ILRI MANUAL 15

CGIAR RESEARCH PROGRAM ON Livestock and Fish

# Pig management: Ensuring appropriate husbandry practices for profitability

## Uganda smallholder pig value chain capacity development training manual


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# Pig management: Ensuring appropriate husbandry practices for profitability

# Uganda smallholder pig value chain capacity development training manual

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# Contents

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# Abbreviations

| | |
|---|---|
| ADDIE | Analysis, Design, Development, Implementation and Evaluation |
| AFRISA | Africa Institute for Strategic Resource Services and Development |
| ASF | African swine fever |
| BRAC | Bangladesh-based development organisation formerly known as the Bangladesh Rehabilitation Assistance Committee |
| CRP | CGIAR Research Programme |
| DSIP | Development Strategy and Investment Plan |
| DVO | District Veterinary Officer |
| EC | European Commission |
| GDP | Gross Domestic Product |
| IFAD | International Fund for Agricultural Development |
| ILRI | International Livestock Research Institute |
| KCCA | Kampala Capital City Authority |
| LAF | Livestock and Fish |
| MAAIF | Ministry of Agriculture Animal Industry and Fisheries |
| NAADS | National Agriculture Advisory Service |
| NAGRIC | National Animal Genetic Resources Centre |
| NaLiRRI | National Livestock Research Institute |
| NARES | National Agricultural Research Systems |
| NGO | Non-Governmental Organization |
| PFA | Prosperity for All Programme |
| PMA | Plan for Modernization of Agriculture |

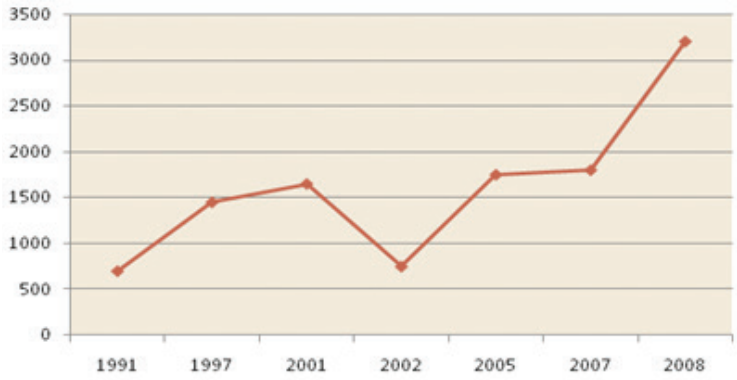
| | |
|---|---|
| SACCO | Savings and Credit Cooperative |
| UBOS | Ugandan Bureau of Statistics |
| UN | United Nations |
| UNDP | United Nations Development Programme |
| UNFAO | United Nations Food and Agriculture Organization |
| UPO | Uganda Piggery Organization |
| USAID | United States Agency for International Development |
| VEDCO | Volunteer Efforts for Development Concern |

# Introduction

Pork production and consumption have risen rapidly in Uganda over the past decade, driven by population growth, urbanization, increasing incomes and changing tastes. In 2011, Uganda had the highest per capita consumption of pork in East Africa (3.4 kg/person per year).

The number of pigs has increased more than tenfold from less than 200,000 three decades ago to roughly 3.2 million. More than 1 million households in Uganda raise those pigs. The majority of the pigs are kept by women in rural areas, with limited access to technology, services and markets.[1]

Figure 1. Trends (000) in the number of pigs in Uganda, 1991–2008.




Source: National Livestock Census Report (2008).

The CGIAR Research Program on Livestock and Fish,[2] led by the International Livestock Research Institute, started the Smallholder Pig Value Chain Development Project to improve the livelihoods of smallholder pig producers, particularly women, through increased productivity, reduced risk from disease and improved market access.

A key activity of the project is to strengthen the capacity of women and men pig producers and help them transform subsistence-level pig-keeping into viable, profitable businesses. A companion project, 'Safe Food, Fair Food', under the CGIAR Research Program on Agriculture for Nutrition and Health,[3] is working to improve pork safety and market access. These efforts, in turn, should enhance food security, help preserve natural resources and reduce poverty. Poverty in Uganda currently stands at 37.8 percent (people living on less than USD 1.25 per day).

This training modules are targeted to extension workers, veterinarians and para-veterinarians and policy makers responsible for animal disease surveillance and control and for livestock market development and regulation. Improved knowledge should help provide incentive for decision-makers to help poor pig farmers and promote the sector.

1. Find ILRI pig value chain assessment slide share presentations here: http://slidesha.re/1IojJPX
2. CGIAR Research Program on Livestock and Fish, http://livestockfish.cgiar.org/
3. Learn more about the program here: http://www.ilri.org/crp[4]

Others who may benefit from the training modular content include suppliers, pig producer organizations, transporters and entrepreneurs involved in the sale of live animals, pork and other pork products.

ILRI has also developed training modules on village boar management, control of African swine fever, parasite control, feeding strategies and marketing to help strengthen the capacity of farmers.

While designing the modules a process has been facilitated with research and development partners to practice the delivery of the packages.[4]

# Expected outcomes

This module is designed to enhance farmers' knowledge of pig-keeping systems to improve the management and productivity of their farm. It is envisaged that the skills gained will foster a commitment by farmers to manage their pigs effectively. For example, the module includes information about various pig-house requirements and how to better manage pregnant cows through a sow calendar. The training course is expected to help improve the income of the farmers, including women involved in smallholder pig rearing.

Upon completion of this module, participants will be able to:

- Describe their pig keeping systems and husbandry improvements they should make.
- Determine the appropriate pig housing requirements that match their production systems and productivity improvement needs.
- Integrate better management skills on their farms.
- Use the sow calendar as a key management tool of pregnant sows.
- Practice effective record keeping.

4. Learn more here: http://www.slideshare.net/ILRI/capacity-development-in-the-uganda-smallholder-pig-value-chain-development

# Training methods

The module includes group discussions, exercises and practical demonstrations on the use of a sow calendar.

The module is divided into four training sessions. Each session has two parts—content description and a handout that contains instructions to guide the practical delivery of the content. The handout can be photocopied and used as notes during the training. It is impossible to discuss housing and management without drawings and posters. These have been provided to guide a deeper understanding of the content.

## Proposed training schedule

Session 1 Pig keeping systems (time/duration: 1 hour)

- Pig-rearing systems.
- Handout 1.1 brainstorming on how to improve the tethering system.

Session 2 Pig housing construction (time/duration: 2 hours)

- Key messages in pig housing.
- Handout 2.1 group exercise on how to achieve a low cost pig housing unit.

Session 3 Herd and feed management (plan almost a full day)

- Session objectives.
- Session delivery plan.
- Handout 3.1 management of piglets.
- Handout 3.2 management and feeding of growers and fatteners.
- Handout 3.3 management and feeding of pregnant sows.

Session 4 Biosecurity and manure management (time/duration: about 1 hour)

- Handout 4.1 Principles of biosecurity on a pig farm.
- Handout 4.2 Manure management and disposal.

Tools and materials (prepare in advance)

- Ring binder, with outline of the training programme
- Flip chart

- Markers
- Masking tape
- Drawings—three pig pen housing unit (in this handout)
- Notebooks
- Two sisal strings
- 24 pegs (1m length)
- Hammer
- 2 kg, 4-inch nails
- One panga
- One bow saw
- One hoe

# Training aids/handouts

- Handout 1.1 Brainstorming on how to improve the tethering system.
- Handout 2.1 Group exercise on how to achieve low-cost housing.
- Handout 3.1 Management of piglets.
- Handout 3.2 Management and feeding of growers and fatteners.
- Handout 3.3 Management and feeding of pregnant sows.
- Handout 4.1 Principles of biosecurity on a pig farm.
- Handout 4.2 Manure management and disposal.

# Glossary of technical terms used in this module

| | |
|---|---|
| Biosecurity | Measures that prevent disease to affect your pigs |
| Boar | Male pig |
| Farrowing | To give birth |
| Free range | Letting a pig roam during the day, tethering or keeping it indoors at night. |
| Gilt | Young female pig, especially one that hasn't had a litter. |
| Grower | Pig between weaning and sale or transfer to the breeding stock. |
| Intensive | Rearing a pig under confinement, such as in a pig house. |
| Piglet | Young pig |
| Sow | Adult female pig |
| Tether | Keeping a pig on a rope that's fastened to a tree or peg. |
| Weaning | Gradually introducing pig to adult diet. |

# Background

Uganda represents the highest annual per capita consumption of pork in Africa at 3.4 kg, and demand is rising because of rapid population growth. To meet this demand, smallholder farmers need to ensure that their pig management practices maximize productivity, profitability and competitiveness.

