

THINGS TO CONSIDER WHEN STARTING UP A PIGGERY PROJECT

The following things should be considered when one is intending to start up a piggery project:

1. Capital

The amount of money required to set up the piggery project is dependent on the unit size one intends to operate. In pig production capital is needed to construct the sties and to buy equipment and breeding stock. Working capital is also needed to pay for feed, drugs and labour for the first year of operation. For a breeding/feeding unit, cash outflow tends to increase to a maximum at the end of the first 11 months of operation while cash inflow starts only 11 months after commencement of the project. It is therefore important for the farmer to have sufficient funds to sustain the operations of the piggery for a period of 11 months.

2. Knowledge

Knowledge on how to successfully manage a pig production enterprise is very important. In order for the farmer to avoid making costly mistakes in the running of the pig production enterprise he should be trained in pig husbandry.

3. Breeding stock

The output of a unit can be limited by the quality of breeding stock. Inferior breeding stock results in

an inefficient utilization of feed and space. Farmers must be prepared to pay high prices for quality stock. Poor quality breeding stock may be cheaper in the short term but in the long run they will be expensive.

4. **Market**

Farmers have to identify the market for their pigs before they start producing them. Farmers should desist from the practice of hunting around for a market when their pigs are ready for sale. When the producer has identified a market he must ask himself whether the price being offered for his pigs will be enough to make the project viable. An important point to consider when one is choosing a market is the distance to the market. If the distance to the market is long the project will incur high transport costs and hence will be less viable.

5. **Water**

Water should be of the right quantity and quality. Inadequate water supply depresses the growth rate of the pigs. Lactating sow need a lot of water for milk production. The pigs' water requirements will vary with the weather. On a very hot day the pig will use more water than during a cold day. As a general guide a farmer should budget about 150 litres of water per sow per day.

6. **Housing**

The pigsties should be constructed in a way that will allow the stockman to carry out his daily duties with ease. The sties have to be designed in a

manner that will help management in monitoring the pig enterprise. Poor housing designs can lead to disproportionate food sharing, inefficient utilization of space, feed wastage and poor performance of the pigs among other things.

7. Feed availability

A guaranteed supply of feed is a prerequisite for the successful operation of a piggery project. Feed account for about 80% of the production costs on a pig production enterprise. Pig feeds are compounded using maize or other small grains and concentrates. The farmer should budget about 3.4 tonnes of maize per sow per year if he is to operate a breeding/feeding unit.

SITING A PIGGERY

The pigsties should be sited in the direction of the prevailing winds in relation to the homestead. The pens should not be built in swampy areas. Wherever possible take advantage of the natural slope in sitting the piggery. It is also recommended to use land, which is not suitable for cropping as the location for the pigsties. The area where the sties are located should be easily accessible by trucks to allow for easy delivery of supplies and to facilitate the movement of the pigs to the market. Another thing to consider when sitting the pigsties is the source of water for the project. Stockpersons should not travel long distances to fetch water for the pigs. While it is prudent to have the water source close to the piggery care should be taken on where the effluent from the piggery goes. If the effluent is dumped close to the

water source there is danger of contamination of the water. The effluent should not be channeled to a site that is close to the source of drinking water. When sitting the pigsties one should make considerations for future expansion of the project. The place where the pigsties are located should be spacious so that there is room for future expansion of the project. The security of the pigs and property should also be considered when sitting the piggery. Isolated locations can result in theft problems.

When constructing the sties they should not face east-west. The buildings should face north-south. This is done to prevent the pigs from having sunburn and heat stress.

SPACE REQUIREMENTS

It is important to have the right number of pigs in a pigsty. Overcrowding can result in depressed growth in addition to easy transmission of diseases. Overcrowded pigs dung everywhere hence the environment will be conducive for the spread of diseases.

The table below is a guideline on the space requirements of the different classes of pigs.

	Area
In pig sows Stalls	2m long*0.64m wide
Cubicles	As for stalls and similar dunging and exercise area
Yards	3-4m ² per sow

Farrowing	
Crate	2m long * 0.7m wide
Pen, including crate	6.2m ²
Solari follow on, including creep area	10m ²
Multi suckling	7-8m ² /sow and litter
Weaners	
Cages (per pig)	0.2m ² lying area + 0.2m ² slatted area
Yards/pig	0.7-0.9m ²
Porkers (pen, including dunging area)	0.73m ² /pig
Baconers (pen including dunging area)	0.93m ² /pig
Trough space (per pig)	
Light porkers	0.2m ²
Heavy porkers	0.25m ²
Baconers	0.3m ²
Gilts/Sows	0.35m ²

PEN REQUIREMENTS WORKOUTS FOR A 100 SOW UNIT

i. Assumptions

Farrowing index 2

Weaning age 5 weeks

18 pigs are sold per sow per year

20 weaners are produced per sow per year

Sows enter farrowing house 1 week before farrowing and the pens are rested for a week after weaning

Weaners occupy weaner pens for 3 weeks and the pens are rested for 5 days.

Fatteners occupy the fattening pens for 105 days and the pens are rested for 3 days.

ii. Farrowing Places

Farrowings per year $100 \times 2.0 = 200$

With a 7 week occupation period the number of times the same farrowing place can be used $= 52/7 = 7$ approx

No of farrowing places required $= 200/7 = 29$ approx

iii. Dry sow places

The sow is weaned after 5 weeks.

The sow enters the farrowing house a week before farrowing. At 2 litters per sow per year a period of $(6 \times 2) = 12$ weeks is spend away from dry-sow housing.

The period the sow is in the dry sow pens is 40 weeks.

The number of dry sow places required is $40 \times 100/52 = 77$

If sows are housed 8 in a pen

No of pens required $= 77/8 = 10$

v. Weaner Pens

Output of weaners per year $= 100 \times 2 \times 10 = 2000$ weaners

Weaners stay in the weaner pens for 3 weeks with the pen being rested for 5 days.

Batches per year $= 365/26 = 14$ batches

No of pigs/batch $= 2000/14 = 143$ pigs

At 12 weaners/pen the number of pens required = $143/12 = 12$ pens

vi. Fattening Pens

Pigs occupy the fattening pens after 8 weeks.

Fatteners are marketed when they are about 5 1/2 months of age.

Allowing 3 days cleaning between batches the number of batches that can use the same facility per year is $365/109 = 3.3$

Output per year is $100 * 18 = 1800$

For a 100 sow unit the number of pigs per batch is $100 * 18 / 3.3 = 545$.

545 fattening places are required per time.

At 15 pigs/pen the number of pens required is $530/15 = 34$ pens.

PIG HOUSING

- One of the aims of providing housing to pigs is for management to be able to exert their control on the pigs. Pig housing is intended to control the pig environment and to protect the pigs from rain and sun's rays.
- Housing should be used to modify the environment e.g. in the farrowing house there is need to provide two microenvironments within the same pen. A warm environment is needed for the piglets and a cool environment is needed for the lactating sow.
- The sties should be constructed in a way that will help in the prevention of diseases. There should be adequate openings to allow for ventilation in all the pig buildings. In the case of the farrowing

house there should be provision to close the openings when it is cold.

- Pig housing should help the stockperson to perform his duties e.g. heat detection, weighing and moving pigs from one pen to the other or to the loading bay.
- Pigsties can be constructed using a variety of materials but emphasis should be placed on using durable material. Pigsties can be of brick under asbestos, iron sheets or thatch. Ideally thatch should not be used for the farrowing and weaner pens.
- Each pen should have a feeding trough and a water trough. If there is provision for nipple drinkers then there is no need for a water trough. The feed trough should not be sited in the dunging area. The water trough should not be sited at the upper end of the slope otherwise spillages will render the pen wet all the time.
- The floors should ideally be of hard concrete to prevent the rooting behaviour of the pigs and to facilitate easy cleaning of the pens. The floors should neither be too rough nor too smooth. Smooth floors can cause leg injuries while too rough floors cause damages to the teats and to the piglet legs during suckling. Too rough floors can also damage the claws of pigs. The floors should allow easy drainage of water. This can only be achieved if the floors are sloping to the outside drainage channel. The outside drainage channel should be at least 30cm wide.
- The walls should be plastered and should be free

of sharp objects.

- The roof should not be low. Low roofs interfere with the stockman when he is carrying out his duties.

PIG BREEDS

LARGE WHITE

Attributes

- White in colour with pricked ears
- Fast growing animal
- Has good strong legs
- Females are prolific and have excellent mothering ability
- Free from the halothane gene
- Lean and meaty pig
- Displays large appetite and hence show good voluntary feed intake
- Sires inject uniformity and quality in a pig herd
- Adapt well to confinement conditions
- Breed is mainly used for cross breeding
- More susceptible to sunburn

LANDRACE

There are two types of Landrace, the Scandinavian Landrace and the Belgian or Dutch Landrace

Attributes

- White in colour with floppy forward pointing ears
- Scandinavian type are long, quite lean and prolific but not especially muscular
- Belgian type less prolific than the Scandinavian but noted for being muscular
- Belgian landrace is blocky and well muscled. It has high incidence of the halothane gene and hence is easily affected by stressful conditions.

- Landrace dams are docile and have excellent mothering instincts and milking abilities
- Reach peak milk production after five weeks
- Less prolific than the large white
- Long bodied with light shoulders and well developed hams
- Produces lean, fast growing progeny
- Have weak legs. In order to mask the leg weaknesses of the landrace it is usually crossed with the large white.

DUROC

attributes

- Coloured breed ranging from gold to rusty red to dark brown in colour
- Developed in the USA
- It's a robust breed that perform well in tough conditions
- Has drooping ears that are never held erect
- Has strong legs
- Renowned for having high intra muscular fat
- Fast growing
- Female is average on mothering ability and litter size
- Free from the halothane gene hence it is not easily affected by stressful conditions
- Normally used as a terminal sire

HAMPSHIRE

Attributes

- Black in colour with a white collar on the

forequarters

- Has a reputation of meatiness rather than reproductive performance
- Has fast growth rate
- Has high lean percentage
- Cope better with extensive conditions than white breeds
- Well muscled pig, with good feed conversion

MUKOTA

Indigenous breed that is normally black in colour

- Hardy breed that can survive under very harsh conditions
- Has poor growth rate
- Is early maturing
- Has poor reproductive performance. It produces small litter sizes.
- Females have excellent mothering ability
- Deposit a lot of fat at an early age
- Has poor feed conversion ratio
- Long nose and razor- backed

SELECTION OF BREEDING STOCK

It can be done through progeny testing, sib testing or performance testing. Performance testing involves assessing an animal using its own performance. Progeny testing involves assessing an animal on the basis of the performance of its progeny. Sib testing involves assessing an animal on the basis of the performance of its relatives.

In Zimbabwe animals are selected using the performance testing method. Usually final selection

of the animals is done when they are five to five and a half months of age.

Guidelines when selecting breeding stock using the performance testing method.

An ideal animal should:

- Have fast growth rate
- Is wedge shaped. It must be broader at the back and narrower at the front or fore legs. The shoulders should be light in relation to hams.
- have good strong legs. The legs should neither be O-shaped nor X-shaped. The clays should be even and not wide open. The dew claws (zvimbi) should not touch the ground when the animal is walking. When viewed from the front the legs should be straight. When viewed from the side view the fore legs should not be sickled.
- not have a fat collar in the neck
- have a wide well rounded and not deep chest
- have a wide, long, arched and strong back
- have wide, well filled (down to the hock) hams
- have at least 12 well spaced and functional teats
- be free of genetic defects like hernia or upturned vulva
- come from parents with a known history of high productivity

MANAGEMENT OF THE BREEDING STOCK

Management of the breeding stock should be aimed at having the sows in the productive state for most of the time. The productive periods in the life of a sow are the pregnancy and lactation periods. If the sow is neither lactating nor in pig it is in an unproductive state. The unproductive periods are the period

between selection and conception, the period between weaning and conception and the period between final weaning and culling. The unproductive period can be unnecessarily long if:

1. the sow fails to show heat after selection
2. the stockperson fails to detect a sow on heat
3. the sow fails to conceive after service
4. the sow aborts
5. there is a prolonged delay in selling culled breeding stock

The Gilt

Improper handling of the young gilt can adversely affect her future performance. The young gilt should be fed 3-4kg of a well balanced sow diet per day. Over feeding should be avoided as it results in fat gilts. The bought in gilt should be carefully introduced into the herd. She should be encouraged to eat in its new environment. On arrival on the farm she should be checked for damages to the legs that might occur during transportation. The gilt should quickly come in heat after selection.

