

Animal-friendly pig husbandry

An advisory tool for Swaziland

Animal-friendly husbandry is ethically necessary and a key prerequisite for economic production of quality meat.

This guide explains the natural behaviour and needs of pigs, draws conclusions for animal-friendly husbandry systems and presents proven solutions as well as relevant additional information on production issues.

In each chapter, the key aspects for discussion with farmers are pointed out.



Some basic reflexions related to pig husbandry

Animal production is always a compromise between respecting the needs of the species and considering the goals of the keeper. When pigs are allowed to express their natural behaviour in a healthy environment and are fed according to their needs, they will reward it with good health, good fertility of the sows and good growth rates of the piglets. Therefore, it is worthwhile to consider the pigs' requirements by ensuring appropriate housing and feeding.



Wild pigs spend the majority of their activity time rummaging through the ground looking for food.



Animal-friendly pig production allows domesticated pigs to behave like wild pigs.

Some characteristics of pigs:

- Pigs are intelligent animals with species-specific behaviour and needs. Wild pigs, for example, search for food during 80% of their daytime activity. Therefore, pigs need to dig in the soil or root around to fulfil their natural requirements, even if they are given enough feed.
- Pigs distinguish between different activity areas for resting, feeding, excretion, etc. Therefore, if pigs are provided a separate excretion area, they will stay clean.
- High performing pig breeds grow fast and, thus, require a lot of feed in a short period of time.
- Pig manure is a highly valuable farm fertiliser.

Aspects farmers should consider before starting with pig farming:

- Only well-kept, healthy pigs can attain optimum growth and optimal fertility and, thus, make production profitable.
- Successful pig production requires the consistent use of all available preventive measures in husbandry, hygiene, feeding and management to prevent development of major diseases, injuries and stress. Sick animals will reduce profitability due to high veterinary costs and low weight gains.
- Successful pig production also depends on the farmer's carefulness and attentiveness to detect diseases early, and on well-trained and motivated staff. For qualified support, it is essential that consulted veterinarians and advisors are versed in pig husbandry.
- The easiest way to start with pig farming is by fattening weaners during the dry season when soil conditions are good. This will only require simple housing systems. By keeping a few fatteners, farmers can test their pig sense and become familiar with the responsibility involved in keeping pigs. Once farmers are familiar with pig farming, they may increase their pig fattening business according to their financial resources, existing housing facilities and available feed and market demand.
- Keeping sows and producing piglets is much more challenging than keeping fattening pigs. Housing and managing sows requires more knowledge and higher investments in housing than fattening pigs.
- From a health perspective and a holistic point of view, pigs are ideally bred and fattened on the same farm, in a closed production system.
- It is an ethical rule to keep pigs fair and sound. Therefore, farmers need to understand and respect the pigs' natural behaviour and needs.

Key numbers pig farmers should know:

- **Numer of litters per year:** 2
- **Average size of litters:** about 10 piglets
- **Duration of pregnancy:** 3 months + 3 weeks + 3 days
- **Duration of fattening period:** about 5 months (depending on the breed and available feed).
- **Feeding:**
A sow needs about 1000 kg feed a year
($\times \text{€ } 6.00/\text{kg} = \text{€ } 6000$ feed costs/sow/year)
A fattener needs about 200–300 kg in the fattening period ($250 \text{ kg} \times \text{€ } 7.00/\text{kg} = \text{€ } 1750$ per fattener)

Groups distinguished in pig production				
Age group	Period	Age	Weight	Housing
Growing pigs				
Piglets	From birth through lactation to weaning	Day 1 to 8 weeks	From 800 g at birth to 10 kg	Farrowing pen
Weaners	From separation from the mother to beginning of fattening	From 8 weeks to about 12 weeks	From 10 kg to 30 kg	Weaner pen
Fatteners	From beginning of fattening to slaughter	From about 12 weeks to 30 weeks	From 30 kg to 120 kg	Fattening pen
Sow				
Farrowing sow	From 1 week before farrowing through farrowing	First mating at about 220 days of age	First mating between 130–150 kg	Farrowing pen
Lactating sow	After farrowing to the end of lactation	First lactating at 118 days of age (3 months, 2 weeks and 3 days)		Farrowing pen
Sow in gestation, dry sow	After mating to farrowing			Waiting pen/pasture
Boar				
Boar for mating		From 7 month to 3 years old		Boar pen

Site requirements for pig pens

- Elevated place safe from floods.
- If possible situated in the shade of trees to offer protection from the sun.
- With ample fresh air.
- At least 8–10 m downwind from human housings.
- Good connection to roads throughout the year.
- Suitable facilities for intermediate storage of the manure.
- With connection to reliable sources of water and electricity.

Minimum space requirements for indoor pig pens

Farrowing pen	7m ² + 5m ² outrun
Waiting stable	3,5m ² indoor + 5m ² outrun per sow
Weaning pen	0,3m ² indoor + 0,3m ² outrun per weaner
Boar pen	6m ² + 5m ² outrun
Fattener pen	1,0m ² indoor + 1,0m ² outrun per fattener

In addition to the measures above all animals should be offered pasture or outrun to natural ground.

Minimum space requirements for free range pigs

Fattener pen	200m ² per pig
Sow pen	400–500m ² per sow

Every 3 to 4 months, the pasture must be changed to avoid overfertilisation.

Questions to be discussed with the farmer


- **Does the farmer have any experience with pig husbandry?** Farmers should be familiar with the behaviour and needs of pigs before starting with pig husbandry. Organise courses or excursions. Offer information material and advise to the farmers.
- **Does the farmer have the required knowledge to keep sows?** Keeping sows is a challenging task and requires considerable knowledge.
- **Is there enough space for keeping pigs?** Indoor pig husbandry requires space for the pens and the outruns. Free range pig husbandry requires 1000m² of pasture per sow and year.
- **Is appropriate housing available? Is there an appropriate site for the pig pens?** Check the requirements listed on the left.
- **Does the farmer have enough time to look after the pigs?** Clarify, who will look after the pigs. Attention: Keeping sows requires more time and dedication than keeping fatteners!
- **Does the farmer have enough farmland to keep fatteners and sows and to produce their feed?**
- **Is there enough money to purchase pig feed, if necessary?** Encourage the farmers to grow their own pig feed. And/or find solutions to get cheap, but appropriate feedstuff.
- **Is there a possibility to buy weaners for fattening?**
- **Is there a market demand for pig meat at a price which covers all the production cost including labour and will still result in some profit? How is the market expected to develop in the next years?** Inquire about marketing opportunities and conditions. Calculate the estimated costs and revenue together with the farmer. Assist the farmer in signing contracts to sell the weaners and the fatteners.
- **Is there a market demand for piglets?**
- **Is transportation ensured at any time?** Think about solutions for transportation to buy and sell pigs.
- **Are there possible uses for the pig manure (e.g. in vegetable gardens or in cassava fields)? Is composting of the manure an option?**