The current pig production system, however, is characterized by poor housing, poor management and poor husbandry practices largely due to limited knowledge and skills to improve the enterprise. The result is lower farmer income, which negatively impacts livelihoods.

# Session 1 Pig keeping systems (time/duration: 1 hour)

## Objective Help farmers learn the kinds of pig-keeping systems in Uganda

### Instructions Explain to the group the various pig-house systems

Free range (extensive) system

Figure 2. Free-range piglets.

Credit: ILRI/Michel Dione.

In this system, pigs are kept outdoors during the day to feed by themselves and confined in the house (Figure 2) or tethered to a tree during the night (Figures 3 and 4).

The advantage is that it is a low-cost system— no money is spent on feed or housing. The disadvantages include the possibility of damage to neighbours' crops and likely quarrels as a result, high risk to disease, a high worm and parasite burden and high piglet mortality. In Uganda, local breeds and piglets are more exposed to this management system; exotic breeds are better taken care of because they have a higher monetary value and are considered more susceptible to disease.

Figure 3. Leg injury due to a tight rope.

Credit: ILRI/Michel Dione.

### Tethering (semi-extensive) system

In this system, pigs are tethered with a rope on a tree or on a peg under a shade in the compound or in the bush near the homestead (Figures 3 and 4).

This is the most widely used pig-keeping system especially in rural areas. It is a low-cost practice because farmers don't need to invest in housing. The disadvantages include potential leg injury associated with the tight rope, discomfort, bacterial infection and, in extreme cases, dislocation of limbs. Like the case with free range, survival rates for piglets are low because there are no special facilities for them.

Figure 4. Tying the rope in chest area can greatly reduce leg injuries.

The tethering system can be improved to reduce the pain and discomfort by tying the rope around the chest area (Figure 4). Ensure that the rope isn't too tight in order to reduce friction and possible injury.

Adopted from the Training manual on smallholders pig management.

## Intensive system

Figure 5. Bare floor pig house in Masaka.

Credit: ILRI/Michel Dione.

In the intensive system pigs are reared under total confinement. This is the most common system in urban areas. Total confinement tackles most problems presented by the free range and tethering system.

Based on the types of the floor, pig housing can be categorized into three types bare earth, timber and concrete.

Housing with a bare earth is considered an upgrade from the free range and the tethering system. This type of floor however is difficult to clean and pigs remain dirty, the drainage system is poor and the risk for animals to contract disease in this environment remains high (Figure 5)

Figure 6. Low-cost raised house.

Credit: ILRI/Michel Dione

Timber floor raised housing has no contact with the earth, allowing urine and manure to easily drip, keeping pigs clean most of the time. The floor seen in the photo on the left has a low clearance, making manure removal more difficult (Figure 6).

Figure 7. Pig house with a concrete floor.

Credit: ILRI/Lawrence Mayega.

This system is too expensive for most farmers, but is the best way to prevent diseases. A concrete floor is easy to clean. Pigs keep clean, resulting in a low incidence of diseases. There is usually a common drainage channel. Feed and water troughs also are often constructed in bricks and plastered with cement and therefore long lasting (Figure 7).

Figure 8. House made of timber walls and iron roof.

Credit: ILRI/ Michel Dione.

Pig house walls are mostly made of timber, however some are made of bricks. Roofs can be made of iron sheets, grass, or papyrus and polythene sheaths. In some instances, when a farmer cannot afford any kind of roofing material, the roof may be open (Figure 8).

# Exercise 1.1 Brainstorming on how to transform the system from tethering to low-cost housing

Tools and materials:

- Flip chart
- Markers
- Masking Tape
- PowerPoint equipment or printed notes if power and equipment isn't available.

# Instructions

Pair up participants to assess current status of pig farming systems. Write each category of the pig farming systems on different colour cards and pin them up on the left side of the board as shown in the handout. Give each participant a pink sticky card to write down his or her current system at home using one of the following options: 'free range', 'tethering' or 'intensive.'

Request each participant to give one recommendation on how to improve his/her current system using the following options:

- Tethering by tying the rope around the pig's chest
- Build bare floor pig house
- Build raised house with floor and walls made of timber.
- Build cement floor house with walls made of timber.
- Install roofing with local materials (grass or papyrus).
- Install roofing with iron sheets.

Collect the responses and tally the recommendations.

Discussion, recommendations and way forward

- Ask participants how they will put recommendations into action.
- Record the proposals on the flip chart as presented.
- Give a step-by-step recommendation to upgrade the pig farming systems.

Conclude by highlighting the three basic requirements in pig housing:

- Protection from adverse weather
- Adequate space for each pig
- Ease to clean and maintain good hygiene

# Session 2 Pig housing construction (time/duration: about 2 hours)

Objective help participants understand the importance of housing and how to achieve a housing plan that matches their resources.

Instructions Discuss the following items:

- Types and sizes of pig pens
- Starting points before constructing a pig house

In rural areas, emphasis should be on how to transform the tethering system by adopting a low cost housing strategy. (Exercise 2.1) In the intensive and semi-intensive systems, emphasis should focus in providing knowledge and skills to provide adequate space and how to achieve good cleaning and hygienic practices.

## Exercise 2.1 How to achieve a low cost pig housing unit

Resource person livestock extension officer

Tools and materials:

- flip chart
- markers
- masking tape
- drawings—three pig pen housing unit
- notebook (exercise book)
- 2 sisal strings
- tape measure (50 metres)
- 24 pegs (1m length)
- 1 hammer
- 2 kg nails 4”
- 1 panga
- 1 bow saw
- 1 hoe

### Instructions Provide a step-by-step guide on the importance of appropriate pig housing

The investment to improve pig farming in any given area highly depends on the market demand of pork hence the possible investment returns. Small steps should be taken at a time.

- It is important to start improving the pig farm without spending a lot of money. Start with what farmers have. For instance, since the majority have local pigs and access to local materials, start by improving the existing stock through cross-breeding and protection from adverse weather conditions and predators. This requires selection of

a good boar and crossing it with the best female to produce a good litter. Crosses are heavier and grow faster. This will increase the income from the sale of piglets and fatteners, income that can be used to improve housing.

- It is cheaper to start with a raised house**.** This can be done by using timber on the sides and the floor. Roofing can be grass, papyrus mats or bamboo where it is available. Timber pieces in the farrowing pens are nailed close together to prevent escape and accidents to piglets.
- The height off the ground of a raised house is critical to the good health of the animals. Low clearance makes it difficult to remove the manure, which accumulates and leads to ammonia gas toxicity. The ammonia gas affects the respiratory system, which can stunt the growth of the piglets. The clearance should be about 1m from the ground.

The value of investing in pig housing

- protects animals from extreme weather (rain, cold, sun).
- protects against predators and wild animals.
- protects against theft.
- enables better management through the reduced risk of disease, easy cleaning and minimizing the waste of feed and water.

All of the above lead to increased productivity.

Starting points before constructing a pig house

## Location

The site for a pig house should be easy to drain and not water logged. It should be a significant distance away from the neighbours and public walk ways.

## Orientation

The house should face north-south to avoid direct sun into the pens. A simple demonstration is for the trainer to stand and face the direction where the sun rises (the east). Your left arm points to the north and the right arm to the south. The north-south direction becomes the front or back view of your pig house.

## Floor space requirements

As animals grow they take up more space. Pig space is calculated according to age and production stage taking into account feeding, watering, sleeping and dung area requirements. In most books, the housing area is reflected in square metres or square feet. However to a smallholder, this can be confusing. Thus in this guide, we discuss the most practical way to size pens. We discuss three pen types as below:

- Farrowing pen for the sow to give birth until weaning.
- Pregnant sow pen designed for pregnant sows only, to control feed and prevent fights that can result in early abortions.
- Group pens for weaners, growers or fatteners—designed for growers and finishing pigs.

## Floor space requirement for a farrowing (maternity) pen

The farrowing pen is the 'maternity' pen on a pig farm. It is designed to host the mother and a feed area to prevent the crushing of baby piglets. The piglets can remain in this pen until two months old before moving to the growers' pen.

## Floor space requirement for a pregnant sow pen

| | |
|---|---|
| 2.25 m | |
| Feeding<br>Sleeping | 2.5 m |
| Dung area | 1.5 m |

The farrowing pen is the 'maternity' pen on a pig farm. It is designed to host the mother and a feed area to prevent the crushing of baby piglets. The piglets can remain in this pen until two months old before moving to the growers' pen

Figure 9. Floor space for pregnant sow.

