

# Training Manual for Capacity Building of Pig *Bandhu*

Prepared under the  
**Assam Agribusiness &  
Rural Transformation Project (APART)**  
ARIAS Society, Khanapara, Guwahati

For  
**Animal Husbandry & Veterinary Department**  
Govt. of Assam

By  
**International Livestock Research Institute (ILRI)**



# **Training Manual for Capacity Building of Pig Bandhu**

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**By  
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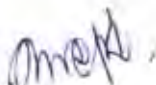
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## Foreword

Available veterinary manpower in the state is not good enough to meet some minor veterinary First Aid and extension services of smallholder pig producers in far-flung areas of the state. Therefore, the Animal Husbandry and Veterinary Department (AHVD), Govt. of Assam is taking an initiative to create a brigade of community animal health service providers named as "Pig *Bandhu*" under the World Bank aided Assam Agribusiness and Rural Transformation Project (APART). These Pig *Bandhus* may be assigned to extend certain services like vaccination, deworming, artificial insemination and minor first aid services (e.g. dressing of wound, ear tagging, clipping of needle teeth etc.) to pig producers at village level under the direct supervision of local Veterinary Officers. This requires a customised training course for the Pig *Bandhu* to build their knowledge and capacity to provide these services with quality. International Livestock Research Institute (ILRI), the knowledge partner for the APART project, has made it possible by preparing this training manual of high standard.

The training manual has covered all important topics including roles and responsibilities of Pig *Bandhus* with do's and don'ts, internal and external body parts of pigs, germs that cause disease, most prevalent diseases of pigs, their main symptoms, mode of transmission and control options, vaccination and deworming of pigs, disease reporting system to local veterinarians, zoonotic diseases of pigs, methods of minor First Aid care etc. that a Pig *Bandhu* should essentially learn.

I am happy to understand that this manual will be an important handbook for the Pig *Bandhu* to perform their duties. I truly commend the effort put by ILRI in developing the manual with support from the concerned officials of AHVD and ARIAS society. The topics in the manual have been explained in short and simple language with the help of several photographs, illustrations, etc. for ease of understanding by a semi-literate Pig *Bandhu*. The training manual will meet important needs of the Department and will remain as an asset to train such Pig *Bandhus* under APART and in any future scheme that Govt. of Assam undertake.

  
(Rajesh Prasad)

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## Preface

There is a good scope for the development of piggery sector in the state and it could partly be accomplished through providing proper knowledge, extension and minor first aid services to the pig producing community. In the present scenario, the manpower in the Animal Husbandry and Veterinary Department (AHVD) is not sufficient to cope up with the service need of the pig farmers. Because of this, some community level animal health service providers render minor first aid services, including castration, without having any training and technical knowledge on the subject. Sometime this add more burden to the problem. To overcome the problem, a brigade of local service providers termed as *Pig Bandhu* has been created under the World Bank aided Assam Agribusiness and Rural Transformation Project (APART). The *Pig Bandhu* may render services like-vaccination, deworming, artificial insemination and minor first aid services (e.g. dressing of wound, ear tagging and clipping of needle teeth) to pig farmers at cluster level under the direct supervision of local Veterinary Officers.

International Livestock Research Institute (ILRI) being the knowledge partner of AHVD under APART has developed this customised training manual for the *Pig Bandhu* in consultation with the target group and concerned officials of AHVD in order to build their knowledge and capacity.

I am sure this manual will be an important guiding document for the *Pig Bandhus* to carry out their day to day activities. The manual will also help the Department to organize well structured and result oriented training of uniform standard and quality for the local service providers throughout the state. I appreciate the sincere efforts put by ILRI, the concerned officials of AHVD, Assam and ARIAS Society for developing this manual.

Commissioner & Secretary  
A.H. & Veterinary Department, Govt. of Assam



## Acknowledgement

We are immensely grateful for the guidance and support that we received from the Agriculture Production Commissioner (APC) to the Govt. of Assam, Commissioner and secretary to the Govt. of Assam, Animal Husbandry and Veterinary Department (AHVD); State Project Director, ARIAS Society; Director, Nodal Officer (APART) and other officials of AHVD and concerned officials of the ARIAS Society without which this training module would not have been possible to complete.

We also owe our deep sense of gratitude to the Veterinary Officers (VOs) and other concerned officials who gave important feedback during content development and content finalization of this training module.

Our sincere thanks also goes to the pig producers who helped us by supplying the necessary information during Training Need Assessment (TNA) and content development and supported in collecting images of specific pig farming activities needed to incorporate in the manual.

At last but not the least we express our sincere thanks to all the ILRI's colleagues who drafted the earlier version of this training manual based on which the current comprehensive revised version has been developed to meet the current need of the farming communities.

**Team Leader & Resident Consultant, APART-ILRI**  
International Livestock Research Institute (ILRI)

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## Abbreviation

<b>AHVD</b>	: Animal Husbandry and Veterinary Department
<b>AI</b>	: Artificial Insemination
<b>APART</b>	: Assam Agribusiness and Rural Transformation Project
<b>ARIAS</b>	: Assam Rural Infrastructure & Agricultural Services
<b>ASF</b>	: African Swine Fever
<b>CSF</b>	: Classical Swine Fever
<b>DVO</b>	: District Veterinary Officer
<b>FA</b>	: First Aid
<b>FIG</b>	: Farmer's Interest Group
<b>FMD</b>	: Foot and Mouth Disease
<b>ILRI</b>	: International Livestock Research Institute
<b>IMO</b>	: Indigenous Micro Organisms
<b>MIS</b>	: Management Information System
<b>PB</b>	: <i>Pig Bandhu</i>
<b>PRRS</b>	: Porcine Reproductive and Respiratory Syndrome
<b>TNA</b>	: Training Need Assessment
<b>VFA</b>	: Veterinary Field Assistant
<b>VO</b>	: Veterinary Officer

## Proposed training schedule

Day	Session	Topic	Time
1 <sup>st</sup> Day	Registration	Pre-training evaluation	9:30-10:00 am
	Session 1	<i>Pig Bandhu</i> : Their importance, roles, responsibilities and business development avenues Tea break	10:00 am-11:00 am
	Session 2	Handling, restraining and transportation of live pigs Lunch break	11:01-11:15 am 11:16-1:00 pm
	Session 3	Internal and external body parts of a pig recapitulation of the days' learning	1:00-2:00 pm 2:00-4:00 pm
2 <sup>nd</sup> Day		Recapitulation of previous days' learning	
	Session 4	Germs that cause diseases to pigs Different types of important diseases of pigs Lunch break	10:00-12.00 pm 12:00- 1:00 pm 1:00-: 2.00 pm
	Session 5	Recapitulation of the day's learning	2:00-4.00 pm
3 <sup>rd</sup> Day		Recapitulation of previous day's learning	
	Session 6	Preventive measures of diseases: Vaccination, deworming, feeding of minerals and vitamins Lunch break	10:00 am-1.00 pm 1:00 pm-2.00 pm
	Session 7	Familiarization with commonly used medicine	2:00 – 4.00 pm
4 <sup>th</sup> Day		Recapitulation of previous day's learning	
	Session 8	Certain minor veterinary practices that a <i>Pig Bandhu</i> may need to attend in the field Lunch break	10:00 am-1.00 pm 1.00 pm-2.00 pm
	Session 9	Introduction and demonstration of the first aid kit and planning for the next day's field visit recapitulation of the day's learning	2:00 pm-4.00 pm
5 <sup>th</sup> day	Session 10	Field exercise demonstration of certain minor veterinary practices in association with a local veterinary hospital	10:00 am-4:00 pm
7 <sup>th</sup> day to 22 <sup>nd</sup> day		On job training in the field under the guidance of local Veterinary Officer	

**Note:** The suggested schedule is only indicative and facilitator may modify the schedule as deemed fit locally

**First aid training: 5 days**

**Production training: 5 days**

**On job training: 15 days**

**Refreshers Training: 5 days**

**Total days: 30**



# SESSION 1: Pig Bandhu: Their Importance, Roles, Responsibilities and Business Development Avenues

## Introduction to the training

The training facilitator will introduce the training by following the sequence as stated below-

**Welcome address:** facilitator will welcome the participants and explain the objectives of the training.

**Self-introduction:** Facilitator will ask the participants to state their name, address, primary occupation, years of experience on milk trading.

**Expectation from the training:** Facilitator will ask the participants to explain their expectations from the training. Facilitator will write down the key points in a flipchart/whiteboard/black board in order to revisit the same at the end of the training.

**Pre-training status evaluation:** Facilitator will distribute the pre-training evaluation form among the participants. Facilitator will ask them to put tick marks in the appropriate boxes (Agree/Disagree/Don't know) under the "Before Training" column. After the evaluation, he/she will collect the forms and use the same at the end of the training to compare the differences before and after the training.

**Ground rules:** Facilitator will ask the participants what general behavior (e.g. switching off the mobile during training, coming to the training on time, leaving the training after completion, no involvement on side discussion during the time of training delivery etc.) He/She expects to experience in order before and after the training to run the training smoothly and effectively. He/She will list all suggestions in a flip chart and post the flipchart where it is visible throughout the training.

**Content:** Importance of the *Pig Bandhu*, his/her roles and responsibilities and business development plan

## Training materials

- Laptop, LCD projector and screen
- White board and marker (with multiple colour)
- Flip chart
- Pre-training evaluation form
- Manual and handouts

## 1.1 Importance of Pig Bandhu in piggery development

- Number of veterinary hospitals and dispensaries are not adequate to meet the growing demand of veterinary services in the state. Farmers in remote rural areas do not get adequate access to veterinary services.
- Number of Veterinary Officers (VO) and Veterinary Field Assistants (VFA) are also not adequate to cater to the need of veterinary services of the farmers.
- Many small farmers try to treat the animals either by themselves with traditional means or by purchasing medicines directly from the pharmacy without consulting with a veterinarian.
- In some of the villages, traditional healers /quack treat the animals without having any formal training or technical understanding on the cause of diseases.
- Needs a brigade of trained community animal (pig) health and extension worker (under the APART project they are named as *Pig Bandhu (PB)* created to meet the growing need of minor health and extension services at community level.

- The *Pig Bandhu* is an extended wing of Animal Husbandry & Veterinary Department (AHVD) and they will work under the direct supervision and guidance of the department.
- Pig Bandhu is not a government job. It is a voluntary but paid community animal service. Although, in initial year/s, Pig Bandhu will be paid some honorarium/ incentive by AHVD under the support of APART, subsequently they are to generate revenue by themselves for their sustenance.

## 1.2 Roles and responsibilities of Pig Bandhu

- *Pig Bandhu* is from the community and for the community. They will be selected by community people under the guidance of AHVD officials.
- *Pig Bandhu* must need to be acceptable and approachable to the community.
- *Pig Bandhus* will work for door step minor service delivery as an extended wing of the AHVD.
- *Pig Bandhus* will carry out vaccination, deworming, dressing of wound/maggoted wound, minor first aid, artificial insemination and provide extension services to the pig producers in the project villages.
- Inform the local veterinary officials under AHVD about the occurrence of disease problems in the project villages and to support in carrying out the subsequent activities in that context.
- Assist the local VOs/VFAs in implementing the project activities
- Necessary records for Management Information System (MIS) will be collected and recorded by them using a Tablet. The Big bandhu will be responsible for collection of information related to sick animal observation, disease and treatment, vaccination and deworming, and animal feed management whose activity checklist/record formats are given in the annexures All, AIII, AIV and AV Respectively.
- To supervise the activities within the Farmers' Interest Group (FIG) such as introduction of community board, assist in organizing the monthly cluster level meeting, etc.
- Creating awareness about the project activities
- Serves as a key contact person in the project villages
- All pig health related work including vaccination and deworming will be done by *Pig Bandhu* under the supervision/guidance/directive of local VOs/VFAs. The evaluation of performance of a Pig Bandhu will be done by a VO/BVO following a format as shown in Annexure VII
- However, *Pig Bandhu* would not treat any pig (except providing first aid services/AI/deworming/data collection for MIS) and would not go against the directive of local veterinary officers as far as animal health issue is concerned.
- For any unauthorized activities performed by *Pig Bandhu* may lead to termination of their contract with the department and may face consequences as per the act of law.
- Activities performed each week needs to be reported to the local VO.

## 1.3 Business development plan of a Pig Bandhu

### 1.3.1 Setting up aims

A *Pig Bandhu* should have his/her business development aim to prosper in future through increased quality and demand for his services.

His/her business aim should include-

- Increase the quality of services;
- Increase the quantum of services (increase in quantum of service may be proportional to quality);
- Increase the revenue generated by him/her;
- Increase social recognition;

### 1.3.2 Strategizing business of a *Pig Bandhu*

A *Pig Bandhu* would render services in the villages where farmers do not get easy access to veterinary and extension services. However, given the livelihood concern of the *Pig Bandhu*, he/she should have planned vision to expand his number of clients through offering quality services. For that, the *Pig Bandhu* has to strategize for a planned service delivery by taking care of the following:

- Assess the requirement of services by pig producers in the area that a *Pig Bandhu* can offer;
- Prioritize the services which are required the most;
- Assess producers' level of satisfaction on their quality of services;
- Identify the betterment options and scope for improvement;
- Build up his skill, network and resources to deliver those services with quality on time;
- Try to give value for money paid by the pig producers;
- Fee should be claimed as decided by the community people in consultation with the project people and local VO;

### 1.3.3 Creating plan of action

Based on the compiled information and identification of key issues the *Pig Bandhu* may formulate the plan of action. Before formulating the plan of action, he/she should consider the following issues in mind:

- **Trust on the service:** He/she should make every effort to provide the best of his/her service with quality so that farmers trust to call him/her next time.
- **Development of skill set:** Quality of service and thereby gaining trust on him/her may be realized by making continuous effort to improve the skill of providing services. The basic services that are mandated to be offered by a *Pig Bandhu* should be improved upon from time to time through discussion with the veterinary officers and occasionally reading the training manual and attending the refresher training. He/she should also focus on learning through on job training.
- **Avoid unhealthy competition:** The *pig Bandhu* should not indulge in unhealthy competition with the VFA and VO. He/she is mandated to support the VO and the VFA for treatment of diseases.
- **Fee:** Fee charged should be linked to the services provided and that should also be competitively low so that poor farmers find him/her economical to call next time for basic healthcare services. The various sources of revenue generation for a *Pig Bandhu* is given in Annexure AVI.
- **Prompt and punctual:** For on farm services, a pig producer may want the *Pig Bandhu* as early as possible after the call. So, the *pig Bandhu* should respond promptly to the call made by pig producers.
- **Networking with the veterinary dispensary:** *Pig Bandhu* should be in a constant touch with the veterinary dispensary/hospital, semen station and cluster center for the update on supply of vaccines, medicines, semen doses etc.



- **Future prospect:** Serve your clients in the way that they are fully satisfied with the service and you can ensure a better prospect for yourself in your jurisdiction.
- **Feedback system:** Always maintain a feedback system in your service. Ask for the level of satisfaction of your customers and record if there is any part in the service where the customer is not satisfied with. Try to improve your service based on the feedback feedback given by customers.
- **Courtesy and respect:** Always respect your clients. The pig are favourite to their owners and hence always treat them with love and care.
- **Never argue or figurate with your clients:** The customers may have their points of view about the disease. You respect that and if there is any wrong perception, explain them in a gentle way as what it should be.
- **Thank your clients:** Your clients have chosen you and taken your against the other service providers in the locality. So, gratefully acknowledge it every time you visit them.
- **Close rapport with clients:** You should maintain a close rapport with your clients. Once a satisfied client makes his/her animal cured.

### 1.3.4 Personal business and behavior skill

In order to promote for his/her business a *Pig Bandhu* should inculcate certain good business and behavioral skills as follows.

- **Active listening skill:** A *Pig Bandhu* should possess the skills to listen actively to his/her clients. He/she should also be able to read body language as well as verbal communication. He/she should try to respond according to the clients' opinion.
- **Keep emotions under control:** A *Pig Bandhu* should have the ability to keep his/her emotions under control even when some difficult circumstances are faced.
- **Clear and effective communication:** A *Pig Bandhu* should communicate to his/her clients the way they understand the most. Pig farmers generally expect simple explanation in the language they speak, while a veterinarian expects an explanation in the widely used terminology. He/she should also try to communicate slowly and clearly without expression of any excitement, anger and emotions.
- **Collaboration and teamwork:** For effective business management and service delivery a *Pig Bandhu* will need support from many others. To strengthen his/her association with others he/she should take all concerned into confidence, communicate transparently, keep commitment, discuss issues on time, give due share/credit for their contribution and appreciate the contribution that others have made in making things happen.
- **Problem solving skills:** A *Pig Bandhu* may confront variety of problems in the field while delivering the services. He/she should try to inculcate good practices that may potentially diffuse the tensions. He/she should avoid stating/behaving the way that may aggravate the situation. He/she is the best person to judge the situation and behave according to the need.
- **Decision making ability:** When a *Pig Bandhu* faces a client with particular problem, he/she should have the ability to correctly assess the situation and make a decision which is appropriate under the given circumstance and act accordingly. He/she should always discuss with local VO or VFA before making any commitment/decision.
- **Maintaining good relationship:** A *Pig Bandhu* should always try to maintain friendly working relationship with all concerned for making his/her services better, timely and more effective.

### Key messages of the session:

- The services of *Pig Bandhu* are critical for reaching the unreachable.
- *Pig Bandhu* brigade is an extended wing of AHVD and therefore they should work under direct supervision of local VOs
- *Pig Bandhu* is not authorized to treat any disease, they should inform local VO if they are informed about occurrence of any disease in the area.
- *Pig Bandhu* is not a government job. Initially they will get some honorarium/incentives from the department; subsequently they are to generate revenue by themselves.
- *Pig Bandhu* should have strategic business development plan by improving the quality of their services.
- For improved business of *Pig Bandhu*, they should develop their technical, behavioural, communication and business management skills

# SESSION 2: Handling, Restraining and Transportation of Live Pigs

## Session objectives

- To understand the behavior of pigs, flight zone and point of balance for restraining.
- To demonstrate different methods of handling piglets and mature pigs for treatment
- To make the participants understand the important considerations during transportation of live pigs/piglets

## Training Methods to be followed

- Participatory discussion.
- Explanation with the help of exercises and activities.
- Farm visit and demonstration
- Physical demonstration
- Group discussion

## Training Materials

- Laptop, LCD projector and screen
- Videos
- Manual and handouts
- Flip chart
- A rope of 5-6 feet long

## 2.1 Natural behaviour of pigs

- Pigs are social animals;
- They like to follow each other;
- They find it difficult to adjust in Isolation from a group;
- They, when removed from/added to a group, will try to re-establish social order;
- They spend much of their time in feed-related activities;
- They have tendency to chew any object, even ears or tails of each other;
- They don't have sweat glands and hence, cannot withstand exposure to hot conditions;
- They try to escape always as a result they may get injured;
- They don't like darkness.

## 2.2 Flight zone and point of balance

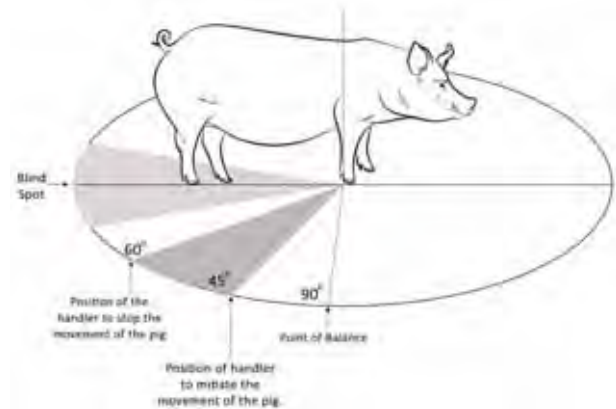
Handling of pigs becomes much easier if the pig's flight zone and point of balance are understood well.

- The mid-point of shoulder of a pig is called the point of balance. Pigs can be touched or handled in this point comfortably without causing any panic or fear to the pig.
- If we draw an imaginary line along the bodyline towards the tail and another line through the point of balance transverse to the body line, an angle of 90° will be formed.
- If one moves from the shoulder towards the tail to cover 45°, the pig will move forward.
- If moved further up to 60°, the pig will try to stop moving.