Ways of inducing gilts to quickly come in heat

- mixing of strange groups under supervision. The stress associated with mixing helps to stimulate the onset of heat
- transportation
- housing them close to mature boars where they can have nose to nose contact with the mature boar. The sight, sound, smell and contact with a mature boar will induce the gilts to quickly come in heat.

The young boars

Purchase them in advance of expected use

- spray and de-worm them on arrival
- feed the young boar 2-2.5kg of a balanced diet per day
- keep the boar in a fit but not fat condition. Over fat boars have reduced libido (sexual drive)
- boar can be used at 7.5 - 8 months
- should first service a sow well on heat and standing firm
- should not be introduced to a group of sows as he can be bullied and this will ultimately reduce his confidence.
- Should be housed in cool conditions since high temperature can affect the fertility of the boar
- Should have one complete service per week. Overuse should be avoided because it has adverse effects on litter size and the lifespan of the boar. Conception rate can also be affected if the boar is overused.

Mature boar

- Should be housed in spacious cool conditions. High temperature depress libido and affect the quality of the sperm.
- A boar to sow **ratio of 1:20** can be used. With small units a narrower boar to sow ratio is the norm.
- Over working boars reduce the **quality and quantity** of sperms
- at 10 months a boar can work on 2 sows/week
- under used boars can have semen quality problems
- culling of boars depends primarily on performance. Farmers can have a policy of replacing boars if

- they have 3 years of working life.
- Old and heavier boars are only suitable for big sows

HEAT DETECTION AND SERVICE MANAGEMENT

Heat detection is conducted early in the morning or late in the afternoon when it is cool. Once a gilt is observed to be in heat it has to be serviced there and then. A sow observed to be in heat is not serviced there and then. If a sow is observed to be in heat in the morning it is serviced late in the afternoon. A period of about **12 hours** is allowed to lapse before a sow is serviced. The services should be conducted when it is cool because boars tire easily when it is hot.

Sows that are weaned in good body condition normally come in heat within a week. Heat normally lasts for 2 to 3 days. It is recommended to service the sow or gilt 3 times at 12-hour intervals during the heat period.

Signs of heat

- Swelling and reddening of the vulva
- The sow mounts others and it will allow itself to be mounted by pen mates
- The sow will stand firm for the boar
- Pricking of ears in prick eared breeds
- The sow becomes restless and will give a characteristic grunt to attract the boar
- Sow can lose appetite
- When pressure is applied on her back in the presence of the boar the sow will stand firm. In the

absence of the boar some sows will not respond positively to the back pressure test.

Service Management

- Gilts are serviced when they are between **7 -8 months** of age
- Its recommended to service them during the 2nd oestrus to increase litter size
- Gilts are serviced on the first signs of heat, sows are serviced **12hours** later
- Service should take place when its cool i.e. early morning or late afternoon
- Make sure the vulva area is clean before service. If the area is dirty the stockman should first wash it, this will help the prevention of cystitis.
- Make sure the boar has gotten enough **rest between services**. A young boar (< 12 months) should complete one full service per week whilst an **old boar** (>12 months) should complete **two full services per week**.
- Do not mate related animals as this result in poor litter size and growth rate
- The service area should provide a good foot grip for both the boar and the sow. Slippery surfaces can seriously affect the confidence of the boar. They can also result in the premature termination of a service.
- Match the size of the boar to that of the gilt. Avoid giving a big boar to a gilt and a small boar to a big sow. A small gilt will find it very difficult to carry the big boar during the mating period. The small boar can be frustrated if it fails to mount the big sow. The frustration can result in reduced libido in

the boar.

- Do not service the sow or gilt immediately after vaccination with farrowsure. Normally 14 days should lapse before services are done.

HOW TO GET HIGHER PREGNANCY PERCENTAGE

- Supervise the services
- A sow or gilt in heat should be **serviced 3 times at 12 hour intervals**
- Use **crossbreds**
- Service gilts from 2nd heat onwards
- Ensure good **feeding** management of sows before and after service
- Give the boar adequate **rest between services**
- **Avoid stressing** the newly serviced sows

MANAGEMENT OF THE PREGNANT SOW

1. Feed the newly serviced sow 2kg of a dry sow diet per day. Overfeeding of the pregnant sow can result in farrowing problems. Over fat sows are usually lazy and they have prolonged farrowings. If the farrowing process takes a long time the piglets that are born last are usually weak and chances are some might be stillborn.
2. Avoid stressing the newly serviced sows as this can result in small litter size. Mixing of strange groups, transportation, feed and water deprivation are some of the stress factors that should be avoided.
3. Check for returns between **day 18 and 24** counting the day of service as day 0
4. De-worm the pregnant sow two weeks before

farrowing.

5. Move the sow to the farrowing house **7-10 days** before the due to farrow date. This is done to enable the sow to get used to the farrowing environment and to avoid sows farrowing in-group situations. Before the sow enters the farrowing house it has to be **washed** thoroughly and sprayed with an acaricide like triatix to control the mange mites. The farrowing house where the sow is going should also be cleaned and disinfected before the sow comes. If there are no accommodation problems the farrowing quarters should be rested for at least 3 days between farrowings.
6. Monitor the sow for any signs of farrowing. The pregnancy period for a pig is **114-115** days. Use your records to look for those sows that will be nearing farrowing.
7. Make sure short straw or saw dust is available in the farrowing house

FARROWING MANAGEMENT

Signs of imminent farrowing

A sow that is about to farrow will show any of the following signs:

- a) Attempting to build a nest if bedding is available
- b) Abdominal muscle contractions as the sow tries to expel the piglets from the womb
- c) Restlessness characterized by biting of bars of the farrowing crate if the sow is confined in the crate. The restlessness of the sow continues throughout the farrowing process and this places the newly born piglet in danger of being crushed.

- d) Expulsion of blood stained fluids
- e) Expulsion of foetal faeces. The faeces are expelled is the fluids as small greenish-brown pellets.
- f) Frequent urination
- g) Milk can be extracted from the teats after a gentle massage of the udder
- h) The vulva swells, the udder drops and there is change in the texture of the udder from being soft and flabby to being firm and turgid.
- i) Pulse and respiration rate increases
- j) The sows loses its appetite
- k) Twitching of the tail just before the expulsion of a piglet.

It is very important for the stockperson to monitor the farrowing process because there are a number of problems that can arise during the farrowing process.

Problems during farrowing

The sow can push and strain with no piglets coming out. This scenario is referred to as dystocia. Dystocia might be due to:

1. **Two piglets trying to come out at the same time** and as a result they get trapped in the birth canal
2. A piglet coming out broadside. The normal birth presentation is either nose first or hind feet first.
3. The piglet **is too big** for the birth canal.

Experience has shown that if the sow is straining and nothing is coming out, taking the sow for a 10-15 minute walk can help. If this is done and the sow continues to have problems the stockperson should assist in the removal of the piglets. The stockperson

should thoroughly **wash the hand, arm**, the vulva and surrounding area before he goes in to remove the piglets. The hand and arm should be lubricated so that it is easily moved into the birth canal. Any **rings** should be removed and **finger nails** trimmed before assistance is rendered to the sow. The assisting individual can grab the piglets by the hind legs or the head and then pull. Delays in assisting struggling sows can result in the birth of weak or stillborn piglets. As a precaution the stockperson should inject the sow with a broad-spectrum antibiotic to cater for any pathogens that might be introduced into the womb.

Another problem that can arise during farrowing is that the sow may be **lazy to push**. This situation can arise when the **sow is too fat**. If the sow is lazy to push the stockperson is advised to administer **oxytocin to induce abdominal muscle contraction**. Farmers and stock people are warned against administering oxytocin to a sow that is pushing and straining because the oxytocin will further enhance the abdominal muscle contractions and this might cause the rupture of the umbilical chord whilst the piglet is still in the womb. Once the umbilical chord ruptures in the womb the piglet will be stillborn.

Savaging can be a problem especially with gilts. The strain and pain of farrowing is linked to this abnormal behaviour. If the stockperson is supervising the farrowing process he can quickly notice any attempts at savaging the piglets. Once this is noticed a restrainer should be placed on the mouth of the

sow. Usually after the completion of farrowing the sow will not show this abnormal behaviour and hence the restrainer should be removed.

Duration of Farrowing

- Varies from 1-12 hours - **abnormal if more than 30 minutes** - 1hr elapses there is no piglet born but the sow labours
- Leave piglets with sow, unless she is ill natured
- Suckling by the piglets stimulate womb contractions hence the stockperson should desist from the practice of separating the sow and her piglets during the farrowing period

Completion of farrowing

When farrowing is complete the sow will **expel the placenta** or after birth. It is normal for the afterbirth to be expelled in two portions.

Factors affecting litter size

The number of pigs sold per sow per year can be affected by the litter size at birth. If a big litter is farrowed and mortality is low the number of pigs sold per sow per year will be high. Litter size at birth is affected by:

1. Parity

First litter sows produce fewer piglets than later parity sows. It is, therefore, important not to have a high proportion of first parity sows in the herd as this will mean a high proportion of poor performers. Litter size tend to decline after the forth parity. The litter size of sows above the seventh parity is

comparable to that of gilts hence a large proportion of sows in their late parities will result in reduced herd sow productivity.

2. **Breed**

There is a breed difference in litter size. The mukota pig produces smaller litters than the large white or landrace. It has been reported that large white boars produce consistently better litters. **The crossbred produces about 5% more pigs at birth on average than the average of the constituent purebreds. Inbreeding results in the production of smaller litters.**

3. **Frequency of mating**

Single mating tends to result in smaller litters than double or triple mating. Double or triple service spread over the period when the sow or gilt shows the standing reaction to the boar helps to increase litter size.

4. **Timing of mating**

Mating very early or very late in heat results in lower conception rate and smaller litter sizes. The optimum timing of service or insemination to maximize conception rate and liter size appears to be 10-20 hours before ovulation (release of eggs from the ovary). Since the exact timing of ovulation cannot be predicted, mating cannot be timed to produce an optimum result. In order to increase the chances of fresh semen being available when ovulation takes place multiple services are conducted during the period the sow stands for the boar.

5. **Diseases**

Some diseases e.g. SMEDI cause embryonic deaths

and this negatively affects litter size.

6. **Overuse of boars**

Overuse of boars can cause lower conception rate and smaller litter sizes. Overuse of boars also reduces the life span of the boar. Semen quality is affected when a boar is overused. The **sperms need time to mature** hence if the boars are overused there is little time for the sperms to mature and this greatly affects their ability to fertilize.

7. **Feeding management after mating**

Overfeeding during the post-service period has been linked to smaller litter sizes. It is recommended that serviced sows should be fed 2kg per day.

8. **Stress**

Stress can cause high embryonic mortality. Stress can arise from mixing of groups, denying the pigs food and water and rough handling by the stockperson.

9. **Previous lactation length**

Very early weaning (less than 21 days) has been observed to cause lower conception rate and smaller litter sizes. It is recommended that the lactation length should not be less than four weeks.

10. **Environmental temperature**

Excessive environmental temperatures in early pregnancy have been observed to increase embryonic losses. It is recommended that the sows be kept at temperatures between 18-21°C. Sprinklers can be used to cool the sows when it is too hot.

11. **Flushing**

The process of increasing feed or energy intake for several days before mating is known as flushing. If gilts are to be mated at second heat, the

most effective treatment is to limit their feed intake in the later part of rearing, to increase their feeding level 10-14 days before mating and to reduce feed allowance to normal restricted levels immediately after mating.

12. Heat number at which the gilt is mated

Litter size at first farrowing is more influenced by the heat number at which the gilt is mated than by her age or live weight at that stage. The number of eggs shed is lowest at first heat and tend to increase with subsequent heat.

Litter management

- Assist piglets to find udder and creep area
- Remove mucus from the nose
- Assist small piglets to get colostrum
- Piglets can be transferred to another sow (fostering). Fostering is effective if sows farrow within 3 days of each other. Teats that are not being suckled dry up within 3 days after farrowing.

