

# **ANNEXURE – IX-E**

## **PIG**

Introduction

Breeds of pigs

Handling and caring of pigs

Management of the boar

Housing

Satellite Pig Farm

## 1.0 INTRODUCTION

India has one of the largest livestock populations in the world. As per the 2003 livestock census, there were 187.38 million cattle of which 22.63 million are crossbred, 96.62 million buffaloes 61.8 million sheep and 120 million goats and 14 million pigs in the country, Haryana has 0.12 million and U.P. has 2.6 million pigs. From these resources, about 1 million tons of meat is produced annually and it is expected to be doubled by 2005 A.D. This quantity is produced from 1.4 million cattle, 37.3 million sheep and goats, and 1.5 million swine slaughtered in the abattoirs annually. Of the total meat thus produced, 54% is mutton and chevon, 26% beef and buffalo, 13% poultry meat and 7% pork in addition to 2.4 million tons of fish. The rate of slaughter of cattle and buffaloes in the country in relation to their population is approximately 1.4% as against 21-30% in the developed nations. Nearly 99% of Pig Population is slaughtered annually.

The composition of livestock population has undergone significant transformation. The share of bovine population declined from approximately 68 percent in 1951 to less than 58 percent in 2003, and the share of goats increased from 16 percent to over 24 percent. Second, within the bovine population, there has been a clear shift towards buffaloes. The share of buffaloes, in the bovine population increased from 22 percent in 1951 to 33 percent in 2003. Further, within cattle there has been a marked shift from work animals towards milch animals. The proportion of male cattle in the population declined from 41.8 percent in 1972 to about 36.4 percent in 1992. Finally, within milch cattle the population of crossbred cows has grown at a much faster rate than the indigenous stock. For example, the population of crossbred cows increased at the rate of 7.5 percent during 1982-92 compared to 0.1 percent for indigenous cows. As a result, the number of crossbred cows more than doubled from 3 million in 1982 to 6.5 million in 1992 and 23 million in 2003.

Apart from being an important contributor to national income, the sector has been considered as one with high potential for alleviating poverty and unemployment in rural areas. About three-fourths of India's population and almost three-fourths of the poor population in India live in rural areas and over 70 percent of rural households own livestock. A large majority of livestock owning households comprise of small and marginal farmers and landless households which also account for a large share of poor households. Overall, the distribution of livestock is much more equitable than that of land the bottom 60 percent of rural households, own 65 percent of all milch animals leading to more equitable distribution of gains from livestock production.

In addition to being an important source of income for poor households, livestock has many other important roles. It supplies a significant portion of draft power for farming and rural transportation. Dairy products are a major source of nutritious food to million of people in India and the only acceptable source of animal protein for the large vegetarian segment of the population. The organic fertilizer produced in the livestock sector is a key factor of agricultural production and dung from livestock is a major source of cooking energy in rural areas specially among low income households. Not only is it one of the most important productive assets in the rural areas, it also serves as a critical store of wealth for farm families and an insurance mechanism to cope with household related crisis through goats and pigs.

The situation is very disappointing as far as production of high quality, wholesome, clean and disease free, fresh/processed and preserved meat is concerned. In India only 0.02% of the total meat produced is processed as compared to 50% and 80% in

developed countries. The deterrents probably are identified as the difficult (i) climatic conditions, (ii) liking for fresh-hot-meat directly from the butcher shop, (iii) lack refrigeration of chain system, (iv) cost benefit factors, stiff competition in the international meat trade, (v) no organized, (vi) absence of service sector (vii) processing sector (viii) absence of micro credit, due to technological gaps in processing chain. However, it is gratifying to observe that the government and the industry both are keenly interested in technological break through in the age- old meat industry in the country.

Meat industry, although in a very primitive and developing stage in India, is the top food industry in the world. An analysis of world meat scenario reveals that Europe leads in production, followed by developed continents (North America, Europe and Oceania) contribute about 60% to total meat production they have a monopoly in meat exports as their share is as high as 84%. Nearly 55% of all world meat exports are being shared by European countries alone. The share of Asia in world meat export is very low (6.5%) but it is on the rise.

It is disheartening to note that India with a vast raw material base, contributes less than 1% to the world meat production. Our share in the export of meat is also of the same magnitude. The export of meat from India mainly comprises of fresh, chilled meat, frozen meat and frozen meat products (Tables 1.1 and Table 1.2) A major chunk of meat exports amounting to Rs.400 crores is contributed by Buffalo meat (1994-95). Malaysia and UAE are the principal importers of buffalo meat from India (Table 1.3). However, Indian exports of meat constitute barely 0.8% of global export of this commodity. A great potential exists for exporting buffalo meat, beef and poultry in view of increased demand in gulf countries and higher cost of meat from developed countries. India has additional advantage of geographic proximity to gulf countries. There is an urgent need to tap the world meat export market by establishing modern and hygienic slaughter houses with chilling facilities solely for export purposes.

**Table - 1: Growth of meat and meat product export**

<b>Year</b>	<b>Value (Rs in crores)</b>	<b>Year</b>	<b>Value (Rs in crores)</b>
1985-86	74	1991-92	231
1986-87	76	1992-93	287
1987-88	88	1993-94	245
1988-89	94	1994-95	403
1989-90	114	1995-96	627
1990-91	140		

*Source:* Economic Survey of India

**Table - 2: Export of meat and meat products**

(Quantity in 000 MT Value in Rs. in crores)

<b>Item</b>	<b>1990-91</b>		<b>1991-92</b>		<b>1992-93</b>	
	<b>Qty</b>	<b>Value</b>	<b>Qty</b>	<b>Value</b>	<b>Qty</b>	<b>Value</b>
Buffalo meat	63.50	107.00	81.40	189.0	81.60	214.4
Sheep/Goat meat	8.30	31.00	7.60	32.5	13.70	75.0
Processed meat	0.16	0.82	0.19	1.0	0.15	1.0

**Table -3: Product destination**

<b>Item</b>	<b>Major markets</b>
Buffalo meat	Malaysia, UAE, Jordan, Oman and UAR
Sheep/Goat meat	Saudi Arabia, UAE, Oman, Baharain and UK
Processed meat	Jordan, Russia, Oman, Scuchelles, Baharain
Poultry Products	Bangladesh, UAE, Oman, Saudi Arabia, Maldives

If the quality of Indian meat is strictly controlled, the country may boost its meat exports by selling to developing Asian, African and Latin American countries that import about 25% of the world meat exports. These measures will also help in fetching better prices for our produce, which is nearly 30% lower than the average world meat export price.

The meat produced in the country is from about 3000 municipal slaughter houses, 10 modern abattoir complexes and 150 meat processing plants both in private and public sector a part from a large number of individual rural slaughter slabs. Majority of these do not confirm to the basic sanitary requirements and the food animals processed largely pass without any regular meat inspection procedures, at least for the domestic market. The meat is therefore, of questionable quality keeping into consideration the endemicity of important livestock diseases. The diseased and poor quality meat and meat products generate a poor demand from the affluent nations and a low carcass yield influences the cost structure of meat. Thus, there is express need for the modernization of the meat industry by technological break through by constructing hygienic slaughter houses, imposition of a uniform and stringent code of veterinary inspection of meat (ante and post mortem), organization of meat hygiene service with trained meat inspectors, veterinary public health workers, sanitary engineers, microbiologists and food technologists under a coordinating agency.

Meat industry including the by-product processing technology in India needs to be modernized on priority basis to utilize the vast agrarian resources to its optimum capacity, enhance export possibilities, overcome rampant malnutrition among the population and control the risk of meat borne zoonosis.

The population of pigs by and large consists wholly of the indigenous nondescript type (Desi) except for a few pigs maintained at breeding stations and those distributed to farmers under development programmes. There has been growth of crossbreds as a result of these programmes.

To improve pig production in the country some efforts were made after independence and during second to the fifth five year plan; 7 regional pig breeding farms, 8 bacon factories, 55 pig breeding units and 140 piggery development blocks were established in different parts of the country. The primary objective of the regional pig breeding farms is to improve the breeding stock for distribution to pig breeding units for further multiplication. Pig breeding units are supposed to distribute improved pigs among farmers for cross-breeding the local indigenous stock. The second objective of regional farm is to supply surplus stock to bacon factories.

The Government strategy in piggery development work has been to use improved pigs for grading the indigenous population. The breeding stations have been utilized for the multiplication of imported stock for distribution to farmers. Pig production in the rural areas had been concentrated around the bacon factories.

Pig production in the rural areas had been so organized with a view to supply pigs to bacon factories. The pattern and nature of inputs assistance offered to farmers show considerable variation from state to state. The items that may be subsidized are stock, feed, housing, equipment transportation to market (factory ) and stipend for the training of breeders. Balanced feed at reasonable cost was distributed to a limited extent in Maharashtra and West Bengal. This has been discontinued.

Many of the Government pig breeding farms set up so far have been used largely as seed stock multiplication centres from where pigs would be distributed to farmers. On these farms replacement stocks are selected on the basis of preweaning traits and physical appearance.

The Indian Council of Agricultural Research i.e. the research organization at the apex simultaneously is trying to find out the basic requirements for development of pig industry through coordinated project, being run at Indian Veterinary Research Institute, Izatnagar, Jabalpur, Tirupatti and Assam. The project has done considerable research on the genetic mix with fast growth and high adaptability under Indian conditions, the best cost economic rations and the disease calendar for pig units and training of livestock keepers.

The sector's ability to capitalize on the new market opportunities is constrained by the availability and quality of support services. The productive potential of animals depends crucially on the quality of genetic material and the animal health system, and on both these counts India has a poor record. Although there have been a number of initiatives since the early sixties to increase milk production, the quality of meat and meat products improve the quality and supply of draft animals for agriculture, the quality and accessibility of health and breeding services, barring some cooperatives and Non-Government Organizations (NGOs), generally remains poor. On the health side the focus all throughout the past planning periods has been on enhancing the supply of veterinary services by strengthening the capabilities and coverage of the State Animal Husbandry Departments (SAHDs). The number of state run veterinary institutions grew from about 2,000 in 1951 to over 50,000 at the end of 1997-98. These institutions employed some 36,000 professional staff and over 70,000 para-veterinarians. But, all this investment covered mostly curative services. Over 75 percent of this staff either provided curative health services or implemented other livestock development schemes.

This project involves development of a integrated Piggery complex of 100 sows and their followers at 12 acre plot in Gahri- Harswroop village in Gurgaon District as a nodal point for development of farm based entrepreneurship, which will operate as the hub for the development of stallite farm around 10-20 km of Central Nuclear Farm (CNF). Each satellite farm will be offered all the inputs from Central Nuclear Farm at Gurgaon such that they have access to technology, credit, services and goods in an area of 10-20 km around the CNF which will target about 50 sow units (5, 10, 20 or more) and their followers in a period of five years. A market will be provided for all their products viz. meat, livestock and manure the Resource International Pvt. Ltd. will provide inputs to small and marginal pig farmers.

Primary purpose of this report is to highlight the special role of the small holder livestock farmer in sustaining and gaining income through improved Animal Husbandry practices and underwriting technology. This has got a greater relevance when we weigh the resultant benefits to the community through diverse animal resources in terms of human development, against the economic development where there is an opulence of money accrued through individual profit. "Human

Development Report 1999” analyzed the benefit accrued by various economic groups as a result of economic development. 86% share of benefit from world GDP went to the richest twenty percent, 13% to middle sixty percent and 1% went to the poorest twenty per cent. Sixty eight per cent share of the benefit from foreign direct investments in India go to the 20% richest, 30% to the middle 60% and 1% to the poorest 20%.

The case of the small holder in the livestock sector need much greater and concerted attention in the backdrop that the world’s richest animal biodiversity is available in this country, waiting to be explored and tapped optimally.

Following major factors have been identified as constraints to quick growth of this sector in generating wealth and employment:

1. There is a general apathy and lack of interest in piggery development both at official and unofficial levels.
2. Religious taboos and prejudices.
3. Lack of public awareness of nutritive benefits of pig meat.
4. Poor breeding practices and unhygienic management of animals.
5. Pigs are often reared in small groups and allowed to tend for themselves in open and free range condition which is not suitable for hygiene meat production.
6. Desi pigs maintained by poor section of the society and raised mainly as scavengers, is a deterrent to consumption of their meat for various reasons of hygiene and health.
7. There is a lack of systems approach in the operation of pig enterprises.
8. Pig farmers do not get a fair price for their pigs and are usually paid a price at cost lower than the production costs.
9. There are few well trained personal in this area.
10. Lack of genetic diversity in the exotic stock present in the country.
11. Extension publication are lacking.
12. Lack of an organized market for pork and pork products.
13. The small and marginal farmers and agricultural labors schemes in spite of subsidies are not as popular as there are few takers due to little access to credit and margin money.

## **2.0 BREEDS OF PIGS**

### **Breeds – Desi**

In India four kinds of pigs are found viz. Wild pigs, domesticated or indigenous pigs, upgraded stock of pigs and exotics. In order to raise the productivity of indigenous pig stock and thereby to obtain better meat yield, high quality breeds are imported from foreign countries such as European union, New Zealand and Australia.

**The wild pig:** The wild pig has a long snout, short ribs and long legs. Colour of the animal is rusty gray when young and becomes dark chestnut brown with its hair tinged with gray at the extremities. The wild pig is a poor producer of pork products. The meat is however delicious. Blyth is the wild boar found in the forests of Andaman

Islands. The pigmy hog is found in the moist forests at the base of Himalayas in Sikkim and north eastern region including Assam.

Desi pigs differ in their characteristics and colour from region to region. The colour varies from black, brown, rusty gray to an admixture of any two colours. In size and appearance they differ considerably. They possess a long face tapering towards the nostrils. The hairs on the neck and part of the back are thick, long and bristly, while those on the sides and the flank are thinner and shorter. Head and shoulders are heavier as compared to hind quarters, back is slightly arched and rump is drooping. Ears are small and medium sized. Tail reaches nearly the hock and has a tuft of hairs. Females possess 6-12 teats. Adult pigs weigh up to 168 kg. Indigenous pigs are mostly slaughtered and consumed as fresh pork. Some breed types have high fertility genes. So far very little research has been done to characterize indigenous strains of pigs and the diversity in Indian breeds.

