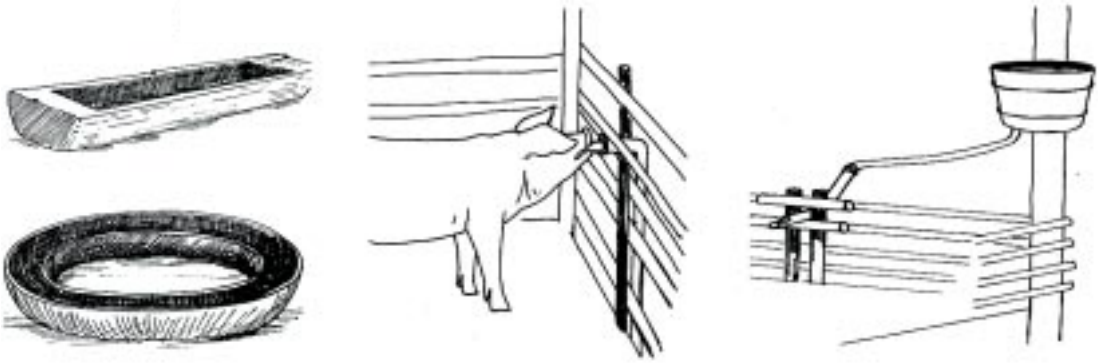
The feeding trough should be firmly anchored to the floor to prevent overturning and wasting feed.

feeders



Drinkers:

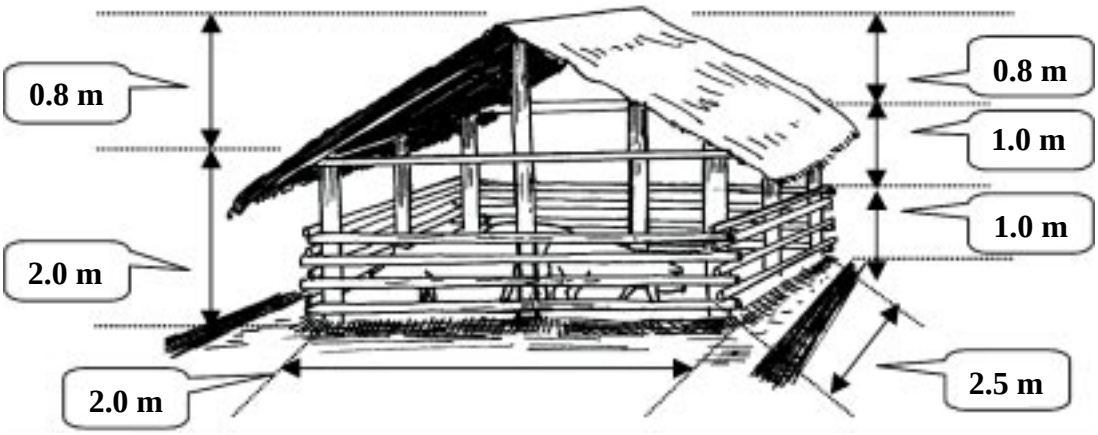
The feeding trough can also be used to supply water. At large farms automatic drinkers are used (bowls or nipples).



3. Pens, floors and space requirements

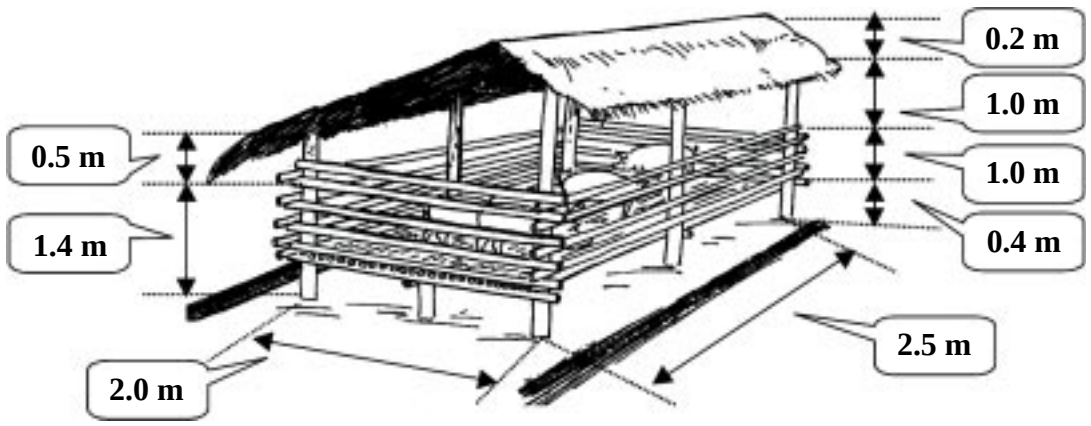
Pens with flat, solid floors:

A flat, solid floor is usually made from cement (but not polished to avoid slipping) or from hard soil. The floor should be sloping away to the rear to facilitate cleaning with water. It is suitable especially for fattening pigs but also for pregnant and farrowing sows and boars.



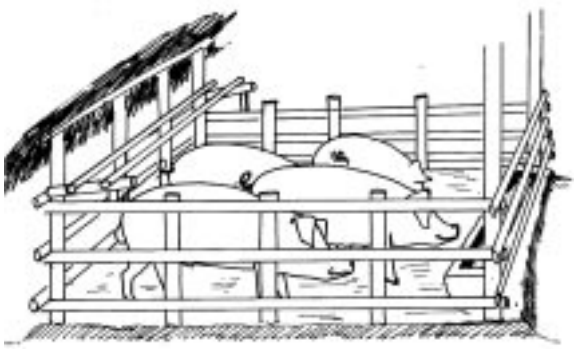
Pens with raised slatted floors:

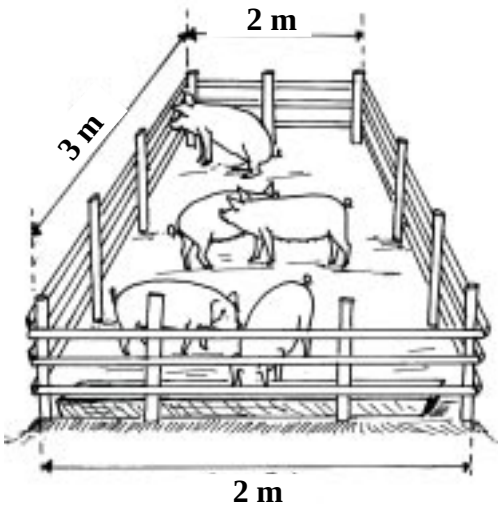
The floor is usually made from locally available wood or timber. Large scale pig farms can have slatted floors that are commercially available (made from cement, iron rods, plastic, etc). Pens with slatted floors are suitable for keeping all types of pigs.



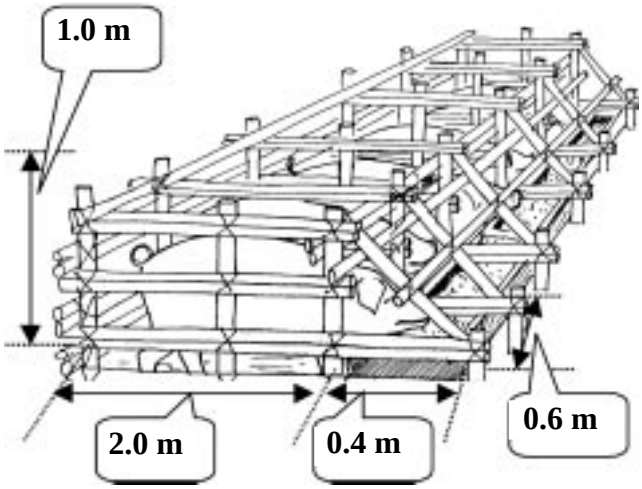
Space requirement for pigs:

<u>Fattening pig</u>:
Per pig 0.5 - 1.0 m²

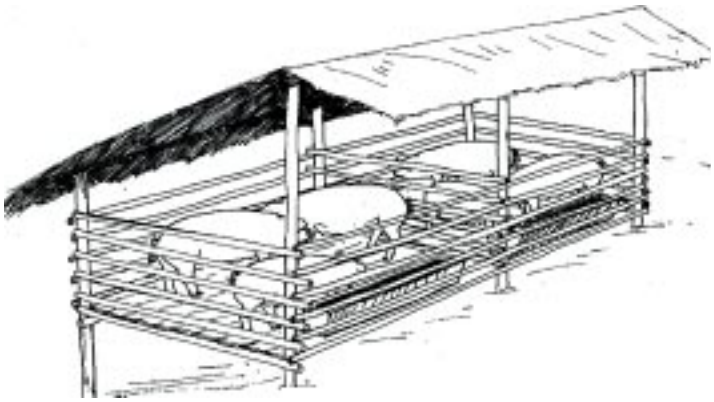




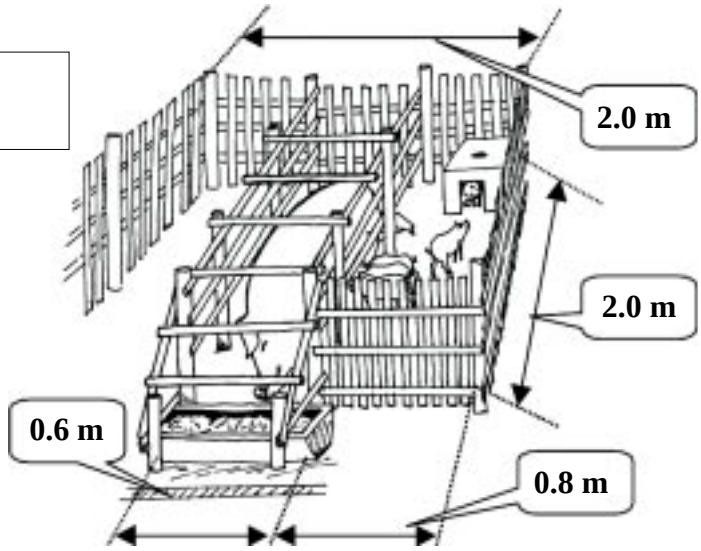
<u>Pregnant sows:</u>
Per sow 1.5 - 2.0 m²



Pregnant sows need a quiet environment. Therefore individual pens are sometimes used for pregnant sows. In hot climates pregnant sows are alternatively housed in small groups of three.

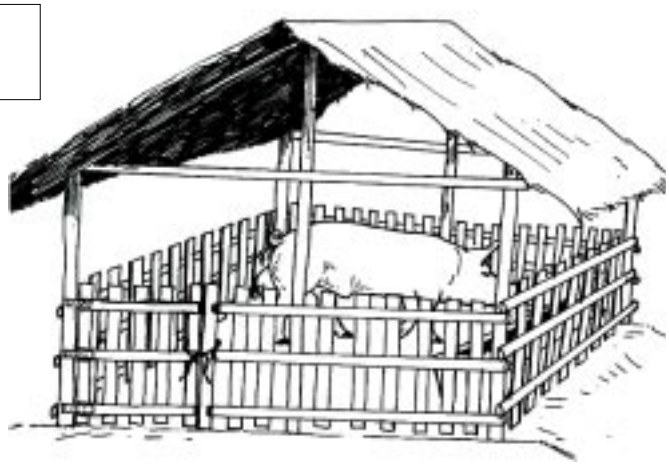


Lactating sows:
Per sow 4 - 6 m²



Weaner piglets:
Per piglet 0.3 - 0,5 m²

Breeding boars:
Per boar 6 - 8 m²



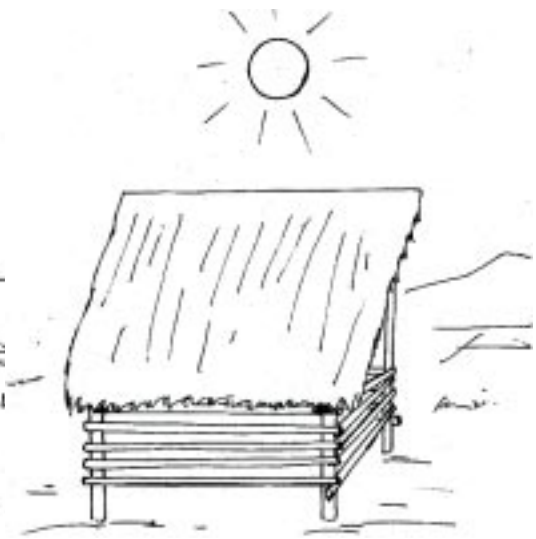
Special care is required to prevent boars from escaping to the gilts and sows that are on heat (strong and high partitions).

4. Different roof systems

Roofs:

The roof of the pigsty can be of grass thatch, bamboo sheets, galvanized iron sheets, tiles, etc. Roofs made of grass thatch or bamboo sheets are cheap and good for ventilation, but these roofs are not durable. The costs of tiles or galvanized iron roofs are high, but these roofs last a longtime. In hot climates, a galvanized iron roof can make the pigsty very hot during the day.

Good, enough shade.



Not good, no shade.

The site of the pen and the roof system should protect the pigs from hot sun and rain. The roof should give enough shadow at the hottest time of the day.

There are 4 popular roof systems:

- **single sloping roof,**
- **uneven sloping roof,**
- **high, even sloping roof,**
- **double ventilation roof.**

Single sloping roof:
This roof system is cheap and easy to build. It provides good ventilation, but the pen can be penetrated by too much sun and become hot. During the rainy season, strong wind and heavy rain can come in.

Uneven sloping roof:
This roof type is higher than the single sloping roof. The advantage of this type is that it protects better against sun and rain.

High, even sloping roof:
The cost of building this roof type is higher than the first 2 types, but it gives better protection against sun and rain.

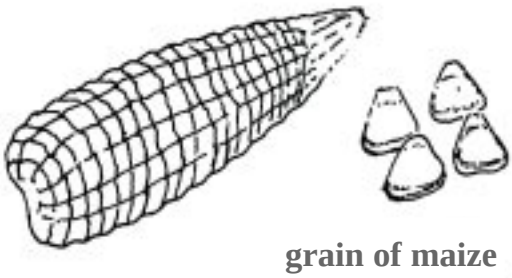
Double ventilation roof:
This type of roof provides good sun and rain protection and it ensures good ventilation. The investment cost is rather high, but often it is necessary in hot climates to keep the temperature in the larger pigsty at a reasonable level.

1. Traditional animal feeds

Feeds should meet the animal's needs for maintenance, growth and reproduction. Good pig feed contains sufficient energy, protein, minerals and vitamins. Rice bran, broken rice, maize, soya-beans, cassava, vegetables and distillers' residues are often used in pig feed.

Maize:

Maize is a very good animal feed. It contains up to 65% carbohydrates (=high) and 9% protein. It can be mixed and cooked with other feeds, but not more than 40% in the mix ration.

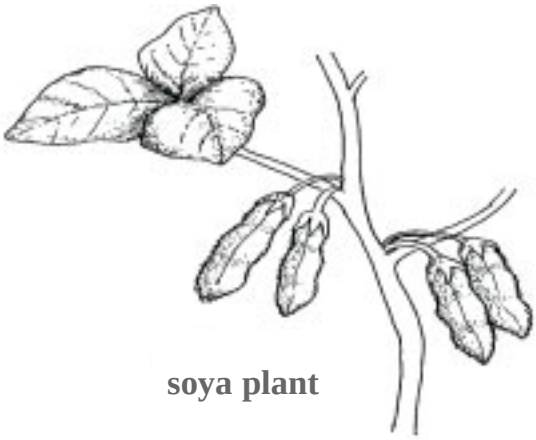


grain of maize

maize cob

Soya beans:

Soya is a crop which has a high nutritional value and is very good for pig feeding. It contains 38% protein (=very high). It should be dried, milled or well cooked in combination with other feedstuff like rice bran, broken rice and maize.

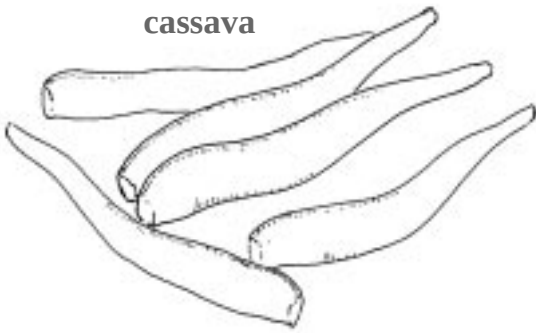


soya plant

Cassava (or tapioca):

Cassava is a root crop which is used for pig feeding. It can be mixed with other feeds up to around 10 - 20% (never more than 30%). First it should be peeled and washed and then sliced, dried and ground before use. It should not be fed to pigs as raw cassava with the skin, because of toxic substances. The sliced and dried cassava can be kept longer.

cassava



Leucaena, Acacia and other tree leaves:

Leucaena and Acacia are traditional, locally available tree-crops. The leaves are rich in protein. After drying, they can be mixed and fed to pigs with other feeds.

leucaena

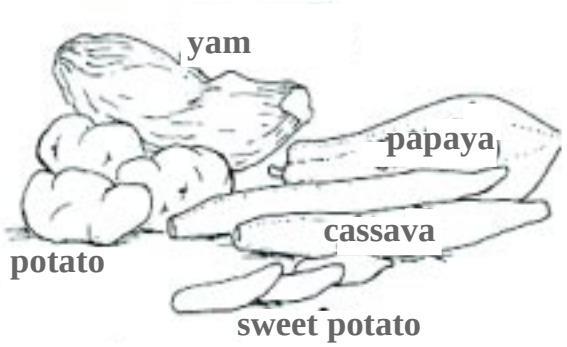
cassava

long bean

Vegetables:

Vegetables are used as supplementary feeds for pigs by boiling and mixing with other feeds such as rice bran, broken rice and maize. They can also be given fresh. Suitable vegetables are:

- **cabbage, lettuce, spinach,**
- **morning glory, sweet potato vine,**
- **wild taro (needs boiling),**
- **java weed, water hyacinth.**



Copra residues:

Residues from copra juice can be fed to pigs as well. It contains 60 - 70% fat and 20% protein. It can be mixed as 10 kg in 100kg feed (10%).

coconut

Rice bran:

Rice bran is very suitable for pig feeding. It contains 11% protein and can be used as the main ingredient. Rice bran can be mixed with other feeds to 30 - 45%. Rice bran can be kept no longer than 1 month because it can become mouldy.

Broken rice:

Also broken rice is very suitable for pig feeding. It can be mixed with other feeds up to 15 - 20%. Broken rice contains about 8% protein.

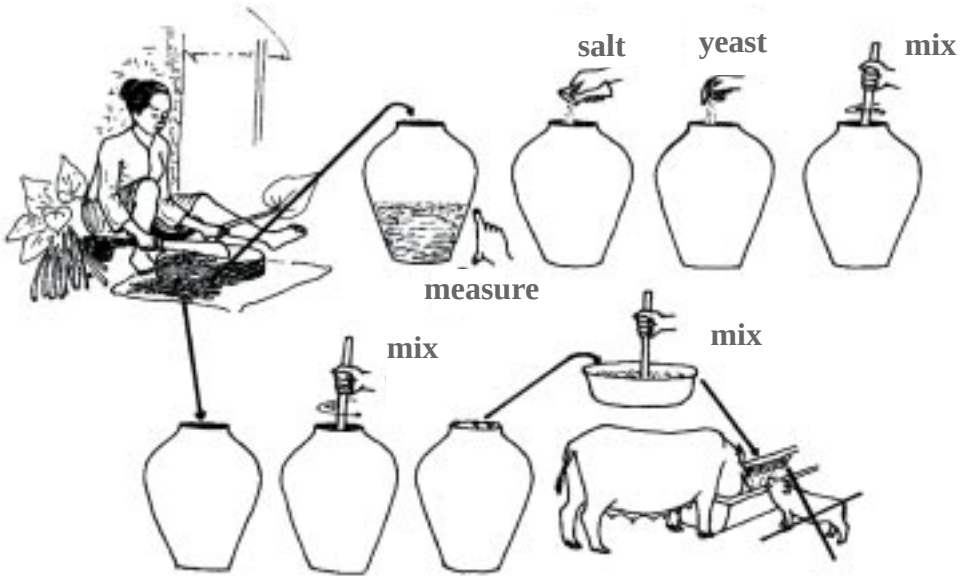
Alcohol - rice distilling residues:

Local alcohol can be made from rice, maize, sweet potato, cassava, banana, etc. Most popular for pig feeding is distillery waste from rice. It should be mixed with other feeds such as rice bran and broken rice. Distillers' residues can be fed to fattening pigs, but not to pregnant or lactating sows. Yet, these animals require high quality of feed and therefore distillery waste needs to be replaced by other high quality feed like commercial feeds. The following mixing ratio is commonly used in combination with distillery waste:

- **rice bran (2 kg),**
- **broken rice (1 kg),**
- **distillers' residues (5-10 liters).**

Forest products:

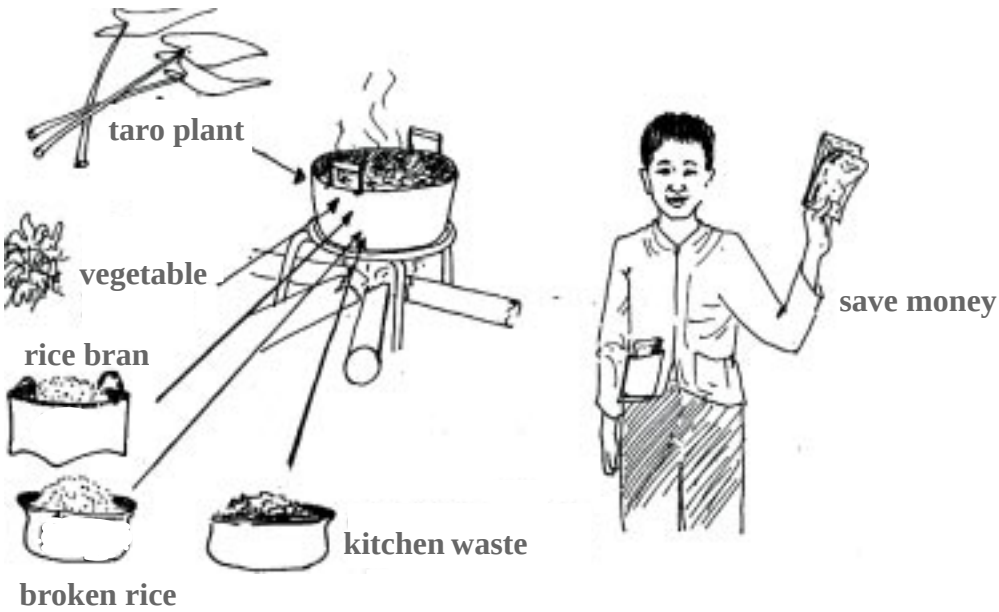
Pig feed can also be prepared with forest products (wild vegetables, wild bananas, wild taro, etc). At the same time, food waste can be used (soup, rice, noodles etc). Below is an example of a locally prepared supplementary pig feed from a forest product (taro).



2. Traditional feed processing

Different feeds are mixed and boiled to make the pig feed more palatable. There are 2 types of traditional processing:

1. **Mixing all different feeds together (rice bran, broken rice, crushed maize and soya, dried and crushed cassava, dried acacia leaves, etc) in proportion and giving it directly to the pigs.**
2. **Cooking the different raw materials together to improve digestibility and to breakdown toxins from some feeds as raw cassava, wild taro, banana stem, maize and soya grains, beans, kitchen waste, etc.**



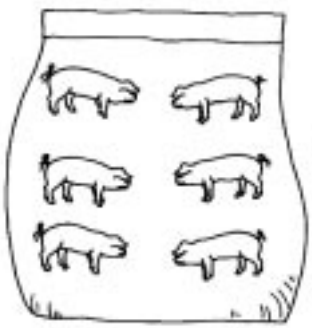
Local pig feed ration:

Ingredients	Mixing ratio (%)		
	Pig weight 15 - 30 kg	Pig weight 30 - 60 kg	Pig weight over 60 kg
Soya beans	25	20	15
Rice bran	25	30	35
Maize	20	25	30
Broken rice	5	5	5
Cassava	20	15	10
Acacia leaves	5	5	5
Total (100%)	100	100	100
Crude protein (%)	16	15	14

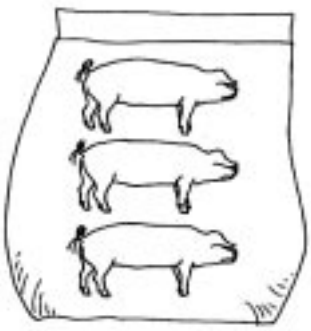
3. Commercial feeds

Complete feed:

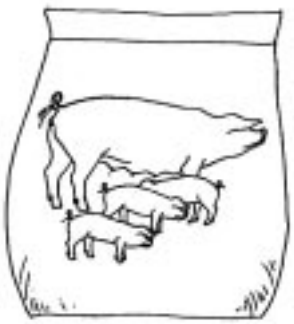
Complete feeds are factory manufactured according to specific feed formulations appropriate to specific categories of pigs. There are many kinds of complete feeds such as: feed for suckling and weaning piglets, fattening pigs, dry, pregnant and lactating sows, boars, etc. Complete feeds can be fed directly to the pigs.



feed for piglets



feed for fattening pigs



feed for lactating sows

Concentrated feed:

Concentrated feeds are factory produced with a high level of protein. They must be mixed before feeding, with other feeds such as rice bran, broken rice, maize, etc. to made a good, suitable home-made ratio.