- Again, if one moves further to the tail end of a pig (this point is called blind spot) and stand the pig will express fear/panic to the pig.

### 2.3 Demonstration on how to handle piglets and mature pigs by different methods for treatment and transportation

Pigs need to be restrained (controlled) for different purposes, such as, checkup of general health, administration of medicines, conducting minor surgical operation, giving identification mark, etc. Pig bandhu must know appropriate techniques of restraining pig for safety of the animal as well as of himself. There are different methods of restraining both pigs and piglets. The most common methods of restraining pigs/piglets are stated below.



**Flight zone and point of balance**

A piglet can be restrained by two ways-

#### 2.3.1 Restraining piglets on its side (for injection/ vaccination/treatment)

- At first, the piglet is placed in a room or pen where it is to be restrained;
- After cornering the piglet, hold the rear leg with one hand and use the other hand to grasp the front leg on the same side of the pig as shown in Figure;
- Holding the front and rear legs, lift the pig completely off the floor and gently but firmly put the pig back on the floor;
- Use your knee to put pressure on the side of the pig to retain the control.



**Restraining piglet by putting pressure on the back**



**Restraining piglet for the purpose of performing castration**

#### 2.3.2 Restraining piglet by holding its rear legs (for transportation)

- At first, the piglet is placed into a room or pen where it is to be restrained;
- After cornering the piglet, one should catch the piglet by grasping its hind legs with one or both hands. He/she should quickly adjust his/her grip and hold the pig's back against the front of the handler's legs and its nose to the ground;

- He/she should lift the piglet **free** off the ground by bringing both of its rear legs up to almost the height of his/her waist.



**Restraining a piglet for transportation**

### **2.3.3 Method of restraining older or heavier pigs**

For restraining heavier pigs, following methods are commonly used.

#### ***Restraining by using a slip knot***

- A loop is prepared with a rope by giving a slip knot as shown in the photograph. The strength of the rope must be in proportion to the size of the animal;
- One should put the slip knot in to the mouth and over the nose /upper jaw. The handler should make sure that the loop is above the tongue and pulled back into the mouth, and the loop is not around the lower jaw;
- He/she needs to pull the other end of the rope as tight as possible;
- The rope is then tied off on a post of the shed or a tree. It is best to limit the length of the rope to only a foot or two in order to restrict the movement of the pig;
- After completion of the intended job, one should loosen the rope from the pig by pulling the slip note and quickly move away.



***Preparing a slip knot***





**Restraining a heavier pig with the help of a rope**

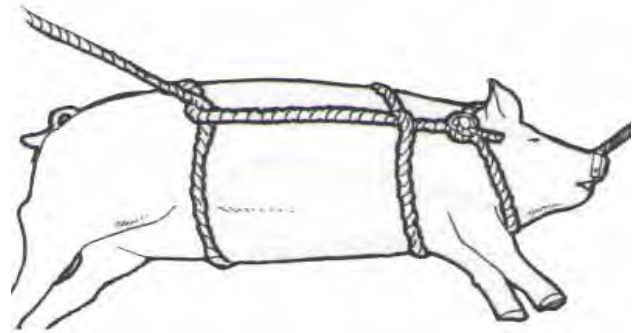
***Restraining by laying the pig on its side***

In case of surgery, foot trimming, or other management practices, the pig is restrained using a slip knot

- A loop is formed at the end of a 15' length rope and is placed around the neck of the pig taking care not to place the knot on top of the neck but on the side of the neck;
- One should use the long end of the rope to give another half hitch around the body immediately behind the front legs
- Then he/she will take the rope further back along the top line and place a second half hitch just in front of the rear legs;
- The pig can now be laid upon its side by pulling on the end of the rope that extends to the rear beyond the second half hitch (as shown in the illustration);
- As the pig begins to go down in response to the tightening hitches, it can be guided with the rope and snare to lie on one side or the other;
- When the management task is completed, one should loosen the half hitches;
- Finally it is to remove the slip knot and observe the pig for a few seconds to see whether it is recovering properly or not



**Efforts to restrain a pig by pulling the rope**



**A restrained pig**

***Restraining by grasping the tail and lifting the hind quarter***

This is one of the commonly used methods in the field condition for minor procedures like administering medicines, local applications, injections, ear tagging, etc. This method includes:

- One should gently approach the pig without making it scared;
- Then gently pet over the back to get the animal familiarized;
- One should go on petting towards the tail and catch hold of the tail on the base with both the hands within a fraction of second and then to lift the hind quarter upward;
- The pig will be able to show only a limited movement with the forelimbs;
- The pig may be restrained by tying its legs with a rope for even better control.



**Efforts to restrain a pig by holding on its tail**

***Restraining by tying the fore-legs and hind legs separately***

- The pig is laid on its side with the help of three or four persons securely applying force;
- The fore legs are closely tied with a strong rope;
- Same procedure is applied to the hind legs;
- A 3-4 feet long rope is passed through the middle of the left and right legs along the body length and above the knots tied already to the legs;
- A knot is given with both the open ends of the rope in such a way that all the four legs are closely brought together;

- One should put some pressure over the shoulder area with the knees;
- Then some extra pressure is put over the shoulder area with a bamboo pole being held by two persons if required.

### Caution

Pregnant pigs should not be restrained unless it is of utmost necessity. If it is very essential, adequate care should be taken so that no harm is caused to the foetus.

- Never restrain pigs on uneven surface or very hard surface (e.g. rock)
- Never restrain pigs under direct sunlight during hot summer.
- Never restrain pigs on hot surface like sand during hot summer.
- Never restrain pigs in dark.
- Never beat the pigs during restraining. It is better to offer some feeds during restraining and handle with care to make it comfortable.
- One should gently release the pigs after restraining to avoid any unintended injury.

## 2.4 Transportation of pigs

### *Points to be considered during transportation of live pig/ piglet*

Improper handling of pig; prior to and during transportation may result in excessive shrinkage loss, wound, injury, crippling loss, occasional death and dissatisfied customer.

Normally for transportation of pigs/ piglets by road, truck/ mini truck/ auto van/ pulling cart is used depending on the distance and number of pigs to be transported. For long distance travel, train is preferred. During the process of transportation of pig, following precautions should be taken:

- Transporter should clean, disinfect and change the bedding materials (sand, straw etc.). Generally pigs are transported with about 1 inch (2.5 cm) sand, and in wintertime straw is placed on top of the sand but not during hot weather.



### Clean and adequate bedding materials

- Care should be taken that pigs are properly loaded. Below capacity loading can be just as dangerous as overloading. In the case where truck or train bogie is not fully loaded, one may use partition to keep the pigs closer together; and in very long trucks to keep pigs from crowding from one location to another.



**Use partition in truck that is not fully loaded to keep the pigs closer together**

- Provision of halt is the single most important factor for consideration during transportation. Halting time and place should be finalized and organised before starting the journey in order to avoid any last minute hassles.
- Pigs should be fed and watered properly prior to loading. Pig transported should either be fed lightly or to withhold feeding for 12 hours prior to loading depending on distance, temperature and treatment upon arrival.
- Pigs that are overfed or watered in excess at the time of loading defecate and urinate excessively. As a result, the floor becomes dirty and slippery and the pigs may feel uncomfortable. Such pigs shrink heavily and present an unattractive appearance when unloaded.
- Efforts should be made to keep the pigs quiet. Hot, excited pigs experience more shrinkage loss and are more prone to injury or death.
- Transporter should never lose temper and should avoid hurrying and striking. Pigs should not be beaten with such objects as pipes, sticks, canes or forks; instead a flat, wide canvas slapper or something like broom should be used.
- When mixed loads (consisting pig, cattle, goat, etc.) are placed in the same truck or train bogey, partition each class of pigs separately. Also, boar, sow, piglet, diseased pig should be properly partitioned.



**Consequences of loading only a few pigs in a truck for transportation**



- Whenever possible, transportation should be avoided particularly when weather is too hot or too cold. During such time, shrinkage and death losses are higher than normal weather. During warm weather transportation at night or in the evening is suitable. If required, wet the sand during hot weather.
- Driving the truck should be done carefully. Slow down on sharp turns and speed breaker. Avoid sudden stops. Provide covers for trucks to protect from sun-heat during summer and cold during winter.
- Any protruding nails, bolts and sharp objects in truck or train should be removed;
- Unloading should be done slowly and carefully. Never to drop pigs on the ground. Back the truck slowly and squarely against unloading dock.



**Pig shall not be transported during hot sunny hours of the day**



**Consequences of overloading a truck and sudden stop during transportation**



**Proper unloading of piglets**





### **Pigs shall not be unloaded inhumanly**

#### **Farm visit and Demonstration**

**Instruction for the resource person:** Take the participants to a nearby farm. Explain the method of restraining pigs and demonstrate practically how to restrain. Allow few participants to restrain different categories of pigs.

#### **Key messages of the session:**

- For a variety of reasons such as, treatment/ vaccination/ injection/ transportation) pigs need restraining
- Try to get familiarized with the point of balance and flight zone of pig and apply specialized techniques.
- Try different methods of restraining/controlling pigs
- Pigs restraining techniques vary based on type of pigs (piglets, heavier pigs, pregnant pigs etc.)
- Adequate care should be taken prior to and during transportation of pigs or else may result in excessive shrinkage loss, injury, crippling loss, occasional death etc.

## SESSION 3: Internal and External Body Parts of a Pig

### Session objectives

- To make participants familiar with the different external body parts of pigs
- To understand the internal body systems, the organs in it and their functions
- To understand the reproductive system of different categories of pigs (e.g., boar, sow etc.)

### Training Methods to be followed

- Participatory discussion on external and internal body systems and their functions.
- Explanation with the help of exercises and activities.

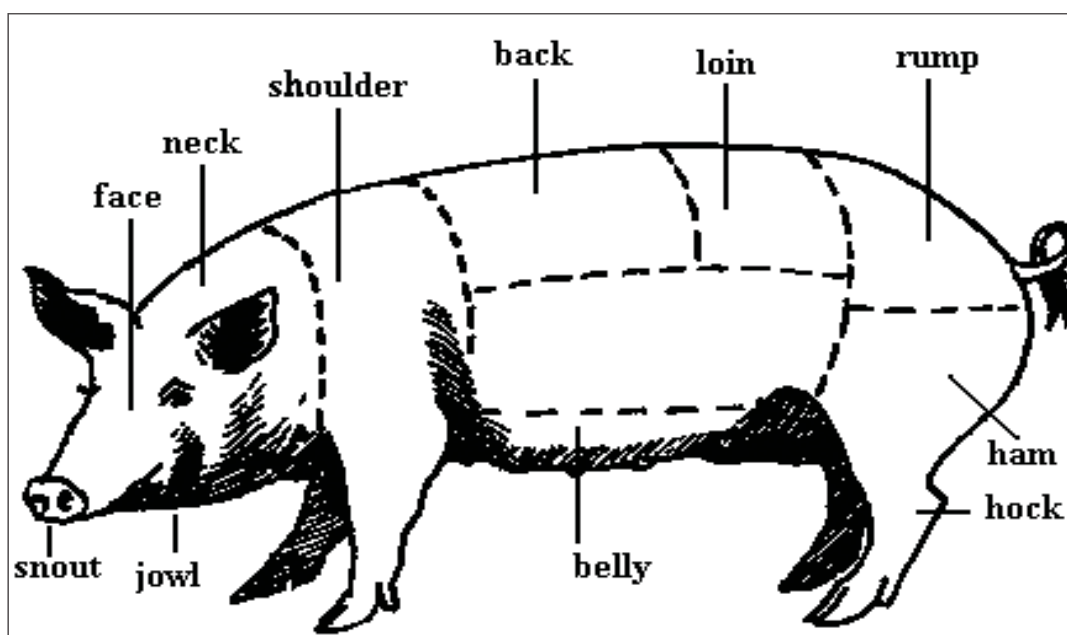
### Training Materials

- Laptop, LCD projector and screen
- Manual and handouts
- Flip chart

### 3. Internal and external body parts of pigs and basic functions of these organs in layman's term

#### 3.1 External body parts of pig

The main external body parts of pig are stated in figure given below :



*External body parts of pig*

#### 3.2 Internal body parts of pig

The animal body is constituted by millions of cells. Cell is the smallest building block of the whole body. Within the body, there are several systems and each system consists of a number of organs. All the organs within a system work collectively to carry out some special functions.

**Table 1: Different body systems and their key functions**

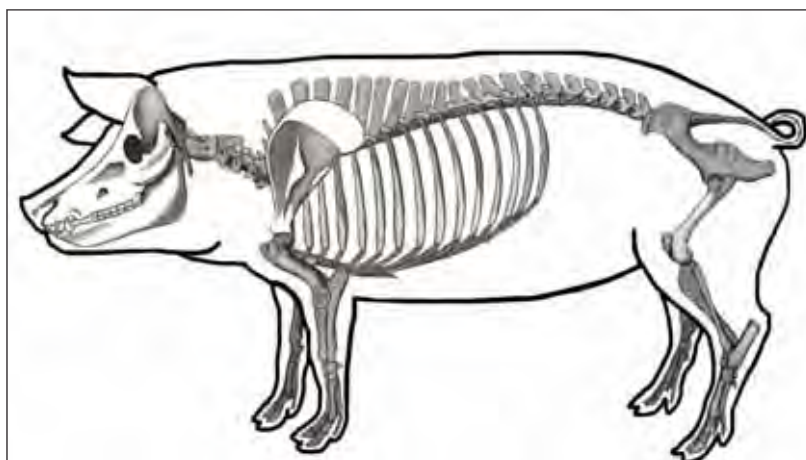
Body systems	Organs under the system	Functions
Skeletal system	Whole bony structure of the body of a pig	Give the shape of the body and support the soft body structures and its movement
Muscular system	Constitutes several layers of muscle of different types	Support the body to move and cover the bones and internal organs and vessels
Digestive system	Teeth, mouth, esophagus, stomach, intestine (small and large), rectum. The salivary glands, liver and pancreas serve as accessory organs of the digestive tract.	Digest and absorb foods
Circulatory system	Heart and blood vessels (artery and vein)	The blood carries nutrients around the body through the blood vessels
Respiratory system	Nostril, nasal cavities, pharynx, trachea and lungs	Breathing
Urinary system	Kidneys, ureter, urinary bladder, urethra	Excretion of metabolic waste in the form of urine
Nervous system	Brain, spinal cord and nerves.	Pass messages around the body, control the body actions and reflexes
Reproductive system	Male: Testes, accessory sex glands, penis, Female: ovaries, fallopian tube, uterus, vagina, vulva, udder	Reproduction

**3.2.1 What is skeletal system?**

- Skeleton is the hard framework of the body which supports the other body structures (muscle, fats etc.).
- This is composed of bones, cartilage and ligaments (show in human body).

**Functions****Skeleton system-**

- Provides the shape of the body;
- Gives flexibility to the body;
- Helps in movement of the body;
- Provides support to the body structures.



*Skeletal system of pig*

### 3.2.2 What is joint?

Joint is the structures formed by the union of two ends of bones or cartilages with the help of certain binding materials, i.e. the ligaments. The joint is responsible for different types of movement of the skeleton and thereby help in locomotion.

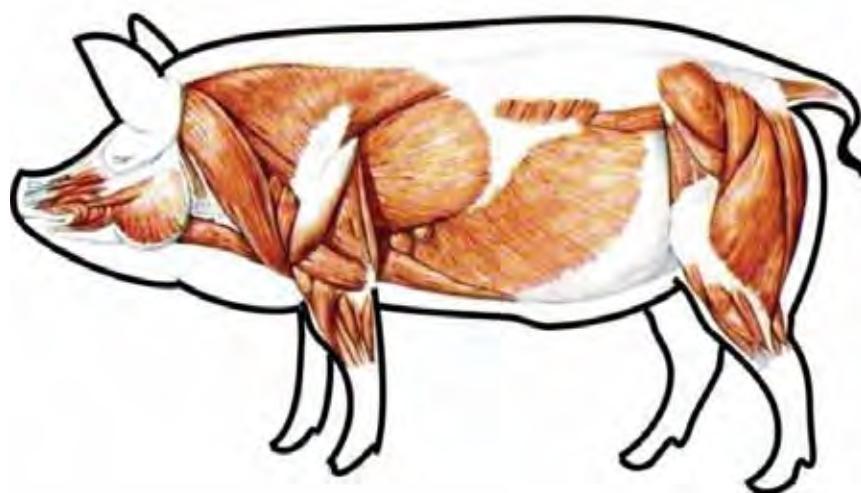
### 3.2.3 What is muscle?

Muscle is the structures formed by the bundles of muscle cells in the form of fibres and possess the property of contraction or relaxation for effective body movement. Muscular system is mainly composed of muscles, which performs different functions in the body like-

- Movement of the skeleton;
- Generation of body heat;
- Circulation of blood etc.



**The bones and joint of a pig**  
(courtesy: Poperko Peter, 1975)



*Different muscular structure of a pig (courtesy: Poperko Peter, 1975)*

### 3.2.4 Circulatory system

- This system consists of a network of blood vessels (arteries, veins & capillaries) for circulating the blood.
- Heart receives deoxygenated blood from various parts of the body and pump out the oxygenated blood to the different parts of the body.

#### Functions

- The function of blood is generally related to transport of nutrients, oxygen, carbon di oxide, waste products, hormones, and immune bodies etc.



The heart of a pig (courtesy: Poperko Peter, 1975)

### 3.2.5 What is artery and vein?

#### Artery

Blood vessels carrying blood away from the heart are known as artery. Artery carries oxygenated blood. However, pulmonary artery carries deoxygenated blood.

#### Vein

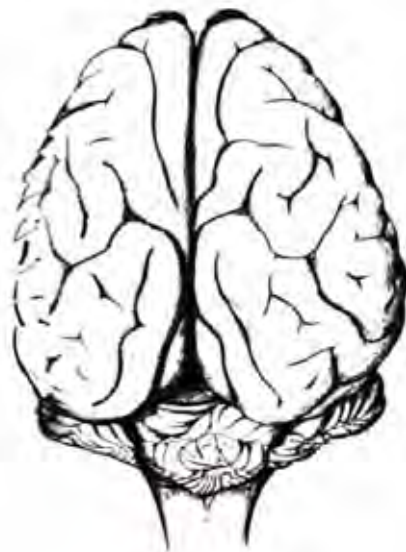
Blood vessels which carrying blood from different body parts to the heart are known as veins. Veins carry deoxygenated blood. However, like pulmonary artery, pulmonary vein also carries oxygenated blood.



Artery and vein in the head of a pig

### 3.2.6 What is nervous system?

It acts as a control system of the body. The main constituents of nervous system are the nerves and the brain.



The brain of a pig

#### Nerve

A bundle of fibers that passes signals to transmit sensory stimuli of pain, heat, cold etc. between the brain and other parts of the body. Nerves form a network of pathways for transmitting information throughout the body. It enables the pig to adjust itself or its parts to change in the external or internal stimulus/ environment.

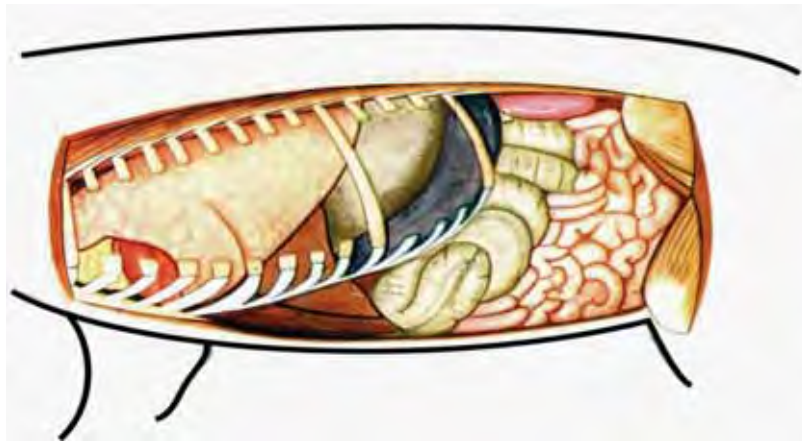
#### Brain

- The brain is the master control center of the body;
- It receives information/ sense through the nerves from inside or outside the body;
- After receiving information, brain analyzes the information and then sends messages to the body that controls its functions and actions.



