

WEEK FOUR

FEEDING MANAGEMENT OF PIGS

Pigs (swine) are essentially kept for meat (pork) production. Pigs are born alive. Pigs are usually fed managed from birth until they are disposed of. Feed constitutes the largest single expense of any swine operation. For convenience feeding management of pigs may be divided into 4:

1. Feeding the nursing pig.
2. Feeding the weaned pig.
3. Feeding the market pig.
4. Feeding the breeding herd.

Feeding the Nursing (Suckling) Pig

Milk Feeding

The first successful step in feeding pigs is to ensure that they have access to their mothers' milk within 24 hours of birth. This is to ensure that each newborn gets an adequate supply of **colostrums**, the first milk produced by the sow after giving birth (parturition). Colostrum helps to increase disease resistance by providing immunization with proteins known as **gamma globulins**. Colostrum also provides glucose for the pigs which have low reserves of glycogen at birth. Colostrums also provides nutrients and other essential substances in highly concentrated forms. If pigs fail to get colostrums after birth, they may not survive. Since piglets rapidly lose their ability, with time, to absorb gamma globulins and the fact that the gamma globulin content of sow's milk declines rapidly after birth, it is very important that piglets (young pigs) suckle their mother during the first 24 hours of life. Weak piglets should be moved closer to the sow's udder in order to suckle their mother.

Piglets should continue to suckle their mother until they are weaned at 3 weeks, or at most, 6 weeks of age. The mother may not produce sufficient milk to take care of the excess pigs from

large litters or the mother may die after farrowing, leaving behind orphan pigs. In such situations, a **milk replacer** may be fed at the rate 10ml. Milk replacer per piglet, 4 to 6 times daily until they are weaned. Milk replacers can be obtained commercially. A milk replacer may also be made by blending the following:

1000ml or cc (one litre) of cow's milk plus one raw egg, 2 tablespoons of sugar and some commercial iron.

Sow's milk is generally deficient in iron. Consequently, to prevent anemia and to ensure good growth, supplementary iron is necessary. It has been estimated that for optimal growth, piglets require 7mg of iron per day. Therefore for pigs weaned at 3 weeks of age, a single injection (preferably in the neck) of 100-150 mg of iron, as **iron dextran**, is sufficient. However, if pigs are weaned after 3 weeks of age. For oral treatment, the first one should be given 1 to 3 days after birth and then weekly. Sprinkling a little soil in the pen, preferably sterilized by heat to avoid infection, may be an effective and cheap alternative to injection or oral administration of iron.

Creep Feeding

Maximum milk production of the sow is attained during the third and fourth week and declines steadily thereafter. Milk therefore, does not provide all the needed nutrients of the piglets before weaning. Therefore, supplementary feed must be supplied the suckling piglets. This feed is known as **creep feeding**. Piglets should be started on creep feed at about seven days of age. At first, the creep feed should be placed on a dry section of the floor at the rate of 20-25 g/litter/day and should not be given within a few hours of the sow being fed since most of the piglets will be sleeping or sucking and may not notice the creep feed. This practice should be continued for 3 or 4 days or until the piglets are obviously consuming the feed. After this period, the feed should be placed on a shallow feeder, large enough to allow as many pigs to feed together. For the first few days, creep feed should be fed often and a little at a time. This would ensure that the feed is always fresh. This practice also helps to encourage consumption since piglets tend to be curious when any new material is introduced into the pen. Any stale feed should be discarded daily. Some pig diets are shown in Table 1

Table 1. Percentage composition of pig creep and starter diets.

Ingredients	Creep diets (1-10kg)			Starter diets (for 10-20kg pigs)				
	1	2	3	4	5	6	7	8
Maize (corn)	61.70	57.50	56.60	61.70	58.85	60.55	-	67.30
Guinea corn	-	-	-	-	-	-	61.95	-
Groundnut meal	29.00	39.00	-	20.50	27.50	-	-	-
Soybean meal	-	-	39.50	-	-	28.00	27.60	29.25
Wheat bran	-	-	-	10.00	10.00	8.00	6.00	-
Fish meal	7.00	-	-	5.00	-	-	-	-
Fat or oil	-	-	0.70	-	-	-	1.00	-
Bone meal ¹	1.50	2.00	2.00	1.50	2.00	2.00	2.00	2.00
Periwinkle shell ²	0.25	0.65	0.65	0.60	0.75	0.75	0.75	0.75
Common salt	0.35	0.35	0.35	0.50	0.50	0.50	0.50	0.50
Methionine	-	0.10	-	-	0.05	-	-	-
Lysine	-	0.20	-	-	0.15	-	-	-
Premix ³	0.2	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Calculated composition								
Crude protein (%)	24.20	24.10	24.10	20.30	20.20	20.10	20.20	20.10
ME, kcal/kg diet	3510	3500	3507	3360	3360	3368	3350	3440
Lysine (%)	1.23	1.20	1.57	1.03	1.00	1.25	1.22	1.24
Meth.+cyst. (%)	0.66	0.65	0.71	0.60	0.56	0.62	0.61	0.60
Calcium (%)	0.90	0.91	0.94	0.92	0.93	0.95	0.96	0.94
Total phosphorus (%)	0.74	0.71	0.72	0.73	0.74	0.72	0.74	0.70

¹ Dicalcium phosphate can be used in the place of bone meal

² A good quality limestone or oyster shell can be used in place of the periwinkle shell

³ Premix supplied the following per kg diet: vitamin A, 20,000 i.u.; vitamin D₃, 2000 i.u.; vitamin E, 25 i.u.; vitamin K, 3.0mg; thiamine, 1.3mg; riboflavin, 5.0mg; niacin, 30mg calcium pantothenate, 17.5mg; biotin, 0.06mg; vitamin B₆, 2.5mg; choline chloride, 125mg; folic acid, 0.5mg; vitamin B₁₂, 0.02mg; vitamin C, 25mg; manganese, 25mg; zinc 146 mg; copper, 25mg; iron, 125mg; iodine, 0.8mg; cobalt, 0.9mg; selenium, 0.1mg.

The introduction of solid feed at the suckling stage helps to get used to solid feed and promotes the development of the necessary digestive enzymes. For piglets weaned after 4 weeks, creep feeding results in 10-15% heavier weight at weaning. With creep feeding, piglets tend to suckle less, leaving sows in a better body condition. This results in higher conception rate and the shortening of the weaning to breeding intervals

Feeding the Weaned Pig

Piglets are weaned anytime between 3 and 6 weeks. Weaning is stressful to the pig. The earlier the pig is weaned, the greater the stress. The weight of the piglet at weaning would depend on the age at weaning and management during the suckling period. The average weaning weight may vary between 4 and 7 kg.

To reduce stress after weaning, the animals should be properly fed. The creep diets should continue to be fed to the pigs until they attain an average weight of 10kg per pig. The creep diets at this stage (post weaning) may be referred to as **pre-starter** diets. Once the pigs has attained 10kg weight, they should be provided with a **starter** diet. Some sample pig starter diets are also shown in Table 1. The starter diet should be fed up till approximately 20kg weight. Weanling pigs appear to perform better of pelleted diet and crumbles than on mash diet.