Natural pig behaviour and conclusions for pig husbandry


To find out what an animal friendly husbandry system means, it is necessary to focus the natural behaviour of the wild species. Wild pigs show, what domesticated pigs should be allowed to do. If domesticated pigs are not able to express their

normal behaviour, it could result in disorders and illness. The following table show the natural behaviour of pigs structured for stable areas, the resulting requirements and the relevance of this behaviour.

Activity areas of pigs based on their natural behaviour and resulting requirements for housing

	Natural behaviour	Requirements	Relevance
Resting area	Relaxation <ul style="list-style-type: none"> > Pigs rest in groups during the afternoon and at night. > Pigs rest in protected areas; sleeping in different positions according to temperature. 	<ul style="list-style-type: none"> > Ensure enough space for all pigs to lie in a lateral position. > Build three sides with closed (opaque) walls. > Provide enough litter in cold nights and less litter and more sun protection on hot days. > Ensure the resting area is dry, draught-free and adaptable to temperature. > Make sure the pigs can be observed easily. 	<ul style="list-style-type: none"> > Relaxed sleeping is a prerequisite for performance. > Especially young animals need a warm area to stay warm without needing energy. > In defecated and wet resting areas, pathogens spread easily.
		 <p><i>Pigs want to stay clean. The stable should offer the pig the possibility to keep the lying area clean.</i></p>	

Group housing of pigs	Social behaviour <ul style="list-style-type: none"> > The sows live in mother-family groups. The daughters stay in the group, whereas the young males separate from the family group. The boars live alone. > All activities of the sows, such as eating, sleeping and lactating, are highly synchronized. > They live with a clear hierarchy. 	<ul style="list-style-type: none"> > Ideally, keep all the pigs in groups. > Provide the pigs with sufficient space to allow them to sleep, feed and lactate in groups. > Provide sufficiently spaced and structured pens to allow proper behaviour in the hierarchic structures. 	<ul style="list-style-type: none"> > Minimize stress and animal losses.
		 <p><i>The sows and their piglets can be kept in groups from 14 days after farrowing to weaning.</i></p>	

	Natural behaviour	Requirements	Relevance
Activity and faeces area	Exploration <ul style="list-style-type: none"> › Pigs spend 80% of their daytime activity exploring their environment, mainly with their nostrils. 	<ul style="list-style-type: none"> › Combine the activity area with a natural outrun! › Provide enough rummage and manipulable material in the outrun. 	<ul style="list-style-type: none"> › Exploration and movement reduce stress of pigs.
	Movement <ul style="list-style-type: none"> › Pigs are very active animals. › Pigs move fast and run. 	<ul style="list-style-type: none"> › Provide enough space, structured areas and non-slip ground. 	<ul style="list-style-type: none"> › Prevention of injuries
	Comfort <ul style="list-style-type: none"> › Pigs like to rub their body and wallow to cool down and protect their skin from sun and insects. 	<ul style="list-style-type: none"> › Provide facilities that allow pigs to rub their skin (scratching brush or tree). › Provide cooling opportunity with a mud bath on loamy soils or a sprinkler. 	<ul style="list-style-type: none"> › Good comfort reduces stress in general and heat stress in particular.
	Excretion <ul style="list-style-type: none"> › Pigs distinguish between relaxing and excretion areas. › Pigs defecate to mark their territory. 	<ul style="list-style-type: none"> › Encourage pigs to urinate in the outrun, f.e. by providing water there. › Make sure that the ground has a slight slope to allow proper draining and easy cleaning. › To encourage the pigs to defecate in the excretion area allow sight contact to neighbouring pen. 	<ul style="list-style-type: none"> › A separate area for defecation contributes to good animal health and reduces workload. Defecation in the outrun helps to keep the indoor/laying area clean and dry.
		<p><i>A wallow offers a perfect cooling opportunity to the pigs. The mud protects them from sunburn and ectoparasites.</i></p>	

Feeding and drinking area	Foraging <ul style="list-style-type: none"> › Pigs are omnivores. › Pigs eat in groups, but do compete for the food. 	<ul style="list-style-type: none"> › Install at least as many feeding places as there are pigs. › Bay screens between the feeding places reduce fighting during feeding. › Self-locking feeding crates are ideal for sows. › Feed twice a day during their daytime activity. › Provide a diverse ration and roughage. 	<ul style="list-style-type: none"> › Pigs should be enabled to eat and drink without any social stress or constraints. › Feedstuff is the basis for performance.
	Drinking <ul style="list-style-type: none"> › Pigs like to drink from open water. 	<ul style="list-style-type: none"> › Use troughs instead of nipple drinkers. › Provide at least 1 drinker per 10 pigs. › Check the cleanliness and functionality of the water troughs and feeding places twice a day. 	<ul style="list-style-type: none"> › Water is the cheapest feedstuff.
Farrowing pen	Relation between mother and piglets <ul style="list-style-type: none"> › Sows separate from the group for farrowing. About 14 days after farrowing, sows group again. › Sows build a nest before farrowing. › Sows warn the piglets before lying down. › Weaning takes place over a period of several weeks. 	<ul style="list-style-type: none"> › Separate the sows from the herd before farrowing. › Do not fix the sows during farrowing. › Provide nesting material (straw) in the farrowing pen. › Wean the piglets not earlier than 6 weeks after birth. 	<ul style="list-style-type: none"> › Avoid losses of piglets through crushing by the mother. › Minimize stress for the sow and the piglets. › Ensure good health of the sow and the piglets at all times.