### 3.2.7 What is respiratory system?

- Respiration is the process by which pigs obtain and use oxygen and eliminate carbon dioxide;
- The respiratory system consists of the lungs and the air passage leading to them, including the nostrils, nasal cavities, pharynx, trachea and lung;
- Air with oxygen enters into the lung through nostril, nasal cavity and respiratory tract;
- Lung absorbs the oxygen from air and passes out the CO<sub>2</sub>.



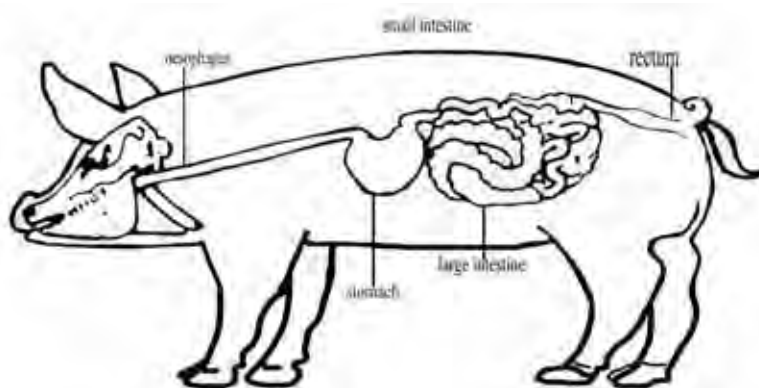
*The lungs of a pig*

### 3.2.8 What is digestive system?

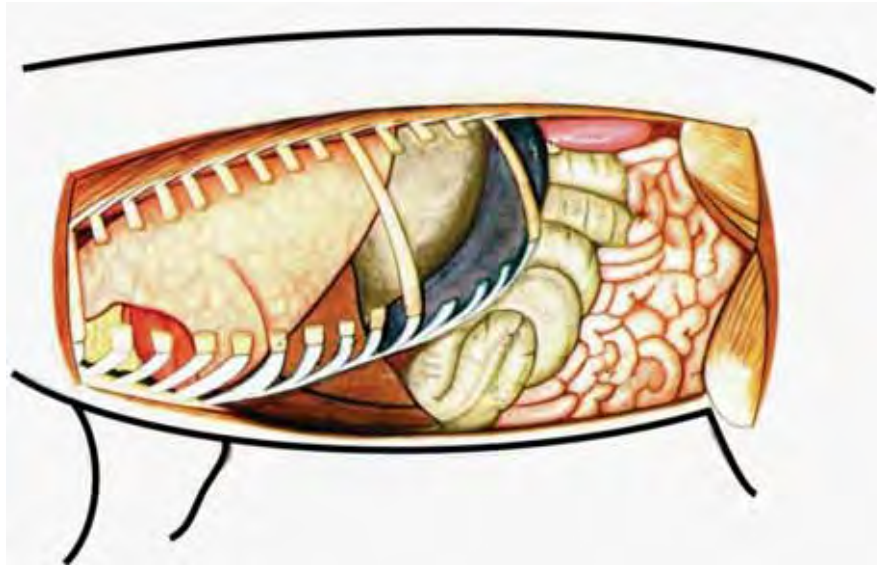
The pig is an omnivorous animal and it can consume both plant and animal sourced of food

- The digestive tract is a hollow tube like structure that extends from mouth to anus;
- After ingestion, food pass through the oesophagus and is deposited in the stomach;
- Main function of stomach is to store the ingested food and initiation of digestion of food stuffs with the help of gastric juices produced in it;
- In small intestine, it is transformed into simpler molecular forms, which is absorbed by the small intestine. Further, it is absorbed in large intestine. The undigested food particles are excreted through anus;

**Liver** of pig helps in detoxification, protein synthesis and digestion of fat in the small intestine.



The digestive tract of the pig (Courtesy: Swine Science by Ensminger, M.E & Parker, R.O.,)



Intestine of a pig (Courtesy: Poperko Peter, 1975)

### 3.2.9 What is urinary system?

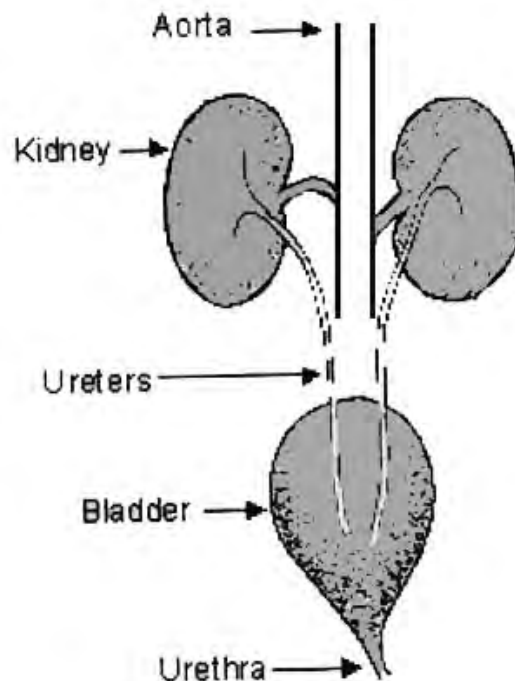
The main organs of the urinary system are kidneys, ureters, urinary bladder and urethra.

It is a biological system that removes excess, unnecessary or harmful metabolic waste from the body in the form of urine and maintains the internal stability of the cell;

Kidneys are a pair of organs in body that filter out toxic and other waste materials from the blood stream and pass out the unnecessary fluid from the body in the form of urine.

Ureters are two tubular structures that carry the urine formed in the kidneys to the urinary bladder.

Urinary bladder is a hollow muscular organ that stores urine before releasing it from the body; Urethra starts at the urinary bladder and ends at the tip of the penis. It carries urine stored in the urinary bladder to outside the body.



Urinary system of a pig

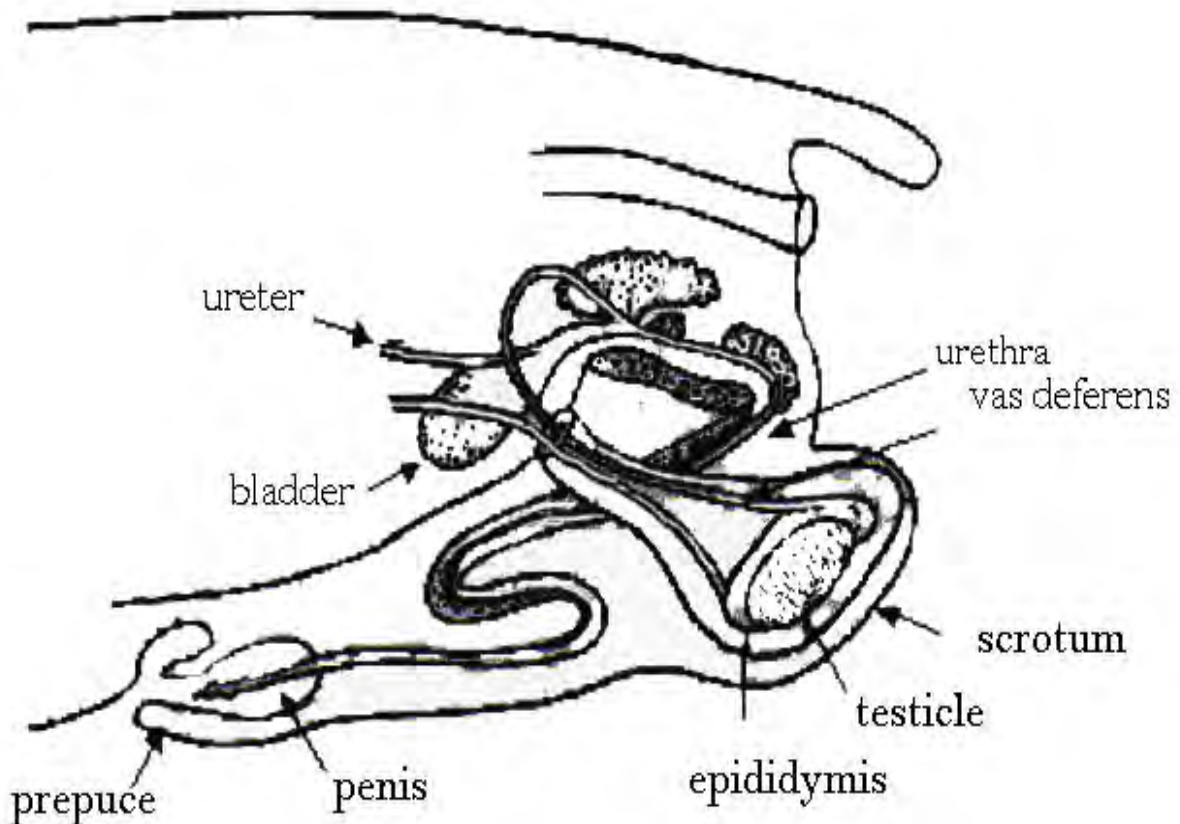
### 3.2.10 What is reproductive system?

#### **Male (Boar)**

Reproductive functions of the male involve formation of sperm and deposition of these into the female reproductive tract. Testicles are the main part of male genital organ. It produces sperm which is ejaculated through penis.

It also secretes male sex hormone testosterone.

After the mating, sperm goes from male genital organ and enter into the reproductive tract of female, where it fertilizes the ova.



**Reproductive system of the boar (Source: Ensminger, M.E & Parker, R.O., 1984)**

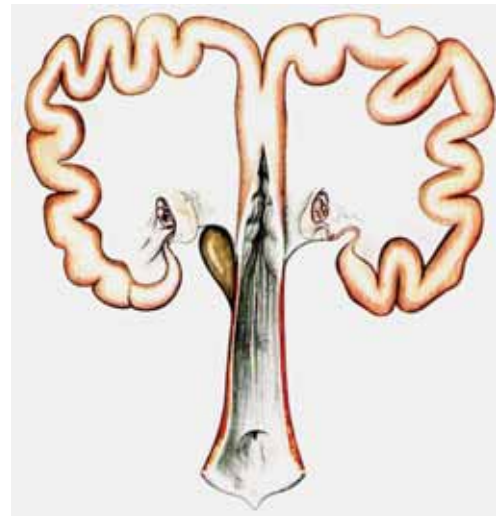
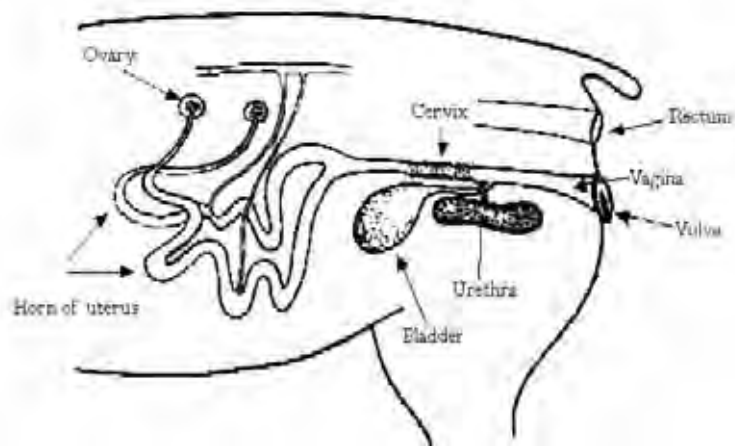
#### **Female (sow)**

The reproductive functions of the female include production of ova (egg) and provision of an environment for growth and nutrition of the foetus that develops after fertilization of a mature ovum by a spermatozoa.

Terminal condition of the latter function is to give birth at an appropriate time and to continue the nutritional function through lactation.

Parts of female reproductive organs are- ovaries, uterine tube, uterus, vagina, vulva.

Ovary is the main component of female reproduction system. It produces and also releases ova for fertilization.



Reproductive system of sow (Source: Popesko Peter, 1978)

#### Key messages of the session:

- Pigs have different external and internal body parts and have specific functions of those
- Pigs have different body systems that constitute skeletal, muscular, digestive, circulatory, respiratory, urinary, nervous and reproductive system.
- Each of the pigs body system is composed of different organs supporting to carry out the specific functions.
- Reproductive functions of male and female pigs are different.
- Pig bandhu should have basic idea about how the different system work.
- It is important for them to know what is muscle, artery and vein to administer any medicine intramuscularly.

## SESSION 4: Germs as Cause of Diseases to Pigs

### Session objectives

- To make the Pig Bandhus familiar with the disease causing agents, such as bacteria, virus, parasites and fungi and their key characteristics and transmission.
- To make the participant Pig Bandhus know how germs can cause disease, pre disposing factors for disease condition, routine examination for health/soundness etc.
- To make the Pig Bandhus enable observing the symptoms in body parts, behavior and excreta of pigs to diagnose the disease condition.

### Training Methods to be followed

- Participatory discussion.
- Group discussion.
- Field exercise.

### Training Materials

- Laptop, LCD projector and screen
- Manual and handouts
- Flip chart

### 4.1 Different types of disease causing agents- Bacteria, virus, parasites, and their main characteristics in a layman's perspective

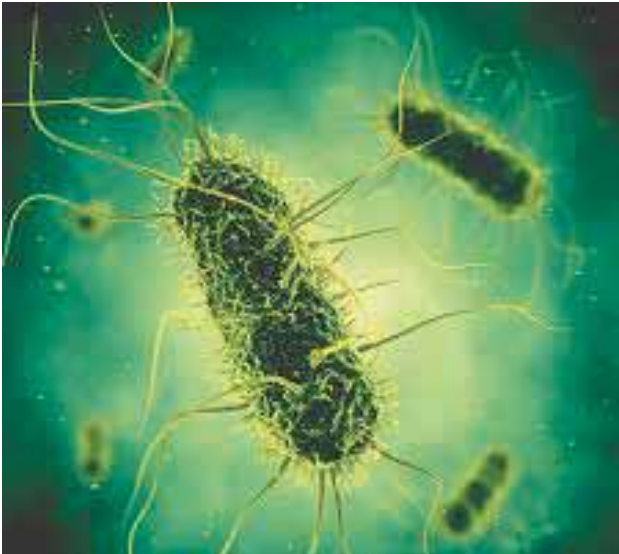
#### 4.1.1 What is germ?

- Germs are tiny living things that cannot be seen with naked eyes. It is visible only with the help of a microscope. A tip of a needle may contain millions of germs;
- Germs is found most abundantly almost in all living bodies and their surroundings i.e. soil, air and water especially, if it contains dirt;
- Germs can reproduce quickly in suitable substances (media) or inside the body of the host and cause disease but all types of germs are not harmful to the living beings;
- Germs are mainly of two types: bacteria and virus;

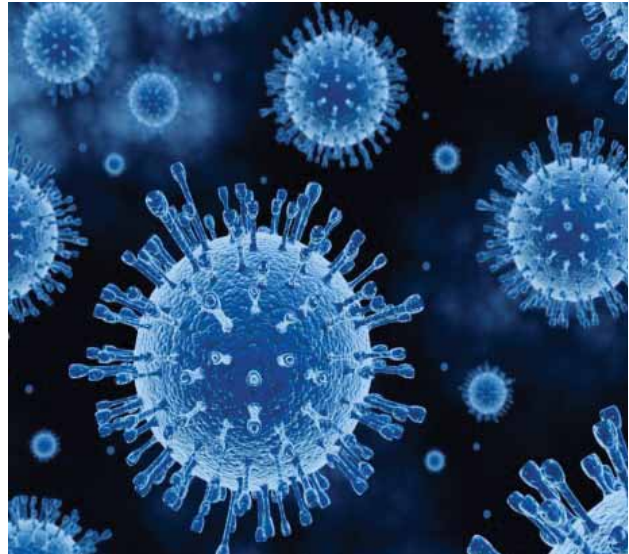
#### Bacteria

- Bacteria are one kind of germs that causes various types of diseases to human and animals;
- Bacteria have a wide range of shapes, ranging from round balls to rods and spirals;
- Bacteria are the common cause of many diseases;
- There are several medicines to treat bacterial diseases (or to kill bacteria). These medicines are called antibiotic group of medicine;





**Bacteria**



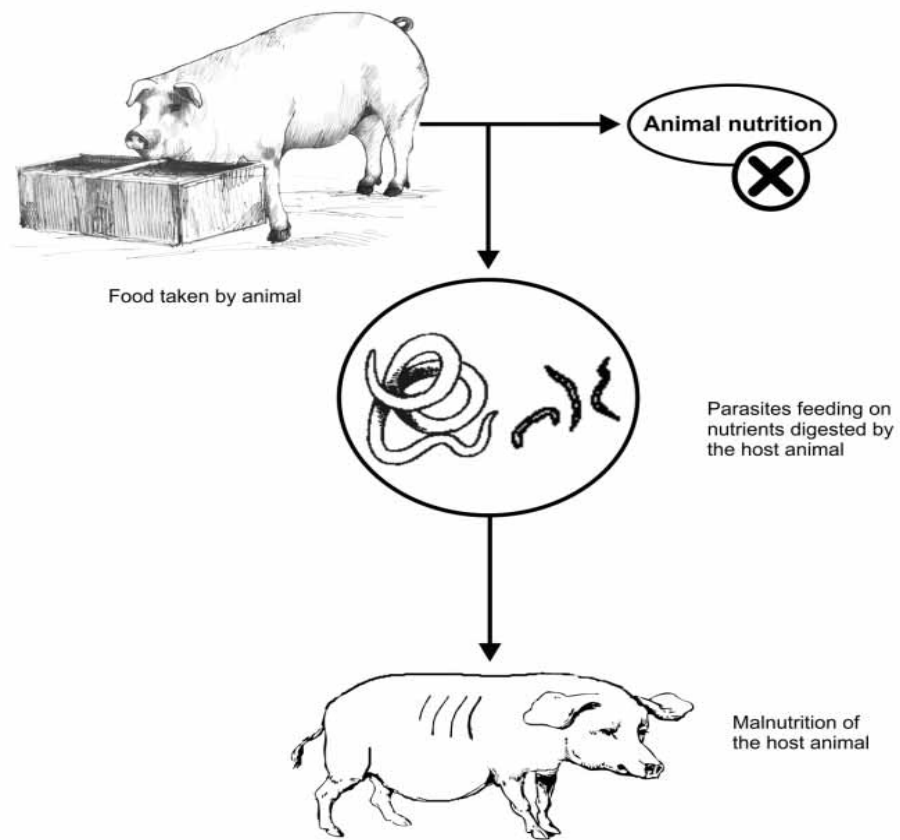
**Virus**

## **Virus**

- A virus (meaning toxin or poison) is a semi-living infectious agent that is unable to grow or reproduce outside a host cell.
- Virus is much smaller in size than bacteria; most viruses are not even visible with a light microscope.
- Virus does not have any specific shape, it varies from very simple helical structure (e.g. coil) to more complex structure. Virus is found in almost all living beings.
- Viruses infect all types of living body from animals to plants to bacteria.
- Antibiotics have no effect on virus. Vaccine is the only way out to prevent viral diseases. Therefore, diseases caused by virus are most difficult to treat.

### **4.1.2 What are parasites?**

- An organism that lives in/on another species (its host) and benefits by taking nutrients from the host species.
- They are of two types- i) Ectoparasites (live on outside the body, e.g. lice, ticks, etc.) and ii) Endoparasites (live in inside the host's body, e.g. tapeworm, hookworm, ascaris, etc.).
- Parasites consume the host's nutrition. This is why the host cannot fully utilize the feed resulting in deficiency in nutrition.