To maximize the benefit from a good starter, weaning pigs should be provided adequate feeder and floor spaces. A feeder space of 6-7 cm per weanling pig is recommended. A floor space allowance of 0.25m² per pig is recommended up to 20 kg. alternatively the floor space per pig may be phased out as follows:

up to 14kg – 0.15m² (1.6 sq. feet);

14 to 18kg – 0.20m² (2.2sq. feet);

18 to 20kg – 0.25m² (2.7 sq. feet).

In addition, overcrowding of pigs should be avoided. It is good practice to house all pigs from a single litter in one pen.

Performance of Starter Pigs

Performance targets should be set for any pig enterprise. Table 2 provides some useful information on the performance of weaning pigs. From Table 2, it can be calculated that it takes 24 (best) 28 (better) and 33 (good) days from 7 to 20 kg weight at total feed intake of 18.5 kg; 20.0 kg and 21.1 kg, respectively, per pig.

Table 2 – Performance of Weanling Pigs from 7 to 20 kg Body Weight

	Good	Better	Best
Average daily gain	400	475	550
Average daily feed (g)	640	715	770
Feed conversion (g feed/g gain)	1.6	1.5	1.4
Mortality (%)	2.5	1.5	0.5

Data were adapted from “Swine Nutrition Guide” by J.F. Patience and P. A. Thacker, 1989.

Feeding Management of Market Pigs

Pigs are switched from starter diets to grower/finisher diets when they attain 20 kg live weight. The pigs are fed and managed until they attain market weight. Market weight varies from 60 kg to about 100 kg. In well managed piggeries, pigs are sold at weights of 90 to 100 kg. these weights are achievable in less than 200 days from birth. Both **boars** (males) and **gilts** (females) are reared for the market. However because males have some boar taint, they are normally castrated at 2-3 weeks of age. **Castration** (removal of the testicles) of pigs intended for slaughter may be done later, at 6 weeks of age. Castration should however not be done within one week of weaning. Castration prevents the development of boar taint. Such castrated young males are known as **barrows**. Boars grow faster and are leaner than gilts, which in turn, grow faster and are leaner than barrows. Boars also tend to convert feed about 3% more efficiently than gilts and about 7% more efficiently than barrows.

Feeding of Market Pigs

About 60% of the total cost of pork production is incurred during the period between 20 kg and market weight. The traditional system of feeding employs one grower diet from about 20 kg to a market weight of 105 kg. Another diet option is to feed more than one diet from 20 kg to market weight. The second option is the one recommended here. In this option, a grower diet is fed from 20 kg to 60 kg and then another grower/fattener diet is fed from 60 kg until market weight. Some typical grower diets are shown in Table 3. these diets are intended for pigs reared from 20 to 60 kg. Table 4 shows the composition of typical diets which can be used for pigs from 60 to 100 kg weight. These diets are intended as guides only. Usually pigs are fed to appetite (*ad libitum*); that is they are allowed continuous access to feed. Some operators practice the limit feeding system. In this system, the pigs are fed only a fraction of their *ad libitum* intake. Limit feeding system has been shown to improve feed efficiency by 5-10%, reduce carcass fat by 2-4% but reduce growth rate by 5-10%. If practiced, feed restriction should not exceed 10% of *ad libitum* intake and should not be practiced at any weight below 60 kg live weight.

The overall objective of a market pig enterprise is profitability. The cheapest or most expensive or the feed that gives the best efficiency is not necessarily the most profitable feed. This fact should be borne in mind. Feed should not be considered in isolation of other management factors. All pigs should also get continuous access to fresh, cool and clean water and must be in good health always. Over-crowding should be avoided. To get maximum benefit from any feed, sufficient feeder and floor spaces should be provided. As a guide, a floor space of 0.7 square metres per pig should be provided from 20-105kg. The floor space may be phased according to pig weight as follows:

20 – 35 kg	0.35m ² (4 sq. feet).
35 – 70 kg	0.55m ² (6 sq. feet).
70 – 105 kg	0.75m ² (8 sq. feet).

Table 3. Percentage Composition of Pig Grower Diets (for 20-60 kg pig)

Ingredients	1	2	3	4	5	6	7	8
Maize (corn)	47.00	47.40	51.50	52.00	-	75.30	75.30	37.65
Guinea corn	-	-	-	-	53.00	-	-	-
Groundnut meal	15.50	-	12.50	-	-	21.65	-	21.65
Soybean meal	-	16.00	-	13.00	16.00	-	21.65	
Wheat bran	34.70	33.80	-	-	28.20	-	-	-
Brewers dried grain	-	-	33.05	32.05	-	-	-	-
Palm kernel meal	-	-	-	-	-	-	-	37.65
Bone meal ¹	1.00	1.00	1.75	1.75	1.00	2.00	2.00	2.00
Limestone ²	1.10	1.10	0.50	0.50	1.10	0.35	0.35	0.35
Common salt	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Premix ³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Calculated composition								
Crude protein (%)	17.10	17.20	17.20	17.20	17.10	17.20	17.10	21.90
ME, kcal/kg diet	3109	3108	3110	3112	3107	3456	3441	3075
Lysine (%)	0.78	1.00	0.79	0.97	0.88	0.69	1.00	1.83
Meth.+cyst. (%)	0.52	0.59	0.67	0.72	0.54	0.44	0.53	0.66
Calcium (%)	0.77	0.78	0.78	0.79	0.78	0.76	0.77	0.92
Total phosphorus (%)	0.67	0.67	0.65	0.65	0.66	0.65	0.65	0.77

See Table 1

Premix supplied the following per kg diet: vitamin A, 12,000 i.u.; vitamin D3, 1200 i.u.; vitamin E, .. i.u.; vitamin K, 1.8 mg; thiamine 0.8mg; riboflavin, 3.0 mg; niacin, 18 mg; calcium pantothenate, 5mg, biotin, 0.0375mg; vitamin B6, 1.5mg; choline chloride, 75mg; folic acid, 0.3mg; vitamin B12, 12mg; vitamin C, 15mg; manganese, 15mg; zinc, 87.6mg; copper, 15mg; iron, 75mg; iodine, ...mg; cobalt, 0.54mg; selenium, 0.06mg.

Table 4. Percentage Composition of Pig Grower Diets (for 60-105 kg pig)

Ingredients	1	2	3	4	5	6	7	8
Maize (corn)	36.55	37.05	44.30	-	-	32.30	80.30	44.30
Cassava meal	-	-	-	36.30	36.30	-	-	-
Groundnut meal	7.50	-	2.00	6.50	-	3.50	-	2.00
Soybean meal	-	7.50	-	-	6.50	-	16.80	-
Wheat bran	53.50	53.00	-	-	-	41.75	-	-
Brewers dried grain	-	-	51.00	54.50	54.50	-	-	-
Palm kernel meal	-	-	-	-	-	20.00	-	51.00
Bone meal ¹	0.25	0.25	1.50	1.50	1.50	0.25	2.00	1.50
Limestone ²	1.50	1.50	0.50	0.50	0.50	1.50	0.20	0.50
Common salt	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Premix ³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
<i>Calculated composition</i>								
Crude protein (%)	15.10	15.00	15.00	15.10	15.00	15.20	15.20	15.70
ME, kcal/kg diet	2902	2901	2900	2904	2900	2906	3440	2914
Lysine (%)	0.74	0.84	0.74	0.78	0.87	0.67	0.84	0.53
Meth.+cyst. (%)	0.54	0.57	0.77	0.72	0.75	0.50	0.57	0.60
Calcium (%)	0.70	0.70	0.71	0.73	0.73	0.76	0.76	0.67
Total phosphorus (%)	0.63	0.63	0.60	0.60	0.60	0.62	0.63	0.78

See Table 2

Performance of Market Pigs

Some typical performance data for market pigs are presented in Table 5. These data are intended as guides only to help monitor any market pig flock. They should not be regarded as definitive. However if performances vary too much below the data given in Table 5, then solution to the problems must be sought. For example for the 20-105 kg pigs, average daily gain of 0.85-0.95 kg and feed efficiency of 2.7-3.0 can be achieved with overall excellent management. However the bottom line in any pig enterprise is profitability. This must always be borne in mind.