Temperature and climate requirements

Similar to humans, the skin of pigs is not covered by fur or wool for insulation. Thus, they require appropriate housing to protect them from extreme cold. Furthermore, pigs have no sweat glands, and therefore, do not sweat. For cooling down, pigs naturally roll in the mud.

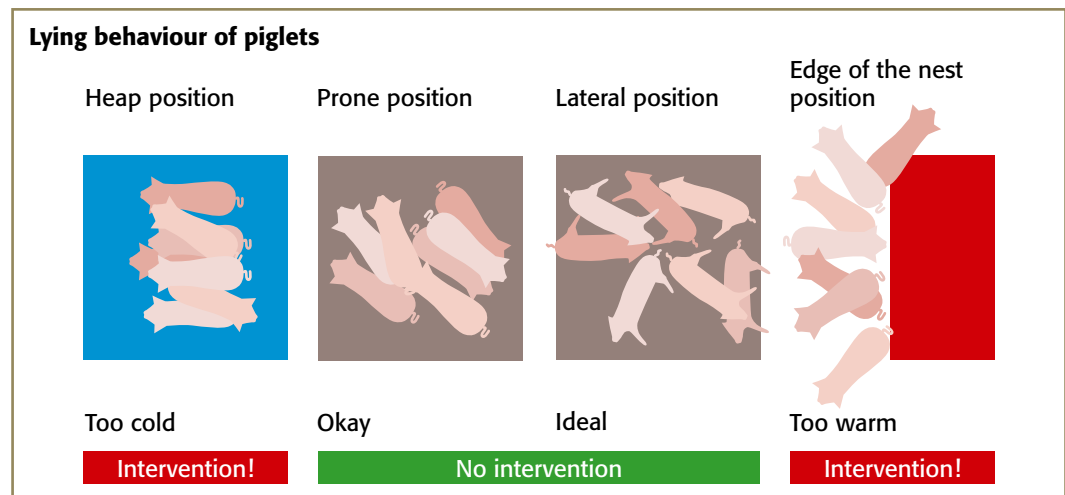
Under cold conditions, pigs use energy to raise their body temperature. Therefore, food energy is used with the result that pigs grow less. For sows in gestation, boars and older fatteners, heat is more problematic than coldness. For piglets and weaners, coldness is more of a problem than heat.

Ideal temperature ranges for pigs						
Piglets	Weaners 6–7 kg	Weaners 8–25 kg	Growers 26–60 kg	Breeding stock 61–100 kg	Boar and dry sows	Lactating sows
32°C	25–30°C	21–27°C	17–21°C	15–19°C	15–24°C	15–21°C

How to fulfil the temperature requirements of piglets and weaners:

- Provide an isolated and draught-free piglet nest (including an insulated floor).
- Install heater lamps or a cover heating to provide a warm nesting area.

A warm nest helps to prevent diseases among piglets and is even more important if piglets suffer from diarrhoea! Make sure that the laying area is covered with a layer of saw dust or wood shavings.



The lying behaviour of piglets indicates, whether the temperature in the piglet nest is too low, ideal or too high. The lying behaviour of the piglets should be checked every day, as the piglets' temperature needs change. Special attention is needed in case of high temperature differences between day and night.



The piglets on the left indicate with their lying position that their nest is too cold, whereas the piglets on the right seem to be very comfortable.



How to provide a possibility of cooling to weaners and older pigs:

- Cooling pigs requires water or a «wallow» (an area of mud). If there is no cooling opportunity, pigs will wallow in their own excrements.
- A natural wallow requires a clayey soil to hold the water back. Pigs will build their own wallow if there is enough water.



- In concrete outruns, pigs need a shower. The cheapest way is to install a hose line with a spray nozzle. Ideally, the shower is linked to a clock timer to provide the shower during the afternoon, when outside temperature is high.
- The natural or concrete outrun may be covered with a net or roof to provide shade.

Indoor or outdoor housing?

Pigs can be kept indoors, outdoors or in systems which combine both. The selection of the appropriate system depends on the available land surface, on the farm situation, local climate conditions, finances, existing infrastructure, farming traditions, personal preferences, animal health and welfare aspects, as well as risk of nutrient leaching.

Keeping pigs indoors only, without offering them an outdoor run, is not animal friendly. Outdoor runs can consist of natural soil or deep litter or have a concrete or slatted floor. They can be built in the open air or covered partially or fully by a roof. In mixed systems, pigs are usually kept indoors for farrowing and outdoors during gestation and fattening.

Indoor and outdoor housing – a comparison

Indoor housing	Free range or outdoor housing
	
<p>Challenges:</p> <ul style="list-style-type: none"> › This system requires separation of lying, defecation and activity areas to avoid health problems, economic losses and extra work. › The sows and piglets need an outrun to allow them to express their natural behaviour. › The pens must satisfy the individual temperature requirements of piglets, sows, weaners and fatteners. 	<p>Challenges:</p> <ul style="list-style-type: none"> › Appropriate pasture rotation must be assured to maintain a permanent vegetation cover. › Wild animals and dogs must be kept out, and the pigs must be prevented from escaping with proper fencing. Birds must be kept away from the feed trough. › Identification and treatment of sick animals, and supervision of the sow and the piglets around birth are more difficult than in indoor housing. › Work must be managed well to keep the work load low.
<p>Advantages:</p> <ul style="list-style-type: none"> › Land needs are moderate. › The pigs behaviour and health can be easily controlled. › If the pigs' excrements are collected in a pit and applied to the crops properly, the negative impacts on the environment are minimized. 	<p>Advantages:</p> <ul style="list-style-type: none"> › The costs for housing are low. › The pigs can express their natural behaviour without restrictions with positive effects on animal health and welfare. › Low animal densities, access to natural light and good air conditions have positive effects on animal health. › Negative impacts on the environment can be limited if the outdoor pig husbandry is integrated well into the crop rotation. › Feeding on green plants and digging in the soil supplies minerals and vitamins to the pigs, including iron to the piglets.
<p>Disadvantages:</p> <ul style="list-style-type: none"> › The costs for housing and energy are high. › Expression of the pigs' natural behaviour is somewhat limited. › High animal densities increase the risk of disease infections. › The number of sows and fatteners that can be housed is limited to the existing infrastructure. › Indoor housing requires more technical equipment. › Cleaning the stables and the concrete ground before every new batch requires high amounts of water. › The animals are partially kept in conditions of artificial and controlled light regime. › The piglets depend on oral iron preparations or injections after birth in order to prevent iron anaemia. 	<p>Disadvantages:</p> <ul style="list-style-type: none"> › If stocking density exceeds 15 sows per hectare on outdoor areas, the risk of nitrogen leaching is increased. › During cold and wet weather, management logistics are laborious. › Outdoor housing requires information on wildlife disease reservoirs and risk of soil-borne parasite infections. › Young piglets may be subject to predation by dogs.

