LVEMP ECONOMIC PRODUCTION OF PIG

TRAINING MANUAL

BY

DR. HIGENYI JAMES

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1. Introduction to poultry production:

In Uganda, pig production is increasingly becoming important with a very fast developing over the past three decades. This is indicated by the change in pig population from 0.19 to 3.2 million, and it has been estimated to increase by 3% (MAAIF, 2009, 2011). This has been attributed to increased demand for animal protein attributed to high population growth. According to ILRI (2011), per capita consumption of pork in Uganda was 3.4kg per person per year, and is so far the highest in sub-Saharan Africa.

Rationale of pig production

Pig industry is one of the livestock components being promoted through improved breeding as strategic intervention. MAAIF through NAGRC & DB promoted a hybrid breed (Coumbrough) from South Africa, and remarkable results have so far been registered with increased productivity in Uganda. Contemporary information indicate that more than 1.1 million families in Uganda are raising pigs mostly as backyard activity in small holder households in peri-urban and rural areas. Ultimately, pig production contributes largely to food security and poverty eradication in small holder households. Notwithstanding, pigs have high reproductive potential and generation cycle (highly prolific and multiply fast), hence with the obvious market both in the rural and urban areas, the investment returns can be realized fast. The demand for pork is growing, which means piggery will be a lucrative business.

Objective:

To equip farmers with skill and knowledge in economic pig production

Learning outcomes:

By the end of the trainings, farmers should be able:

- To select quality pigs for production
- To implement best practices in piggery production and management
- To design and construct a good pig sty
- To identify or detect diseases and report to vets
- To understand the limitation to use of feed stuffs
- To increase digestibility of feed stuffs through processing

2. Factors considered before establishment of piggery enterprise

Generally before start up a piggery project, it proper for a farmer to consider the following factors but not limited to;

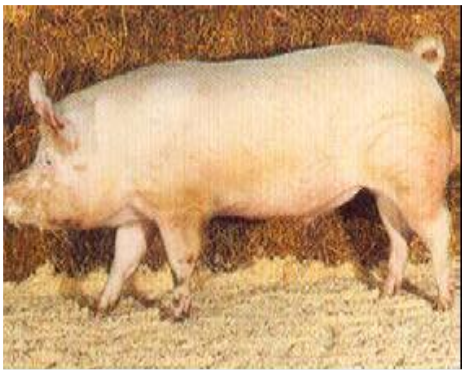
- **Capital** – relates to money to construct sties, buy equipments and breeding stock. Let alone the working capital to procure feeds, veterinary services, labour atleast for the first year operations because cash flow starts only after 11 after commencement of the project. So then the farmer should have sufficient funds to sustain the operation for a period of 11 months. Thereafter plough back concept can apply.
- **Knowledge-** the knowhow of animal husbandry is very important for proper management of the project
- **Breeding stock**- the output of the unit is limited by the quality of breeding stock. Indeed inferior breeding stock result in an inefficient utilisation of feed and space.
- **Market**- it a good practice to determine the market for the products before real production. In relation to this the farmer ought to have a clear business strategy ie sale of weaners, breeding stock (gilts and boars), porkers and becorners for slaughter.
- **Water-** it is important that water is sufficient in your site to raelise objectives of the project-fast growth and carcass quality.
- **Housing**- proper housing of pig sty is key as it allow easy operations by personels, comfort of the animal and friendly environment
- **Feed availability**- the success of the piggery enterprises hinges on quality nutrition. It estimated that feed account for 70-80% of production costs. As such availability of quality feed stuff is a pre-requite for economic pig production. Before introduction of pigs into the rearing system, farmer must ensure uninterrupted feeding and mobile feedstuff.

3. **Common breed types and characteristics in Uganda**

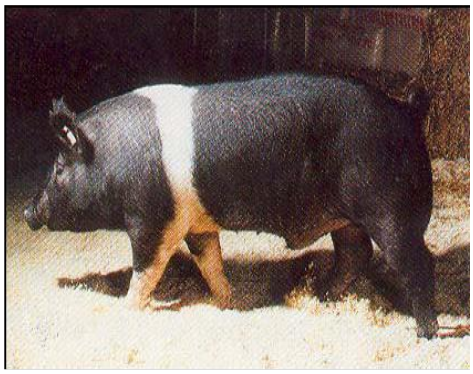
The main pig breed include; Local, Large white, Duroc, Land race, Cambrough, Pietrims, Hampshire (saddle back) and their crosses