4. Commercial feeds mixed with traditional feeds

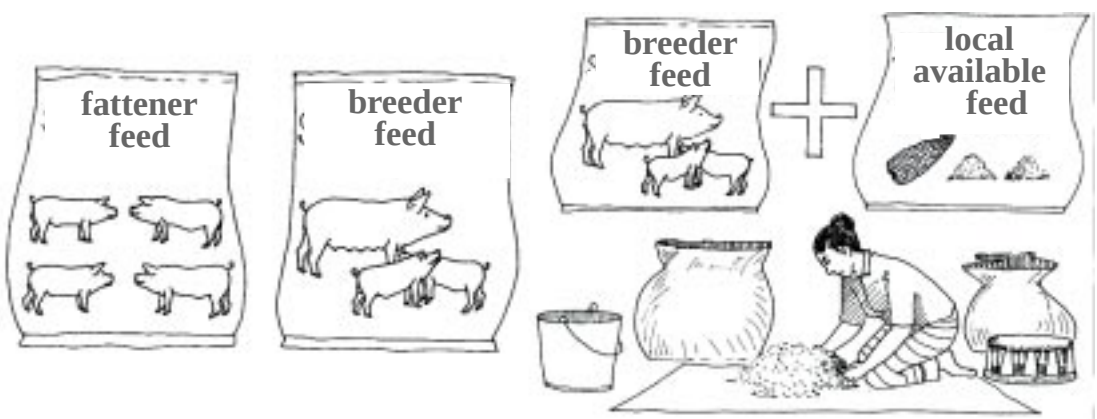
A major problem with improving rural pig production is improving the different feeding systems that are based on locally available products. Many regions or ethnic groups often have their own traditional feeding systems. But often these traditional feeding systems need improvements in cases like:

- **keeping (local) pigs in pens,**
- **keeping pig crosses (or even exotic pig breeds).**

Mixing concentrated feed:

The mixture of concentrated feed with locally available feeds should meet the requirements of the growing pig.

Ingredients	Mixing ratio (%)		
	Pig weight 15 - 30 kg	Pig weight 30 - 60 kg	Pig weight over 60 kg
Rice bran	40	40	40
Maize	30	35	40
Concentrated	30	25	20
Total (%)	100	100	100
Crude protein	16 - 17 %	15 - 16 %	14 - 15 %



Improved rural pig production systems, the use of crossbreeds of exotic breeds and a mix of commercial feeds with local cheap available feeds (like rice-bran, maize and beans) is preferably used. Lactating sows, piglets and weaners should have a rich home-made pig feed ration, containing some commercial feeds.

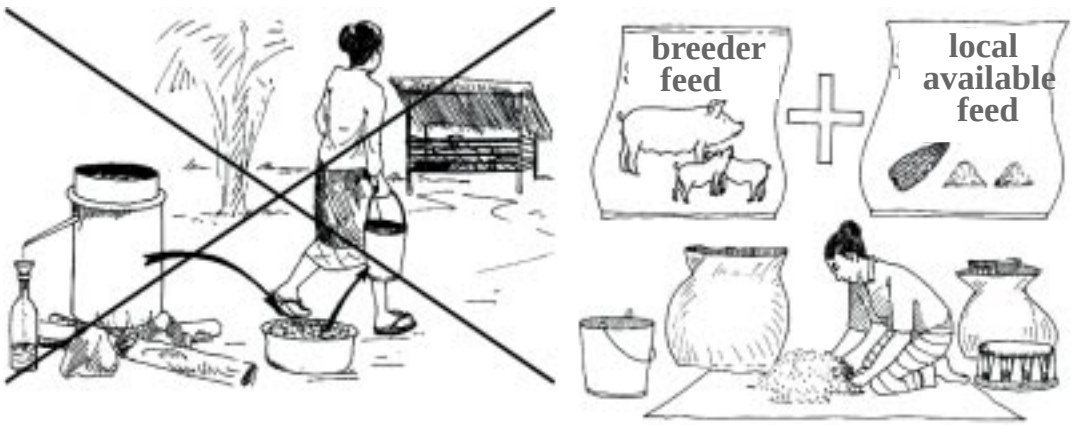
Measuring the correct amount of feed (weight or volume):

One tin weighs 0.5 kilogram

Four tins weigh 2 kilograms

Commercial feeds are expensive and have to be used efficiently. Also, when we make a homemade feed ratio as above, we have to mix the different components correctly (correct weight or volume). Farmers need to calibrate the container or scoop (a tin, part of plastic bottle, etc.) that they use for feeding the pigs to know how many kilograms they are feeding or mixing.

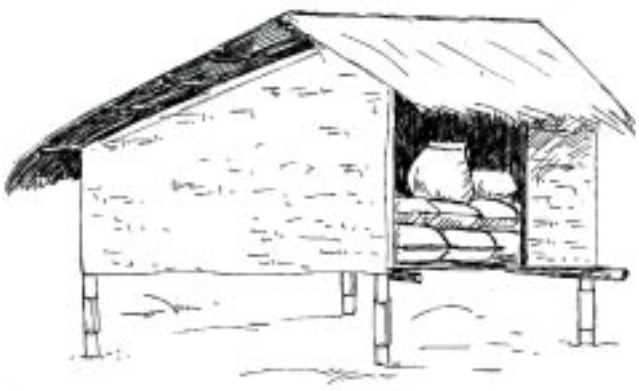
Replacing distillery waste with commercial feeds for sows, piglets and weaners:



Distillery waste (Lao-Lao waste) is much appreciated in the traditional Lao pig husbandry, especially for fattening pigs. It is advisable however, not to give this high valued feed to pregnant and lactating sows and to piglets and weaners because of the alcohol contents in the waste. These animals require high quality of feed and therefore distillery waste needs to be replaced by other high quality feed like commercial feeds.

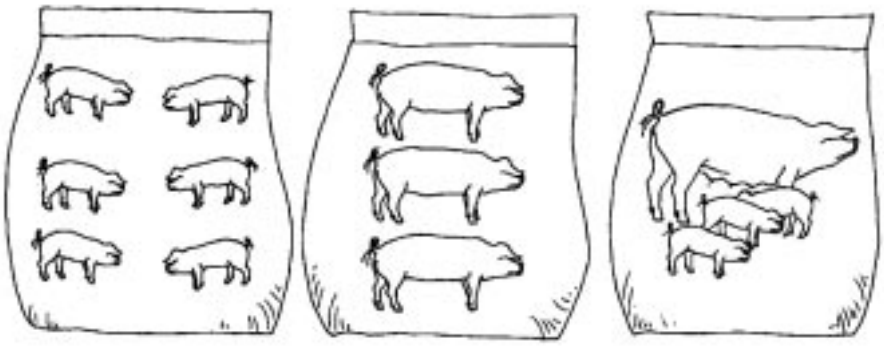
Feed storage:

Some raw materials like cassava, maize and soya beans need to be dried well before storing in a barn or shed. Also complete feed and mixtures of feeds need to be stored dried to avoid moulding. Moulded feeds are unfit for animal feeding. The store needs to be well protected against rats.



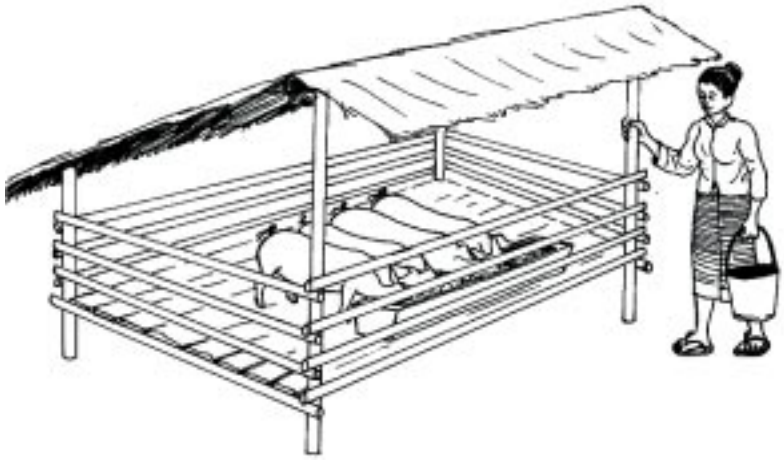
5. General feed management

Nutritional needs change each week for nursery piglets and each month for grower pigs. The nutritional quality of feed, especially protein level, must be correct for pigs at each stage of growth.



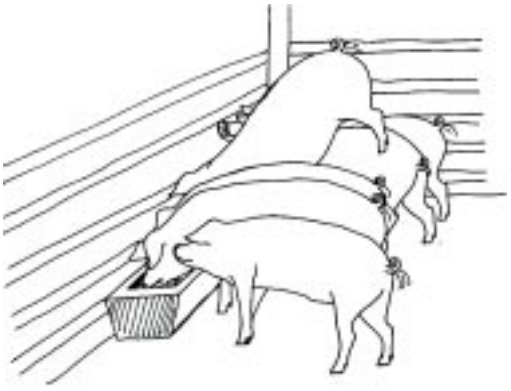
Piglets: 18-20% protein **Growers: 16% protein** **Sows: 15% protein**

The growth rate depends on the intake of good quality and quantity of pig feeds. Every day, each pig must get the right quantity of fresh feed. Stale or dirty feed will reduce their appetite.



Good pig appetite is important. Pigs will eat more fresh clean feed than if it is contaminated, stale or moldy. Clean feed troughs daily.

Sufficient feeder space is necessary, so each pig can eat what it wishes every day.



On many farms feed waste is 15% or more. Feed waste must be avoided as much possible:

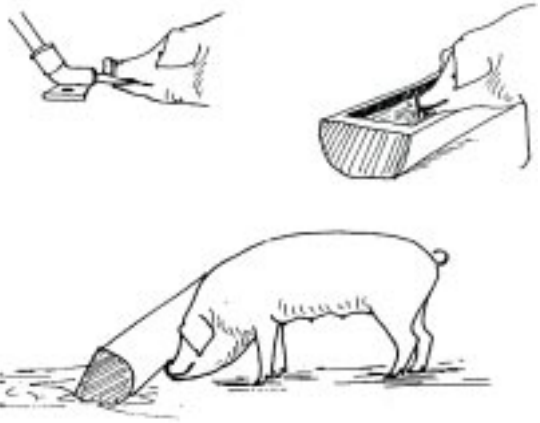
- **Pigs must be fed on time; this makes the pigs familiar to the feeding regime.**
- **Pigs need to be fed according to their sizes and ages.**
- **Troughs must be anchored so they cannot be turned over.**

The feeding regime is as follows:

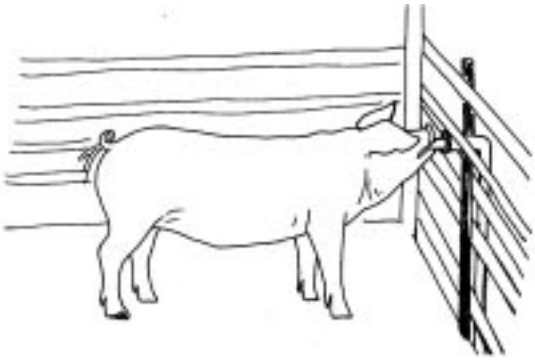
- **Weaned piglets are fed 4 times per day.**
- **Growing pigs are fed 2 times per day.**

All pigs need water.

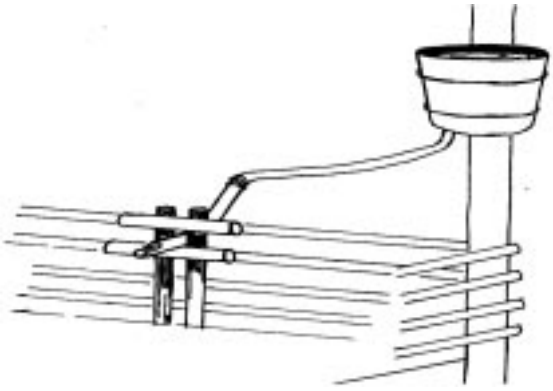
- **A pregnant sow: 10 - 12 liters water per day.**
- **A lactating sow: 20 - 30 liters per day.**
- **A growing pig: 6 - 8 liters per day.**
- **A boar: 12 - 15 liters per day.**



Not enough water can reduce daily feed intake. Ample clean water must be available to drink at all times.



The last part of the water-piping to the drinking nipple must be made from a galvanized-pipe as a plastic hose or PVC tube will be chewed by the growing pigs.



When pigs reach 20 - 60 kg body weight, they are classified as "growers" and their feeding regime, using complete feed, is as follows:

- **Growing pigs are fed 2 times in the day: morning and evening.**
- **Growing pigs with 20 - 40 kg body weight: 1.5 - 2.0 kg per pig per day.**
- **Growing pigs with 40 - 60 kg body weight: 2.0 - 2.5 kg per pig per day.**

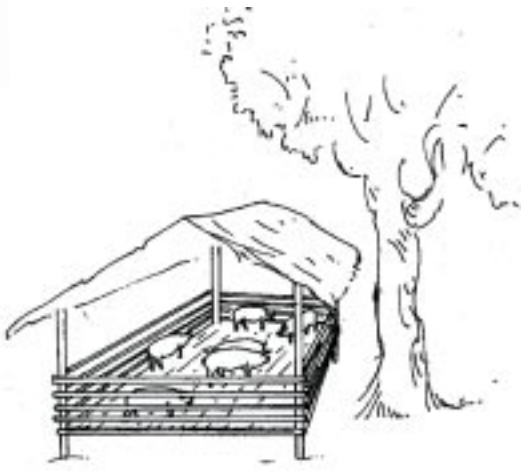
The above feeding practices are especially applicable to farmers with exotic breeds, good feed and management.

The previously mentioned amounts of feeds are based on commercial feeds. The farmer needs to calibrate his feeding container to know how much he is feeding. He also needs to know approximately the weight of his pigs. Estimation of weights can be learned from others (like traders and butchers) or by using scales.

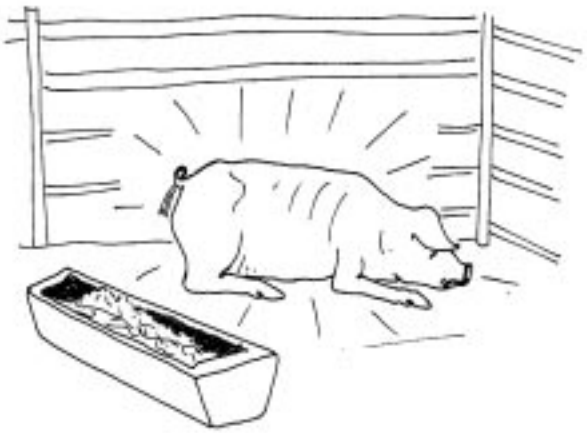
When the farmer is using a cheap home-made feed ratio, it is difficult to know if the farmer is feeding his/her pigs with enough energy and protein for maintenance and growing. In these cases, as a rule of thumb, he/she must feed the pigs till they are satisfied and do not scream anymore. When the farmer is fattening pigs, he/she should feed them even a little bit more (one scoop extra).

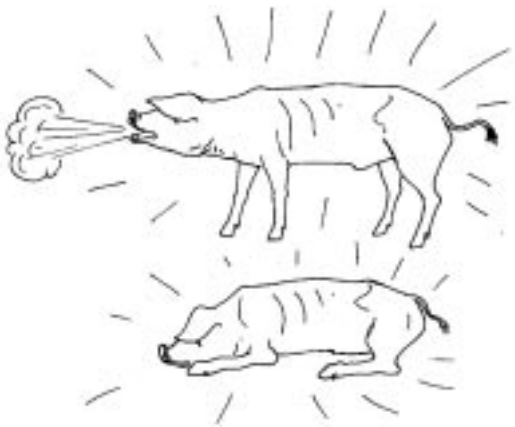
One scoop extra

Keep pigs comfortable to get the best performance. High temperature and high humidity decreases feed intake and growth.



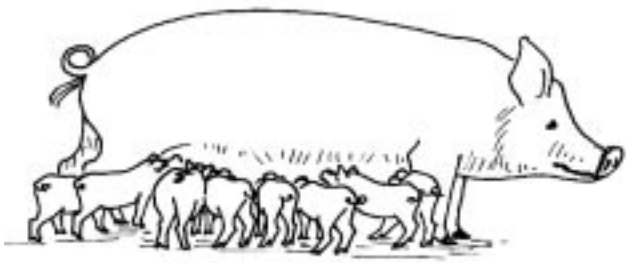
Pigs that are sick will have a reduced appetite and they will not obtain enough nutrients.



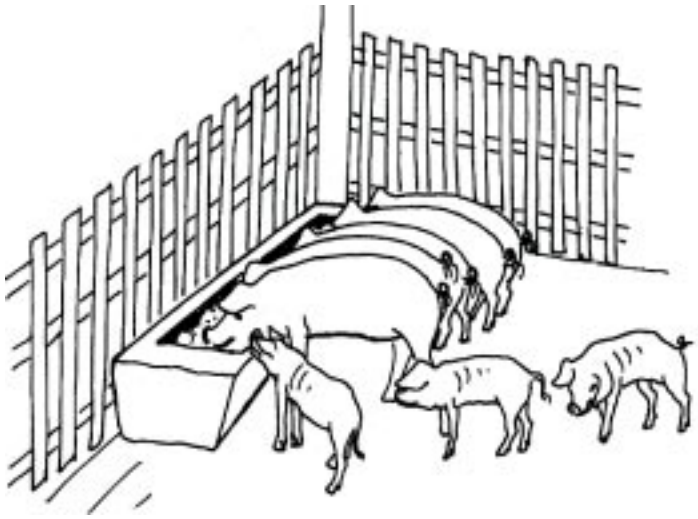


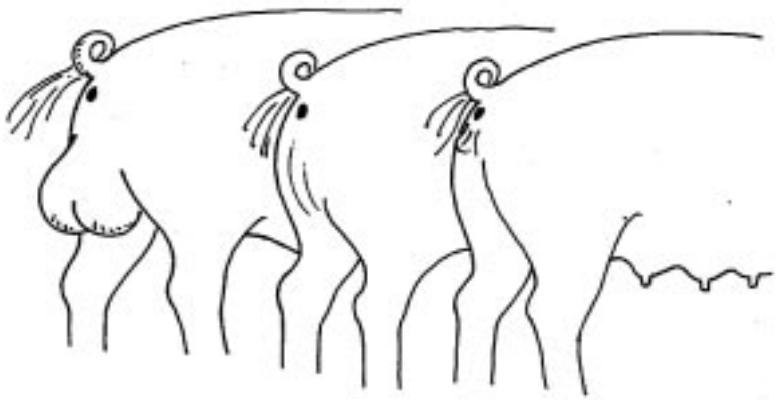
Health problems and parasites can reduce growth efficiency by up to 50% and cause uneven growth.

We know that good performance of a growing pig depends on good growth as a piglet during the first 8 weeks.



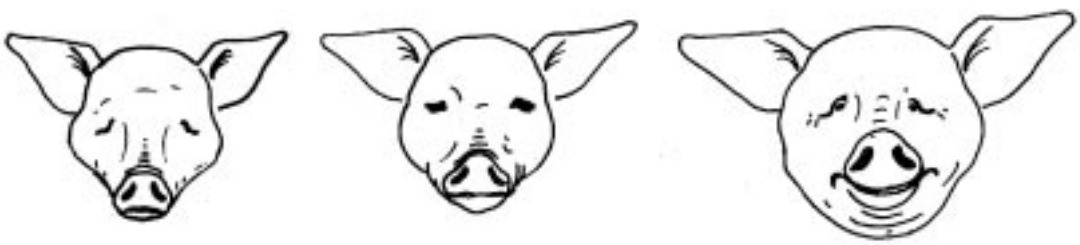
If we cannot get little piglets to eat enough, then the best feeds in the world are useless. You need to cull (sell) these slow growers as soon as possible.



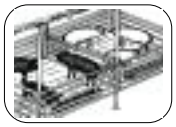


Boar **Castrate** **Gilt**

When the growing pigs reach 50 kg, their nutritional needs diverge according to sex (gender). So it is preferable to pen gilts and castrated boars separately.



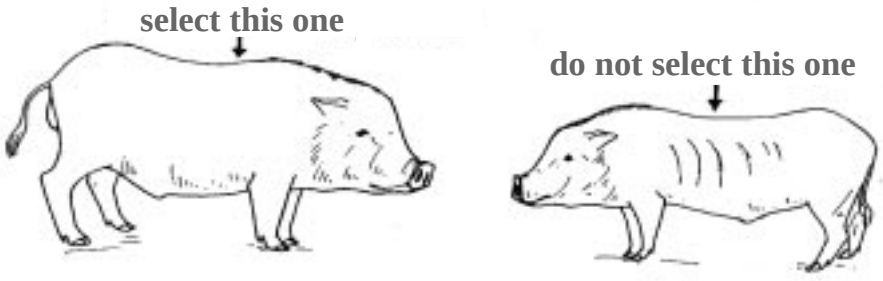
Good feed, effective disease control and a clean environment (pens) will improve pig growth.



1. Selection of boars and gilts

Boar selection:

selection of boars

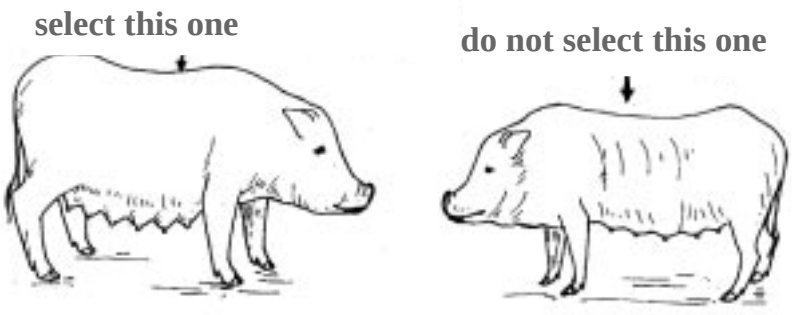


The selection of a good breeding boar is very important for profitable pig production.
Selection criteria are:

- **Avoid inbreeding: do not select boars for breeding within same family lines.**
- **Select offspring from a sow that has consistently farrowed and weaned large litters.**
- **Select from a sow that has a good size and not less than 12 nipples.**
- **The boar should have grown fast and be in good health with strong legs.**
- **The boar should have a good reproductive organ.**

Gilt selection:

selection of gilts

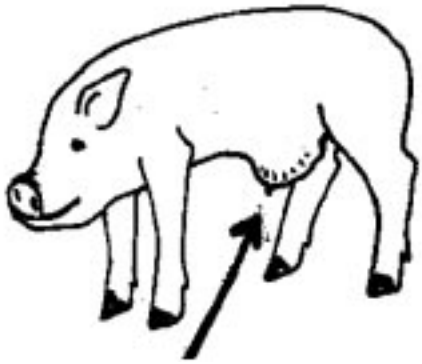


Proper gilt selection is important to obtain large litter sizes and piglets that grow fast.
Selection criteria are:

- **Avoid inbreeding: gilts should not have been mated by their fathers.**
- **Select from a sow that has farrowed and weaned large litters (not less than 9 piglets).**
- **The gilt should have a good size and not less than 12 nipples (same criteria for mother).**
- **The gilt should have grown fast and be in good health with strong legs.**

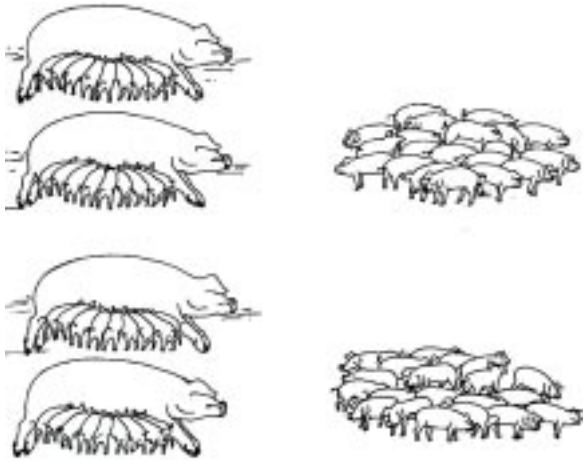
Signs of inbreeding:

A high incidence of hernia can be a sign of inbreeding. Consider replacing the boar and sow(s) and do not use pigs from litters with high incidence of hernia for breeding. If these replacements come from another village then the likelihood of relationship is very small.

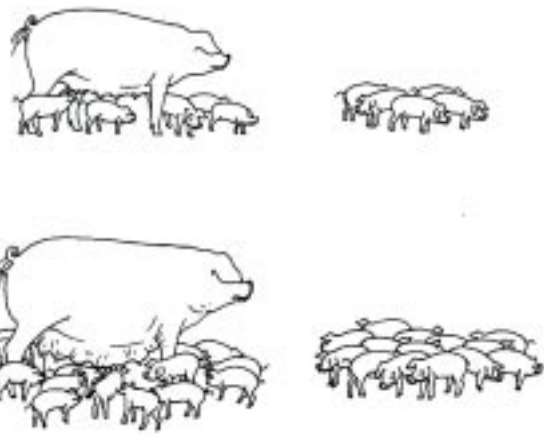


2. Productive sows

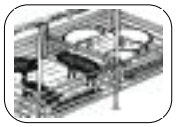
The sow productivity is calculated from the number of piglets per litter and how many litters she produces per year. Her lifetime productivity is the total number of piglets she produced.



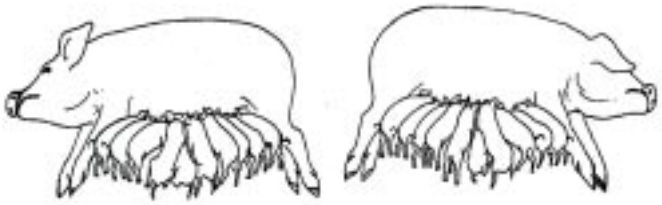
Two years of sow productivity: target is 4 litters.