Some additional information can be calculated from Table 5 for the 20-105 kg pig as follows:

Weight gain	=	85 kg (105-20 kg)
Feed conversion	=	3.3
Total feed consumed	=	$8.5 \times 3.3 = 280.5\text{kg}$
Creep feed consumed	=	0.3kg
Starter feed consumed	=	21.25 kg
(See Table 6-27)		
Total feed consumed	=	$280.5 + 0.3 + 21.25 = 302.25$
Days from 20kg to 105kg	=	110
Days on starter feed	=	33
Days to weaning	=	28
Total days to market	=	171

Generally, total feed from birth to market may vary between 265 and 340 kg. Age from birth to market varies from 160 to 200 days depending on management and weight at slaughter. Weight at slaughter varies between 75 and 110kg.

Table 5. Performance of Market Pigs from 20 to 105 kg weight

	Weight Range of Pigs		
	20-60 kg	60-105kg	20-105kg
Average daily gain (kg)	0.605	0.825	0.776
Average daily feed (kg)	1.66	3.00	2.52
Feed conversion (kg feed/kg gain)	2.74	3.64	3.25
Days to market	-	-	105-125
Hot dressed percentage	-	-	75-80
Lean meat yield (%)	-	-	52-61
Back fat thickness (cm)	-	-	3.0-3.6

Data are for Large White x Landrace crosses

Feeding Management of the Breeding Herd

The breeding herd is made up of both females and males. The females are known as **gilts** before their first litter and **sows** after a first litter. The males are known as **boars**. The pregnancy period is known as the **period of gestation** and pregnant animals are known as **gestating pigs**. The gestation period is an average of 114 days (range of 112 to 115 days) or 3 months, 3 weeks and 3 days. Female pigs that are producing milk are said to be in lactation and are known as **lactating animals**.

Feeding of Gilts During Gestation

The breeding herd is kept solely for the production of young pigs (**piglets**). Traditionally, gilts intended for breeding are selected at market weight and are kept till they reach 120kg or more by which time they are 8 to 9 months old before breeding. It is however recommended that all replacement gilts be selected before market weight (say one month before) for proper gilt management. It is also more profitable if gilts are bred at an earlier age, and many producers are now successfully doing this. The level of feed intake affects the age at which a gilt reaches puberty, that is the age at which the reproductive organs become operative.

All gilts intended for breeding purposes should be fed *ad libitum* until they are bred by artificial insemination or by mating them with a boar. After service, feed intake should be reduced to about 2.0-2.7 kg per pig per day.

Sample gestation diets are shown in Table 6. The diet is fed from the time gilts are selected as breeders and through pregnancy.

Feeding of Sows during Gestation

The threshold level of feed intake/pig/day is about 1.5 kg. Above this level, feed intake has very little effect on litter size. Therefore, sows should be fed restrictedly. In general for pregnant sows, feed allocation should be restricted to 2.0-2.7 kg per animal per day. This level of feed intake should be maintained throughout pregnancy up to farrowing time (i.e. time of birth). Feed intake above this level is not much beneficial and result in increased feed cost. In addition, at higher level of feed intake, the sow may become over fat and litter size may increase without increasing birth weight. There is also some evidence that embryonic survival, and thus litter size, may be increased by restricting level of feed intake during gestation. As the level of feed intake during gestation increases, the level of feed intake during lactation decreases. This may result in the sow depleting its body reserves and consequent loss in body conditions during lactation.

To prevent sows getting overweight, a good rule is to feed 2.0 to 2.2 kg of feed per pig per day at 120 kg weight and increase this amount by 0.2 kg for every 20 kg increase in weight. The gilt or sow would gain weight during pregnancy. This weight gain consists of the net weight in gain by the sow (estimated at 10-15kg net weight gain per sow up to the fifth litter) and the weight of the foetal tissues (about 25 kg up to the fifth litter). After the fifth litter, sow weight gain should be nil. Thus the gilt or sow should be weighted at intervals to obtain the weight and the feed intake adjusted accordingly. A daily weight gain of 0.2 kg is considered normal.

Sows which are housed and fed in group be given 10-15% feed allowances above that of sows fed individually. This is to ensure that less aggressive sows also get feed that is sufficient to

prevent reproductive failure. For both gilts and sows, the amount of feed recommended for use during pregnancy should be taken as a guide only. This is because the actual amount of feed provided during gestation would depend on a number of factors. These factors include condition and size of the animal, method of feeding and housing, standard of management, health of the herd, environment, and productivity level.

Sows are also fed similar gestation diets as gilts (see Table 6).

Table 6. Percentage Composition of Gilt and Sow Gestation Diets

Ingredients	1	2	3	4	5	6	7	8
Maize (corn)	37.25	37.75	44.50	-	-	79.50	79.50	-
Guinea corn	-	-	-	-	-	-	-	81.00
Cassava	-	-	-	57.00	57.00	-	-	-
Groundnut meal	8.00	-	3.00	19.30	-	16.80	-	-
Soybean meal	-	8.00	-	-	19.30	-	16.80	15.30
Wheat bran	51.50	51.00	-	-	-	-	-	-
Brewers dried grain	-	-	49.00	20.00	20.00	-	-	-
Bone meal ¹	1.25	1.25	2.60	3.00	3.00	3.00	3.00	3.00
Limestone ²	1.30	1.30	0.20	-	-	-	-	-
Common salt	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Premix ³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
<i>Calculated composition</i>								
Crude protein (%)	15.10	15.00	15.10	15.10	15.00	15.20	15.20	15.10
ME, kcal/kg diet	2905	2905	2904	3280	3266	3432	3420	3328
Lysine (%)	0.73	0.84	0.74	0.70	0.97	0.60	1.84	0.71
Meth.+cyst. (%)	0.54	0.57	0.75	0.44	0.51	0.41	0.48	0.42
Calcium (%)	0.91	0.91	0.91	1.04	1.04	0.91	0.91	0.91
Total phosphorus (%)	0.80	0.80	0.80	0.80	0.80	0.81	0.81	0.80

¹ Dicalcium phosphate can be used in the place of bone meal

² A good quality periwinkle shell or oyster shell can be used in place of the limestone

³ Premix supplied the following per kg diet: vitamin A, 12,000 i.u.; vitamin D₃, 2000 i.u.; vitamin E, 35 i.u.; vitamin K, 3.5mg; thiamine, 1.0mg; riboflavin, 5.0mg; niacin, 15mg calcium pantothenate, 15mg; biotin, 0.150mg; vitamin B₆, 2.0mg; choline chloride, 200mg; folic acid, 0.5mg; vitamin B₁₂, 0.015mg; manganese, 20mg; zinc 58.5mg; copper, 10mg; iron, 50mg; iodine, 0.3mg; cobalt, 0.35mg; selenium, 0.15mg.