### **Exotic Breeds**

The primary objective of swine production is to get maximum lean meat in the form of bacon and ham. It is essential to know the different strains of germ plasm available in the country and all over world in relation to these traits.

### **Large White Yorkshire**

The large white Yorkshire is a native breed of United Kingdom and is reported to produce better bacon when crossed with other suitable types. This breed was imported into India from UK, New Zealand and Australia. It is large in size with a long and slightly dished face. Body is covered with fine hair, free from curves. Skin is pink colored and is free from wrinkles with long and moderately fine coat. Ears thick, long and lightly inclined forward and fringed with fine hair. Neck is long and full to the shoulder with deep and wide chest. Shoulders are not too wide. Back is slightly arched, loin is long and broad with a well developed wide rump. Hump is fleshy extending up to the hocks. Tail is set high. Mature boars and sows of this breed generally weigh 295-408 kgs and 227 – 317 respectively. This breed is very popular for the bacon.

### **Middle White Yorkshire**

The middle White Yorkshire was evolved as a result of crossing Large White Yorkshire and Small Yorkshire breeds of UK. It is a medium sized bacon pig and a good porker at light weights. It is white in colour with a short head and turned dished face wide between the ears. Neck is blended neatly from head and to shoulder. Ears are nearly erect but somewhat inclined forwards. Hams are broad and fleshy up to the hocks. It is a prolific breeder, maturing early and the sows make good mothers. Mature boars and sows of this breed generally weigh 249-340 kg and 181-272 kg respectively.

### **Berkshire**

The Berkshire is one of the oldest English breeds of swine. This breed is valued as a producer of quality meat, specially suitable for the pork market. This breed is used in upgrading programs. The pigs are black with white markings usually on the feet, head and tail. It has a short head with dished face. The snout is short. The body is long and ribs well sprung. Mature boars weigh about 280-360 Kg or more.

### **Landrace**

It is a bacon breed; colour white large in size, ears are lopped, head and neck small, light shoulders, great length of side and heavy hams. There had to be a high proportion

of lean meat and a small proportion of fat and fine bone. The carcass of this breed pig is so proportioned that as much as possible could be made into bacon with as little wastage as possible. Sows have good mothering quality.

### **Hampshire**

Hampshire breed was developed in USA from hogs imported from UK. It is a black hog with a white belt encircling the body and including the front legs. Head and tail are black, and the ears are erect. The pigs are short legged. Sows are very prolific breeders. The weight of a mature boar is 300 kg and sow 280 kg.

### **Tamworth**

Tamworth is possibly the purest modern representative of the native English pig. The colour is reddish or chestnut, typically golden red hairs on a flesh coloured skin. The snout is very long and straight. The ears are fairly large and rigid and incline forward. It has a strong back and thin shoulders. The carcass produces bacon of best quality. Sows are prolific breeders. Mature boars weigh up to 300 kg.

### **Wessex Saddleback**

Wessex Saddleback, an English breed is essentially a bacon breed, easily adaptable for pork production. It is known for its prolificacy and has a robust make up. Head, neck, hind quarters, hind legs and tail of this breed are black. Head is fairly long with straight snout and ears having a forward pitch without being floppy. Pigs of 8 weeks of age weigh 21.5 kg.

### **Duroc**

Duroc has its origin in USA. It is red in colour, with the shades varying from golden to very dark red. It is a large breed with excellent feeding capacity and prolificacy. The sows are good mothers. The weight of mature boar is 410 kg and sow 250 kg.

### **Chermukha**

This is a heavy pork-breed of Russia and imported in India for pork production in North Eastern states. It is a hardy and well adaptable breed, which has thrived well in various parts. It is a spotted pig with patches of black and white. Heavy with strong head and shoulders, face is slightly dished and is wide between ears and eyes, neck is short and back is straight or slightly arched. Ears are long extending forward. Legs are short but strong and feet are strong and fair sizes. Loin is strong and broad, ribs are well sprung and belly is deep with straight underline, hams are broad and full deep to hocks. Coat is long, straight and abundant. Sows have 12 or more sound teats, evenly placed. It is a hardy breed for upgrading the indigenous pigs and has been specially popular in North-Eastern States of India. Now few specimens are available in field.

## **3.0 HANDLING AND CARING OF PIGS**

**Handling and catching:** Small pigs may be easily caught by grasping either of the hind legs just above the hock joint and lifting them off the floor. Stronger pigs should be caught by grasping them behind the shoulders, using your out stretched hands. In this way pigs up to about 50 kg may be handled with little difficulty. Heavier pigs should be run into a cage – such as the pig scales or restricted by using a rope.

Several suitable types ropes are available which are slipped over the upper jaw of the hog and provide the person with sufficient leverage to hold the hog readily when it pulls backward.

For holding large sows and boars, use a piece of stronger rope about one-half inch in diameter and several feet long. Make a loop in one end and slip it over the upper jaw of the hog. As the hog pulls backward, the noose is tightened. The other end of the rope may be quickly snubbed around a post the rope stays tight because the natural tendency of the hog is to pull backward when held in this manner.

**Nose rings:** By instinct most hogs do some rooting, but it is likely to be especially damaging to pastures. When rooting starts, the herd should be "ringed"; and this applied to all hogs past weaning age. Older animals can be restrained by a rope or snare placed around the snout, whereas young pigs can be held.

Many types of rings can be and are used, but the fish – hook type is most common. Rings (usually 1 to 3 rings) are usually placed in the snout, just back of cartilage but away from the bone; although some producers prefer to use a ring that is placed through the septum (the partition of the nose). Others cut the cartilage on top of the snout, but this causes a rather severe setback and should be practiced with caution.

**Clipping the boar's tusks:** It is never safe to allow the boar to have long tusks, for they may inflict injury upon other boars or even prove hazardous to the caretaker. Above all, such tusks should be removed well in advance of the breeding season, at which time it is necessary to handle the boar a great deal. The common procedure in preparation for removing the tusks consists of drawing a strong rope over the upper jaw and tying the other end securely to a post or other object. As the animal pulls back and the mouth opens, the tusks may be cut with a bolt clipper.

**Tube feed small pigs:** Small pigs are often defeated in their quest for milk by bigger pigs in the litter. A simple and effective way to provide small pigs with adequate energy until a sucking order has been established is to tube feed them with supplemental milk.

The equipment necessary for tube feeding is a 20 ml hypodermic syringe, a 12 to 15 inch piece of soft rubber tubing with an inside diameter small enough to fit snugly over the end of the syringe, and a suitable device to hold the syringe while the pig is being fed.

A supplemental feed for young pigs can be prepared by mixing 1 quarter of cow's milk, ½ pint of half an hour, 4 tablespoons white jarosyrup, 1 egg, and a suitable antibiotic.

The procedure for feeding a pig is simple. Hold the pig by the head, place the tube carefully through its mouth into the esophagus, and force the milk into the pig's stomach. Small pigs should be fed 15 to 20 cc at four-hour intervals until they are strong enough to compete successfully for their share of the sow's milk. They should not, however, be removed from the sow unless it is absolutely necessary.

## **Injections**

Shortly after birth a pig receives his first injection. Proper injection involves the right size needle for the job and the best site for the injection. For piglets, 0.5 to 1 inch (13 to 25 mm) 20 gauge needle works for this liquids when an 18 gauge needle is best for thick liquids. Most sow injections should be clean and sharp.

There are two ways in which you may inject a pig (a) sub-cutaneously, which means under loose fold of skin and (b) intramuscular, which is to inject directly into the muscle.

The most suitable site for injecting under the skin is at the base of the ear, where loose folds of skin are clearly available. This site also has the advantage of being in a clean area of the pig's body. An alternative site is in the groin region.

Clean the site with surgical spirit and then inject under loose skin, which may be held between the first thumb and finger of your left hand.

1. Assemble the syringes and needle, shake the bottle and swab the cap with clean surgical spirit.
2. Draw into the syringe a volume of air slightly more than the volume of liquid to be withdrawn, and thrust the needle through the rubber cap of the bottle.
3. Turn the bottle upside down, push the plunger to inject the air in the syringe into the bottle. If you do not do this you will have difficulty in withdrawing the dose, as a partial vacuum will form inside the bottle.
4. Make sure that the needle tip is well below the surface of the fluid
5. Pull the plunger down, drawing slightly more liquid than is required. Push the plunger slightly to expel any air bubbles, and adjust to the right dose.
6. Detach the syringe, leaving the needle in the cap for withdrawing subsequent dose.
7. Finally, attach a second needle to the syringe, expel any air from the needle, and make the injection.
8. Immediately after use the syringe should be dismantled, thoroughly cleaned, and then sterilized by boiling in clean water for twenty minutes.
9. Needles should be changed frequently, and then sterilized with the syringe. For intramuscular injections a 30 mm sixteen gauge is used and for subcutaneous injection a 15mm eighteen-gauge needle is used.

#### **4.0 MANAGEMENT OF THE BOAR**

As the boar contributes half the inheritance of all pigs produced, he therefore has the widest influence over type and the importance of his selection is obvious. Proper management of the boar can influence litter results and prolong his useful life.

When selecting accommodation for the young growing boar two points must be considered, freedom from undue excitement, and the nature of the soil in the yard, it is a wise plan to house the boar so that he will not be excited unduly, also he should not be placed in a yard which has a hard stone-covered surface as the stones will cause sore feet, thus preventing him from working properly later on, and actually shortening his period of usefulness. Sound legs and feet are essential in a boar if he is to work satisfactorily. When the young boar is ready for work he should be given a chance to accustom himself to his duties.

**Control of services is important:** No matter what the age of the boar may be, and for this season mature sows and gilts must be placed in the boar's yards, only when ready for service. It is particularly a bad practice to place a young untried boar amongst sows, as he may be rendered useless for work by being bullied and knocked about by older animals.

When the boar is ready for his first service it is a good idea to select from the baconers about ready for market gilt who is heat and introduce her into the boar pen. Stand by to observe just how the boar performs, and lend assistance if necessary. The reason for

using small gilts is that they are not big enough to bully the boar and make him timid. If baconer gilts are not available a sow known to be quiet should be used, but do not select a big tall sow, unless the boar himself is tall, and able to cover the sow effectively.

However, whether the boar being used is young or experienced, it is best to take the sows to the boar one at a time. If the boar has to mate with more than three sows in one week only one complete service should be allowed for each sow. Too frequent matings will hinder the development of young growing boars, and is not advised for older boars for similar reasons.

After the first mating the young boar should not be used again for a week or more. Where sows are restless and will not stand to service, they should be placed in a rush or race, between a fence and one or two hurdles, or in a service crate. This makes the boar's work less exhausting and tends to ensure effective service.

A boar needs exercise and proper feeding to prevent his becoming lazy. Boars which become very fat often cannot work, and may become useless or even important. Where sows of various sizes have to be mated to the one boar, or where the boar is much smaller than the sows, the use of some apparatus to lessen the difference in height is of advantage. However, a modification of the service crate may be arranged by digging a shallow pit and using hurdles; the sow being prevented from moving forward and the hurdles arranged so that they do not prove of undue assistance to the boar, thus preventing his developing a dependence on aid for effective work.

Where the boar is properly handled the ratio should be 20 sows or less for each boar. As a safety measure it is advisable to de-tusk the boar, this will prevent injury to brood sows and possibly to the owner or hired attendant.

A simple and effective method of de-tusking is to securely rope the boar to a post with noose over the upper jaw and cut the tusks off to gum level with a pair of bolt cutters.

### **Management of the Sow**

As with the young boar, gilts would be given every opportunity to develop fully before mating. The same rules regarding feeding and housing should be followed, and the general management is the same. When the gilt is 8 to 9 months old and well grown about 125 kg. live weight – she may be mated. Early mating of gilts hinders body growth, as a portion of the food eaten is required for the development of the litter at the expense of the gilt's own growth. The position is worse when she is suckling a litter, as the demand of her body is increased. The result is that early mated gilts do not grow to maximum size, and are seldom able to handle big litters as well as similar gilts allowed to grow before mating.

Gilts and sows should be in fleshy condition prior to mating. Fat sows are liable to fail to hold to service, or they may produce small litters; thin sows may do likewise, and if successfully mated will probably remain in low condition due to the demands made by the unborn litter. Such sows cannot be expected to give permanently good results.

Sows which are very fat should be given very light diet for a few weeks, then be fed well for a week before mating. Sows which are poor in condition should not be mated to the boar just after weaning the litter, but fed well for three weeks, and then mated, continuing the feeding to build up condition and strength by next farrowing time. Sows which have not bred for a few months should also be flushed as that tends to stimulate the whole body and its functions, tending to ensure effective mating, with an increase in litter size. The feeding of young green Lucerne for flushing has given excellent results.

Young sows should not be mated to a rough or heavy boar if another is available, for reasons similar to those of not putting a young boar with big sows. Service crates or other aids may be used but only if necessary as their use is not generally successful and their preparation entails additional expense.

Indications that the gilt or sow is “in season” will be obvious to the pig raiser. The period of heat lasts from one to three days, generally being two days. The functioning of the reproductive system is such that best results are generally obtained by mating the sow on the second day when the commencement of the heat period is known. The most convenient time to mate the sow is just before feeding. She should be taken to the boar’s paddock, and when the boar has completed service properly, she should be removed to a pen of her own, and be kept quiet for a few days thus improving the chances of the service being effective. If the boar has covered the sow for at least three to five minutes the service should be successful. The date of service, due date of farrowing, and the boar’s name should be entered in a sow’s breeding record with any other appropriate information.

The sow should be closely watched 21 days after service to see if she comes on heat again, as the normal interval between oestral seasons is 3 weeks. If she does not show signs of hogging she can be regarded as an in pig sow.