Credit: Lawrence Mayega

The pregnant sow pen is the smallest pen. It is designed to accommodate one pregnant sow only. This is done to reduce fights that may lead to early embryonic deaths. Given the small size of the pregnant pen, the sow has to be transferred two weeks before farrowing to a larger farrowing pen to give birth with enough space (Figure 9).

## Recommended size for a pregnant pen

| | |
|---|---|
| 1.2 m | |
| Feeding<br>Sleeping | 2.5 m |
| Dung area | 1.5 m |

Floor space requirements for growers, fatteners and finishers

Figure 10. Example of a growers unit in Masaka.

Note the over-stocking.
Credit: Lawrence Mayega.

Growers, fatteners and finishers are housed in groups of 6–10 pigs. These are called group pens as compared to farrowing and pregnant pens, which are individual pens. It is recommended not to exceed 10 pigs in one group pen. Floor space requirements for the boar are similar to that of the growers unit as illustrated below.

## Recommended size of growers and fatteners pen

| | |
|---|---|
| 2.25 m | |
| Feeding<br>Sleeping | 2.5 m |
| Dung area | 1.5 m |

Ground plan and side elevation of a grower's pen

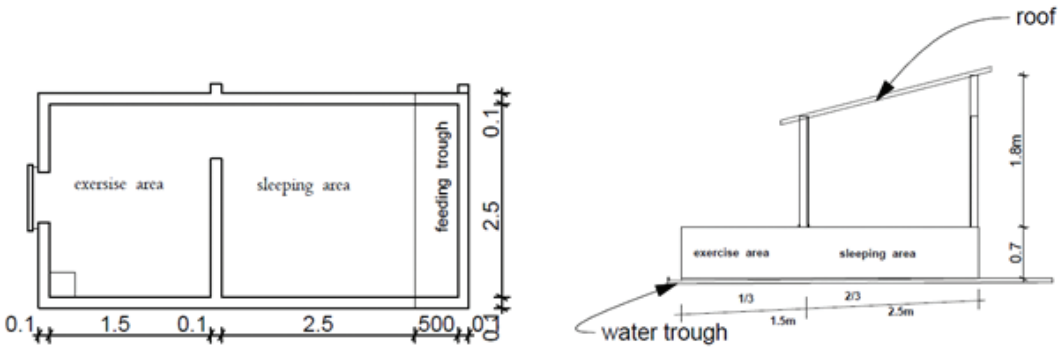



Figure 11. Three-dimensional view of a grower pen.

Credit: Lawrence Mayega.

Figure 12. Low-cost raised pig house, commonly constructed using eucalyptus timber.

Credit: Lawrence Mayega.

How a three-pen hybrid pen unit appears after laying poles and the concrete floor (Figure 13).

Figure 13. Floor set-up of hybrid three-pen unit made of concrete floor and timber walls.

Credit: Lawrence Mayega.

How the house appears after roofing and fixing timber walls (Figure 14)

Figure 14. Hybrid three-pen unit made of concrete floor and timber walls.

Credit: Lawrence Mayega.

# Session 3 Herd and feed management (time/duration: half day)

Objective provide participants with the knowledge and skills on managing pigs, including pregnant sows through the use of the sow calendar.

Instructions The session should be undertaken in the morning when learners are still fresh. It introduces new concepts and is delivered with the aid of three handouts.

Resource person livestock extension officer

Tools and materials (prepare in advance of training)

- Handouts 3.1, 3.2, 3.3
- Flip charts
- Markers
- Masking Tape
- Important drugs used on young piglets
- Iron dextran
- Iodine tincture
- Vitamin ADE

## Short group work (time/duration: 30 minutes)

Split the participants into two groups. Ask each group to discuss the challenges in managing pregnant sows and come up with a coping strategy for each challenge. Have each group present their key findings and write them down on a flip chart. Integrate the key findings into the module summary.

## Handout 3.1 Management of piglets and castration procedure (time/duration: 15 minutes)

Objective provide knowledge to participants on how to provide 'tender loving care' to piglets

Introduce session to participants using common examples in human life:

- Give similarities to when young babies are born.
- Emphasize nostrils have to be clear to ensure good breathing.
- Stress that first milk is required so a farmer may need to assist young piglets to access the teats.
- Emphasize the umbilical cord is a source of infection so it needs treatment the very day piglets are born.

Ask participants how they manage the young piglets (time/duration: 15 minutes)

- Write the responses from participants on a flip chart.

Table 1: Activity guide for managing piglets (time/duration: 10 minutes)

| Age | Management activity |
|---|---|
| 1 day old | When piglets are born wait for umbilical cord to stop bleeding, then trim cord and dip in medical iodine solution. |
| 3 days old | A number of activities are done by the farmer when piglets are three days old. These include:<br><br>Give iron dextran and vitamin ADE injection. Piglets require iron because sow milk contains little iron and this causes anaemia in very young piglets. The iron injection should be done by a veterinarian.<br><br>Trim needle teeth (seek expertise of a veterinarian to gain experience to undertake this activity).<br><br>Weigh piglets.<br><br>Identify piglets with serious defects and cull them.<br><br>Fostering can be done at this stage if two sows have farrowed on the same period and one sow has little milk.<br><br>Castrate piglets being raised as fatteners (use guide for the procedure putting emphasis on an aseptic procedure). |
| 20 days old | Introduce piglets to small amounts of a high protein baby feed (starter feed). This feed is expensive and should be placed in the creep area not to be eaten by the mother. It can be home mixed using recommended feed ingredients. |
| 35 days old | Manage weaning.<br><br>Transfer the mother sow to the dry pen but leave the weaning piglets in the farrowing pen until when they are hardy enough to transfer to the growers unit.<br><br>Identify and separate good quality piglets to rear as replacement stock in one's own farm. |

# Castration of piglets to be raised as fatteners

Rearing piglets as fatteners is a very common practice in all systems. Castration is intended to remove the boar taint which if not done reduces the sale price of males for slaughter. The common practice by smallholders is to castrate piglets at the age of one month. However, it is recommended to do so when piglets are three days old. This is less painful and the piglet at this age has high levels of maternal immunity.

Requirements

- Scalpel or razor blade
- Disinfectant (ethyl alcohol)
- Iodine
- Proper restraint (by a second person)

# Illustration of a castration

Discussion and analysis (time/duration:10 minutes)

- Ask participants what they have learnt and how it will help them to reduce piglet mortality.

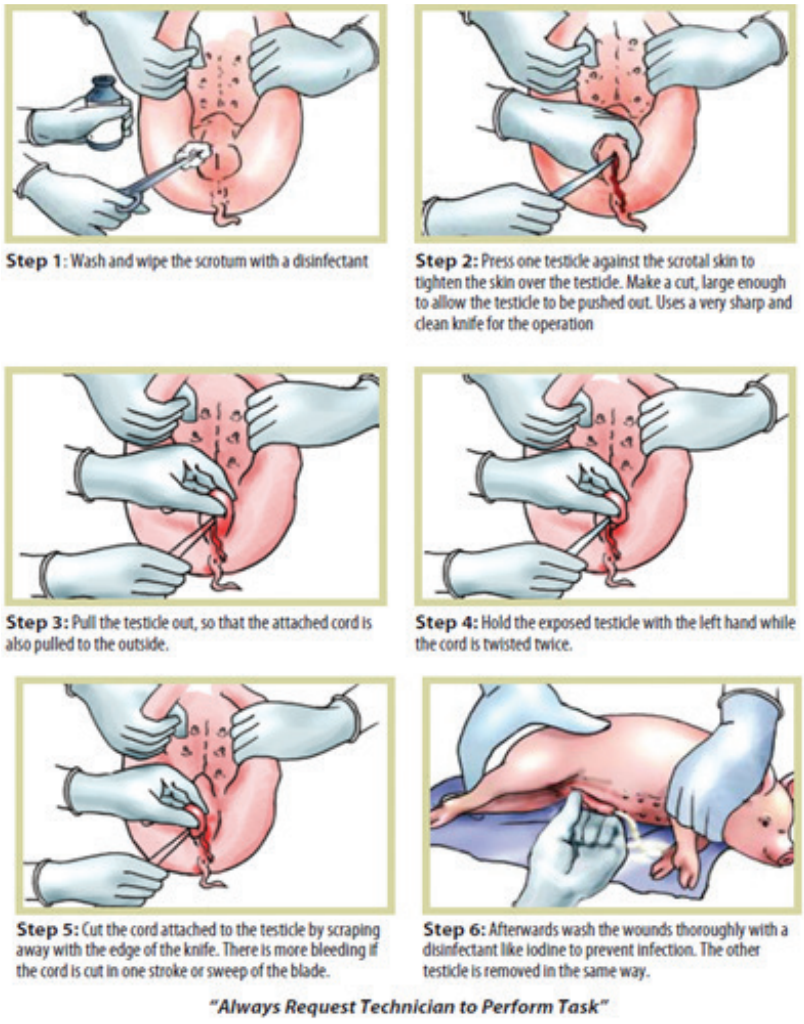
Record the points on a flip chart.