Feed Restriction during Gestation

Feed restriction can be effected by either of four methods.

1. Individually feeding each pig the recommended amount of feed every day. This is the easiest method and provides the most effective control over the feed intake of gilts and sows. It is however labour intensive and may require individual housing.
2. Skip method. In this method, gilts or sows are allowed access to feed for 6-8 hours per day for only 3 to 4 days in the week. For the remaining 3 to 4 days, pigs are allowed access to water but no feed.
3. Diet dilution method. In this method, energy intake is restricted by diluting the diet with a high fibre ingredient. This method is less labour intensive. However it may cost more to maintain the sow and it is very difficult to prevent sows from getting fat. Making high fibre diets may sometimes be quite expensive. There are other problems associated with this method of feed restriction.
4. By using the electronic sow feeder in which several pigs can be group fed from one feeding area. In this method, the amount of feed each sow gets each day is programmed into the computer. Devices are put in place to prevent other pigs from getting at the feed specifically released for any particular sow. This method is attractive but is expensive.

Feeding the Sow during Lactation

There is a direct relationship between the amount of feed consumed by the sow during lactation and the amount of milk produced. As the level of feed intake increases, the level of milk production also increases and consequently, the growth rate of suckling piglets also increases. Insufficient feeding during lactation would result in the sow drawing on its body reserves causing an appreciable loss in body weight. This may result to depleted back fat reserves, longer weaning to conception intervals, low rates of conception and premature culling. Therefore sows should be given additional feed to meet the needs for milk production. Under normal conditions, the sow produces about 7 kg of milk daily during lactation.

Sows should also be fed according to the size of the litter. A good rule is to allow 2.2 to 2.5 kg of feed per day for the sow and additional 0.5kg for each pig in the litter. For example, to calculate the feed required per day by a sow nursing 10 piglets, proceed as follows:

Sow feed allowance = 2.2 to 2.5kg
 Piglet feed = (0.5 x 10) = 5.0kg
 Total feed allowance = 7.2 to 7.5 kg
 (That is 7.2 – 7.5 kg of feed/sow/day).

There are several ways of maximizing feed intake during lactation. One way is to give the feed wet. Sows appear to consume more of a wet feed than they will of a dry feed. The feed can be made wet by simply sprinkling some water on the feed allocation for any period. A second method is to feed 2 or more times a day. It has been demonstrated that sows will consume more feed if fed two or more times a day as compared to feeding once daily. The use of pelleted feed has also been shown to increase the feed intake of sows. Pelleted feed should thus be used when available. Day length has also been shown to influence the amount of feed consumed by the animal. Where possible, day length period in the sow pen should be increased to about 15 hours by artificial lighting (use electric or kerosene lamps) to stimulate further consumption of feed. In addition, sows in lactation must be allowed continuous access to clean and fresh water at all times. The sow’s daily water consumption is high. It may be as much as 15-25 litres per sow per day. Inadequate consumption of water may result in reduced feed intake by the sow. Sample sow lactation diets are given in Table 7.

Table 7. Percentage Composition of Sow Lactation Diets

<u>Ingredients</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>
Maize (corn)	42.50	43.00	-	-	77.00	77.00	-	-
Guinea corn	-	-	-	-	-	-	78.25	78.05
Cassava	-	-	61.00	61.00	-	-	-	-
Groundnut meal	12.00	-	25.20	-	19.10	-	-	18.00
Soybean meal	-	12.50	-	25.30	--	19.30	18.00	-
Wheat bran	42.20	41.20	-	-	-	-	-	-
Brewers dried grain	-	-	10.00	10.00	-	-	-	-

Bone meal ¹	1.50	1.50	3.00	3.00	3.00	3.00	3.00	3.00
Limestone ²	1.10	1.10	-	-	-	-	-	-
Common salt	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
L-lysine	-	-	-	-	0.10	-	-	0.15
DL-methionine	-	-	0.10	-	0.10	-	0.05	0.10
Premix ³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Calculated composition								
Crude protein (%)	16.10	16.20	16.10	16.00	16.10	16.10	16.20	16.20
ME, kcal/kg diet	3008	3010	3400	3382	3438	3424	3336	3338
Lysine (%)	0.75	0.93	0.72	0.06	0.75	0.92	0.86	0.75
Meth.+cyst. (%)	0.53	0.58	0.50	0.50	0.52	0.50	0.50	0.50
Calcium (%)	0.91	0.91	1.05	1.05	0.91	0.92	0.93	0.92
Total phosphorus (%)	0.80	0.80	0.80	0.80	0.82	0.82	0.85	0.84

¹ Dicalcium phosphate can be used in the place of bone meal

² A good quality periwinkle shell or oyster shell can be used in place of the limestone

³ Premix contained the following per kg diet: vitamin A, 12,000 i.u.; vitamin D₃, 2000 i.u.; vitamin E, 35 i.u.; vitamin K, 3.5mg; thiamine, 1.0mg; riboflavin, 5.0mg; niacin, 15mg calcium pantothenate, 15mg; biotin, 0.1505mg; vitamin B₆, 2.0mg; choline chloride, 200mg; folic acid, 0.5mg; vitamin B₁₂, 0.015mg; manganese, 20mg; zinc 58.5mg; copper, 10mg; iron, 50mg; iodine, 0.3mg; cobalt, 0.35mg; selenium, 0.15mg.

Feeding the Sow between Weaning and Rebreeding

The level of feeding just before weaning should be maintained for about a week. Thereafter, feed should be provided at the rate of 2.7 kg per day. Gilts that have just weaned their first litter are sometimes difficult to rebreed due to poor body condition. For such gilts, a high level of feed of 3.5 to 4 kg per day (known as **flushing**) should be provided in order to improve the number of days from weaning to rebreeding and to improve the conception rates. Flushing is not necessary for older sows. After breeding, feed levels should be reduced to 2.0-2.7 kg per pig per day. Diets for dry sows are similar to those for the 60-120 kg pig.

Feeding Boars

Boars are first used for breeding at 8 to 9 months of age. Boars should be individually fed twice per day, at the level of 2.3 to 3.0 kg per day. Any of the diets recommended in Table 6-29 for the 60-105 kg pigs is suitable for boars. Over feeding of boars may reduce **libido (sexual drive)**,

increase the size of the bear so that it become incompatible with the sows in the herd, result in early culling of the boars.

Performance of Gilts and Sows

The reproductive performance of swine breeding herd is shown in Table 8. these values are only guides and performances above the values stated in Table 6-33 are not uncommon.