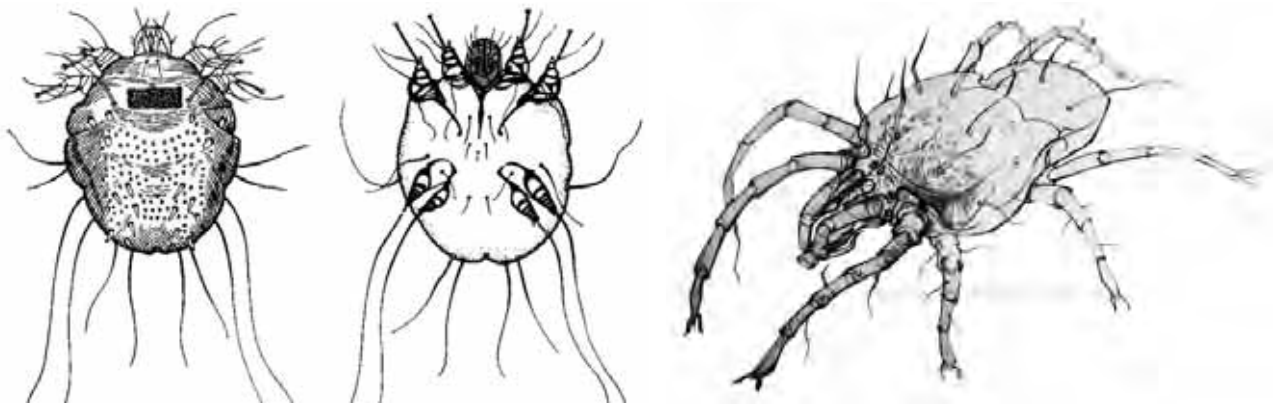
### Parasitic infestation leading to malnutrition

- It reduces both productive and reproductive capacity of the animal and leads to weakness, poor health, loss of blood and also causes skin diseases. To prevent diseases caused by parasites (external and internal), several medicines are available.



**Round worms in the intestine of a pig**

(Source: [www.altered.states.net/roundworms](http://www.altered.states.net/roundworms))



External parasites (mites)

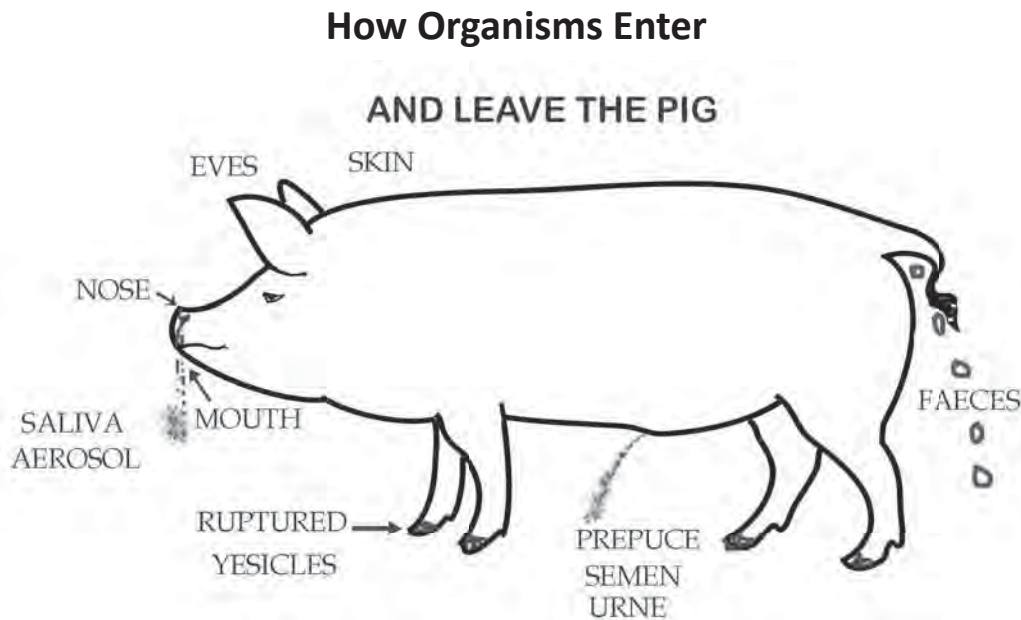
#### 4.1.3 What is fungi?

Fungi (moulds and yeasts) are found mainly in damp conditions such as -feed stuff stored in damp/ moist/humid condition. In the process of multiplication, some species produce poisons (mycotoxin) which, when ingested, are capable of causing a variety of clinical signs; e.g. Aflatoxicosis

To treat diseases caused by fungus or its toxin there is a group of medicines called Antifungal drugs.

#### 4.2 How germs are transmitted?

Germs are mainly transmitted through the following routes:



How organism enters and leaves the body (Source: [www.pigsite.com](http://www.pigsite.com))

#### 4.3 How germs can cause disease?

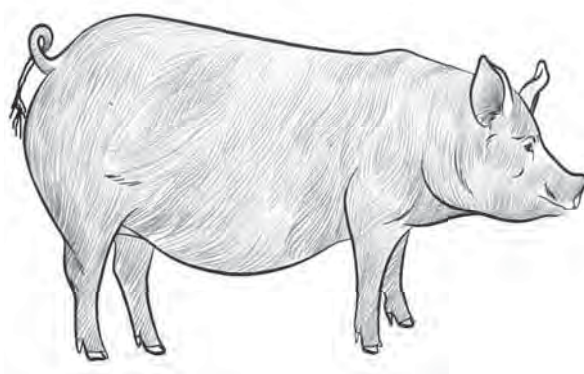
- If a pig comes in contact with germs, it enters into the body and may cause disease if the body does not have adequate internal defense mechanism (immunity);
- In case of parasites, all parasites do not go inside the body as some may remain on the skin surface as ectoparasite and cause disease to the animal;

#### 4.4 Predisposing factors for disease condition

- Exposure to stressful environment and adverse weather condition;
- Feeding of old/ and contaminated feed;
- Consumption of poisonous/ toxic substance;
- Mixing with other diseased animal;
- Incidence of disease of air born nature in the surrounding area;

#### 4.5 Routine examination for health/soundness

- Closely observe the animals for at least once everyday (particularly during morning hours while offering feed).
- For any abnormality, if noticed, observe the animal further to identify whether the symptom is because of disease or in response to some stress or unfavourable condition.
- If the symptom is because of perceived threat of disease, immediately consult a veterinarian to avoid further deterioration of the health condition of the pig.
- Separate the diseased animal from the healthy flock (quarantine). Make separate arrangement for feeding and watering of the diseased pig.
- Explain the detailed history of the disease to the veterinarian. Follow the advice of the veterinarian thoroughly.



A healthy pig

#### 4.6 Observing the symptoms in body parts, behaviour and excreta

The following body parts/excreta and behaviour are to be checked regularly to see whether the pig is in good health or not. A healthy pig could be recognized by observing the external behavior as indicated below. Any deviation from these could be considered as unhealthy pigs.

The pig producer/ *Pig Bandhu* should always observe the pigs for following signs to identify if a pig is diseased or healthy:

- **Eyes:** the eyes should be bright and alert with no discharge at the corners.
- **Nose:** the nose should be clean with no discharge. The muzzle should be moist, not dry. Healthy animals frequently lick their noses with their tongues.



- **Ears:** Most pigs have erect ears which move in the direction of any sound. Ear movements will also be quick to get rid of flies.
- **Legs:** Pig should stand on four feet. Irregular movement results from pain in the feet or limbs.
- **Tails:** A curly tail is a sign of good health
- **Skin:** Shiny skin is an indication of good health. A scaly skin points to health problems.
- **Mouth:** There should be no saliva dripping from the mouth. If chewing is slow or incomplete there must be a problem with the teeth.
- **Head movement:** A healthy pig should hold its head up watching the happenings around it.
- **Temperature:** The body temperature of the pig can be manually checked by touching the ear. Temperature can be recorded by putting a thermometer in anus. The normal temperature of body of a pig is 30°C/ 102°F



**A healthy boar with a curly tail**



*Steps involved in measurement of temperature of a pig*

- **Breathing:** should be smooth and regular at rest. Remember that movement of the pig and hot weather will increase the rate of breathing. If the pig is resting in the shade it will be difficult to notice the chest moving as it breathes. The normal respiration of young piglet is 50/ minute while of aged pig is 13-15/minute
- **Faeces:** Faeces should be firm. Diarrhoea is a sign of ill health. Difficulty in defecating is also a sign of bad health.
- **Urine:** urine should be clear and should exhibit no signs of pain or difficulty in urinating.
- **Eating behavior:** The animal should eat and drink normally. Failure to eat is an obvious sign of ill health. If feed is available, the healthy animal will have a full belly. When feed is placed before pigs they will naturally rush at it, which otherwise is an indication that something is wrong.



- **Movement of legs:** If an animal keeps looking at its flanks or kicks at its belly then there may be pain in the stomach.
- **Sick animal:** If suspected that an animal is sick one should take its temperature. Body temperature showing higher than normal may be a sign of an infection.
- **Separation:** Animal kept himself / herself aloof from the group is often a sign of health problem.



Measurement of respiration of a pig

The *Pig Bandhu* will carry out the routine health examination of the pig by following the prescribed format given at Annexure-II

#### Field exercise

##### Instruction for the resource person:

Take the participants to a nearby farming household having a diseased and healthy pigs. Ask them to observe both the animals and to record the symptoms/behaviour of both the animals including body temperature. Ask the participants to discuss among themselves and to decide which pig is diseased and why they are saying so.

#### Key messages of the session:

- Pigs may come into contact with different types of disease causing agents like bacteria, virus, parasites and fungi.
- To prevent the spread of the disease causing agents antibiotic group of medicines, vaccines, and antifungal and parasitic drugs are available.
- Germs are transmitted through various routes and may cause disease.
- Predisposing factors also increase the chances of getting the pigs inflicted with diseases.
- Routine examination for health/soundness and observing the symptoms in body parts, behavior and excreta may reduce the chances of disease incidence.

# SESSION 5: Different Important Diseases of Pigs

## Session objectives

- To make the *Pig Bandhu* familiar with the infectious bacterial diseases, their mode of transmission and symptoms and suggesting of preventive measures.
- To make familiar with the infectious viral diseases, their mode of transmission and symptoms and suggesting of preventive measures.
- To be familiar with the important internal and external parasitic diseases, their mode of transmission and symptoms and suggesting preventive measures.
- To make the *Pig Bandhu* understand the important reproductive diseases of pigs, their causes, symptoms and preventive measures.

## Training Methods to be followed

- Participatory discussion.
- Explanation with the help of exercises and activities.
- Group discussion

## Training Materials

- Laptop, LCD projector and screen
- Photographs and illustration
- Manual and handouts
- Flip chart

There are different types of diseases of pigs including bacterial, viral, parasitic (external & internal), metabolic, reproductive, etc. The important and most prevalent diseases in Assam are explained below.

## 5.1 Infectious bacterial diseases

### 5.1.1 Swine Dysentery

It is a severe diarrheal disease that primarily affects pigs during the growing- finishing period.

#### ***Mode of transmission***

- Contaminated feed and water;
- Affected animals may release the causal organism in urine and faeces and contaminate feed and water. If pigs get those contaminated feed and water may get inflicted;
- Organisms remain alive and multiply in moist soil.

#### ***Symptoms***

- Diarrhea and dysentery;
- Yellow to gray soft faeces;
- High Fever 104-105° F
- Presence of mucus and flecks of blood in the faeces a few days after the infection;
- Partial inappetence;
- Neonatal (new born piglets) diarrhea is quite common; if it occurs, piglets become lethargic, huddled together and dehydrated;

- An arched back and occasional kicking at the abdomen suggests abdominal pain.
- Prolonged diarrhea leads to dehydration with increased thirst and affected animals become weak, uncoordinated and emaciated.



*Kicking at the abdomen*

#### **Suggestion**

- Immediately consult with a veterinarian;
- Provide plenty of water adding electrolyte;
- In case of emergency, human medicine used for diarrhea may also be used for treating small pigs.

#### **Preventive measures to be taken**

- Separation of the diseased animal (segregation) from healthy ones;
- Proper sanitation, proper feeding and good care of the sick animals;
- Faeces of infected animals should be disposed properly to reduce the chance of infections;
- Houses and equipment should be thoroughly cleaned and disinfected.

### **5.1.2 Hemorrhagic Septicemia (HS)**

#### **Mode of transmission**

- Contaminated feed and water;
- Inhalation or/ ingestion of germs;
- Stressed factors (e.g. transportation, heat)
- Blood sucking parasites.

#### **Symptoms**

- High Fever (42°C or 104-107° F);
- Swelling of throat and neck;
- Difficult respiration with mucous discharge from nose;
- Swollen eyes and enlarged tongue;
- Difficulty in swallowing;
- Salivation;
- Death within 8-24 hours.

### **Suggestion**

- Consult with a local veterinarian;

### **Preventive measure to be taken**

- Proper vaccination of the animals at every six months (in the area where it is prevalent);
- Separate the diseased animal (segregation) from the healthy ones;
- Proper sanitation, feeding and good care of the sick animals;
- Report the outbreak to local veterinary authority as early as possible.

## **5.2 Infectious viral diseases**

### **5.2.1 Classical Swine Fever (CSF)**

It is an acute and highly contagious viral disease affecting pigs of all ages, characterized by sudden onset, rapid transmission, higher mortality and generalized bleeding. This is the major disease problem in pigs.



**A pig with CSF symptoms-bluish purple colour and bleeding under the skin**

### **Mode of transmission**

- Direct contact with the infected pigs;
- Contaminated feed and water;
- Urine, nasal and ocular discharges from infected pig;
- Recovered pig may act as carrier;
- Feeding raw and uncooked meat from affected pig;
- Clothes, vehicles and workers.

### **Clinical sign**

- High rise in temperature (105- 107°F);
- Dullness, depression and loss of appetite;
- Vomiting and/or severe diarrhea;

- Severe conjunctivitis and nasal discharge;
- Purplish discoloration of ear, abdomen, inner side of the legs;
- Nervous sign like convulsions, tremor etc. followed by terminal coma;
- Abortion may occur in pregnant sow.

### **Suggestion**

- Consult with an experienced veterinarian;
- There is no specific treatment but supportive treatment may be given as advised by the local veterinarian

### **Prevention**

- Vaccinate the pig against Swine Fever disease. 1ml of vaccine to be injected subcutaneously or intramuscular (depending on the instruction of the manufacturer);
- Separate the diseased pig from the healthy ones;
- Make separate arrangement for feeding and watering of the diseased pigs. Take utmost care for personal hygiene of the person who is involved in management of the farm to avoid any spread of infection.
- Clean all the utensils thoroughly with antiseptic solution;
- Clean the pig sty and surrounding thoroughly and dust/ sprinkle antiseptic solution;
- Inform other pig producers in the neighborhood regarding occurrence of the disease and suggest them to adopt hygienic measures.

### **5.2.2 Swine Pox**

The disease is caused by the swine pox virus. Pigs of all age groups may be affected. However, the disease is more common in the first 4 months of age.

#### **Mode of transmission**

- The virus is transmitted from pigs to pigs by direct contact;
- Through rubbing of the skin, the infected one may transmit the infection to other healthy pigs;
- Pig lice may carry the virus for weeks or months;



**Pig affected with Swine Pox**

#### **Clinical sign**

- High rise of temperature (105- 107<sup>0</sup> F) with nasal and ocular discharge;
- Initially, skin lesions of pox (follicular growth) of about 1 cm diameter appear. Ultimately, red brown scabs develop on skin within 8-11 days;
- In severe cases, the lesions may be located inside the mouth;
- Pigs become dull and depressed;
- Conjunctivitis and keratitis may develop in piglet.



### **Suggestion**

- Consult with an experienced veterinarian;
- There is no specific treatment against swine pox but supportive treatment may be given as advised by the local veterinarian;

### **Prevention**

- Infected animal should be separated from other healthy animals;
- Infected animal should be kept in clean and hygienic condition;
- Pig sty, utensils and surrounding of the sty should be thoroughly cleaned to prevent from fly, lice, tick, mites etc.;
- A course of ectoparasiticide drugs may be given to keep the pigs free from lice;

### **5.2.3 Foot and Mouth Disease (FMD)**

FMD is an acute and highly contagious disease of pig and other livestock. Morbidity (occurrence of disease) is very high but mortality (death) is very less. The disease is caused by a virus.



**FMD-foot lesions in pig**



**FMD-mouth lesions in pig**

### **Mode of transmission**

The disease is spread at an extremely rapid rate through

- Direct contact with the infected animal;
- Urine, faeces, saliva of infected animal;
- Contaminated feed, water, grass, raw or temporarily cooked garbage containing infected meat or animal products;
- Semen of infected animal;
- Free living birds may carry the infection;
- Through air;

### **Clinical sign**

- Vesicular eruption in the buccal cavity (oral mucosa), tongue, feet, hoof, teat and udder;
- Profuse sticky, foamy and stringy salivation;
- Lameness (do not want to move);
- High rise of temperature (104<sup>0</sup>- 106<sup>0</sup>F);
- Pregnant animal may abort;
- High mortality rate in case of piglets showing the sign of severe gastro enteritis;

- Difficulty in eating and lack of appetite due to painful tongue and mouth lesions;
- Severe lesions in the udder in lactating sows which may lead to mastitis and even, sloughing off of the teats;

#### ***Suggestion***

- Consult with an experienced veterinarian;
- There is no specific treatment but supportive treatment may be given as advised by the local veterinarian;
- Antiseptic or antibiotic ointment/ lotion may be applied to control secondary bacterial infection and facilitate wound healing;
- Fly repellent preparation is very useful to prevent maggot infestation;
- Washing foot and mouth lesions with Potassium Permanganate solution (1%) is useful;

#### ***Prevention***

- Proper vaccination;
- Good sanitation, strict hygiene, clean and dry sheds;
- Isolation of the affected animals;
- Proper feeding (specially soft and liquid food should be given) and good care;
- Houses and equipments should be thoroughly cleaned and disinfected;
- Report the outbreak to local veterinary authority;
- Suggest farmers not to slaughter and sale diseased pigs;
- Do not allow the animals to roam freely;
- No visitors should be allowed to enter the farm;
- Farm workers and *Pig Bandhu* should wash hands and feet thoroughly before and after every time entering the farms;
- Traders shall not be allowed to enter the farms;

### **5.2.4 African Swine Fever (ASF)**

#### ***Mode of transmission***

- Direct contact,
- Indirect contact through contaminated feed, water, garbage, visitors, birds, vehicles, flies etc.
- Through soft ticks infestation.

#### ***Clinical sign***

- High fever;
- Decreased appetite and weakness;
- Red/blotchy skin lesions;
- Diarrhea, vomiting;
- Coughing;
- Difficulty in breathing;
- Ocular and nasal discharge;
- Abortion of pregnant sows at all stages of pregnancy;

### **Suggestion**

- There is no specific treatment and vaccine against ASF; adoption of proper bio-security measures is the only control option.
- Immediately inform the local veterinarian;

### **Prevention and control:**

- Separate the unaffected pigs to a quarantine shed;
- Testing of biological sample of affected pigs for confirmation of ASF;
- If found positive, cull and bury those pigs;
- Thoroughly clean and disinfect the farm premise, utensils and surroundings;
- Wait for 40 days for restocking;
- Introduce pigs of about 10% of total capacity in the farm at the beginning and check the occurrences of the disease for 6 weeks;
- Suggest farmers not to slaughter and sale diseased pigs;
- Do not allow the animals to roam freely;
- No visitors should be allowed to enter the farm;
- Farm workers/ Pig *Bandhu* should wash hands and feet thoroughly before and after every time entering the farms;
- Traders shall not be allowed to enter;

### **5.2.5 Porcine reproductive and respiratory syndrome (PRRS)**

#### **Mode of transmission**

- Direct contact;
- Contaminated feed, water, garbage, etc.;
- Visitors, birds, fly, etc.;
- Droplet infection;

#### **Clinical sign**

- Anorexia;
- Fever;
- Lethargy;
- Depression;
- Respiratory distress or vomiting;



**Red areas on skin of thigh and extremities**



**Necrotic lesions on skin of the abdomen**



**Troubled breathing in PRRS**



**Abortion in pregnant sow affected with PRRS**

- Mild cyanosis (bluish discoloration) of the ears, abdomen and vulva;
- Reproductive problems;
- Increase in premature farrowings;
- Late term abortions, stillborn or weak piglets and mummified fetuses;
- Pre-weaning mortality is high. Nursing pigs may have dyspnea (“thumping”).