- Remind farmers that the more piglets kept alive at birth, the more money that comes into one's farm.

Conclude session with a summary of key messages (or have a farmer help summarize the session):

- Keep umbilical cords short and dip them in iodine tincture.
- Ensure that weak piglets get the first milk.
- Ensure that the afterbirth is removed from the mother.
- Establish a creep area to prevent crushing by the mother.

Figure 15. Illustration of castration procedures.




Source: Farmer's handbook on pig production for smallholders at village level, FAO.

## Handout 3.2 Management and feeding of growers and fatteners (time/duration: 50 minutes)

Objective provide information to participants about using average daily gain as a feed management tool for growers and fatteners.

Resource person Livestock extension officer

Tools and Materials (prepare in advance of training)

- Handouts
- Flip charts
- Markers
- Masking tape

Introduction (time/duration:15 minutes)

Introduce the topic of managing growers to participants by asking them how in practice, they feed grower pigs up to market stage:

- Ask them how long it takes for the pigs to be sold.
- Ask them the approximate weight of pigs for sale.
- Write the responses from participants on a flip chart.
- Present key management requirements for growers/fatteners as follows for smallholders

Discuss the transition period between weaners to growers and key points with fatteners:

- Weaning is very stressful and should be managed with care.
- To prevent stress, transfer the sow but not the piglets to a different pen.
- Tag the piglets and separate small from big piglets.
- Separate male and female weaning pigs and place them in different pens.
- Pay attention to hygiene, feeding and avoid extreme cold.
- Post weaning diarrhoea may occur. Treatment should be done by your veterinarian using the following guide:
    - Stop feeding the piglets for 1–2 days.
    - Treat with antibiotics mixed in feed or drinking water.
    - Treat with antibiotic injections if necessary.
- Fatteners need to be castrated early enough to remove the boar taint and hence improve the quality of meat.
- Commonly available feed ingredients for fattening are maize bran, silver fish, cotton seed cake, sunflower cake, common salt and a general mineral pre-mix.
- Restaurant swill in urban centres also can be used.

Introduce the concept of Average Daily Gain (ADG) as a feed management tool for growers and fatteners.

Table 2. Application of ADG, FCR and Mortality as performance targets of growing pigs in Uganda

| Performance measure | Management ranking | | | | |
|---|---|---|---|---|---|
| | Poor | Fair | Moderate | Good | Excellent |
| Daily gain (grams) | <500 | 500–550 | 550–600 | 600–650 | >650 |
| FCR | >4.2 | 3.8–4.2 | 3.5–3.8 | 3.2–3.5 | <3.2 |
| Mortality (%) | >4.2 | 3.0–4.0 | 2.0–3.0 | 1.0–2.0 | <1.0 |

- The majority of pig farmers in Uganda do not weigh their pigs and this makes it difficult to explain the application of the ADG as applied in pig fattening. However, the facilitator should be able to explain how this can be done.
- In our systems, an ADG of 500–550 or up to 600 has been achieved by even the smallholders. Demonstrate the practical application of using the feed guide by using the feed table below based on an ADG of 650g/day. Adjustments in the total daily ration are made on a farm to farm basis, based on what other feed is available.

Table 3. Feed tables for growers and fatteners based on a target of an average daily gain of 650 g

| Week | Normal weight (kg) | Kg feed per day | Number of growers/fatteners per pen | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 1 | 20 | 0.80 | 2.40 | 2.80 | 3.20 | 3.60 | 4.00 | 4.40 | 4.80 |
| 2 | 23 | 1.00 | 3.00 | 3.50 | 4.00 | 4.50 | 5.00 | 5.50 | 6.00 |
| 3 | 26 | 1.20 | 3.60 | 4.20 | 4.80 | 5.40 | 6.00 | 6.60 | 7.20 |
| 4 | 30 | 1.40 | 4.20 | 4.90 | 5.60 | 6.30 | 7.00 | 7.70 | 8.40 |
| 5 | 34 | 1.60 | 4.80 | 5.60 | 6.40 | 7.20 | 8.00 | 8.80 | 9.60 |
| 6 | 38 | 1.80 | 5.40 | 6.30 | 7.20 | 8.10 | 9.00 | 9.90 | 10.80 |
| 7 | 42 | 2.00 | 6.00 | 7.00 | 8.00 | 9.00 | 10.00 | 11.00 | 12.00 |
| 8 | 47 | 2.00 | 6.00 | 7.00 | 8.00 | 9.00 | 10.00 | 11.00 | 12.00 |
| 9 | 51 | 2.10 | 6.30 | 7.35 | 8.40 | 9.45 | 10.50 | 11.55 | 12.60 |
| 10 | 56 | 2.20 | 6.60 | 7.70 | 8.80 | 9.90 | 11.00 | 12.10 | 13.20 |
| 11 | 61 | 2.30 | 6.90 | 8.00 | 9.20 | 10.35 | 11.50 | 12.65 | 13.80 |
| 12 | 66 | 2.40 | 7.20 | 8.40 | 9.60 | 10.80 | 12.00 | 13.20 | 14.40 |
| 14 | 76 | 2.60 | 7.80 | 9.10 | 10.40 | 11.70 | 13.00 | 14.30 | 15.60 |
| 15 | 81 | 2.70 | 8.10 | 9.45 | 10.80 | 12.15 | 13.50 | 14.85 | 16.20 |
| 16 | 86 | 2.80 | 8.40 | 9.80 | 11.20 | 12.60 | 14.00 | 15.40 | 16.80 |
| 17 | 91 | 2.90 | 8.70 | 10.15 | 11.60 | 13.05 | 14.50 | 15.95 | 17.40 |
| 18 | 96 | 3.00 | 9.00 | 10.50 | 12.00 | 13.50 | 15.00 | 16.50 | 18.00 |
| 19 | 101 | 3.00 | 9.00 | 10.50 | 12.00 | 13.50 | 15.00 | 16.50 | 18.00 |
| 20 | 106 | 3.00 | 9.00 | 10.50 | 12.00 | 13.50 | 15.00 | 16.50 | 18.00 |

Average starting weight: approximately 20 kg (2 months)
Daily gain: approximately 650 g per day
Feed conversion: approximately 3.25

Total feed intake according to schedule per animal
After 120 fattening days: (4 months) 240 kg
Each additional day approximately 3 kg

## Discussion and analysis (time/duration: 15 minutes)

### Brainstorming

- Ask participants what they have learnt and how it will help them to manage growers.
- Record the ideas on a flip chart.
- Discuss the relationship between feed costs and economic viability. A rough indication of economic viability is the pork price to feed price ratio. Generally, a ratio of 7 and above means that pig husbandry can be profitable. For example, if the pork price is UGX 8000 per kg and the feed price is UGX 800 per kg, then the ratio is 10 which means that pig husbandry is profitable in this area.

## Summary (time/duration: 5 minutes)

Feed and feed management are the most important determinants of productivity and farm economics. The feed tables provided are based on standard normal feed, based on an Average Daily Gain (ADG) of 650 g/day. However, because smallholder pig farmers find it difficult to raise pigs exclusively under concentrated feed, one can target to achieve an ADG of at least 500–550 g/day.

To attain break even growth, farmers should feed growers on balanced home mixed rations for at least the first two months after weaning and thereafter on sweet potato silage or some other balanced feed as guided by your area veterinary advisor. If this is not possible, provide some kind of protein feed which may be added to the normal diet of tubers, kitchen waste and crop residues.

Key messages:

- Management of the transition period from weaning to growers starts as early as 20 days old when piglets should be introduced to a high protein diet.
- Piglet diarrhoea and lack of protein diet are the two most common limiting factors in piglet management.
- Average Daily Gain tables are intended to guide farmers to aim at appropriate targets.

## Handout 3.3 feeding and managing pregnant sows

Objective help participants learn how to apply a sow calendar to properly feed pregnant pigs.

Resource person livestock extension officer

Tools and materials (prepare in advance of the training)

Print the following training aid materials provided in this handout. Each beneficiary should have a copy of the following:

- Sow calendar
- Calendar calculation table
- Sow card (front and back page)
- Feed chart of pregnant sows (to be used with sow calendar)
- Flip charts
- Markers
- Masking Tape

## Part A Applying knowledge of the sow calendar to fill the sow card (time/duration: 45 minutes)

Introduce content with uses of the traditional calendar in homesteads and daily lives.