Table 8. Reproductive Performance of Swine Breeding Herd

	Temperate¹	Nigerian²	Nigerian³
Age at first breeding – sows (months)	8-9	8-9	10.00
Number of piglets born alive	9.8	9.8	9.4
Number of piglets weaned per litter	8.4	8.1	8.1
Mortality before weaning (%)	14.0	17.4	14.0
Weight per piglet at birth (kg)	1.4	1.5	N/A
Weight per piglet at weaning (kg)	6.4	6.6	5.7
Age of piglets at weaning (weeks)	3-4	3-4	5-6
Number of litters/year	1.8-2.3	1.8-2.3	1.5-2.3
Number of pigs weaned/sow/year	15-19	15-19	12-19

¹Summarized data of research conducted in temperate regions

²Summarized data from Nigeria for large white x landrace crossbreds

³Summarized data from field survey of pig farms in Nigeria (LIMECU, Federal department of livestock and pest control services, Abuja, 1992).

GENERAL COMMENTS ON FEEDING MANAGEMENT OF PIGS

All the diet formulations shown are examples only and other combinations are possible. Manufactured feeds should not be stored longer than four weeks at a time. Feed wastage must be prevented. Feed should be provided in an area separate from the watering area. The watering and feeding system must be adequate and clean. Only up-to-date feeding programmes should be used. Unproductive animals should be culled. In addition, animals must be kept healthy. Pig pens should be scrubbed daily and disinfected as often as possible.

FEEDING MANAGEMENT OF PIGS

Pigs (swine) are essentially kept for meat (pork) production. Pigs are born alive. Pigs are usually managed from birth until they are disposed of. Feed constitutes the largest single expense of any swine operation. For convenience feeding management of pigs may be divided into 4:

5. Feeding the nursing pig
6. Feeding the weaned pig
7. Feeding the market pig
8. Feeding the breeding herd

Feeding the Nursing (Suckling) Pig

Milk Feeding

The first successful step in feeding pigs is to ensure that they have access to their mothers' milk within 24 hours of birth. This is to ensure that each newborn gets an adequate supply of **colostrum**, the first milk produced by the sow after giving birth (parturition). Colostrum helps to increase disease resistance by providing immunization with proteins known as **gamma globulins**. Colostrum also provides glucose for the pigs which have low reserves of glycogen at birth. Colostrum also provides nutrients and other essential substances in highly concentrated forms. If pigs fail to get colostrums after birth, they may not survive. Since piglets rapidly lose their ability, with time, to absorb gamma globulins and the fact that the gamma globulin content of sow's milk declines rapidly after birth, it is very important that piglets (young pigs) suckle their mother during the first 24 hours of life. Weak piglets should be moved closer to the sow's udder in order to suckle their mother.

Piglets should continue to suckle their mother until they are weaned at 3 weeks, or at most, 6 weeks of age. The mother may not produce sufficient milk to take care of the excess pigs from large litters or the mother may die after farrowing, leaving behind orphan pigs. In such situations, a **milk replacer** may be fed at the rate 10ml. Milk replacer per piglet, 4 to 6 times

daily until they are weaned. Milk replacers can be obtained commercially. A milk replacer may also be made by blending the following:

1000ml or cc (one litre) of cow's milk plus one raw egg, 2 tablespoons of sugar and some commercial iron.

Sow's milk is generally deficient in iron. Consequently, to prevent anemia and to ensure good growth, supplementary iron is necessary. It has been estimated that for optimal growth, piglets require 7mg of iron per day. Therefore for pigs weaned at 3 weeks of age, a single injection (preferably in the neck) of 100-150 mg of iron, as **iron dextran**, is sufficient. However, if pigs are weaned after 3 weeks of age. For oral treatment, the first one should be given 1 to 3 days after birth and then weekly. Sprinkling a little soil in the pen, preferably sterilized by heat to avoid infection, may be an effective and cheap alternative to injection or oral administration of iron.

Creep Feeding

Maximum milk production of the sow is attained during the third and fourth week and declines steadily thereafter. Milk therefore, does not provide all the needed nutrients of the piglets before weaning. Therefore, supplementary feed must be supplied the suckling piglets. This feed is known as **creep feeding**. Piglets should be started on creep feed at about seven days of age. At first, the creep feed should be placed on a dry section of the floor at the rate of 20-25 g/litter/day and should not be given within a few hours of the sow being fed since most of the piglets will be sleeping or sucking and may not notice the creep feed. This practice should be continued for 3 or 4 days or until the piglets are obviously consuming the feed. After this period, the feed should be placed on a shallow feeder, large enough to allow as many pigs to feed together. For the first few days, creep feed should be fed often and a little at a time. This would ensure that the feed is always fresh. This practice also helps to encourage consumption since piglets tend to be curious when any new material is introduced into the pen. Any stale feed should be discarded daily. Some pig diets are shown in Table 1

Table 1. Percentage composition of pig creep and starter diets.

Ingredients	Creep diets (1-10kg)			Starter diets (for 10-20kg pigs)				
	1	2	3	4	5	6	7	8
Maize (corn)	61.70	57.50	56.60	61.70	58.85	60.55	-	67.30
Guinea corn	-	-	-	-	-	-	61.95	-
Groundnut meal	29.00	39.00	-	20.50	27.50	-	-	-
Soybean meal	-	-	39.50	-	-	28.00	27.60	29.25
Wheat bran	-	-	-	10.00	10.00	8.00	6.00	-
Fish meal	7.00	-	-	5.00	-	-	-	-
Fat or oil	-	-	0.70	-	-	-	1.00	-
Bone meal ¹	1.50	2.00	2.00	1.50	2.00	2.00	2.00	2.00
Periwinkle shell ²	0.25	0.65	0.65	0.60	0.75	0.75	0.75	0.75
Common salt	0.35	0.35	0.35	0.50	0.50	0.50	0.50	0.50
Methionine	-	0.10	-	-	0.05	-	-	-
Lysine	-	0.20	-	-	0.15	-	-	-
Premix ³	0.2	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Calculated composition								
Crude protein (%)	24.20	24.10	24.10	20.30	20.20	20.10	20.20	20.10
ME, kcal/kg diet	3510	3500	3507	3360	3360	3368	3350	3440
Lysine (%)	1.23	1.20	1.57	1.03	1.00	1.25	1.22	1.24
Meth.+cyst. (%)	0.66	0.65	0.71	0.60	0.56	0.62	0.61	0.60
Calcium (%)	0.90	0.91	0.94	0.92	0.93	0.95	0.96	0.94
Total phosphorus (%)	0.74	0.71	0.72	0.73	0.74	0.72	0.74	0.70

¹ Dicalcium phosphate can be used in the place of bone meal

² A good quality limestone or oyster shell can be used in place of the periwinkle shell

³ Premix supplied the following per kg diet: vitamin A, 20,000 i.u.; vitamin D₃, 2000 i.u.; vitamin E, 25 i.u.; vitamin K, 3.0mg; thiamine, 1.3mg; riboflavin, 5.0mg; niacin, 30mg calcium pantothenate, 17.5mg; biotin, 0.06mg; vitamin B₆, 2.5mg; choline chloride, 125mg; folic acid, 0.5mg; vitamin B₁₂, 0.02mg; vitamin C, 25mg; manganese, 25mg; zinc 146 mg; copper, 25mg; iron, 125mg; iodine, 0.8mg; cobalt, 0.9mg; selenium, 0.1mg.