### **Suggestion**

- Consult with an experienced veterinarian;
- There is no specific treatment but symptomatic treatment may be given as advised by the local veterinarian.

### **Prevention**

- Vaccinate against PRRS, if available;
- Separate the infected pigs;
- Apply antibiotic/ antiseptic solution/ ointment, if required;
- Clean and disinfect the farm house, utensils and surroundings;
- Report the outbreak to local veterinary officer;
- Suggest farmers not to slaughter and sale diseased pigs;
- Do not allow the animals to roam freely;
- No visitor should be allowed to enter the farm;
- Farm workers/ Pig *Bandhu* should wash hands and feet thoroughly before and after every time entering the farms;
- Traders should not be allowed to enter the farms;

## **5.3 Important internal parasitic diseases**

### **5.3.1 Ascariasis (Round Worm)**

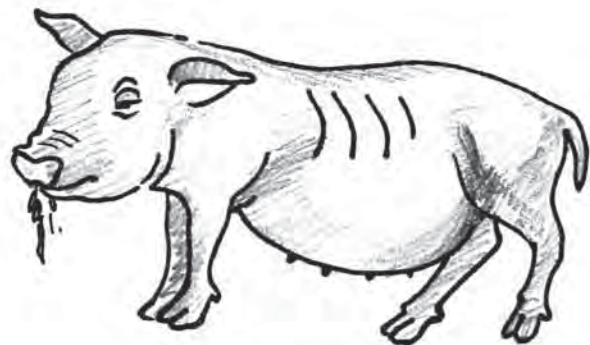
Round worm is found in small intestine and it survives on food taken by pigs. This results in lesser nutrient available for pig’s growth and development.

#### **Symptom**

- Unthrifty appearance;
- Pot bellied condition (enlargement of stomach);
- Roughness of body coat and stunted growth;
- Difficult breathing/ pre pneumonic condition;
- Worms are passed in faeces;
- Hairy pigs;
- Blood in faeces;

#### **Transmission**

- Through contaminated feed and water;
- From mother to off-spring (vertical transmission)



**Pot bellied appearance of piglet affected by Ascariasis**

### **Treatment**

- Deworming drugs should be given at a periodic interval as advised by local VO.

### **5.3.2 Swine Cysticercosis (*Cysticercus cellulose*)**

Pig is the intermediate host of *Taenia solium*. The adult worm is found in small intestine of man and its larvae are found in muscles, brain etc. of pigs which may be transmitted to human beings by ingestion of inadequately cooked pork. Egg of the tapeworm is highly dangerous which human being cannot see by naked eye.

### **Symptom**

- No apparent clinical symptoms are exhibited by pig except it being a generalised infection.
- The meat of the infected animals show white or little brownish pin heads (cotton seed like follicle) in muscles or below the tongue commonly known as measy pork.
- Emaciation (abnormally thin and weak)



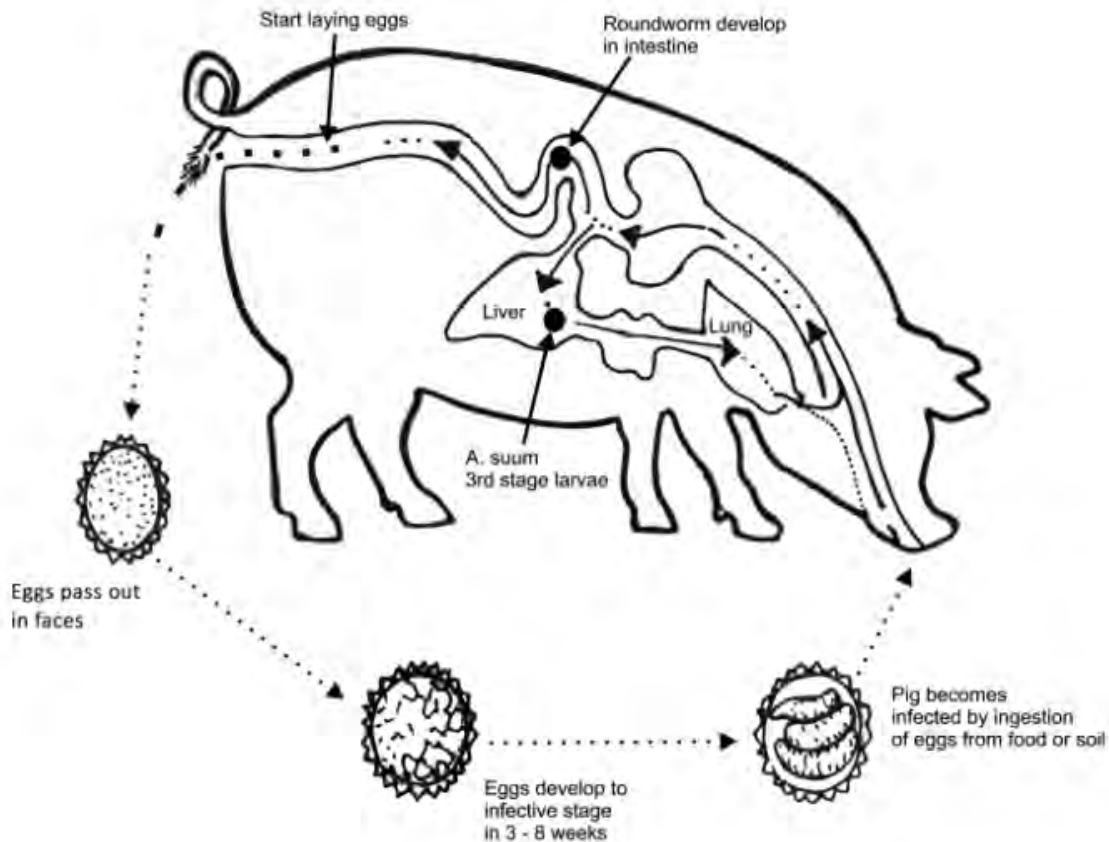
**Pork infested with Swine Cysticercosis (measy pork)**

### **Prevention**

- Do not buy pork having measy pork/ cotton seed like follicle in the muscle;
- Cook the pork properly to destroy the larvae;
- Improve farm hygiene and sanitation;
- Periodic vaccination and deworming of pigs;



## Cycle of round worms



### Life cycle of a worm

#### 5.3.3 Lung worm infestation

Lung worm with *Metastrongylus* infestation affect pigs in the lung.

#### **Symptom**

- Respiratory discomfort,
- Coughing with discharge from nose (nasal discharge),
- Loss of appetite,
- Poor feed conversion,
- Weight loss.

#### **Transmission**

- Through earthworm, snails etc.

#### **Prevention**

- Deworming drugs.
- Liver tonic and/or vitamin supplement should be given to pigs for few days before giving deworming drugs.
- Clean and dry sheds with proper sanitation practices to be adopted. One should provide deworming drugs to pig at a periodic interval as advised by local VO.

- Equipments and utensils used in the farm should be thoroughly cleaned and disinfected

### **Precautions**

- Never to give deworming drugs when the pig is too weak;
- Never to give deworming drugs if the pig is suffering from any disease;
- Give deworming drugs during cooler hours of day only, especially in the evening;
- Do not give dewormer to pregnant animal. In situation when the deworming drug is very essential to give, he/she should take advice from local VO before giving.

## **5.4 Important external parasitic diseases**

There are five groups of external parasites that include ticks, mites, lice, mosquitoes and flies. They are present/contact on the skin and may cause skin diseases resulting in considerable skin irritation, loss of blood and poor growth. Some of these parasites can transmit diseases. Flies can mechanically transmit bacteria and viruses from one pig to another, directly in the case of biting flies or indirectly by contaminating feed. Flies can also transmit infections from one pig farm to another located within a radius of 3 km. Mosquitoes can transmit the deadly Japanese encephalitis virus from pigs to human beings.

### **5.4.1 Mange/ scabies**

It is chronic condition caused by a species of mite called *Sarcoptes scabiei*, *Demodex suis*

#### **Symptom**

- It causes itching and constant irritation leading to restlessness and body scratching, red papules, wrinkled skin, hair loss, rough body coat, thickened skin, etc.;
- Initially, the mange is seen in the ear as thick asbestos like scab, loosely attached to the skin and very rich in mites;
- In chronic case, they cover the head, neck and other parts of the body;
- Abrasions of skin and loss of hair;

#### **Transmission**

- Through direct contact

#### **Treatment**

- Use deworming drugs as advised by local veterinarian and following the manufacturer's instruction;
- Injectable form of parasiticide should only be used under mandatory supervision of local veterinarian.

### **Prevention**

- Thoroughly clean the pig sty and burn the concrete wall, floor and surrounding with the help of blow lamp;
- Wash the pig at least once in a week with Potassium Permanganate . Infected pig may be washed with Cypermethrin, Deltamethrin or Permethrin solution under the supervision of veterinarian and following the manufacturers' instruction;
- New born or uninfected pigs should be separated from older pigs infected with mange;
- Animals with chronic lesions should be identified and culled;
- Boars should also be treated as frequently as that of sows, as they are likely to remain affected;
- Cracks and crevices should be repaired so that the larvae of mites cannot hide themselves there.



*Mange in pig*

### **5.4.2 Lice infestation (Haematopinusuis)**

#### **Symptoms**

- Itching,
- Irritation,
- Anaemia,
- Lice visible.

#### **Transmission**

- By direct contact

#### **Prevention**

Lice are one of the easier conditions to eliminate from the farm. It is important to treat the whole herd to break the cycle from the sow to the suckling pig.

Treat the entire breeding herd in one operation.

Infected pig may be washed with Cypermethrin, Deltamethrin or Permethrin solution under supervision of Veterinarian and following the manufacturers' instructions. Giving two doses in an interval of ten days may totally eradicate lice. All medicines are ineffective against the eggs and hence there is the necessity to treat twice.

## 5.5 Important reproductive diseases of pigs

In addition to infectious diseases, there are some diseases that are mainly related to reproductive system of pigs. Some of the important reproductive diseases are mentioned in the table below (Table 2)

**Table 2: Important reproductive diseases of mature female pigs**

Disease	Cause	Symptoms	Suggestion	Preventive measures
1. Anoestrus	<ul style="list-style-type: none"> <li>Nutritional deficiency</li> <li>Physiological abnormality</li> <li>Infectious</li> </ul>	Not coming into heat	Consult with a qualified veterinarian	<ul style="list-style-type: none"> <li>Provide good quality feed that contains adequate protein source, minerals and vitamins</li> <li>Animal should not keep in the farm longer if it does not respond to treatment</li> </ul>
2. Repeat breeding	<ul style="list-style-type: none"> <li>Physiological</li> <li>Infectious</li> <li>Nutritional</li> </ul>	Animal do not get conceived and comes to heat time and again	Consult a qualified veterinarian	<ul style="list-style-type: none"> <li>Treat the animals as required</li> <li>Provide good feed with minerals and vitamins</li> <li>Do AI on right time by experienced inseminator with quality semen</li> </ul>
3. Abortion	<ul style="list-style-type: none"> <li>Infection like Brucellosis, viral disease</li> <li>Physical trauma/ stress</li> </ul>	Abortion of pregnant sows	Consult a qualified veterinarian	<ul style="list-style-type: none"> <li>Isolate/ segregate the diseased animal</li> <li>Disposed the diseased animal</li> <li>Avoid any physical injury to the animal</li> <li>Vaccinate the animal against brucellosis</li> </ul>
4. Still birth	<ul style="list-style-type: none"> <li>Infection</li> <li>Nutritional</li> </ul>	Dead fetus	Consult a qualified veterinarian	<ul style="list-style-type: none"> <li>Provide good feed with minerals and vitamins</li> </ul>
5. Udder oedema and failure of letting down of milk after farrowing	<ul style="list-style-type: none"> <li>Poor feeding especially minerals &amp; vitamins during pregnancy</li> <li>Less water intake and constipation</li> <li>Infection of the udder</li> </ul>	Poor milk production, poor health of the piglets, fluid accumulation beneath the skin or in deep	<ul style="list-style-type: none"> <li>Consult a qualified veterinarian.</li> <li>Offer cow milk/ goat milk to piglets</li> </ul>	<ul style="list-style-type: none"> <li>Provide mineral and vitamin mixture during pregnancy.</li> <li>Provide plenty of water 2-3 days prior to farrowing</li> <li>Reduce the feed intake before farrowing but can add forages.</li> </ul>

## 5.6 Other Important Diseases

In addition to infectious and reproductive diseases, there are some diseases caused by non-infectious agents that are stated below in Table 3.

**Table 3: Other important diseases of pigs**

Name of the disease	Cause	Symptoms	Suggestion	Preventive measures
Gastritis	Stress, feeding of finely ground feed, maize etc.	<ul style="list-style-type: none"> <li>• loss of appetite,</li> <li>• occasional vomiting</li> <li>• weight loss</li> <li>• black colour faeces</li> </ul>	Consult with a qualified veterinarian	<ul style="list-style-type: none"> <li>• Provide plenty of drinking water</li> </ul>
Diarrhoea	Many reasons. <ul style="list-style-type: none"> <li>• Infection</li> <li>• Over feeding the sow after farrowing</li> <li>• Feeding of decomposed sour feeds.</li> </ul>	Watery stool/ faeces at frequent intervals	• consult with a qualified veterinarian	<ul style="list-style-type: none"> <li>• Change the feed, if required</li> <li>• Control diet just after farrowing</li> <li>• Provide plenty of water with electrolyte powder (1 sachet in 1 lit of water)</li> <li>• Use antidiarrheal medicine</li> </ul>
Anaemia	<ul style="list-style-type: none"> <li>• Deficiency of iron,</li> <li>• Worms infestations</li> <li>• Poor feeding</li> </ul>	<ul style="list-style-type: none"> <li>• Weakness</li> <li>• Frequent breathing</li> </ul>	Provide mineral mixture during pregnancy & lactation	<ul style="list-style-type: none"> <li>• Iron injection on 7<sup>th</sup> and 14<sup>th</sup> day of age</li> <li>• Paint the udder of sow with iron sulphate and sugar, so that piglets consume iron during suckling</li> </ul>



## 5.7 Other frequently encountered diseases/conditions








**Table 4: Other frequently encountered disease/ conditions**

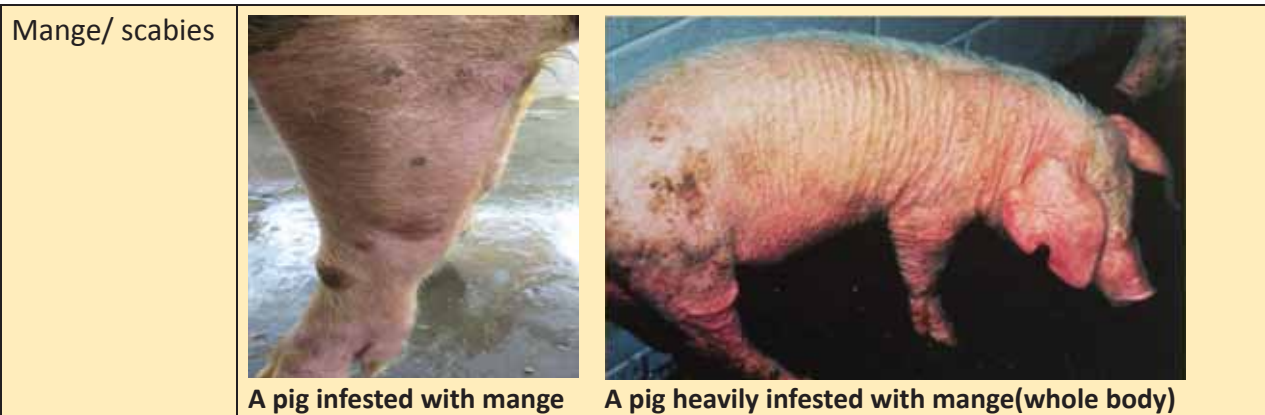
Disease/ condition	Cause	Symptoms	Preventive measures
1. Atresia ani/ani et recti,	A congenital deformity (deformity which is acquired by birth)	<ul style="list-style-type: none"> <li>• Absence of anus/both anus and rectum</li> <li>• Stool not passed out</li> </ul>	Surgical intervention by experienced veterinarian right after birth
2. Scrotal/ umbilical hernia	<ul style="list-style-type: none"> <li>• Congenital defect</li> <li>• Improper cutting of umbilical cord</li> <li>• Castration by unskilled village people</li> <li>• Trauma</li> </ul>	<ul style="list-style-type: none"> <li>• Swelling in the below (ventral) surface of the abdomen</li> <li>• Swelling of the scrotum, sometimes misleading to enlarged testicles</li> <li>• Swelling reduces while laying the piglet ventral side (abdominal) up and a small hole can be felt by finger, even the finger can be inserted into abdominal cavity</li> </ul>	Surgical intervention by experienced veterinarian
3. Uterine prolapse	<ul style="list-style-type: none"> <li>• Prolonged labour/ farrowing</li> <li>• Older age of sows with large litters or that farrow very large piglet</li> <li>• Mineral deficiency</li> <li>• Hormonal imbalance (Estrogenic mycotoxins)</li> </ul>	<ul style="list-style-type: none"> <li>• Begins with the appearance of the red mucosa of the uterus.</li> <li>• Bulging out of part of or whole of the uterus/ both the horns</li> </ul>	<ul style="list-style-type: none"> <li>• Consult with a veterinarian</li> <li>• If survives, in most cases the sow should be culled for welfare reasons.</li> </ul>
4. Mastitis	<ul style="list-style-type: none"> <li>• Bacterial infection is the most common cause</li> <li>• Complication of FMD</li> <li>• Blunt teat</li> <li>• Poor hygiene</li> </ul>	<ul style="list-style-type: none"> <li>• Inflammation and swelling of the udder</li> <li>• Fever</li> <li>• Pain in the udder</li> <li>• Less milk secretion</li> </ul>	<ul style="list-style-type: none"> <li>• Maintain hygiene</li> <li>• Test mastitis by CMT test</li> <li>• Use medication as advised by a veterinarian</li> </ul>

Disease/ condition	Cause	Symptoms	Preventive measures
5. Agalactia	<ul style="list-style-type: none"> <li>• Poor nutrition</li> <li>• Mineral deficiency</li> </ul>	<ul style="list-style-type: none"> <li>• Less amount of milk in the udder</li> </ul>	<ul style="list-style-type: none"> <li>• Follow proper feeding schedule</li> <li>• Give properly balanced feed with optimum nutrition</li> <li>• Supplement the feed with minerals, vitamins and calcium</li> <li>• Feed the newborns with other sow's milk or cow milk</li> </ul>
6. Still birth	<ul style="list-style-type: none"> <li>• Genetic cause</li> <li>• Bacterial and viral Infections</li> <li>• Trauma during pregnancy</li> <li>• Malnutrition</li> <li>• Delays in farrowing</li> <li>• Oversized foetuses</li> <li>• Calcium deficiency</li> </ul>	Giving birth to dead piglets at full term of gestation with in the membrane	<ul style="list-style-type: none"> <li>• See history of the breeding stock while purchasing</li> <li>• Provide adequate nutrition</li> <li>• Avoid any trauma during pregnancy</li> <li>• Call vety. doctor in case of delayed farrowing</li> </ul>
7. Trempling death	<ul style="list-style-type: none"> <li>• By the sows having lower mothering trait</li> <li>• Lethargy of the sow</li> </ul>	The sow suddenly , without any signal, falls over the litter causing injury/death to the piglets	<ul style="list-style-type: none"> <li>• Provision of creep box</li> <li>• Select the sow having good mothering trait</li> </ul>

Every disease has some specific symptoms/ condition/ lesion that helps in diagnosis of the particular disease. Some of the diseases with their specific symptoms are stated in Table 4

**Table 5: Important diseases of pigs with photographs of key signs**

Name of disease	Images	
Classical Swine Fever (CSF)	 <p data-bbox="461 632 737 657">A pig with CSF symptoms</p>	 <p data-bbox="862 632 1406 657">Bluish purple colour and bleeding under the skin</p>
Foot and Mouth Disease (FMD)	 <p data-bbox="480 968 708 993">FMD lesion of foot</p>	 <p data-bbox="1040 968 1284 993">FMD lesion of snout</p>
Porcine Reproductive and Respiratory Syndrome (PRRS)	 <p data-bbox="423 1325 789 1350">Respiratory symptoms in PRRS</p>	 <p data-bbox="1049 1325 1252 1350">Abortion in PRRS</p>
Cysticercosis	 <p data-bbox="740 1671 1065 1696">Cysticercosis (measly pork)</p>	



## 5.8 Notifiable diseases in pigs

- There are certain diseases that need to be reported to the Govt. (A.H. & Veterinary Deptt.)
- If any symptoms related to these diseases are observed by the *Pig Bandhu*, he/she should report to the local Govt. Veterinary Officer without any delay.