Ask participants the following questions:

- How many participants have the wall calendar at home? (by show of hands)
- For those who have, how do you use the wall calendar at home?
- What are the key main holidays marked in your calendar? (random responses)

- The sow calendar is the driver of record keeping in pig farming.
- Sow records and management activities rotate around the sow calendar.
- Sow calendar applies to small and large farms

After the above responses, introduce the sow calendar. Take the participants through the similarities and differences of the household wall calendar and the sow calendar. Then navigate participants into the deeper content of the sow calendar.

Similarities and differences:

- The household wall calendar starts on 1st January and ends 31st December, while the sow calendar starts on conception (day 1) and ends on farrowing (day 114).
- The household calendar is 365 days while the sow calendar is 114 days.
- We use the household calendar in several ways; for example to prepare for the school term, church activities, birthdays, marriages and many other events.
- The household calendar has some days marked in red; for example New Year's Day, Easter, Independence Day, Christmas day and others.
- Likewise, the sow calendar has some days the farmer will highlight in red including the farrowing date, the steaming up date, the date for first washing/worm control/mange control and the date for the second washing/worm control/mange control.

The main business of pig farming is to ensure that all piglets are born alive and survive up to market day. For this to happen, the farmer has to master the sow calendar to have full control of each individual event. The sow calendar is therefore customized per individual sow starting on conception. Sows that conceive on the same day will be subjected to similar events. The sow calendar gives the farmer 'early preparation activities' throughout the gestation cycle.

The sow calendar

| Sow calendar date | Management activity |
|---|---|
| Starting date | For first time gilts, skip the first 2–3 heats and serve when they attain good body weight (8–9 months old). For old sows, give little feed on weaning day and place them in a group with other dry sows. The next day after weaning, feed 2 kg per day of normal feed for up to 5 days. |
| Day 6–10 | Increase feed allowance to 3.5 kg day of normal feed. This is called 'flushing' and is intended to mobilize enough body resources for breeding. |
| Day 10 | Reduce feed allowance from 3.5 kg/day to 2.3 kg /day of normal feed until after the 6-week pregnancy. |
| Day 21 | Three week pregnancy check. Sow will return in heat if there was no conception on Day 1. |
| Day 42 | Six weeks pregnancy check. If positive, increase feed allowance from 2.3 kg/day to 2.5 kg/day |
| Day 85 | Increase feed allowance from 2.5 kg/day to 3.5 kg/day of normal feed. This is called 'steaming up.' This caters to the increased body demands, rapid embryo growth and sow milk formation. Remember an individual sow can bear up to 16 piglets in one litter. |
| Day 101 | Reminder: It is 14 days before farrowing<br><br>Carry out first wash and first mange treatment and first deworming. Farmers should always use their area vet or community animal health worker for the ivermectin injection.<br><br>Disinfect planned farrowing pen. |
| Day 107 | Reminder It is 7 days before farrowing;<br><br>Second wash and second mange treatment and second deworming. Farmers should always use their area vet or community animal health worker for the ivermectin injection.<br><br>Transfer sow to farrowing pen. |

| Sow calendar date | Management activity |
|---|---|
| Day 112 | Reminder It is 3 days before farrowing day |
| | Reduce feed to 2 kg/day. Small feed amounts reduce the size of the abdomen and reduce soiling of baby piglets. |
| | Check that the farrowing pen is in order, prepare creep area and have bedding well-arranged using saw dust or dry grass. Stockman should be in position to check every hour. |
| Day 114 | On farrowing day be at hand to assist all piglets to access clostrum, bearing in mind the baby activities that have to be done: |
| | Help very weak piglets. |
| | Trim umbilical cord and dip in iodine. |
| | Provide sufficient warmth. |
| | Prevent crushing of young ones by the sow who may be very tired at this time; establishing a creep area is of paramount importance in a farrowing pen. |

Practical exercise with the sow calendar and the sow card (time/duration: 45 minutes)

Instructions

- Give each participant a copy of the **sow calendar, sow card** and **calculation table.**
- Ensure that all participants have a pen with them.
- Explain the two faces of the sow card (front and back page).
- Ask for questions about any item that is not clear at this stage and respond with examples.

Guide participants in filling out a sow card

- **Step (1)** Participants are guided to write an imaginary **sow ear no**; for example enter **Number 1651.**
- **Step (2**) Record the breed; for example fill in '**Large white.'**
- **Step (3)** Record the date of birth; for example **15/5/2013.**
- **Step (4)** Record the service date; for example **11/3/2014.**
- **Step (5)** Calculate and record the **projected farrowing date** (use the calculation table)

Date of service is 11/3/2014 and corresponds to **70 days** since the year begun (the answer is read from the Day Calculation Table)

The projected farrowing date will be **114 days** after conception therefore we simply add the two figures **70 + 114 = 184**

184 corresponds to 3/7/2014 (Read from the Day Calculation Table)

**Record the projected farrowing date as 3/7/2014**

**Step (6)** Calculate and record the steaming-up date (use the Day Calculation Table). Steaming up is done 85 days after service/conception of the sow calendar

**Date of service is 11/3/2014** and corresponds to **70 days** since the year begun (read from calculation Table). Steaming-up date is calculated by adding 85 days **70 + 85 = 155 days**

155 days correspond to 4/6/2014 (Read from the day calculation table)

**Record the steaming-up date as 4/6/2014**

**Step (7)** Calculate and record the date of first deworming and mange treatment; this is calculated **101 days** after service/conception**.** Date of service is 11/3/2014 and corresponds to 70 days (read from the Day Calculation Table).

1st deworming/mange/washing of sow will be 101 days forward 70 + 101 = 171 days

171 days corresponds to 20/6/2014 (Read from the Day Calculation Table)

**Record on the sow card First deworming/mange control/washing of the pregnant sow is 20/6/2014**

**Step (8)** Calculate and record the date of the second deworming and mange treatment; this is done 108 days after service/conception of the sow calendar.

**Date of service is 11/3/2014** and corresponds to **70 days** since the year begun (read from the Day Calculation Table). The second deworming/mange/washing of sow will be **70 + 108 = 178 days**

178 days corresponds to 27/6/2014 (Read from the Day Calculation Table)

**Record on the sow card Second deworming/mange treatment/washing of sow will be on 27/6/2014**

At this stage, participants have filled in the most important data in the sow card. Other data will be filled in as it comes till farrowing.

Congratulate all participants for their work with a very big clap.

Discussion and analysis (time/duration: 15 minutes)

- Ask the participants what they have learnt and how it will help them to practice sow records.
- Using a question and answer session—brainstorm on whether the farmers were able to follow the events on the sow calendar.
- Discuss and respond to challenges met in filling out the sow card.

Summarize the application of the sow calendar to fill sow cards (time/duration: 10 minutes)

- Date for flushing
- Date for steaming up (day 85)
- Date to carry out washing, deworming and mange treatment (day 101)
- Date; to carry out second washing , deworming and mange treatment (day 108)
- Date to transfer sow from pregnant pen to farrowing pen
- Date to prepare bedding for the sow
- Date projected for farrowing (day 114)

Key messages:

- Good identification is a prerequisite for keeping animal records. Without identification, it is difficult to make records.
- Good records are the basis of pig farm development.
- Good records are also marketing tools for your farm as good animals will be traced to your farm.