After remaining for a few days in a pen alone, the sow may be returned to the sow paddock, where she should be fed to build up condition right up to farrowing time, but should not become fat. Exercise and green food are essential, and may best be supplied by allowing the sows to run in a grass paddock or on a crop for grazing, such as Lucerne. In pig sows should be kept free from disturbances by dogs, cattle and other sows which are hogging. Also the food troughs should be so built and of sufficient number that the sows do not have to fight and scramble at feeding time. Rough treatment from one of the above causes may bring about abortion. Foods should be wholesome, and contain ample supplies of the necessary nutrients, especially vitamins and minerals. Clean drinking water should be available at all times. Shelter sheds should be warm in winter, cool in summer and dry at all times. Shade trees are of benefit and in hot areas a wallow is beneficial, provided that it is kept clean.

Under no circumstances should a sow be constipated at farrowing time, for constipated sows will experience difficulty in farrowing and often become feverish, clumsy, lose their milk supply, and thus the litter is wholly or partially lost. The practice of light feeding prior to farrowing will help to prevent the occurrence of such troubles.

Gilts and sows should be kept quiet at farrowing time, and the pig raiser should not interfere unless the sow is obviously in difficulty. Some knowledge of the anatomy of pigs is essential in such cases, and the attendant should be gentle, and exercise common sense. Sows in good condition rarely require attention at farrowing time, but they should be watched occasionally to see that all is well. When a sow is restless, or weather is cold or wet it is a good practice to take each piglet as it is born, free it of membranes, wipe it dry, and place it in a straw-lined box where it can be kept warm.

### **Properly Caring for the Sow During Gestation**

**Feed a Balanced Ration:** The kind and amount of feed fed a sow from the time she is bred until she farrows affects the size, vigor, and number of pigs born. The ration also influences the number of pigs that are weaned. The gestation ration must provide adequate protein, vitamins, minerals, and energy to maintain the sow’s body and

nourish the developing unborn pigs. In addition the gestation ration must furnish gilts sufficient nutrients for growth until they reach mature size.

**Limit Energy Intake:** Hand feeding brood sows and gilts during the gestation period is recommended to save feed and increase litter size. A daily feeding of 2 to 2.5 kg of a high-quality, concentrated ration is usually sufficient for sows and gilts in dry lot during the first two-thirds of gestation. The ration should be increased to 3 kg per day for the last month to six weeks of the gestation period, to meet the greater nutritional requirements of the developing pigs at this time.

**Feed sows in Stalls During Gestation:** Feeding sows and gilts in stalls is necessary to eliminate the problem of overfeeding aggressive sows and underfeeding timid sows. Some sows can eat 2 to 2.5 kg of feed in 15 minutes while others may require as long as 30 to 45 minutes to consume the same amount of feed.

**Provide Pasture for Gestating Sows:** High quality legume pastures provide an excellent source of feed for breed sows and gilts and make it possible to limit the feeding of grain and protein supplements. 1 to 1.5 kg of feed per head daily on pasture will produce a gain on sows and gilts during pregnancy equal to that produced by 2 kg of feed per head daily in dry lot.

**Control Gains During Gestation:** The optimum weight gain during gestation will vary with the type, weight, and condition of the gilt or sow at breeding. But as a general rule, sows should gain approximately 30 kg and gilts should gain approximately 40 kg during this period. Since some gain appears to be essential for satisfactory lactation performance, and most of the fetal growth occurs during the later part of the gestation period, it is desirable that the largest part of the gestation gain be made during the last one third of the pregnancy. Also, a high energy intake early in the gestation period has been found to be a contributing factor to increased embryonic loss.

**Provide Exercise:** Sows which have sufficient exercise during the gestation period usually have less difficulty at farrowing and they often produce pigs which are more vigorous than those produced by sows which have not had ample exercise.

**House Properly:** The sleeping quarters should be sufficiently large to be comfortable for the sow and should be warm, well bedded, properly ventilated, and dry.

**Control Parasites:** Sows and gilts should be wormed three to six weeks before they are to farrow. Lice and mange can also be controlled by spraying sows with lindane, toxaphene, or malathion at the same time they are wormed.

### **Caring for the Sow Prior to Farrowing**

**Remove Sow from Herd:** A few days before farrowing the sow should be removed from the herd and thoroughly scrubbed with soap and warm water to remove all dirt from her body. This is very important since dirt may contain many disease germs and parasite eggs. If either lice or mange is present, the sow should be treated before farrowing.

**Add bulk to the Sow ration:** Adding bulk to the sow's ration 3 to 5 days before she farrows will help prevent constipation while she is confined. The amount of feed does not need to be reduced. If a different ration is to be fed after farrowing, this is a good time to make the change.

### **Caring for the sow at farrowing**

It is good practice to be on hand when sows farrow, or at least to check on them every few hours. However, too much attention to a nervous sow may do more harm than good.

### **Caring for the Sow after Farrowing**

**Provide Fresh Water:** The sow should be given an ample supply of fresh warm water at farrowing time. If she seems hungry, offer her ½ to 1 kg of a bulky feed such as wheat bran or ground oats. After the first day, gradually increase the sow's feed so that she is on a full feed of 15 to 16 per cent protein ration by the end of the first week. Full feed the sow for the rest of the lactating period.

### **Management of suckling piglets**

#### **Removal of mucus membrane**

Immediately after the piglets are born, make sure that all mucus is removed from the nose and mouth.

**Revive stillborn pigs:** It is not uncommon for one or more pigs in a litter to be stillborn. Not all pigs can be revived but a surprising response may be observed by applying one of the following approved practices promptly:

1. Use a small funnel to provide mouth-to-mouth resuscitation.

Place a plastic funnel over the nostrils of the stillborn pig and blow air into the lungs from the small end of the funnel.

If a plastic funnel is not available insert the small end of a funnel in the stillborn pig's mouth, place a finger over the pig's nostrils, close the pig's mouth around the funnel, and blow air into its lungs from the large end of the funnel, and blow air

2. Shake the pig vigorously while holding it upside down by the hind legs with one hand and keeping its mouth open with thumb and finger of the other hand.
3. Rub the stillborn pig briskly and massage each side of the rib cage.

**Feeding Colostrum:** The piglets must receive the first milk which the sow gives after farrowing and is called colostrum. Be sure to feed the piglets should get enough of colostrum daily for the first 3 days following its birth. Any excess colostrum may be fed to other piglets in the herd in amounts equal to the amount of whole milk normally fed. None of it should be wasted. The digestibility of colostrum increases when it is given at a temperature between 99°F and 102°F. The importance of colostrum can be felt more from the following virtues.

- a) The protein of colostrum consists of a much higher proportion of globulin than does normal milk. The globulins are presumed to be the source of antibodies which aid in protecting the animal from many infections liable to affect it after birth.
- b) The protein content of colostrum is 3 to 5 times as that of normal milk. It is also rich in some of the materials, of which copper, iron, magnesium and manganese are important.
- c) Colostrum contains 5-15 times the amount of vitamin-A found in normal milk, depending upon the character of the ration given to the mother during the rest period.

- d) Colostrum is also superior to milk in having a considerably greater amount of several other vitamins which have been found essential in the growth of dairy calves, including riboflavin, choline, thiamine and pantothenic acid.
- e) Colostrum acts as a laxative to free the digestive tract of faecal material.

**Cutting of Navel cord:** The navel (umbilical cord) should be tied off to prevent loss of blood, and it should be cut so that 3 to 5 cm remain and this portion dipped into a solution of iodine. This section will soon dry up and drop off, leaving a clean, non-infected navel. The umbilical cord is a crucial area for the entrance of infection. A common malady, "navel ill," which can cause lameness or death, may result from failure to disinfect this cord at birth.

**Treatment of Anemia:** Iron should be administered to prevent anemia, the new born pig has only a limited reserve of iron for hemoglobin synthesis owing to inefficient placental transfer of iron to the fetus. The newborn pig contains only about 50 mg. Since sow milk is also very low in iron, the suckling pig must have supplemental iron during the first few days to prevent anemia. Pigs depend mainly on milk for nutrients until they begin to nibble on sow feed or creep feed at two to three weeks of age. Thus, the amount of supplemental iron should be 150 to 200 mg to meet the needs until iron-containing dry feed is eaten in significant amounts at about three weeks. In the past, this iron need was from the environment. When pigs are kept indoors in concrete-floor pens this source of iron is eliminated. Anemia can be prevented and cured by supplying iron either orally or by injection.

Oral administration consists of spraying or swabbing the sow's udder with a solution of ferrous sulfate (1 lb ferrous sulfate in 1 gallon of water) so that some iron will be ingested when the pigs nurse. To be effective this solution must be applied daily from birth until the pigs begin to eat creep feed. Commercial sources of iron in the form of pills or pastes, to be administered to the pigs individually, are also available. Also, iron-rich sweetened feeds or pellets may be provided on the pen floor. A more dependable method is the intramuscular injection of iron dextran compounds. These compounds are available commercially and a single injection given at 4<sup>th</sup> and 14<sup>th</sup> days provides protection until dry feed is consumed. A concentration of 100 to 150 mg of iron per ml is customary, so that a 1ml injection is adequate.

**Removing needle teeth:** New born pigs eight small, tusk like teeth (so-called needle or black teeth), two on each side of both the upper and lower jaws. As these are of no benefit to the pig most swine producers prefer to cut them off soon after birth this operation may be done with a small pair of wire cutters or with forceps made especially for the purpose. In removing the teeth, care should be taken to avoid injury to the jaw or Jaw, for Gums; for this reason only the tips of needle teeth should be clipped about 2/3 of each tooth.

### **Identification**

The identity of an animal has to be established soon after its birth. Pig can be marked by ear-tag, tattoo number, tags attached around the neck or ear notches, photograph or by colour sketches.

### **Body Tattoo marking**

Tattooing is the best and most practical way of marking for the identification.

Area on which the tattooing is to be applied should be clean and free from accumulation of muck. The tattoo needles are dipped in the paste or ink. The best position on the body for the tattoo mark is on the shoulder.

The efficiency of tattooing as a means of identification depends on.

1. The effective use of the tattooing instrument.
2. The use of an instrument of a reliable type with strong sharp needles.
3. Taking time to do the job properly; and
4. The use of a reliable brand of ink, paste, or paint.

### **Ear Marking**

No system of identification is perfect, but for the identification of live animals both earmarking and ear tattooing are practical and readily applied. The earliest age at which an identification mark becomes necessary in pig is between one and two months.

**Ear Tattooing:** Tattooing the ears is another method of marking pig belonging to light coloured ears, the method is to punch several small holes with a dye (meant for this purpose) in the form of numbers or letters through the skin on the inside of the ear and then fill them with tattoo ink. If done correctly, this is a permanent mark. The usual practice is to start the marking with '001' and continue the same up to '999'. Its disadvantage is that animal must be caught and the inside of the ear cleaned to be able to read the identifying marks.

**By Ear Notches:-** A satisfactory system of earmarking pigs by Notches in the ears. For this system of ear marking unit numbers 1 to 9 are placed in right or off ear, and tens (10 to 90) in the left or near ear. As the position of the notch on the ear determines its value, it is important that positions 1 and 10 and 4 and 40 be kept well towards the bottom and the tip of the ear respectively, to prevent confusion with the positions 2 and 20 in the middle of the ear.

### **Ear tags or Buttons**

**Ear Tagging:** Ear-tags are metal pieces with number or letters engraved on them. There are two types of ear-tags, self piercing tags and that require a hole in the ear made with a ear punch. Generally the tags are inserted within on third of the way out from the base of the ear, generally on the upper edge of the ear with the number on top.

All tags are subject to being pulled or torn out or to be crushed, mutilated, or disfigured to such an extent as to be unreliable as a means of identification. Liability to be pulled or torn out when the animal fights or rubs against wire netting, and consequent unreliability as a permanent identification. If not properly inserted, the ear tag may disfigure the ear. The method of applying the ear tag by use of combination pliers is that one portion of the instrument is used to punch a hole in the ear into which the tag fits. The other portion of the pliers is to seal the tag.

### **Hair-clip marking**

Marking pigs by clipping away the hair on any particular portion of the body is at best merely a temporary sale mark so also is paint marking. Very strong objection to their use lies in the fact that an unscrupulous person could readily disfigure the mark and thus cause confusion and annoyance.

### **Creep feeding**

This is a critical management skill that is essential for growth of the young pig. Usually the floor is the best place to begin, the golden rule being fresh, palatable creep feed, little and often.

The creep area must be well designed to present poaching of creep feed by the sow and the food needs to be fresh, attractive and palatable. Perhaps the habit of creep feeding is more important than the actual quantity intake, but once the creep feed consumption builds up the litter is less reliant on the sow's milk.

Price per kg of creep feed does not really matter since food conversion is very good at this stage. Once young pigs are eating, most rearing problems are solved.

It is unlikely that much creep will be eaten before seven to ten days, but it should be introduced at about five to seven days. Even at three weeks daily food intake will be well under 0.45 kg per pig per day, and at four to five weeks is not likely to be much more than 0.45 to 0.68 kg per head. The major factor influencing weaning weight will be the age at weaning, but correct feeding of the sow during early lactation and successful creep feeding play a large part in reaching an optimum weight at the appropriate age.

### **Castrating the piglets**

Castration is the unsexing of the male or female and consists in the removal of both testicles or ovaries respectively. It is probably the most common and oldest of all surgical operations, its objectives are to prevent reproduction, to increase faster body weight gains to produce a more desirable type of meat and to make the animal docile and easier to handle.

**When to Castrate :** Pigs may be castrated when two to six weeks of age while they are still suckling the dam, since at that age there is considerably less shock to the nervous system and the growth of the pig will not be checked. A two to six weeks' old pig can be handled conveniently, and the testicles are large enough to render their removal quite simple.

**Equipment:** One sterile scalpel and sterile blades, surgical spirit, cotton-wool cloth and bucket of warm water with mild antiseptic solution added, sulphanilamide powder.

**Treatment of Animal, etc. Prior to Operation:** (1) The animal should be without food for at least six hours before the operation is to be performed. Clean drinking water, however, should be available. (2) The knife to be sharpened to razor-edge. Prior to the commencement of the operation and while not in use the knife should be kept in the disinfectant solution

**Method of Castration:** An assistant should catch the male pig by the hind legs and hold it between his legs in an upside-down position. Wash the scrotum with the warm water and antiseptic to remove dirt and dung. Swab the scrotum with surgical spirit. Hold the testicle between first finger and thumb by pressing the testicle forward with the third finger. Make a firm, fold incision down the length of the testicle. At this stage the stone will pop out and may be gripped with the finger and thumb and pulled out, or the cords may be severed with scaplel.