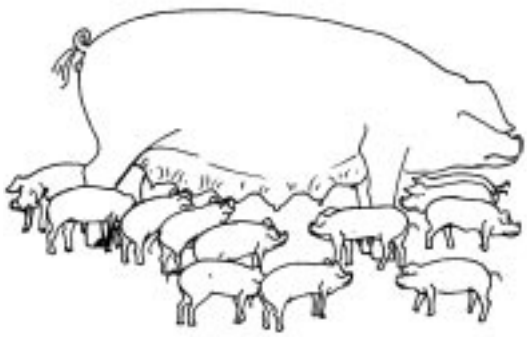
A good and bad sow: many and few piglets.



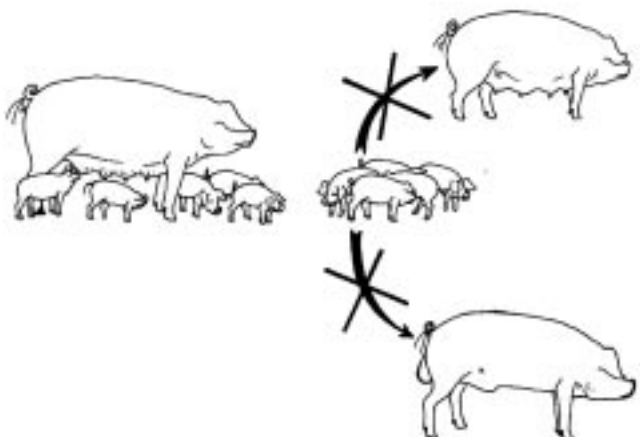
On average, the sow should produce 2 litters per year with over 8 piglets weaned per litter.



Therefore it is important to know the farrowing and nursing characteristics of the sow: ease of birth, mothering instinct, milking ability, etc.

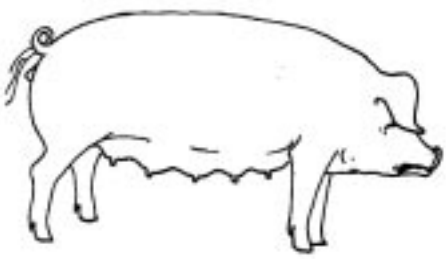


A sow that does not have a good mothering capability needs to be culled. Their offspring should not be used as breeding animals.



We need to develop effective methods to raise all the extra piglets that the sow can not nurse satisfactorily. Sometimes we can transfer piglets to a sow that has only a few piglets (farrowed at the same time).

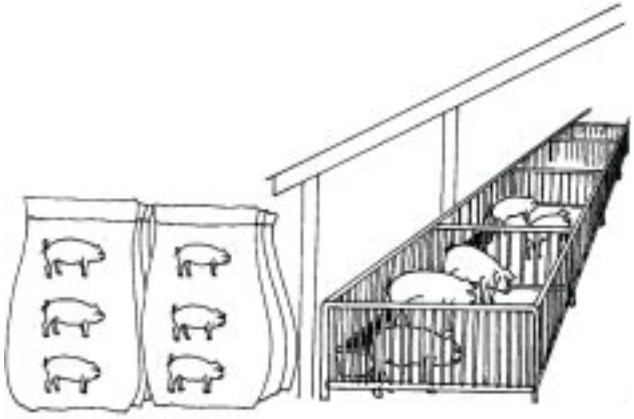
Feed quality and quantity must be balanced so sows do not get too fat in pregnancy or too thin during the nursing period. Both situations can cause reproduction problems.

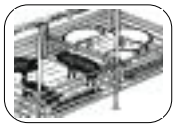


3. Feeding and genetics

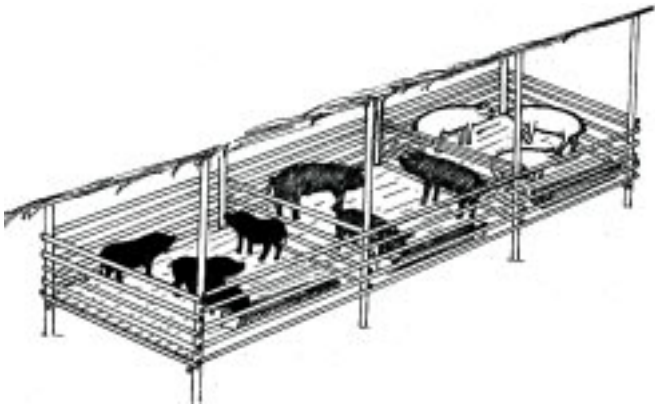
Under Lao conditions it is important that pigs from local or improved breeds can grow on a well balanced diet from locally available feed resources. Lactating sows and piglets also need some commercial feeds in their diet.

It is known that the white exotic pig breeds (Landrace or Large White) do not grow well on simple local diets. Their superior growth can only be reached by feeding them (expensive) commercial feeds.





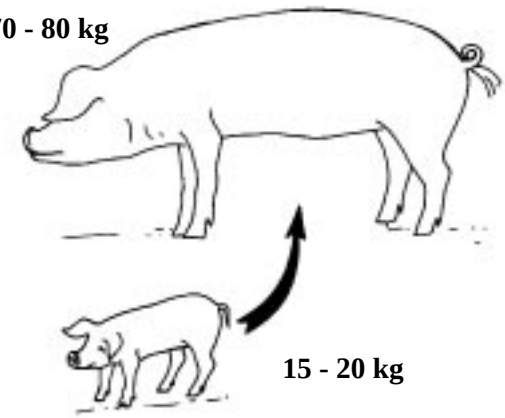
Also, crossbreeds have different appetites and feed conversions (kg of feed needed to grow 1 kg of meat). Cross-breeds can only grow well when they are fed with a good balanced home-made ratio. This means often a mixture of locally available feeds with commercial feeds.



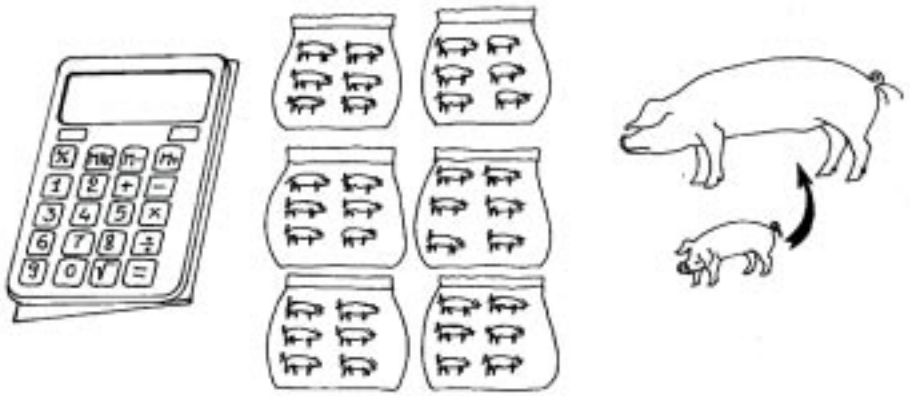
Growth efficiency, litter size and carcass quality are the main characteristics in the selection of breeder animals.

Growing pigs must have the potential to grow rapidly and efficiently and produce a high lean carcass of good quality meat. Below are growing targets for large-scale pig farming in the Lao PDR using exotic breeds and good (commercial) feeds.

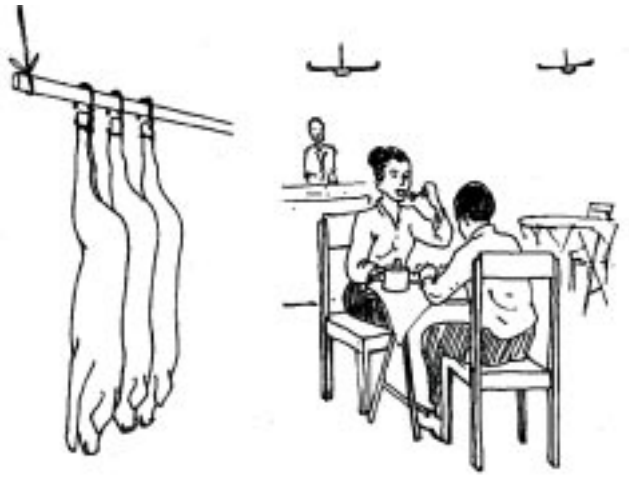
60 kg growth in 3 months with 180 kg feed

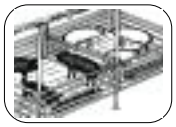


An example of the calculation of feed conversion: 180 kg feed was needed to grow the above pig from 15 - 20 to 70 - 80 kg. Feed conversion = 180 kg feed per 60 kg growth = 3.00 kg feed per 1 kg growth. Thus; the feed conversion is 3.0.



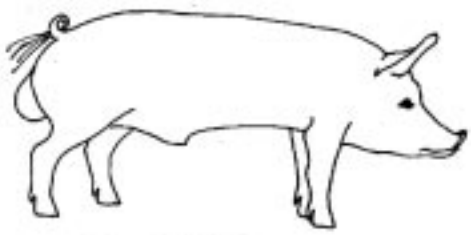
Breeding and feeding techniques determine how uniform and lean pig meat can be. Modern (city) consumers prefer lean pork meat that is less fatty. In rural villages people still prefer the small, local black pig.



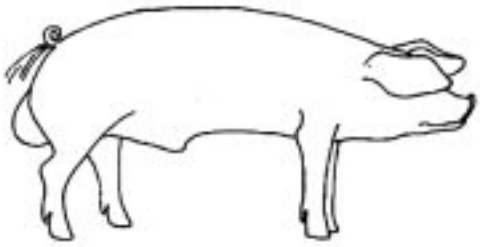


Local pigs, 35 - 40% lean meat

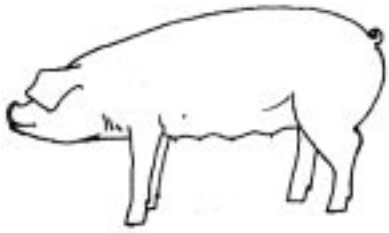
Large-white boar, 45 - 50% lean meat



Specialized commercial breeding programs, over 60% lean meat



Exotic pig breed with lean meat.

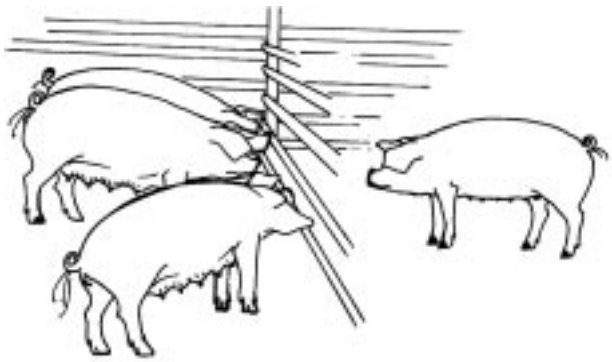


Local pig breed with fatty meat.

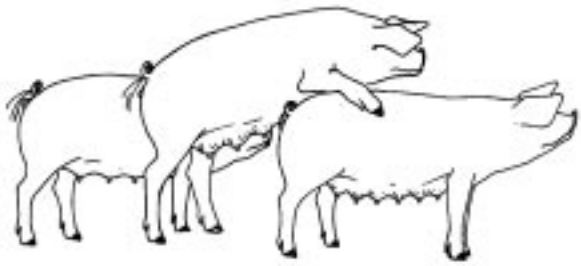
1. Gilt management

Gilts are young female pigs ready for first time breeding at around 8 - 9 months old. Around this time gilts should be placed nearby a boar to stimulate heat, but they should not be penned together with the boar. Gilts should be fed carefully to avoid over or underweight. Usually they are fed around 2 - 2.5 kg per head per day. In addition, they should be given fresh vegetables with the feed.

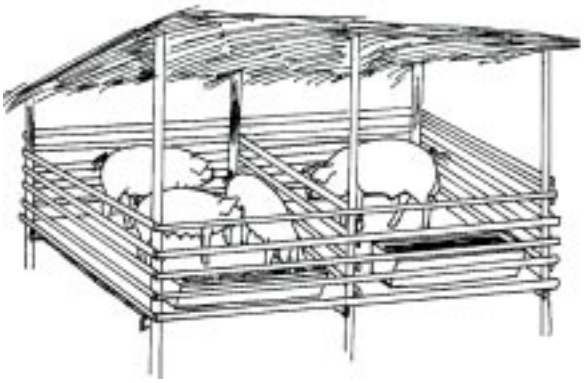
It is useful to expose newly procured gilts to cull sows to get them used to the herd micro flora and to stimulate heat in the new gilts. Carefully mix these newly bought pigs with the others to avoid fighting.



Record the date that any gilts show their first heat signs, but do not mate them.

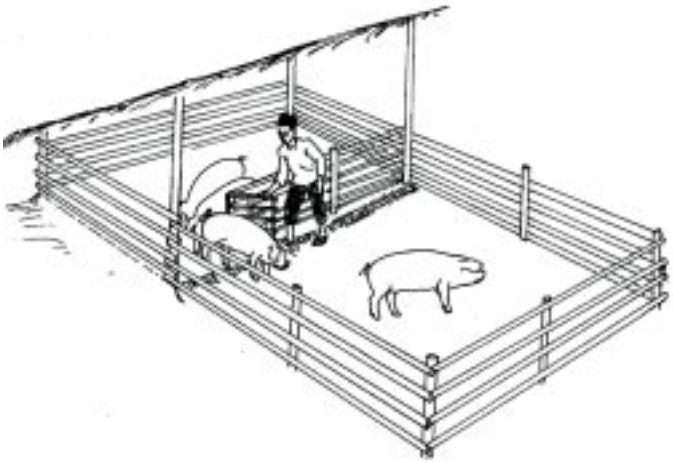


Three weeks after introduction, newly procured gilts should be fully acclimatized, at which time they should be moved into their own pen. This pen should be close to the boar which will stimulate the gilts to come on heat.



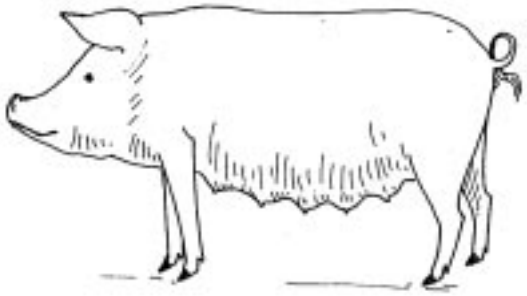
Alternatively, walk a boar before the gilt pen each day, under supervision. Move out any gilts on heat and mate them in a separate area.

If possible, keep gilts in pens so they have exercise for at least half of their first pregnancy, as their body is still growing.



2. Dry sow management

When the sow has weaned her litter she is called a dry sow. This means she is ready for the next breeding. Usually, a dry sow comes into heat about 7-15 days after weaning. Dry sows that have just weaned their litter are often thin because of nursing these piglets. These sows need to be fed well to remain healthy and come in heat. They need to be placed close to a boar and their feed intake should be about 2.5 - 3 kg per head per day.



3. Training of young boars

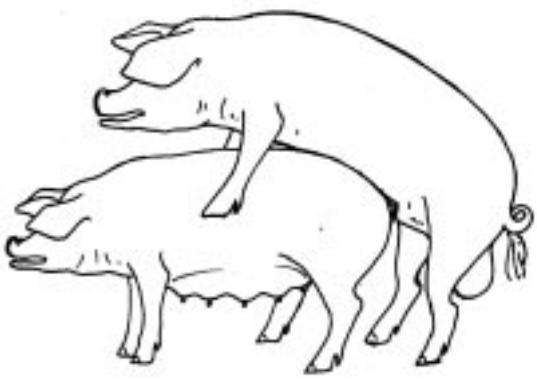
In the beginning young boars can be kept together in one pen, but when they reach 50 - 60 kg they need to be separated to avoid fighting and becoming aggressive.

The training of young boars should start when they reach sexual maturity at around 8 months old. The best place for this practice is in the pen of the boar. A mature sow that is well in heat should be introduced to the young boar. Give them time to get used to each other. Do not allow the boar to mount the sow in front as such a practice might become a bad habit forever. In the beginning, young boars should be given help: the farmer can help inserting the penis into the vagina and let them mate successfully. During mating do not allow interference by other boars.

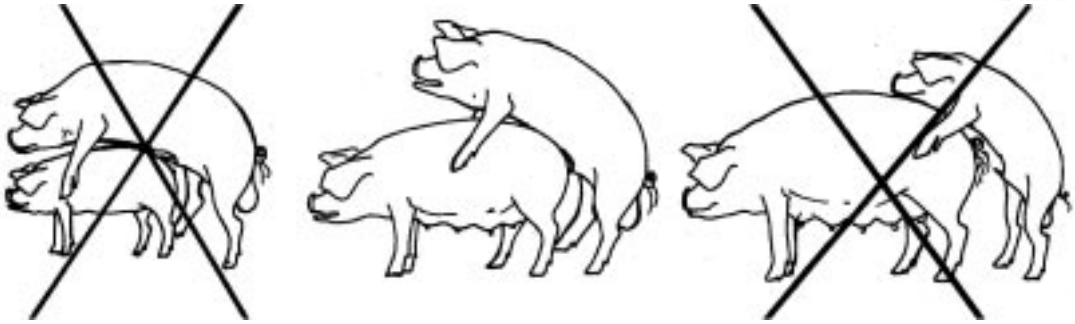
In the case of young boars, train them well when they start working, so they develop good mating habits.

Come on boy!
Right idea - wrong end.

In most cases, natural urges are sufficient to ensure that a young boar will start work enthusiastically.



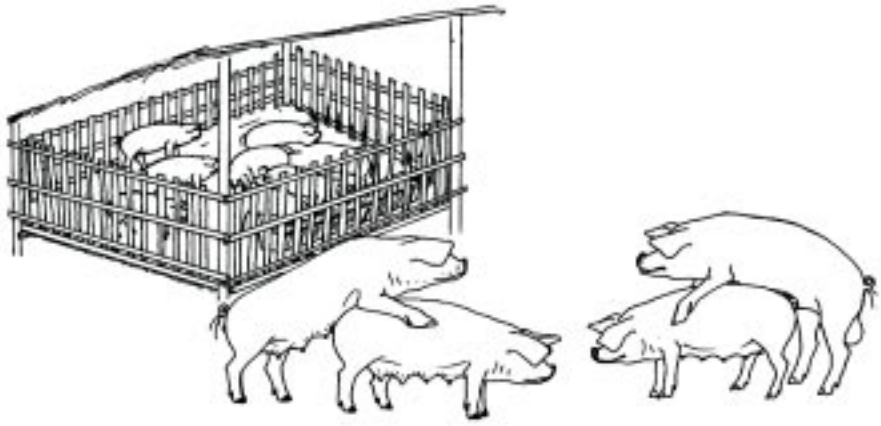
The breeding boar should be (made) docile and easy to handle. Be gentle when handling animals. Do not hit and hurt animals. This boar is too aggressive and too difficult to manage and should not be used for breeding.



Ensure a boar's first service is accomplished with a right-sized female who is strongly on heat.

4. Oestrus cycle, natural and artificial breeding and farrowing date

Sows come in heat 7 - 15 days after weaning, and then after every 21 days until they become pregnant. Correct management of the newly weaned sow is essential to ensure all sows come in heat strongly.

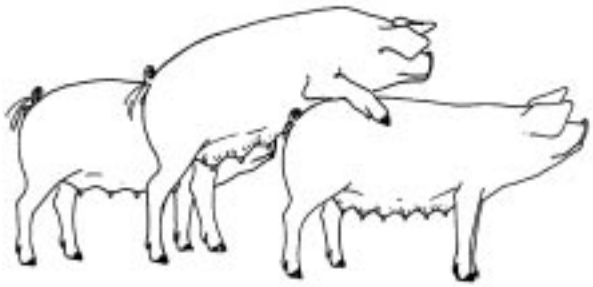


In heat 7-15 days after weaning.

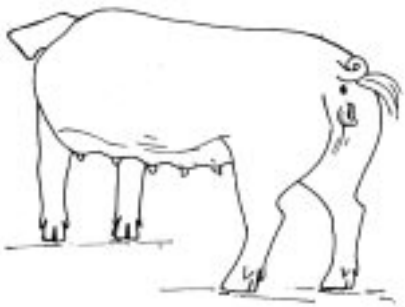
In heat every 21 days till pregnant.

The signs of heat are the following:

- **swollen vulva,**
- **restless (agitated) and roaring,**
- **frequent urination,**
- **reduced appetite,**
- **mounting,**
- **vaginal discharge.**

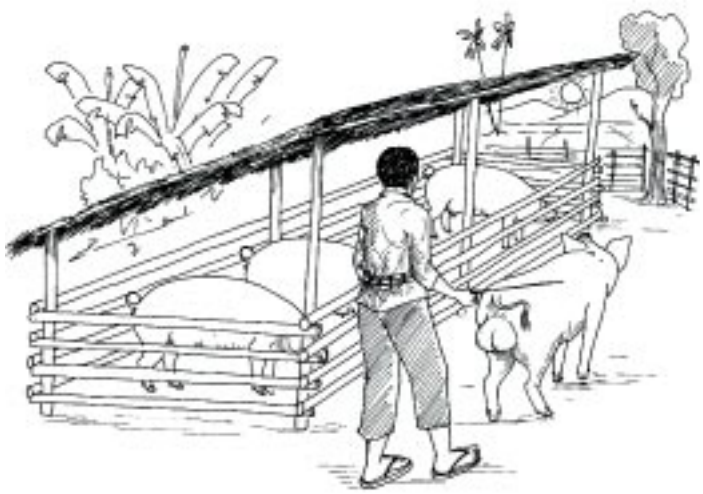


There are 2 steps for heat detection:



1. By observing heat symptoms (restless and mounting), vulva (reddish, swollen with discharge) and touching the sow. Pressure on the back is applied (or one sits on the back) to determine the correct breeding time. During the correct breeding time, the sow does not run away and this is referred to as "standing heat".

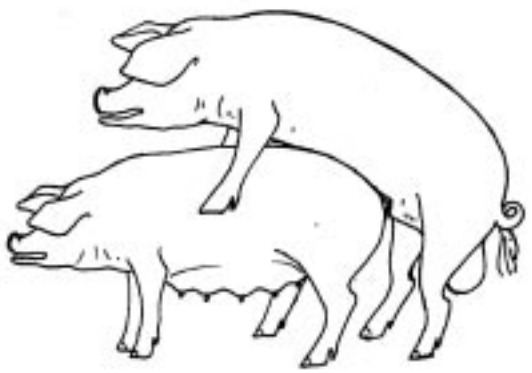
2. By bringing a boar near the sows; the sows will show the heat symptoms more clearly.
This should be done directly after feeding, in the morning and the afternoon.



There are 2 methods of pig breeding, natural and artificial:

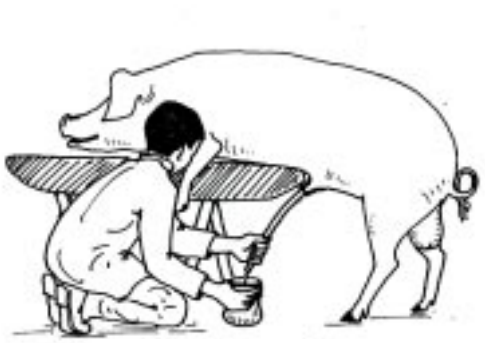
1. Natural breeding

When gilts reach 5 - 6 months, they come in heat for the first time. At this early age the gilts are not suitable for breeding because their reproductive organs are not yet well developed. Gilts must be bred when they reach 7 - 8 months and come in heat for the second or third time. The average length of the oestrus cycle is 21 days and this cycle is repeated when the pig has not been mated successfully.

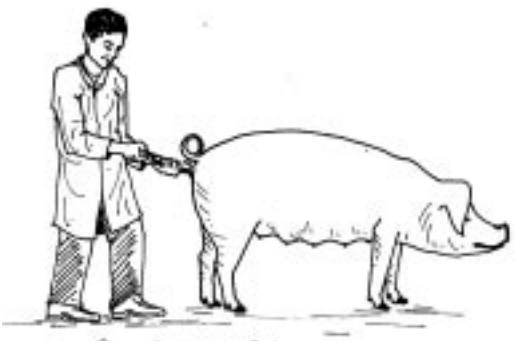


2. Artificial insemination in pigs

When using artificial insemination, the boar does not breed directly with the sow. With the AI method, semen from the boar is collected and " artificially " inserted by the inseminator into the uterus of the sow.



collect semen



insert into uterus

Advantages of artificial insemination:

1. **The semen can be transported over long distance reaching many farmers.**
2. **AI gives a good scope to use one breeding boar for many sows (and reduce operational expenditures).**
3. **AI can restrict the spread of diseases which a boar is likely to spread.**

Calculation of the farrowing date:

The gestation period of a sow is 114 days or 3 months 3 weeks and 3 days (3 months and 24 days).