Breed characteristics

Breed	**Characteristics**
Large White	White, good mothering ability, large litters, fast growth, erect ears, slightly dished faces
Landrace	White, lopped ears, long snouts, fast growth rate, high quality carcass
Duroc	Dark brown, fast growth rate, good mothering ability
Hampshire(Saddle back)	Black with white band over shoulder and white front legs, good carcass quality and high meat yield
Cambrough (hybrid)	White, big litter size, good maternal traits, faster growth rate, tolerant to heat and diseases
Pietrims	White with black spots, faster growth and good mothering ability
Local pigs	-Different colours, hardiness, adaptability, large litters



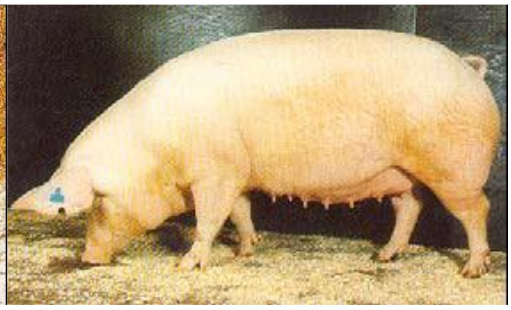
Large white



Hampshire



Duroc



Land race



Local



Pietrim



Cambrough

4. Management principles in economic pig production

Pig production and management involves about 6 different aspects, namely;

- Feed and feeding methods
- Breed type, selection and breeding methods
- Proper housing and related infrastructure
- Pig health care and disease control
- Routine management practices(weight measurement, record keeping, castration, cutting of tail and teeth etc)
- Marketing

Generally all efforts are always directed to this key production and management principles for the success of the piggery enterprises.

5. Over view on production and management systems

Production systems are determined by business strategy (the type of product) that will be provided on the market by the farmer. Ultimately, there are four production systems commonly adopted by farmers, namely;

1) Can keep sows and boars to sell weaners (farrow to wean)

2) Can keep sows and boars to grow weaners for market (farrow to finish)

3) Can purchase weaners to grow for market (wean to finish or feeder pigs)

4) Can have a mixture of the above three systems

Regardless of the system adopted, pigs can be managed:

- Intensively – kept housed all the time
- Semi-intensively – partly housed and partly outdoors on pasture
- Extensively – kept outdoors on pasture all the time

6. Why the concept of improved pig production?

Profitability is a key factor in an economic pig production. However, pig profitability is a function of;

1. Litter size-number of piglets reared per sow per year preferably large litter size

2. Growth rate
3. Carcass quality
4. Keeping minimal feed cost consistent with desired performance
5. Alternative production techniques to cut down on cost

These are in turn, determined by overlapping factors such as good selection of breeding stock and proper breeding (genetic potentiality), adequate nutrition, health, environment and better management practices. On whole the profitability is largely determined by breeding objectives such as;

- Growth rate
- Feed efficiency (FCR-feed conversion ratio)
- Carcass quality
- Maternal traits (ability to yield sizeable litter, ability to have high piglet survival rate and milking ability determined by number of teats)

Local breeds are poor feed converters consequently, poor growth rates, poor weight gains and ultimately low returns. However, at the same ration, the exotic breeds or improved breeds are good feed converters with subsequent fast growth rates, high weight gains leading to high return. This qualifies the concept of improved pig production for increased profitability.

7. Pig health care and common diseases

Economic pig production is more often challenged by the diseases and parasites which lead to production losses (direct and indirect losses). Farmers should be to detect ill-health symptoms in the herd and report to veterinary personels for early management.

- **How does healthy pig behave?**

- ✓ Steady movement
- ✓ Breathes steadily and easily
- ✓ Good appetite and eats well
- ✓ Loose shiny skin
- ✓ Bright eyes and a moist nose
- ✓ Squealing for food when hungry

- ✓ Pigs constantly communicate with other and make range of different groan or grunt
- ✓ pigs love close contact and lying down together with others
- ✓ They enjoy rooting in the ground

- ➢ **Common signs of pig disease and or conditions**

Some of the common signs of ill-healthy pigs include;