MILK PRODUCTION OF SOWS

	Milk production/sow/day	Milk intake/piglet/day
No. of piglets		
6	5 - 6kg	0.9
8	6 - 7kg	0.8
10	7 - 8kg	0.7

12	8 - 9kg	0.7
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Source - Barneveld College Notes

Although milk production increases with litter size milk intake per piglet decreases with litter size hence the growth rate of piglets that are members of large litters is usually lower than that of piglets that are members of small litters.

CAUSES AND MOMENT OF MORTALITY

Cause	0 - 3 days	Age when Dying		Total
		4-7	8 - 35	
Crushing	34 %	9	6	49
Starvation (weak piglets)	25 %	5	3	33
Other (diarrhea, cold)	5%	4	9	18
TOTAL	64%	18	18	100

Source - Barneveld College Notes

The above table shows that about 82% of the piglets die within a week of birth. The stockperson should therefore pay a lot of attention to the piglets during this critical period if mortality is to be reduced.

Causes of piglet mortality

Piglet mortality varies from farm to farm and is a result of the following factors:

1) **Health status**

The herd health status must be high. At birth the piglets are coming from an ideal environment of the womb, where they have been protected from disease causing pathogens, into the farrowing house, which might have an array of pathogens. The piglet's situation is made worse by the fact that its own immunity is not yet fully developed at birth. The piglet's immune system is boosted by the intake of colostrum. Colostrum is rich in antibodies that help the piglet fight off disease challenges. Farmers are advised to ensure that each and every piglet gets a good suckle of colostrum. The sow only produces colostrum during the first day of lactation.

2) **Genetic defects**

The piglets must be anatomically normal. Pigs with a history of genetic defects should not be selected for breeding. Male pigs with atresia ani rarely survive.

3) **Chilling**

Piglets should be provided with adequate temperature so as to conserve their scarce energy reserves. The ideal temperature during the first week of birth is 32°C. At birth the piglet's insulation won't be developed and it also has a poor temperature regulating mechanisms. The use of straw bedding helps to reduce the adverse effects of chilling.

4) **Savaging**

Savaging is usually noticed with gilts. Monitoring of the farrowing process will help to quickly detect any attempts to savage the piglets by the sow. When a

sow has a tendency towards savaging a restrainer should be put on its mouth during the process of farrowing, the restrainer can be removed after completion of farrowing as the sow normally accepts the piglets.

5) **Crushing**

During and immediately after farrowing sows can be restless and as the piglet's weight is around 1% of its dam's weight at birth they are liable to crushing. Starvation, chilling and crushing are interdependent: An underfed piglet is lethargic and is at risk of being crushed. A piglet exposed to chilling conditions is also at risk of being overlain by the sow, as it tends to lie close to the sow. A chilled piglet cannot compete for a suckling position and renders it more prone to starvation. Starvation and crushing account for 50-80% of piglet deaths.

Diagram to show events in the chilling-starvation-overlying problem.

Sub optimal ambient temperature

Lowering of body temperature

Chilling

Reduced Lethargy
Colostrum Intake

Disease

Starvation

Overlying

Death

Crushing incidences are high in situations where:

- Creep area is badly sited and cold
- There is no provision of a well-designed farrowing crate
- The sow is restless
- Piglets have very low birth weights

6) **Starvation**

Every effort should be made to ensure that the piglets are well fed. In most studies, over 70% of pre-weaning deaths are caused by overlying and starvation. Starvation can arise if the sow succumbs to MMA or if the sow develops agalactia as a result of consuming feed contaminated with ergot. Starvation can also arise if the litter size is surplus to the sow's rearing capacity. Those piglets that cannot secure a teat will be in danger of dying from starvation especially if there is no provision of high quality creep feed.

There is a close relationship between birth weight and mortality. **Piglets of low birth weights, below 1kg, are often weak and this make them more prone to crushing.** Incidences of deaths due to starvation and overlying can be reduced by instituting measures that will lead to an increase in the **piglet's birth weight, proper creep feeding**

management and provision of a well designed farrowing crate.

7) Suffocation

Piglets are sometimes born entangled in membranes. If they are not removed the piglets can easily die.

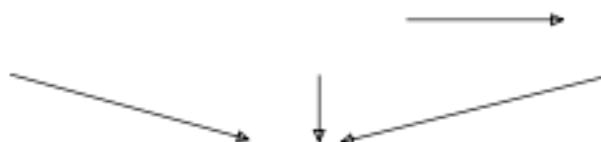
MANAGEMENT TECHNIQUES TO ASSIST PIGLET SURVIVAL

- Provide a warm environment for the piglets. The ideal temperature of piglets at birth is 32 - 35°C
- Fostering: this evens up the number of piglets between litters. It increases piglet survival chances
- Split suckling: it involves temporary removal of the bigger piglets from the lactating sow so as to give the weaker smaller piglets a chance to get colostrum.
- Use of properly designed farrowing crates and a lot of bedding: this helps to minimize the problem of crushing and chilling.

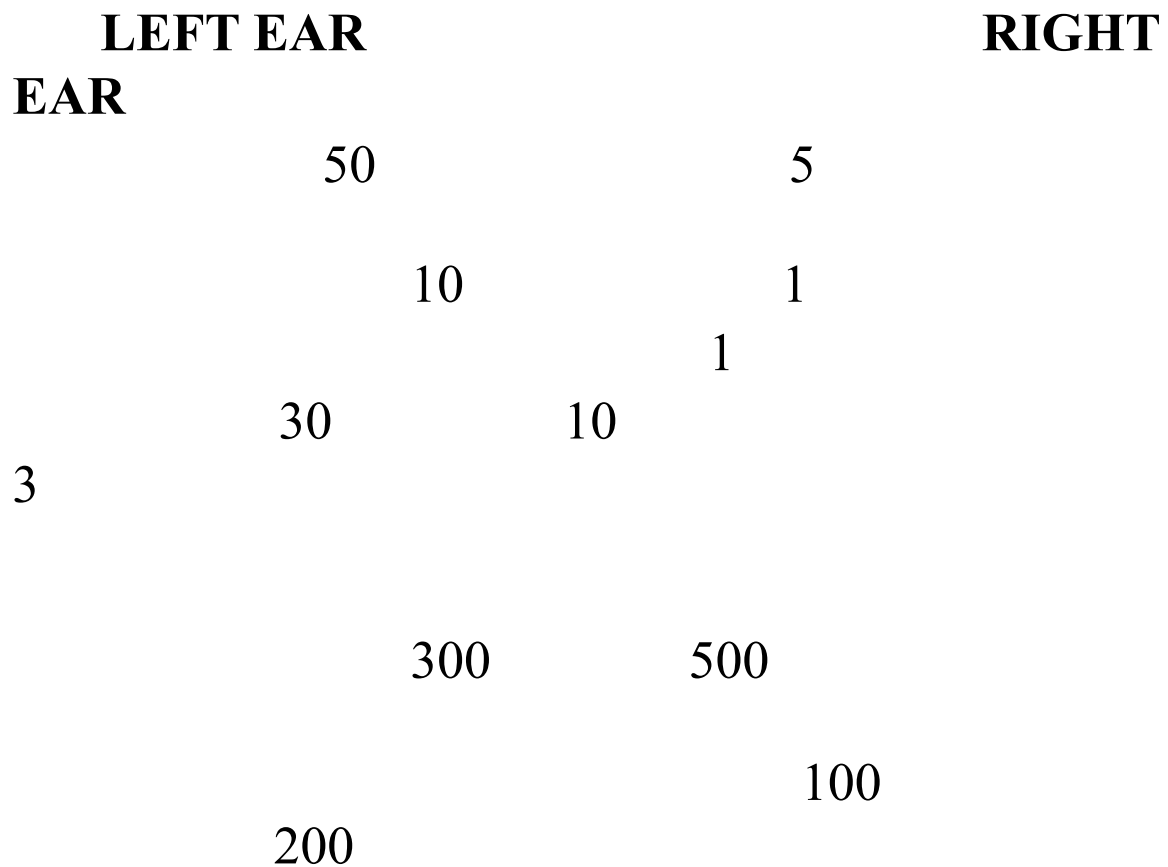
ROUTINE OPERATIONS DONE AFTER COMPLETION OF FARROWING

Ear notching

Piglet identification is essential if proper record keeping is to be practiced. Ear notching is one of the methods that can be used to identify piglets. An ear notcher or a sharp scalpel blade can be used to do it. Notching is best done on the day of birth.



Below is a diagram to show the ear notching positions



Removal of umbilical cord

A piglet is born with a long umbilical cord, which as they move around can be a route through which bacteria can enter the piglet's body. Piglets can develop joint ills as a result of the bacteria. To reduce the incidence of the disease the umbilical cord can be cut to 3-4cm from the belly and the cut end dipped in iodine, spirit or betadine solution.

Tail docking

Sometimes pigs have a tendency of biting each other's tails and this adversely affects the growth and general welfare of the animal. Tail docking can be done on the day of birth. The last third or the whole tail can be removed. A pair of clippers or a sharp

scalpel blade can be used for this operation. Application of a wound powder/spray is recommended to avoid risk of infection. Tail docking is not the panacea of poor management.

Iron supplementation

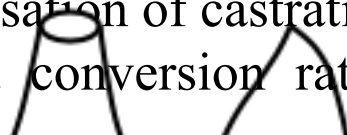
Piglets are born with limited amounts of iron. The low iron content of sow's milk further worsens the situation of the piglets. To avoid the risk of piglets developing anemia iron supplementation is recommended. Iron supplementation is usually done when the piglets are three days old.

Teeth Clipping

Piglets are born with 8 sharp canine teeth. The "eye" teeth can result in piglets damaging each other and the sow's udder. The clipping of the eye teeth is done to minimize injuries to the piglets when they fight. Damage to the udder is also reduced if the teeth are clipped. However, care should be taken to avoid damaging the gums. Studies have shown that damaged gums result in piglets developing arthritis and abscesses. This then defeats the whole purpose of clipping.

Castration

Improvements in animal breeding have resulted in the development of fast growing animals that reach market weight before they are sexually mature. Since castration was done to eliminate the boar taint in meat there is no need for this operation since for fast growing animals. Cessation of castration is also helps to improve the feed conversion ratio since entire



males are better feed converters than castrates. It has been proven that castrated males grow slower than entire ones and they are also exposed to risks of infection. If castration has to be done it's advisable to do it when the piglet is between 2 days and 8 weeks old. It is best done during the first week of birth.

Weighing

Helps the farmer to get an idea of birth weights. (Not necessary when producer has no scale)

CREEP FEEDING

Creep feed is a supplementary dry feed given to the suckling litter

Purpose

The main purpose of creep feeding is to allow the piglets to get used to the solid diet they will consume after weaning. If the piglets are used to the solid diet they will be less likely to suffer any digestive problems at weaning. Creep feed also helps to augment the nutrients that the piglets will be getting from the dam's milk. The milk that the piglets get from the dam is normally not enough to support high growth rate especially after the third week of lactation.

There is very little incentive for the piglets to consume the creep feed during the first three weeks of lactation because milk production will be increasing hence their nutritional requirements will be met by the milk. After the third week milk production will no longer be increasing hence there

is an incentive for the piglets to consume the creep feed.

WEANING OF PIGLETS

In large units farmers are advised to practice batch weaning. Batch weaning involves weaning a group of sows, which farrowed on different dates, on the same day. This system helps to group the weaned piglets and sows according to size. For those producers who do not have specialized farrowing pens it is advisable to remove the sow from the farrowing pen so as to leave the piglets in the environment they are used to.

- Recommended to wean at 5 weeks. If management is excellent weaning can be done at 4 weeks,
- Continue feeding the weaners the same diet they were fed during lactation to prevent digestive problems,
- House the weaners in a warm environment,
- Group the weaners according to size and maintain smaller groups to avoid unnecessary fighting.
- Water should always be available in the weaner pens,
- Runts can be left with a good milking sow for another week.

FEEDS AND FEEDING

Nutrients for pigs

The nutrients required by the pig are energy, protein, vitamins, minerals and water. The major nutrients and the ones that incur the highest cost in pig feeding

are energy and protein. Vitamins and minerals are added in small quantities in pig diets hence their contribution to the cost of the diet is low. Energy, amino acids (building blocks of protein), minerals, vitamins and water are needed by pigs for body maintenance, growth, reproduction and lactation. Pigs must be provided these essential nutrients in adequate amounts and in forms that are palatable and efficiently utilized in order for optimal growth, reproduction and lactation to occur. Feed can only be used efficiently if the nutrients in it are balanced to satisfy the animal's specific needs. The needs of the pig differ hence a diet that is appropriate for the pregnant sow can be inappropriate for the lactating sow.