The farrowing date can be can be calculated as follows:

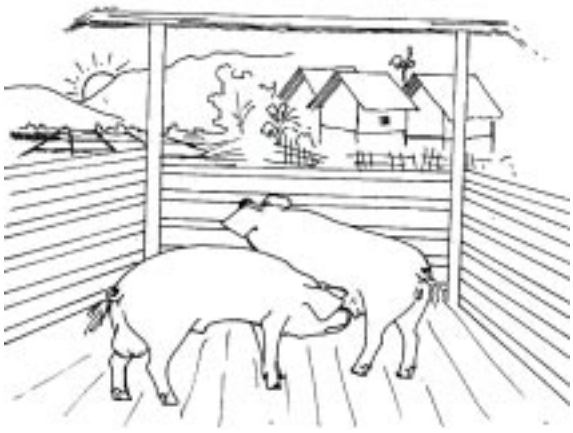
Example 1: Breeding day: 6/08/2002
Gestation period + 24/03/
Farrowing day: 30/11/2002

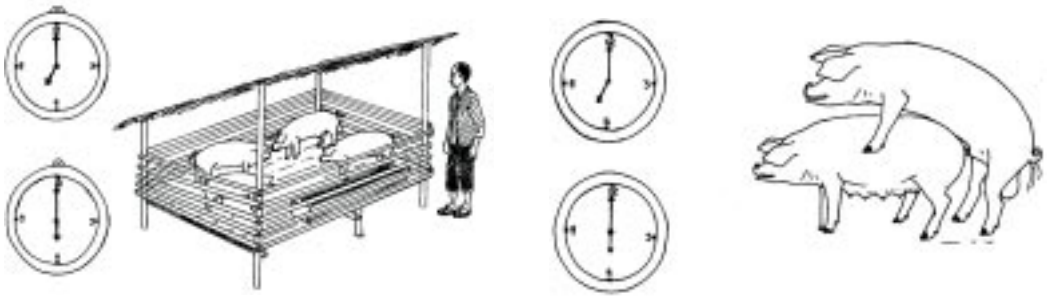
Example 2: Breeding day: 14/08/2002
Gestation period + 24/03/
Farrowing day: 38/11/2002 = 8/12/2002
(day: 38-30=8, month: 11+1=12)

Expected heat and farrowing dates of sows							
Details mating		Details sow & boar		Successful mating		Not successful mating	
No.	Date mating	Boar number	Sow number	Period gestation	Expected farrowing	Heat interval	Next possible heat
1				3m + 24d		21 days	
2				3m + 24d		21 days	
3				3m + 24d		21 days	
4				3m + 24d		21 days	
5				3m + 24d		21 days	
6				3m + 24d		21 days	

5. Practical points regarding heat detection

Heat observation is best done directly after feeding. It should take place early morning or late afternoon, when it is cool and sows show heat more strongly.

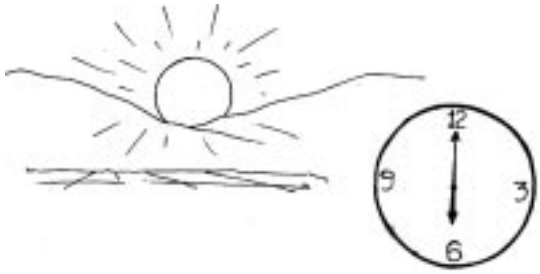




Check sows for standing heat regularly, at least twice a day – early morning and late afternoon. The heat of a sow is short (only one day), so it is best to mate sows at around 12 hours interval (early morning and late afternoon).

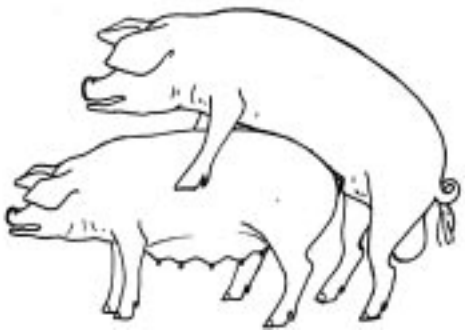
Morning: heat check, plus second mating for sows mated the previous afternoon.

Afternoon: heat check, plus second mating for sows mated in the morning.



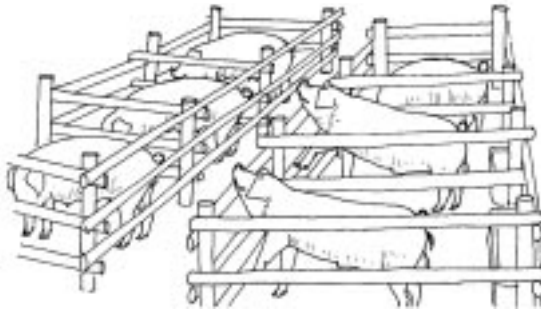
6. Management of mating

Mating is an important event; as at a successful conception, new pigs are created.



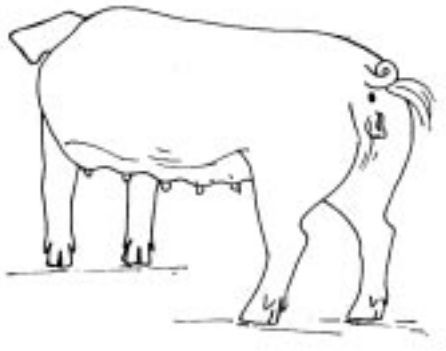
The best approach to detect heat is with the help of a well trained, mature and gentle boar. Every day, gilts and newly weaned sows should make close contact with a boar to stimulate the start of heat.

It is preferable to put newly weaned sows within sight, sound and smell of a boar – the older and smellier, the better.

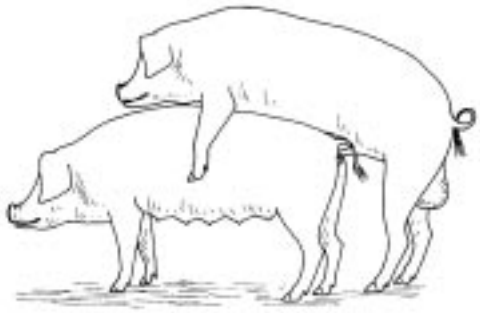


Sows on heat are restless, approach the boar, stand to back pressure and perk up their ears.

The vulva becomes redder, more prominent, swollen and moist.



After heat detection, the sow is ready to be bred. Let the boar and sow meet each other to mate. It is advisable to mate again after 8 - 10 hour interval. This will enhance the chance for conception.



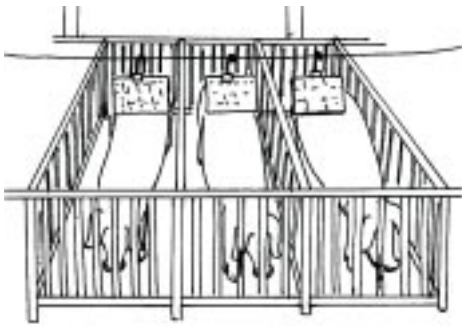
natural mating

Supervised mating ensures maximum efficiency in getting sows pregnant.

Make certain the floor of the mating area is not slippery, so the boar and sow have a good footing. It is advisable to put straw, hay or other material on the floor.

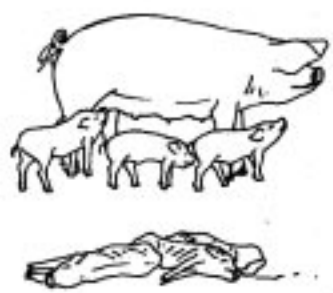
After mating, the boar and sow should be separated and go back to their own pens. Sometimes, the sow is put in an individual pen to avoid fighting with other sows, which may lead to poor conception.

Record all details of the mating on the sow productivity record. Sows that have been bred should be observed for appearance of subsequent heat signs. If the sow shows no sign of being in heat 21 days after mating, we can assume that she is pregnant.

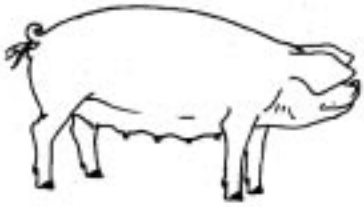


A breeding tip:

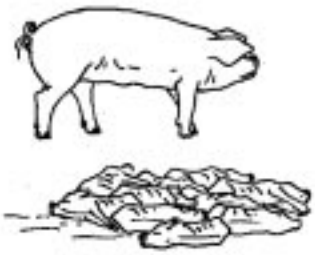
The age of mating depends on the age and weight of the sow. Well-developed gilts can be bred at 8 - 9 months and farrow at 12 to 13 months old. Gilts of exotic breeds should weigh at least 80 kg before breeding. Success of conception is higher at second or third heat (do not mate at the first heat).



This small gilt was mated too early: 3 alive and 3 dead piglets at birth.



A gilt should be well developed before first mating.

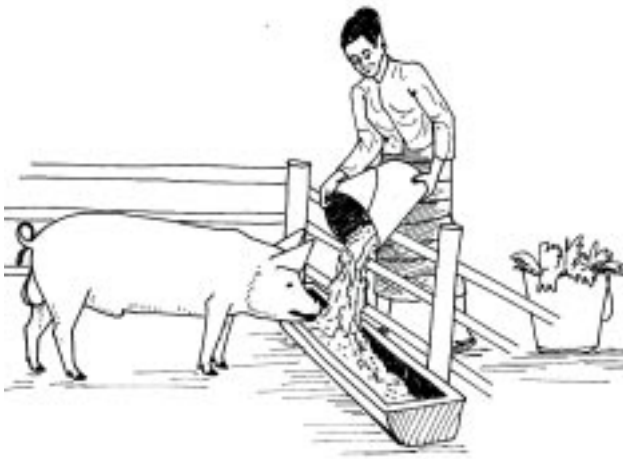


This small gilt was mated too early: all 8 piglets born dead.

7. Management of the breeding boar

A boar used for natural breeding can mate 2 - 3 times a week and can thus have an offspring of 750 piglets per year. In comparison, 1 sow will give birth to about 15 piglets per year (2 litters). Proper attention is required regarding the selection and management of boars to get strong and healthy piglets.

Boar feeding must be controlled to avoid over and under weight as this affects semen quality and libido. Normally, mature boars should be fed 3 - 4 kg per day. But when boars do much mating or are thin, this should be increased and some fresh vegetables should be added in the ration.

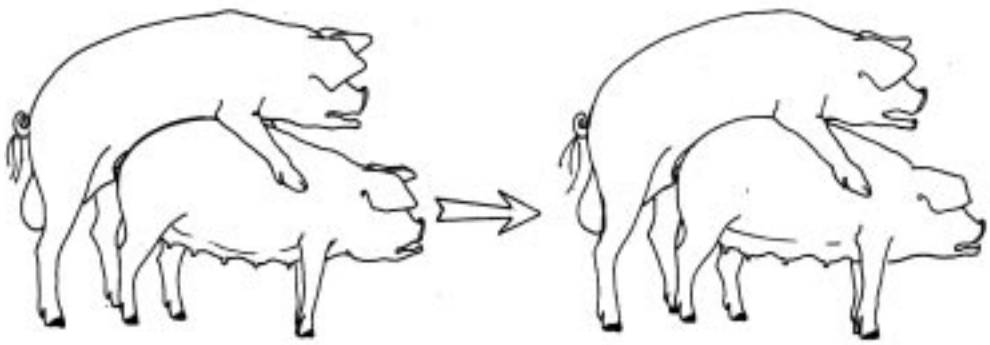


Be careful not to over-use boars or mating performance and semen quality will suffer.

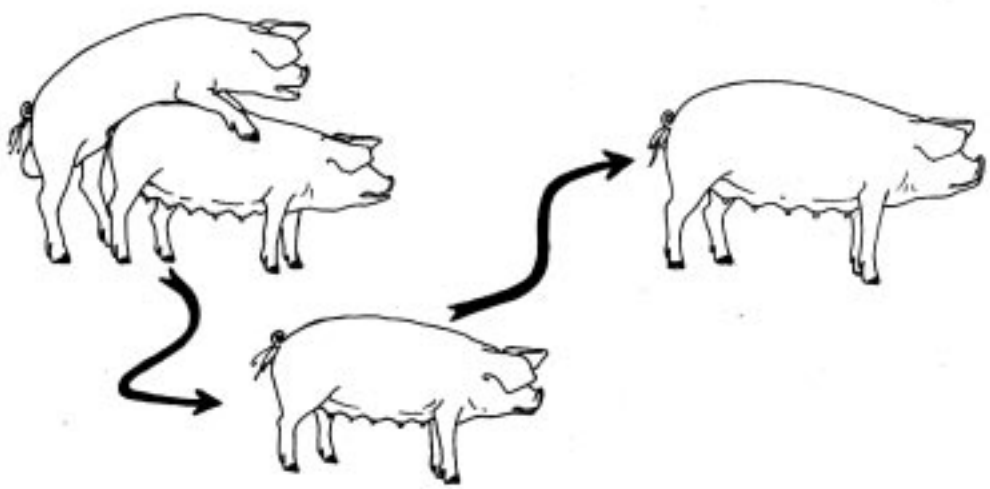
Age of the boar	Breeding frequency
8 - 12 months	2 times per week
as from12 months	3 times per week

1. Pregnancy control and records

A sow can come in heat every 21 days. After a successful mating she will not come in heat any more as she has conceived and become pregnant. Mating the sows twice at 8 - 10 hour interval, will increase the chances of getting the sow pregnant and having many piglets. Sows that did not conceive will return into heat 3 weeks later. So check for returns at 18 - 24 days. Recheck at 6 weeks to be sure all sows are pregnant.

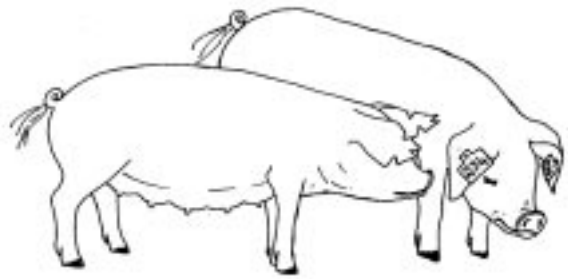


First mating **8 - 10 hours later** **Second mating**



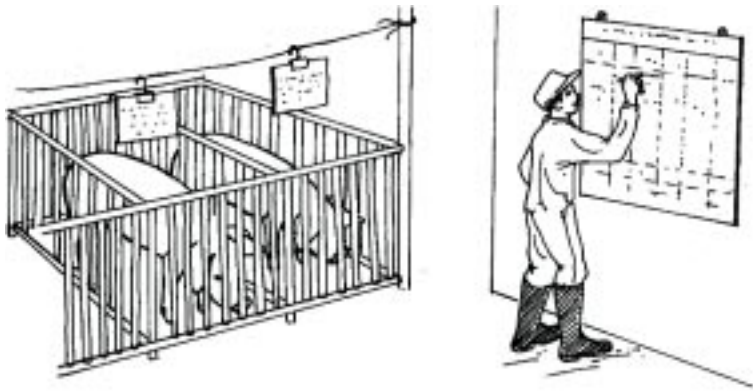
Mating **Check heat 3 weeks later** **Check heat 6 weeks later**

To keep effective control of the breeding herd, sows must properly be identified (ear tag of ear notching).



A pregnant sow should be kept separated from other dry sows and other pigs to avoid fighting and upsetting the early pregnancy.

Keep a record of all sows mated.

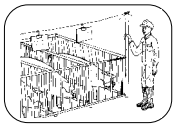


2. Feeding and health

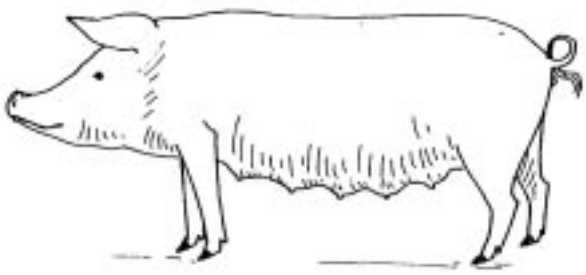
During gestation the sow should be fed well; for herself and embryos. Based on using exotic breeds, good (commercial) feeds and high management, the following amounts of feed are recommended during different stages of gestation:

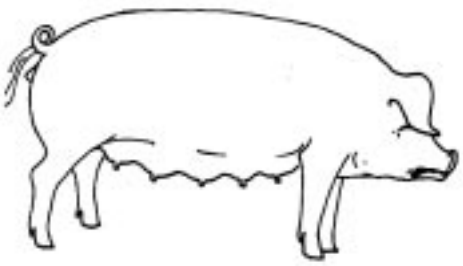
Gestation stage	Amount of feed per sow per day
breeding - 30 days	2.0 kg
30 - 60 days	2.2 kg
60 - 90 days	2.2 - 2.5 kg
90 - 105 days	2.5 kg
105 - 114 days	2.0 kg
at farowing day	do not give feed

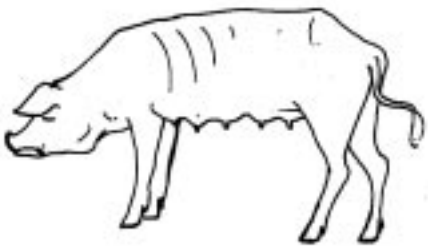
Remember not to feed brewery waste (Lao-Lao waste) to highly pregnant and lactating sows and their piglets.



Feeding should be restricted near the farrowing day (too much feed causes constipation and discomfort during farrowing), but the sow should be provided with ample good drinking water.

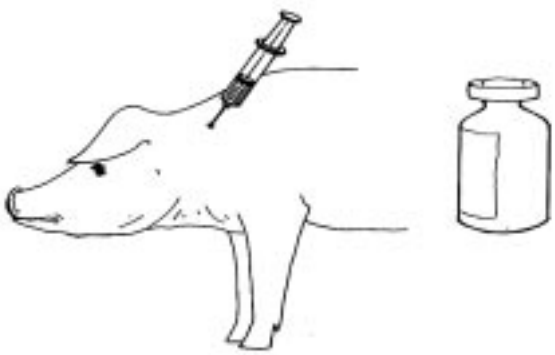




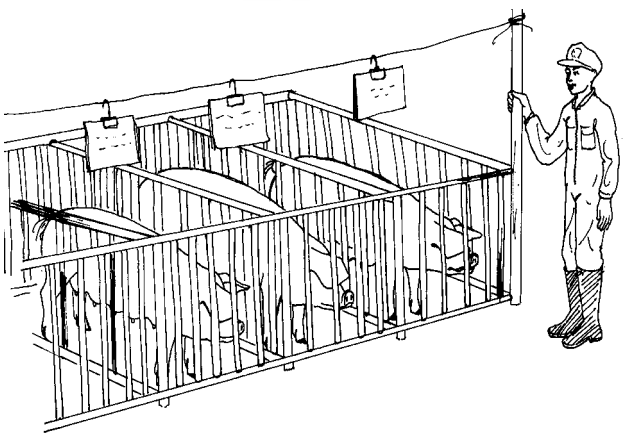


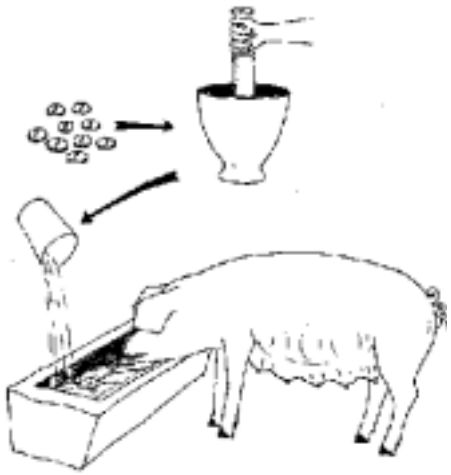
Be careful to feed the correct amounts. Too much feed produces a sow that is too fat and with too little feed the sow becomes too thin. Both situations will lead to farrowing and suckling problems.

A vaccination program is essential for good sow performance.



Inspect each sow daily for lameness, constipation, poor appetite, discharge, coughing physical injury, etc.

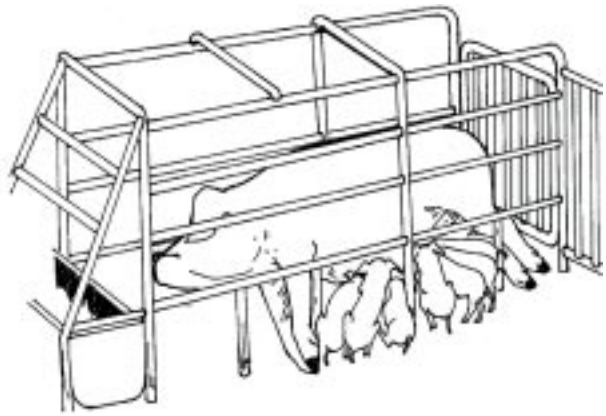




Deworm orally (avoid injections during late pregnancy) and wash the sow as she is moved into the farrowing crate.

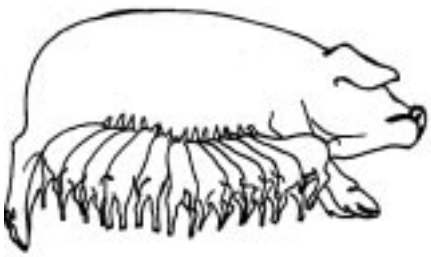
Move sows into the farrowing crate 7 days before they are due. That is the 107th day of pregnancy.

Looking after the sow correctly during pregnancy helps to produce a litter successfully.



1. The days before, during and after farrowing

At the end of the pregnancy the sow should be observed closely to determine the start of farrowing and if necessary to assist the sow and secure the life of the young piglets. On many farms, 30% of all piglets born are lost in the first 4 days. Correct husbandry can save many weak piglets.



When farrowing is near, the sow shows distress, maybe biting walls and the vulva and udder are swollen. At this time the farmer can press the udder softy; if milks appears it means that the sow is near farrowing. The farrowing pen should be prepared with rice straw on the floor and the udder and nipples must be cleaned.

Piglets should be born at regular intervals of approximately 10 - 15 minutes. If there is more than one hour interval, there is a potential problem. Observe the belly for any movements of not yet born piglets.

The farmer should attend the farrowing and assist when necessary. A clean cloth should be available for cleaning and drying the piglets and removing all mucus from mouth and nostrils to ensure that the breathing passages are clear. In that way many piglets can be saved.

When we observe or assume problems with the birth of the piglets, the farmer needs to do a vaginal check. Sometimes piglets can be stuck and the farmer can gently assist these piglets to be born.

Before any vaginal-check, the farmer needs to wash his hands and arms thoroughly with soap. Clip nails short and remove any dirt under the nails. By not observing strict hygiene standards, the uterus can easily become infected.

In the case that the farrowing sow has not enough energy or effort for the contractions, or that the farrowing interval last longer than 1 hour, the sow should be given an intramuscular injection with 0.25 cc Oxytocine to assist the sow in making contractions. If the sow still does not give birth, a veterinarian should be called in for assistance.

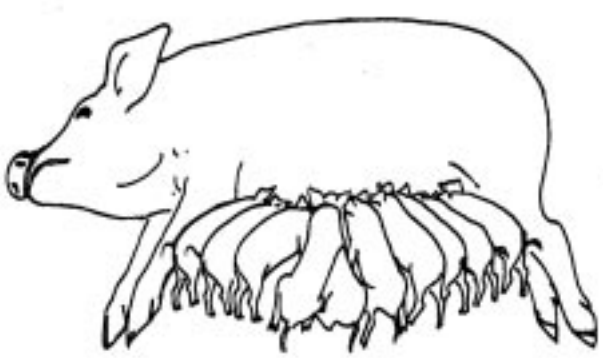
Be sure the sow cleanses completely within 1 hour after the last piglet was born or a uterine infection may result.

Check the sow's udder at least twice a day. If it gets hard, lumpy and hot there may be infection of the udder (mastitis). In that case veterinary assistance should be called.

Use oxytocin and antibiotica only under the direction of a veterinarian (or a VVW) to treat udder and uterine infections.

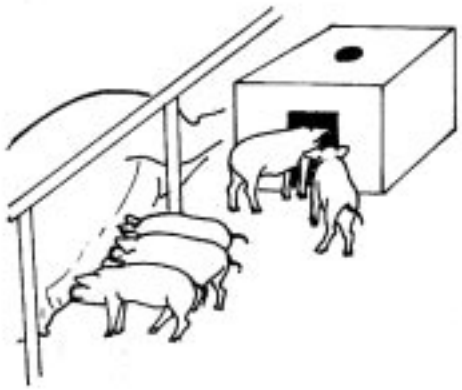
2. Heath care of the newly born piglets and sow

All piglets must suckle immediately some of the sow's first milk (colostrum) as this contains anti-bodies to protect the piglet from disease.



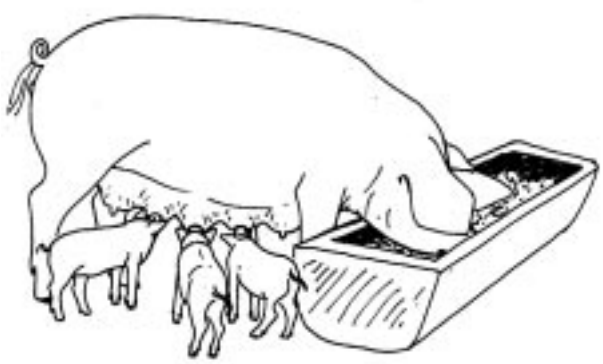
Disinfect the navel as soon as the piglet is born (use Iodine). Clip the eye-teeth and if required shorten their tails (tail docking).

When piglets are kept on a wooden or concrete floor, the piglets need an iron injection within 72 hours after birth to prevent anaemia (milk is iron-deficient). This is not necessary when piglets have a walking space with access to soil (soil contains iron). Piglets with iron deficiency become white and hairy, start scouring and may die.

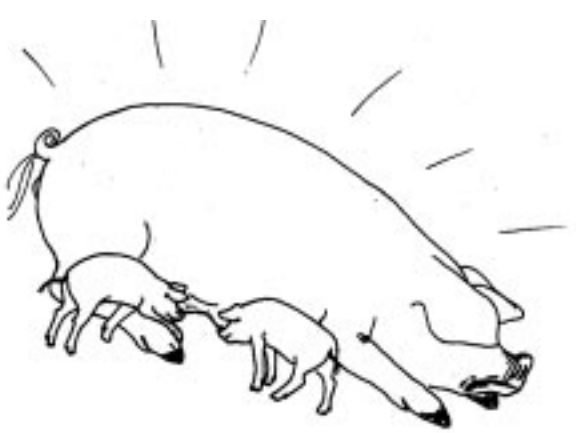


A warm place for the newly born piglets away from the sow is important. This area should be 27 – 30 degrees Celsius for the first 4 days and draft free. A piglet box can be used (60 cm by 60 cm) and or a light to give warmth.