- ✓ Loss of appetite
- ✓ loss of weight
- ✓ skin discoloration
- ✓ Blisters on snout
- ✓ wounds on the coronate and interdigital space
- ✓ Cough
- ✓ stunted growth
- ✓ scrubs on skin, wrinkling and hardening of skin
- ✓ Rubbing against the hard objects
- ✓ Diamond lesions on skin
- ✓ Abortion
- ✓ Dysentery or bloody diarrhoea
- ✓ Whitish or watery diarrhoea
- ✓ Difficult and abnormal breathing
- ✓ The animal appears dull
- ✓ The animal passes excessively hard or watery feaces
- ✓ The feaces may be blood stained or contaminated with worms
- ✓ High temperature (fever) and heart beat becomes abnormal
- ✓ Loss of condition, and rough hair coat
- ✓ Some lameness
- ✓ Some vomit
- ✓ Huddling together

Table 1: Common diseases and or conditions in piggery enterprise

Name of disease	**Cause**	**Signs**	**Prevention and control**
African swine fever	Viral	Vomiting, echmotic hemorrhage on skin especially extremities(skin discolouration)	Bio-security, control of animal movement or quarantine, disinfectant
Swine erysipelas	Bacteria	Reddened diamond lesion on skin, lameness, fever, loss of appetite	Good hygiene, spraying to control ticks and use of antibiotics and multivitamins
Mange	Parasites	Rubbing against the hard objects, loss of hair	Spraying and use of ivomectin
Mastitis metritis agalactia	Bacteria	Hardened mammary gland, no milk and fever	Good hygiene, avoid over weight, good feeding, treatment using antibiotics
Prolapsed of uterus, rectum and penile	Nutritional deficiency and poor feeding	Reddened prolapsed organs	Surgical approaches-pus string and retention suture, anti-biotics
Gastro enteritis (swine dysentery and viral infections)	Corona/rota virus and E.coli	Whitish or yellowish greenish or bloody diarrhoea and emaciation in the 1 wk old piglets. In 3-4wks and adult-profuse watery diarrheoa, loss of appetite, loss of weight	Good hygiene, antibiotics and disinfectant
Worms	Worms	Starry hair coat, cough, reduced appetite, weight loss and poor growth	Regular deworming, good hygiene
Foot and mouth diseases	Viral	Vesicle/blisters on snout or around coronate, lameness, fever, loss of appetite	Bio-security, vaccination, control animal movement, quarantine, disinfectant

			and antibiotics
Poisoning	Poisonous feedstuff, misuse of drugs	Constipation, sudden death, vomiting, labour ed breathing	Good feedstuffs and use of toxin binders in feeds
Collibacilosis(E.coli infection)	Bacteria	Loose feaces or watery whitish diarrhoea especially after weaning, dehydration	Antibiotics, use of feed additive-bentonite as toxin binders
Dietary diarrheoa	Succulent feedstuff	Greenish diarrheoa	Good hygiene, use of proper diet
Abortion	Poison, infections and trauma	Dead foetus,	Antibiotics, proper feeding, isolation of expectant sows/gilts
Brucellosis	Bacteria	Abortion, retained placenta	Culling
Trypanosomiasis	Parasites	Fever, sudden death and hemorrhage	Control tsetse flies by spraying, use diminazene aceturate
Tetanus	Bacteria	Common after castration, stiffening of body and difficulty in breathing and movement	Good hygiene during and after castration, antibiotics
Anthrax	Bacteria	Fever and blood oozes out of orifices	Antibiotics, quarantine
Pneumonia	Bacteria, parasites, viruses	Cough, difficult breathing, sneezing, snout distortion due to rhinitis	Strict hygiene, good housing, antibiotics, control worms and good feeding
Nutritional defiencency	Nutrient deficiency - iron deficiency, zinc	Pale skin, weak, wrinkled and hardened skin	Good feeding(sufficient and balanced diets), iron injection to piglets 1-3 days after furrowing
Polyarthritis	Bacteria	Lameness, loss of appetite	Antibiotics and good hygiene

8. Strategies for disease prevention and control on farm premises

Various approaches can be adopted for the prevention and control of diseases on farm. These include;

- Biosecurity measure which essential contains the pathogen at source point, thus control entry, establishment and control. Apply the STOP-GO principle.
- **S**-separate sick birds from health herd (isolation/quarantine)
- **T**-take off all your attire (shoes and others) before entering the herd or disinfect them
- **O**-only authorized persons should access your herd
- **P**-protect any tools or implements from outside farm
- and
- **GO**- start from health herd to sick ones

  Other biosecurity practices involve;

  Use of antiseptics and disinfectants -The proper use of disinfectants can play a vital role in an effective disease control programme for pig units. To eliminate microorganisms, a disinfectant must gain access to them; therefore the farmer should ensure cleanliness of pig houses and equipment.