Pig feeds classification

Pig feeds can be classified into two major categories and these are:

- Energy sources
- Protein sources

Energy sources are generally of plant origin although animal fat can be used as an energy source in pig diets. Protein sources are both of plant and animal origin. In Zimbabwe most of the protein sources used in pig diets are of plant origin. Although feeds can broadly be classified as either energy or protein sources this does not mean energy can only be supplied by the energy source or protein can only be supplied by the protein source.

Energy sources

- 1) Maize

It is the most preferred energy source. Maize is highly digestible and is extremely palatable. Maize protein is of poor quality because it is deficient in the amino acids tryptophan and lysine. To make up for the deficiency of these essential amino acids feed formulators usually mix it with soyabean meal. It is advisable to grind maize, using a 3mm screen, before mixing it with protein supplements.

2) Sorghum

It has 85-90% of the feeding value of maize. White sorghum is better than red sorghum when it comes to pig feeding.

3) Millet

Pearl millet has almost the same nutritive value as maize. It's a valuable ingredient of pig feeds since it promotes the production of firm white fat. It must be ground before it is offered to pigs. Its major drawback is it is susceptible to ergot infection especially in exceptionally wet seasons. Ergot can cause cessation of milk let down in lactating sows. As a precaution pearl millet should not be incorporated in the diets of breeding females.

4) Wheat

It is used mainly for human consumption. Rain damaged wheat is sometimes used for pig feeding in Zimbabwe. Care should be taken when using such grain since it can contain mycotoxins, which can negatively affect pig performance. The protein content of wheat varies widely depending on climate, variety and soil fertility. Wheat should be mixed with

grains that have a relatively high fiber content because it is glutinous and too much can lead to digestive disturbances. It should not be ground too finely because it can, when in contact with water or saliva, become very sticky and pasty. This can cause the area around the feeding trough to become very unhygienic.

5) Cassava

The root is a good energy source however it has a low protein content. It is important to balance for amino acids especially methionine when feeding cassava. It is important to peel the cassava before feeding it to pigs.

6) Barley

Traditionally used for beer production in Zimbabwe. Only rain damaged barley finds its way into pig feeds. It must be crushed before feeding it to pigs. It has about 90% the feeding value of maize. Barley is more fibrous than maize. It promotes the production of firm white carcass fat. It should be blended with maize in pig diets for best results.

7) Hominy feed

It's a by-product of the corn processing industry. Consists of a mixture of the bran, germ and part of the starchy fraction of the grain. It should not replace 100% of the maize in pig diets.

8) Wheat bran

It is too fibrous to be included in creep and weaner diets. Can be included in diets of finisher pigs and

sows. Should not exceed 10% of the diet for best results.

9) Pollards

Fine wheat bran that contains wheat meal in varying proportions. Better digestible than wheat bran. Maize pollards can also be obtained from the GMB. They are better than maize bran.

Protein sources

1. Soyabean meal

Raw soyabeans are unsuitable for pigs because they contain toxic factors, which must be destroyed by heat treatment. Soyabean meal is the residue left after oil extraction and it is heat treated to degrade the toxic factors.

2. Cottonseed meal

Contains toxic yellow and purple pigments known as gossypol that is poisonous to pigs. The symptoms of gossypol poisoning are anemia, diarrhea and eventually paralysis. The addition of iron sulphate at a rate of 1% can neutralize the gossypol. Cottonseed meal is low in lysine and tryptophan and it has low digestibility.

3. Fish meal

It is the most suitable of all protein sources for growing pigs. It has a high biological value because of the better balance of essential amino acids. Fish meal is not widely used in pig diets in Zimbabwe because the cost is prohibitive. It is only used in starter diets by some farmers. There is a danger of

fish taint in pork if fish meal is included in diets fed to pigs up to slaughter.

4. Skimmed milk

It is not normally used in pig diets because it is expensive. It is ideal for piglet and weaner diets.

5. Meat and bone meal

It is a by-product of the meat processing industry. The quality of the final product is dependent on the products used. Care must be taken during processing to ensure that the meal is free of pathogens such as salmonella. Inclusion rate should be 5-10% for best results.

6. Blood meal

It is a potentially good source of animal protein. It is subject to great variations in quality. Under processed material can cause outbreaks of salmonellosis. Overheated material is highly unpalatable and is of moderate nutritional value. Heating during processing can reduce amino acid availability. The inclusion rate should not exceed 5% for best results.

7. Sunflower meal

The composition of the meal depends on whether it contains the hulls or not. Hulled sunflower meal is of lower nutritive value than dehulled meal. The dehulled meal has more protein but the protein is low in lysine. Sunflower seed meal produced by small-scale oil extractors is of variable composition. In

most cases the residue after oil extraction contains a lot of oil hence the meal will have more energy.

8. Groundnut meal

Best avoided for pigs because of the danger of it containing aflatoxins. Aflatoxins depress growth rate. The meal has a high protein content but it has a poor balance of amino acids.

Marginal feeds

These are feeds that are normally used by farmers when they are in desperate situations but do not supply the required nutrients to the pigs. Some of the marginal feeds are maseke, pumpkins, vegetables, fruits, sadza, sweet potatoes and kitchen leftovers. Kitchen leftovers can be dangerous because the salt level can be very high thereby causing salt poisoning. Vegetables can be fed as a supplement to a properly balanced diet in order to reduce problems of constipation. Maseke are too fibrous for pigs and their composition vary widely.

Ways of sourcing pig feeds

- 1) Meals: these do not have to be mixed with anything
- 2) Concentrates: they have to be mixed with grain preferably maize. The manufacturer usually states the mixing ratio.
- 3) Buying in different ingredients and compounding the diet: when compounding the diet you need an energy, protein and vitamin mineral source. The percentages of the different feed ingredients that are needed in the

final diet are determined through the process of ration formulation.

Formulating pig diets

Ration formulation is the process by which one determines the percentage composition of the diet. It is important because of a number of factors and these are:

- The animal's nutrient requirements cannot be met by nutrients found in one feedstuff. Ingredients differ in their suitability for providing nutrients.
- It facilitates the production of balanced diets at least cost
- It enables the nutritionist to incorporate marginal feeds in the pig diet
- It enables the incorporation of less palatable ingredients in the pig diet

Ration formulation can be done with the aid of computers or it can be done using a calculator. The trial and error method and the Pearson square method can be used to carry out ration formulation when one is using a calculator. Ration formulation should not be confused with ration mixing. Ration mixing is the compounding of a diet using the ingredient percentages determined using ration formulation.

Factors to consider when doing ration formulation

The following factors have to be considered when formulating pig diets:

- Nutrient composition of the feedstuffs: Fish meal has a better profile of amino acids and as such is

the ideal protein source in starter pig diets.

- Class of animal to be fed the diet: Fibrous materials are inappropriate for baby pig diets.
- Availability of the different feedstuffs: It is pointless to formulate diets based on feedstuffs that are not readily available.
- Cost of the feedstuffs: Very expensive feedstuffs make pig production less viable.
- The palatability of the feedstuffs: Unpalatable material restricts feed intake and hence animal performance.
- The practicality of mixing the diet: Whey can be a good source of nutrients for pigs but it is difficult to handle.
- Digestibility of the feedstuffs: Digestibility can be influenced by any of the following factors:
 1. heat damage: digestibility falls dramatically if the protein is heat damaged. Amino acids may be bound on heating. The classic case is the binding of lysine to sugar compounds, a situation that reduces the digestibility and utilisability of the lysine. If the lysine is unavailable, then all the other amino acids in the protein, even though utilizable, cannot be utilized because lysine is the first limiting amino acid in pig diets.
 2. Nature of protein: the protein may be bound in feed or in a form resistant to enzyme attack e.g. proteins in leather and feather meal.
 3. Rate of passage: digestive enzymes need time to work. Anything that increases the rate of

passage of digesta through the intestine has the net effect of reducing digestibility.

4. Protection: enzymes work most efficiently if they have a large surface area upon which to act. If the diet contains large masses of material which may surround the protein and prevent enzyme penetration digestibility will be reduced.
5. Anti-nutritional factors: these are poorly digested constituents of feed ingredients. Anti-nutritional factors may cause disturbed digestion, which not only results in poorer economic performance but also scouring.

How to use the square method to formulate diets

The steps in the use of the square method when only two feed ingredients (e.g. soyabean meal and maize meal) are involved are as follows:

1. draw a square at the left side of the page
2. insert the % crude protein desired in the final mixture e.g. 16% in the middle of the square
3. place maize with its % crude protein (8.5) on the upper left corner and soyabean meal with its % crude protein (44) on the lower left corner. For this method to work, one feed must be above the desired level of protein and the other below.
4. subtract the % crude protein in corn (8.5) from the % crude protein desired in the mix (16) and place the difference (7.5) on the corner of the square diagonally opposite from the corn. This amount is soyabean meal.
5. subtract the % crude protein desired in the mix (16) from the % crude protein in the soyabean

meal (44) and place the difference (26) on the corner of the square diagonally opposite from the soyabean meal. This amount is maize.

- the differences obtained on subtraction represent the proportions maize and soyabean meal that will provide a mix containing the desired % crude protein i.e. 16. The amounts are then converted to a percentage or other weight basis for mixing purposes.

Below is the diagrammatic presentation of the square method:

		On a % basis	
Maize meal 8.5		28	$28/35.5 * 100 = 78.9\%$

16

Soyabean meal 44		<u>7.5</u>	$7.5/35.5 * 100 = 21.1\%$
	Total	35.5	100

Square method when three or more feeds are involved

Normally it is desirable to use more than two feeds in formulating a feed mixture.

Example: a producer may decide to use a mixture of

maize, millet and soyabean meal in formulating a 14% crude protein (CP) mix for his pregnant sows. The maize and millet may need to be used in a proportion of 2:1. The average percentage protein in the maize and millet component must be calculated as follows:

$$\begin{array}{rcl}
 2 \times 8.5 & = & 17 \\
 1 \times 11.1 & = & \underline{11.1} \\
 \hline
 28.1 & \text{divide by } 3 & = 9.37
 \end{array}$$

Place ‘two maize plus one millet’ with its calculated percentage of CP (9.37) on the upper left corner of the square and the 44% soyabean meal on the lower left corner.

Application of the square method as outlined above using three or more ingredients is presented below.

maize	plus	millet
9.36	30	=
86.6%	30/34.63*100	

14

Soyabean	meal	44
	<u>4.63</u>	=
	4.63/34.63*100	

13.4%

Total

34.63

100

The final ration mixture will contain the following:

Maize $2/3 * 86.6 = 57.7$

Millet $1/3 * 86.6 = 28.9$

Soyabean meal = 13.4

Square method with a fixed percentage of one or more ration components

A producer might wish to formulate a 14% CP mixture for pregnant sows using maize, millet, soyabean meal and a vitamin-mineral supplement. The producer may want to include in the mixture exactly 20% millet and 3% vitamin-mineral supplement. The producer needs to know what combination of maize and soyabean meal that can be used to make up 77% of the mixture and give an overall mixture that contains exactly 14% CP.

Contribution of millet to protein content = $20 \times 11.1\% = 2.22$

The vitamin-mineral supplement is protein free.

The remainder of the 14% CP ($14 - 2.22 = 11.78$) must then come from the maize and soyabean meal mixture.

In order to determine what combination of the 77% of maize and soyabean meal that will provide 11.78% of needed protein we use an adaptation of the square method.