Repeat with the second testicle. Dust the cavities with sulphanilamide powder to prevent infection of the wound.

Return the pigs to a clean, disinfected pen, with plenty of fresh bedding.

**Weaning:** It is customary to wean pigs at five or six weeks of age, although some producers are routinely weaning pigs at an earlier age. Some advantages of early weaning are these:

- (i) Sows require less feed during lactation;

- (ii) Sows can be rebred earlier if desired;
- (iii) There is a possibility of heavier, more uniform pigs at six weeks of age, However, It requires superior management.
- (iv) The stress of weaning can be minimized by removing the sow and leaving the pigs in the farrowing pen for the early part of the growing period.

### **Transportation and care during transport**

In India specially built transport trucks for pigs or for that matter for any livestock are not available in India, as such the common transport trucks are used for transportation of pig loads. From nearly distances of about 15 to 20 kilometres around meat production units pigs are mostly driven on foot by road. Contractors and pig producers generally prefer transport through trucks for quicker transport and transaction. During transport by truck animals be provided with sufficient bedding, paddy straw which is commonly used as bedding in India, so that animals don't get bruised in transit and animals should not be overloaded in the truck to avoid exhaustion and if possible properly restrained during transit to avoid injury. In case of long distances and specially during summer months, they should be provided fresh clean water for drinking for which bucket, and watering troughs as made available. In case of long distances and some light food on way should also be provided to them.

These pigs are also transported to long distances through Rail, in Railway Vans. In such cases, bedding of paddy straws watering arrangements and feed be provided and an attendant has to accompany them. Bruise injury be avoided. They can be kept in small enclosures, temporarily provided in the Railway vans.

Care in preparing animals for transportation to long distances either by Truck or Rail is required to be taken in loading and the handling of pigs so as to reduce greatly the losses due to bruises, crippling and death of animals in transit. Following considerations be given in transport of pigs:

- i) Clean the truck or Railway wagon before loading the pigs;
- ii) Don't feed pigs heavily before transportation;
- iii) Use paddy straw for bedding specially during winters;
- iv) Do not put too many or too few pigs in truck of Railway wagon;
- v) In hot weather, generally transport them during night;
- vi) Handle the animals quickly and with care;
- vii) Check rail heads and other obstructions in the transport truck before loading and remove them to avoid possibilities of any injury to animals;
- viii) Wet or sprinkle animals and bedding during hot weather. The greater the distance, the greater the value of sprinkling and there is less danger of mortality from heat and less bruising from transportation, crowding and less shrinkage;
- ix) Heavy and light pigs depending on weight be kept separately.
- x) Animals should not be overloaded. Allow about 2-2 pigs of about 90 kg. weight for running foot of length and about 1.8 pigs per running foot of length of truck of Railway wagon floor space;

- xi) Side openings be closed and cover over truck provided specially during summer/rains to avoid heat stress.
- xii) The vehicle should be driven carefully and sudden steps checked.

### **Disinfection and Precautions in transport**

It is always advisable to clean and disinfect any Rail wagon or Truck, through which pigs are transported.

Every fitting in the Railway wagon or truck should be thoroughly washed or scrubbed or scoured with water, washing soda and then disinfected with any approved disinfectant. The scrapings and sweepings of the truck or Railway wagon floor and the sides along with solid material be first removed there from and may be mixed with quick lime and can be destroyed by fire by burning in case there is suspicion of infections or disease in animal during earlier transport. All head glare and halters used for securing animals on truck or Rail wagon, after use be disinfected by a thorough immersion in the disinfectant. The disinfectant used is standard phenol of the dilution which can be one part of phenol to Nineteen parts of water or any other disinfectant equivalent to it.

Precautions in transport be taken keeping in view various points regarding loading and the load of pigs during transport, capacity of the vehicle be kept in view, while deciding on number of pigs to be transported along with the weight of the animals, they should not be too few or too many in the vehicle. Time and distance for transport be kept in view in the light of weather conditions i.e. in summer transport in night be preferred and stress conditions avoided and facility for sprinkling of water on animals should be made available to avoid exhaustion. Proper bedding and precaution to avoid any bruises or injury during transit be taken.

### **Hygiene**

#### **Dis-infection of Piggeries**

A Piggery may require disinfection following an out break of Swine fever, and erysipelas. Feeding butchers offal is the most common method by which the disease is introduced and therefore attention need to be paid to offal containers crates and feeding utensils

Dis-infection of Piggeries in following disease is described for guidance only.

The cleaning and disinfection should specially be directed to those parts of the premises and to such things as are most likely to have been in contact with pigs themselves or their excreta. These include floor, lower parts of the walls food troughs, pig crates nets, brushes and shovels etc. Used in cleaning the pens the boots of the attendants and any other thing that the farmer thinks may have been in contact directly or indirectly with infective material. It is generally considered that infective manure loses its virulence in comparatively short time but infective manure taken from the piggery should be buried. After an out break of disease cleansing must precede disinfection. The pens should be well scraped out and the scrapings added to the dung water should than freshly used and the place thoroughly scrubbed and scoured. All the corners and angles in the pens and passages should be picked out clean. The walls require scrubbing to a height of at least 6 ft. If piggery is dirty and ill lit the cleansing operations may well be extended to other parts that are not necessarily splashed with manure Following the preliminary cleansing the premise and equipment may be disinfected by bleaching powder

The floor walls food troughs etc. should be scrubbed with a 10% sol of bleaching powder and than left for 24 hours, after which the entire place should be thoroughly scrubbed out to get rid off all residue. The doors and windows must be left open to get the place dry after which fresh animals may be admitted

### **Disease prevention through management of sanitation**

#### **(I) For new Boars**

- (1) Preparation of Prospective mother
  - (a) Observe record of breeding date observe closely for first in of labour
  - (b) Remove all manure a dirt and secretions from mammary area
  - (c) Provide light laxative but adequate ration avoid constipation
  - (d) Provide sufficient fresh water
  - (e) Provide trace, minerals e.g. bone meal etc.
  - (f) Provide clean well disinfected farrowing pen
  - (g) Obtain Veterinary aid at first sign of abnormal or difficult parturation

#### **(II) Post Parturent care of young**

- (a) Remove mucus from mouth following delivery
- (b) Apply Tr iodine to naval Chord.
- (c) Aid new born in nursing. Provide colostrums, check for mastitis, and Chip baby teeth of piglets.
- (d) Remove Placenta and contaminated bedding from pen immediately following passage. If Placenta retained obtain Veterinary aid
- (e) Watch for enteric, respiratory and infections disease
- (f) Cartage or notch offspring for registration and production record and identification
- (g) Provide supplementary heat during inclement weather
- (h) Thorough cleaning of all utensils etc.
- (i) Castrate at recommended age
- (j) Prophylactic vaccination

### **III. Transportation**

- (a) Move pig only through experienced transporter with good transported vehicles.
  - i) Avoid stress Provide light food, water and rest.
  - ii) Transport only in clean disinfected vehicles;
  - iii) Avoid transportation of animals in inclement weather

### **IV. Isolation**

#### **Isolate all new additions for observation:**

- i) Isolate for 30 days
- ii) Have animals rested and inspected for disease prior to admission in the main herd.

## V. Disposal of Carcass

### The disposal of carcasses is effected by two methods

1) Cremation/incineration

2) Burial

(I) **Cremation** : There are three methods of cremation

(a) The crossed trench

(b) The Bostock pit and

(c) The surface burning method

(a) **The crossed trench** : In this two trenches 7 ft long are dug so that they cross each other. Each is about 18 inch deep and 15 inch wide becoming shallower towards the extremities of the limbs. The soil is thrown on the to the surface in the angles of the cross and upon the mounds so made two or three stout pieces of iron beams of wood or trenches from a tree are placed straw and faggots are Piled in the trenches to the level of surface of the ground the carcass is placed across the centre of the trenches and more wood or coal is piled around and above at sufficient paraffin oil is pouised over the whole and straw is lighted.

(b) **Bostock Pit** : In this method an oval pit is dug which is 4 feet wide and dug to a depth of 3 ft to 4 ft and a crossed trench 9" x 9" is dug in the floor upon a wind ward side of the pit ventilation trench of 4 ft long and 1' 6" wide and deep than the main pit and at right angles to is dug. A field drain pipe is placed in a tunnel connecting the trench with the fert this pipe is stufted with straw more wood or coal is piled around and above it and paraffin oil is poured over the whole. The straw is finally lighted in the bottom of the ventilation when burning is complete the soil is replaced and the ground is leveled.

(c) **Surface burning Method** : One long trench is dug about 1'6" deep and 1 foot wide and about 3 ft length. Fuel is placed around the central trench and the carcass are drawn across it. More fuel is heaped around and between them and Paraffin oil or petrol is sprayed over the whole. The straw lighted. More fuel may be required.

**Precaution:** Where the carcass of an animal has divide from a contagious disease is Burial Suitable site be selected where there will be no danger of Pollution of steams, rivers and canals or other water supplies and where there is a sufficiency of sub soil to allow a depth of 6 clear ft. of soil above the carcass a pit is dug, about 8 or 9 ft. deep, in such a manner that the surface soil and the sub soil are not mixed and a clear approach is left to its edge roughly about 3 ft. for each pig. The dead animal should be arranged upon its back with the feet upwards and if these rigidly project too far, upwards, the locks may be 'hamstunged' and the tenders round the knee divided. Where contagious disease has been cause of death the removal of skin is not be encouraged. The carcass is next covered with quicklime or a powerful dis-infectant, and the pit filled in with sub soil. If the weather is very wet or if the soil is naturally loose and soft the surface of the ground should be fenced of to prevent horse, cattle form passing over and perhaps sinking into the loose soil. It is not safe to plough over a large burial pit for 6 months after it has been closed, nor should heavy implements or vehicles be allowed to pass over it.

Finally, all attendants should the informed of the risks they run in handling disease carcass and with risks there are of contamination other healthy cattle, and each one of

them should be made to wash his hand and arms and to dip his feet into a Pailful of disinfectant before he leave, the place of disposal.

## **Reproduction**

**Estrus:** The period of time during which a sow or gilt will mate with a boar is known as estrus or the heat period. Estrus first occurs when gilt reaches puberty, at six to seven months of age, and may last from one to five days, although two to three days of heat are most common.

**Estrus Cycle:** If gilt or sows are not bred or if they fail to conceive, they will under normal conditions return to heat in 18 to 24 days. This period of time, referred to as the estrus cycle, is divided into the following stages; (1) metestrus, which follows ovulation and lasts for three days; (2) diestrus, the period from the fourth day to the seventeenth day; and (3) proestrus, from the eighteenth day until ovulation.

**Signs of Estrus:** Sows and gilts vary a great deal in their expression of external signs of estrus. Some are quite easy to detect and others most difficult. The following signs of estrus are common in most sows and gilts:

### **1. Coming into heat**

- a) Restlessness – walking the fence, grunting, squealing.
- b) Enlargement and inflammation of the vulva
- c) Mounting of companion sows
- d) Running or moving away when pressure is applied to her back
- e) Trace of discharge from the vagina

### **2. In standing heat**

- a) Vulva at the peak of enlargement and inflammation
- b) Mucus discharge from the vagina
- c) Bracing and flipping up of her ears when pressure is applied to her back.
- d) Standing for companion sows to mount her.

**Age to breed:** Although gilts may come into heat at 4 or 5 months of age, the general recommendation is to breed at the third heat, to take advantage of increase in ovulation rate. Therefore, gilts are usually bred at 7 to 8 months of age.

**Best time for breeding sows:** In deciding on the best time to breed sows the following factors should be considered.

- 1) The time of year to market the pigs to best advantage
- 2) The climatic conditions
- 3) The equipment and labour available

## **Timing of mating or insemination**

It is to breed the sow during the first or second day of the heat period. Larger litters may result from two services 12 – 24 hours apart. The gilts should also receive twice her normal ration on the day of mating and the day after. After conception takes place the fertilized eggs attach themselves to the wall of the uterus to develop into foetus.

Unfortunately, many of the fertilized eggs will be reabsorbed into the sow's blood stream if she is upset, knocked about by moving from place to place, or bullied by other sows. It is for this reason that the gilts is best housed separately for a couple of days after mating and fed well.

## **Breeding procedures**

**(a) Hand mating :** In this procedure individual sow or gilt is brought to the boar. The benefit of the procedure are as follows:

1. Exact breeding dates are known
2. There is assurance that each female is bred.
3. More is known about the breeding performance of the boar
4. Hand breeding also allowed a mature, heavy boar to breed gilts, or a young boar to breed big rangy sows by the use of a breeding crate.
5. By this method the boar can be used to breed the maximum number of sows.

### **(b) Pen-mating or Herd mating**

In this method boar is allowed with the sows to be bred. When this method is in practice two procedure are recommended:

1. Split the sow or gilt herd so as to have one boar per group of 10 to 12 females. Or
2. Use one boar or set of boars one day and another boar or set of boars the next day.

**Parturition:** Parturition is defined as the process of the pregnant uterus delivering the fetuses an placenta from the maternal organism. It is one of the most critical stages in the whole process of pig production, for the well-being of both the sow and the piglets.

## **Stages of parturition**

### **Parturition can be divided into three phases**

Stage 1. The preparatory stage (dilation of the cervix).

Stage 2. The stage during which the piglets are expelled.

Stage 3. The stage during which the placenta or afterbirth is expelled.

#### **First stage**

The cervix (Muscular entrance to womb) dilates in preparation for delivery of the piglets and the muscular walls of the womb start to contract rhythmically, moving the fetuses towards the pelvic inlet. These contractions occur about every 15 minutes and last about 5 to 10 seconds but become more frequent as farrowing progresses. During the first stage, the only outward signs are those of abdominal discomfort and restlessness.

#### **Second Stage**

As soon as the first piglet enters the cervix, which lies within the bony cannal or pelvis, the sow begins to assist expulsion of the foetus with visible abdominal contractions (straining or pressing). The period from the beginning of abdominal contractions to expulsion of the first piglet may take from one to three hours in most cases (with a range of 15 minutes to almost 10 hours).