Things to know about outdoor systems

Outdoor housing systems make it possible to start pig farming with little investments. Outdoor housing also meets the natural behavioural requirements of pigs very well. Nevertheless, pigs require minimal housing such as huts and paddocks to protect them from extreme weather conditions and wild animals.

Minimal requirements for outdoor pig husbandry:

- Dry and wind-save shelter.
- Flood-proof location of housing.
- Shade to protect from strong sun.
- Electric fence (run by a solar panel), fence made of branches from thorn bushes, and watch or herd dogs to prevent predation from dogs and wild animals.
- Feeding and drinking places.



These outdoor pig huts have been covered with straw to avoid overheating of the interior on hot days.



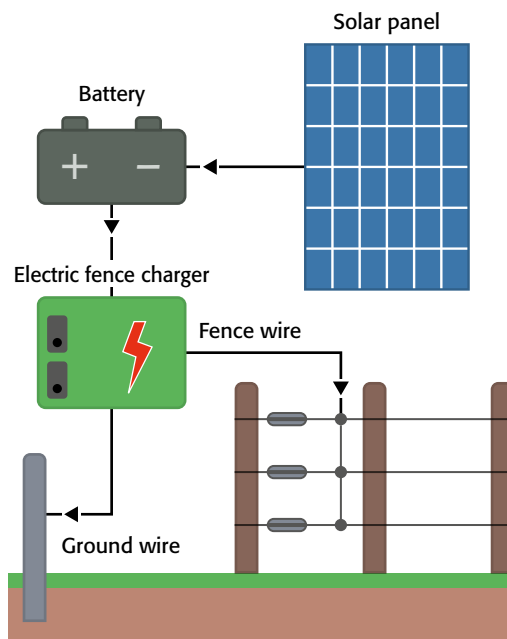
Outdoor farrowing pens can be built of wood. A net between houses provides some shadow.



The feeding area for the piglet should be fenced-in to prevent the mother sow from eating the piglets' feed.



The feed must be protected from rain. This may be done in a simple and cheap way inverting an old pan or hubcap on a pole.



The electric fence has proven effective for providing enclosure. Power is supplied by solar or battery powered electric fence chargers, or by using equipment connected to the power supply grid. Electric fences require proper grounding.

Questions to be discussed with the farmer

- Can pig husbandry be managed safely if an outdoor system is used? Develop a security plan for the outrun.

Housing of farrowing sows

One week before farrowing, the sows are moved into the farrowing pens, where they will stay until weaning. The farrowing pen is the most challenging and costly construction in pig husbandry, as it must fulfill different requirements for sows and piglets.

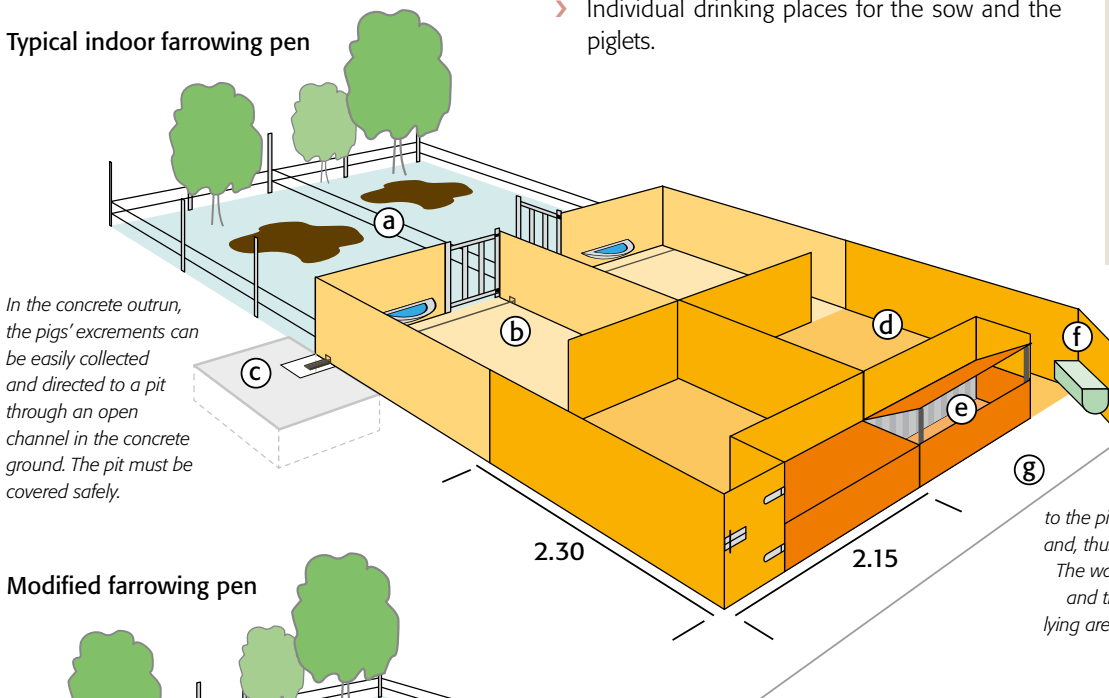
Housing requirements for indoor pens:

➤ Different functional areas for laying, defecating, resting, activity etc. for the sow and the piglets.