You need to first calculate the percentage protein that is needed in the maize and soyabean meal combination so as to provide 11.78% of protein per

77kg mixture:

$$11.78/77*100 = 15.3$$

This figure is then used in conjunction with the square method as follows:

$$\begin{array}{r} \text{Maize} \\ 28.7 \end{array} \quad \begin{array}{r} 8.5 \\ 28.7/35.5*77 = 62.3 \end{array}$$

$$\begin{array}{r} \text{Soyabean} \\ 44 \\ \underline{7} \end{array} \quad \begin{array}{r} 15.3 \\ \text{Total} \\ 35.5 \end{array} \quad \begin{array}{r} \text{meal} \\ \underline{6.80} \\ 6.8/35.5*77 = \underline{14.} \end{array} \quad \begin{array}{r} 77.0 \end{array}$$

The composition of the diet will be:

$$\begin{array}{r} \text{Maize} \\ \text{Millet} \\ \text{Soyabean meal} \\ \text{Vitamin-mineral premix} \end{array} \quad \begin{array}{r} = \\ = \\ = \\ = \end{array} \quad \begin{array}{r} 62.3\% \\ 20\% \\ 14.7\% \\ 3\% \end{array}$$

Feeding management

Proper feeding management helps to maximize lean growth and minimize fat deposition, improve overall growth rate, reduce pressure on housing and increase sow productivity.

Feeding systems

There are basically two feeding systems and these are ad libitum feeding and restricted feeding. Under the ad libitum feeding system pigs have access to

feed all the time. This system of feeding is mainly practiced for weaners and growing/finishing pigs. Under the restricted feeding system pigs do not have access to feed all the time. The pigs will normally be fed twice per day, in the morning and late in the afternoon. Ideally growing finishing pigs on restricted feeding system should feed for about 30 minutes at each feeding time. If the pigs finish all the feed within say 10 minutes one has to increase the amount fed to prevent reduced growth rates. Breeding animals are often on restricted feeding because unrestricted access to feed is a waste of money and can adversely affect reproductive performance.

Advantages and disadvantages of ad libitum feeding over restricted feeding

Advantages

- Fast growth rate
- More uniform growth rates
- Less labour intensive
- Can house more pigs per pen
- Shorter feeding periods

Disadvantages

- More feed wastage especially if the feed troughs are poorly designed
- Pigs consume more
- Inferior feed conversion ratios
- May lead to production of fat carcasses
- Does not help the stockperson to identify sick pigs
- It is difficult to practice wet feeding

Factors affecting feed intake

- 1) water availability: feed intake is directly proportional to water intake
- 2) water temperature: high or low water temperature reduce water intake and hence feed intake
- 3) environmental temperature: high environmental temperatures reduce feed intake
- 4) feed palatability: unpalatable diets reduce intake
- 5) feed accessibility: if the feed is not readily accessible intake will be reduced
- 6) energy content of the diet: animals eat less of high energy feeds
- 7) mode of feeding: wet feeding improves intake but is ideal for animals on restricted feeding system.
- 8) Age of animal: intake increases with age and size of the animal
- 9) Health of the animal: a sick animal has reduced appetite
- 10) State of the animal: a lactating animal has more appetite than a pregnant animal.

Creep feeding

The main aim of creep feeding is to try to reduce the stress at weaning. Weaning should be more of a process than an event. If the piglets have access to solid feed before weaning they will be less likely to suffer digestive upsets. Ideally the piglets should be given the creep diet on a little and often basis to keep them interested in the feed and also to keep the feed fresh. The feeder should be easily accessible to the

piglets and should be placed away from the piglet dunging area. The sow should not have access to the creep feed. Milk production from the sow increases up to the third week. If the farmer is weaning at five weeks he can start creep feeding anytime from seven days to three weeks. There is very little intake before three weeks because the piglets will be getting most of their nutrient requirements from the milk. Any soiled creep feed should be removed and offered to the sow. The crude protein content of the creep diet should be between 20.9-26%.

Grower feeding

Feeding of growing pigs should be aimed at achieving maximum lean tissue growth rate. A properly formulated diet can achieve this objective if it's fed in the right quantities. If feed is not a problem growing pigs should be on ad libitum feeding system. With inferior genotypes there is merit in restricting feed during the finisher period because there is danger of excessive fat deposition if they are not restricted. The crude protein content of the grower diet should be around 18%.

Boar feeding

Boar feeding management should be aimed at maintaining him in a fit but not fat condition. The boar is fed the pregnant sow diet. The boar should be fed 2-2.5kg per day depending on condition. A boar in poor condition is fed more (2.5kg). The crude protein content of the boar diet should be 13%.

Dry sow feeding

A dry sow-feeding program should be aimed at maintaining the dry sow in a fit but not fat condition. Newly weaned sows should be fed 3-4kg per day. As soon as the weaned sow comes in heat it should be fed 2kg per day. Overfeeding after service can result in poor litter size at farrowing. During pregnancy the sow should continue getting 2kg per day. High feeding levels during pregnancy can result in high embryonic deaths and farrowing difficulties. The crude protein content for the dry sow diet should be 13%.

Feeding the lactating sow

The most formidable challenge in feeding the breeding sow is in catering for her needs during lactation. Adequate nutrient intake during lactation is not only important for milk production, but is also important in reducing the extent to which the sow loses body condition. Feeding the sow properly during lactation is also important for the rebreeding performance of the sow after weaning.

During lactation nutrients are required for maintenance, production of milk and growth especially with gilts. The amount of nutrients required depend on milk production, which is a function of litter size. As a guide a lactating sow should be fed a basic allowance of 2kg plus an additional $\frac{1}{2}$ kg per every piglet it will be nursing. For example a sow nursing 10 piglets will have to be fed $2 + (\frac{1}{2} * 10) = 7$ kg. In order to enhance voluntary feed intake during lactation wet feeding and frequent feeding is recommended.

If a lactating sow is underfed it will mobilize its body reserves in order to produce milk and as a result it will lose condition. A severe reduction in nutrient intake cannot be fully compensated by mobilization of body reserves. During very low nutrient intake the lactating sow responds by reducing milk yield. Failures to cater adequately for a lactating sow's requirements will not only affect her milking and rearing performance but it can also affect her subsequent reproductive performance. Sows that are likely to have the most serious weight losses during lactation are first lactation gilts and those sows nursing big litters. Unless these valuable, yet vulnerable animals are well catered for nutritionally they will lose a considerable amount of body tissue and this can lead to the developing of body sores, lameness, poor competitive ability in a group situation and premature culling. Care should, therefore, be taken during fostering not to overburden gilts with big litters. Inadequate nutritional support to gilts has been implicated in the depression in number born in the second litter.

The nutrient requirements for lactation may not always be met either because the management system limits intake or because of the inability of the sow to consume the required quantities of feed. A range of animal, dietary and environmental factors can affect sow voluntary feed intake during lactation. The crude protein content of the lactation diet should be 17.5-19%.

Feed contamination

Mycotoxins (fungal poisons) can contaminate feed thereby resulting in poor animal performance or ill health. Moulds produce the mycotoxins, however, the presence of a mould does not mean that a mycotoxin is present and the apparent absence of moulds does not rule out the presence of toxins. Pigs are very sensitive to some mycotoxins. Many mycotoxins produce similar signs of toxicity in pigs' e.g. reduced feed intake, poor weight gain and vomiting. The use of feed supplements, like mycosorb, that have a binding effect on many of the mycotoxins will help to reduce the negative effects of mold-infested grain. As a precaution farmers are advised to add these supplements whenever they use rain damaged wheat or barley in pig diets.

The major types of mycotoxins are:

1. Aflatoxins: often found in groundnuts but it can also contaminate grain. They can cause diarrhea, reduced intake, suppressed immune function and liver damage.
2. Zearalenone (F2 toxin): may be produced in the field or in storage under improper conditions. It has estrogenic effects on pigs. It causes vulva reddening and/or swelling, vulva discharge and sometimes rectal or uterine prolapse. On withdrawal of contaminated feed clinical signs disappear within 3-4 weeks. It can cause anoestrus. F2 toxin ingestion by mature gilts induces pseudopregnancy. The gilts do not cycle and hence the breeding program will be disrupted.

3. Ochratoxin A: it causes decreased weight gain, decreased feed intake, increased thirst and urination. It is found mostly in wheat and barley. It arises after very damp harvests or in grain stored with high moisture content.
4. Ergot: often found in millet. It causes agalactia (cessation of milk let down). Ergot alkaloids can also cause nervous system disorders, tremors, convulsions, diarrhea, reduced feed intake, abortion and stillbirth.

Summary on feeding of different classes of pigs

Feed type	Class fed	Period fed	Level and mode of feeding	Remarks
Sow feed	boars	From 7 months until culling	2-2.5kg per head per day. Can be fed wet or dry	Adjust ration according to boar condition.
Sow feed	gilts	From approximately 6 months until farrowing	2kg per head per day. Can be wet or dry	Adjust ration during flushing.

			feeding	
Sow feed	Dry sows	Between weaning and service	3-4kg per head per day. Can be wet or dry feeding	Level of feeding helps the sow to quickly come in heat
Sow feed	Pregnant sows	Between service and farrowing	2kg per head per day. Wet or dry feeding	Overfeeding causes farrowing problems
Sow feed	Lactating sows	During lactation	2kg + ½ a kg per piglet being nursed. Wet feeding.	Frequent feeding is recommended to encourage intake.
Colostrum and ordinary milk	Suckling piglets	Birth to weaning	Ad libitum	Colostrum is a must for all piglets.
Creep feed	Suckling piglets and weaners	Week 1 to week 8	Ad libitum	Creep feeding during suckling reduces digestive problems at weaning
Grower	growers	8 weeks to	Ad lib or	If restricted

feed		60kg	restricted	the pigs should be fed twice per day. Pigs should feed for about 30 minutes at each feeding time.
Finisher feed	finishers	From 60kg to slaughter weight	Ad libitum or restricted	Same as above
Grower finisher feed	Growers and fatteners	From 8 weeks to slaughter	Ad libitum or restricted	Same as for the grower
water	All classes	Throughout life	Ad libitum	Water must be cool and clean.

SURVIVAL STRATEGIES DURING TIMES OF FEED PROBLEMS

There are a number of strategies that a pig producer can implement in order to cope with difficult times. The success of any strategy is dependent upon meticulous planning. Poor planning can result in good strategies yielding the wrong results. Poor monitoring of the chosen strategy can also lead to the wrong results. The strategies that can help the pig

producer survive during times of feed shortages are:

a) **Culling**

The decision on when to cull is very important. The pigs should be culled when they are still in good condition so that they will fetch better prices at the market. It's advisable to start culling when you still have some feed in stock. Culling reduces the numbers to be fed hence the available feed will last for a longer period. The proceeds from the culling exercise should be invested in sourcing more feed.

What to cull

Sows in their late parities

Those sows that are not exceptional performers

b) **Feeding system**

It is advisable to practice restricted feeding if feed is scarce. The level of restriction can be varied depending on the circumstances. It is wiser to feed half the recommended ration than to feed the full ration and then run short of the feed and starve the pigs later. The pigs should have access to water all the time. It's also advisable to give your pigs some vegetables if they are available so as to enable them to fill their stomachs (note that vegetables are not a substitute of a balanced diet they should be used as a supplement)

c) **Sourcing of feeds**

The producer should buy feed to best advantage. Farmers are advised to incorporate marginal feeds

e.g. maize or wheat bran when compounding the pig diets. If the money is available the farmer is advised to stockpile concentrates or pig meals.

d) **Hygiene**

Hygiene levels in the pig unit must be maintained at a very high level to minimize the outbreak of diseases. A comprehensive de-worming program will improve the efficiency of utilization of feed. Diseases reduce the growth rate and feed conversion efficiency of pigs. Diseases also result in high medication costs. The money that would have been used to augment feed supplies will thus be diverted to foot the veterinary costs.

e) **Marketing**

It's advisable to dispose the pigs whilst they are still in good condition. In some cases a strategy of cutting done on one's loses can be appropriate. The farmer should slaughter pigs at lighter weights. Heavier pigs have higher intakes hence the available feed will not last for a longer period. However, avoid slaughtering very small pigs unless the price is very good.

f) **Service management**

One can delay servicing some sows if the farrowings will occur before the feed situation improves i.e. before the harvest.

PIG DISEASES

Why are diseases of economic importance?