#### **Third Stage**

The ends of each afterbirth become fused with adjacent afterbirth in the majority cases, forming a continuous tube through which the piglets pass. However, part of the tube' may break away during farrowing so that a clump of afterbirth may be passed. Nevertheless, in the majority of cases, all the afterbirth is passed in one mass after the last piglet has been born.

## **Behaviour of the sow during farrowing**

The marked increase in the average activity of sows, as they approach farrowing, continues during the second phase, i.e. when piglets are being expelled. Some sows are

very peaceful in the second and lie on their sides throughout. Whereas other sows can be very restless and this particularly applies to gilts.

### **Intervals between births**

The longer it takes to free itself from the cord attaching it to the placenta and the longer it takes to get a successful suckle. Thus, a long delivery period would seem to have an adverse effect on the vigour of the piglet at birth. Prolonged birth interval can result in piglets which were alive at the start of farrowing, dying from suffocation in the uterus. Such deaths are termed intra-partum stillbirths or type 2 stillbirths as distinct from type 1 stillbirths or prepartum deaths, which have occurred before the start of farrowing.

The longer period from the delivery of the first piglet will cost delay in reaching the udder for suckling and cause depression in vigour of new born piglet. This depression may also be the result of greater physical difficulty of later born piglet in getting the udder and to obtain a successful suckle because of the presence of early born piglet at the udder and stiff competition from them.

### **Birth order:**

The incidence of still birth (intrapartum deaths) increases with the birth order. These piglets dying from anoxia (suffocation) intrapartum can often be recognized by the staining of their body with greenish brown material which is meconium or foetal faeces. These faeces are released as the piglet suffocates in the uterus and they soil the surface of the piglet. Later born piglets run a greater risk of being born dead. It may be due to suffocation in the uterus as farrowing proceeds veterinary help is required.

## **5.0 HOUSING**

### **Fundamental needs**

The commercial pig production with exotic breeds is being promoted in our country. It has increased the need for adequate and cheap housing. The pigs are highly susceptible to climatic stress. The heat regulating ability of new born piglets is very poor, and as a result, mortality increases in pre-weaned piglets due to extreme change in weather. Housing can help in providing good management for production of high quality pigs.

### **The basis principles & requirements of Housing**

The pig is a warm blooded animal. Its body temperature is 38.9°C. It has no sweat glands. The young piglets are poorly endowed with hairs, skin and subcutaneous fat and very susceptible to cold, damp and draught. The greater part of the energy is converted into heat, faeces and urine. The utilization of energy in the production of heat can be minimized only through good housing. The most economical way to help pigs to maintain a heat balance is to give them free access to shade all through the day.

Desirable temperature for pigs of different ages and weight are as follows:

0 – 1 weeks	25 – 30°C.
1 – 5 weeks	22 – 27°C.
1 – 5 weeks	22 – 27°C.
Less than 50 kg	18 – 24°C.
More than 50 kg	15 – 24°C.

Other factors like climatic condition, humidity, air velocity influences on the heat tolerance of the animals. Temperature exceeding 30- 35°C for exotic and crossbred pigs would reduce feed conversion efficiency in growing and finishing pigs and reproductive performance in breeding animals.

### **Types of pig sties under confinement system.**

There are three types of pig sties generally constructed for housing of different classes of animals.

- i) Grower's / Finishers pens: Growing/ finishing pigs (20-90 kg live weight)
- ii) Farrowing pens
- iii) Gestating sows.

### **Location**

A good location for a pig unit should meet the following requirements i.e., road communication and transportation reliable water supply, well managed under ground drainage system and sufficient distance from residential areas so as to avoid nuisance from odour and flies. The site of the building should be planned to give protection from the sun and exposure to wind. An east –west orientation is usually preferable to minimize exposure to sun. Main supplies of electricity should be available.

### **Types of construction**

Regardless of the type of house, construction should provide strength, resistance, warm and dry conditions. The pigs have powerful biting jaws and strong snout. Buildings and fencing must therefore be constructed in such a way that the pigs cannot either pull them down or roots them out. Materials like stone, bricks, concretes are suitable for construction of pig houses. The walls of the building should preferably be cement plastered to form smooth cleanable surfaces. Concrete floors are the best and most durable, easy to clean, non-absorbent and not slippery if rough finished. Cement floors can be finished with non-porous and it should provide a reasonable grip. Floors can be solid, semi slatted or fully slatted. Slatted floors are widely used in intensive pig houses. The slatted floors make the cleaning easier since a lot of manure is pushed through the slots. It also reduces the chances of spread of disease and helps to maintain comparatively a cooler environment so that more number of pigs can be housed. Slats can be made of timber, concrete or plastic. Timber slats should be made from quality, non-splintering hardwood.

### **Space requirements and pen layout**

The requirement of floor area per pig varies depending upon the size of animals and prevailing climate of the area. It also depends on whether they are kept on solid or slatted floors. Pigs on solid floors requires a greater area.

The requirement of spaces are given in terms of length and breadth of pens and varies greatly depending on the building plan. There must be sufficient space for feeding trough to ensure that all the pigs in the pen get adequate quantity of feed. The space requirement of feeding trough of pigs are shown below:

<b>Pigs weight (kg)</b>	<b>Trough space per pig (inch)</b>
11 -18	6
18 – 45	10
18 – 45	10
68 – 95	13
Sows	14

The above figures indicate space needed for individual feeding. For group feeding each feeding space is allowed for every 3-4 pigs with pens accommodating up to 20 pigs and each space per 4-5 pigs with pens of over 20 pigs.

## Housing for different stages of Production

### Boar shed:

Safety and ease in handling a comfortable shed for protection from weather and a provision for exercise are the key points while planning accommodation for Boar. A Boar should never be kept in confinement particularly on hard floors. Such a confinement without adequate exercise leads to overgrowth of the hoofs creating difficulty in mounting and loss in the breeding power of the Boar.

**Housing for growing/ finishing pigs:** In this system, a central feeding alley along with feeding troughs on each side of the passage, associated with pens of 3m x 1.80 meter deep are provided. These would accommodate:

Upto	40 Kg	15 pigs
40 -	90 kg	10 pigs
Over	90 kg	8 pigs

In summer months, it is preferable to reduce the number of pigs. Pen wall should be made of solid wood or concrete of about 60 cm height to prevent pigs from fighting between pens. Above this point tubular steel is preferable. Controlled feeding is important to ensure the best possible feed conversion efficiency and production of high quality pigs. Feeding trough should be made up of concrete or other resistant material. The trough can also be used for watering, but automatic device will ensure the constant supply of fresh water.

**Housing for gestating sows:** In this system of confinement housing the sows can be individually fed both during gestation and immediately after weaning in order to improve the reproductive performance.

The shed may be cemented or brick paved, but in any case it should be easy to clean. The floor should be rough, so that animals will not slip. The drains in the shed should be shallow and preferably covered with removable tiles. The drain should have a gradient of 1" for every 10' length. The roof may be of corrugated cement sheet, asbestos or brick and rafters. Cement concrete roofing is too expensive.

Inside the open unpaved area it is always desirable to plant some good shady trees for excellent protection against direct cold winds in winter and to keep cool in summer.

### Construction details of sty

The construction of pigs sty shall vary from place to place depending upon the climatic conditions and it shall be constructed on the recommendation of the local building experts.

**Floor:** The inside floor of the barn should be of some impervious material, which can be easily kept clean and dry and is not slippery. Paving with bricks can also serve ones purpose. Grooved cement concrete floor is still better. The surface of the cowshed should be laid with a gradient of 1" to 1½" from manger to excreta channel.

**Walls:** The inside of the walls should have a smooth hard finish of cement, which will not allow any lodgment of dust and moisture. Corners should be round.

**Roof:** Roof of the shed may be of asbestos sheet or tiles. Corrugated iron sheets have the disadvantage of making extreme fluctuation in the inside temperature of the barn in different seasons. However, iron sheets with aluminum painted tops to reflect sun rays and bottoms provided with wooden insulated ceilings can also achieve the objective.

**Doors:** Satisfactory gates can be made of a number of material but it should be well galvanized or the deterioration will be very marked. Timber gates are also satisfactory but should be protected with sheet metal at any point at which the pig can make contact. The gate must also be well secured on its hanging side; it gives the strongest fitting if it hangs on a steel post or channel independent of the dividing wall. Pig-proof and still easy to operate, preferably with one hand.

**Water-bowls:** A necessary permanent fitting in the piggery is the automatic water-bowl. As self filling bowls are generally used and there is always some spillage, it is most satisfactory to place them in the dunging area; where this is impossible they should at least be situated at the lowest point in the pen adjoining the dunging area. The bowl is best placed well within the passage so the pig has its whole body in the passage when drinking. To satisfy requirement the bowl may be either placed on the dung passage door. Connected by flexible piping, or recessed into the dividing wall between pen and passageway. The bowl lip should be 15 cm above floor level, but where young pigs before weaning are using it, it is good practice to place a step up to it.

The nozzle drinker has in recent years achieved a large measure of popularity, the water flowing when the pigs depress a valve on the end of a brass nozzle projecting from the wall, gate or pen division. The system is cheap, hygienic and should give little mechanical trouble, but is wise to select a good one rather than a cheap one as many have a short life and soon drip or run excessively. Pigs are also rather inclined to play with them and waste water.

**Isolation boxes:** Animal suffering from infectious diseases must be segregated soon from the rest of the herd. They should be situated at some distance from the other barns. Every isolation box should be self-contained and should have separate connection to the drainage disposal system.

**Weighing Room:** An essential to the study of progress in fatteners is constant weighing, at weekly or fortnightly intervals. Fixed weighing machine in a separate place the pigs are being brought to it and return on an organized circulation system. With regular routine the pigs soon become used to the procedure and easy to handle.

**Loading Pens:** A passageway should be provided from the piggery to a loading bay holding the maximum number of pigs that are likely to be sent off at one time. A further help is to provide a raised loading bay to allow the pigs to walk on level with the lorry. If this whole set up is near the highway but at least 40 m from the fattening house, the danger of disease introduction is virtually eliminated and the job becomes an easy one.

**Service Room :** The pigman must not be neglected. Not only does he need a place to keep protective clothing and boots, but he needs a place where he can take and collate the many records required in an efficient unit. This involves no more than a small, well insulated room, ideally attached to the farrowing house, with lighting and heating points.

### **Role of Nutrition & Feeding of pigs**

#### **The importance of feed and nutrition to pig production**

The feed accounts about 80 percent of all costs. Efficient use of feed will ensure the profitable pig production. The important point which is to be considered is cost of feed per kg of pork produced. The feeding of cheaper ration based on locally available materials, may not produce fastest gain but will reduce the feed cost per kg of carcass

weight gained. Therefore, it is highly important that economical as well as nutritionally balanced diets are provided during all phases of the life cycle. The economics of swine feeding are largely dependent on local conditions of feed stuff availability and competition for use by either humans or other animals. The pig has a simple digestive system with limited ability to utilize large quantities of forage like the ruminants. Practical swine feeding consists of meeting the biological needs with proper combination of feed ingredients and pure sources of limiting nutrients to yield an economical and nutritionally balanced diet.

### **Nutrient Requirements of Pigs**

The nutrients requirements should prescribe that amount of each essential nutrient that will result in maximal production with a minimum of overfed. The nutritional needs of different period of life cycle like gestation, lactation, suckling, growing, finishing etc. should be met to promote optimum performance. Therefore, knowledge of minimum requirements is of direct practical significance in the formulation of balanced ration for the sows.

### **Significance of Nutrients in the diet of the Pigs**

#### **Energy**

Energy is the largest and important component of swine diets. Most of the energy fed to the animals is wasted. It is possible to control the inefficiencies of energy use by selection of nutritionally balanced diets. Energy is yielded by the carbohydrates, fats and proteins. Most of the energy needed by the pig is supplied by dietary carbohydrates, but pig do not have specific enzymes for digesting plant cellulose based carbohydrates. Fat is very high in energy. Protein is the least efficiently used of all sources of energy and needed in the synthesis of new body protein. The digestibility of cereal grains can be improved by reduction in the particle size by fine grinding and cooking.

The energy is required for maintenance, production and growth. The requirement of energy increase in pregnancy, milking and growth. During the growth, the energy required for maintenance increases with the size of the animals. In initial stages of growth the energy is utilized for conversion of body fat. Energy given to pigs goes first to satisfy the needs for gestation and milk production and then for maintenance. The low supply of energy will lead to losing of weight in pregnancy and lactation.

#### **Protein**

The protein is needed for growth, maintenance and production. Inadequate dietary protein causes the slow growth and inefficient feed utilization. The protein requirements for gestation and lactation are more, but it appears that lactation is considerably more critical. The protein is also needed for fertility and long term reproduction. The reproductive performance in terms of number, weight and composition of piglets born per litter is maximized when the sow is given a daily allowance of 140-180 g crude protein subject to the meeting requirements for amino acids.

#### **Minerals, Vitamins and water**

Though minerals and vitamins are needed in small amount in the diet but it has been shown to produce a maximum response of characteristics of economic importance.

#### **Minerals and Trace elements**

The calcium and phosphorus are required in large quantity and to be supplied in the diet. The other mineral requirements of pigs are largely supplied by minerals occurring naturally in the feedstuff of the normal diet. These minerals can also be supplied in

the form of mineral mixture. The aim of the minerals supplement should be to balance the total needs of the animals with the supply of elements already contained within the diet ingredients. Calcium, Phosphorus, Sodium and Chloride are normally added as ground limestone, dicalcium phosphate and trace mineralized salt. The salt serves as a carrier for trace minerals including iron, copper, manganese, selenium, iodine and zinc. The trace minerals are obtained from dietary sources.

### **Vitamins**

Vitamins are substances present in natural feed stuff, essential for health which exercises an influence in nutrition out of all proportion to the amount consumed. Vitamin supplements now form an essential part of pig stock feeding. The vitamins are added into pig diets in the form of composite premix.