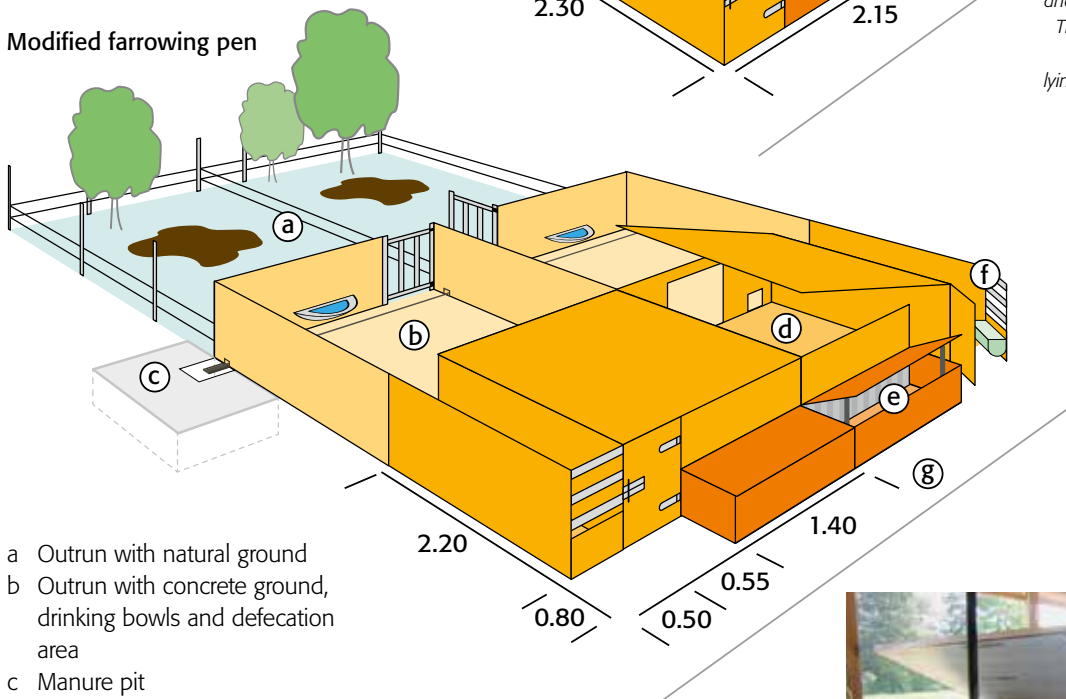
- A laying area with a minimum size of 7m².
- A warm, draught-free nest for the piglets with a minimal surface of 1,2m² for each litter (all piglets should be able to lie in lateral position during 8 weeks of lactation). The temperature in the piglet nest must be kept at a constant temperature of about 32°C in the first weeks after birth.
- A trough for the sow, which the piglets also may use. In case the piglets should get special feed, a separate feeding place for piglets is required.
- Individual drinking places for the sow and the piglets.

Note: The piglet nest, the lying area and the service passage must be covered with a roof to protect them from rain and sun! In cold climate, additional protection against cold and wind may be necessary.

Typical indoor farrowing pen



Modified farrowing pen



- a Outrun with natural ground
- b Outrun with concrete ground, drinking bowls and defecation area
- c Manure pit
- d Lying area for the sow
- e Piglet nest
- f Feed trough for the sow (and the piglets)
- g Service passage

When temperatures allow, the roof of the box is opened, whereas at low outside temperatures, the box is closed.



Protection of the piglets from being crushed

A healthy and fit sow will not crush her piglets. If piglets happen to be squeezed by their mother, she will react immediately, as the piglets will scream, and most piglets will survive. The risk of crushed piglets is much higher if a sow is weak, tired or diseased. In that case, a sow will lean against the wall to lie down.

Wooden planks or metal rods mounted on the walls at an appropriate height from ground (see on the far right) protect the piglets from getting crushed, especially in the first days after birth, when they are not familiar yet with their warm piglet nest.

Piglets like to lie next to their mother because of her body temperature. As a result, they often lie between the mother and the wall, which increases the risk of crushing.



Requirements for outdoor farrowing:

- › Insulated hut with a minimal length of 2 to 2,5m and a minimal width of 1,5 to 2m with proper insulation. Insulation is especially important for young piglets to ensure constant warm temperature in the hut (neither too hot nor too cold). For isolation, natural (e.g. straw, sawdust, leaves) or artificial (e.g. glass wool, polystyrene) materials can be used.
- › The farrowing hut is kept dry and draught-free by orienting the entrances downwind and by closing any holes between the hut walls and the ground with mud.
- › A curtain at the doorway reduces loss of temperature during cold weather. When outside temperature is high, the curtain is opened.
- › Adequate depth of clean, dry straw bedding, evenly spread over the floor of the hut and flattened when farrowing is near.
- › Separate farrowing paddocks for each sow prevent disturbance from other sows.
- › Good fencing to keep predators away.
- › «Fender» at the doorway to keep the piglets in the hut. The fender is removed, when the piglets start to jump around at about 7 days of age.

Hygiene:

«Prevention is better than cure» is a basic principle for animal health and welfare in pig production. Cleaning reduces the level of germs significantly. In addition, the amount of antibiotics can be reduced.

Every day hygiene:

- › Cleaning and drying up before setting in a new group
- › Check feeders and drinkers: remove dirt or old feedstuff
- › Wash hands and disinfect after contact with animals
- › Wear gloves during birth intervention
- › Clean and disinfect medical instruments after use
- › Use disposable materials (injection, scalpel, etc.)

Disinfection is helpful if there are known specific disease problems. Disinfection works only if the cleaning was done properly. Much more effective is drying up of the stable. Especially in warm climatic conditions and with open stables, the wind and, in particular, the sun kill the majority of germs.



In outdoor systems (as well as in indoor systems), several lactating sows may be kept together in a paddock 14 days after farrowing.

Key management measures during farrowing:

- › Keep the farrowing area clean and dry.
- › Provide sufficient manipulable materials, especially straw, at least 3 days before the expected farrowing date to allow the sow to build a nest without stress. Stress-free nest-building activity will result in a shorter farrowing period and reduced risk of lying on the piglets.
- › Check temperature and other potential stress factors during farrowing. The temperature should not exceed 24°C.
- › Reduce the sow's food ration the day before farrowing.
- › Provide easily digestible food such as flax-seed.
- › Provide enough roughage and water during pregnancy.

Hygiene management:

- › Avoid introducing diseases!
- › Avoid spreading diseases on the farm!
- › Reduce level of germs in the farm!

Housing of weaners

Weaning is a very stressful period for piglets. Therefore, weaners absolutely depend on a warm nest area to survive. The earlier weaning takes place in the piglet's life (earliest at 6 weeks, ideal at 12 weeks of age), the greater the stress, the more the piglets depend on ideal conditions to stay healthy and survive.