Table 4. Calculating number of days

| 1-Jan | 1 | 1-Mar | 60 | 1-May | 121 | 1-Jul | 182 | 1-Sep | 244 | 1-Nov | 305 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 | 2 | 2 | 61 | 2 | 122 | 2 | 183 | 2 | 245 | 2 | 306 |
| 3 | 3 | 3 | 62 | 3 | 123 | 3 | 184 | 3 | 246 | 3 | 307 |
| 4 | 4 | 4 | 63 | 4 | 124 | 4 | 185 | 4 | 247 | 4 | 308 |
| 5 | 5 | 5 | 64 | 5 | 125 | 5 | 186 | 5 | 248 | 5 | 309 |
| 6 | 6 | 6 | 65 | 6 | 126 | 6 | 187 | 6 | 249 | 6 | 310 |
| 7 | 7 | 7 | 66 | 7 | 127 | 7 | 188 | 7 | 250 | 7 | 311 |
| 8 | 8 | 8 | 67 | 8 | 128 | 8 | 189 | 8 | 251 | 8 | 312 |
| 9 | 9 | 9 | 68 | 9 | 129 | 9 | 190 | 9 | 252 | 9 | 313 |
| 10 | 10 | 10 | 69 | 10 | 130 | 10 | 191 | 10 | 253 | 10 | 314 |
| 11 | 11 | 11 | 70 | 11 | 131 | 11 | 192 | 11 | 254 | 11 | 315 |
| 12 | 12 | 12 | 71 | 12 | 132 | 12 | 193 | 12 | 255 | 12 | 316 |
| 13 | 13 | 13 | 72 | 13 | 133 | 13 | 194 | 13 | 256 | 13 | 317 |
| 14 | 14 | 14 | 73 | 14 | 134 | 14 | 195 | 14 | 257 | 14 | 318 |
| 15 | 15 | 15 | 74 | 15 | 135 | 15 | 196 | 15 | 258 | 15 | 319 |
| 16 | 16 | 16 | 75 | 16 | 136 | 16 | 197 | 16 | 259 | 16 | 320 |
| 17 | 17 | 17 | 76 | 17 | 137 | 17 | 198 | 17 | 260 | 17 | 321 |
| 18 | 18 | 18 | 77 | 18 | 138 | 18 | 199 | 18 | 261 | 18 | 322 |
| 19 | 19 | 19 | 78 | 19 | 139 | 19 | 200 | 19 | 262 | 19 | 323 |
| 20 | 20 | 20 | 79 | 20 | 140 | 20 | 201 | 20 | 263 | 20 | 324 |
| 21 | 21 | 21 | 80 | 21 | 141 | 21 | 202 | 21 | 264 | 21 | 325 |
| 22 | 22 | 22 | 81 | 22 | 142 | 22 | 203 | 22 | 265 | 22 | 326 |
| 23 | 23 | 23 | 82 | 23 | 143 | 23 | 204 | 23 | 266 | 23 | 327 |
| 24 | 24 | 24 | 83 | 24 | 144 | 24 | 205 | 24 | 267 | 24 | 328 |
| 25 | 25 | 25 | 84 | 25 | 145 | 25 | 206 | 25 | 268 | 25 | 329 |
| 26 | 26 | 26 | 85 | 26 | 146 | 26 | 207 | 26 | 269 | 26 | 330 |
| 27 | 27 | 27 | 86 | 27 | 147 | 27 | 208 | 27 | 270 | 27 | 331 |
| 28 | 28 | 28 | 87 | 28 | 148 | 28 | 209 | 28 | 271 | 28 | 332 |
| 29 | 29 | 29 | 88 | 29 | 149 | 29 | 210 | 29 | 272 | 29 | 333 |
| 30 | 30 | 30 | 89 | 30 | 150 | 30 | 211 | 30 | 273 | 30 | 334 |
| 31 | 31 | 31 | 90 | 31 | 151 | 31 | 212 | | | | |
| 1-Feb | 32 | 1-Apr | 91 | 1-Jun | 152 | 1-Aug | 213 | 1-Oct | 274 | 1-Dec | 335 |
| 2 | 33 | 2 | 92 | 2 | 153 | 2 | 214 | 2 | 275 | 2 | 336 |
| 3 | 34 | 3 | 93 | 3 | 154 | 3 | 215 | 3 | 276 | 3 | 337 |
| 4 | 35 | 4 | 94 | 4 | 155 | 4 | 216 | 4 | 277 | 4 | 338 |
| 5 | 36 | 5 | 95 | 5 | 156 | 5 | 217 | 5 | 278 | 5 | 339 |
| 6 | 37 | 6 | 96 | 6 | 157 | 6 | 218 | 6 | 279 | 6 | 340 |
| 7 | 38 | 7 | 97 | 7 | 158 | 7 | 219 | 7 | 280 | 7 | 341 |
| 8 | 39 | 8 | 98 | 8 | 159 | 8 | 220 | 8 | 281 | 8 | 342 |
| 9 | 40 | 9 | 99 | 9 | 160 | 9 | 221 | 9 | 282 | 9 | 343 |
| 10 | 41 | 10 | 100 | 10 | 161 | 10 | 222 | 10 | 283 | 10 | 344 |
| 11 | 42 | 11 | 101 | 11 | 162 | 11 | 223 | 11 | 284 | 11 | 345 |
| 12 | 43 | 12 | 102 | 12 | 163 | 12 | 224 | 12 | 285 | 12 | 346 |
| 13 | 44 | 13 | 103 | 13 | 164 | 13 | 225 | 13 | 286 | 13 | 347 |

| 1-Feb | 32 | 1-Apr | 91 | 1-Jun | 152 | 1-Aug | 213 | 1-Oct | 274 | 1-Dec | 335 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | 45 | 14 | 104 | 14 | 165 | 14 | 226 | 14 | 287 | 14 | 348 |
| 15 | 46 | 15 | 105 | 15 | 166 | 15 | 227 | 15 | 288 | 15 | 349 |
| 16 | 47 | 16 | 106 | 16 | 167 | 16 | 228 | 16 | 289 | 16 | 350 |
| 17 | 48 | 17 | 107 | 17 | 168 | 17 | 229 | 17 | 290 | 17 | 351 |
| 18 | 49 | 18 | 108 | 18 | 169 | 18 | 230 | 18 | 291 | 18 | 352 |
| 19 | 50 | 19 | 109 | 19 | 170 | 19 | 231 | 19 | 292 | 19 | 353 |
| 20 | 51 | 20 | 110 | 20 | 171 | 20 | 232 | 20 | 293 | 20 | 354 |
| 21 | 52 | 21 | 111 | 21 | 172 | 21 | 233 | 21 | 294 | 21 | 355 |
| 22 | 53 | 22 | 112 | 22 | 173 | 22 | 234 | 22 | 295 | 22 | 356 |
| 23 | 54 | 23 | 113 | 23 | 174 | 23 | 235 | 23 | 296 | 23 | 357 |
| 24 | 55 | 24 | 114 | 24 | 175 | 24 | 236 | 24 | 297 | 24 | 358 |
| 25 | 56 | 25 | 115 | 25 | 176 | 25 | 237 | 25 | 298 | 25 | 359 |
| 26 | 57 | 26 | 116 | 26 | 177 | 26 | 238 | 26 | 299 | 26 | 360 |
| 27 | 58 | 27 | 117 | 27 | 178 | 27 | 239 | 27 | 300 | 27 | 361 |
| 28 | 59 | 28 | 118 | 28 | 179 | 28 | 240 | 28 | 301 | 28 | 362 |
| 29 | 60 | 29 | 119 | 29 | 180 | 29 | 241 | 29 | 302 | 29 | 363 |
|  |  | 30 | 120 | 30 | 181 | 30 | 242 | 30 | 303 | 30 | 364 |
|  |  |  |  |  |  | 31 | 243 | 31 | 304 | 31 | 365 |

| | |
|---|---|
| **Father:** | **Origin:** |
| **Mother:** | **Entry Date:** |

**Total number of weaned piglets:**_____ **Total born alive:**_____ **Total still born**____

**Last Weaning Date**

| **Service date** | Boar | **3-weeks control** | **6-weeks control** | **Projected farrowing date** | **Farrowing da** |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

| **ACTIVITIES** | | **Plan** | **Actual** | **Initials** |
|---|---|---|---|---|
| Flushing | | Day 0-6 | | |
| | | | | |
| Pregancy test | positive | Day 21 | | |
| | negative | Day 42 | | |
| Steaming up | | Day 85 | | |
| 1st mange,deworm & wash | | Day 101 | | |
| 2nd mange, deworm &wash | | Day 108 | | |
| Transfer to farrowing pen | | Day 108 | | |
| Disinfection umblical cord | | 1st Day | | |
| Clip teeth + tail docking | | 3rd Day | | |
| Iron + Vitamins | | 3rd Day | | |
| Castration | | 3rd Day | | |
| | | | | |
| **Vaccinations** | | | | |
| Erysipelas | | | | |
| Parvo | | | | |
| Other | | | | |
| Vitamin injection | | | | |
| **Weaning** | | 30-36 days | | |
| **Service** | | 6 days | | |
| **Lost days** | | 10 days | | |

| **PARTICULARS OF PIGLETS** | |
|---|---|
| Born alive; | Males: |
| | Females: |
| Total born alive | |
| Still born: | |
| | |
| Fostering date: | |
| Fostering: from sow: | |
| | to sow: |
| **Weight of piglets** | |
| Weight at birth | |
| Weight at weaning | |

| **Mortality of piglets** | | | |
|---|---|---|---|
| Date | Male | Female | Cause |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

## FEEDING ADVICE DURING PREGNANCY

| **Feed plan kg/day** | | **Actual feed kg/day** |
|---|---|---|
| **Flushing; after** | | Date start: |
| **weaning (0-6 days)** | | Date end: |
| Day **10** | 2.3 kg | |
| Day **42** | 2.5 kg | |

| **Feed plan kg/day** | | **Actual feed kg/day** |
|---|---|---|
| **Steaming up** | | Date start: |
| **Day 85** | 3.5 kg | Date end: |
| Day **101** | 2.5 kg | |
| Day **108** | Reduce feed to 1.0 kg | |