Based on the information Government monitors the disease and takes necessary action.

The following diseases are recognized as notifiable diseases

- African Swine Fever (ASF),
- Foot & Mouth Disease (FMD),
- Classical Swine Fever (CSF),
- Porcine Reproductive and Respiratory Syndrome (PRRS or Blue Ear),
- Swine Influenza,
- Infection with *Taenia solium* (Porcine cysticercosis),
- Nipah virus encephalitis

**The Pig Bandhu will make entry of disease and treatment record of the pig in the prescribed format given at Annexure-AIII**

### Group discussion

**Instruction for the resource person:** Ask the participants to divide in 5 groups. Let each group to identify one important disease prevailing in the area. Ask them to discuss about the symptoms, transmission and control/preventive option of that disease.

### Key messages of the session:

- The session discusses different types of diseases of pigs such as bacterial, viral, parasitic, metabolic reproductive and others.
- Mode of transmission, symptoms, suggestions and preventive measures to be taken of the diseases under each type is also discussed.
- The infectious bacterial diseases include swine dysentery and Hemorrhagic Septicemia (HS)
- The infectious viral diseases are the Classical Swine Fever (CSF), Swine Pox, Foot and Mouth disease (FMD), African Swine Fever (ASF) and Porcine Reproductive and Respiratory Syndrome (PRRS).
- Diseases like Ascariasis (Round Worm), Swine Cysticercosis (*Cysticercus cellulose*), Lung worm infestation fall under the category of internal parasitic diseases, while diseases like Mange/ Scabies, lice infestation (*Haematopinus suis*) etc. are external parasitic diseases.
- Important reproductive diseases are Anoestrus, Repeat breeding, Abortion, Still birth, Udder oedema and failure of letting down of milk after farrowing.
- The diseases recognized as Notifiable disease should be reported to local govt. veterinary officer.

## SESSION 6: Preventive Measure of Diseases: Vaccination, Deworming, Feeding of Minerals and Vitamins

### Session objectives

- To make the *Pig Bandhu* know the preventive measures of different diseases of pigs: vaccination, cleanliness and hygiene and quarantine.
- To make the *Pig Bandhu* know about traceability and its importance

### Training Methods to be followed

- Participatory discussion.
- Explanation with the help of exercises and activities.
- Demonstration

### Training Materials

- Laptop, LCD projector and screen
- Photographs and illustration
- Manual and handouts
- Flip chart
- One Thermos flask. One cool box, one photograph of a fridge, one vial of vaccine with patent label on it, and one 5 ml syringe and needle

## 6.1 Preventive measures of different diseases of pigs

### 6.1.1 Vaccination

Vaccination is the most effective method of preventing infectious diseases. Build up of the immunity due to vaccination is largely responsible for the eradication/ restriction of dreaded diseases. The vaccination schedule of most important pig diseases are presented in Table 6.

**Table 6: Vaccination schedule for pigs** (may vary from company to company)

Disease	Type of vaccine	Age of vaccination	Dose	Immunity
Classical Swine Fever (CSF)	Freeze dried tissue culture	2 months of age and a booster dose after 4 weeks followed by regular vaccination at 6 months interval	1ml S/c	6 months or 1 year
Foot and Mouth Disease (FMD)	Polyvalent tissue, inactivated tissue culture	2 months of age and a booster dose after 4 weeks followed by regular vaccination at 6 months interval	2ml i/m	5 months
Cysticercosis	Recombinant Porcine Cysticercosis vaccine accompanied by Oxfendazole at regular interval	2 months of age and a booster dose after 3-4 weeks followed by regular vaccination at 6 months interval	1ml deep i/m behind the ear area	6 months

**Note:** This schedule is just indicative. The manufacturers' schedule should primarily be followed.





**Vaccination against Cysticercosis under APART, AHVD**

### 6.1.2 Maintenance of cold chain

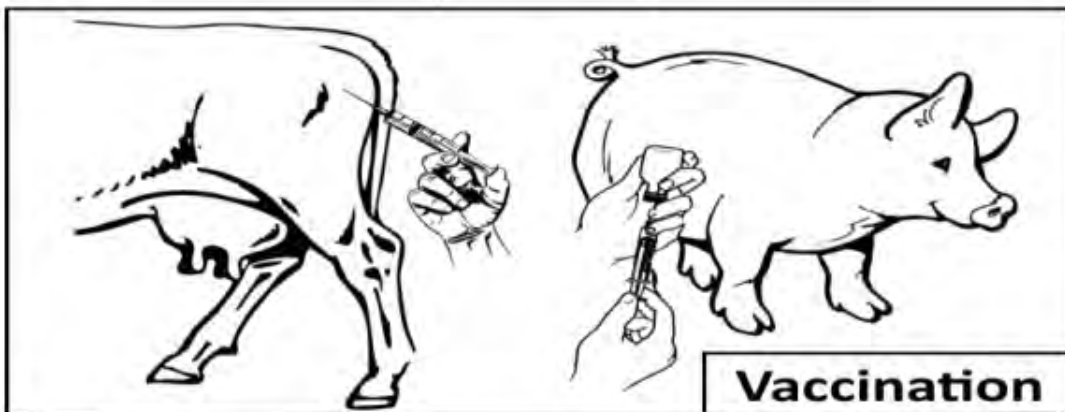
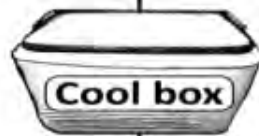
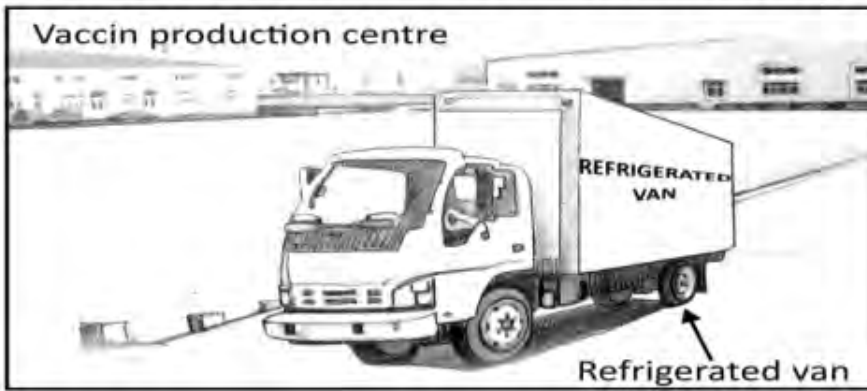
Vaccines are sensitive biological products that may become less effective, or even non effective, when exposed to temperatures beyond the recommended range and/or to direct sunlight or fluorescent light. Temperatures falling outside the recommended range require immediate action to avoid loss of product.

The “cold chain” refers to the process used to maintain optimal temperature during transportation, storage, and handling of vaccines. The chain starts at the manufacturer and ends with the administration of the vaccine to the targeted animals. The optimum temperature for refrigerated vaccines is between +2°C and +8°C (+35°F and +46°F) (2). For Freeze Dried vaccines, the optimum temperature is –15°C (+5°F) or lower. In addition, protection from light is a necessary condition for some vaccines. Proper storage temperatures must be maintained at every step in the chain and failing to do so may result in vaccine getting damaged and/or unsuitable for administration. The refrigerator must be equipped with continuous power back up arrangement; otherwise the vaccines will lose its potency. During power failure, the refrigerator must not be opened. Re-vaccination of animal who have received an ineffective vaccine may cause a loss of public confidence on vaccines and/or the health care system as a whole. A situation of shortage of vaccine supply could be created due to a mass revaccination in the scenario of rising demand for vaccine.

#### Practical demonstration

**Instruction for the Resource Person:** (i) Take one Thermos flask and one cool box and demonstrate how to use it. Demonstrate that the cap/lid should be tightly closed, should be away from any source of heat; Close the cap/lid tightly immediately after taking out the vial. (ii) Take one vial of vaccine and demonstrate the date of manufacturing to ensure that it has not been expired; demonstrate the temperature range specified for that vaccine by the manufacturer and let them know how to maintain that temperature. (iii) Take one photograph of a fridge and show the participants where to store the vaccine. If the temperature range is ,say, 2-8°C, then the vaccine must not be stored in the ice chamber of the fridge and if indicated to be below 0 °C, say (-) 15 °C, then explain how to store in the ice chamber and not in the cooling chamber. Also tell the trainees not to open the fridge door repeatedly. (iv) Demonstrate the procedure of drawing the required amount of vaccine and to inoculate with a separate needle; it should be ensured that the exact route of inoculation as specified by the manufacturer is followed.

# Maintenance of cold chain



Maintenance of cold chain for vaccines



**An Ice box**



**A refrigerator**



**CSF Vaccine preserved in a refrigerator**



*Thermos flask*

### **6.1.3 Precautions for vaccination program**

Immunization program may not be effective and there may be break down of immunity if the execution of vaccination work is not done properly. The following measures should be taken to store the vaccines in cool conditions:

- Store the vaccine in refrigerator at the specified temperature to maintain the potency of the vaccine;
- Under no circumstances, vaccines should be allowed to get exposed to normal environmental temperature prior to administration;
- Purchase the good quality vaccines of a reputed brand having excellent track record of providing sufficient immunity;
- Procure the required quantity of vaccine in order to avoid any scarcity or unnecessary surplus as the vaccine has a limited self life;
- Use disposable syringe and needle;
- Dissolve the vaccine in clean container;
- Never use the vaccine that has expired;
- Use the exact route and dose as indicated: The route and dose prescribed in vaccine only should be used;
- Do not use chlorinated water, boiled water or alcohol to sterilize the syringe and needle.

### ***Common reasons for vaccination failure***

- Lack of maintenance of cold chain from the time of manufacturing to vaccinating;
- Poor immune response in weak and improperly fed animals;
- Lack of herd immunity due to only a few animals being vaccinated;
- Poor quality of vaccine - quality will deteriorate if repeatedly thawed and cooled;
- Low efficiency or ineffective vaccine – may occur in case of variation of strains in vaccine and infected animals (e.g. FMD).

**The *Pig Bandhu* will make entry of vaccination record of the pig in the prescribed format given at Annexure-VI**

## **6.2 Preventive measure of diseases: cleanliness & hygiene and quarantine**

Reduce transmission of diseases by adoption of improved practices

### **6.2.1 Sanitation, hygiene and disinfection**

**Sanitation:** It is the process of adopting hygienic measures to reduce the incidence of diseases and create conditions that secure better health.

Popular proverb “**Prevention is better than cure**”

“Pigs are often thought to be dirty, but they actually keep themselves cleaner than most pets. They are seen laying in mud because they do not have sweat glands and constantly need water or mud to cool off.” -The (U.S.) National Pork Producer’s Council)

#### ***Importance of sanitation***

- Proper sanitation helps in prevention and control of most of the communicable diseases;
- Helps in providing the most unfavourable conditions for germs;
- Prevents economic losses caused by infection;
- Lowers the rate of mortality and increases the longevity of animals;
- Helps in minimizing contaminations and production of good quality meat and meat products;

#### ***Regular sanitation programme***

Infections in farms and various disease conditions can be prevented if following essential features of adequate sanitation are adopted:

- Proper ventilation of the shed should be ensured;
- All dirt in floor, walls, roof/ceiling should be cleaned thoroughly at least once in a month;
- Proper disposal of manure, feed wastes and other excreta each day to prevent forming of breeding place for flies;
- Construction of proper drainage system and manure pit to facilitate drainage of liquid excreta;
- Watering and feeding utensils should be cleaned thoroughly on every day with disinfectant like potassium permanganate, bleaching powder etc.;
- Make arrangement for proper cleaning and keeping floor dry;
- In case of earthen floor, occasionally remove 15 cm top soil and replace it by new soil/sand;
- It is important to burn all sweeping and scrapings and if possible expose the floor to sunlight;



- Apply heavy coating of white wash containing a reliable disinfectant (1/2 kg of lime in one gallon of water and disinfectant) to the floors, walls and partitions, mangers etc.;
- Judicious spraying for disinfectants surrounding the pig sty at a regular interval is essential along with cleaning of garbage;
- Dead animal should be disposed properly through burring in a place away from the human habitation;

***Special sanitation programme (when pigs in a herd suffer from disease)***

- Separate the diseased animals from healthy one to prevent spread of infection and to keep diseased animals under observation (quarantine).
- Give curative treatment to suspected animals. Curative treatment should be provided in isolation until they are free of infection.
- Thoroughly clean the contaminated premises and utensils using hot water and disinfectant. Pig sty and surrounding may be disinfected with lime, phenol, formalin etc.
- Never sell diseased pigs, pigs which are under treatment or who failed to respond to treatment. The farmers and traders should be well informed about the worst outcome of these practices.



*Cleaning and disinfection of farm premises and utensils*

- Fresh lime can be sprinkled on the floor, walls and ground for disinfecting them. Whitewash acts as more effective disinfectant when phenol up to 5% is mixed. Lime can also be used for cleaning feed and water troughs. All utensils, mangers, troughs, etc. may be scalded with boiling water adding washing soda.
- Phenol can be used for disinfecting metallic objects, clothing etc.
- Skin disinfectants like iodine, iodophore, potassium permanganate, hydrogen peroxide, etc. may be used for cleaning the visible wounds of the diseased animal.
- Potassium permanganate is used extensively in foot bath.
- All waste products including blanket, thrown off materials from sick animals may be infective and, therefore, must not be allowed to accumulate, but should be immediately destroyed, buried or rendered harmless.





#### **Disposal of dead carcass through burial method**

- Discharges from nose, mouth, skin, eyes, uterus, dung and urine can be dangerous source of infection. To prevent the spread of these infective discharges, all persons other than attendant of diseased animals to be kept away from infected pens, utensils, clothing, etc.
- Dry sweeping or dusting may also be dangerous, as the organism may remain in the air of buildings and settle again on different places. Therefore, all surfaces should be moistened before sweeping and scrapping.
- After completing the disinfection in every detail, one should disinfect one's hands, arms, booths and other wearing objects.
- Animals in good health should be washed or bathed once or twice in a week.

#### ***Disinfectant***

- Compounds used to kill germs (bacteria, virus and parasites such as lice, mites, ticks and fleas) are called disinfectant.
- Since causative agents of many diseases are extremely small and may remain for indefinite period in dust, cracks, and crevices of buildings, proper disinfection must be carried out carefully to kill the germs from contaminated premises.

**Table 7: Common disinfectants and their level of concentrations, method of use and surface for use**

Name	Concentration	Method of use	Surface for use	Remarks
Washing soda	3% solution in boiling water	Splashing (wet the surface with the solution), rinsing utensils	Utensils and floors	Little disinfection power but effective cleansing agent.
Lime	½ kg lime in about 4 lit of water as white wash+ 5% phenol.	Sprinkling, dusting of powder of lime alone.	Floors, walls and grounds	Use freshly prepared solution.
Potassium permanganate	1 gm in 10 lit of water	Splashing	Floors, foot bath, wheel bath, and troughs	Disinfection action is due to oxidizing power
Phenol	20-50 ml in water	Splashing	Metallic objects and clothing	Goods disinfectant
Bleaching powder (calcium hypochlorite)	30% available chlorine	Dusting	Floors, gutters, passages	Protect it from sunlight
Boric acid	5-6% solution	Splashing	Skin, floors, walls equipments, wounds etc.	-

Source: Dr. Neeraj (1998)

### 6.2.2 Quarantine practices at farm level

- Every pig farm should follow a quarantine practice before putting any newly purchased pig in a farm to prevent the spread of infection from new animals to the old ones.
- This is nothing but keeping the newly purchased pigs in a separate shed, preferably just near the entrance gate, for about 21 days instead of mixing them directly with the old stock.
- During the time of keeping the pigs in quarantine shed they should be fed and watered adequately and also should be kept under close observations.
- Any abnormality observed in the pigs should be reported to the local veterinarian immediately and they should be treated well.
- The person handling the newly introduced pigs kept in the quarantine shed should not handle the old ones without properly cleaning hands and feet with soap and water. In case of farms having two persons to look after the animals, one should be exclusively kept engaged in looking after the new animals.
- The utensils used for feeding and watering the old and new animals should be separate.



Packet of Potassium permanganate

- All utensils should be cleaned properly.
- No visitor should be allowed to enter into the quarantine shed.
- Diseased animal in quarantine shed should be treated properly and should be moved to the main shed only after one week of complete recovery.

### **6.2.3 Reducing antimicrobial residue**

While antibiotic medicine is used to treat diseases in pigs, part of it excreted through urine, faeces, milk and some part remains in the body. This leftover medicine is called residue.

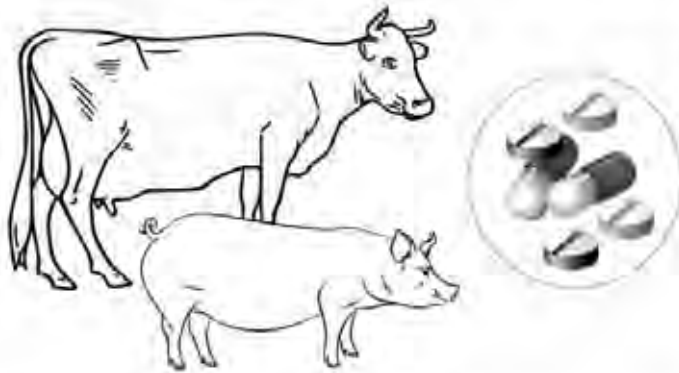
The issues concerning antibiotic residue are

- If the diseased pigs under treatment are slaughtered and sold, antibiotic goes to human through consumption of such pork;
- This residue may cause production of resistant bacteria in human body. This means if the person consumes same antibiotic while he/ she suffer from the disease, the antibiotic may not work;
- This is an important and emerging problem throughout the globe because if human body becomes resistant to number of antibiotics it will be difficult to treat them in future.

#### ***Preventive measures***

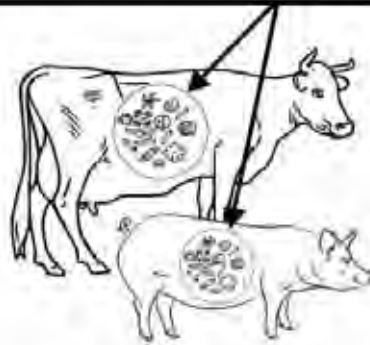
- Antibiotic should be used only when it is of utmost importance to use;
- Antibiotic is not required to treat all diseases;
- Antibiotic should only be used as per the advice of qualified veterinarian;
- It should not be purchased directly from pharmacy without doctor's prescription;
- Antibiotic should be used judiciously. Both over use and underuse of antibiotic is bad for the animals;
- Antibiotic should be used for the full course (say for 5 days). Should not stop using of antibiotic if the animal recovers before the end of the course;
- Diseased animals should not be slaughtered and sold while they are under treatment.

**Antibiotic residue:**  
How it contribute to development  
of antibiotic resistant bacteria



**ANTIBIOTICS**

- I. Low doses of antibiotics are put into feed for better growth of the pig & treatment of diseases.
- II. Animal products are sold within the withdrawal period and antibiotics are passed to humans when consumed.
- III. Overuse / Misuse of antibiotics by farmers.



**ANTIBIOTIC - RESISTANT BACTERIA**

develop in the intestine of the animal.



Bacteria from animal's intestine enters -

- I. Meat during slaughtering and processing.
- II. Milk during production



Bacteria are carried through animal waste & then by air to crops.