✓ Isolation and Quarantine

  Animals from infected areas are restricted from mixing with other animals.

  Any sick animal must be isolated from the rest of the animals as soon as the disease is suspected.

  When new animals are introduced on a farm isolate them for a minimum period of not less than 1 month.

- Disposal of dead animals -Burn or bury dead animals at the site of death. Bury deep 3 – 4 m under the ground
- Control of carriers -House or fence animals to avoid contact with carriers and ecto-parasites such as ticks can also act as carriers of diseases e.g. ASF. Spray the pigs with acaricides
- Good hygiene practices on the farm-clean all feeder and drinkers regularly
- Good pig sties which is not readily accessible to strangers and stray pigs

- Good production practices ie proper use of drugs, minimal use of swirls(hotel refuse) and restraint workers to bring pork products on farm
- Use of footbath at the entrance to farms and procure only quality stocks from health farms
- Carry out regular deworming and parasite control on skin

9. Basics of breed selection and breeding

➢ Reproductive efficiencies or values

Genetic potentiality of pig greatly contributes to economic pig production through fast growth rates, high feed convertion rates among others. However, the recommended reproductive values in pig breeding include;

- ✓ Sexual maturity occurs 4-5 months but first service of gilts be at 7-8 months, early breeding of gilt wears out the young sow quickly and will have poor performance
- ✓ Normal heat period lasts 3-5 das and heat cycle 18-21 days
- ✓ One boar can manage 15-20 sows a year (correct breeding ratio in natural services) for economic production
- ✓ Sow farrow two and half times a year
- ✓ Life span for fattener intended for slaughter should be below 8 months to maximize returns on investment (economic production), otherwise beyond that there is marginal weight gain compared to amount of feed consumed
- ✓ Gestation period is 114 days(3 mo, 3wks and 3 days)
- ✓ Post-weaning oestrus in sow is 4-7 days
- ✓ Tine between heats 21days
- ✓ For economic production weaning is at 4 -5 weeks instead of 8-10 weeks
- ✓ The productive life of sow is 4-5years
- ✓ Boar can be used for mating at 8-9 months of age

➢ Selection

Selection simply refers to making choice of the best gilt/sow and boars for production and breeding purposes. As acknowledged, a combination of sow and boar constitute the genetic traits for which selection is emphasized. The selection of breeds involves

evaluation of economic performance traits as well as physical soundness. Breeding gilts/sow and boars must be carefully selected and managed.

In selection of gilt/sow, consider the following:

- ✓ Sow should have minimum of 12 teats
- ✓ Atleast 10 litter size
- ✓ Highly prolific(high and excellent feed converter ie 0.5 kg/day) with good mothering abilities and docile
- ✓ High survival rate for the litter and atleast proven resistance to common diseases and free from abnormalities
- ✓ Sexually mature by 220days of age
- ✓ Sow comes on heat fast or very fertile
- ✓ Strong feet and legs
- ✓ Straight back and good length
- ✓ Ham is heavy and thick

Boars have more impact than the females, so select them carefully and wisely by considering various aspects such as;

- ✓ Free from abnormalities(cryptochidism)
- ✓ Active libido or willingness to breed
- ✓ Free protruding penis
- ✓ Sound leg and proper feet
- ✓ No buckling of front legs and stiffness of hind
- ✓ Free from diseases and in good body condition
- ✓ Good general conformation, size and or height

- ➢ **Signs of heat (hogging)**
- ✓ General weakness
- ✓ Vulva turns red and swollen
- ✓ White mucus discharge
- ✓ Tendency to mount and be mounted
- ✓ Stand still on back pressure
- ✓ Frequent urination

- **Breeding of pigs**

There are two type of natural breeding namely;

Hand mating- A sow/gilt on heat is moved to the boar for the mating and witness the process

Pen mating- A boar is left to run in group of gilt/sow in a pen and he mates the sows/gilts when they come on heat. A group of 8-10 sows/gilts is appropriate as mating ratio.

Generally in natural service, boar to gilt/sow ratio per year is normally (1:20).

Timing and number of services

Ovulation occurs about 36-40hrs after beginning of standing heat. Optimum mating is 6-12hrs prior to ovulation, thus mate 24hrs after initiation of standing heat and re-breed 8-16hrs late if the female will still accept the boar. In case you are using the pen mating, could put the sow twice.

Artificial Insemination- This is another method of breeding in pigs which being practices especially in urban areas. In this method, the semen is collected form boar and artificially inserted in uterus of pig by insemination.