Housing requirements for indoor pens:

- A warm nest with a constant temperature of 21–27°C is crucial for weaners, so they can keep themselves warm without using energy.
- Because of the high sensitivity of weaners to diseases, the pens must be easy to clean.
- To avoid a dirty or wet lying area, it is recommended to have a flexible back wall to reduce the space of the lying area in the beginning and increase it with the size of the weaners. All the pigs must have the possibility to lie in a lateral position in the lying area.
- The feed should be provided in a long trough to ensure that all the weaners can eat at the same time.

How to prepare the piglets for their new diet?

Besides appropriate housing, provision of appropriate feed is decisive for weaners (see chapter on feeding). If the piglets are not prepared for the change in feed at weaning, the capacity of their stomach to produce acid is insufficient after six weeks of life. As a result, harmful bacteria can pass from the stomach into the intestine, multiply and cause diarrhoea.

The risk of diarrhoea can be minimized by offering a starter feed mixed with wheat grains to the sucklers. At the age of 12 weeks, piglets will be able to eat on their own and, thus, will be prepared to digest carbohydrates.

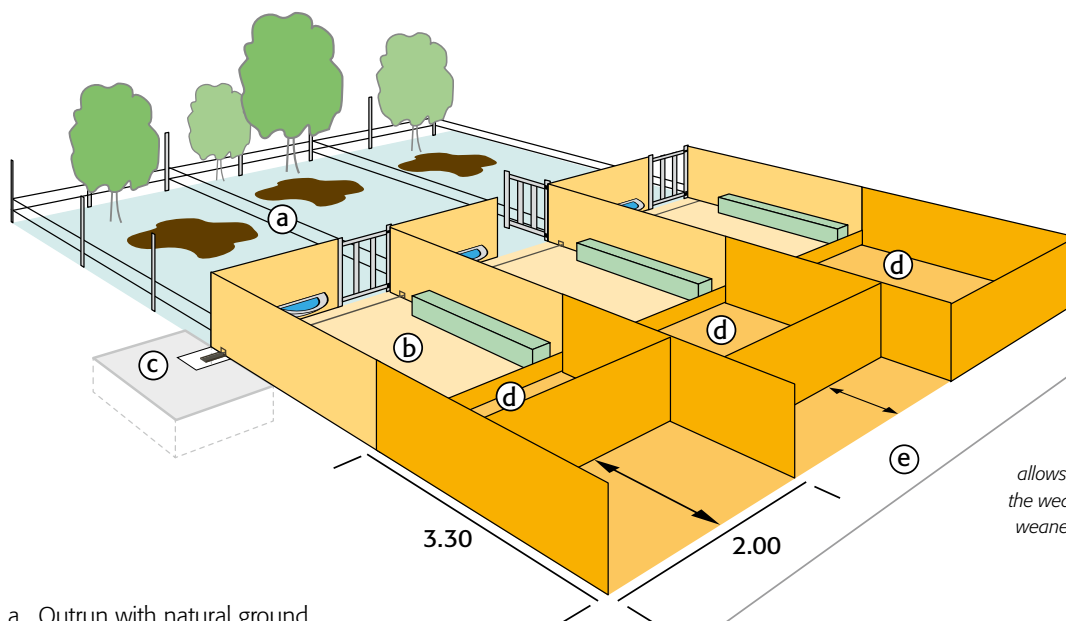
Note: All stables: build with a slight slope of 3–5% of the ground towards the outrun to avoid wet lying areas.



Instead of keeping the weaners in an indoor weaner pen, they may be kept in a more cost-effective outdoor system instead. A well-managed outdoor system can contribute to good health and welfare of the animals. To provide a clean environment without pathogens, outdoor huts should be moved to a new spot after every batch.

Typical indoor pen for weaners

Measurement for 25 weaners per pen



- a Outrun with natural ground
- b Outrun with concrete ground, drinking bowls, feeding troughs and defecation area
- c Manure pit
- d Flexible lying area
- e Service passage

An adjustable back wall in every unit allows to adapt the lying area to the size of the weaners. At an entry life weight of 10 kg, weaners only need half the size of the lying area of the exit life weight of 25 kg.

Note: As for the other pens, too, the lying area of weaner pens must be covered with a roof to protect them from rain and sun! In cold climate, additional protection of the lying area against cold and wind may be necessary.