Humans consume the contaminated meat, milk and food products and the antibiotic resistant bacteria and gets totally sick.

**Passes of Antibiotic residue from animals to human**

## 6.2.4 Reducing pesticide residue

Pesticide is used for control of pests in crops. While using pesticides risks may be exposed to the animals in the following way:

- Part of pesticide remains in the crops,
- Such crops are used for feeding of pigs,
- The residue remains in pork and may go to human body,
- Pesticide residue is a risk to human health.

### Control measures

- Judicious use of pesticides,
- Limit the use of pesticides in fodder crops/food feed crops used for feeding of pigs,
- Replace chemical pesticide with herbal/organic pesticide.

## 6.2.5 Traceability

Traceability is a process to verify the history, location, etc. of pigs by means of online recorded data. This is done through a customized Management Information System (MIS) Apps. The *Pig Bandhus* will have to take the responsibility of inserting all the relevant data into the tablets/smartphone given to them. The data will be centrally processed and necessary information/documents will be supplied to all concerned. The following are the key activities for creating good traceability:

- Ear tagging of each individual pig/piglet for identification;
- Entering the profile of the pig and other relevant information into the Apps installed in tablet/smart phone;
- Data are made centrally accessible and monitorable;
- Follow up activities to be sent back to field level operators i.e. *Pig Bandhus*.

By using traceability, it will be easier to-

- Sell pigs/piglets based on online information provided by traceability software,
- Take preventive health care services ( e.g. vaccination, iron supplementation, deworming, castration, etc. ) more timely and without any lapse,
- Track back the source of the pork in the event of outbreak of any food born (pork) diseases,
- See the availability of stock in different places at different times.

### Key messages of the session:

- Vaccination is an effective method to prevent diseases which needs following the proper schedule and maintaining cold chain for storage and transportation.
- Sanitation in the farm and cleanliness and disinfection of farm equipments and quarantine practice are useful for preventing diseases in pigs.
- Following regular and special sanitation programme may help avoid infection and prevent diseases of pigs.
- Antimicrobial and pesticide residues have emerged as an important area of concern.
- Traceability software can be an important means of tracking diseased pigs.



# SESSION 7: Familiarization with Commonly Used Medicines

## Session objectives

- To know about the types of medicines, generic and brand name of medicines, date of manufacture and expiry, storage, shaking/mixing, indication, dose, routine administration, common routes of use etc.
- To know the methods of administering medicines, vaccines iron injection etc..

## Training Methods to be followed

- Participatory discussion.
- Explanation with the help of exercises and activities.

## Training Materials

- Laptop, LCD projector and screen
- Photographs and illustration
- Manual and handouts
- Flip chart
- One vial of injection, one piece syringe and a needle, cotton swab, tincture of iodine.
- A vial of a vaccine and a diluents, one disposable syringe, one piece of needle
- One thermos flask & Ice box
- One bolus, syrup, one injection, a file of tablet

*Pig Bandhus* should have basic idea about the use and misuse of medicines, do's and don'ts in the use of medicine, transportation and storage of medicines, expiry of medicines, importance of record keeping etc. before they start using medicine even under direct supervision with local veterinary officer.

## 7.1 Important lessons to be learnt before using any medicine

### 7.1.1 Type of medicines

There are different types of medicines to treat various kinds of diseases. The types of medicines that a *Pig Bandhu* might need to handle include:

- **Analgesic:** used to treat pain and inflammation;
- **Antipyretic:** used to treat fever;
- **Antidiarrhoeal :** Used to treat diarrhea, dysentery, loose motion, etc.;
- **Vitamin and Miineral mixrtre:** used to treat vitamin and mineral defficiency;
- **Anthelmintic:** used to treat/prevention of worms infestation;
- **Liver tonic:** used to treat liver disease, increase digestion, increase appetite, in gastritis, supportive to deworming, etc.;
- **Antibiotics:** used to treat infections caused by bacteria;
- **Vaccine:** used for prevention of some infectious diseases (viral /bacterial/parasitic) which are difficult to treat after occurrence;

- **Antiseptic solution/ointment/powder:** used for dressing of wound, abrasion, ulcer, etc. to prevent infection;
- **Paraciticide:** Used to treat and prevent external parasites;

### 7.1.2 Generic and brand name of medicines

Each medicine is composed of certain basic drugs (e.g. Paracetamol, Ampicillin, Albendazole etc.), the name of the drug is called generic name (common name/ general name). Generic name remains same in all the medicines composed of the same drug/s while trade name will vary from company to company. Different manufacturing companies give different names to the same medicine prepared by them (e.g. Albendazole is marketed as Noworm, Albidol, Albomar, etc.)

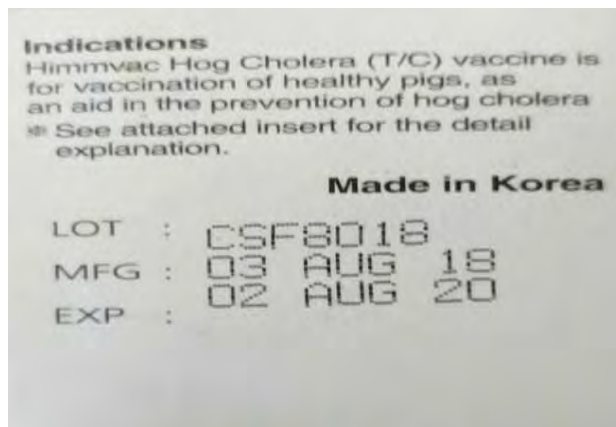
Doctors generally prescribe medicine in trade name (as quality of medicine may vary from company to company).

#### Physical Demonstration:

Instruction for the Resource Person: Explain to the participants (i) the difference between a vial of generic medicine and a vial of proprietary medicine; (ii) the difference between bolus, syrup, tablet, injection etc.

### 7.1.3 Date of Manufacturing and Expiry

Each medicine is manufactured on certain date/ month and that is written on the vial/ sachet which is called date of manufacturing (MFG). Again, each medicine has certain life span within which it should be used for treatment. The last date/ month until which medicine remains effective is called Date of Expiry (EXP). Medicines must not be used beyond the date of expiry under any circumstances. Pig Bandhu should always check the date of expiry before purchasing any medicine.



**Date of Manufacturing and Expiry**

### 7.1.4 Storage

Medicines should be stored in cool dry place away from direct sunlight. Medicines should not be kept open; it should be tightly closed and kept away from the reach of children. Other than vaccine no medicine should be refrigerated.

### 7.1.5 Shaking/ mixing

Liquid medicine should be shaken well to mix the content/composition every time before use.

### 7.1.6 Indication

Disease or condition against which a particular medicine is used should be known. This is generally written on the medicine. If not, *Pig Bandhu* should consult with an experienced veterinarian.

**Contra indication:** Disease or condition against which the particular medicine should not be used.

### 7.1.7 Dose

Quantity/volume of medicine to be administered /used per animal per day/time for treatment should be known. Doses of medicine to be administered/ used depend on the body weight of the

animal. Smaller the animal smaller is the dose and vice versa. This is generally written on the cover of medicine. If not, Pig Bandhu should consult with an experienced veterinarian.

### 7.1.8 Route of administration

The route of administration varies based on type of medicine

Bolus/ Tablet: Generally fed orally

Syrup: Generally fed orally

Ointment/ lotion/ powder: Generally applied externally on the skin

Vial of injection: Injected through different route i.e. Intramuscular, Intravenous, Subcutaneous

### 7.1.9 Common route of use of medicines by farmers

Route of use of different types of medicines are oral, ocular drops, ear drops, intra muscular injection, local applications etc.

Pig *Bandhu* must have knowledge on different methods of administration of medicines in order to-

- Provide medicines without much inconvenience and harm to animal;
- Make use of drugs properly without wastage/ under-dose/ overdose;
- Treat animals properly;
- Understand in case of oral medication, the medicines should be palatable to them;

Different methods are:

#### ***Feeding boluses/ tablets***

The bolus/ tablets are grinded and mixed with the feed specially molasses, banana etc. The amount of feed should be less so that the animal takes the medicines properly. Molasses/ banana mixed with medicine should be offered to pig during the time when they are hungry, especially before offering normal feed and water.

#### ***Feeding syrup/ suspension***

Drenching is a method that is satisfactory for giving moderate amount of liquids or suspension. This should only be done by an experienced veterinarian.

#### ***Injections***

Medicines which act very rapidly or those which cannot be administered orally (because they may become ineffective once they come in contact with the digestive juices or because the diseased animal is too weak) are commonly administered by injection. Pig *Bandhu* shall not use injection as a common method of administration of medicine. It should be done only under the prescription and instruction of a qualified veterinarian.



**Drenching of liquid medicine to pig**

## 7.2 Methods of administering medicines in the form of injection

### 7.2.1 Method of withdrawing medicine from a vial

- Sterilize the needle and syringe (if glass syringe is used) with warm water. If disposable (use and through) plastic syringe is used, sterilization is not required;

- Select the vial of medicine to be used;
- Select the appropriate size of syringe (eg.2ml, 5ml, 10ml, 20ml) based on the volume of medicine to be injected;
- Select the appropriate size of needle (e.g. 16, 17, 18, 19, 20 gauge, etc.) based on the age and size of the pig;
- Remove the plastic / steel cap of the vial and invert it;
- Fix the needle with the syringe;
- Insert the needle in the vial through the rubber cap;
- Draw the required volume of medicine by pulling the plunger;
- Expel the air fully from the syringe (remaining above the medicine) by pushing back the plunger; Take extra care, so that no air bubble remains above the medicines. If required, little medicine may also be expelled through the needle to confirm the expulsion of air completely;
- Always keep partly used bottle/ vial in a fridge or in cool place away from the reach of children;
- Burn or burry the needle, syringe, vial, medicine, etc. carefully in a place away from the homestead.



**Drawing medicines through needle and syringe**

### **7.2.2. Intramuscular injection (into muscle)**

In pigs the preferred site for intramuscular injection is the thigh region.

#### **7.2.2.1 Method used in young pigs**

- Collect required materials and drugs;
- Restrain the animal and select suitable site in the thigh region;
- Clean the site of injection with tincture of iodine;
- After determining the proper dose, pull the drugs into the syringe;
- Pierce the needle into the site to enter deep into the muscle;
- Gently inject the contents of the syringe;
- Take out the needle and gently massage the area with cotton soaked in tincture of iodine.

### **Physical Demonstration**

**Instruction for the Resource Person:** Give a demonstration on how to draw the desired volume of medicine, preparation of the injection site and the other steps of pushing the injection.

#### **7.2.2.2 Method used for adults**

The method of using injection in adult pigs is explained below:

- In adult pigs, the method is almost the same, but after drawing the medicine, the needle is separated from the syringe and thrust in the muscle of pig using the dagger method (piercing the needle applying little bit of force from a little distance) without stopping, and then the syringe is fitted;

- Check for blood by drawing back on the plunger;
- Make sure that the needle is not improperly placed into a vein or artery, and then the content is injected deep into the muscle.

**Precaution**



**Different steps in pushing an Intramuscular injection**

- Fluids injected intramuscularly are not absorbed as fast as those given in the veins, but are absorbed faster than those injected under the skin;
- Special care must be taken to avoid infection because deep sores may follow which are painful and difficult to treat;
- Expel the air completely from the syringe by pushing the plunger with medicine to the mouth of the needle;
- The needle should be thrust quickly through the skin at right angles to it and into the muscle without stopping;
- To make sure that needle has not penetrated a blood vessel, pull out the plunger of the syringe a little bit before injecting contents. If blood is sucked into the syringe, choose another site;
- Ensure that the needle passes the fatty layer of pigs and inserted in the muscle layer;

**7.2.3 Subcutaneous injections (under the skin)**

In pig the preferred site for subcutaneous injection is base of the ear. The method/seps of using subcutaneous injections is explained below:

**Method**

- Collect the required materials and drugs;
- Restrain the animal in proper way;
- Draw the required medicine in to the syringe;
- Clean the base of the ear by applying tincture iodine;
- Pull a fold of the skin at the base of the ear by the index and thumb fingers;
- Pierce the needle through the skin in an oblique, thrusting the needle quickly and firmly;
- Push steadily the contents of the syringe;
- Take out the needle and gently massage the area to hasten absorption.





**Different steps in pushing a sub-cutaneous injection**

### **Precaution**

- In the above method, tip of the needle should be located in between skin and muscles;
- Serious results may follow if certain fluids are injected into a vein. To make sure that the point of the needle is not inserted in vein, the plunger of syringe be pulled out a little before injection is given. If blood appears, another site should be used;
- Care should be taken not to inject fluid into a muscle, otherwise a large swelling and abscess may later result.

## **7.3 Administration of vaccine**

### **7.3.1 Administration**

The vaccine should be kept cold until used and each bottle should be well shaken before contents are withdrawn. Only disposable syringes and needles should be used. The vaccine should be injected by deep intramuscular route through an area of clean, dry skin with precautions taken against contamination at the mid neck region.

### **7.3.2 Dose**

Dose should be computed as per instruction given by the manufacturer.

### **7.3.3 Caution**

In rare cases hypersensitivity may occur. In such cases immediate treatment with antihistaminic is advocated. Under field conditions it is extremely difficult to avoid the accidental introduction of bacteria when withdrawing of vaccine from the bottles. Partly used bottles of vaccine should therefore be discarded at the end of the day's operations.

### **7.3.4 Transportation and storage**

The optimum transport and storage temperature is between 2°C and 8°C. The antigenicity of the vaccine deteriorates if the temperature is allowed to rise above this range. The rate of deterioration depends on both temperature and time.



**Thermos Flask**



**Ice Box**

## 7.4 Iron injection

The use of injectable compounds to prevent piglet anemia is widespread. Although oral iron products have been shown to prevent anemia, most pork producers and veterinarians still rely on injectable iron. The techniques of giving iron injection are as shown below:

- The piglet is held between the left elbow and body, and the right ear is grasped and pulled firmly forward;
- The skin is pricked with the needle and pushed upward, and the needle is inserted to the hub;
- The injection is administered, the needle is withdrawn, and the ear is released simultaneously;
- Pushing the skin upward prior to injection prevents leakage;
- The best needle for most injectable is 18 gauge and 12 mm, but a 20 gauge needle may be used for thin liquids;
- The iron injection site is preferred over the ham area.

### Key messages of the session:

- There are different types of medicines- each type having specific purpose of treatment.
- Trade name of the medicines may change but the generic name remains same.
- Before using a medicine *Pig Bandhu* should know manufacturing and expiry date, storage guidelines, shaking/mixing, indication and dose, route of administration, etc.
- Methods of administration of medicines include method of withdrawing medicine from a vial, method used in young pigs and adults, methods applied for subcutaneous injections, oral administration, topical application, etc.
- The *Pig Bandhu* should clearly know administration, dose, transportation and storage norms of vaccines, etc.
- Apart from oral iron products, iron injections are supplemented to piglets to prevent piglet anaemia

## SESSION 8: Certain Minor Veterinary Practices that a Pig Bandhu may Need to Attend in the Field

### Session objectives

- To know about assisting the sows during farrowing, giving first aid to pigs, castration, post surgical care, dressing of fresh and maggotted wounds, management of bleeding, dressing of abscess, general management of wounds, clipping of needle teeth, ear tagging, record keeping of number of pigs, dressing of foot rot, etc.
- To make the Pig Bandhu know about the items that a first aid kit should contain and precautionary measures for maintaining personal safety and hygiene

### Training Methods to be followed

- Participatory discussion.
- Explanation with the help of exercises and activities.

### Training Materials

- Laptop, LCD projector and screen
- Photographs and illustration
- Demonstration
- Manual and handouts
- Flip chart

Certain minor veterinary practices like assistance to sows during farrowing, dressing of fresh wound, dressing of maggotted wound, ear tagging, use of local application including antimicrobial/antiseptic ointments, fly repellent, etc. are generally done by community people without the support of local veterinarian. To perform these more scientifically *Pig Bandhu* should be taught about the processes.

### 8.1. Assisting the sows during farrowing

If the sow shows the signs of farrowing but do not produce a piglet and do pawing with a hind leg, or if 45 minutes pass since the first piglet appears with no sign of the second one, should be helped the sow in farrowing. The assistance can be done in the following way:

- Sows normally get farrowed at night and therefore, presence of an experienced attendant should be ensured during the time of farrowing.
- If any help is required to assist the farrowing the attendant may call a veterinarian or can try to assist by himself.
- The person should wash his/her hands and arms with luke-warm water and soap thoroughly.
- The region of the vulva of pigs should be washed.
- Hands should be soapy or should apply olive or sunflower oil to make slippery.
- The person should put his hand into the vagina and should try to feel for the piglet/matter causing the blockage and try to remove it.
- The person should clear the piglet's mouth and nostrils for any mucous attached and if it is not breathing. He/she can gently slap it to encourage it to breath. Gently rub the piglets to dry and put its mouth on a teat.

## 8.2 First Aid to pigs

First aid is the immediate care of injured animals or those suffering from sudden illness. The aims of first aid are to protect life, reduce pain and suffering and to prevent the deteriorating situation to promote recovery.

### *Precautions to be taken before first aid*

- Before attaining first aid, assess the situation for any health risk to yourself or others.
- Injured animals feel pain and may bite. Make sure that the animal is correctly restrained before handling or lifting. You should not put yourself or others at risk while giving first aid.

### *Limitations of First Aid*

Under the Veterinary Surgeons' Act 1966, no-one is allowed to practice veterinary surgery unless they are registered in the VCI or State Veterinary Council.

## 8.3 Castration

It means removal or dysfunction of testes in males (or ovaries in female) to prevent breeding.

### *Purpose of castration*

- Indiscriminate breeding can be checked by eliminating undesirable males through castration;
- Castration makes animals more docile;
- Castrated males can be housed along with females;
- Meat of castrated male is of superior quality;

### *Age of castration*

1.5 -3 months of age

Castration of male piglets should be done by a veterinary practitioner or a trained person with surgical intervention.

## 8.4 Post castration care

If castration is done by the owner or any other local person experienced in this activity, following measures are should be taken:

- Never use any locally available material for healing of the wound such as –dust, dung, etc.;
- Wash the cut wound with saline water and if not available, clean water should be used by dissolving a pinch of common salt;
- Apply some antiseptic fly repellent ointment/lotion regularly.;
- Keep the wound away from dust, dung, mud, etc. till the healing is complete;
- It is best advisable to perform the procedure by a qualified Vet.

## 8.5 Dressing of fresh wounds

Cut wounds generally have even edges and bleeding is sometimes profuse. Treat the cut wound under the supervision of an experienced veterinarian. The following are the requirements for dressing of fresh wounds:

### *Requirements*

- Cotton,
- Saline solution,

- Haemostatic drug Scissors,
- Shaving blade,
- Forceps.

#### **Procedure**

- The animal should be restrained properly.
- For any bleeding (hemorrhage), it should be controlled by application of tourniquet (bindings) or by using haemostatics or by using locally available medication (which can stop bleeding).
- One should clean, clip or shave the edges of the wound and its surroundings;
- The area should be washed with lukewarm water or saline solution;
- A Tincture Benzoin co. should be applied to a thin layer of dry cotton over the sutured wound edge;
- Dressing of the cut wound should be done regularly until the wound completely heal;

#### **Precaution**

- The wound should be checked for pus formation;
- The wound area should be prevented from licking by the animal;
- Should apply fly repellent to prevent maggot infestation

### **8.6 Dressing of Maggotted wound**

Maggotted wound can be detected by the presence of an offensive smell, dribbling of blood mixed exudates and presence of maggots in the wound. One should treat the maggotted wound under the supervision of an experienced veterinarian. Following are the requirements and procedure for dressing of Maggotted wound:

#### **Requirements**

- Cotton
- Turpentine oil
- Forceps
- Tincture iodine
- Fly repellent

#### **Procedure**

- First, one should clean the surface of the wound with dry cotton or soaked in warm saline water or tincture iodine.
- If the wound is superficial, one should remove the maggots with the help of forceps. If the maggots are deep seated, put a cotton plug soaked in turpentine oil in the wound and leave for sometime (minimum half an hour).
- The cotton plug should be removed first and later the dead maggots to be removed with the help of forceps;
- Any dead tissues present should be removed;
- The wound should be scrubbed with tincture of iodine;



- Then one should dress the wound everyday with tincture of iodine and apply a fly repellent like Himax, Topicure in the surrounding area of the wound;
- A course of antibiotic and an anti inflammatory drug may be given after consulting a veterinary practitioner.