10. Feeding for economic production

In pig production, feed contributes 70-80% of production costs, thus it is very critical. The conventional feed stuff is mainly cereals, cereal processing by-product and oil seeds, which are increasingly becoming competitive and costly because they are shared and demanded with human and other livestock. As such feeding of pigs for economic production involves using balanced home mixed rations and adopting use of alternative feed stuffs to minimize on the feed cost.

The alternative feed stuff include; sweet potato vines, cassava leaves, amaranthus, wondering Jew, young elephant grass, matooke peeling(cooked), vegetable culls, fruit culls, sweet potato peeling (cooked), dried malwa, kwete and brewers waste, bakery waste, root and tubers, whey, incubator waste among others. However, hotel wastes (swirl) usually contain a lot of salts, broken bottles, steel wool and other dangerous materials; therefore give it a second thought. Similarly, the idea of giving pigs feed adlib is uneconomical. It also leads to animals to become too fat which affect fertility. Farmers

are encouraged to give pigs balanced mixed feeds; otherwise, maize bran alone makes the pigs infertile and sows farrow a litter of less than 3 piglets. In addition most of these alternative feed stuffs such as brewers waste are low quality proteins deficient of lysine, tryptophan and high fibre content while others have high worm load as well as anti-nutritional factors which lead to stunted growth. Therefore, when using alternative feed stuff, precautionary measures are instituted like processing them before feeding pigs together with use of properly formulated feeds.

The balanced home mixed feed is blended targeting specific nutrient requirement for the different physiological stages (production phases) such as piglets, weaners, growers (porkers), finisher (baconer) pregnant and lactating sows. Various category feed stuff sources providing nutrients are used in mixing of balanced rations, namely;

- ✓ **Carbohydrates**: Energy sources (Sorghum, millet, wheat, maize bran, broken maize, rice bran)
- ✓ **Protein source**: Body building (Soya meal, blood meal, fish meal, sunflower, cotton cake)
- ✓ **Minerals and salts**: Bone meal, lake shells, dicalcium, limestone
- ✓ **Vitamin premix** for body protection
- ✓ **Feed additives** for technological purposes

The HOME MADE mixed feed include; creep feed (20-22%CP), grower feed (14-16%CP), finisher (12-14% CP) and sow and weaner feed (11-13%CP).

Amount of balanced ration given to different stages will depend on weight. However, recommended estimates of feed per pig per day are as below:

Production phases	**feed per day (kg)**
✓ Piglets (4-5wks)	0.5kg adlib
✓ Weaners (8-12wks)	1-1.5kg
✓ Growers (12-18wks)	1.5-2kg
✓ Finishers	2.5kg
✓ Pregnant sows	2.5-3kg
✓ Suckling sow	2.5-3kg(basic maintenance ration)
✓ Boar	2.5-3kg

11. Limitations and processing of feed stuff

The use of universal feedstuffs used in piggery is challenged by;

1. Although cereals, cereal by-products and oil seed are abundant but competitive and costly.
2. In addition some of the feedstuff contains bioactive substances that impede digestibility and bioavailability of nutrients for utilization by the animal.
3. It also acknowledged that cereals are deficient in some nutrients. For instance protein from feedstuffs of plant origin is poor quality except soyabean

The highlighted factors limit the use of the feed stuff. However, an inherent biological substance emphasizes the need for preparation and processing of the feedstuff use.

Processing of feed stuff would render it fit for use in pig feeding.

Feed processing employs both traditional and modern techniques. However, principally may be by;

- Physical
- Chemical
- Thermal
- Bacterial
- Other alterations of a feed ingredients like use of acids

Why process feedstuff?

- Alter particle size or physical form
- Preserve
- Isolate specific parts
- Improve palatability and digestibility
- Alter nutrient composition
- Detoxify

On whole the most effective processing method, it must reduce wastage, increase consumption and rate of gain or be utilized more efficiently

- ✓ Roasting in case of soyabean to reduces trypsin inhibitor and lectins
- ✓ Boiling in case of beans and cabbages
- ✓ Boiling of sweet potato, yam and cocoyam reduces cynoglucosides

- ✓ Drying in case of cassava to remove cyanide factors and also ensure the feedstuff are free of molds making them more palatable and digestible
- ✓ Cooking and fermentation reduces cyanide in cassava to improve digestibility
- ✓ Grinding to reduce particle and facilitate digestibility

12. Sitting, design and layout of pig sty

Housing is key in proper management of pig. However, before construction of sty, you need to do careful study of your site to make good farm layout. Careful sitting of pig sty right from start is crucial to avoid future inconveniences from smell and drainage from the pig sty.