## SOW FEEDING AND HEALTH RECORD

**SOW No.**

| Pregnancy control | | | Mange & Worm contr | | Care to piglets | |
|---|---|---|---|---|---|---|
| Date | pos (+) | neg (-) | Date | Drug used | Day 1 | Day 3 |
| 3-weeks | | | | | Trimm umblical | Teeth clipping, |
| 6-weeks | | | | | cords, disinfect | Castration (fatteners) |
| | | | | | with iodine | Iron, Vitamins, Pen & strep |

### FEED FOR PIGLETS

| Date | Age | Feed in kg | |
|---|---|---|---|
| | | AM | PM |
| | 1 | | |
| | 2 | | |
| | 3 | | |
| | 4 | | |
| | 5 | | |
| | 6 | | |
| | 7 | | |
| | 8 | | |
| | 9 | | |
| | 10 | | |
| | 11 | | |
| | 12 | | |
| | 13 | | |
| | 14 | | |
| | 15 | | |
| | 16 | | |
| | 17 | | |
| | 20 | | |
| | 25 | | |
| | 30 | | |
| | 31 | | |

### FEEDING ADVICE FOR SOWS

| | |
|---|---|
| Service to 80 d of pregnancy | 2.5 kg |
| Last month of pregnancy | 3.5 kg |
| 3-days before farrowing | 2 kg |
| Days of farrowing | **little feed** |
| **Suckling period** | |
| 1st day | 1 kg |
| 2nd day | 2 kg |
| 3rd day | 3 kg |
| 4th - 7th day | 4 kg |
| **Rest of suckling period** | |
| Feed= **1.5 + (0.5 kg x no piglets)** | |
| **Weaning date** | **Little feed** |
| **Day after weaning until** | |
| **Service day (flushing)** | 3.5 - 4 kg |

### TREATMENT FOR SOWS

| Date | Treatment | Sign |
|---|---|---|
| | | |
| | | |

### TREATMENT FOR PIGLETS

| Date | Treatment | Sign |
|---|---|---|
| | | |
| | | |

| WEANING OF PIGLETS | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Males | Ear Nos | | | | | | | | | |
| | | Weight | | | | | | | | | |
| | Female | Ear Nos | | | | | | | | | |
| | | Weight | | | | | | | | | |

**Part B** Applying knowledge of the sow calendar to draw a feed management chart for pregnant sows (time/duration 40 minutes)

(Assumes participants have some knowledge of supplementary feeding)

Objective Help participants learn how to link the sow calendar to a feed chart for pregnant sows.

Resource person Livestock extension officer

Tools and materials:

- Feed chart
- Flip chart
- Markers
- Masking Tape

Group exercise (time/duration: 20 minutes):

- Introduce the topic by asking participants to brainstorm on how they feed pregnant sows.
- Write the responses from participants on a flip chart, recognize individual farmer innovations in management by giving hands of applause.
- Divide into four groups and ask each group to draw a feed chart for pregnant sows.

**Step 1** Ask groups to write the title 'Feed Chart for Pregnant Sows'

**Step 2** Ask groups to draw two axis:

- Vertical axis represents the amount of feed in kg per day.
- Horizontal axis is the number of days of the sow calendar.

**Step 3** Participants are guided to draw the feed management chart:

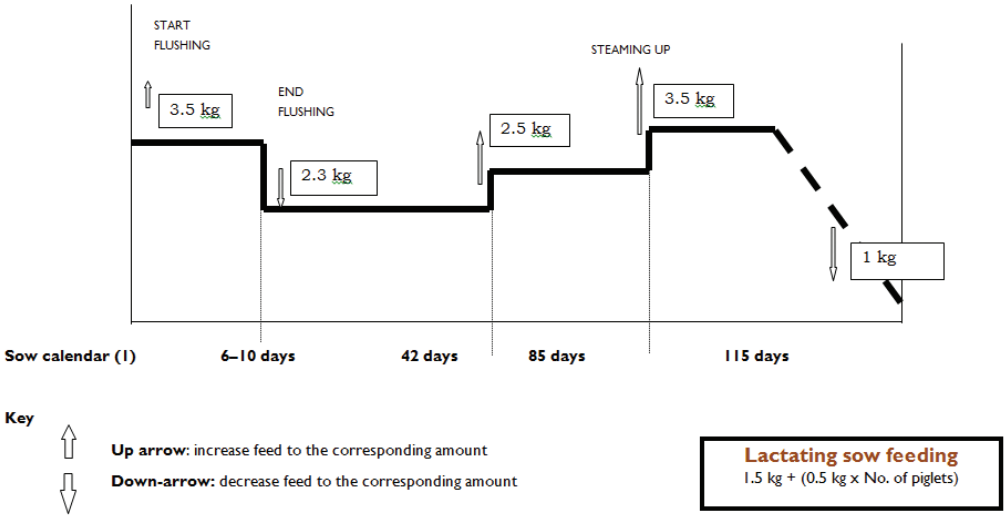
- **Flushing** Dry sows are fed 3.5 kg per day for six days. Sows would have come on heat and served in this period. Flushing is aimed at increasing the body energy as the sow prepares for the next breeding cycle after weaning.
- **After 6–10 days** Feed is reduced from 3.5 kg to 2.3 kg per day. This marks the end of flushing.
- **After 42 days** If sow is pregnant, feed is increased to 2.5 kg per day.
- **After 85 days** Steaming is done and feed is increased from 2.5 kg to 3.5 kg per day. Steaming is aimed at providing sufficient nutrients for the many embryos as well as for milk formation and body maintenance for the pig.
- **After 101 days** Feed is reduced gradually from 3.5 kg to 1 kg per day until farrowing day.

The feed chart is now complete. The feed guide can be reproduced as a poster for the training.

Discussion and analysis (time/duration: 10 minutes)

- Ask participants what they have learnt and how it will help them to plan in feeding pregnant sows.
- Record the ideas on the flip chart.

Figure 16. Using the sow calendar to draw a feed chart of normal concentrate feed for pregnant sows.




**Key**

**Up arrow**: increase feed to the corresponding amount

**Down-arrow:** decrease feed to the corresponding amount

**Lactating sow feeding**
1.5 kg + (0.5 kg x No. of piglets)

# Session 4 Biosecurity and farm hygiene (time/duration: 30 minutes)

Objective Provide participants with knowledge about good husbandry practices to prevent disease on the farm and basic biosecurity measures.

Assumes prior knowledge of participants of general hygiene and challenges of disease control especially African swine fever.

Resource person Livestock extension officer

Tools and materials (prepare in advance of training):

- Poster Making rules for biosecurity on a pig farm
- Flip charts
- Markers
- Masking Tape

## Handout 4.1 Principles of biosecurity on a pig farm

Instructions Use poster to brainstorm on how to make biosecurity rules on the farm

- Homestead activities (owners, visitors and kitchen waste)
- Workers and veterinarians
- Purchases of new pigs, supplies and equipment
- Traders, vehicles and boda-bodas
- Farm hygiene
- Tools and equipment from crop farm, other enterprises and neighbours

## Discuss principles of biosecurity

Biosecurity are rules (policies) and actions that are put in place by the farm to prevent entry of infection and in the event that a disease outbreak occurs on the farm, disease is contained to deter its spread to other farms. Biosecurity has three components: bio-exclusion, bio-management and bio-containment.

### Bio-exclusion

Security measures that prevent the introduction of unwanted diseases into the farm. Bio-exclusion by smallholders may include:

- Not allowing boda-bodas and vehicles beyond the front of the main house.
- Making simple footbaths and separating boots by different colours for the pig farm from those used in gardening.
- On intensive farms, invite visitors, traders and veterinarians only by appointment.

### Bio-management

Routine activities that aim at control of diseases that are already present in the farm. These include daily cleaning of the floor, utensils and the immediate surroundings. Application of a disinfectant solution on a weekly basis also has been proven to be very effective.