Diseases are of economic importance because they

result in

- Death of pigs hence the farmer will have less pigs to sell per sow per year
- Poor growth rate of pigs. This result in cash flow and accommodation problems
- small litter sizes. Small litters result in fewer number of marketable pigs/sow/year
- high medication costs
- poor feed conversion efficiency which result in high feed cost per pig sold
- High medication costs. High medication cost negatively affects the profits.
- High housing overhead charge per pig marketed because the pigs will take longer to reach market weight.
- Carcasses being condemned and as a result the farmer gets nothing for his pigs
- Affected areas of a carcass being trimmed off. The farmer will not be paid for the trimmed portions.
- Exports of pork and pork products being banned thus depriving the nation of much needed foreign currency

PREVENTION

For prevention of diseases, one needs to take into cognizant the following points: -

- a) Vaccinations: these help to arm the pig before a disease challenge.
- b) Keep many infectious agents out of the unit. This can be done through strict adherence to bio-security measures. The use of wheel bath and foot baths at entry points into the unit will help to keep infectious agents out of the

unit. Footbaths can also be placed at entry points in the different sections of the unit, for example, farrowing, mating, gestation and nursery.

- e) Boundary fences to stop casual visitors. Boundary fences also prevent other animals that might spread diseases from roaming around in the piggery.
- a) Disinfectants: disinfectants are the means used for making infected or suspected infected premises safe but an essential prerequisite is to thoroughly clean the premises first. Inactivation by organic matter reduces the efficacy of disinfectants and they also differ in their activity against different organisms e.g. bacteria and viruses. Buildings should be left empty after washing off disinfectant to permit drying for as long as is convenient before re-entry of stock.
- e) Quarantine: this requires the limitation of movement of animals. Under commercial conditions two to three weeks quarantine would be acceptable. In the quarantine period close attention should be paid to the emergence of signs of disease.
- f) Destruction of dead pigs: dead pigs should either be burnt or buried. Proper disposal of dead pigs helps to prevent the spread of diseases.
- g) Hygiene: high levels of hygiene help to prevent the outbreak and spread of diseases. Thorough cleaning of pens help to reduce the

bacterial load in the sties. Syringes and needles that are used for treating sick animals should be kept clean all the time. Ideally they should be sterilized after using them.

- h) **Healthy breeding stock:** it is advisable to buy healthy breeding stock preferably from one source. If the breeding stock is unhealthy it will be very difficult to control diseases within the piggery as they will easily transmit the disease causing pathogens to their offspring.
- i) **Stress:** it is of paramount importance that stress is minimized. Stress lowers the ability of the animals to fight off diseases. Overcrowding can be a stress factor hence it should be avoided.
- j) **Nutrition:** well-fed pigs stand a greater chance of fighting off disease causing pathogens than malnourished pigs. There are some nutritional diseases that can arise due to deficiencies in the diet.
- k) **Colostrum intake:** it is important for the piglets to get enough colostrum for the maintenance of good health. Colostrum is rich in antibodies that help the piglet to protect itself from the potentially hostile organisms it encounters soon after birth.
- l) **Water:** diseases of the urethral system can easily affect pigs that do not have access to clean water all the time
- m) **Proper pen design:** bad flooring can cause

leg problems and wet floors help in the proliferation of disease causing bacteria.

- n) Monitoring: frequent checks on the animals are important because they help to quickly detect disease problems and thereby triggering control mechanisms.
- o) Isolation of sick animals: sick animals should be confined in sick bays. The sick bays should be the last to be cleaned and the equipment used (brooms, shovels, wheel barrows etc) should be cleaned and stored in a clean place.

What is a healthy animal?

THIS IS AN ANIMAL, WHICH HAS ALL ITS BODY FUNCTIONS WORKING IN HARMONY. THE ANIMAL HAS A GOOD APPETITE, WALK PROPERLY AND HAS NO PROBLEMS WITH BREATHING.

HOW TO CHECK THE HEALTH OF A PIG

When to check for disease signs

The best time to check for diseases is when the pigs are fed i.e. in the morning and in the afternoon. The stock person should however keep a close eye for any signs of diseases all the time. The signs highlighted below are general signs of a sick pig. Most diseases have specific signs.

□ Behaviour

When an animal is sick there is change from normal behaviour. A sick animal will be passive and it will isolate itself from others. Its movement will not be

free and easy. It will be disinterested in what will be happening in its surroundings.

□ **Appetite**

- During feeding check to see whether the animal is feeding. A sick animal normally goes off feed.
- A pig will lose weight if it's not feeding for a long period.

□ **Respiration**

- Should be normal and regular. Heavy breathing is indicative of problems in the lungs.
- Adult pig breathes 10-20 times per minute, younger pigs more often .
- Breathing is quicker if the pig has high temperature or if its excited .

□ **Skin and mucous membranes**

- The colour of the skin and mucous membranes should be reddish if the animal is healthy.

□ **Hair coat**

- A sick animal will have dull hair coat. Hairs should be lying close to the skin.

□ **Body temperature**

One can take the rectal temperature of the pigs to determine if they have a fever. The normal body temperatures for the pigs are given below.

Adult pigs: 38.0-39.5°C (Growing and Lactating sows)

38.5-40.0°C (Pregnant sows)

Piglets: 39.0-40.0°C

DISEASES AND THEIR CONTROL

INTERNAL PARASITES

There are many species of internal parasites that can affect pigs. Eggs and larvae, the stages of worms that exist outside the pig, survive best under unhygienic conditions thus it is essential that the sties are always kept clean. The parasites can be brought into the herd through bought in animals hence it is advisable to quarantine and de-worm bought-in animals. Contaminated feed and water can be other avenues through which the parasites can be introduced into the herd.

ROUND WORMS. (Ascaris)

The round worms are a major problem in many pig units. The worms affect all classes of pigs. The eggs of the round worms are sticky and hence they can stick on the body of the animal, on gumboots worn by stockpersons, on equipment used in the piggery and on tyres of vehicles. Contamination of feed, pens, the pigs' skin, soil and bedding with dung containing eggs is the main mode of egg transmission. The worm eggs need warmth and moisture to survive and they will not survive in direct sunlight or dry conditions for a long time. The eggs can be resistant to disinfectants. It is advisable to use those disinfectants with sodium or calcium hypochloride to control the worms.

Symptoms

Signs of worm infestation in pigs are:

1. unthriftiness or rough hair coat
2. diarrhea
3. coughing

4. poor growth rate and poor feed conversion efficiency
5. pot bellied
6. adult worms in dung
7. milk sports on the liver. The liver is condemned at the slaughter plant if it is infected.

Prevention and or treatment

The control of round worms can be done through the following measures

1. Hygiene and sanitation. Thorough cleaning of pens and equipment is essential.
2. Strategic use of de-wormers like piperazine and levamisole. Sows should be dosed one week before entering the farrowing house and thoroughly washed on entry to remove any worm eggs that might be stuck on the skin. Boars should be dosed bi-annually. Growing stock should be dosed at 8 to 10 weeks and again 4 to 6 weeks later.
3. Sound management practices that limit the transmission of worms from the sows to the progeny. Cleaning and resting of pens between pig batches helps to prevent between batch transmissions of worm eggs.

Economic Losses

- Stomach functions poorly because of the damage thus causing a high feed conversion and a lower daily gain.
- Pigs' resistance to diseases will be reduced because of the poor functioning of the damaged lungs and liver.
- The damaged liver is condemned.

SMEDI.

SMEDI is abbreviation for:

S - Stillbirth

M - Mummification

ED - Embryonic Death

I - Infertility

The disease affects sows and gilts and is usually noticeable at farrowing. Boars can be responsible for the spread of the disease.

Symptoms.

Production of stillborn piglets, mummified foetuses, farrowing small litters and an unusual number of bred females returning to heat.

Causes.

Disease is caused by a group of parvoviruses.

Prevention

Vaccination of breeding animals with parvovirus vaccine will help to prevent the outbreak of the disease. The vaccine should be administered at least two weeks before breeding. For lactating sows the vaccine should be administered at least two weeks before weaning.

Treatment.

No treatment but sows that repeatedly show the disease should be culled.

MMA

MMA is abbreviation for:

M – Mastitis

M – Metritis

A – Agalactia

MMA occurs in sows or gilts within 72 hours after farrowing.

Symptoms

- Loss of appetite.
- There might be vaginal discharge due to uterine infection.
- Mammary glands are swollen, inflamed and hard with elevated temperature.
- The sow lies on its belly thereby preventing the piglets from suckling.
- The piglets become unthrifty, thin and begin to die on the second or third day.

Causes

- E. coli, Staphylococcus and Streptococcus bacteria cause the disease.
- Constipation, which is caused by low fibrous diets, has been linked to the disease.

Prevention

- Hygiene.

Predisposing Factors.

- Dirty and dump floors.
- Cold draughty farrowing pens.
- Bruises and cuts on sow's teats.
- Constipation.
- Retained uterus.
- Stress.

Treatment

Inject sow with streptomycin and hemicillin. The use of oxytocin will also help in inducing milk let down and the expulsion of retained placenta.

CYSTITIS.

Disease affects sows and gilts that have been serviced. The disease affects the bladder or kidney hence the production of urine with bloodstains.

Symptoms

- Presence of puss, tissue debris and later blood in the urine.
- Loss of condition and in some cases paralysis of the hindquarters.
- Death of pig may occur.

Prevention

- Ensure vulva is clean at service.
- Boars should be checked for bacteria as well as treated when necessary.
- Avoid water restrictions of anything below 15 litres per day as this is the cause for urinary tract infections leading to cystitis.

Treatment

Use of broad-spectrum antibiotics is effective.

ERYSIPELAS (Diamond Skin Disease)

Disease affects pigs of all ages though it is common in pigs that are four months and older.

Symptoms

- High temperature (41-42⁰C)
- Diamond skin lesions develop on the skin
- Abortion in pregnant sows
- Purple areas on the throat, belly flank and inside the thighs
- Arthritis
- Partial or complete paralysis caused by infection in the backbone
- Sudden death.

Prevention.

Vaccinate pigs with Erysipelas vaccine especially those that are not affected by the disease.

Treatment.

Erysipelas responds very well to penicillin.

SCOURS

Disease affects the newly born or newly weaned piglets.

Symptoms.

- Severe watery type of diarrhea.
- Rapid loss of condition.
- Mortality of up to 100% depending on the severity of the disease.

Predisposing Factors.

Unhygienic conditions, chilling, insufficient water, restrictions of space and sudden changes of the diet.

Prevention.

- Ensure hygienic environment by cleaning pens thoroughly daily.
- Supply plenty of clean water to piglets.
- Provide good bedding.
- Avoid overcrowding.
- Ensure good ventilation.
- Vaccinate sows and gilts with E.Coli vaccine two weeks before farrowing to ensure newly born piglets receive additional antibodies via colostrum.

Treatment._

Administer antibiotics orally. Tetracycline can be used to control scours.

ANAEMIA.

It is a disease that attacks newly born piglets up to the fourth week.

Symptoms.

- Poor growth rate.
- Pig appears pale in colour.

- . Ears, belly, and mucosal appear yellowish.
- . There can be oedema of the head and forequarters.
- . Diarrhea is common though faeces are normal in colour.
- . Affected pigs appear dull.
- . Severely affected piglets may die suddenly.

Causes.

Shortage of blood caused by lack of iron.

Prevention.

- . Iron injection should be given to piglets at the age of three days.
- . Use of wetted red soil can help although it is not very effective since iron levels vary with source. Soil is placed in the pen where piglets can easily pick it up as they move around the pens.

Treatment

- . Inject piglets with iron dextran complex. This injection is good for both prevention and treatment.

ARTHRITIS/JOINT ILLS

This is a disease that affects piglets that are one to three weeks old.

Symptoms.

- . Fever.
- . Rough hair coat.
- . Depression.
- . Pig might lose weight.
- . Swellings on the joints and lameness.

Prevention.

- . Good managerial practices such as the provision of bedding in the farrowing house.
- . Cut navel chord to 3 to 4cm from the belly and dip the remaining position of the chord in iodine or

- betadine or apply methylated spirit.
- . Avoid rough flooring that can cause abrasions, which then become entry points for bacteria.

Treatment.

Use of antibiotics such as penicillin and Terramycin.

MANGE.

It's a skin disease that affects all classes of pigs.

Symptoms.

- . Pigs scratching.
- . Lesions appear at least 3 – 4 weeks after initial infestation.
- . Pigs may lose condition.
- . Appearance of brownish scabs on the damaged skin.
- . Skin may be wrinkled, covered with crusty lesions and thickened.
- . Skin inflamed and swollen.
- . Appearance of small red pimples all over the body followed by severe itching and rubbing which tends to remove the hair.

Causes.