### **Water**

The water holds a paramount place in its importance in feed. There is a minimum requirement for water without which the welfare of the pig would be adversely affected. The temperature of the environment will influence the water utilization. The frequency of drinking depends upon the dryness of the food and to the frequency of water loss from the body. Lactating sows need to drink more frequently than pregnant sows. It is also required to mix in feed to increase the palatability.

### **Non-Nutritive feed additives**

Copper and arsenic compounds have growth promotive effects and is added in the diets of growing pigs. Pigs should not be fed diet containing arsenic compounds 10 days prior to slaughter. Recently it has been proved that a combination of synthetic androgen (methyltestosterone) and a synthetic oestrogen (diethylstilboestrol) has achieved some success in the promotion of growth. The diet containing hormones should be discontinued 72 hours prior to slaughter.

### **Feed stuff and modern feed formulations**

The value of feed stuff in the formulation of rations is influenced by a number of factors which should be taken into consideration skillfully in formulating rations.

### **Characteristics of Good rations**

- i) A good ration should provide nutritionally based diet according to the changing nutritional requirement of animal through out the life cycle.
- ii) A good ration should be nutritionally balanced
- iii) It should be palatable and safe
- iv) It should be adapted to the system of farming
- v) It should be economical
- vi) It should be readily available
- vii) A good ration should be adapted to the environmental conditions.

### **Feed stuff for pig rations**

#### **A. Cereal Grains and By Products**

The cereal grains and many by-products constitute a larger percentage of an important constituent of the ration. The addition of cereal grains and their by-products helps in raising level of protein, minerals and vitamins to the level required by the pigs. Most of the cereal grains and their by-products are palatable to swine. The cereal grains are costly but the by-products are available on cheaper rate. The palatability of cereal based products can be increased by processing i.e. heat treatment, mixing with other

feed stuff, cooling et. the costly products are added to the ration to the limit of appetite. The selection of cereal grains and by products can be done according to the availability and cost and quantity of nutritive value.

### **B. Milk, Animal and Marine By-products**

Cereal grains and other type of feed stuff must be supplemented with feeds that contribute additional protein to the ration. Milk, animal and Marine byproducts helps in increasing the quality of the feed stuff for gaining more feed conversion efficiency.

The milk products contains the excellent high quality of protein, vitamins and minerals and milk sugar i.e. lactose. Dried skim milk, dried butter milk, dried whey, cheese rind and dried whey soluble are some of the examples of milk products. Milk products are best for young pigs. The modern met packing plant byproducts, slaughter house waste, marine products are important sources of swine feeds. The marine based feed stuff provides pigs a clean, highly nutritive feed supplement. These include fish meal, These products are excellent sources of several water soluble vitamins, high quality protein. The semisolid fish product contains important amounts of calcium and phosphorus. These products makes excellent ingredients in manufactured mixed rations or in supplements for swine.

### **C. Feeds of the Plant origin - Forages**

The digestive system of the pig is not well adapted for dealing with fibrous and bulky foods. A large proportion of the ration must consist of materials with low fibre content. However, addition of forage may be advantageous as they are the excellent sources of essential vitamins and minerals. They permit the animals to have access to iron rich soil which aids in anemia prevention.

#### **Locally available resources**

All small farmers do not have access to compound rations at reasonable prices. Therefore, it is possible to make better use of locally available feed crops, offals and byproducts, hostel and kitchen wastes from hotels and Dhabas etc. the other local available resources includes Algal, Bakery waste, wasted bananas (damaged crops) blood meal, bone meal, bran (wheat, rice) vegetable and other fruit wastes, cassava, carrots, coconuts, distillery by products, hatchery waste, sugarcane etc.

#### **Scales of Rations for various stages of production cycle.**

The ration should be formulated in such a way that it provides all essential nutrients and is economical and palatable. Different feed stuff can be used in various categories of weight and breeding. The ration should be given according to body weight and stage of the life cycle.

#### **Appetite an important factor in the selection of diet.**

The amount of food a pig eats mainly depends upon its size and nutritional requirements. The appetite is also influenced by the digestibility of the diet, energy density of the diet, its physical form and method of presentation, its palatability and the environment of the pig. An excessive appetite in pigs reduces the carcass quality by deposition of over fat. Excessive appetite also reduces the feed conversion efficiency. Piglets under stress eat less feed. Appetite in sows is influenced by their body reserves of fat and the stage of pregnancy and lactation. Pregnant sows eat more than non-pregnant sows of the same weight. Feed intake is linked to milk production, high milk producer will eat more than low yielders.

## **Feeding during various phases of life cycle**

### **Feeding sows and gilts during breeding season**

During the breeding season gilts and sows in dry lot will gain about a pound a day if they receive 1.3 to 1.7 pound of concentrates daily per 100 pound of live weight. With gilts being served during their second or third heat periods, flushing is possible for the last 10 days before service and during this period the feed should be increase to 3.5 kg per day. Flushing for this period of time increases the ovulation rate and this can increase the litter size by one or two piglets. This level of feeding is maintained for 2 days after service to ensure that ovulation is completed. The level of feed can be reduced to 1.8 per ay an continued until the stage of pregnancy.

### **Pregnant sows and gilts**

The feeding scale for pregnant sow will depend upon the size of sow or gilts, desired rate of growth and stage of pregnancy. There is a need for a sow to gain weight in pregnancy to protect the depletion of material body, and for good lactation. The obesity in sows is not desirable as it reduces the embryo and foetal survival, crates problems at farrowing and lactation. In addition to this deposition of excess fat increases the maintenance cost.

### **Lactating sows**

Feeding of lactating sows depends upon the productive capacity of the milk, size of the litter, weight and age of the sow. The lactation ration should make allowance for the next conception.

### **The feeding of piglet**

The lactating sow is a supremely competent mammal which efficiently covets dietary nutrients in the milk. It is important for her to support a gain in the live weight of her litter or 2.5 kg/day during the first three weeks of lactation. Colostrum (first milk) should be fed to piglets for protecting them against disease.

It is common commercial practice to offer feed to piglets while they are still with the sow in a creep area. The composition and amount of creep feed is important in achieving success at weaning.

### **Feeding of Growing pig**

Pigs require more feed daily for maintenance and for growth. The appetite increases with size s well as the rate of fat deposition. For reducing the maintenance of the pig, it is important to restrict the appetite. It will also help in reducing the fat deposition.

The ration scale for growing pigs will depend on the individual circumstances, economics, type of carcass desired. Young pigs can benefit from ad-lib feeding. Ad-lib feeding has also advantage in terms of labour use an simplicity of management. However, the growth obtained may be rich in fat. Therefore, rationing by eight and by time plays an important role in reducing the cost of rations an to gain carcass which is more in lean meat than fat. Pigs can be weighed regularly and allocated their appropriate ration.

### **Feeding Boars**

Young boars are normally ready for service at around 7 months of age and to start with they should be used for a single service once or twice a week. For mature boars four or five services evenly spread per week is possible. For a averaged size boar the daily feed requirement is between 2.4 to 3.4 kg of meal used for lactating sows. Under

feeding can reduce the boars fertility and overfeeding will increase live weight and reduce its libido.

### **Method of Feeding and Feeding Equipments**

In modern intensive pig production the method of feeding and feeding equipments effects on productivity effects on productivity. Feeding methods should be chosen according to the aim of the production of type of met, rationing system, form of food, type of food available.

### **Complete diets**

Complete diets are those in which all the ingredients are missed together before feeding usually in dry form. These diets can be fed dry, as a meal or pellets, or wet, either by the addition of water to the feed in the trough at feeding time or preparing in liquid form.

### **Ad libitum Feeding**

Diets which are based largely on bulky feeds can often be fed ad libitum because the pigs capacity will limit their energy intake. It is a labour saving in operation and allows the pigs to fulfill their full growth potential. The ad libitum feeding may cause a lot of food wastage, and the efficiency of food conversion is somewhat low. The finished carcass tend to be rather fat. The young animals are fed ad libitum up to 45 kg body weight.

### **Restricted Feeding**

The animals are given a measured amount of feed once, twice or three times a day. In this feeding the growth is restricted, but the feed conversion efficiency is improved. The quality of animals becomes better by lean meat deposition. Ration feeding has a higher demand than ad libitum but there is a saving on wastage.

### **Fine or Coarse grinding**

Fine grinding increases the digestibility of many ingredients specially plant materials. But, fine grinding increases the cost of feed. In addition of this very fine grinding of some ingredients, practically cereals increases the incidence of stomach ulcers.

### **Meal or Pellets**

The cost of the pelleted feed compared to meal type rations will largely determine the economy of this method of preparation for swine feeding. Compared with meal, pellets generally improved performance, partly by reducing feed wastage and partly by increasing digestibility.

### **Wet or Dry feeding**

Wet feeding also reduces food wastage and may also increase digestibility. Wet feeding means mixing of dry feed with 2-3 times its weight of water in the trough. It gives slightly better food conversion and growth rate than dry feeds alone. In dry feeding there is slightly less wastage and can be successfully used for ad libitum and rationed feeding.

### **Equipment for mixing, storage and feeding**

**Mixing:** The simplest way of mixing a diet is with a shovel on the ground. Turning the mixture over six times will give mixing complete. For larger quantities and more regular mixing, a simple mixer like a cement mixer is suitable. Specialized feed mixtures are also available but costly.

**Storage:** The feed ingredients should be stored under cover and in vermin proof containers if possible. If it is stored in racks, they should be raised clear of the ground and away from walls. These should be stored in dry form, as the wet feeds deteriorate rapidly and are also very attractive to vermin.

**Feeding:** Equipment for feeding needs to be well designed to allow pigs good access to the feed but eliminate feed wastage. For feeding a ration, troughs of brick, concrete or sheet metal are also suitable.

For sows and boars a single large trough each is best. For self feeding hoppers or sheet metal are best. Self feeders also promote sanitation and provide large feed storage space. However, these are expensive. A good self feeder should be available to the pigs for the supply of lean, dry feed at all times. For liquid feeding liquid food trough should be installed.

### **Keeping records in the pig farm**

It is impossible to run any kind of business profitably without proper records. A pig farmer who does not have a fairly accurate record of the amount of feed given to the pigs in his herd, and of the amount of bodyweight gain and which they produce is certainly not conducting his business efficiently. Unless accurate records are kept, the best pig in a herd is likely to have equal rank with the poorest, at least in the mind of the owner.

#### **Kinds of records**

Several kinds of records may be kept in a pig farm. Records of production should be kept by all pig farmer. The important records which should be kept are discussed below:

**Breeding Records:** Keep a record of the date each sow or gilt is bred. This is desirable so that each female may be checked in 18 to 21 days after she is bred, and thus it may be determined if she has settled. Also, these records are necessary to determine when each sow is due to farrow so preparations can be made and each sow placed in a farrowing pen 2 or 3 days ahead of the date she is due to farrow.

**Herd records:** In selecting animals for retention in your herd and in advising prospective buyers, you will need information on the parents of each animal and on one or more additional generations. Herd records of the kind indicated make it possible to trace this information. Keep the entries as regards the sale of animal these entries, include the particular animal sold, the name and address of the buyer, the date of the sale, and the price received.

**Feed records:** A record of the feed used in the hog enterprise is of considerable value in checking the efficiency of swine production. If you know how many quintal of feed is consumed in this enterprise during the year and determine the quintal of live marketable hogs produced, you are in a position to compute the feed required per 100 kg weight. Since feed costs comprise about 80 per cent of the total costs of producing hogs, a fairly accurate estimate also may be made of the total costs if the cost of feed is known.

**Labour Records:** A record of the labour used in the swine enterprise is of value in checking on the efficiency with which labour is used. By totaling the hours of labour and computing the amount per 100 lb. of live hog produced, or per head, it is possible to note the efficiency in your enterprise.

**Financial records:** Financial records of various kinds for the swine enterprises are of considerable value if carefully kept, interpreted and used. These kind of records are needed for determining the money returns, costs and profits or losses from the swine enterprise.

In making a financial summary. Compute the total credits and the total charges. The difference between these sums is called the "net loss, depending on which of the two sums is the larger.

**Keeping the Diary:** In raising hogs, it is desirable to have a small notebook for diary to records various happenings and items of importance which you will forget unless they are written down as they happen.

As you apply certain approved practices, you may write them down, together with the date each was applied. Losses, sales, changes in rations, weights, etc, may be included. Do not include in the diary the items directly and immediately entered in other records.

**Analyzing and using records:** It takes time and effort to keep good records, and the benefits come only as you use these records to determine (1) How efficient you are as a swine raiser, (2) the extent to which the enterprise is improving from year to year (3) The strong and weak places in the enterprise, and (4) what practices should be emphasized to improve the enterprise. A careful study of the records should and you in making effective use of them. Computerizing records is now essential and analysis should be done on daily basis

### **Establishing the Herd and Selecting Swine**

It is very important that pig producers select carefully the animals that are to be used in breeding herd, in order to raise pigs of desired type and to reach the goals of good litter size and rapid gains etc.

Pigs should preferably not be selected for breeding until they are four months of age or older, as defects is type may appear which may not be evident in pigs younger than this. Further, more additional information can be taken into account on rate of growth or weight at birth, weaning at these later ages.

#### **Selecting gilts or sows:**

The three principal considerations selecting breeding stock are:

- (i) Type and appearance.
- (ii) Transmitting ability as shown by pedigree
- (iii) Performance or productive ability
- (iv) Additional factors

#### **Type of appearance:** Physical traits

For convenience in studying the external appearance of gilt or sows, the various characteristic of type are grouped under the following headings.

**a) Breed type:** In breed type, choose pigs that conform to the requirements of colour, set of ears, shape of head and other characteristics for the particular breed.

**b) Size or weight for age:** A gilt or sow in average conditions should be large for her age because the females that are well grown for their age are most likely to produce fast growing offspring that are most economical to raise.

**c) Condition of development in the regions of high priced cuts:** A gilt or sow should have natural fleshing and development in the region of high priced cuts of meat.

She should have medium long fairly wide backs and loins, wide and plump rear quarters, and long and deep sides.

**d) Feet and legs:** The legs should be straight, set well apart, and medium in length. The pasterns should be short and upright. Any sign of lameness or clumsiness should also be watched.