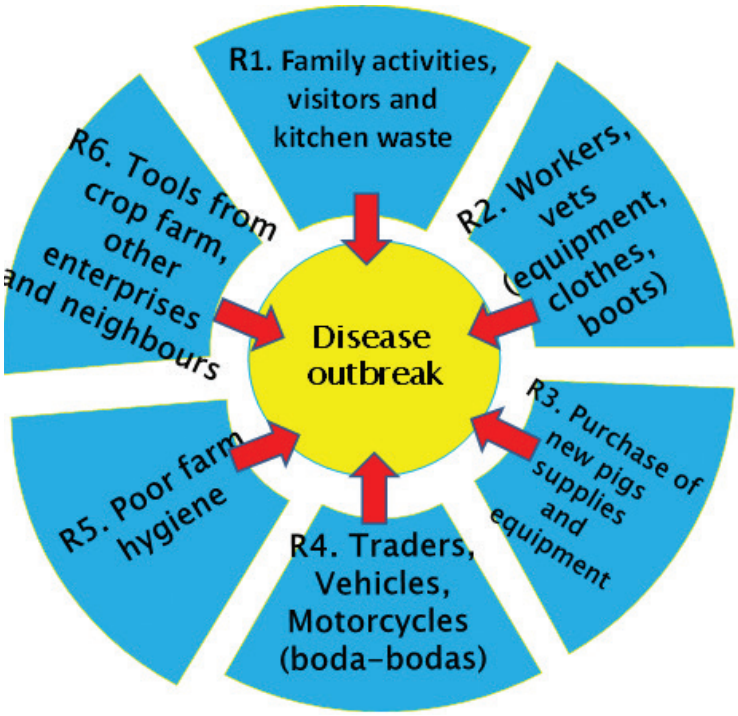
### Bio-containment

When a disease outbreak occurs on your farm, report it to the veterinary authorities and inform your neighbours so that you prevent the spread of the disease from your farm.

### Brainstorming exercise

After introducing the concept of biosecurity, use brainstorming with participants to make possible biosecurity rules on their pig farms. Rules will differ from farm to farm and will be different for a smallholder and a commercial farmer. The poster below works as a guide for this discussion.

**Poster 4A** Making biosecurity rules for pig farms



Using this poster, participants discuss how to make rules for biosecurity on their farms as described below:

Rule 1: Control yourself, family activities, visitors and kitchen waste

- Restricted entry protocol; start with family members.
- Feed kitchen residues and swill only after boiling them.
- Wherever possible, use separate clothes and boots on the pig farm.
- On a weekly basis (in church or other meeting places), ask your fellow farmers if they have experienced any diseases on their farms.

Rule 2: Have a room or shade where workers and veterinarians change clothes and boots

- Separate farm into two compartments: a dirty and a clean area. The two should be separated by a compulsory change room.
- Ensure that veterinarians change boots and needles on your farm.

Rule 3: Isolate new pigs and control new supplies and equipment

- New animals should stay separate for 30–60 days. This is applicable to commercial farms.

Rule 4: Control traders, vehicles and boda-bodas

- Do not allow unauthorized vehicles to enter your farm.

Rule 5: Clean daily to ensure good farm hygiene

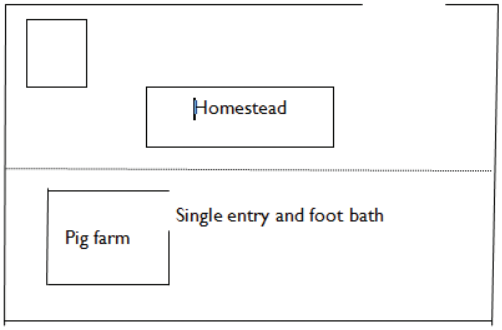
- In the semi-intensive system, farmers can spread the manure directly in gardens or deposit it in a compost pit on a daily basis.
- In the intensive system with concrete floors:
    - Light cleaning of pens should be done twice daily after feeding.
    - Thereafter clean and dry all drainage channels daily.
    - Introduce a major weekly cleaning schedule of all pens and all drainage channels. It is always recommended to have a specific calendar day when you do the weekly cleaning, for example every Friday.

Rule 6: Don't use equipment from other farms or other enterprises and neighbours:

- Clothes, boots and equipment from other enterprises shouldn't cross over to the pig farms.
- Neighbours should be made aware of the regulations on the farm so that they follow procedures at all times.

Implementing biosecurity rules on pig farms

Figure 17. Home layout to prevent disease entry.



In the semi-extensive system, such as the tethering system, implementing biosecurity precautions is difficult given the social setup of the pig community. However, farmers can do the following:

- If pigs are tethered, it should be behind the house where they are not easily accessible to the public.
- If an enclosure is available, introduce a perimeter hedge around the pig unit and provide only one entry to the sty.
- Have a visitors' book. It helps trace events in case you were away from the farm.
- Put up a notice that prohibits access to the animals without permission.
- Allow farm visitors and buyers on appointment only when you are around.

## Perimeter fence around the pig house

Strive to have only one entry into the farm and make it compulsory even to family members.

## Footbath application at the entry

This can be done for example by using a 20-litre jerry can with the side removed. Always cover the footbath after use. All family members also should be required to use the footbath.

## Application of disinfectants

Use disinfectants in the weekly cleaning of footbaths. Change/refill disinfectant as recommended.

Visitors' book

Introduce a visitor's book for all guests. The book will help to trace the possible origin of a disease.

## Farm boots and clothes

- Introduce boots to wear only at the pig farm and separate them from those used for gardening.
- Require visitors and health workers to always change clothes and use farm boots.
- Arrange to have a pair of boots on your farm for the animal health worker.
- Wherever possible, use separate clothes on the pig farm.

## Pork products on the farm

Soup or bones from pork consumed at home should never be served to your pigs. You can never underestimate the African swine fever virus.

## Be alert

Whenever an outbreak is announced, close your farm to the rest of the public and increase vigilance of personal hygiene on the farm, even by the smallholder. In an outbreak, refrain from serving pork.

## Summary and key messages for the session

- Farmers should introduce biosecurity rules that they can implement on their farms. This helps to prevent disease on the farm.
- Farmer networking and information sharing should be strengthened.
- Training should be undertaken to increase the awareness of the importance of biosecurity measures and strengthen disease-control roles of all of those who are involved.

# Handout 4.2 Manure management and disposal

## Design of drainage channels

For intensive and semi-commercial systems, proper manure disposal starts with the design of the drainage channels and waste disposal pits. The ratio of crop residues is high in pig diets and therefore provisions should be made in the width of the channel. Recommended width is 450–500 mm. This should be integrated in the building design and site layout. Take advantage of the natural gradient in constructing the disposal pit. As a benchmark, an adult sow produces about 15 kg of manure per day. To a smallholder, manure can be spread directly to plants, however for semi-commercial farmers proper storage is needed.

Do not discharge animal wastes into waterways or public drainage systems.

Manure handling and uses:

- Direct use on land
- Sell as fertilizer (dry in the sun and sell it in bulk)
- Can be used in fish ponds
- Can be used to produce biogas

Advantages of proper manure handling:

- Better sanitation and hygiene
- Fewer flies
- No soil pollution
- Less smell
- Clean rivers
- When used as a fertilizer, it improves the soil, providing a long-lasting supply of nutrients to plants

## Negative effects of the excessive use of manure

Sometimes excessive quantities of manure are used on farming land. The negative effects include:

- **Erosion** Potassium, nitrate and phosphorous are highly soluble. These elements are washed away by rain and end up in surface water.
- **Leaching** If the amount of manure applied contains more nutrients than what crops require, the excess nitrates and potassium will leach out and pollute the groundwater.
- **Accumulation in the soil** Phosphate is absorbed by the soil. As a result of excessive manure, the amount of phosphate absorbed in the soil will increase until the soil becomes incapable (saturated) of binding any more phosphate. When this happens, excess phosphate will leach out into the surface water and groundwater.

# References

Farmers Choice Limited. 2014. Pig training manual. Nairobi, Kenya: Farmers Choice Limited.

Ikan, I. and Dafwang, I. No date. *Pig production technology for piggery farmers*. National Agricultural Extension and Research Liaison Services. Zaria, Nigeria: Ahmadu Bello University.

Levis, D. and Rodney, B. 2011. *Biosecurity of pigs and farm security*. Nebraska, USA: University of Nebraska.

Katunguka-Rwakishaya, E. and Ndikuwera, J. 2008. *A manual of farm structures and housing technologies*. Kampala, Uganda: Fountain Publishers.

Ouma, E., Dione, M., Lule, P., Pezo, D., Marshall, K., Roesel, K., Mayega, L., Kiryabwire, D., Nadiope, G. and Jagwe, J. 2014. *Smallholder pig value chain assessment in Uganda: Results from producer focus group discussions and key informant interviews.* ILRI Research Report. Nairobi, Kenya: ILRI.

Rameswar, D. and Wright, I.A. 2011. *Training manual on smallholders pig management*. New Delhi, India: ILRI.

The National Agricultural Advisory Services—Ministry of Agriculture, Animal Industry and Fisheries. 2005. *Pig production manual*. Kampala, Uganda.

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