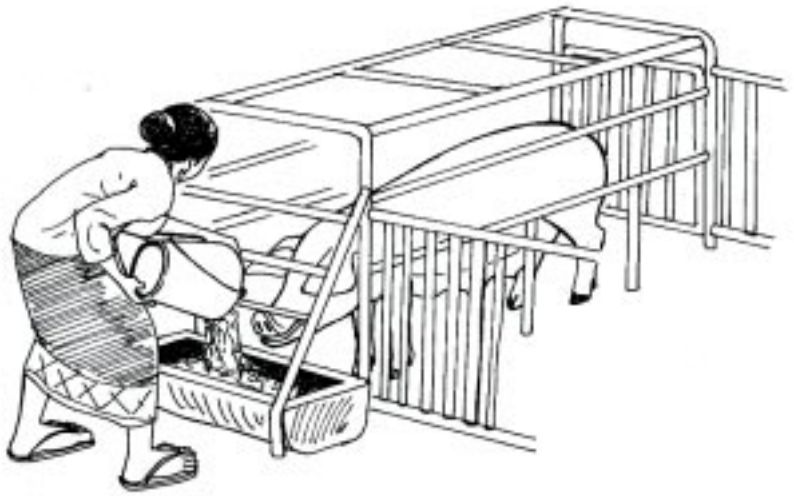
Feed the sow twice per day so the feed does not get stale. Water must be available at all times.



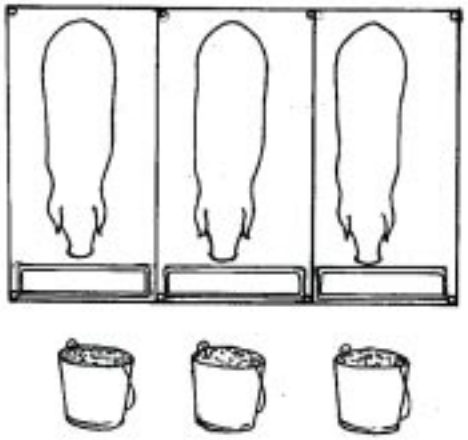
Be careful the sow does not get too hot, goes off feed or get constipated. In these cases she will not produce enough milk for her piglets.

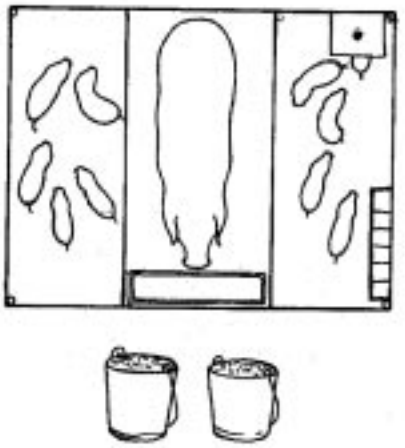


Good feeding practices of the sow are very important. The amount of feed needs to be reduced on the day of farrowing till 1 - 2 days later. After that the feeding should be according to the sow's needs and to the litter size and its condition.



On the day of farrowing no feed must be given to the sow, but ample water should be available. During the second day and later the sow is gradually given more feed. A sow needs a ration of around 2.0 - 2.5 kg per day for maintaining her body weight . For milk production and feeding her piglets, an extra of 0.25 kg is required per day per piglet (based on exotic/improved breeds with good feeds).





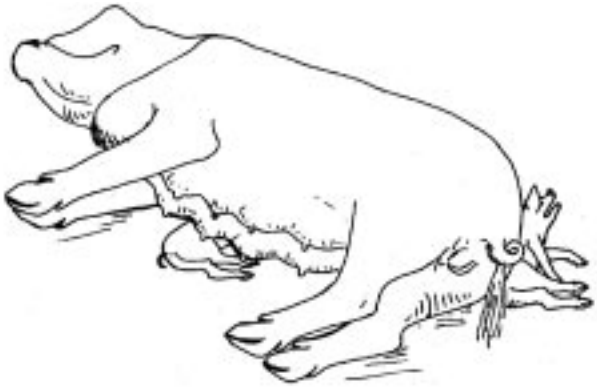
For example: the ration for a sow with 8 piglets is 4 kg per day:
2 kg + (0.25 kg x 8 piglets) = 2 kg + 2 kg = 4 kg per sow per day.

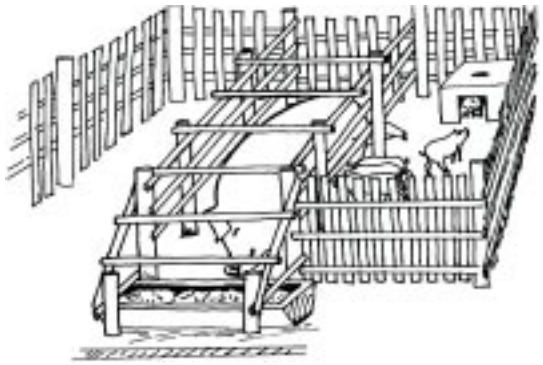
1. Housing and comfort zones for piglets

A sow weighs 100 times more than the piglet at birth. Many piglets get laid on, unless we take precautions. A warm, draft free comfort zone to attract the piglets away from the sow is the best approach.

Newly born piglets need a clean, dry, draft-free and warm area or box to keep them comfortable, avoid diarrhea and prevent weak piglets from dying. Such a comfortable place can be dried rice straw on the floor with an electric or kerosene light above (at 1 meter height) to provide heat for the piglets.

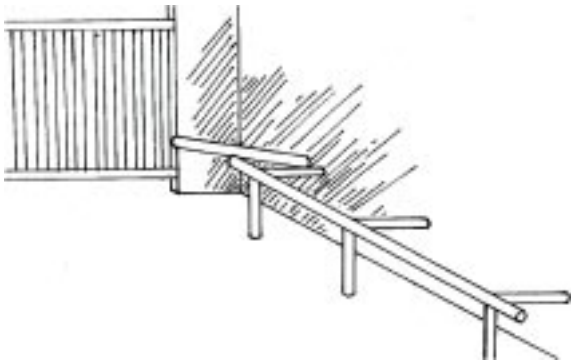
Piglet losses due to being laid on are totally unacceptable and reflect poor husbandry standards.





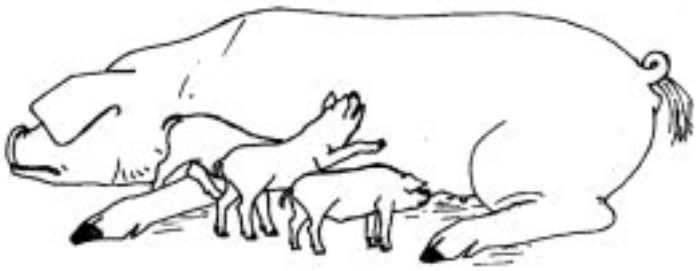
A farrowing crate will prevent many piglets from being laid on.

In a pen without a farrowing crate, the pen needs to have a heavy rail 20 cm away from the wall (and 20 cm above the floor) to prevent piglets from being squeezed against the wall.

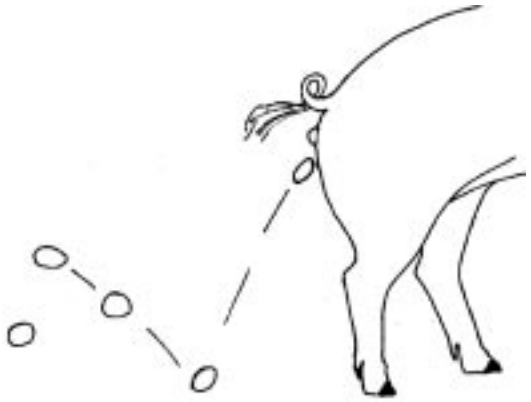


2. Health care of the piglets and sow

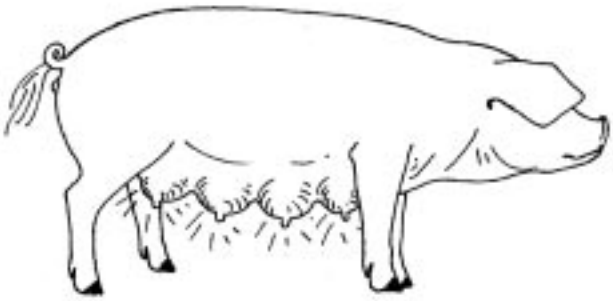
Piglets worrying the sow between feedings means that the piglets are not getting enough milk.



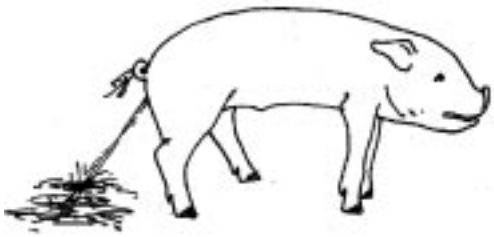
“Ping Pong” ball manure or no dung means the sow is constipated. She will be uncomfortable. Often farmers know traditional medicines to overcome constipation problems.

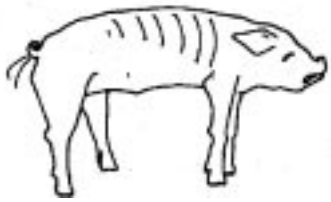


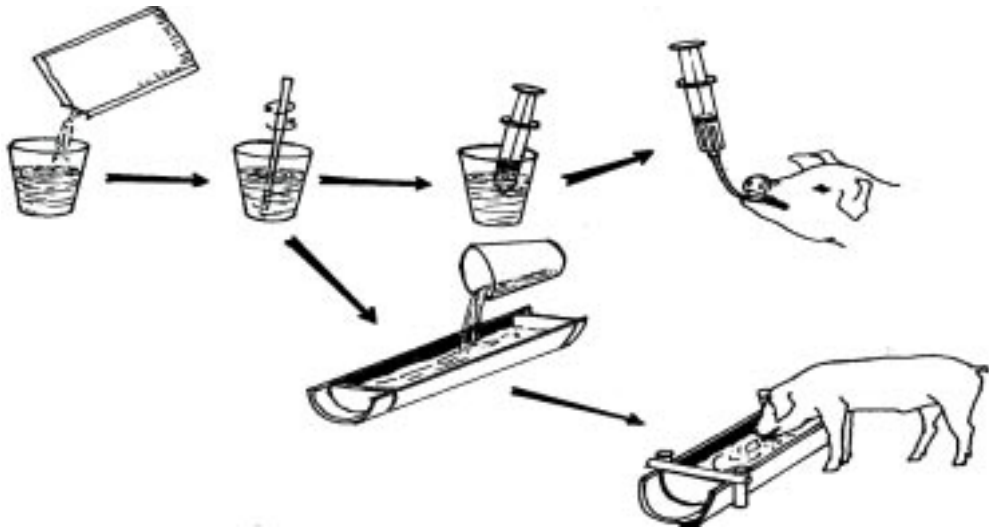
The risk with constipation is that feed ferments in the gut. Toxins are absorbed into the blood causing milk problems. The udder becomes hot and hard.



Diarrhea is the biggest disease threat for piglets. In less than 24 hours piglets can become dehydrated.





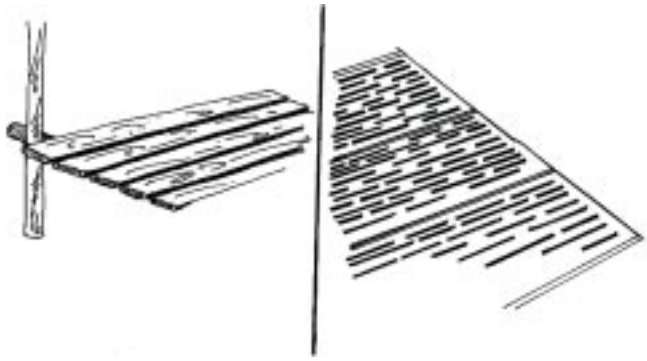


A solution with a rehydration medicine (or a weak mixture of salt and sugar) can be given to the weak piglet by a syringe, with or without a tube, or in the feed if the piglet is able to feed by itself.

Prevention is better than cure. Make certain that all piglets receive iron and that the sow is fully protected by de-worming and that the usual vaccination program against diseases has been undertaken well before farrowing.

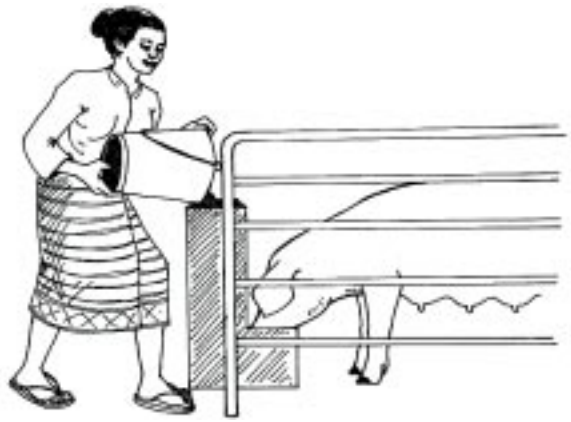
3. Housing, hygiene and feeding

A good pig pen minimizes stress and a slatted floor allows manure to drop through, so that piglets are not exposed to contamination (0.5 - 1.0 cm space between the slats).

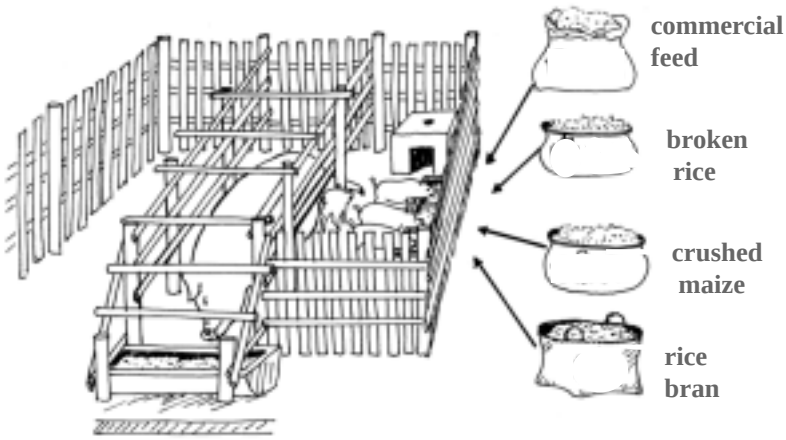


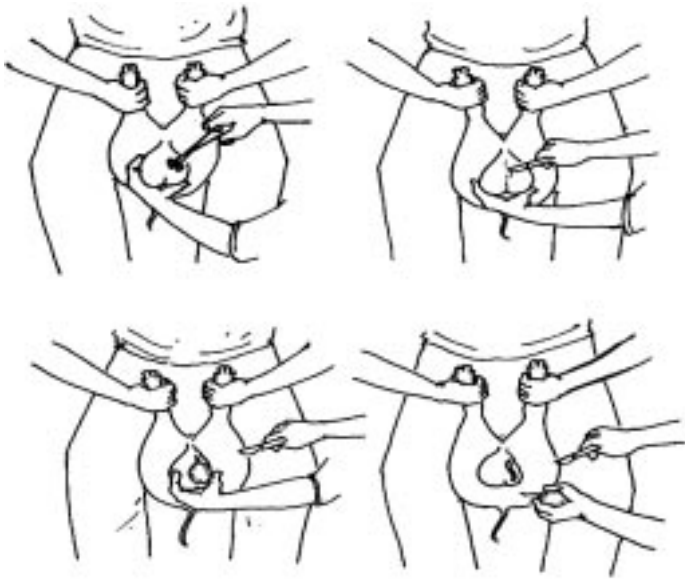
Hygiene standards in the farrowing house must be very high. It is essential to completely clean, wash and disinfect between successive occupancies.

Correct feeding and watering of the sow help to provide a trouble-free suckling period.



When piglets reach 7 days they must learn to eat feed. They should have access to good quality commercial creep feed (about 20g per piglet per day) or a good home-made mixture with fine rice bran, broken rice and milled maize grains. Clean drinking water must always be available.

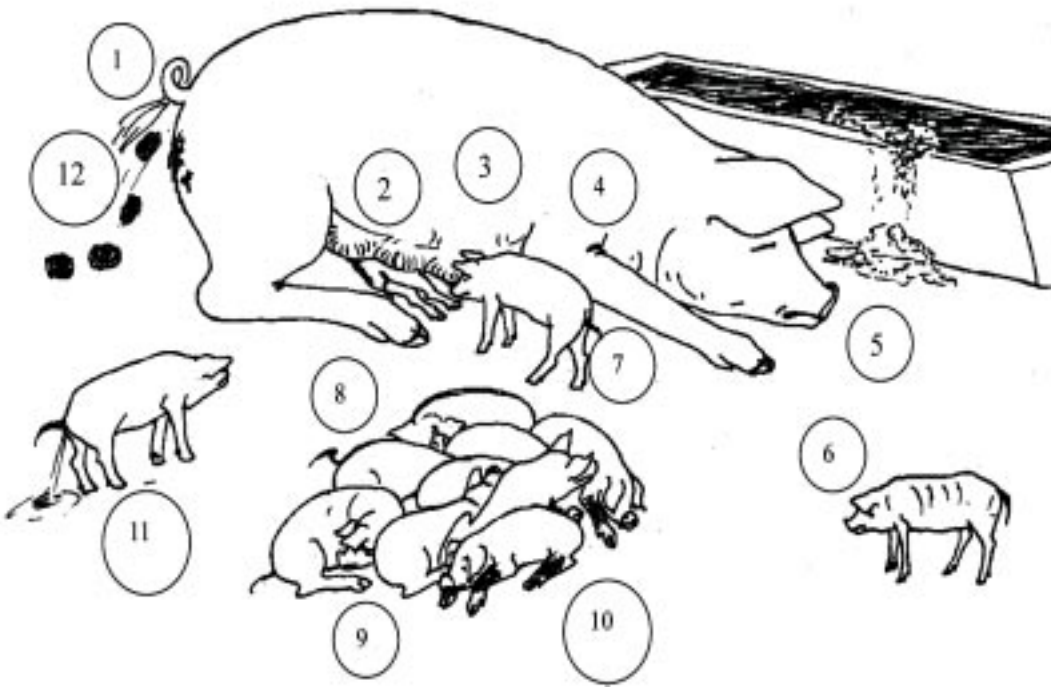


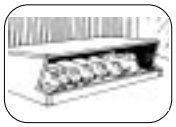


Male piglets that are not selected for breeding can be castrated at the age of 2 weeks old (easy to handle and wounds heal quickly).

4. Check list for the lactating sow and piglets

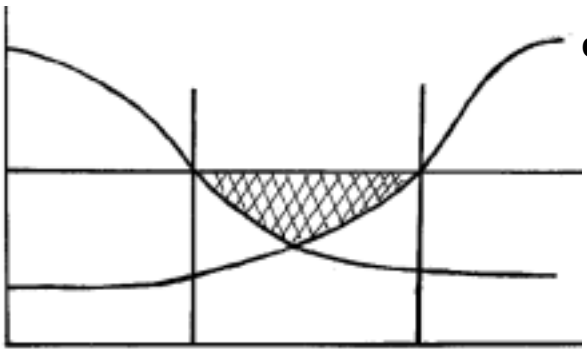
1. **Vaginal discharge that is white indicates an uterine infection.**
2. **Udder hot and lumpy indicates infected udder (mastitis).**
3. **Sow lying on her stomach and not letting the piglets suckle indicates udder discomfort: congested or sore by piglets not having their eye-teeth clipped.**
4. **Sow lacks energy and/or is irritated, indicates that the sow is unwell which will cause her to stop looking after her piglets. Check her temperature!**
5. **Sow not finishing her feed may indicate feeding too much, or water is not available, or she is unwell.**
6. **Piglets become thin and hairy, but not scouring, indicates lack of milk. If they are white and scouring, they may suffer from iron deficiency.**
7. **Piglets always restless and worrying the sow indicates piglets are not receiving enough milk.**
8. **Too many piglets squashed indicates piglets are too cold and sleeping to close to the sow, or that they are not getting sufficient milk, or that the sow is not properly contained.**
9. **Piglets piling-up indicates they are cold and miserable.**
10. **Scabby face and knees indicate fighting at feeding time because piglets are not getting enough milk. Knee abrasions only, mean that the floor is too rough.**
11. **Piglets scouring yellow is milk-scour; the sow may be giving too much milk. White or reddish scour may be bacterial scour and needs antibiotic treatment.**
12. **Sow not dunging or manure is in hard balls indicates that the sow is constipated. This leads to the sow becoming uncomfortable causing milk problems.**





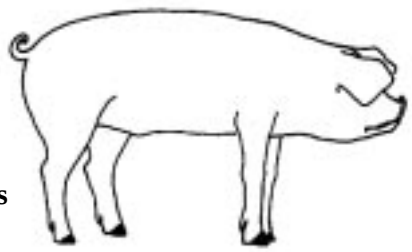
1. Immunity and weaning time

Newly weaned pigs are very vulnerable: the acquired maternal immunity plus their own immunity levels are very low. Only after 5 weeks is their own immunity (by field challenge and/or by vaccinations) at a reasonable level to give protection against diseases.

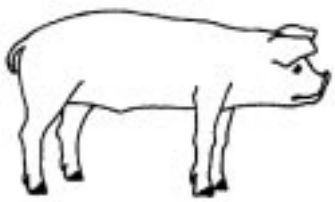


Traditional weaning is at 6 weeks and the piglets are moved to a nursery pen. At improved farms weaning is at 4 weeks. During the first days after weaning (without the sow, her care and milk), weak piglets can be affected and provision of very good feed at this time is essential.

6 weeks

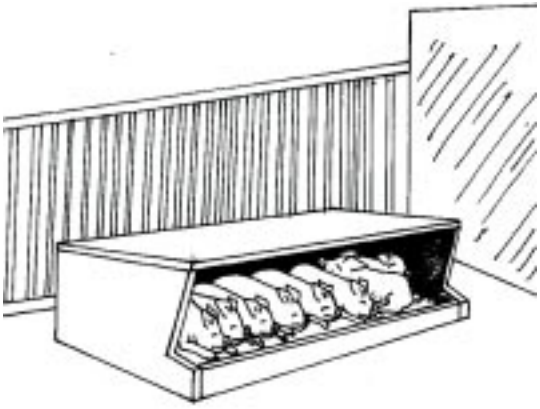


4 weeks

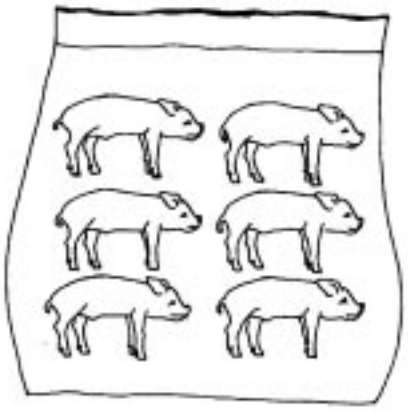


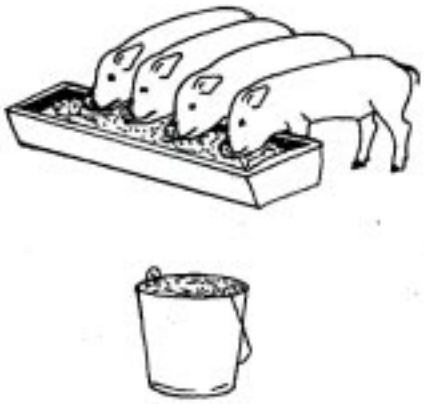
For the early weaned piglet every thing is critical: health and hygiene, nutrition and housing. Everything in the nursery pen must be completely cleaned and disinfected before a new group of weaner piglets is introduced.

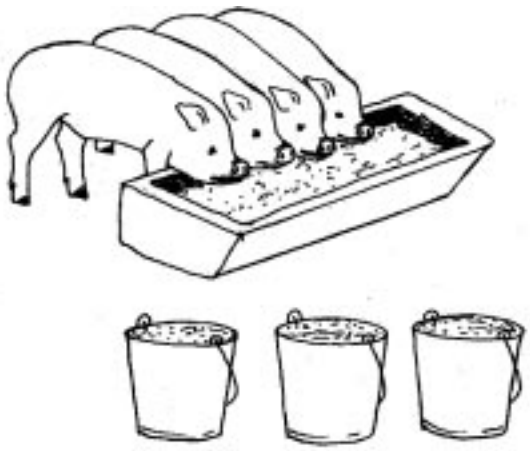
We must provide comfort zones for the very young piglets, especially for the early weaners. Young piglets have almost no tolerance to environmental changes. A draft free and warm comfort zone must be available to piglets at all times.



The nutritional requirement of young piglets is very delicate. Only the best commercial feed should be used. Expensive feed will pay for itself as more piglets will survive and grow faster to 8 weeks old.