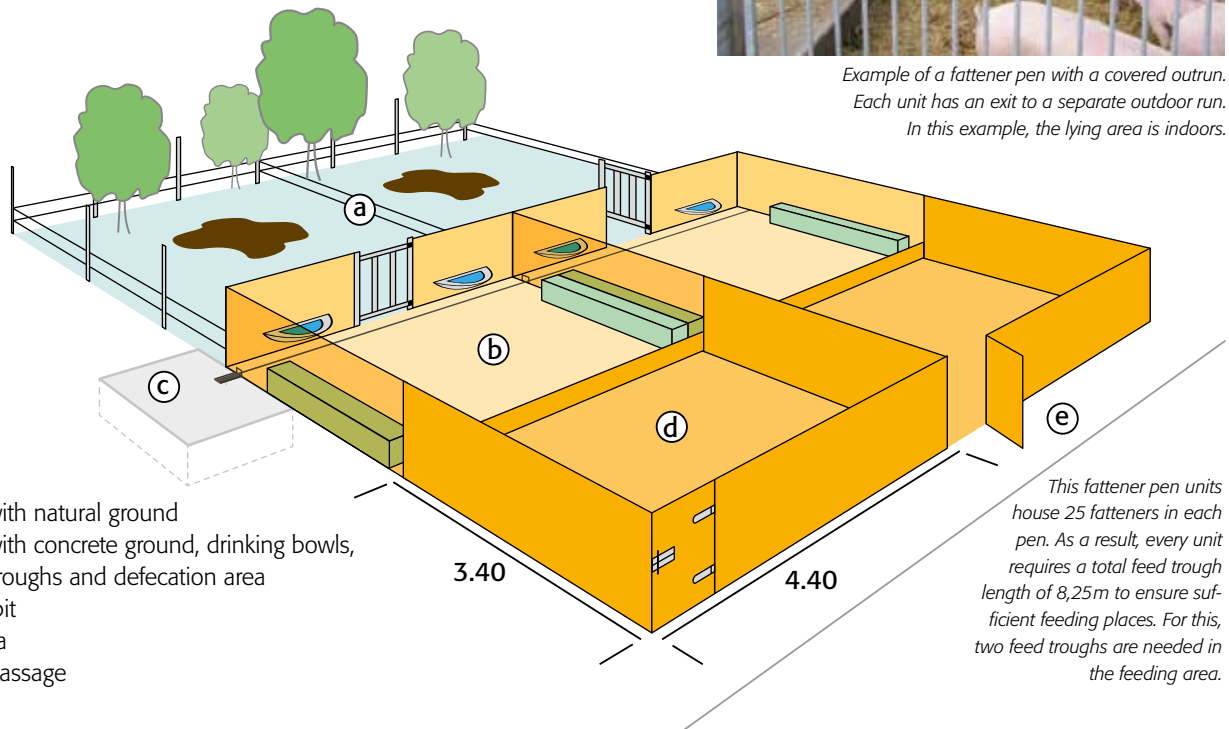
Housing of fatteners

Pens for fatteners are commonly structured into a covered lying area to keep them warm in cold weather periods, an activity area with sufficient feeding opportunities and into an outrun.



Example of a fattener pen with a covered outrun. Each unit has an exit to a separate outdoor run. In this example, the lying area is indoors.

Typical pen for fattening pigs Measurement for 25 pigs per pen



If the feed trough is too small, some fatteners will not get enough feed, which has negative effects on their growth.

Outdoor fattening of pigs

Fattening pigs outdoor is an extensive production system. The required covered lying area can be made with one half of an old water tank, for example. In cold weather periods, the floor inside the huts must be covered with a thick layer of littering material to ensure proper insulation from below. In warm weather periods, the hut must be opened on one or two sides to avoid overheating inside.



Feeding of outdoor fatteners can be achieved by using storage containers to offer feed at will. If continuous feeding is not possible, the fatteners should be fed twice a day from a large trough to allow simultaneous eating.

Key management measures for fattening pigs:

- Provide a warm, littered nest area during cold and/or wet weather conditions. Provide shade and cooling opportunities, such as a shower or a wallow, during hot weather.
- Feed the fatteners twice a day. Clean the trough before every feeding.
- Provide sufficient clean (running) water at all times. Clean the drinking bowls every day.
- Separate diseased pigs from the group.

The basic elements of pig feeding

Pigs have a monogastric digestive system which allows them to digest almost any food/feed type. Intensive pig industry mostly depends on concentrate feeds consisting of cereals and pulses. This makes pigs direct competitors to humans for nutrition. To avoid such competition, alternative feedstuffs should be considered.

Including farm-grown feed

Farmers should be encouraged to grow their own feed components. This may result in a higher profit of the farm's pig production. In addition to farm-grown feed, some side products from the food industry of good quality (not rotten or contaminated with chemicals, pesticides or hormones!) can be used.

High performance breeds have higher feed requirements than breeds with moderate performance. Therefore, it could be an option to buy feedstuff for high-performing breeds from the industry and supplement it with home-grown or alternative feedstuff. For breeds with a moderate performance, farm-own feed sources and their own/self-produced or purchased waste products are most appropriate.

Ensuring efficient handling of feed

Feeding is labour-intensive. Therefore, handling of feed for storage and preparation, and cleaning of the feed trough must be managed efficiently. The trough or feeding area should be easily accessible, so that the feed can be removed with a wheelbarrow or a tractor or with an automatic feeding system.

To ensure all-time good quality of the feed, clean, dry (covered) and pest-safe storage of the feed is essential.

Composition of appropriate diets

Feed should meet the animal's needs for maintenance of the body's functions, growth and reproduction. Appropriate pig feed contains sufficient energy, protein, minerals and vitamins in the right proportions.

Rice bran, broken rice, maize, soybeans, cassava, vegetables and distillery residues are often used in pig feed. Distillery waste is much appreciated in traditional pig husbandry, especially to fatten pigs. It is advisable, however, not to give this high valued feed to pregnant and lactating sows and to piglets and weaners because of its alcohol content.

Possible feed components for pigs:

- **Yellow maize:** a very good feed with up to 65% of carbohydrates and 9% of proteins. Maize can be mixed and cooked with other feed, but should not exceed 40% of the ration.
- **Soybeans:** a crop with a high nutritional value containing 38% of proteins. Soybeans should be dried, milled or well-cooked.
- **Root crops such as turnips and sweet potatoes:** they can be mixed with other feed up to a share of 10–20% (but never more than 30%).
- **Tubers and hay of manioc/cassava:** the leaves are harvested after 3–4 months when they have reached the size of about 30–45 cm (12 to 18 in). The leaves are then sun-dried for one to two days. Cassava hay has a high protein content of 20–27% and 1,5–4% of condensed tannins.
- **Wheat bran** is rich in dietary fibres and contains significant quantities of carbohydrates, proteins, vitamins, and minerals. Wheat bran is widely used as a major component in animal feed. Its protein content lies between 14% and 16%, fat content up to 9,5%, crude fibres 8,0 to 10,0% and carbohydrates up to 25%.
- **Sweet potato vine and tubers** can be fed to pigs, too.
- **Clover:** has a crude protein level in the dry matter of about 25% and phosphorus content of about 0,3% with a digestibility of up to 75%. Sodium content is low with 0,05% to 0,15%.
- **Vegetables, fruit or bread:** products that were damaged during transportation, storage and handling can be used as supplementary feed for pigs by boiling and mixing them with other feed such as maize or feeding them freshly. Raw potatoes must be cooked.
- **Restaurant and kitchen wastes:** they are likely to contain meat products and must be cooked for an hour before feeding them to pigs. Fermented products or products that ferment while stored, such as apples and brewery wastes, can cause pigs to become drunk.
- Some **expired food products** from retail stores may be a feed source, too.



Piglets need high quality feed with a good taste and all nutrients they need. Therefore, commercial piglet feed should be purchased if the necessary feed can not be produced on the farmer's own.



The provision of silage and roughage to piglets and sows in addition to concentrate feed supports their digestion.