The introduction of solid feed at the suckling stage helps to get used to solid feed and promotes the development of the necessary digestive enzymes. For piglets weaned after 4 weeks, creep

feeding results in 10-15% heavier weight at weaning. With creep feeding, piglets tend to suckle less, leaving sows in a better body condition. This results in higher conception rate and the shortening of the weaning to breeding intervals

Feeding the Weaned Pig

Piglets are weaned anytime between 3 and 6 weeks. Weaning is stressful to the pig. The earlier the pig is weaned, the greater the stress. The weight of the piglet at weaning would depend on the age at weaning and management during the suckling period. The average weaning weight may vary between 4 and 7 kg.

To reduce stress after weaning, the animals should be properly fed. The creep diets should continue to be fed to the pigs until they attain an average weight of 10kg per pig. The creep diets at this stage (post weaning) may be referred to as **pre-starter** diets. Once the pigs has attained 10kg weight, they should be provided with a **starter** diet. Some sample pig starter diets are also shown in Table 1. The starter diet should be fed up till approximately 20kg weight. Weanling pigs appear to perform better of pelleted diet and crumbles than on mash diet.

To maximize the benefit from a good starter, weaning pigs should be provided adequate feeder and floor spaces. A feeder space of 6-7 cm per weanling pig is recommended. A floor space allowance of 0.25m² per pig is recommended up to 20 kg. alternatively the floor space per pig may be phased out as follows:

up to 14kg – 0.15m² (1.6 sq. feet);

14 to 18kg – 0.20m² (2.2sq. feet);

18 to 20kg – 0.25m² (2.7 sq. feet).

In addition, overcrowding of pigs should be avoided. It is good practice to house all pigs from a single litter in one pen.

Performance of Starter Pigs

Performance targets should be set for any pig enterprise. Table 2 provides some useful information on the performance of weaning pigs. From Table 2, it can be calculated that it takes

24 best) 28 (better) and 33 (good) days from 7 to 20 kg weight at total feed intake of 18.5 kg; 20.0 kg and 21.1 kg, respectively, per pig.

Table 2 – Performance of Weanling Pigs from 7 to 20 kg Body Weight

	Good	Better	Best
Average daily gain	400	475	550
Average daily feed (g)	640	715	770
Feed conversion (g feed/g gain)	1.6	1.5	1.4
Mortality (%)	2.5	1.5	0.5

Data were adapted from “Swine Nutrition Guide” by J.F. Patience and P. A. Thacker, 1989.

Feeding Management of Market Pigs

Pigs are switched from starter diets to grower/finisher diets when they attain 20 kg live weight. The pigs are fed and managed until they attain market weight. Market weight varies from 60 kg to about 100 kg. In well managed piggeries, pigs are sold at weights of 90 to 100 kg. these weights are achievable in less than 200 days from birth. Both **boars** (males) and **gilts** (females) are reared from the market. However because males have some boar taint, they are normally castrated at 2-3 weeks of age. **Castration** (removal of the testicles) of pigs intended for slaughter may be done later, at 6 weeks of age. Castration should however not be done within one week of weaning. Castration prevents the development of boar taint. Such castrated young males are known as **barrows**. Boars grow faster and are leaner than gilts, which in turn, grow faster and are leaner than barrows. Boars also tend to convert feed about 3% more efficiently than gilts and about 7% more efficiently than barrows.

Feeding of Market Pigs

About 60% of the total cost of pork production is incurred during the period between 20 kg and market weight. The traditional system of feeding employs one grower diet from about 20 kg to a market weight of 105 kg. Another diet option is to feed more than one diet from 20 kg to market weight. The second option is the one recommended here. In this option, a grower diet is fed from 20 kg to 60 kg and then another grower/fattener diet is fed from 60 kg until market weight. Some typical grower diets are shown in Table 3. these diets are intended for pigs reared from 20

to 60 kg. Table 4 shows the composition of typical diets which can be used for pigs from 60 to 100 kg weight. These diets are intended as guides only. Usually pigs are fed to appetite (ad libitum); that is they are allowed continuous access to feed. Some operators practice the limit feeding system. In this system, the pigs are fed only a fraction of their ad libitum intake. Limit feeding system has been shown to improve feed efficiency by 5-10%, reduce carcass fat by 2-4% but reduce growth rate by 5-10%. If practiced, feed restriction should not exceed 10% of *ad libitum* intake and should not be practiced at any weight below 60 kg live weight.

The overall objective of a market pig enterprise is profitability. The cheapest or most expensive or the feed that gives the best efficiency is not necessarily the most profitable feed. This fact should be borne in mind. Feed should not be considered in isolation of other management factors. All pigs should also get continuous access to fresh, cool and clean water and must be in good health always. Over-crowding should be avoided. To get maximum benefit from any feed, sufficient feeder and floor spaces should be provided. As a guide, a floor space of 0.7 square metres per pig should be provided from 20-105kg. The floor space may be phased according to pig weight as follows:

20 – 35 kg	0.35m ² (4 sq. feet).
35 – 70 kg	0.55m ² (6 sq. feet).
70 – 105 kg	0.75m ² (8 sq. feet).

Table 3. Percentage Composition of Pig Grower Diets (for 20-60 kg pig)

Ingredients	1	2	3	4	5	6	7	8
Maize (corn)	47.00	47.40	51.50	52.00	-	75.30	75.30	37.65
Guinea corn	-	-	-	-	53.00	-	-	-
Groundnut meal	15.50	-	12.50	-	-	21.65	-	21.65
Soybean meal	-	16.00	-	13.00	16.00	-	21.65	
Wheat bran	34.70	33.80	-	-	28.20	-	-	-
Brewers dried grain	-	-	33.05	32.05	-	-	-	-
Palm kernel meal	-	-	-	-	-	-	-	37.65
Bone meal ¹	1.00	1.00	1.75	1.75	1.00	2.00	2.00	2.00
Limestone ²	1.10	1.10	0.50	0.50	1.10	0.35	0.35	0.35
Common salt	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Premix ³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
<i>Calculated composition</i>								
Crude protein (%)	17.10	17.20	17.20	17.20	17.10	17.20	17.10	21.90
ME, kcal/kg diet	3109	3108	3110	3112	3107	3456	3441	3075
Lysine (%)	0.78	1.00	0.79	0.97	0.88	0.69	1.00	1.83
Meth.+cyst. (%)	0.52	0.59	0.67	0.72	0.54	0.44	0.53	0.66
Calcium (%)	0.77	0.78	0.78	0.79	0.78	0.76	0.77	0.92
Total phosphorus (%)	0.67	0.67	0.65	0.65	0.66	0.65	0.65	0.77

See Table 1

Premix supplied the following per kg diet: vitamin A, 12,000 i.u.; vitamin D3, 1200 i.u.; vitamin E, .. i.u.; vitamin K, 1.8 mg; thiamine 0.8mg; riboflavin, 3.0 mg; niacin, 18 mg; calcium pantothenate, 5mg, biotin, 0.0375mg; vitamin B6, 1.5mg; choline chloride, 75mg; folic acid, 0.3mg; vitamin B12, 12mg; vitamin C, 15mg; manganese, 15mg; zinc, 87.6mg; copper, 15mg; iron, 75mg; iodine, ...mg; cobalt, 0.54mg; selenium, 0.06mg.