**e) Quality:** A gilt or sow should have a reasonable degree of refinement as shown by having medium sized bones, trim jowls, firm flesh, smooth shoulders, fine hair and a skin free from wrinkles. She should be feminine with prominent eyes.

**f) Teat development:** The udder or underline of the gilt or sow should consist of well spaced, properly formed teats. Preferably she should have 12 or 14 sound teats.

**g) Freedom from heritable defects:** The sows or gilts should be free from the abnormalities or a family history of following traits:

Cryptorchidism, ruptures, atresia ani, rectal prolapse, hermaphroditism, swirls, and infantile vulva etc.

#### **Transmitting ability shown by pedigree:**

If the ancestry is good, it lends confidence in projecting how well young animals may breed.

#### **Performance of productive ability:**

The chief measure of performance available for a gilt is her own weight for age. The best single measure of the ability of the sow is the weight of her litter at 56 days or some later age which indicate her prolificacy, mothering ability and ability to produce pigs that grow rapidly (fast growth).

#### **Additional Factors**

**Health:** Breeding animals that are in thrifty, vigorous condition and that have been raised under a system of swine sanitation should have a decided preference. Tests should be made to make certain of freedom from swine Brucellosis or leptaspirosis. The herd from which the animals come should be inspected, and breeding stock should be purchased only from disease free herds.

**Disposition:** The sow or gilt should be easy to handle and not excitable. She should be mild and quiet yet active and vigorous.

**Price:** In selecting a sow or gilt, price is an important factor, to get full value for the money spent.

**Selecting of boars:** In many respects, selecting a boar is similar to selecting a good gilt or sow. Consider (1) Type (2) Transmitting ability or prepotency (3) Additional Factors such as health, disposition, reliability of the breeder, and price. In selecting a boar, be especially careful to secure an outstanding individual, as he has an influence on all the pigs he sires. It is highly desirable to secure a purebred boar.

**Selecting for type or appearance:** In type or appearance, the boar should be just as good as, or even better than, the gilts or sows with which he will be mated. Select a boar that is large for his age, as this is some indication of his ability to transmit fast-gaining qualities to his offspring. In addition to his weight at 56 days, weigh him at the time he is being selected.

A boar show masculinity by general ruggedness and by such characteristics as broad head and development in the neck region. However, a boar needs to be smooth and

uniform in width over the shoulders and throughout the body. He should be free from wrinkles and coarseness along the shoulders and sides. The testicles should be well formed and uniform in size. Boars should show at least 12-14 rudimentary teats, or "Buttons" which are properly spaced. Select a boar free from inheritable defects, such as ruptured scrotum and swirls, and from a family that is also free from these or other heritable defects.

**Selecting for transmitting ability or propotency:** Study information available on the parents of the boar being considered. Here again, note his similarity to his parents in type, size and other desired characteristics,. Observe littermates and half sisters and half brothers to note uniformity in type and consistency in rapidity of growth. The weight of the litter from which the boar himself came is, in part, heritable and hence some indication of his transmitting ability in this regard.

In studying the pedigree of the boar, give special attention to his immediate parents and to his grandparents.

**Additional factors:** Health disposition, reliability of breeder, and price are important in selecting a boar. Since a boar is frequently used for several sows, the cost can be appropriated over large number of pigs. Consequently, the added cost is justified if it is likely to result in improved offspring.

### **Pig Diseases and Control**

This Pig is by nature a clean animal. It is mostly due to the fault of the system under which the pig is maintained or the person rearing the Pig that the Pigs become dirty and unclean. When the management is not clean or if the pigs are reared carelessly, the pigs become the victims of many diseases. It is important to keep the money earned pigs healthy with proper management to avoid heavy losses due to mortality, reduced growth rate and production.

Swine diseases and parasites are responsible for heavy losses every year. It is estimated that one third of the pigs farrowed die before they are weaned, and another are stunted or are unprofitable because of diseases or parasitic conditions only about one third of the pigs farrowed are grown out as healthily ones.

The diseases of the pigs may be due to several causes. These are broadly clarified under four groups (i) Hereditary (ii) Infections (iii) Parasitic. The prevalence of these disease varies, generally, from place to place and season to season. In India hog cholera (Swine Fever) brucellosis Swine Pox, Foot and Mouth disease, and parasites are responsible, for most of the disease problems. A brief discussion about these diseases is compared under.

#### **Hereditary Diseases.**

They are due to the presence of certain undesirable genes in the stock. Conditions like (i) Hemophilis, (ii) umbilical inguinal hernias, (iii) Anatomical deformities. etc. Are caused by these gene and such conditions could be traced through generations. The only way to prevent occurrence of such conditions is to stop breeding the animals which are found to carry these genes.

#### **Infectious Diseases**

The main agents causing disease in pigs are viruses, bacteria, fungi and parasites, These diseases are communicable from affected animals to other healthy animals and in certain cases to man also. The following general precautions will be necessary to protect the pigs from such infections.

- i. Clean disinfected premises.
- ii. Clean utensils and equipment's.
- iii. Clean Pasture.
- iv. Prevention of dampness, avoiding exposure to extreme cold or heat.
- v. Avoiding overcrowding.
- vi. Isolation and treatment of ailing animals.
- vii. Vaccinations to protect against swine diseases.
- viii. Regular deworming of pigs.

**Swine Fever:** Swine Fever or Hog Cholera is caused by a virus. Young animals are more susceptible than adult pigs. The symptoms of the disease occur in about a week after infection and being with high fever and loss of appetite. The animal lose weighty. Dark red or purple discoloration appears on the underside of the neck and abdomen. Sticky discharge from the eyes may be noticed. In acute cases, the animals die in a few days. In the Chronic form of the disease, the animals may recover but partially. In severe cases treatment with specific antiserum may be helpful. Vaccinations give protection against the disease. Thorough cleaning and disinfection of the premises is important to check infection.

**Swine pox:** The disease is caused by a virus and is characterized by fever. Inappetance and eruptions on ears, neck interior abdomen and inner aspects of the thighs and in very sever case on the parts of the body. Young animals are more seriously affected. Strict isolation of affected animals and proper treatment are necessary.

**Foot and Mouth:** It is a viral disease and is highly infections. The disease commenes with high fever followed by eruptions and vesicles in the mouth and feet. The affected animals are unable to take feed or walk about. Young animals may die of the disease.

**Brucellosis:** The disease is caused by the bacterium *Brucella abortus suis*. The disease is also called Bang's disease Contagious abortion. In females the disease is characterised by abortion, birth of weak or dead piglets and sterility or infertility. In boars, inflammation of the testicles and joints occurs. Sterility of infertility results in boars also. Many animals are carriers of the disease without showing symptoms. The disease spreads by contact with aborted animals, after birth or through contaminated feed and water. The infection is persistent and treatment of affected animals is ineffective. The animals showing positive reaction to Brucellosis test should be removed from the herd. Newly arrived animals should be invariably tested for the disease. Only Bruscellosis free stock be used for breeding purposes.

**Tuberculosis:** *Mycobacterium tuberculosis* of avian or bovine type causes Tuberculosis in pigs. They pick up infection from birds or cattle. Young pigs get infection through infected sows Milk. The disease affects all parts of the body. The lesions begin as a degenerative change and follow a regular pattern of necrosis, caseation and calcification. The disease may be local or genetralsed. In the local form tubercular lesions are found in certain organs or tissues. The lesions may break in to the blood stream to cause generalised tuberculosis. In generalized cases, lesions are found throughout the body and internal organs including liver, spleen kidneys, Joints and lymph glands Intermittent high fever is often noticed. Lung form of tuberculosis is highly contagious since the infection is air borne. To detect tuberculosis, an allergic test called Tuberclin Test should be conducted on all animals. The positive reactors to the test should be removed from the herd and destroyed. Periodic testing may be undertaken to eliminate he reacting animals and to keep the herd free of the disease.

## **Parasite**

A parasite is something which lives on, and gets its food from some other plant or animal. Swine have a number of parasites. Some live on or under the skin and are called external parasites. Others live within the organs of the body and are called internal parasites. The latter group of organisms are most injurious to swine.

**Roundworms:** Large intestinal roundworms, or ascarids, cause pig raisers heavy losses every year. These losses are due to stunting, development of a pot-belly, general weakness, and sometimes death of the pigs.

**Lungworms:** These worms are long, slender, and whitish in color, from 1.25 centimeters to five centimeters long, and threadlike. They are found in the windpipe, more often in the two branches of the lower windpipe, and in the lungs.

**Prevention:** There is no known treatment for lungworms once they are in the lungs. Sick animals should be isolated from the herd and fed highly fortified, balanced rations.

Lungworms can be controlled quite well by the use of rotated pastures and by the use of sanitary practices during farrowing time and until the pigs are three months of age.

## **Mange**

Mange is a contagious skin disease, and although very few animals die as a result of mange, it is the most serious of the external parasites.

**Cause:** Mange is caused by a very small mite which spends its entire life on the pigs. It feeds on the tissues of the skin and blood and burrows into the skin, causing a dry, rough scaly hide.

**Damage:** Hog mange intense itching, which motivates the pig to bite and rub itself. The infection usually starts around the eyes and ears and along the underline where the skin is tender. It may spread until the entire body is covered with a red rash or heavy scaly hide.

**Prevention:** The mite can live in infested quarters for several weeks. Control measures must include a thorough cleaning of the shelters and houses. All manure should be removed. All surfaces should be disinfected with chemicals or with boiling water.

## **Lice**

Hog lice, by their blood sucking habits, cause economic loss to swine producers, and they may be responsible for the spread of infection. The louse is about six millimeters long and greyish brown in color. During the winter months it may be found in the ears, in folds of skin around the neck, and around the tail.

The female lays several eggs a day during the winter. These eggs are attached to the hair, and hatch in two to three weeks. They mature in another two weeks.

**Prevention:** The pigs should be dusted with an insecticide, such as DDT powder or sprayed with a 0.5 per cent DDT solution. The pigs should be treated as often as necessary.

## **Disease Control**

Successful pig production generally rests on the efficient disease control. Surprisingly pigs are clean animals by nature and cannot thrive in a bad environment. They require good, clean, well ventilated surroundings. Pigs reared under damp, dark, dirty and badly ventilated houses are naturally stunted in growth with low feed efficiency and are highly susceptible to diseases. Improper disease and parasitic control practices may

lead to reduced returns by at least 20 percent in piggery operation, The aim should be to prevent diseases and parasites rather than merely treating after they occur. Adoption of treatment after outbreak of diseases will be more expensive. Especially when there is low level disease and parasite infestation, the farmer may not be aware of the impending serious problems which eventually lead to serious losses in the productivity and profitability of the herd.

In case of intensive rearing of pigs, the animals are closer to each other and the chances of spreading diseases from one to the other also increases. Certain infectious diseases that were mild problems become much more important. Hence producers must realize in intensified pig operations that disease problems may occur which were not hitherto known before. The greater the piggery unit, the more vulnerable it becomes to disease outbreak. Further, the diseases tend to become more difficult to control and any outbreak is much more serious in its effect.

Pig farmers should be made aware of the fact that no one can make profit out of sick animals. Prevention is better than cure and better the sanitation in pig sty, the less is the chance of incidence of the diseases. It is neither difficult nor costly to practice a suitable sanitation programme in pig farming. Periodical removal of pig manure and wet litter with good facilities for drainage in pig farms helps in maintaining normal health status of animals. Before introducing a new stock in the pig sty, the sty should be thoroughly cleaned and disinfected with phenyl or caustic soda and the sty should be unoccupied for ten days after it has been cleaned and disinfected.

For disease control it is essential to completely avoid visitors. All the outside doors should be locked and the front entrance should be planned to give the pig operator complete control. Casual visitors are generally satisfied by seeing the pigs at a distance from outside. Important visitors for whom the pig operator feels an obligation to show more detail, should change into outer clothing and boots provided, and step through disinfecting foot path kept at the entrance.

It is obvious that the methods of disease control are based on very high standards of hygiene followed by efficient vaccination programme. Large scale operation of pig farming often leads to disease problem, warranting prevention and control measures, Farmers rearing pigs should either raise their own fattening animals or buy only from, reputable disease free stock owners.

### **Slaughter of Pig**

**Slaughter:** The pigs selected for slaughter should be free from disease and in a healthy condition, gaining and not losing weight.

**Pre- Slaughter Care:** Pigs should be kept off their food for about 12 hours before slaughter and allowed all the water they will drink. A well rested and fasted animal will give a better carcass, as the muscle is in good condition and the blood stream will not be gorged with nutrient substances from the digestive system. In ordinary circumstances, most of the contamination that takes place at slaughter is of intestinal origin, and for this reason, the intestinal content should be reduced to minimum.

The chain method of slaughtering is used in Killing and dressing pigs. In this method, the following steps are carried out in rapid succession

**Stunning :-** The pigs are rendered insensible by use of captive bolt stunner, gunshot, electric current or carbon dioxide.

**Shackling and Hoisting-** The pigs are Shackled just above the hoof on the hind leg and are hoisted to an overhead rail.

**Sticking:** The man doing the sticking takes a position securely in front of the pig, holds down the snout and opens the skin for a distance of about three inches in front of the breast bone. He then inserts the knife, edge upwards, taking a line with the base of the tail, for about four or five inches, lowers the wrist, which brings the point of the knife upwards and withdraws the knife. The animal is allowed to bleed for 5 to 6 minutes. Blood provides an ideal medium for the growth and multiplication of putrefactive organisms and it supplies a vehicle for their distribution throughout the animal. Thorough bleeding therefore has a profound influence on the keeping quality of carcass.

The animal is placed in a scalding vat for about 4 minutes.

**Scalding:** The carcass should be kept moving, so that all parts get a uniform scald and a clean white skin is produced. The temperature of the water is about 150°F (66°C). The scalding process loosens the hair and scruff. A slow scald is better and much safer than a quick scald.

**Dehairing:** After the pig has been lifted from the scald and placed on a bench or table, the scraping must be done as quickly as possible, as the hair will again adhere if allowed to cool.

**Returning to overhead tracks:** As the animals are discharged from the dehairing machine, the gam cords of the hind legs are exposed; and gambrel sticks are inserted in the cords. Then the carcass is again hung from the rail.