Planning the feeding

Fattening of pigs requires plenty of feedstuff. To fatten a pig to 100 kg live weight takes about 6 months and 300 kg of concentrate feed. To fatten 10 piglets at a time, which corresponds to one litter of a sow, requires 3 tons of feed. Thus, fattening several pigs at a time can result in high expenses if only concentrate feed is used. Fattening 100 pig-



Pigs naturally suck the water. Nipple drinkers are more hygienic than bowls, but the pigs drink less. Therefore, cup drinkers or a drinking trough are better.



Water – the most important feedstuff

Pigs of all ages need sufficient clean drinking water. Clean water must be available at all times in sufficient quantity. A pregnant sow needs 10 to 12 litres of water a day, a lactating sow 20 to 30 litres, a growing pig 6 to 8 litres a day, a boar 12 to 15 litres. Shortage of water can reduce feed intake. Water is the cheapest «feedstuff». Proper water supply increases productivity and maintains animal health.

lets, which corresponds to the annual offspring of 5 sows, requires 30 tons of feed. Such a production requires sufficient cash money, appropriate feed storage and transport facilities.

Purchasing commercial concentrate feed has the advantage that its contents in energy, protein, amino acids, vitamins and minerals are well-balanced for pigs of a specific age. The main disadvantage is its high costs which may result in low profitability.

Sows, piglets and fatteners have different nutritional demands. Due to this, it may be an option to buy concentrate feed for piglets and weaners, because they react most sensitively to the quality of the feed, and to produce one's own feed for the sows and the boar. Sows in gestation can be fed with 50% concentrates and 50% roughage. Lactating sows have high energy and protein demands. Piglet feed must be highly digestible. Fatteners must be fed sufficiently, but economically too, to reach growth rates and be profitable.

General feeding rules

Piglets and Weaners:

- › Offer feed to suckling piglets twice a day.
- › Remove old feed from the trough and give it to the mother sow.
- › Feed weaned piglets several times a day with special piglet feed or farm-made highly digestible feed.
- › Even in case of limited budget, invest in high-value feed for the piglets.

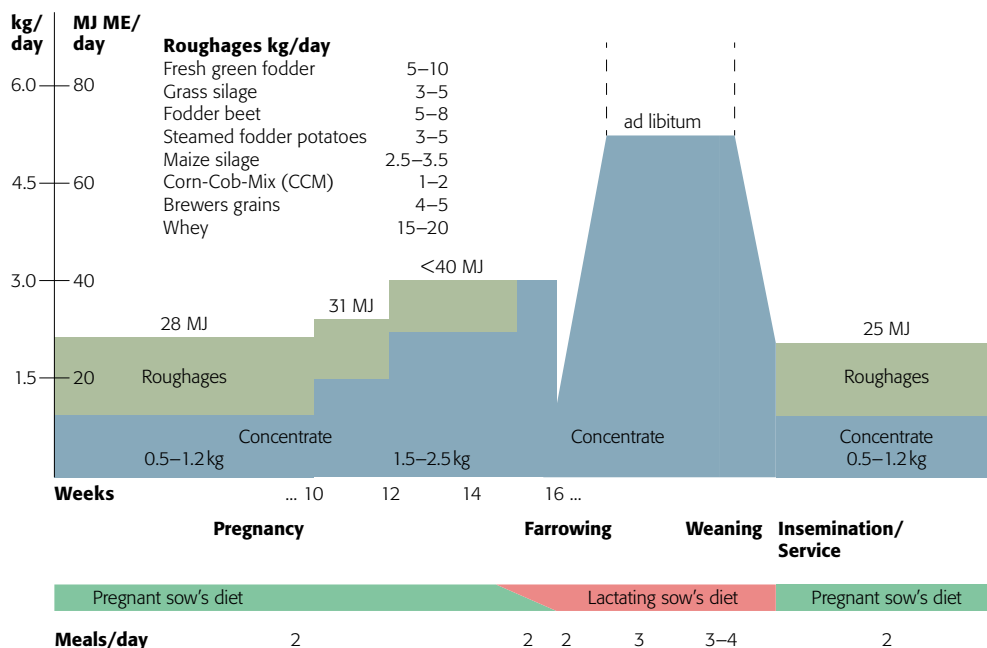
Fatteners:

- › Fatteners of 30 kg weight eat about 1,5 kg of feed a day. At a life weight of 100 kg, they need around 3,5 kg of feed per day.

Sows:

- › During gestation, feed the sows restrictively, but sufficiently with grass, silage, hay or other roughage.
- › Two days before farrowing, cut down the feed ratio of the sow. As a substitute feed bran and high quality hay or silage.
- › Lactating sows need a lot of feed. Depending on the number of piglets a sow needs 5 to 7 kg of feed per day.
- › Increase the amount of feed under cold weather conditions to ensure that the sows can maintain their body condition.
- › Provide sufficient high quality roughages (no mouldy roughages!) to avoid hunger and aggression. Roughages also help to prevent constipation at birth.
- › Make sure the provision of proteins, energy, lysine, phosphorus and calcium is sufficient, especially during lactation. A balance between nutrients is also important: the optimal Ca:P ratio is 1.3:1.

Feeding curve for sows



This graph advises on how much feed (kg/day) and energy (MJ ME/day) should be fed to sows in the different production stages. Depending on the production status (pregnancy, farrowing/lactation, weaning and insemination/service time) the sows need different amounts of feed with certain energy contents. The line at the bottom shows the amount of meals pigs should be provided with per day.

To increase the uptake of concentrate feed, natural and economic roughage can be fed in addition to the concentrates.

Body condition scoring

The body condition score graph helps farmers check if the sow is in optimum condition. The optimal score varies depending on the production status.

During the suckling period, excessive body condition must be avoided due to fertility problems. Therefore, the diet and the amount of feed must be adapted during pregnancy according to the body condition score. Optimum score at farrowing is 3.



Questions to be discussed with the farmer

- › Can the pigs be fed (at least partially) from farm-grown feed? Appropriate feed include cereals, yellow maize, cassava, glover, root crops like turnip, sweet potatoes, and grassland.
- › Is appropriate foreign pig feed available? In case there is not enough farm-grown pig feed, foreign waste or byproducts from the food industry or from vegetable farms may be used. Pig feed from a company can be an option if the economic calculation is positive.