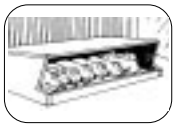






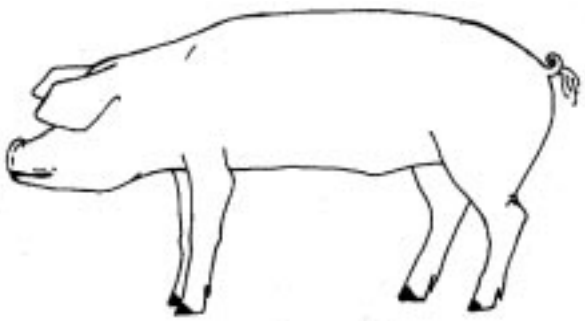
The feeding regime for weaned piglets can be as follows (based on exotic/improved breeds with good feeds):

- **Start feeding newly weaned piglets (4 weeks old) 200 - 250g per piglet per day.**
- **Increase the ration each following week by 100g per piglet per day.**
- **At 8 weeks (1 months later) they are fed 600 - 700g per piglet per day (3 times more than at the start).**



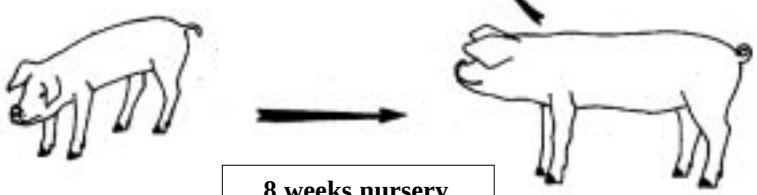
The young piglet grows very fast. Under good management it almost triples in size during 8 weeks in nursery. From 4 weeks weighing 6 – 7 kg to 12 weeks weighing 15 – 20 kg (weights are for commercial pig breeds). Its growth performance during the nursery period, determines its potential for efficient growth in the fattening period (fattening to 60 - 80 - 100 kg).

Ready for slaughter: 12 weeks fattening period, weighing 70 - 80 kg at age 12 + 12 = 24 weeks



Early weaners at 4 weeks: 6 - 7 kg.

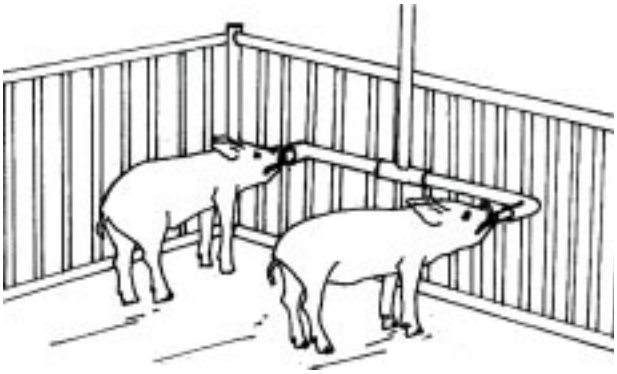
Ready for fattening at 12 weeks: 15 - 20 kg.



8 weeks nursery.

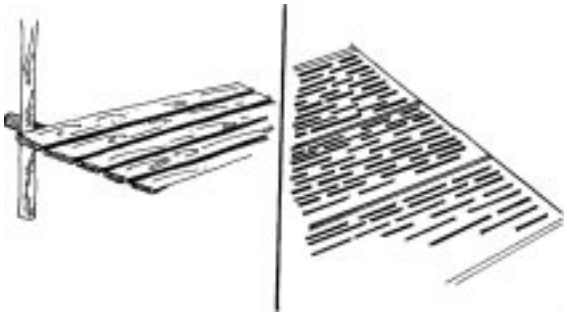
2. Feeding and housing of weaners

The farmer must ensure that piglets drink sufficient water to prevent dehydration and monitor water consumption.

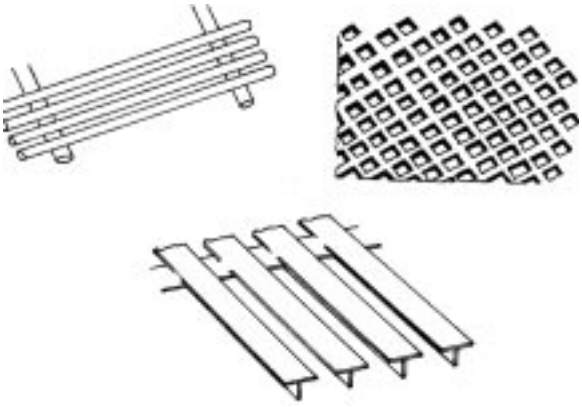


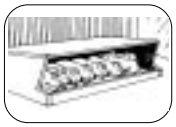
The farmer must feed the pigs several times a day and ensure that all piglets can eat at the same time (have enough feeding space per piglet). He/she must observe carefully and treat any health problem immediately.

It is preferable to use a slatted floor, so manure does not build up on the floor. The rule is that nursery piglets should not be allowed on a concrete floor until 8 weeks old.



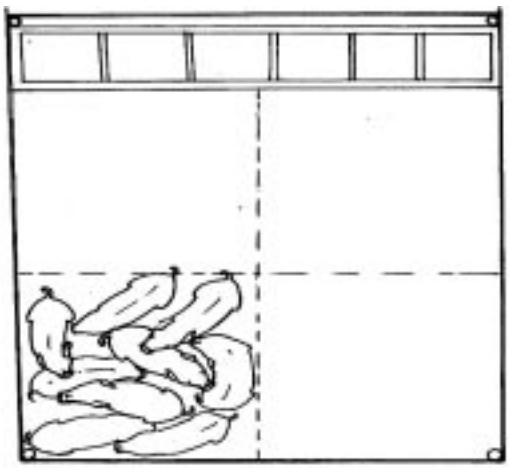
On large pig farms the following (factory-made) materials are used for slatted floors:
1) metal rods,
2) plastic coated metal,
3) plastic slats.



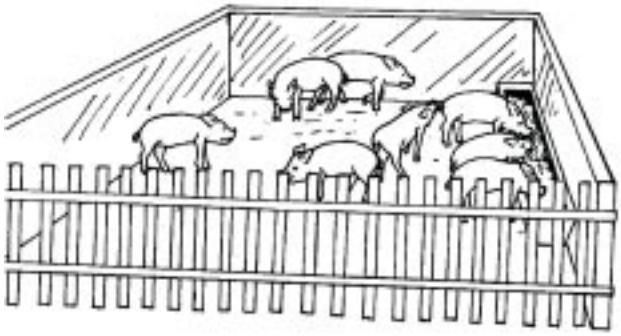


Concrete is like a sponge when it comes to bacteria. It is very difficult to get a concrete floor clean without bacteria. The magnified surface of a concrete floor shows that it is quite rough allowing many germs to hide from cleaning.

Piglets will move in their pen to the area in which they feel most comfortable. It may change several times a day.



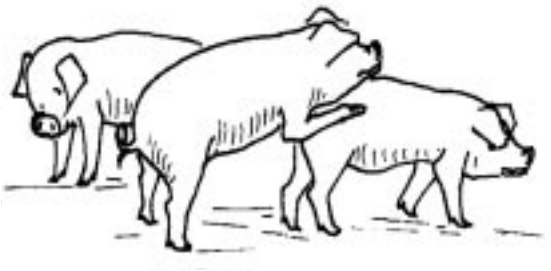
For practical reasons, the single stage nursery (from 4 to 12 weeks) is most widely used. This nursery pen must be well designed to provide a wide range of facilities as the piglets grow from 7 kg to 20 kg. The husbandry practices must be optimal.

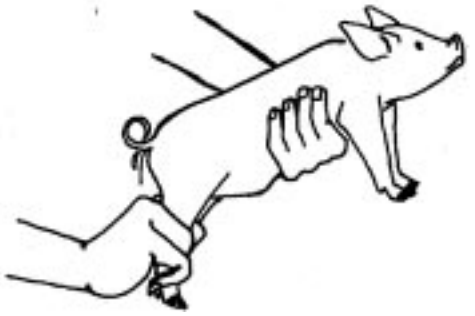


On large pig farms, "All-in All-out" pens are used so pigs of the same age and weight are together and isolated from pigs of other ages.

3. Handling and transporting pigs

Two weeks after weaning, the piglets can be sold or moved to other places. When moving piglets to another place, clean and disinfect in advance the new pen and equipment (feed trough and drinker) and provide enough feed.

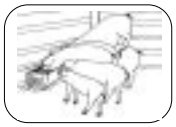




The following need attention when handling and moving piglets:

- **For a small piglet, take the rear leg and hold it in one hand.**
- **Two persons might be needed to handle young pigs, like driving the pigs into a vehicle.**
- **Pigs might fight and bite during transportation. It might be necessary to put them in crates. During transport the pigs must be protected against bumping, hitting and strong sun.**

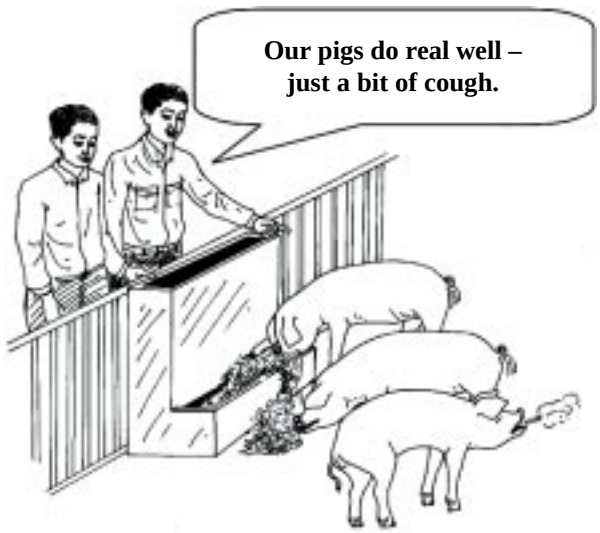
When a truck loaded with pigs halts for a rest in the shade, pigs can be sprinkled with water to reduce high temperatures. After arrival, pigs should take a rest for around 30 minutes and then be given water and feed.



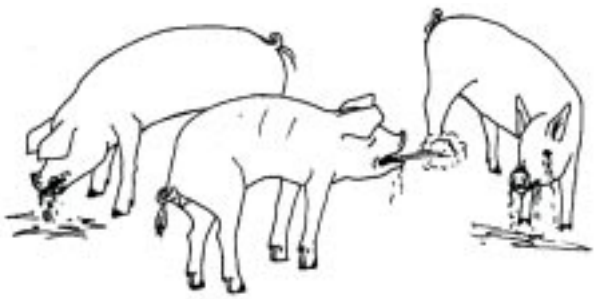
1. Problems during the growing and fattening period

Piglets are moved from the nursery to the grower pen at 12 weeks of age when they are weighing 18 to 20 kg. Moving at too early an age or too light a weight, can permanently reduce the pig's ability to grow efficient and fast.

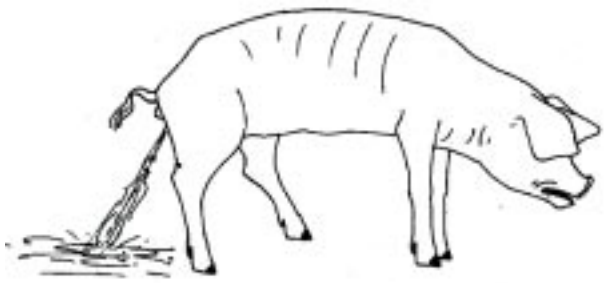
Inefficiency in growers is difficult to notice as pigs just grow slowly or feed is wasted. Avoiding feed waste, providing animal health care and proper housing are the most important factors for growing pigs profitable.



Respiratory problems manifest themselves as coughing, sneezing, snout distortions due to rhinitis, pneumonia due to viruses and bacteria.

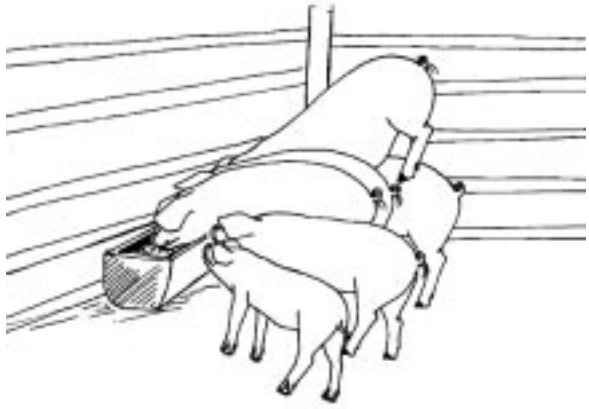


Intestinal problems, e.g. swine dysentery and viral intestinal infections, may result in diarrhea and/or blood in the manure.

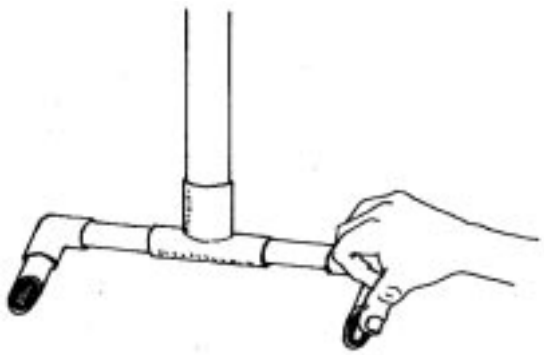


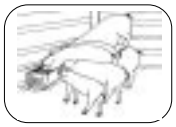
Intestinal and stomach parasites can absorb many of the nutrients that should be used by the pig. External parasites (mange) cause much stress and loss of weight.

Feeder space problems: size of the feed space is important as the pigs get bigger. Weaker and less dominant pigs do not always get the chance to eat enough feed and become even weaker.



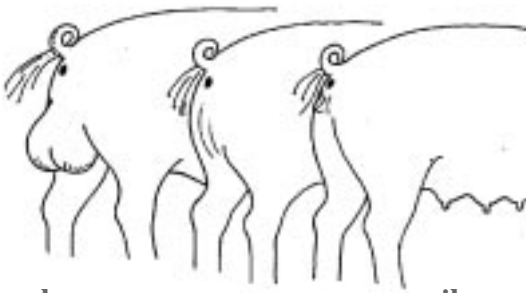
Water problems: at least two drinkers per pen are required and water should be available at all times. Check water flow daily. The piping should be made of a galvanized pipe to prevent pigs from chewing it.





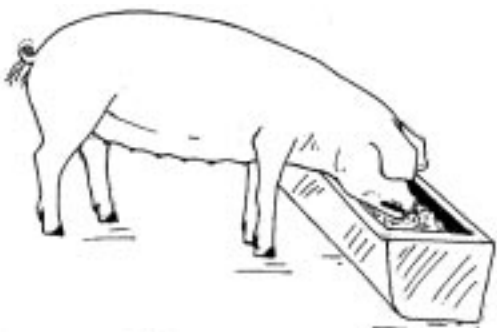
2. Grouping and feeding pigs

At over 50 kg, gilts and castrates should be kept seperately, as their nutritional needs are different.



boar castrate gilt

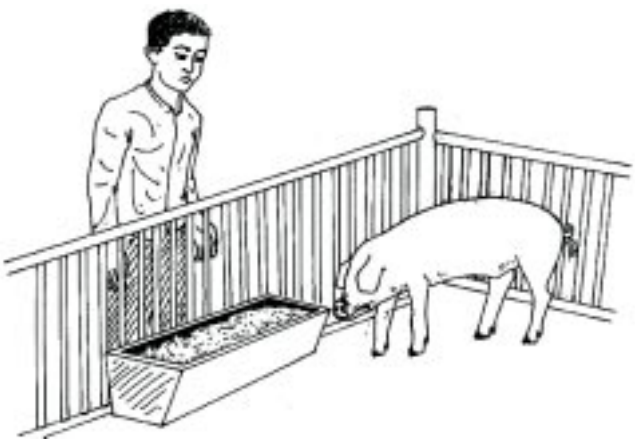
Gilts need more protein and grow a little more slowly.



Castrates have a larger appetite and reach market-weight earlier.

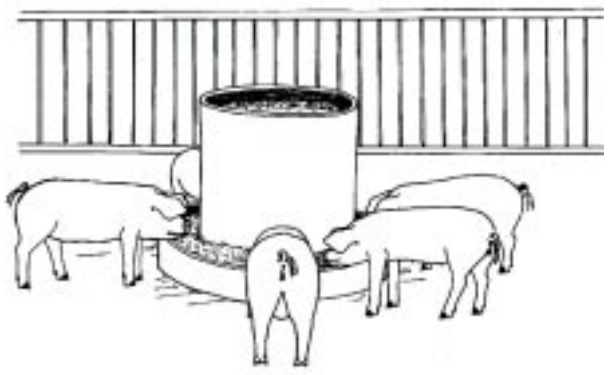
Pigs have a good appetite from 15 - 20 kg to 60 - 80 - 100 kg and appetite is a good indicator of health. Pigs off feed = health or feed problems.

Careful observation will spot a pig not eating, even though they join the group at feeding time.

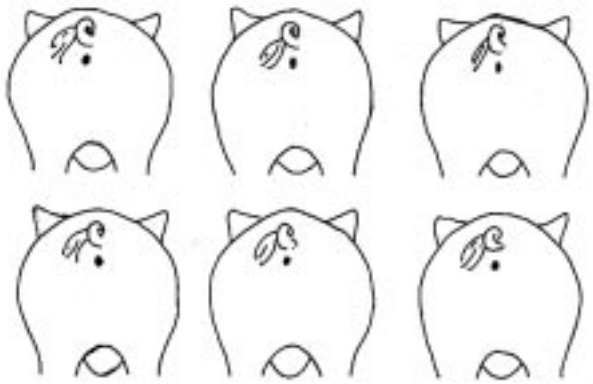


On large pig farms, self-feeders are sometimes used. If properly managed, they save labor and pigs always have fresh feed.

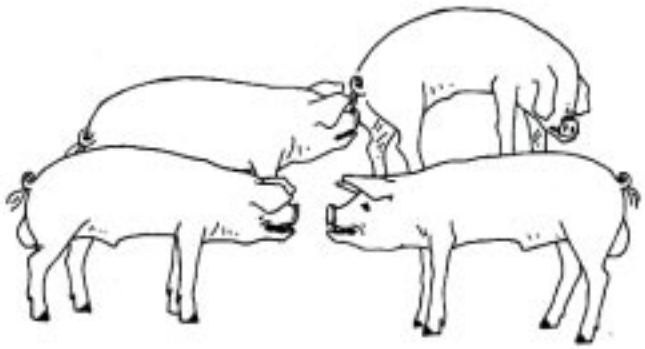
A major disadvantage of self-feeders is that these feeders attract rats.



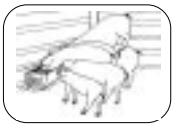
Good marketing strategy requires pigs to be of uniform weight and ready for selling when the market price is attractive. Farmers should know the periods when pork meat is in high demand with likely high prices!



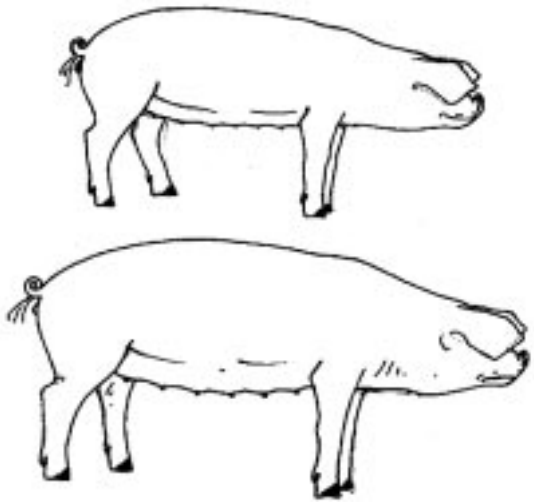
If necessary, regroup smaller piglets into a group that can be grown and marketed together. But be careful: mixing pigs in a new group changes the "pecking order". Several days of growth can be lost as the pigs re-establish their social position in this new group.



OK, who is number one, the boss?



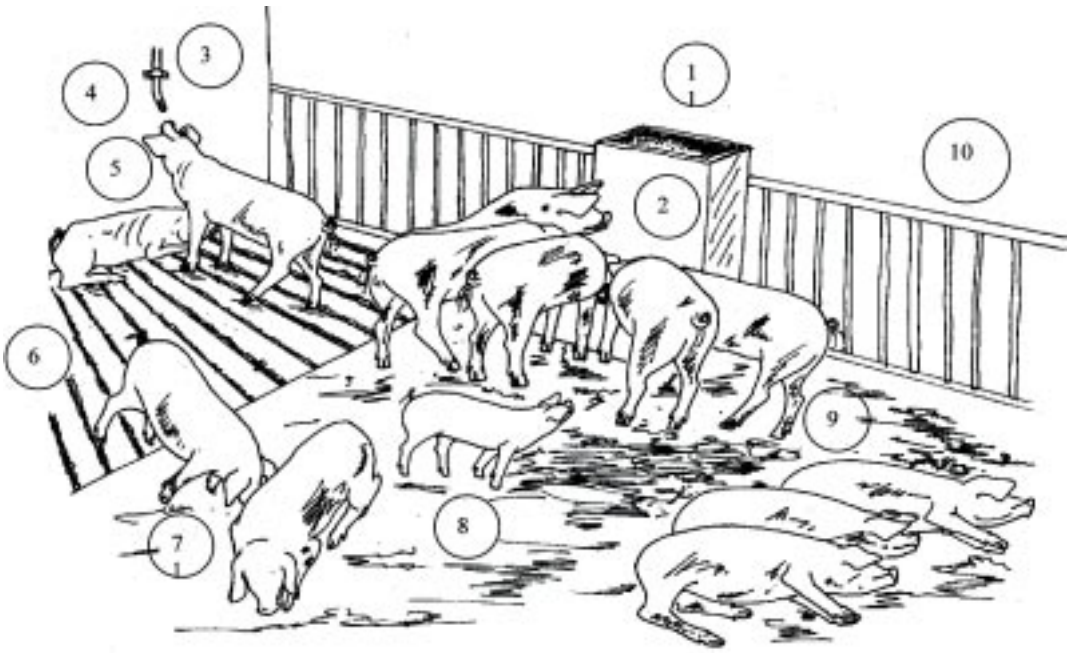
The key to profitable sales of market pigs depends on sorting out poorly performing piglets at 8 - 12 weeks and carefully sorting grower pigs of the same age and weight together into the same group.

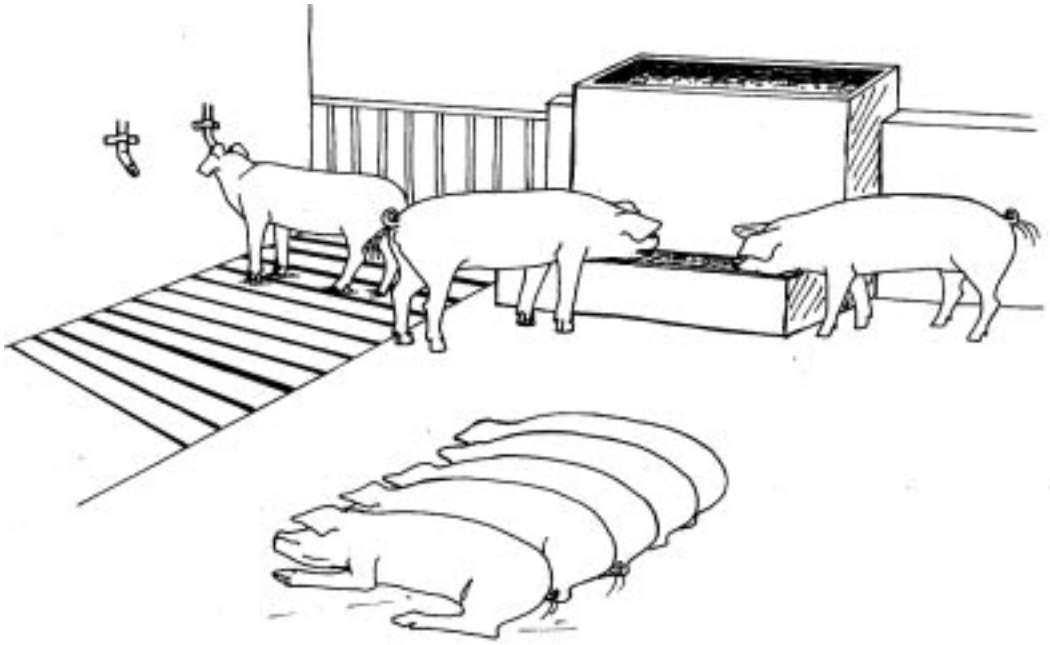


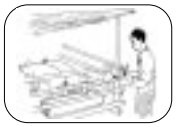
3. Check list for growing and fattening pigs

1. **Feeder is too small for number of pigs. This gives too much competition at the feed trough.**
2. **Too many pigs in the pen results in slower and uneven growth, and sometimes social vices such as tail-biting.**
3. **Insufficient access to water, usually through too few drinkers per pen. All pens must have at least two drinkers in case one breaks.**
4. **Drinkers installed incorrectly so pigs have difficulty getting water.**
5. **Sick pigs must be treated promptly, or their condition will rapidly deteriorate and they may die.**
6. **Bad edges on the slats or slats with gaps too wide will cause foot and leg damage.**
7. **Pigs showing social vices and their victims must be both promptly dealt with to avoid losses.**
8. **Unevenness of size of pigs in a pen must trigger an alarm. Is there too much competition for space, feeder or water? The cause must be found and corrected rapidly.**
9. **Dirty pens, especially in the feeding area, indicate pigs do not feel comfortable. The reason must be found and corrected. Too hot? Too drafty? Floor uneven? Sloped the wrong way? Pigs ill?**
10. **Gate divisions (piped fencing) over solid areas of the pen do not help the pig in deciding where to sleep and where to dung. Use a solid wall on a solid floor for the sleeping area.**

3. Check list for growing and fattening pigs

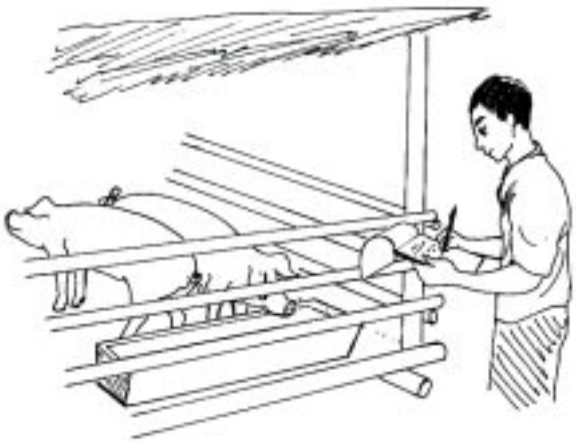




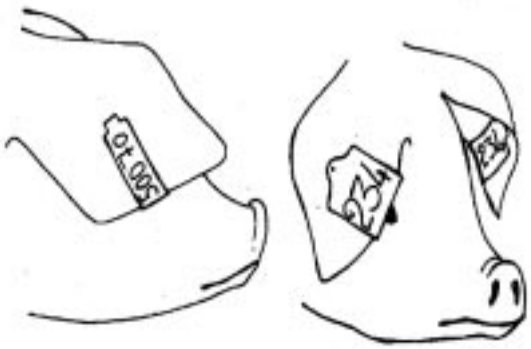


1. Record keeping

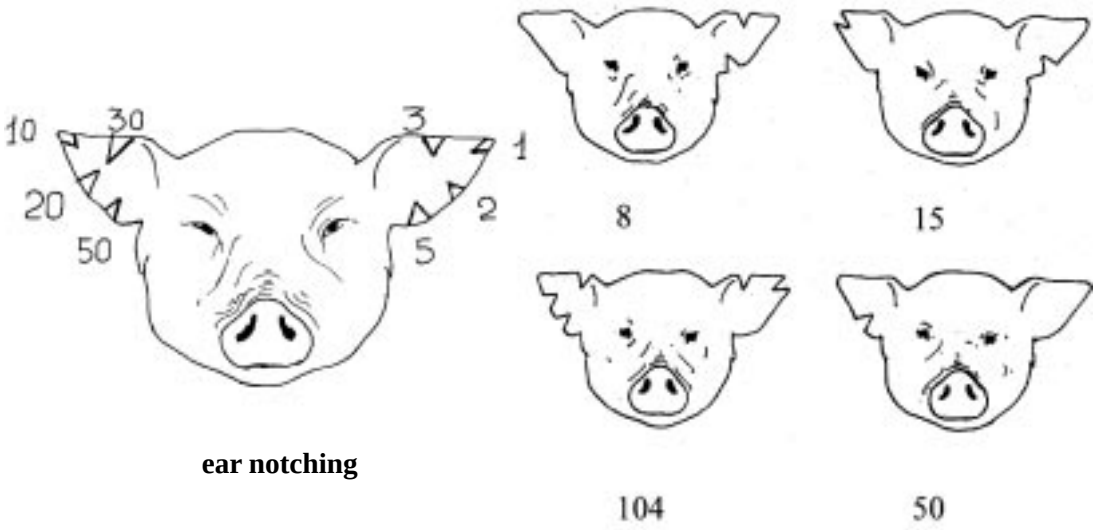
The pig farmer needs to keep production records of his pigs to monitor the growth of the pigs (feed conversion), the reproductive performance of his sows (piglets per litter or per year), to administer vaccines and drugs in time, to calculate his profit (revenues minus costs), etc.