The main principles of housing include;

- ✓ Easy cleanable floor, drinkers, feeders and good drainage
- ✓ Provide shelter from harsh environment
- ✓ Provision of sunbathing and exercise
- ✓ Affordabe ie not to expensive
- ✓ Adequate ventilation
- ✓ Adequate space allowance per pig
- ✓ Heat reduction measures for adult pig
- ✓ Quard rails for farrowing to reduce crushing of piglets

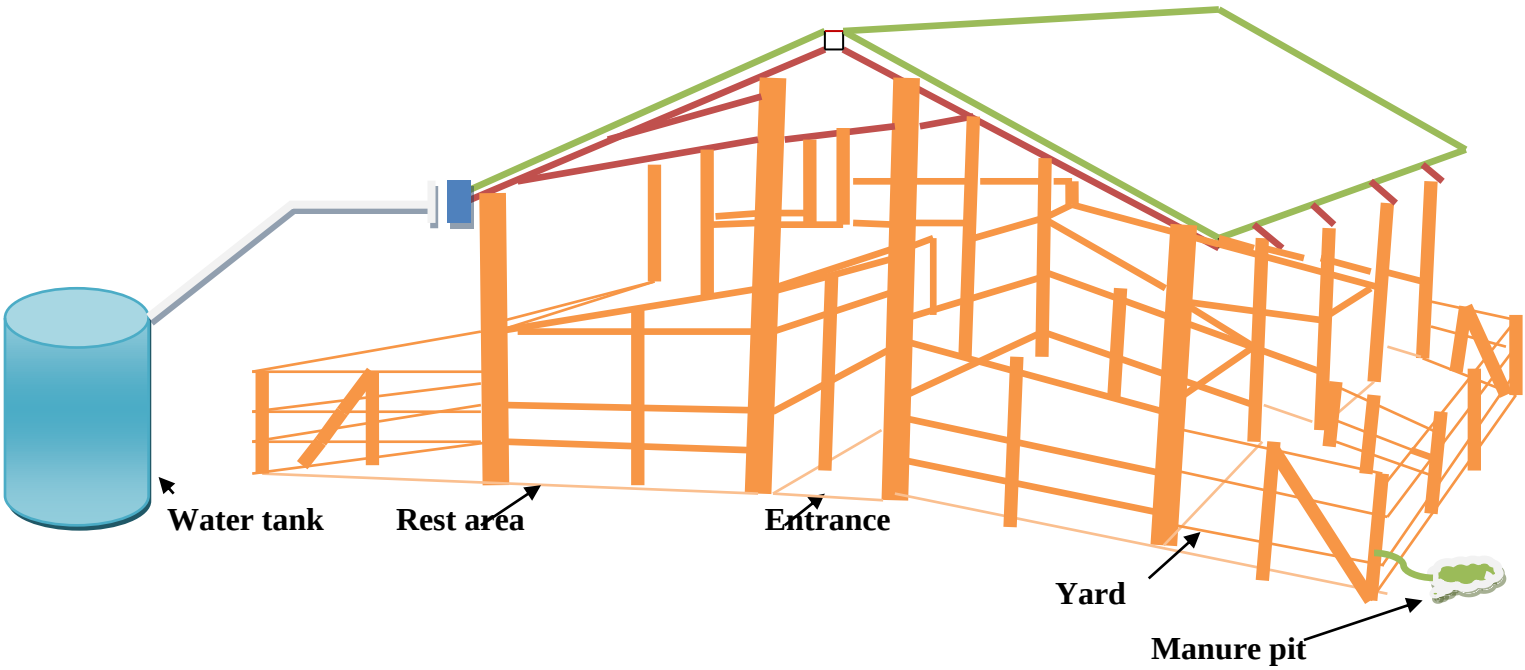
In light of the above, a piggery unit should have the following;

1. Sty for resting and provide shelter(7'x8') and feed trough
2. Yard without shelter for sun bathing and exercise(6'x8') with water trough
3. The floor should be concrete

Recommended floor space

The purpose for which the pig is being kept determines the size of the pen. However, a uniform sty of about 8 feet by 13 feet can be multipurpose. This pen (8'x13') can accommodate 20 piglets for growing purposes or three for breeding or one sow and its litter. A modern pig sty with multiple cubicles in double pens is illustrated below:

PIG STY



Ground plan