- . Disease caused by mange mite Sarcoptes scabiei var suis which burrows in the skin. The mites that cause the disease spend their entire lives under the skin of the pig. The life cycle, from egg to adult, of the mite is completed in 10 to 15 days. The mite only reproduces on the host.

Prevention.

- . Avoid contact of infected and non-infected animals. Bought-in animals should be quarantined and sprayed before allowing contact with other pigs.
- . Good management practices that include treatment of pregnant sows before they move on to the

farrowing house to reduce infection of piglets. If parent stock is clean there is little risk of the piglets getting infected.

- Housing pigs in clean accommodation especially after they are treated.

Treatment.

- Washing pigs and then spray them with acaricides such as Triatix using a knapsack sprayer. This should be repeated on three treatment occasions seven to ten days apart. Some useful hints when spraying the pigs are:
 1. before spraying, the entire pig should be washed to open up the barrows which can be plugged with dirt thus preventing good dip soaking
 2. the whole pig must be soaked with the dip especially areas with soft skin. The sprayed pigs should be kept in the shade to allow for slow drying of the dip.
- Ensure the ears are well sprayed with the acaricides as the mange mites might hide in the ears.
- Ivormec injection can be used in place of triatix for the control of mange mites. The advantage of ivormec injection is that it is effective against internal parasites like round worms however it is expensive.

ABSCESSSES

An abscess is a swelling or pus pocket that can be found throughout the body of a pig. Abscesses can affect all classes of stock.

Symptoms.

- Swollen lumps on skin of the animal that feels

different from normal tissue. The area may vary from soft and spongy to hard and is usually hot to the touch. An abscess may also be slightly moveable with gentle finger pressure. Pus can be noticed when a syringe is used to withdraw contents of the lumps.

- Lameness can occur if the abscess is in the hip or shoulder area
- Internal abscesses may be observed when the pigs are slaughtered.

Causes.

- Disease caused by bacteria after it gains entry through the bruises on the skin or through the use of dirty needles and syringes.

Prevention.

- Remove any sharp or rough objects from pigpens.
- Avoid too rough floors that can cause abrasions on the skin.
- Injection equipment must be kept clean.
- Prevent the outbreak of mange mites.

Treatment.

- Cut and drain the abscess when its ripe and then apply wound solutions such as betadine or iodine to heal the wound. Use of antibiotics can also help.

NOTIFIABLE DISEASES

AFRICAN SWINE FEVER

It's a disease that affects pigs of any age. It is a highly contagious viral disease. The acute form will kill almost all the pigs that become affected. It does not affect other species of animals or humans.

Symptoms.

- Acute fever, temperatures can go up to 46°C.

- . Small purplish blotches on the skin. Discolourations appear on the ears, snout, tail, legs abdomen and flanks of white-skinned pigs.
- . Almost all infected pigs develop diarrhea.
- . Coughing
- . Laboured breathing,
- . Inco-ordination.
- . Loss of appetite.
- . Animals huddle together.
- . Death can result and can be up to 100%.

Causes.

African swine fever is a viral disease. The virus is highly resistant to environmental conditions, such as high temperatures. African swine fever can be spread by a number of ways including:

1. contact between infected and susceptible pigs
2. contaminated garbage, feed or water
3. contaminated insects- lice, biting fly; also ticks particularly soft ticks. A tick called *Ornithodoros moubata* has been known to transmit the disease.
4. contaminated premises, clothing, footwear, equipment
5. contaminated vehicles
6. improper disposal of infected carcasses

In Zimbabwe the wild pig is known to be a carrier of the virus that causes African swine fever.

Prevention.

- . Erect a perimeter fence around the piggery unit to prevent the wild pigs from coming in contact with domestic pigs.
- . Isolate infected animals to avoid further transmission of disease.

- .Ensure controlled entry to the unit by people.

Treatment.

There is no effective treatment for African swine fever.

FOOT AND MOUTH DISEASE (FMD).

It is a highly contagious viral disease that affects pigs of all ages.

Symptoms.

- .Lameness involving more than one leg.
- .Lesions on the inside of the mouth and on the feet.
- . Blisters will also form in the nasal passages and other thin-skinned areas. They usually rupture within 24 hours and leave a raw, eroded area.
- . Severe salivation. The animal may open and close its mouth with a smacking noise.

Causes.

Foot and mouth disease is caused by a rhinovirus. The virus may be found in live animals in the fluid and tissue of the body, in the blood, saliva, milk, feces and urine. In dead animals, the virus can be found in the meat, bone marrow and lymph nodes. Foot and mouth disease is spread in a number of ways, including contact with infected animals or semen, through flocks of birds, rodents and flies.

Prevention.

- .Vaccinations using foot and mouth disease vaccine.
- . Controlled entry of people and other cloven-hoofed animals into the pig unit.
- .Use of footbath on entry points to the unit.
- . Slaughtering of infected and exposed animals and disposal of the carcasses by burial or incineration.
- .Quarantine infected animals.

Treatment.

There is no treatment for foot and mouth disease.

RABIES

This disease affects pigs of all ages.

Symptoms.

- . Pig shows intense excitement.
- . Convulsions
- . Nervousness
- . Rubbing the nose
- . Salivations.
- . Uncoordinated movements.
- . Death occurs within 48 – 60 hours.
- . Abortion and birth of stillborn and mummified pigs.

Causes.

A herpes virus causes rabies. Mostly jackals and dogs transmit the virus.

Prevention.

- . When rabies is suspected the affected farm should be quarantined
- . The infected animals should be isolated especially from young pigs and pregnant females
- . Suspected pigs and sick animals should not be handled.
- . Security fence around the unit to prevent jackals and dogs getting in contact with the pigs.
- . Vaccination against the disease.

SUMMARY OF THE COMMON TYPES OF DIARRHOEA

Types	Period of attack	Cause	Symptoms	Treatment	Prevention
Birth diarrhoea	First week after birth	Different types of <i>E. Coli</i> bacteria	Watery yellowish faeces	antibiotics- orally e.g.	-good hygiene all
			bad smell, weak piglets,	neomycin, neftin, furozine, terramycin	all systems
			soiled back, Mortality 0-100%	soluble powder,	vacination
				-injection-	soybean products
				terramycin e 100 or long	gestation
				acting, coopermycin	Environment

				Give plenty of water	environment
Clostridium	2- 7 days after farrowing	<i>Clostridium</i> bacterium	Watery-redish diarrhoea sometimes with air bubbles	Antibiotics -orally or injectable	good hygiene
			Dull, weak piglets	Adequate water	avoid
			Pale colour, 0-80% mortality	supply	prevent E. coli
White diarrhoea(fat diarrhoea)	Piglets 2-4 weeks old	<i>E.coli</i> bacteria	Pasty faeces, which can become more liquid	Antibiotics	Good feed the
		Changes in sow's milk		Creep feed should be fresh	so w
				Make sure piglets are given and Iron	Good hygiene
				injection	Pre ana and

					stre
					Giv fee
Gut Oedema(Post weaning Diarrhoea)	Often 1 week after	<i>E coli</i> bacteria	Rough hair coat,	Reduce feed amount	Rec fee afte
	weaning.	Stress factors(cold,	Swollen eyelids, sudden	Clean water,	wea No
	6-12 weeks of age	fighting, low	death, swaying gait, high	Antibiotics	fee cha
		temperatu res)	Squeling voice		Pre stre
					Ad in t
Salmonellosis	Pigs between 2-6	<i>Salmonell a</i> bacteria	Sick pigs, high fever,	Antibiotics	Hyg all out
	months		watery diarrhoea	Reduced feeding	No fee
			sometimes with blood or	Good water supply	Go hou
			mucus, blue coloured ears		Ke rod awa
			and skin, high		

PIG PRODUCTION RECORDS

What are records?

Records are information pertaining to the production process that is in a written form.

Importance of records

- ✓ They give direction on what action to take on a pig production enterprise. Records help stock people to determine when to wean, rest boars, cull, de-worm and when to move pigs from one pen to the other.
- ✓ They help to determine the efficiency of utilization of feed.
- ✓ They help in the preparation of financial accounts and budgets.
- ✓ They help to ascertain the effectiveness of drugs being used. In some cases disease causing bacteria will develop resistance to certain drugs
- ✓ They help visiting extension and veterinary personnel to unearth problems within a herd. A high number of empty days may be a symptom of poor feeding management during lactation, disease problems, poor heat detection or a combination of these factors.
- ✓ They help in the monitoring of incidences, timing and causes of pig mortality. The information on causes, incidences and timing of death help in the crafting of strategies to arrest and reverse the

situation.

- ✓ They help the farmer to decide on when to make purchases. There are costs associated to overstocking and under stocking hence there is need to minimize them.
- ✓ They provide information on which, to base selection of breeding stock. Quality breeding stock is able to efficiently convert expensive feed into gain.
- ✓ They help to minimize the problem of inbreeding. Inbreeding has cost implications in that it results in litter size and growth rate being adversely affected.

FACTORS AFFECTING PROFITABILITY

1. Number of pigs reared per sow per year-

This is depended on the numbers born per litter, pre and post weaning mortality and the number of litters per sow per year. Most production costs of the breeding herd are constant thus the costs remain the same regardless as to whether production is optimized.

2. Feed conversion Efficiency

This is the feed required by the animal to gain a kg body weight. It is a very important parameter to consider as feed accounts for about 80% of the total production costs. FCR is affected by the following factors

- Breed
- Health of the animal
- Quality and quantity of feed

- Feed wastage and theft
 - Poorly designed housing systems
3. **Prices obtained on the market**
 4. **How one sources feeds**
 5. **The quality of pigs being kept**
 6. **The level of management on the unit**
 7. **The disease status of the herd**

TYPES OF RECORDS

FEED RECORDS

Feed accounts for 80-85% of total production costs in a pig production enterprise hence it should be closely monitored. Monitoring of feed use is only possible if there is a sound recording system. From the feed records one should be able to plan production. Records on a monthly feed usage help the farmer to plan for the future. Monitoring of monthly feed usage will enable the farmer to make timely decisions on when to order feed stocks and when to cull animals. It is unwise to cull animals that are in poor condition because of feed shortages.

The records to be kept include:

- > Daily opening stock of feed ingredients
- > Daily subtractions of feed ingredients
- > Daily closing stock of feed ingredients
- > Daily opening stock of complete feed
- > Daily closing stock of the complete feed

At the end of the month, the producer or the unit manager should compile

- > Opening stock of both the feed ingredients and

the complete feed

- › Monthly usage of both the feed ingredients and the complete feed
- › Closing stock of feed ingredients and complete feed

The monthly usage and the closing stock figures when used with the appropriate production records will help the farmer to determine when and how much to order. At the end of the year, the farmer or unit manager should be able to calculate the amount of feed used per pig sold.

When monitoring feed usage it's unwise to rely on figures based on subtractions and additions in the stock book. There is need to do physical counts periodically. Periodic checks help to assess the adequacy of the storage conditions and can also reveal problems of theft that are being concealed through book entries. Regular checks will also reveal if there is any spoilage in the feed store.

The efficiency with which the feed is converted into gain should be given paramount importance in monitoring the feed. The use of high amounts of feed per pig sold is indicative of an underlying problem. High amounts of feed per pig sold might result from:

- › A lot of wastage due to poorly designed feeders.
- › Heavy worm burden in the pig population
- › Poor quality feeds
- › Thefts
- › Poor quality genetic stock. Poor quality genetic stock will deposit more fat and less meat hence

they will require more feed.

FINANCIAL RECORDS

Reasons for keeping financial records are:

- To ensure that all cash due is claimed
- To record the amount and purpose of payments made and cheques received
- To phase payments and receipts so as to avoid extreme cash imbalance
- To assist in farm decision making and as a measure of managerial efficiency
- To enable the accountant to prepare the accounts

Reliable financial and physical records help a farmer to make sound farm management decisions.

The basic documents required for financial record keeping are:

- Bank statements.
- Paying in-slips (receipts) and cheque book stubs (expenses).
- Payments advice, credits and sales notes (receipts) and statements, invoices and delivery notes (expenses).
- The receipts and expenses analysis sheets.

Maximum use should be made of the bank since it is the hub of the whole system. All cash receipts should be banked and as many payments as is possible made by cheque with adequate detail recorded on the cheque stubs and paying-in- slips.

Financial appraisal of the feeding system should be conducted because feed is the predominant cost item

in pig production and it has a major influence on all major aspects of pig performance.