Individual identification of breeding boars and sows is essential; by ear tagging, ear tattooing or by ear notching.

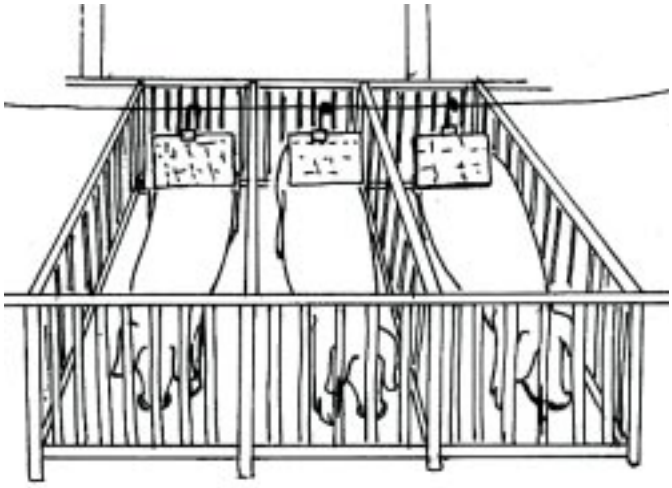


ear tagging



ear notching

Farm records are kept with the pigs, so relevant information is available when tending the pigs. Important is the "sow production card" to verify that each sow is performing satisfactorily.

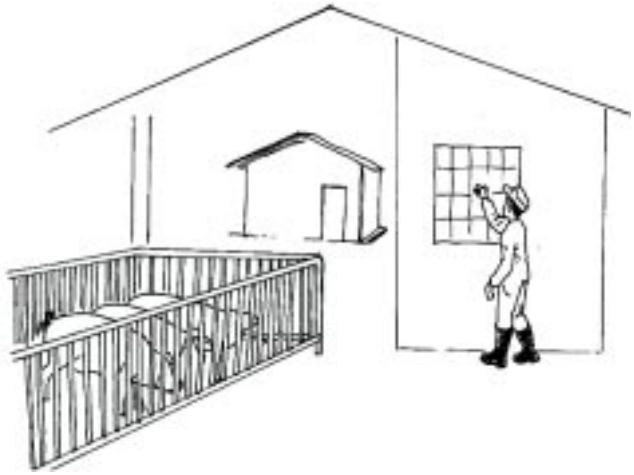


SOW PRODUCTIVITY CARD							
Sow number:		Date birth:		Father:		Mother:	
Litter number	Date mating	Boar number	Date farrowing	No. born piglets alive	No. born piglets dead	No. weaned piglets	Date weaning
1							
2							
3							
4							
5							
6							

Also a weekly activity sheet should be maintained to monitor all the stages of production. This sheet needs to record especially the number of pigs at different ages, breeding herd productivity and the feed utilization.

Weekly activity sheet

- **Matings:**
- **Farrowings:**
- **Weanings:**
- **Deaths:**
- **Transfers:**
- **Sales:**
- **Feed deliveries:**
- **Introductions:**
- **Culls:**



2. Production targets

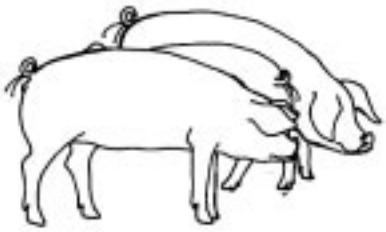
In a breeding herd, each sow must produce as many piglets as possible each year. This is related to 3 components:

1) **number of litters per year,**
2) **number of piglets born per litter,**
3) **number of piglets weaned per litter.**

On a pig farm, the number of litters per year is related to:

- **The average weaning age.**
- **The days between weaning and mating.**
- **The number of sows returning to heat after 3, 6 or 9 weeks.**
- **The number of sows showing up not pregnant or having abortions.**
- **The sow mortality and sows culled.**

An important factor affecting piglets weaned per litter is the number of live healthy piglets born.



In a growing herd, the pigs must grow fast and efficiently to reach their desired slaughtering weight. Performance is related to 4 components:

1) **minimal mortality,**
2) **good growth rate,**
3) **low feed cost,**
4) **high feed conversion.**

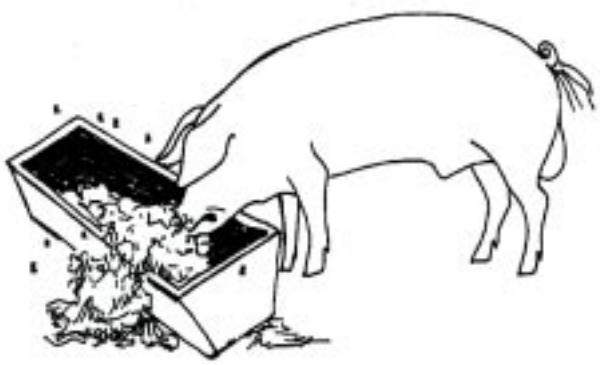
There are 5 main targets for good growth rates and a sample of pigs should be check-weighed at each of these stages.

Stage	Target (white breeds)
1) Birth	1.2 - 1.5 kg
2) 4 weeks	6.0 - 7.0 kg
3) 12 weeks	15 - 20 kg
4) 18 weeks	40 - 50 kg
5) 24 weeks	70 - 80 kg

Pig mortality reduces the number of pigs for sale. Pig mortality must be minimized in all stages – not just in the suckling period.

Stage	Max. allowable mortality
1) Suckling	12 %
2) Nursery	3 %
3) Grower/finshers	2 %

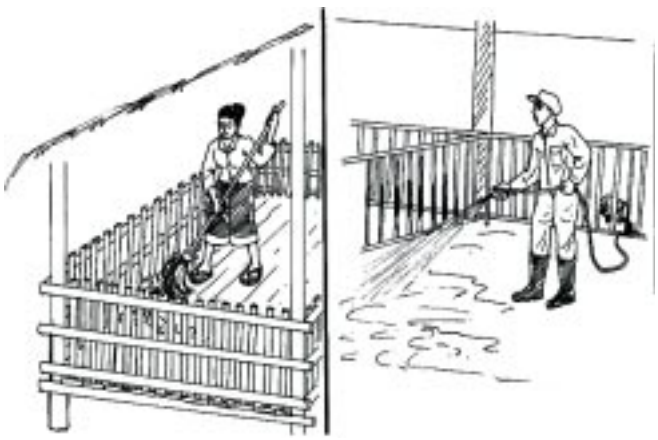
Feed conversion depends on many factors. Be aware that feed wastage is a major contributor to high feed conversion and high feeding costs.



1. Routine hygiene and health measures

The most import daily routine to keep diseases away is by keeping the farm tidy and clean. This means that manure is removed every day from the pen (or drops through the slats). Manure pits or compost heaps should be removed from time to time and put on the gardens or in the fields to fertilize the plants.

Regular complete cleaning of the pig unit reduces the risks of disease outbreaks.



Clean well with disinfectants (like formaldehyde) all the farrowing pens and nursery pens before new sows or piglets move in.

Change into work clothes that are used only in the pig unit. Do not wear these clothes to visit other pig farmers. Clothes and shoes can pass on diseases.

Disinfect your shoes or boots before entering the pig unit. Use a floor mat or cloth drenched in lime solution at the entry of the pig unit. Alternatively use a bucket with a formalin solution to step through.

Visitors must observe hygiene regulations strictly to minimize the risk of bringing in diseases. Keep visitors as much as possible away from your pigs.

Good hygiene practices reduce the spread of disease.

For growing pigs maintain strict age separation, so pigs born in the same weeks are kept together. This will minimize disease spreading from older to younger pigs.

If necessary separate smaller or weaker piglets from dominating bigger piglets. This will prevent the weaker piglets becoming even weaker as they can not eat enough.

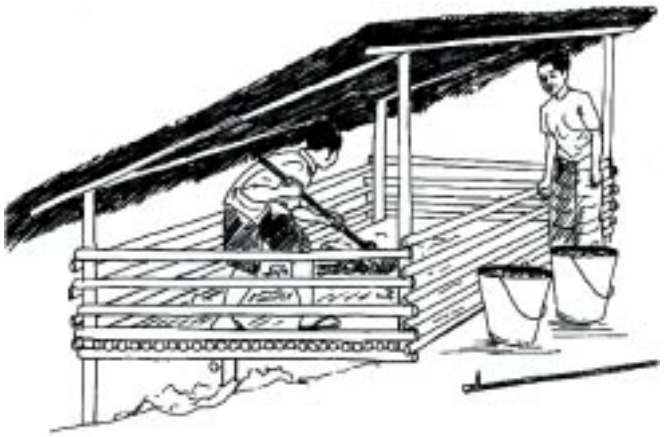
2. Principles of disease prevention

There are 3 types of disease prevention:

a) General preventive actions

- **Clean and desinfect a pen regularly, provide plenty of good quality feed and water.**
- **Remove all germ sources as manure, urine, straw-bedding from sick and dead animals.**
- **Control animal movements in and out villages.**

Clean a pen regularly; a dirty pen can easily harbour diseases.



b) Disease prevention by using quarantine

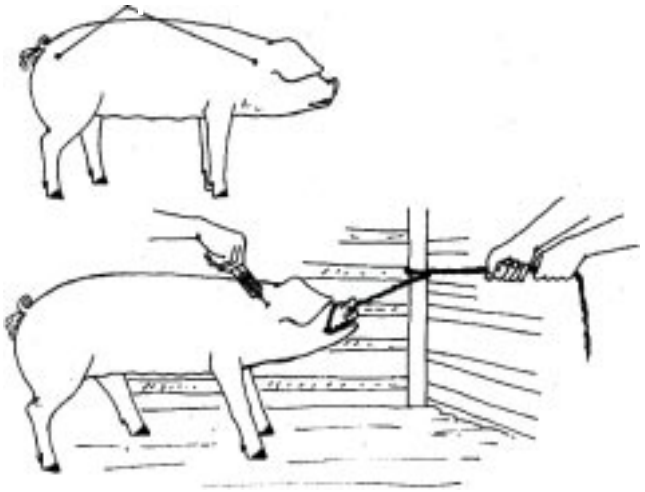
See next chapter "Introducing new pigs to the farm".

c) Disease prevention by vaccination

See chapter "Pig diseases" for details.

injection sites for vaccination

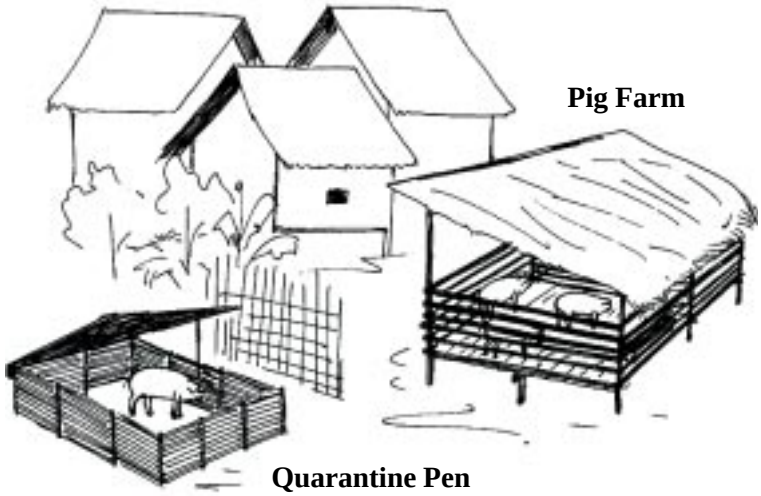
Intra-muscular (IM) vaccinations are in the neck or in the hind-quarters. Big pigs need to be restrained.



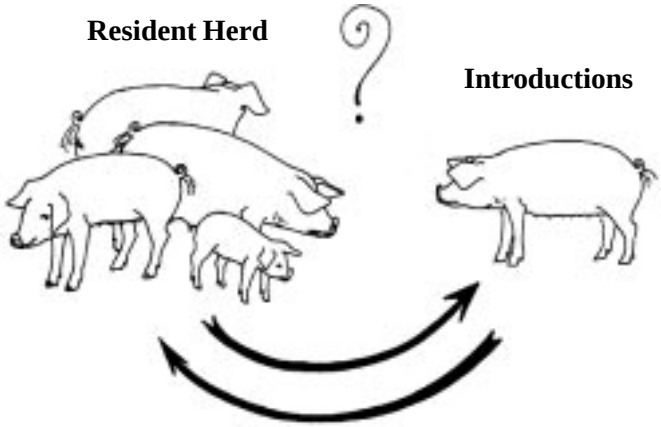
3. Introducing new pigs to the farm

Introducing new pigs to the farm represents a potential threat to the health of the herd.

We must be careful as new pigs may carry diseases that can cause problems in our herd. These new introductions need to be kept for 2 - 3 weeks in a quarantine pen isolated from the pig farm. During this time it will be apparent if the new pigs have diseases or not. Provide plenty of good quality feed and water.

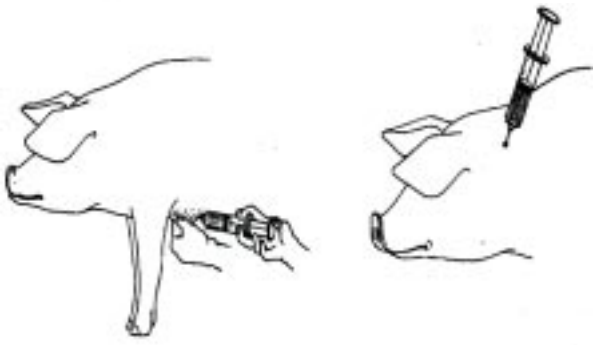


After quarantine, the new animals are introduced to the herd. They should be allowed to adjust to each other and the new environment for a period of around 3 - 4 weeks, before they are used for breeding.

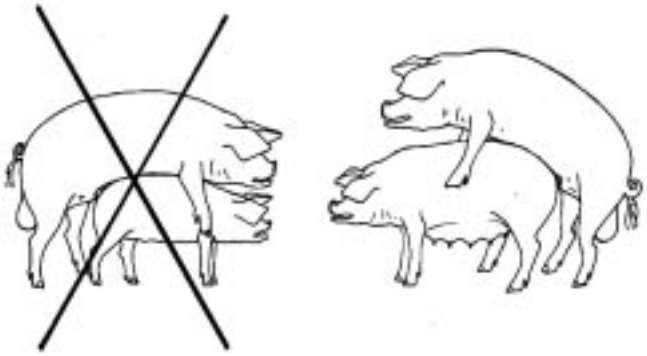


We therefore need to watch carefully the introductions when they are brought from the quarantine pen into the pig pen. During this period of 3 - 4 weeks of adjustment they will be exposed to the resident herd micro flora so that immunity can be acquired.

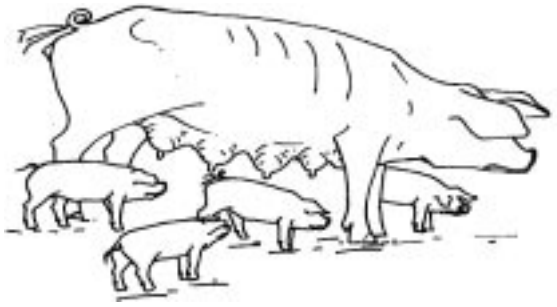
In addition, any vaccination and deworming programs used in the herd, should be applied to the new introductions.

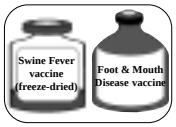


Newly brought-in females should not be mated too early. Gilts should be at least 8 months old (and over 80 kg for white pig breeds) at first mating. Breeding at an earlier age will reduce the productive life, as the gilt will not have time to grow to a well-built reproductive sow.



Too early mating wears out the young sow too quickly and she will have a poor reproductive performance.





1. Classical Swine Fever (Hog Cholera)

Classical Swine Fever is caused by a virus. It occurs in outbreaks and can result in the death of many pigs. The virus is transmitted by sick animals and by meat from infected pigs. It may survive in the environment for a few days and can be destroyed by disinfectants.

1. The virus is transmitted from an infected to a non-infected pig.

2. An infected sow may abort or only a few piglets are born alive.

3. The virus enters and multiplies in the piglet.

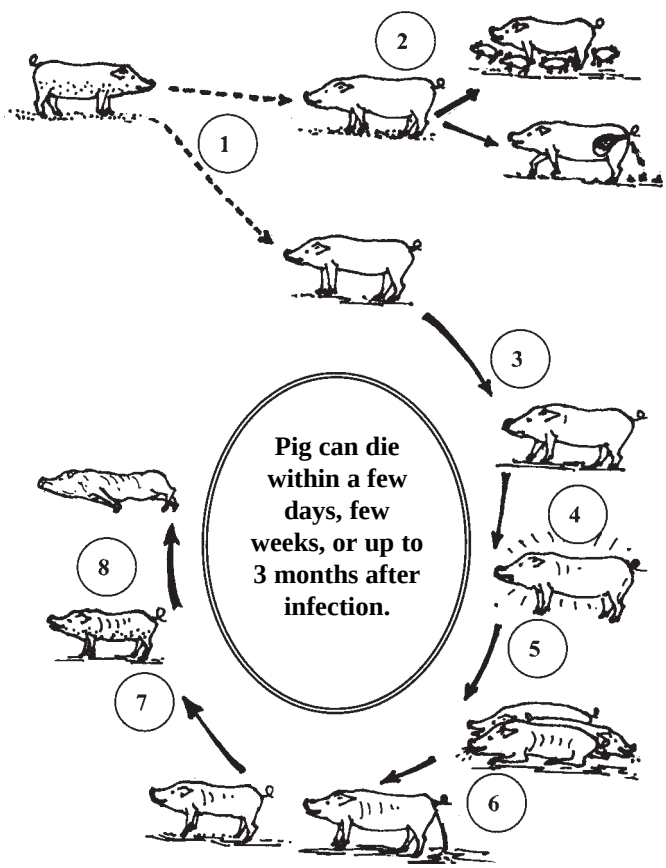
4. The piglet has a fever and does not eat.

5. Piglets huddle together.

6. The pig has constipation and or diarrhoea.

7. The pig has red spots on the skin and it staggers.

8. Dead.



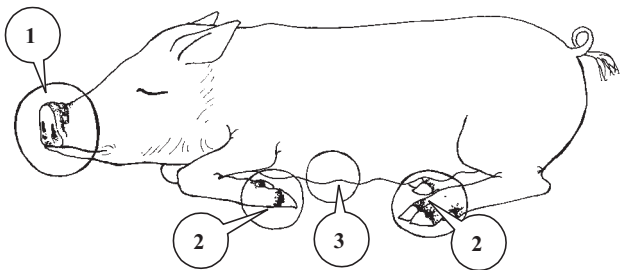
<u>Treatment:</u> There are no medicines which can kill the virus. Affected pigs will die.

<u>Prevention:</u>

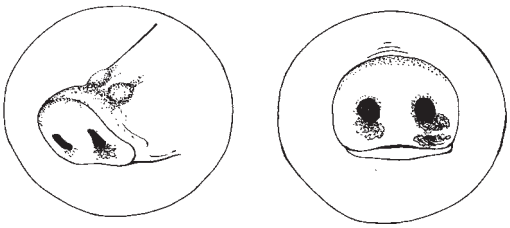
- **To prevent the disease, pigs should be vaccinated with Classical Swine Fever vaccine.**
- **During an outbreak, dead pigs should be buried to reduce transmission of the virus and healthy pigs should be kept away from sick pigs.**
- **Do not transport sick pigs or meat from pigs that are suspected to have the virus.**

2. Foot and Mouth Disease

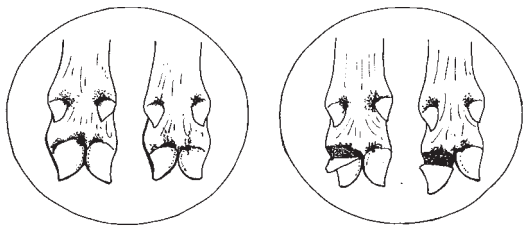
Foot and Mouth Disease is caused by a virus. Outbreaks of FMD occur in cattle, buffalo, pigs, sheep and goats. In pigs lesions develop on the feet, snout and mammary glands. The lesions are worse on the feet than on the snout. The walk is painful and pigs want to lie down. Sows may not allow piglets to suckle because of painful sores on and around the teats.



Pigs lie down, do not eat and have a high temperature.

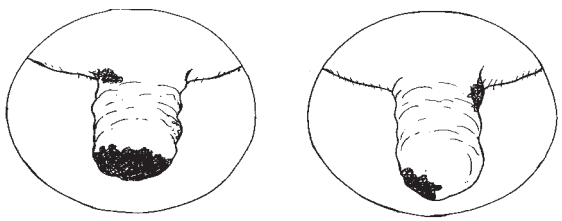


1. At the snout small blisters develop into open wounds.



2. Blisters and wounds develop around and between the hooves. The hoof may fall off.

3. Blisters and wounds develop on the mammary glands and teats.

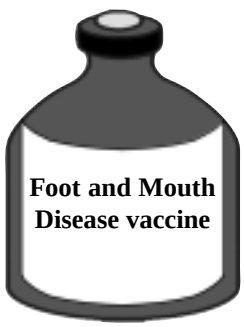


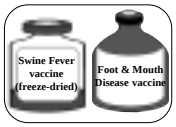
<u>Treatment:</u> There are no medicines which can kill the virus.

Clean the blisters with medicines such as iodine. Antibiotics may be used as bacteria can enter the animal through the wounds, making the recovery time longer.

<u>Prevention:</u>

- **Vaccination with FMD vaccine will prevent this disease.**
- **When there is a disease outbreak, animal movement should be stopped so that non-infected animals do not come into close contact with infected animals.**

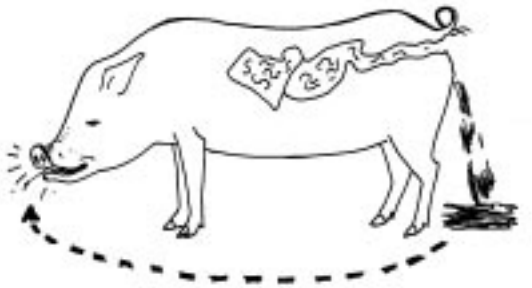




3. Roundworms

There are many types of roundworms that can live in the stomach, intestine or lungs of pigs. They cause illness, weight loss and poor growth. The most important is a large white worm (*Ascaris suum*). This worm lives in the small intestine and mostly affects young pigs between 2 - 4 months of age.

Various types of worms can infect young pigs. The worms may live in the intestine, stomach or lung.