Table 4. Percentage Composition of Pig Grower Diets (for 60-105 kg pig)

Ingredients	1	2	3	4	5	6	7	8
Maize (corn)	36.55	37.05	44.30	-	-	32.30	80.30	44.30
Cassava meal	-	-	-	36.30	36.30	-	-	-
Groundnut meal	7.50	-	2.00	6.50	-	3.50	-	2.00
Soybean meal	-	7.50	-	-	6.50	-	16.80	-
Wheat bran	53.50	53.00	-	-	-	41.75	-	-
Brewers dried grain	-	-	51.00	54.50	54.50	-	-	-
Palm kernel meal	-	-	-	-	-	20.00	-	51.00
Bone meal ¹	0.25	0.25	1.50	1.50	1.50	0.25	2.00	1.50
Limestone ²	1.50	1.50	0.50	0.50	0.50	1.50	0.20	0.50
Common salt	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Premix ³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
<i>Calculated composition</i>								
Crude protein (%)	15.10	15.00	15.00	15.10	15.00	15.20	15.20	15.70
ME, kcal/kg diet	2902	2901	2900	2904	2900	2906	3440	2914
Lysine (%)	0.74	0.84	0.74	0.78	0.87	0.67	0.84	0.53
Meth.+cyst. (%)	0.54	0.57	0.77	0.72	0.75	0.50	0.57	0.60
Calcium (%)	0.70	0.70	0.71	0.73	0.73	0.76	0.76	0.67
Total phosphorus (%)	0.63	0.63	0.60	0.60	0.60	0.62	0.63	0.78

Performance of Market Pigs

Some typical performance data for market pigs are presented in Table 5. These data are intended as guides only to help monitor any market pig flock. They should not be regarded as definitive. However if performances vary too much below the data given in Table 5, then solution to the problems must be sought. For example for the 20-105 kg pigs, average daily gain of 0.85-0.95 kg and feed efficiency of 2.7-3.0 can be achieved with overall excellent management. However the bottom line in any pig enterprise is profitability. This must always be borne in mind.

Some additional information can be calculated from Table 5 for the 20-105 kg pig as follows:

Weight gain	=	85 kg (105-20 kg)
Feed conversion	=	3.3
Total feed consumed	=	$8.5 \times 3.3 = 280.5\text{kg}$
Creep feed consumed	=	0.3kg
Starter feed consumed	=	21.25 kg
(See Table 6-27)		
Total feed consumed	=	$280.5 + 0.3 + 21.25 = 302.25$
Days from 20kg to 105kg	=	110
Days on starter feed	=	33
Days to weaning	=	28
Total days to market	=	171

Generally, total feed from birth to market may vary between 265 and 340 kg. Age from birth to market varies from 160 to 200 days depending on management and weight at slaughter. Weight at slaughter varies between 75 and 110kg.

Table 5. Performance of Market Pigs from 20 to 105 kg weight

	Weight Range of Pigs		
	20-60 kg	60-105kg	20-105kg
Average daily gain (kg)	0.605	0.825	0.776
Average daily feed (kg)	1.66	3.00	2.52
Feed conversion (kg feed/kg gain)	2.74	3.64	3.25
Days to market	-	-	105-125
Hot dressed percentage	-	-	75-80
Lean meat yield (%)	-	-	52-61
Back fat thickness (cm)	-	-	3.0-3.6

Data are for Large White x Landrace crosses

Feeding Management of the Breeding Herd

The breeding herd is made up of both females and males. The females are known as **gilts** before their first litter and **sows** after a first litter. The males are known as **boars**. The pregnancy period is known as the **period of gestation** and pregnant animals are known as **gestating pigs**. The gestation period is an average of 114 days (range of 112 to 115 days) or 3 months, 3 weeks and 3 days. Female pigs that are producing milk are said to be in lactation and are known as **lactating animals**.

Feeding of Gilts during Gestation

The breeding herd is kept solely for the production of young pigs (**piglets**). Traditionally, gilts intended for breeding are selected at market weight and are kept till they reach 120kg or more by which time they are 8 to 9 months old before breeding. It is however recommended that all replacement gilts be selected before market weight (say one month before) for proper gilt management. It is also more profitable if gilts are bred at an earlier age, and many producers are now successfully doing this. The level of feed intake affects the age at which a gilt reaches puberty, that is the age at which the reproductive organs become operative.

All gilts intended for breeding purposes should be fed *ad libitum* until they are bred by artificial insemination or by mating them with a boar. After service, feed intake should be reduced to about 2.0-2.7 kg per pig per day.

Sample gestation diets are shown in Table 6. The diet is fed from the time gilts are selected as breeders and through pregnancy.

Feeding of Sows during Gestation

The threshold level of feed intake/pig/day is about 1.5 kg. Above this level, feed intake has very little effect on litter size. Therefore, sows should be fed restrictedly. In general for pregnant sows, feed allocation should be restricted to 2.0-2.7 kg per animal per day. This level of feed intake should be maintained throughout pregnancy up to farrowing time (i.e. time of birth). Feed intake above this level is not much beneficial and result in increased feed cost. In addition, at higher level of feed intake, the sow may become over fat and litter size may increase without increasing birth weight. There is also some evidence that embryonic survival, and thus litter size, may be increased by restricting level of feed intake during gestation. As the level of feed intake during gestation increases, the level of feed intake during lactation decreases. This may result in the sow depleting its body reserves and consequent loss in body conditions during lactation.

To prevent sows getting overweight, a good rule is to feed 2.0 to 2.2 kg of feed per pig per day at 120 kg weight and increase this amount by 0.2 kg for every 20 kg increase in weight. The gilt or sow would gain weight during pregnancy. This weight gain consists of the net weight in gain by the sow (estimated at 10-15kg net weight gain per sow up to the fifth litter) and the weight of the foetal tissues (about 25 kg up to the fifth litter). After the fifth litter, sow weight gain should be nil. Thus the gilt or sow should be weighted at intervals to obtain the weight and the feed intake adjusted accordingly. A daily weight gain of 0.2 kg is considered normal.

Sows which are housed and fed in group be given 10-15% feed allowances above that of sows fed individually. This is to ensure that less aggressive sows also get feed that is sufficient to prevent reproductive failure. For both gilts and sows, the amount of feed recommended for use

during pregnancy should be taken as a guide only. This is because the actual amount of feed provided during gestation would depend on a number of factors. These factors include condition and size of the animal, method of feeding and housing, standard of management, health of the herd, environment, and productivity level.

Sows are also fed similar gestation diets as gilts (see Table 6).