*Different steps of dressing of wound*

## 8.7 Management of bleeding

Bleeding from small or surface wounds can be stopped by pressing down hard on the wound with a clean cloth. If the blood soaks through the cloth put another on top rather than remove the first one. When the bleeding has stopped clean the wound and treat it.

You will need veterinarian's help to deal with bleeding from large or deep wounds. If you cannot stop the bleeding by pressing down with cloths you can use a tourniquet.

A tourniquet is a piece of rope or cloth which is tied across a blood vessel. It can only be used for wounds in the legs or tail.

## 8.8 General management of wounds

For general management of wounds, one should-

- Gently trim and clean the wound area;
- Irrigate the wound with lukewarm (little warm) water or saline solution to remove debris;
- Use homeostasis drugs to stop bleeding (consult with a veterinarian), if required;
- Gently handle the tissues and avoid use of irritant materials (eg. salt);
- Cover the wound with dressing materials like cotton, gauge bandage;
- Protect the wound from contamination and dirt;
- Absorb the discharge with dry cotton;
- Try to prevent any further trauma;
- Ensure comfortable stay for the animal in a separate pen from others.

## 8.9 Clipping of needle teeth

The needle teeth/ canine teeth are very sharp in piglets and may cause injury to sow's udder or facial skin of other piglets in the event of fighting. If the volume of sow's milk is adequate for the number of piglets in the litter, clipping needle teeth is unnecessary. Clip the needle teeth under the supervision of an experienced veterinarian. The procedure may be followed and precautions may be taken for clipping of needle teeth:

- The top teeth or both top and bottom teeth may be clipped based on owner's preference and experience;
- It is important that only the sharp tip of the tooth is cut;
- If the tooth is cut too close to the gum, the tooth may be shattered and gum infection may occur;
- The sharp edges of shattered teeth may also traumatize the tongue.

### Methods of clipping

- During clipping the sow should be tied up or if it is not, separate her from her piglets and place her in another pen. Take care as the sow with a litter can be dangerous.
- One should corner the young pigs and keep them together or place them in a box.
- The head should be held and the corner of the piglet's mouth should be pressed so that the jaws open.
- The clippers should be placed on either side of one pair of teeth to make sure that the tongue is not in the way. One should tilt the head so that the pieces of the teeth will fall out of the mouth.
- Then the teeth should be cut.
- The clippers have to be cleaned before using them on another piglet.
- This should be operated on the rest of the litter and when it is finished the piglets have to be put back with their mother immediately. One should take note that the young piglets are kept warm.



**Clipping the needle teeth**

### Physical Demonstration

**Instruction for the Resource Person:** Give a demonstration on how to hold and operate with the clipper. Use the bamboo sticks in place of needle teeth and clip them with the clipper to give a demo on it.

**8.10 Ear tagging for identification:** There are several methods of identification. Ear tagging is the most commonly used methods applied in pig.



**Different types of Tag Applicator (ear tagging machine)**

Here, tags with different numbers are used to fix in the ear of the pigs so that each has a unique identification number. Tagging is done with the help of an applicator. There are two pieces of round, flat pieces of metal or plastic, one piece bearing the unique identification number. In the middle of the tag, one piece is having a pointed screw-like structure which, on pressing hard with the applicator, fits into the hole of the other piece, making both pieces inseparable from one another.



**Ear tag**

**Procedure**

While using ear tag, one should-

- Fit both the pieces of the tag into both the facets of the applicator in the respective slots;
- Restrain the pig firmly by a helper/attendant;
- Hold the ear, intended to be pierced, by the thumb and the index and middle finger of the left hand;
- Hold the applicator in the right hand;
- Now, carefully bring the applicator close to the ear in such a manner that the middle of the ear (the site for piercing to be selected where there is no visible blood vessels) is placed in between the two facets of the applicator;
- Press both the levers of the applicator quickly and firmly so that the two pieces of the ear tag are tightly fixed;
- Apply some antiseptic spray/ointment;
- Record the ID number in the record book;

**8.11 Dressing of Foot Rot**

It is a condition of foot caused mainly by bacterial infection. The condition may occur due to unhygienic floor condition.

For dressing of foot rot, one should-

- Repair or remove cracks or broken floor;
- Wash the affected foot with water based antiseptic solution like Potassium permanganate or saturated salt solution;
- Dry the foot with the help of cotton or gauge bandage or a clean cloth;
- Paint the foot with Tincture Iodine or Povidone Iodine;
- A course of antibiotic and analgesic may also be given after consulting a veterinarian.

**Key messages of the session:**

- A Pig Bandhu may perform certain minor veterinary practices like first aid in pigs, first aid during farrowing, dressing of wounds, management of breeding, dressing of abscess, etc.
- While conducting the minor veterinary practices, the Pig Bandhu should care for the precautions and procedures as laid down in the session.
- The Pig Bandhu should take note of the requirements prior to conducting minor veterinary practices.
- The Pig Bandhu may also perform clipping of needle teeth of piglets, ear tagging and notching, recording the number of pigs etc.
- The session suggests the content of the first aid box that a Pig Bandhu will carry
- Pig Bandhu should take precautionary measures for maintaining personnel safety and hygiene while performing their activities.

## SESSION 9: Introduction and Demonstration of the First Aid Kit and Planning for the Next Days Field Visit

### Session objectives

- To make the participants familiar with the items in a first aid kit, practically learn the functions and uses of those while giving first aid to pigs
- To make the *Pig Bandhu* understand the precautionary measures for maintaining personal safety and hygiene while using the first aid kit
- To make the necessary plan for next day's field visit

### Training Methods to be followed

- Participatory discussion on the items of first aid kit, their functions and uses.
- Practical demonstration

### Training Materials

- First Aid kit for the Pig Bandhus and resource persons.
- Training manual

### *Items in a first aid kit should contain*

- Gauze bandages/Sterile wound dressings
- Swabs
- Thermometer
- Common salt: to clean wounds; mix 1 teaspoon of salt to 1 litre of water
- Thermometer & lubricant
- Sticky tape
- Cotton wool, cotton rope
- Adhesive tape
- Scissors
- Antiseptic, antibiotic ointment/ antiseptic solution
- Disposable gloves
- Clean piece of white cloth
- Hand sanitizer
- Address and telephone number of veterinary practitioners

### *Suggested contents for first aid box*

- **Bandages:** Gauze, clean rags, even a sock can be used as bandage material to help control bleeding and keep wounds clean until they can be treated by the veterinary surgeon.. Non-adhesive vet wrap is also great to have in a pet first aid kit, as it does not stick to animal fur and is easier to remove.
- **Sterile saline wash:** Sterile saline wash is useful if the animal has debris or smoke in their eyes. Apply liberally and try to flush the eyes until all debris is removed. You can also use sterile saline to flush out minor wounds.
- **Water:** Water can also be used to flush out minor wounds. It is useful for rehydrating pet, soothing burns, and washing off toxins, soaking a paw, or cooling an overheated pet.



- **Tape:** Micropore tape is useful for securing dressings (and is easy to tear). Alternatively, duct tape can be useful for holding temporary bandages in place.
- **Gloves:** If you can wear gloves when dealing with an injury it helps to reduce any further contamination of the injury. It also protects the handler from contamination from the animal
- **Plastic pouches/bags:** Used to cover foot injuries and help keep them clean, fasten with tape. This will help minimise blood spillages on to carpets, furniture and your car.
- **Scissors:** For cutting tape, gauze, splints, or fur.
- **Hand sanitizer:** Very important from the angle of personal hygiene
- **Contact details:** It is worth making a note of phone numbers for your local vet and the emergency service.

***Precautionary measures for maintaining personal safety and hygiene:***

- Wash your hand properly with soap before entering and after leaving the farm/sty
- Use gloves while handling the aborted materials and other biological waste
- Change clothes everyday
- Dip the feet in the foot bath, if available, before entering and after leaving the farm/sty
- Properly burn/bury the waste materials like-needle, syringe, left over medicine, empty vials, biological waste, etc
- Always carry a disposable bag for proper disposal in right place



*Washing of hands properly*

# SESSION 10: Field Demonstration of Certain Minor Veterinary Practices in Association with a Local Veterinary Hospital

## Session Objectives

- To practically learn the functioning of the local veterinary hospital/dispensary functioning
- To practically learn how to handle the animal during providing minor first aid services.
- To practically learn how to perform the minor first aid services
- To practically learn the use of vaccines
- To practically learn on deworming pigs

## Training Methods to be followed

- Demonstration
- Pigs requiring minor first aid services

## Training Materials

- First aid kit for *Pig Bandhu* and Resource Person
- Manual and handouts

## Suggestions for the Training Facilitator

- The Training Facilitator would inform the local VO in minimum 3 days ahead to organize a field demonstration on first aid (FA) for the trainees
- To arrange few pigs having various minor ailments (preferably relevant to the subject) for the purpose
- To keep the FA kit for each trainee (*Pig Bandhu*) ready prior to field visit
- To explain the items contained in the FA kit
- Do's and Don'ts for the trainees to be explained by the Training Facilitator

## In the field

- The VO of the locality will explain the day to day activities for attending the minor ailments and disease reporting system
- The VO of the locality will give a demo on storage of vaccines and medicines

Visit to the local veterinary hospital, explaining the system of day-to-day work in a hospital, reporting requirement to the local veterinary officer etc. with field exercise

## Instruction for the training facilitator

The facilitator will arrange a few pigs from the locality requiring minor veterinary first aid to practically demonstrate to the participants.

# SESSION 11: Field Exercise of Working under Local Veterinary Officer for

## Session objectives

- To make the *Pig Bandhus* well acquainted with the normal functioning of the veterinary dispensary/hospital
- To make the *Pig Bandhus* aware of the disease reporting and support expected by the local veterinary hospital from them.
- To be well acquainted about the minor first aid services including vaccination, deworming and first aid.
- To be well acquainted with extension and business development services required by farmers
- To build a cordial relationship with the local veterinary hospital and other associated stakeholders

## Training Methods to be followed

- Hands on experience.
- Practical demonstration

## Training Materials

- First Aid kit.
- Training manual

*Pig Bandhus* should work with the local Veterinary Officer for 15 days immediately after completion of the theoretical training to learn their job practically. Thereby they can establish a good relationship with the local veterinary hospital and can learn reporting system and establish link with all concerned. During the time of field exercise, *Pig Bandhus* should follow certain basic behavioral practices which are stated at Table \*\*

**Table 8: Some Do's and Don'ts in the field**

Do's	Don'ts
<ul style="list-style-type: none"> <li>• Be cordial and amicable with the people</li> <li>• Humbly and honestly explain your limitation in handling cases</li> <li>• Always refer all the cases that you are not authorized to handle to the local Veterinary Officer (VO)</li> <li>• Always try to be punctual. If not possible to attend on time, inform the farmer well in advance</li> <li>• Always try to maintain professional ethics</li> </ul>	<ul style="list-style-type: none"> <li>• Don't enter a farm/sty if not considered very essential. If required, always wash your hands and feet before entering and after leaving</li> <li>• Don't loose temper with the pig and treat it rudely</li> <li>• Don't panic and get over excited</li> <li>• Don't speak about fellow professional in front of public</li> </ul>

## Suggestion to local Veterinary Officer

- The local veterinary officer will decide how best the services of the *Pig Bandhu* to be utilized in light of the learning from the training manual prepared under APART and assigned activities under the same project.

Accordingly the local VO would build knowledge and capacity of the *Pig Bandhu* to provide quality services to the pig rearing community.

## Performance Indicators per month - Pig Bandhu:

SI No.	Performance Indicator	Expected performance	Achieved Performance	Remarks
1	Number of breedable sows attended for AI per month	10		
2	Number of pigs vaccinated per month	100		
3	Number of pigs dewormed per month	100		
4	Number of pigs given First Aid per month	15		
5	Number of piglets done clipping of needle teeth per month	5		
6	Number of piglets given iron injection per month	50		
7	Number of pig farmers linked with pig VC actors	10		
8	Disease reporting to doctor	10		

## Sick Animal Observation Check List For Pig Bondhu

Name of the Owner/s:

Address:

Contact No.

A.	History	Particulars	
	Breed	LWY/LB/HS/Ghungroo/CB/others	
	Age	In month	
	Sex	M/F	
	Type	Boar/sow/gilt/piglet/grower	
	Duration of the disease	In days	
	Previous treatment , if any by whom	By traditional healer/by Veterinarian	
	Vaccination	Against which disease & when	
		Against which disease & when	
		Against which disease & when	
	Deworming	When	
B.	External Appearance		
	General Appearance	Dull/alert	
	Posture of tail	Twisted/drooping	
	Lameness	Present/absent; if yes, which leg	
	Posture	Standing/ lying	
	General health condition	Normal/emaciated	
	Off-fed	Yes/no	
C.	Physical Examination		
	Temperature	From thermometer reading ??????	
	Respiration	Fast/slow/troubled	
	Presence of injury	Yes/no	
	Presence of external parasite	Yes/no	
	Presence of worms in stool	Yes/no	
	Diarrhoea	Reddish/greenish/mucous	
	Discharge	Nasal/oral/genital/ocular	
	Tongue	Injury/ulcer	
	Color of mucous membrane of eye	Normal / pale /reddish	
	Vomiting	Yes/no	
	Reddish discoloration of the abdomen, thigh, extremities,ears	Yes/no	
D.	Predisposing factors		
	Occurrence of disease in neighbourhood	Yes/no	
	No. of pigs affected		
	No. of household affected		
	Scarcity of food	Yes/no	
	Flood	Yes/no	
	Damp housing /floor	Yes/no	
	Unhygienic farmstead	Yes/no	



**Disease & Treatment Record of Pigs**

Name of the Owner/s:  
 Address:  
 Contact No.

Breed	Name/ Identification no.	Age	Disease		Diagnosis	Date of Treatment	Treatment	
			Date of Occurrence	Symptoms			Details of Treatment	Advice

**Vaccination & Deworming Record of Pigs:**

Name of the Owner/s:  
 Address:  
 Contact No.

Breed	Name/ Identification no.	Age	Vaccination			Deworming		
			Date of Vaccination	Name of Vaccine	Next due on	Date of Deworming	Name of Dewormer	Next due on

## Animal Feed Management Record Sheet:

Name of the Owner:

Address:

Contact No.

Month:

Type of feed	Source	Quantity/Day in kg	Source (Own/free collection/purchase)	Raw/ Cooked	Price per kg in Rs.	Transportation cost In Rs.	Seasonality (from-to in months)	Recommendation by expert
Energy	Rice Polish, broken rice, rice bran							
	Maize							
	Wheat bran							
	Juguli							
	Sweet potato							
	Tapioca							
	Calocasia/Taro							
	Fish meal							
	Soya bean meal							
Protein	MOC/TOC							
	Boiled Offals of Broiler, pigs, etc.							
	Azola							
Minerals and vitamins	Mineral Mixture							
	Common salt							
Others	Kitchen Waste							
	Jungle forage							
	Vegetables							

## Sources of Revenue Generation for Pig Bandhu

Sl. No.	Activity/Service rendered	Number/day	Agreed Charge /unit	Income/day	Expenses/day	Net earning/day	Net earning/month
1	Vaccination						
2	Artificial in semination (AI)						
3	Deworming						
4	First Aid						
	• Dressing of wound.						
	• Clipping of needle teeth						
	• Tagging						
	• Disease reporting to Doctor						
	• Administration of medicines through oral route						
5	Market linkage for Sale of pigs/piglets						
6	Networking for credit linkage, Insurance, buying of feed and medicines , etc.						
7	Advisory Services like- Feed formulae, etc.						
8	Others						



## References:

ASCI (2016), Facilitator Guide (Animal Health Worker), Agriculture Skill Council of India, Gurugram, Haryana.

Deka, R. & Wright, I.A. (2011), Training Manual on Hygienic Pork Production and Marketing, ILRI (International Livestock Research Institute), New Delhi, India.

Deka, R. & Wright, I.A. (2011), Training Manual on Smallholders' Pig Management, ILRI (International Livestock Research Institute), New Delhi, India.

FAO (2009), Farmer's Handbook on Pig Production for the Small holders at Village Level. Food and Agriculture Organization of the United Nations, Rome, Italy

FSSAI (2019), Training Manual for Food Safety Regulations: Food Safety Regulations & Food Safety Management, Food Safety and Standard Authority of India, New Delhi, India

Kundu, M.S., Kundu, A., Sunder, J. et.al. (Eds.), Training Manual on Scientific Pig Farming, Division of Animal Science, ICAR-Central Agricultural Research Institute, A&N Islands.

Mayega, L., Dione, M.M., Kawuma, B. et al. (2015), Pig Management: Ensuring Appropriate Husbandry Practices for Profitability: Uganda Smallholder Pig Value Chain Capacity Development Training Manual. ILRI Manual 15, Nairobi, Kenya: International Livestock Research Institute

Deka, R. & Wright, I.A. (2011), Training Manual on Veterinary First Aid for Pig, ILRI (International Livestock Research Institute), New Delhi, India.

Popesco, P. (1975), Atlas of Topographical Anatomy of the Domestic Animals (1st edition), WB Saunders Co.

Poperko Peter, (1975), The bones and joint of a pig, Different muscular structure of a pig, The heart of a pig, Reproductive system of sow

Swine Science by Ensminger, M.E & Parker, R.O. (1984), The digestive tract of the pig, Intestine of a pig, Reproductive system of the boar

----- (2017), Manual of Good Practices in Pig Farming, AWARE

### URL:

- <https://www.dayafterindia.com/2017/08/07/210-pigs-piglets-diedclassical-swine-fever/>
- Source: <https://thepigsite.com/articles/how-tofarm-pigs-health-issues>
- [www.altered.states.net/roundwotms](http://www.altered.states.net/roundwotms)
- <https://thepigsite.com/articles/how-to-farm-pigs-health-issues>



### Sources of the images of various disease symptoms of pig

Sl. No.	Name of Disease	Symptom	Source
1	Classical Swine fever (CSF)	A pig with CSF symptoms.	<a href="https://www.dayafterindia.com/2017/08/07/210-pigs-piglets-died-classical-swine-fever/">https://www.dayafterindia.com/2017/08/07/210-pigs-piglets-died-classical-swine-fever/</a>
		Bluish purple colour and bleeding under the skin	<a href="https://thepigsite.com/articles/how-to-farm-pigs-health-issues">https://thepigsite.com/articles/how-to-farm-pigs-health-issues</a>
2	Foot and Mouth Disease (FMD)	FMD lesion of foot	<a href="https://www.pigprogress.net/Health/Health-Tool/diseases/Foot-and-Mouth-Disease-FMD/">https://www.pigprogress.net/Health/Health-Tool/diseases/Foot-and-Mouth-Disease-FMD/</a>
		FMD lesion of snout	<a href="https://www.agriculture.gov.au/biosecurity/australia/naqs/naqs-target-lists/fmd">https://www.agriculture.gov.au/biosecurity/australia/naqs/naqs-target-lists/fmd</a>
3	Porcine reproductive and respiratory syndrome (PRRS)	Respiratory symptoms in PRRS	<a href="https://www.globalmeatnews.com/Article/2013/03/21/New-Zealand-court-rejects-pork-industry-s-PRRS-plea">https://www.globalmeatnews.com/Article/2013/03/21/New-Zealand-court-rejects-pork-industry-s-PRRS-plea</a>
		Abortion in PRRS	
4	Cysticercosis	Cysticercosis (measly pork)	<a href="https://factcheck.afp.com/no-your-heart-wont-look-simply-eating-pork">https://factcheck.afp.com/no-your-heart-wont-look-simply-eating-pork</a>
5	Mange/ scabies	A pig infested with mange	
		A pig heavily infested with mange(whole body)	<a href="https://www.cram.com/flashcards/swine-medicine-8204708">https://www.cram.com/flashcards/swine-medicine-8204708</a>



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