CASHFLOW CALCULATIONS

Forward budgets are an essential basis for forward planning and organization of any farm business. It's unwise to base these forward budgets on the most optimistic possibilities.

Setting Production Targets

Production targets should be set and a monitoring mechanism put in place to check whether the targets are being achieved. If targets are not being met, before setting new targets, investigations should be carried out to ascertain the reasons behind the deviations. These have to be corrected. Targets are adjusted at intervals. Target setting is thus a continuous process as shown in figure 1 below and depends on comprehensive and accurate production records.

**TARGET
OF
SETTING**

**REVISION
TARGETS**

MONITORING

**INVESTIGATION OF
SHORTFALLS
ION**

ACT

IDENTIFICATION OF PIGS

Accurate identification of individual animals is essential for a comprehensive recording system. Identification marks should be:

- ❖ Easy to apply

❖ Legible at a distance

❖ Tamperproof

The common method used in Zimbabwe is notching.

1

PRODUCTION RECORDS

The following records are recommended:

1. Sow ID cards/Record

This card is hung somewhere in the sow's pen. The information on the card is sow ID, weaning date, pen number, parity and her sire. Parent information is important to avoid mating related animals.

4th Parity

W:- 9/02/06

Wean date

L/LR 2

Sow breed & E/No

PIB V 18

Boar

S 15/02/06

Service date

Sow life record card

Litter	Weaning to Service	Service date	Actual Farrowing date	Farrowing Interval (days)	Piglets born alive	Still born piglets	No rears
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				M															
--	--	--	--	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

DEATH CERTIFICATE

Every pig that die in the unit is recorded on this form. For security checks, the stockman, unit manager, security guard should sign for confirmation.

Date	E/ No	Sex	Age	Course of death	Pen no.	Signature	

DAILY TREATMENT RECORD CARD

All treatments must be recorded on the card as shown below

Date	Pen	E/ No	Class pig	of Disease type	Treatment type & quantity

BOAR PERFORMANCE RECORD

Information about a sow’s performance can be used to compile a record on individual boar performance.

Sow No	Service date	Return to service	No born	No weaned	Ave. weaning weight	Remarks

MONTHLY HERD RECORD

Monthly herd records give a census of the different stock in the unit and movements that would have occurred during the month. The report also has a section on feed usage.

A. Breeding Stock	Opening stock	Additions	Subtractions	Closing stock
Boars				
Sows				
Served gilts				
Open gilts				
Total breeding females				
Piglets				
Weaners				
Growers/Fatteners				
Total				

1

B. DISPOSAL

	Death	Butchery sales	Other sales	Live
Piglets				
Weaners				
Porkers				
Baconers				
GPPs'				
Open gilts				

Pregnant gilts				
Sows				
Boars				
Total				

C. HERD PERFORMANCE

Gilts selected..... Gilts served.....

Sows served.....

Farrowings: Litters....Piglets Born Alive...Average Litter Size.....Weaning Litters.....Weaners..... Average Litter Size.....

D. FEED

	Brought Forward	Delivered
Gestation		
Lactation		
Creep		
Grower		
Finisher		
Signature.....		Date.....

HERD PERFORMANCE REPORT

DATA ←	TARGET	MONTH			
		January	February	March	April

FARROWING SECTION					
Number of sows					
Number of boars					
No of gilts					
Total sows farrowed					
Total piglets born/litter					
Number of live piglets per litter					
Number of mummified per litter					
Number of still born per litter					
Live birth mass per piglet					
Number weaned per litter					
Average birth mass per piglet					
Average weight at weaning (kg)					
Pre weaning mortality (%)					
No sold per sow per month					

Growth rate birth to weaning (kg)					
DRY SOW SECTION					
Sows culled per month (%)					
Replacement gilts/ month					
No served					
Return to service (%)					
Farrowing rate(%)					
Farrowing index					
Weaning- conception intervals					
No sold per sow per month					
Conception rate					
FATTENING SECTION					
Post weaning mortality (%)					
Ave live mass @ 8 weeks (kg)					
Mortality after					

8 weeks (%)					
Ave daily gain, 8 weeks to slaughter					
Ave age at slaughter					
Slaughter weight					
Total feed consumed					
Total mass sold					

1

MARKETING

In the past producers were not keen to be involved in marketing aspects. Producers felt the processors best dealt with the marketing aspects. This line of thinking is fast changing because producers are now aware that quality starts at farm level. Processors only add value to quality output. A quality product is easy to sell because it markets itself. The quality of breeding stock and feed given to the pigs has a bigger influence on the quality of pig produced. Producers should always think quality when they produce their pigs.

Producers can help to stimulate some of the functions of an efficient marketing system. If producers are aware of the consumer requirements they can fine-tune their management systems to produce what the consumer wants. The links in the chain between

producer and consumer must not be considered as independent but as interdependent entities.

If the producer is quality conscious he will pay attention to his pigs at the farm, during transport to the abattoir and at the slaughterhouse. Pigs must be transported from the farm at minimum cost and handled carefully in lairage with no adverse effects on carcass quality. Rough handling of pigs during transport negatively affect carcass quality.

Producer to consumer marketing chain

The producer to consumer chain can be direct as is the case of the producer who is licensed and has facilities to slaughter his own pigs. The chain can involve many intermediate stages. Each component of the chain has an important influence on the quality, range and acceptability of products reaching the consumer. The consumer requirements should be relayed efficiently up through the chain in order that each component of that chain can organize its operation to ensure that demands are met for the price the consumer is willing to pay. The communication from consumer through the interdependent links in the chain to the producer must be rapid and efficient. The more all components of the production, processing and marketing chain can cater for consumer requirements, the greater will be the demand for pig meat.

Market for pig meat

Pig meat can be marketed as fresh or frozen pork, as cured sides or cuts and it can be included in

processed products. Fresh pork reaches the consumer quickly after the animal has been slaughtered. If entire males are to be used for the production of fresh pork they must be slaughtered before they reach sexual maturity in order to avoid the boar taint in the meat.

Factors affecting demand for pig meat

1. **Price:** a reduction in the price of pig meat relative to other meats and competitive products will stimulate an increase in the demand of pig meat.
Competitive meats and meat substitutes: if the price of competitive meats and meat substitutes is low the demand of pig meat will be affected negatively.
2. **Income:** as incomes increase there is a proportionate increase in the demand of both fresh and processed pig meat.
3. **Consumer taste:** pig meat can be shunned by certain communities because of their religious beliefs. If the majority of the population is of the religious inclination that despises pig meat the demand will be low.
4. **Sales promotion:** promotions help to entice the consumers to buy certain products. In a situation where demand for a product is outstripping supply little or no effort in terms of sales promotion is necessary. Where demand is no longer rising but static meat promotion activities aimed at both the current and potential customers are necessary. Vital to the success of promotion of pig meat products are consistency of product and a constant availability of supply at all outlets

where consumers have been stimulated to seek the product.

5. Processing, product range and packaging: choice of a product can be influenced by the way the product is packaged. The range of products available can meet the tastes of a wide range of consumers thus affecting the demand.
6. Quality: it has already been stated that quality products are easy to market. All the aspects of quality are essential if pig meat is to be attractive to the consumer.

Controlling carcass and meat quality

There a number of ways producers can undertake to manipulate carcass quality at the farm and these are:

1. Genetics

Back fat depth is greatly influenced by breed and genetic merit. Genetically fat pigs will tend to be always fat within the feasible range of nutritional and environmental variation. It is, therefore, important for the producer to have high quality genetic stock so that manipulation of carcass quality by environmental factors, like nutrition and management is achievable.

Strains of pigs with porcine stress syndrome (PSS) have desirable carcass characteristics in terms of high lean to fat ratio, good eye muscle area, high killing out percentage and high proportion of high priced cuts. These strains of animals, apart from suffering from the problem of poorer reproductive performance, tend to produce meat that is pale, soft and exudative (PSE) when subjected to stress before slaughter. While pigs with PSS are particularly prone

to stress and therefore problems of PSE in their meat, pre-slaughter stress can lead to PSE problems in pigs that do not have PSS.

2. Nutrition

While the long-term strategy for fatness reduction must be genetic, the tactics with animals of any given genetic composition must depend upon the knowledge that fatness is greatly influenced by both quality and quantity of feed. While it can be desirable to restrict feed offered to inferior genotypes after a certain weight so as to minimize fat deposition, this strategy may not be necessary with superior genotypes.

2.1. Protein

Diets that do not adequately provide for the requirements of protein fail to allow maximum lean tissue growth.

2.2. Energy

Under conditions of dietary protein adequacy protein deposition, and hence muscle growth, is a function of energy intake. When maximum protein deposition is achieved, further increases in energy intake will result in a steep rise in body fat content.

3. Management strategies

a) Cessation of castration

Castration was mainly done because of fear of the boar taint in the meat. With modern genotypes, which can be grown quickly, there is no longer the risk of boar taint in the meat since most animals are

being slaughtered before they attain puberty.

b) Feeding management

Fatter genotypes require more control of feed intake during growth than leaner genotypes in order to produce carcasses of similar lean to fat ratio.

c) Slaughter at lighter weights

The rate of fat growth increases, as the pig gets older. Deposition of fatty tissue relative to lean accelerates as the pig matures.

d) Avoiding stress

It has already been stated that a carcass can be downgraded for being pale and for having bruises. It has also been noted that although the problem of PSE is common to strains of pigs with PSS, pre-slaughter stress can also lead to PSE meat in strains, which do not have PSS. It is, therefore, important to avoid stressing the pigs before and during transportation to the market. The pigs should ideally be transported to the market during the morning when it's cool. The stockperson should ensure that fighting between animals destined for slaughter is minimized so as to avoid bruised carcasses.

Transport, lairage and slaughter

It has been stated that rough handling of pigs during transport to the abattoir can result in meat quality problems. Producers should maintain a keen interest in their pigs as they are being marshaled to the loading bay, as they are being loaded, during transit and off-loading at the slaughterhouse, in the period

of lairage, at the slaughterhouse and right up to the completion of the slaughter process.

Factors associated with death in transit

- i. **Fighting:** pigs that are taken to the market come from different pens and as a result they fight. If measures are not put in place to restrain them, the fighting can be severe resulting in some deaths.
- ii. **Temperature:** more pigs die if they are transported when it's hot than when it's cold, for this reason it's advisable to transport the pigs during the cooler times of the day.
- iii. **Feeding:** studies have revealed that pigs that are fed on the day of transport tend to suffer higher losses.
- iiii. **Load density:** adverse effects of overstocking can be accentuated by both the distance traveled and high temperature.
- v. **Distance traveled:** death in transit is positively correlated with distance traveled. To minimize the adverse effects of long transit distance it is important to be particularly careful during the loading process, to avoid overstocking and to ensure that the long distances are done when the temperature is ideal.

Shrinkage in live weight and carcass weight

The carcass weight of a pig is usually between 70 and 80% of its live weight. Usually the dressing out percentage of porkers is assumed to be 70 that of baconers 73 and for manufacturing pigs 76. During transit to the abattoir, pigs can lose between 2 and

10% of their original weight. Much of this weight loss is due to defecation and urination. The gut content in pigs is usually around 5% of the live weight, being greater with high fiber diets due to both elevated quantities of digesta in the caecum and colon and the additional water that the presence of fiber attracts to the gut lumen.

The amount by which the deadweight is reduced due to transport is known as shrinkage. The greater the distance traveled the greater the shrinkage.

Classification of carcasses

The classification of carcasses is mainly based on cold dressed mass (CDM). In Zimbabwe the carcass can be classified as under mass, porker, baconer or manufacturing. Any carcass with a CDM of less than 35kg is classified as under mass. For a carcass to fall into the porker category it must have a CDM of between 35 to 64.9kg. A baconer is any carcass with a CDM of between 65 to 85kg. Carcasses that are heavier than 85kg are classified as manufacturing.

Processors usually offer premiums for the class of pig that they require.

The producer must examine the price offered per kilogram in relation to the cost of production per kilogram of carcass in order to decide on the optimum weight at slaughter. The feed consumed by the breeding herd should be included in the calculation of the production costs. In order to justify slaughtering at lighter weights the price obtained per

kilogram of carcass should be considerably higher than that offered for heavier carcasses. When marketing pigs within a class (porkers or baconers) it is important to market them when they are at the upper end of the weight range.