Table 6. Percentage Composition of Gilt and Sow Gestation Diets

Ingredients	1	2	3	4	5	6	7	8
Maize (corn)	37.25	37.75	44.50	-	-	79.50	79.50	-
Guinea corn	-	-	-	-	-	-	-	81.00
Cassava	-	-	-	57.00	57.00	-	-	-
Groundnut meal	8.00	-	3.00	19.30	-	16.80	-	-
Soybean meal	-	8.00	-	-	19.30	-	16.80	15.30
Wheat bran	51.50	51.00	-	-	-	-	-	-
Brewers dried grain	-	-	49.00	20.00	20.00	-	-	-
Bone meal ¹	1.25	1.25	2.60	3.00	3.00	3.00	3.00	3.00
Limestone ²	1.30	1.30	0.20	-	-	-	-	-
Common salt	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Premix ³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Calculated composition								
Crude protein (%)	15.10	15.00	15.10	15.10	15.00	15.20	15.20	15.10
ME, kcal/kg diet	2905	2905	2904	3280	3266	3432	3420	3328
Lysine (%)	0.73	0.84	0.74	0.70	0.97	0.60	1.84	0.71
Meth.+cyst. (%)	0.54	0.57	0.75	0.44	0.51	0.41	0.48	0.42
Calcium (%)	0.91	0.91	0.91	1.04	1.04	0.91	0.91	0.91
Total phosphorus (%)	0.80	0.80	0.80	0.80	0.80	0.81	0.81	0.80

¹ Dicalcium phosphate can be used in the place of bone meal

² A good quality periwinkle shell or oyster shell can be used in place of the limestone

³ Premix supplied the following per kg diet: vitamin A, 12,000 i.u.; vitamin D₃, 2000 i.u.; vitamin E, 35 i.u.; vitamin K, 3.5mg; thiamine, 1.0mg; riboflavin, 5.0mg; niacin, 15mg calcium pantothenate, 15mg; biotin, 0.150mg; vitamin B₆, 2.0mg; choline chloride, 200mg; folic acid, 0.5mg; vitamin B₁₂, 0.015mg; manganese, 20mg; zinc 58.5mg; copper, 10mg; iron, 50mg; iodine, 0.3mg; cobalt, 0.35mg; selenium, 0.15mg.

Feed Restriction during Gestation

Feed restriction can be effected by either of four methods.

5. Individually feeding each pig the recommended amount of feed every day. This is the easiest method and provides the most effective control over the feed intake of gilts and sows. It is however labour intensive and may require individual housing.
6. Skip method. In this method, gilts or sows are allowed access to feed for 6-8 hours per day for only 3 to 4 days in the week. For the remaining 3 to 4 days, pigs are allowed access to water but no feed.
7. Diet dilution method. In this method, energy intake is restricted by diluting the diet with a high fibre ingredient. This method is less labour intensive. However it may cost more to maintain the sow and it is very difficult to prevent sows from getting fat. Making high fibre diets may sometimes be quite expensive. There are other problems associated with this method of feed restriction.
8. By using the electronic sow feeder in which several pigs can be group fed from one feeding area. In this method, the amount of feed each sow gets each day is programmed into the computer. Devices are put in place to prevent other pigs from getting at the feed specifically released for any particular sow. This method is attractive but is expensive.

Feeding the Sow during Lactation

There is a direct relationship between the amount of feed consumed by the sow during lactation and the amount of milk produced. As the level of feed intake increases, the level of milk production also increases and consequently, the growth rate of suckling piglets also increases. Insufficient feeding during lactation would result in the sow drawing on its body reserves causing an appreciable loss in body weight. This may result to depleted back fat reserves, longer weaning to conception intervals, low rates of conception and premature culling. Therefore sows should be given additional feed to meet the needs for milk production. Under normal conditions, the sow produces about 7 kg of milk daily during lactation.

Limestone ²	1.10	1.10	-	-	-	-	-	-
Common salt	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
L-lysine	-	-	-	-	0.10	-	-	0.15
DL-methionine	-	-	0.10	-	0.10	-	0.05	0.10
Premix ³	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Calculated composition								
Crude protein (%)	16.10	16.20	16.10	16.00	16.10	16.10	16.20	16.20
ME, kcal/kg diet	3008	3010	3400	3382	3438	3424	3336	3338
Lysine (%)	0.75	0.93	0.72	0.06	0.75	0.92	0.86	0.75
Meth.+cyst. (%)	0.53	0.58	0.50	0.50	0.52	0.50	0.50	0.50
Calcium (%)	0.91	0.91	1.05	1.05	0.91	0.92	0.93	0.92
Total phosphorus (%)	0.80	0.80	0.80	0.80	0.82	0.82	0.85	0.84

¹ Dicalcium phosphate can be used in the place of bone meal

² A good quality periwinkle shell or oyster shell can be used in place of the limestone

³ Premix contained the following per kg diet: vitamin A, 12,000 i.u.; vitamin D₃, 2000 i.u.; vitamin E, 35 i.u.; vitamin K, 3.5mg; thiamine, 1.0mg; riboflavin, 5.0mg; niacin, 15mg calcium pantothenate, 15mg; biotin, 0.1505mg; vitamin B₆, 2.0mg; choline chloride, 200mg; folic acid, 0.5mg; vitamin B₁₂, 0.015mg; manganese, 20mg; zinc 58.5mg; copper, 10mg; iron, 50mg; iodine, 0.3mg; cobalt, 0.35mg; selenium, 0.15mg.

Feeding the Sow between Weaning and Rebreeding

The level of feeding just before weaning should be maintained for about a week. Thereafter, feed should be provided at the rate of 2.7 kg per day. Gilts that have just weaned their first litter are sometimes difficult to rebreed due to poor body condition. For such gilts, a high level of feed of 3.5 to 4 kg per day (known as **flushing**) should be provided in order to improve the number of days from weaning to rebreeding and to improve the conception rates. Flushing is not necessary for older sows. After breeding, feed levels should be reduced to 2.0-2.7 kg per pig per day. Diets for dry sows are similar to those for the 60-120 kg pig.

Feeding Boars

Boars are first used for breeding at 8 to 9 months of age. Boars should be individually fed twice per day, at the level of 2.3 to 3.0 kg per day. Any of the diets recommended in Table 6-29 for the 60-105 kg pigs is suitable for boars. Over feeding of boars may reduce **libido (sexual drive)**, increase the size of the bear so that it become incompatible with the sows in the herd, result in early culling of the boars.

Performance of Gilts and Sows

The reproductive performance of swine breeding herd is shown in Table 8. these values are only guides and performances above the values stated in Table 6-33 are not uncommon.

Table 8. Reproductive Performance of Swine Breeding Herd

	Temperate ¹	Nigerian ²	Nigerian ³
Age at first breeding – sows (months)	8-9	8-9	10.00
Number of piglets born alive	9.8	9.8	9.4
Number of piglets weaned per litter	8.4	8.1	8.1
Mortality before weaning (%)	14.0	17.4	14.0
Weight per piglet at birth (kg)	1.4	1.5	N/A
Weight per piglet at weaning (kg)	6.4	6.6	5.7
Age of piglets at weaning (weeks)	3-4	3-4	5-6
Number of litters/year	1.8-2.3	1.8-2.3	1.5-2.3
Number of pigs weaned/sow/year	15-19	15-19	12-19

¹Summarized data of research conducted in temperate regions

²Summarized data from Nigeria for large white x landrace crossbreds

³Summarized data from field survey of pig farms in Nigeria (LIMECU, Federal department of livestock and pest control services, Abuja, 1992).

GENERAL COMMENTS ON FEEDING MANAGEMENT OF PIGS

All the diet formulations shown are examples only and other combinations are possible. Manufactured feeds should not be stored longer than four weeks at a time. Feed wastage must be prevented. Feed should be provided in an area separate from the watering area. The watering and feeding system must be adequate and clean. Only up-to-date feeding program should be used. Unproductive animals should be culled. In addition, animals must be kept healthy. Pig pens should be scrubbed daily and disinfected as often as possible.