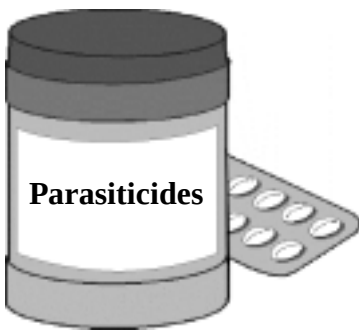


Various types of worms can affect breeding sows, especially while suckling piglets. These worms usually live in the intestine or stomach.

<u>Treatment:</u> Parasiticides should be used to kill the worms.		
	Name of Medicine	**Method, Dose and Schedule**
1		
2		

<u>Prevention:</u>

- **Pigs raised in a clean pen can be treated for worms every 3 months.**
- **If not kept in a clean pen, pigs should be treated every 4 weeks.**
- **Newly procured pigs should be treated immediately on arrival.**
- **Pregnant sows should be dewormed 4 weeks before farrowing.**



4. Diarrhoea in piglets

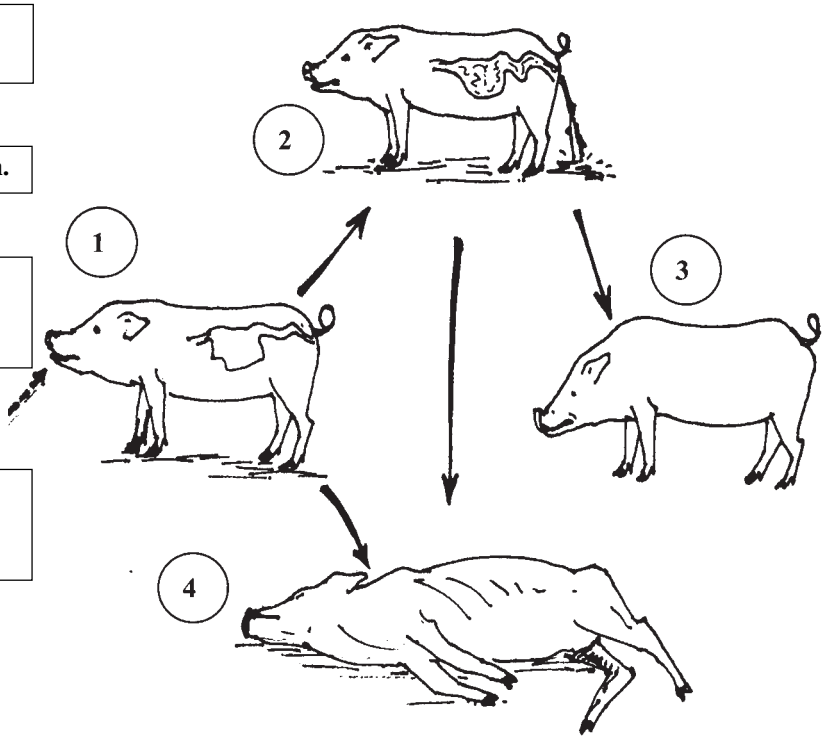
This disease can be caused by many different microbes, both bacteria and viruses. These microbes can enter healthy pigs when they eat feed or water that is contaminated with faeces from affected pigs. The microbes go to live in the small or large intestine. Diarrhoea usually occurs in young pigs from the age of 1 week to 3-4 months.

1. Microbes are ingested by the piglet.

2. The piglet has diarrhoea.

3. The piglet may recover, but sometimes does not grow well.

4. The piglet may die suddenly without signs, or after diarrhoea.

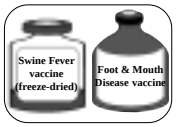


Treatment: Prevent dehydration by giving fluids with a weak mixture of salt and sugar. Vitamins and antibiotics can also help to make the pig stronger.		
	Name of Medicine	**Method, Dose and Schedule**
1		
2		

Prevention:

- **Keeping pigs in a clean pen is important especially for sows with piglets.**
- **Sows with young piglets should be raised separately from other older, growing pigs.**
- **Healthy pigs should be kept away from sick pigs.**

Nutrient medicines



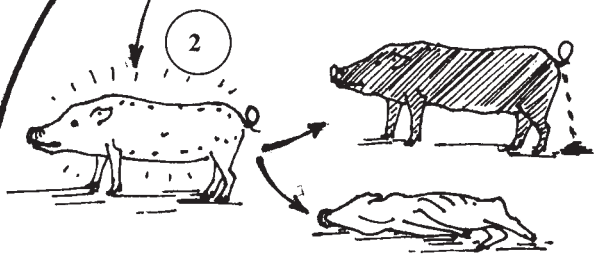
5. Erysipelas

Erysipelas is an infectious disease caused by a bacteria that mainly affects young pigs (it can also affect humans). Pigs show signs of red diamond-shaped plaques on the skin; the spinal cord, joints and heart may be affected and it can kill the pig.

1. The pig is infected by a carrier pig. The pig may suddenly die with no signs.

Pig may survive and be a carrier

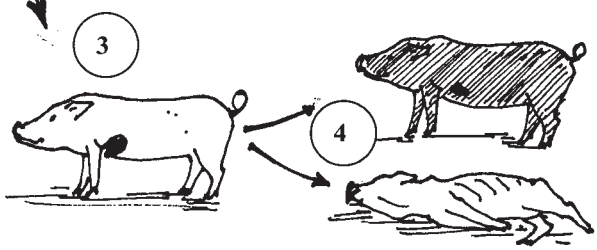
2. The infected pig with high temperature and skin lesions.



3. Bacteria affect the skin, heart and joints. The pig is tired and does not want to walk.

Pig may die in 1-2 days

4. The pig may survive and become a carrier or die due to heart problems.



Treatment: Antibiotics should be used to treat this disease.		
	Name of Medicine	**Method, Dose and Schedule**
1		
2		

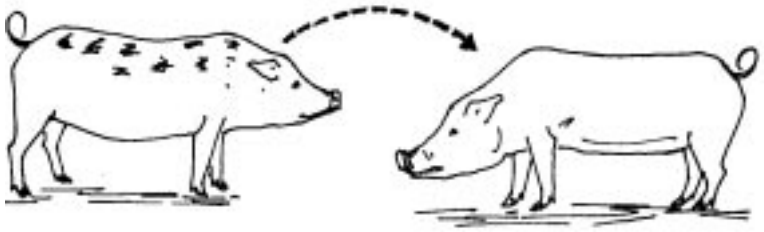
Prevention:

- **Pigs should be raised in a clean pen.**
- **During an outbreak, healthy pigs should be kept away from sick pigs.**

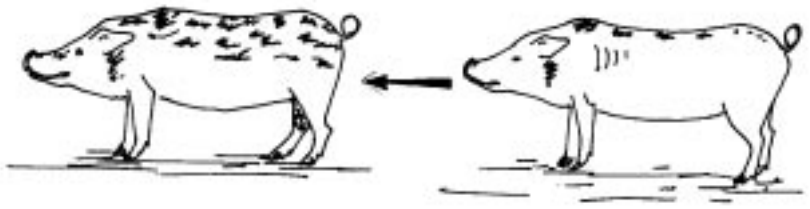
6. Mange

This disease is caused by a mite that lives in the skin. It is very small and cannot be seen by the naked eye. The pig becomes irritated and scratches itself frequently. The affected skin becomes red, crusted and thick. The pig does not eat well and grows poorly.

Transmission occurs by close contact with affected pigs.



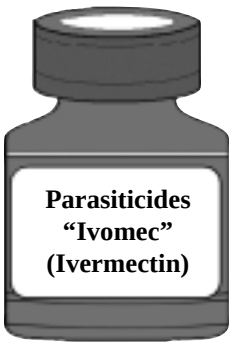
Mites live in the skin around the eyes, ears, snout, legs and body. The pig scratches frequently and the affected skin is red, crusted and thick. The pig does not eat well and grows poorly.

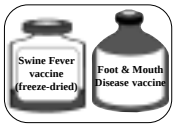


Treatment: Parasiticides should be used to kill the mites		
	Name of Medicine	**Method, Dose and Schedule**
1	**Ivomec**	**Subcutaneous injection: 1 ml per 33 kg weight.**
2		

Prevention:

- **Affected pigs should be treated immediately and kept away from unaffected pigs.**
- **Pregnant sows should be treated 4 weeks before farrowing to prevent mange.**
- **Newly procured pigs should be treated immediately on arrival.**





7. Cysticercosis

Cysticercosis is caused by a tapeworm that lives in humans. This tapeworm produces eggs that are passed in the faeces. When a pig eats human faeces, the eggs hatch to become larvae that migrate to the muscles where they form cysts. When humans eat pig meat that contains the cyst, the cyst grows into a large tapeworm in the intestine. Humans get ill from these worms. More dangerously, when tapeworm eggs are eaten directly by humans, cysts may develop in the brain causing nervous disease.

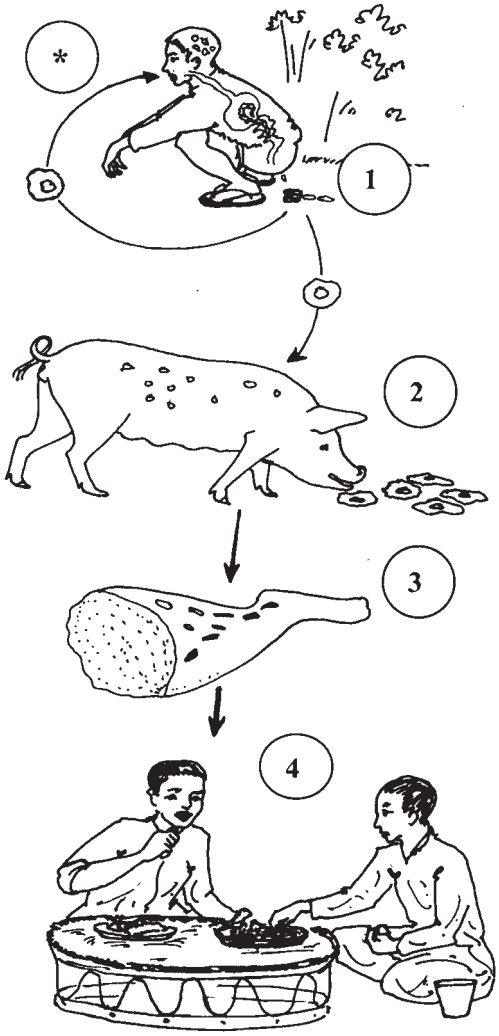
1. Adult tapeworms live in the human intestine and produce eggs.

2. The pig eats the tapeworm eggs in the human faeces.

3. Cysts develop in the pig muscle.

4. When a person eats poorly-cooked meat with cysts, tapeworms can develop in the intestines.

*** People can become infected by ingesting tape worm eggs, either directly or by eating food that is contaminated by human faeces. This happens when food is touched by a person who has the tapeworm and who is not washing her/his hands before handling food. When people ingest tapeworm eggs, cysts may develop in different parts of the body, e.g. the brain. If cysts develop in the brain, they will cause nervous disease.**



<u>Treatment pigs:</u> There is no medicine to kill the worms and cysts in the pig muscles.

<u>Treatment humans:</u> Commonly available parasiticides for humans can kill the large tapeworm.

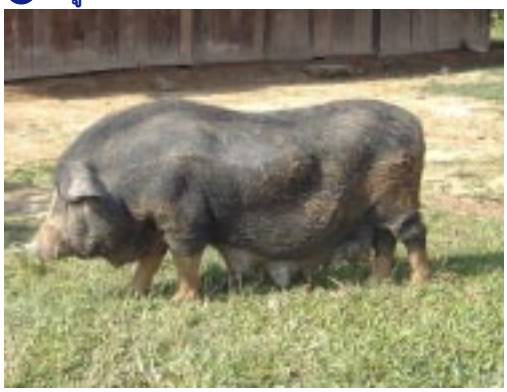
<u>Prevention:</u>

- **To prevent pigs having cysts in their muscles, pigs must be kept away from human faeces. People should use latrines and pigs should be kept in pens.**
- **To prevent human ingestion of cysts from pig meat, the meat should be very well cooked before being eaten to destroy the cysts.**
- **To prevent human ingestion of worm eggs, people should wash hands after toilet and before touching food.**

1 ຫມູລາດປະເພດ 1 Muladt type 1

2 ຫມູລາດປະເພດ 2 Muladt type 2

3 ຫມູລາດປະເພດ 3 Muladt type 3 (Mu LaoSung)



4 ຫມູພັນ ລາດຊໄວ Large White

5 ຫມູພັນ ແລນເດຣສ Landrace

6 ຫມູພັນ ດູຣອກ Duroc

7 ຫມູພັນ ຊິນຢີ Singji

8 ຫມູພັນປັບປຸງ (ຊອດ) Crossbred

1 ຫມູຜູ້ລາດທີ່ດີ Good local boar

2 ຫມູຜູ້ລາດຂີ້ຮ້າຍ Poor local boar

3 ຫມູແມ່ລາດທີ່ດີ Good local sow

4 ຫມູແມ່ລາດຂີ້ຮ້າຍ Poor local sow

5 ປະສົມພັນແບບທຳມະຊາດ Natural breeding

6 ຄັດຫມູນ້ອຍຈາກແມ່ທີ່ດີ Select piglets of good sow

7 ລູກຊອດຈະໃຫ້ຜົນຜະຫລິດດີ Crosses perform well

8 ເລືອກຫມູໂຕທີ່ໃຫຍ່ໄວ Select fast growing pigs

3. ຄອກ ແລະ ພື້ນຄອກຫມູ

1 ບ່ອນຊົ້ນຮົ່ມ ຂອງ ສັດ
Shelter in confined area

2 ຄອກ ຍົກພື້ນ
Small pen - slatted floor

3 ຄອກ ຍົກພື້ນ
Large pen - slatted floor

4 ຄອກ ຊູພື້ນດິນ
Pig pen on soil

5 ຄອກ ເທິງຫນອງປາ
Pen above fish pond

6 ຄອກຫມູນ້ອຍ ຍົກພື້ນ
Nursery on slatted floor

7 ຄອກ ພື້ນຊີມັງ
Cemented floor

8 ຄອກ ພື້ນໄມ້
Wooden floor

1 ຊັ່ງຕວງອາຫານ Calibrated feed scoop

2 ຮາງອາຫານໄມ້ Wooden feeder

3 ຮາງອາຫານຊີມັງ Feeder made in cement

4 ຖັງອາຫານ Self-feeder

5 ກອກນ້ຳ Drinker-nipple

6 ໝູກຳລັງດູດນ້ຳ Pig drinking

7 ໃຫ້ນ້ຳແບບທ່ວໄປ Simple water supply -1

8 ໃຫ້ນ້ຳແບບທ່ວໄປ Simple water supply -2

1 ຮຳ Rice bran

2 ເຂົ້າປຸ່ນ Broken rice

3 ຂີ້ໝາກພ້າວ Coconut

4 ແກ່ນຖົ່ວເຫລືອງ Soya seed

5 ສາລີ Maize

6 ມັນຕົ້ນ Cassava

7 ຕົ້ນບອນ ຫລື ຕົ້ນເຜືອກ Taro plant

8 ໃບກະຖິນ Leucaena leaves

1 ຕົ້ນບອນ Forest taro

2 ຕົ້ນຜັກຕົບ Water hyacinth

3 ຂີ້ເຫລົ້າ Local brewers waste

4 ຜົນຜະລິດ ຈາກ ປ່າ Forest products

5 ອັດຕາສ່ວນ ທີ່ຈະປຸງແຕ່ງ Home-made feed ratio

6 ແປ້ງສາລີ ຫລື ແປ້ງເຂົ້າ Milling maize (or rice)

7 ນຳຜັກໄປຕົ້ມ Boiling vegetables

8 ອາຫານທີ່ປະສົມແລ້ວ Final home-made feed

1 ອາຫານຫມູນ້ອຍເກີດໃຫມ່ Piglet starter feed

2 ຫມູຢ່ານົມ ຫາ ຫມູຂຸນ Feed for weaners - fatteners

3 ອາຫານຫມູພໍ່ແມ່ພັນ Feed for breeders

4 ອາຫານຈາກບໍລິສັດຕ່າງໆ Different feed companies

5 ປະສົມອາຫານເອົາເອງ Mixing own feed

6 ເຂົ້າ ແລະ ສາລີ Rice and maize

7 ມັນຕົ້ນ ແລະ ຖົ່ວເຫລືອງ Cassava and soya

8 ແຮ່ທາດ ແລະ ວິຕາມິນ Minerals and vitamins

1 ຫມູແມ່ເກີດລູກ Farrowing

2 ຊ່ວຍເຫຼືອໃນເວລາເກີດ Assistance at birth

3 ເຊັດຫມູນ້ອຍ ໃຫ້ແຫ້ງ Drying piglet

4 ໃສ່ຢາຂ້າເຊື້ອ ສາຍບື Disinfection of navel

5 ຄອກອົບຫມູນ້ອຍ Piglet box with lamp

6 ຕັດແຂ້ວຫມູນ້ອຍ Teeth clipping

7 ຕັດຫມາຍເບີ່ຫູ ຫມູນ້ອຍ Ear notching

8 ສັກຢາທາດເຫລັກຫມູນ້ອຍ Iron injection

9. ແມ່ຫມູ ໃຫ້ນົມ ແລະ ລູກ ຂອງມັນ

Lactating sows and their piglets

1 ຫມູແມ່ນ້ານທ້ອງແກ່ Highly pregnant sow

2 ຄອກຫມູເກີດລູກສະໄໝໃໝ່ Modern farrowing pen

3 ຄອກເກີດລູກພື້ນບ້ານ Local farrowing pen

4 ຄອກເກີດ, ຄອກຫມູນ້ອຍ Farrowing pen, piglet box

5 ຄອກພື້ນບ້ານ, ຄອກຫມູນ້ອຍ Local pen, piglet box

6 ຝາກັ້ນລະຫວ່າງແມ່ - ລູກ Partition sow - piglets

7 ອາຫານຫມູນ້ອຍເກີດໃຫມ່ Piglet starter feed

8 ອາຫານສຳເລັດຮູບ Commercial feeds

1 ຈັບບັງຄັບໝູ Restraint

2 ກວດກາສຸຂະພາບ Examination

3 ສັກຢາໃຫ້ໝູ ທີ່ຄຸ້ນ Injection quiet pig

4 ສັກຢາໃຫ້ໝູທີ່ຖືກຈັບບັງຄັບ Injection restrained pig

5 ສັກຳ້າມຊີ້ນໝູນ້ອຍ IM injection

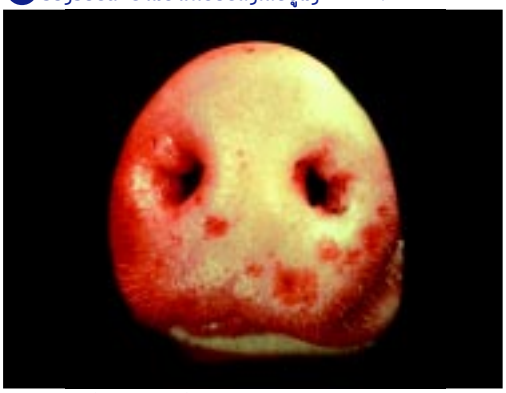
6 ສັກໃຕ້ໜັງ SC injection

7 ສັກໃຕ້ໜັງ SC injection

8 ຕົ້ມອຸປະກອນເຄື່ອງມື Sterilizing equipment

1 ຮ່ອງຮອຍພະຍາດປາກເປື່ອຍລິ້ງເລັບຢູ່ຕີນ FMD, feet lesions

2 ຮ່ອງຮອຍພະຍາດປາກເປື່ອຍລິ້ງເລັບຢູ່ດັ້ງ FMD, snout lesions



3 ຕຸ່ມແດງ, ອະຫິວາຫມູ CSF, red spots

4 ຫມູນ້ອຍເຈັບຍ້ອນອະຫິວາຫມູ CSF, sick litter

5 ຂີ້ເຮື້ອນຫມູ Mange

6 ໃສ້ລິ້ງສາຍບື Umbilical hernia

7 ພະຍາດຖອກທ້ອງ ຂອງ ຫມູ Diarrhoea

8 ອາການເຈັບເປັນຢູ່ເລັບຕີນຫມູ Claw damage

12. ການຕອນຫມູ

Castration

1 ຂ້າເຊື້ອບ່ອນຈະປາດ (ຕອນ) Disinfect

2 ປາດ (ຕອນ) Cut

3 ເອົາແກ່ນຫໍ່ອອກ Remove

4 ທໍາການຂ້າເຊື້ອຊ້ໍາອີກ Disinfect

13. ການເກັບຕົວຢ່າງ ເພື່ອ ສົ່ງຫ້ອງວິໄຈ

Taking samples for laboratory

5 ເກັບຕົວຢ່າງເລືອດ ຢູ່ຫູຫມູ Blood sampling ear

6 ເກັບມ້ຽນໃນຫລອດແກ້ວ Transfer into tube

7 ບັນທຶກ Recording

8 ເກັບຕົວຢ່າງຈາກຜິວຫນັງ Skin (parasite) sampling

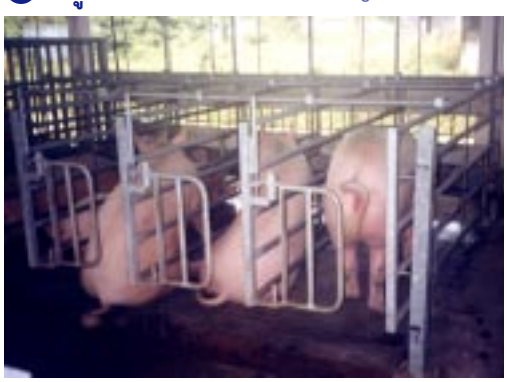
1 ຄອກຫມູເກີດລູກ Farrowing crate

2 ຫມູນ້ອຍໃນຄອກລ້ຽງ Piglets in nursery

3 ຫມູຢ່ານົມໃນຄອກລ້ຽງ Weaners on slatted floor

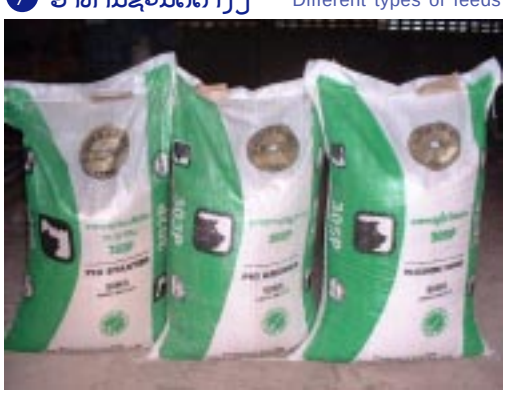
4 ຫມູຂຸນໃນຄອກລ້ຽງ Fatteners on cement floor

5 ຫມູແມ່ພັນໃນຄອກ Pregnant sow crates



6 ນຳໃຊ້ແຮ່ທາດ, ວິຕາມິນ Use of minerals, vitamins

7 ອາຫານຊະນິດຕ່າງໆ Different types of feeds



8 ຂົນສົ່ງຫມູ Transport of fatteners

1 ສັ່ງນ້ຳຫນັກຫມູ Weighing weaners

2 ຍ່າງໄປຕະຫລາດ Walking to market

3 ຂາຍຫມູ ທີ່ຕະຫລາດ Selling at market

4 ສົ່ງໄປໂຮງຂ້າສັດ Fatteners to abattoir

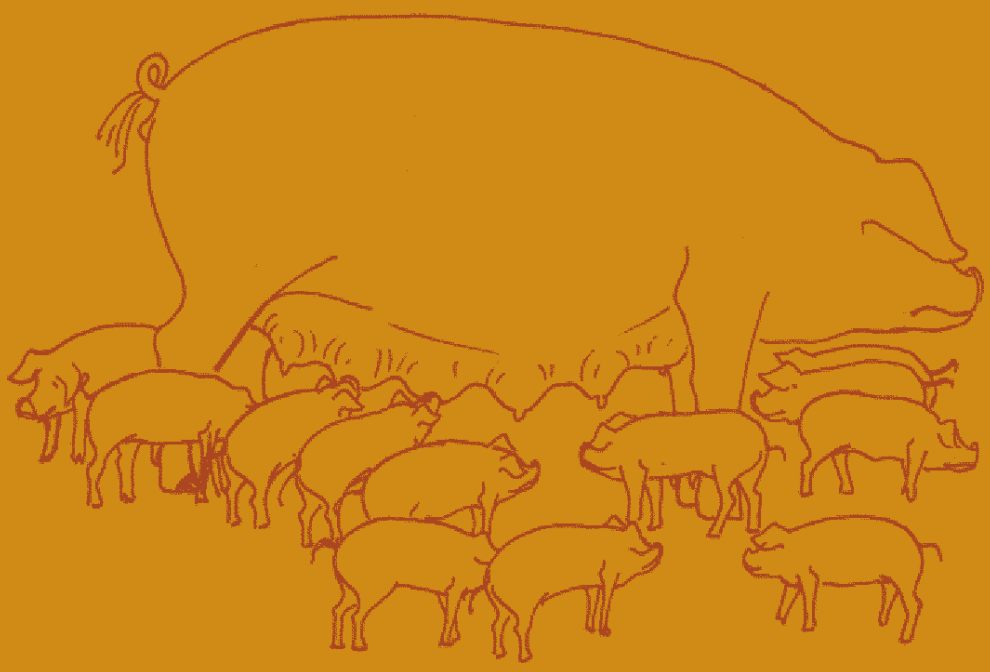
5 ຜ່າຕັດຊາກສົບ Necropsy

6 ຂາຍຊີ້ນຫມູທີ່ຕະຫລາດ Selling pork at market

7 ພໍ່ພັນກຳລັງຍ່າງ Walking boar

8 ອາບນ້ຳໃຫ້ຫມູ ພໍ່ພັນ Washing boar

NOTES



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