**Singeing:** Singe the carcass for the removal of remanent hairs using a blow lamp. Scrape the scruff and wash the carcass thoroughly with cold water.

**Removing the head:** The head should be removed before opening the carcass to permit complete drainage of blood from the carcass. A cut should be made just above the ears at the first point of the backbone and across the back of the neck. The gullet and windpipe should be severed to permit the head to drop. The cut should be continued around the ears to the eyes and to the point of the jaw bone, thus permitting the head to be removed while leaving the jowls on the carcass.

**Evisceration:** Stand at the back of the carcass and grasp the tail then cut around the pelvic arch to loosen the bung, care being taken to keep the point of the knife against the pelvic bones.

With the belly facing the operator, make a shallow cut from between the back legs to the throat; cut deep to the bone between the back legs and open the abdominal cavity, care being taken not to puncture the bladder, insert the left hand and keep back the intestines and stomach and continue the cut through to the breast bone; the knife may be pointed downwards and inserted into the chest cavity in order to continue the cut through the centre of the breast bone and through.

Now pull the bung through the pelvic cavity and ease the intestines down by severing the attachments to the backbone; cut around the skirt or diaphragm and pull out the lungs and heart; cut through just below the gullet.

The carcass is then thoroughly washed both inside and out. The kidneys and leaf fat are also removed and the carcass left neat and trim, then allowed to cool thoroughly.

**Halving the carcass:** Split the carcass by sawing down the midline through the centre of the backbone.

**Removing the leaf fat:** While the carcass is still warm, loosen the leaf fat which is found on the inside of each half of the carcass.

**Washing:** Washing the carcass and then keeping it in the chilled room over night, where the temperature is held from around 34°F (1°C).

Because consumer preference is such an important item in the production of pork, it is well that the producer, the packer, and the meat retailer be familiar with these qualities, which are summarized as follows:

**Quality:** The quality of the lean is based on firmness, texture, marbling, and color.

**Firmness:** Pork muscle should be firm so as to display attractively. Firmness is affected by the kind and amount of fat. For example, pigs that are fed liberally on peanuts produce soft pork. Also, pork with small quantities of fat will contain more moisture and tend to be soft.

**Texture:** Pork lean that has a fine-grained texture and porous, pinkish bones is preferred. Coarse textured lean is generally indicative of greater animal maturity and less tender meat.

**Marbling:** This characteristic contributes to buyer appeal. Feathering (flecks of fat) between the ribs and within the muscles is indicative of marbling.

**Color:** Most consumers prefer pork with a white fat on the exterior and a grayish pink lean marbled with flecks of fat.

**Maximum muscling; Moderate fat:** Maximum thickness of muscling influences materially the acceptability by the consumer. Also, consumers prefer a uniform cover of not exceed ¼ inch (6mm) of firm, white fat on the exterior.

**Repeatability:** The consumer wants to be able to secure a standardized product meat of the same tenderness and other eating qualities as the previous purchase.

### **Marketing of Swine and Meat**

Marketing of pigs, pig meat and its products need special attention for profitable of pig enterprises.

**Marketing of pigs:** The pig farmers main interest end as soon as finished pigs, leave, their farm premises.

In India pigs are marketed in common livestock markets organized and held in rural areas on fixed days. In addition some special pig markets are also held in certain areas in different states in the country on fixed day specially in areas where they are available in large numbers. In these markets pigs are marketed on basis of eye estimates of live weight of these pigs and price is offered and purchase and sale transaction finalized on the bases of price for this estimated live weight. These pig keepers who are experienced also keep, in view the finish of the pigs individually or group of pigs regarding the length, fullness of ham and roundness of back and the type of pig i.e. whether exotic, cross or indigenous.

Factories prefer pigs live weight ranging between 80-90 kg. and pay less or keep a discount per kg. of live weight if the pig is over and above 90 kg. live weight and also lower prices in pigs weighing less than 50 kg. As the output of meat is less in

underweight pigs and there is more fat in over weight pigs and as such discount in price is made. In foreign countries and now even in India there is demand of leaner cuts.

In India the price adapted for purchase of live is through pig producers who can be registered existing in the area adjoining the meat production unit. Either producers directly or through middle men which job is done by one of these producers and they obtain order from meat production unit and collected the required pigs from different pig producer of the area and transport them to the meat production unit in hired transports in truck load where they are paid on the basis of live weight taken before slaughter after resting these pigs for 24 hours and transportation cost is also paid on basis of number of pigs and distance covered. In such cases, often the pig producers also accompany the middlemen to be sure of their transaction. Bigger pig enterprises send their pigs in one lot to the meat unit in truck load, and get their payment. Pigs purchased directly from market by the meat units are purchased after weighment and the price is paid on basis of the weight.

In some meat units pigs are purchased on basis of carcass weight and rates are fixed on that basis. Pigs are slaughtered in meat factory and after dressing and weight of the carcass is taken and prices is paid. Temporary shelter and watering facilities are provided but arrangement for feed has to be made by the producer.

Many of the poor pig producers find difficult to transport their animals to the factory. Efforts by meat factories to purchase pigs from collection/purchase centres located in rural areas around which sizeable pig producers are available and then arrange transport to the factory after weighment will greatly facilitate marketing. These centres may be equipped with shed/lairage for collection of live pigs and weighment facilities etc. when live pigs are produced.

### **Marketing of meat products and care in their transportation**

Pig meat must be processed, packaged and sent to market for disposal through retail outlets or to whole sales outlets for distribution under not only hygienic condition but also at temperatures which may not affect the quality of meat. The wholesomeness of meat and the health of the consumer is to be fully safeguard. Pigs are converted into attractive variety of pork and processed products at low cost and with maximum appeal to modern consumer.

### **Market Survey**

For taking up sales in any area of these meat products the proposes market should first be surveyed. Market survey should be carried out, assessing the sale of each variety of pork products, various brands of products popular in market price at which they are sold, type or packaging , incentives provided to wholesalers/ retailers along-with discount and Commission provided, potential demand of market, consumer /retailer and wholesaler-wise, additional facilities demanded and improvement on terms and condition of sales and the views regarding quality of product, Once market survey is completed then the forecast demand of various products for different markets, at which these can be sold and proposed planning of product sales and market potentiality and proposed marketing strategy be prepared in form of report which may enable the management of meat product unit to take decisions on organizing market sales in particular market.

### **Publicity and advertising**

For organizing and improving sales of pig meat and its products sales promotion and publicity campaign be products sales promotion and publicity campaign be organized,

through different media, viz. Insertion about products in Newspaper and Magazine, through audio-visual media, slides in Cinema Halls. On television and Radio Hoardings, small display Boards and sampling to parties etc. Proper publicity campaign be organized before hand in new markets and also for any new product once they are introduced in any market. Packaging and labeling of different products have to be attractive to draw attention of consumers. Incentive for retailer while and wholesalers in form of storage facilities at attractive terms in form of deep freezer and cold storage facilities with help in attracting them for sales organization of exhibitions and cinema shows for promoting sales will be good. Proper publicity campaign be organized and results of this publicity campaign be monitored as this expenditure will pay off with increased sales.

### **Marketing Strategy**

For organizing marketing strategy, markets have to be chosen after carrying out market survey and sales budget indicating sales product wise for each market should be prepared both in terms of quantity and value wise. In this anticipated increase due to normal growth as well as due to publicity campaign indicated if existing market is being taken. Market strategy for existing markets indicating expansion of sales product wise and party wise and for new markets in two to three years be forecasted. Careful monitoring of the market strategy by regular market performance reporting and periodical review of performance with marketing staff is a must. Production in the factory has to be planned on the basis of this sales budget so that proper inventory of finished products is maintained by organizing product, so that consumer and wholesaler and retailers orders are supplied promptly. The inventory of fresh products have to be less as they have limited shelf life, being highly perishable in nature, but inventories of smoked, cooked and tinned products can be higher as they can be kept for longer periods.

### **Market Intelligence:**

Regular market intelligence regarding various products, Quantum of sales, prices of competitive products and consumer complaints, Dealers comments etc. have to be collected by marketing staff by regular visits to market for different brands of products. These market intelligence reports be properly recorded and periodically reviewed for making amendments in market strategy as well as for revision of sale target and prevention planning and pricing policy of the products.

There are various factors affecting demand of meat and its products.

**Price:** It's a competitive market and reduction in price of products in comparison to other competition products, will increase sales but it has to bear relation with once own cost of production. The extent to which the demand will be increased for a unit of reduction in price is known "Price elasticity of demand" which varies with each product and market.

**Competitive meats and Substitute products:** The price of pork in relation to Mutton /Chicken or buffalo meat also affect demand of pork.

**Income:** The change in demand for a product for a unit change in income is called: income elasticity" This has to be kept in view in planning marketing policy.

**Consumer Taste:** In this country there is intolerance to pig meat on grounds of religion and variety of other objections or superstition i.e. pig meat should not be consumed in summer months. Some associate pork with high fat content being high in calories and is not considered desirable to be consumed by people suffering with heart problem.

**Sales Promotion: The sales promotion efforts also affect sales.**

### **Precautions during transport, packing and despatch**

In case of fresh pork product smoked or cooked products care should be taken to provide ice packing in tin container, insulated with Paddy straw and kept in wooden Boxes for, transport through Rail or Ordinary Truck as the boxes are roughly handled in transit. These products can also be packed in Thermocole Boxes in ice packing and should be packed in cool conditions, after taking out these products directly from cold storage. For nearby markets Refrigerated Vans be used for transportation; of these products, the Tinned products can be transported in wooden Boxes which should be properly marked and labeled on the out sides and should be properly secured. In case of fresh products there is difference in weight of product to shrinkage and sometimes these products get deteriorated in quality due to delay in transit or due to melting of ice. Due precaution in Transport specially of fresh meat products is essential.

## **6.0 SATELLITE PIG FARM**

### **Formation of satellite Pig Units**

The scheme/project involves selection of progressive pig farmers and giving hands-on training to them in modern piggery. After training they will be assisted in developing the pig unit. The unit will be under written by Resource International Pvt. Ltd., both in terms of technology and credit, based on asset position available with farmers. The farmers will be allowed to use training to manage satellite unit to his best capabilities with the support systems available within project, which would primarily revolve around the services of Resource International Pvt. Ltd., who will provide goods and services at cost. The marketing organization of Resource International Pvt. Ltd., in turn will assist the farmers to get his live pigs and other by-product marketed. The responsibility of repayment of loan will essentially rest with farmers primarily through sale of live pigs and other by-products.

Farmers who want to participate in credit facility will have to show that they are credit worthy and will have the logical capacity of repayment on agreed terms against collateral otherwise they could get the credit from banking institutions which could be facilitated by staff of Resource International Pvt. Ltd.

The purchase and insurance of all the male and female pigs will be done under supervision of veterinary doctors of Resource International Pvt. Ltd. These satellite pig units will be linked with CPF and become operational. They could comprise of 5,10, 20 or higher multiples of purebreds crossbred gilts/sows and boars.

### **Pig Farming for small farmer as integrated farming system**

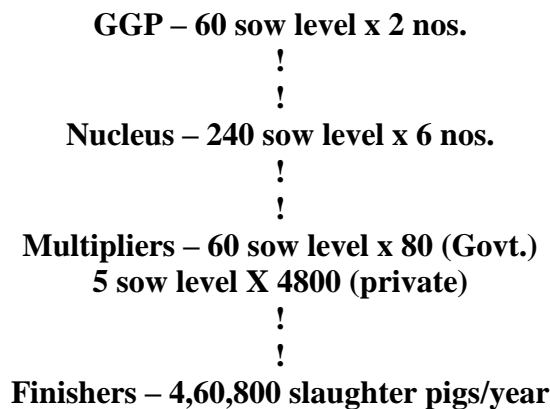
Pig is an important source of subsidiary income to small/marginal farmers and agricultural labourers. The manure from animals provides a good source of organic matter for improving soil fertility and crop yields. The gobar gas from the dung is used as fuel for domestic purposes as also for running engines for drawing water from wells. The surplus fodder and agricultural by-products are gainfully utilized for feeding the animals. Piggery also provides employment throughout the year. The main beneficiaries of piggery programmes are small/marginal farmers and landless labourers. A farmer can earn a gross surplus of about Rs.33000/- per month from a unit of 5 +1 consisting of the capital investment required for Rs.3.5 lakhs as loan to start the enterprise. After paying off the loan towards repayment of the loan and interest the farmer can earn a net surplus of Rs.33000/- per month approximately per year. Even more profits can be earned depending upon the breed of animal, managerial skills developed and marketing potential.

### **Salient features of the proposed component scheme**

The overall goal of the scheme is to enhance the per capita availability of animal protein through increased pork production and to provide supplementary income of the rural farmers by utilizing the un-utilized/under utilized manpower especially women. The specific objectives are as follows

1. Increase the availability of piglets for fattening operation
2. Enhance the quality of piglets by improving
  - a. the growth traits like ADG and FCR
  - b. the reproductive traits, like piglets produced per sow per year
  - c. the carcass traits like back fat and lean meat percentage
3. Enhance the availability of finished pigs.
4. Improve the quality of human resources involved in the sector.

Inadequate piglet production for fattening and slaughter can be largely attributed to lack of multi-layer breeding system as adopted in Kerala, which is planned to be implemented in this component scheme, wherein GGP, nucleus and multiplier herd are included with scientific breeding and selection programmes. The proposed production pyramid is depicted below.



This project is proposed to be taken up initially in Kerala, north-eastern states, West Bengal, Uttar Pradesh, Jharkhand and Andhra Pradesh, Kerala and Assam will have GGP farms to supply the breeding stock to the multiplier farms of the state as well as neighboring states. Each state will have State Implementing Agency (SIA) for implementation of this project. The basis in selecting the states has been the population of pigs, relative importance of the pig production sector among various animal husbandry activities of the state and the demands for pork and pork products.

The piggery sector in the state will be improved by providing inputs in form of quality piglets for breeding/fattening operations, manpower development and marketing of the slaughter pigs/pork. The proposal for implementation in the north eastern states and other selected states is worked out based on the technical programmes