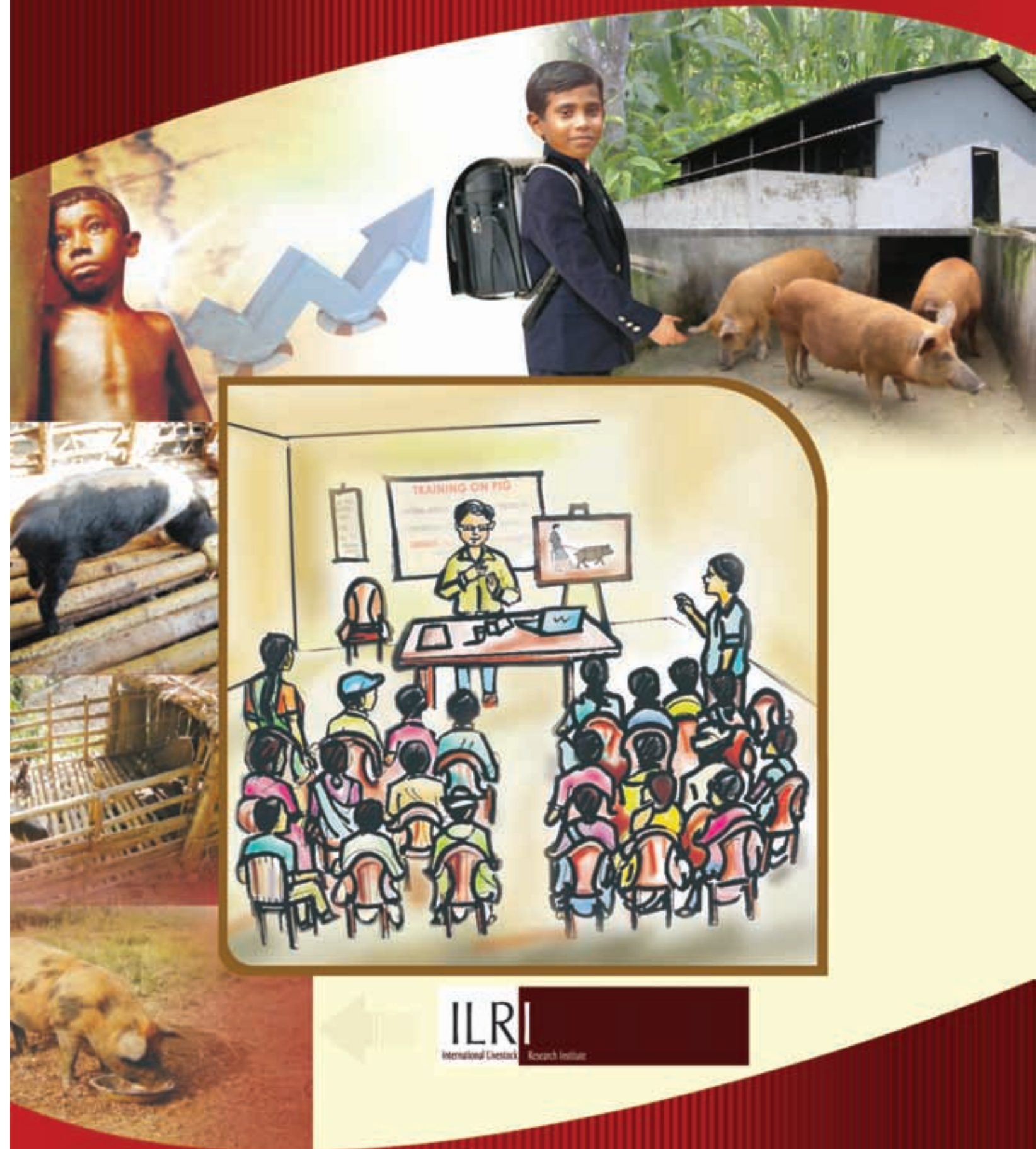




TRAINING MANUAL ON SMALLHOLDERS' PIG MANAGEMENT



TRAINING MANUAL ON SMALLHOLDERS' PIG MANAGEMENT

Dr. Rameswar Deka
Dr. Iain A. Wright

Research support : Dr. (Mrs.) Hiramoni Das
Illustrations : Mr. Robin Bar
Designing and layout : Mr. Nirup Rajkumar

ILRI

INTERNATIONAL
LIVESTOCK RESEARCH
INSTITUTE

TRAINING MANUAL ON SMALLHOLDERS' PIG MANAGEMENT

Dr. Rameswar Deka¹
Dr. Iain A. Wright²
International Livestock Research Institute

July 2011

ILRI- Asia Office
CG Centers Block, National Agricultural Science Centre, DPS Marg
Pusa Campus
New Delhi- 110012
India

Capacity Strengthening (CaSt) Unit
ILRI- Head Quarter
Box 30709
Old Naivasha Road
Nairobi, Kenya
www.ilri.org

¹Special Project Scientist, ILRI-Guwahati, r.deka@cgiar.org

²Regional Representative (Asia), ILRI- New Delhi, i.wright@cgiar.org

U. K. Sangma, IAS

Secretary

North Eastern Council (NEC)

Government of India
Ministry of Development of North Eastern Region
North Eastern Council
Nonggrim Hills, Shillong-793003



Message

I am glad to know that International Livestock Research Institute (ILRI), an international institute of repute, headquartered at Nairobi, Kenya is going to publish three training manuals on pig sub-sector to train pig producers, veterinary first aid practitioner and pork traders respectively to improve the efficiency and productivity of pig production and marketing systems. Pigs play an important role in supporting the livelihood of tribal communities along with satisfying much needed animal protein and various socio-religious obligations. I sincerely feel that there is need of some technical interventions to transform the subsistence production systems to market oriented production systems and ensure better economic return and better health of the pig keepers as well as pork consumers.

I hope ILRI's training manuals will help in building the capacity of the target groups in order to bring desired changes in pig production and marketing systems.

I take this opportunity to congratulate ILRI for this initiative and convey my heartiest best wishes for release of the manuals and right utilization of the same by all relevant departments, organizations, individuals in the country in general and North Eastern region in particular.

(U K Sangma)

L. H. Thangi Mannen, IAS
Commissioner & Secretary



Department of Veterinary & AH and Sericulture
Government of Nagaland
Nagaland, Kohima, India

25th May 2010

Message

Though 80-90% of the tribal population in the North East India are occupied in pig rearing, however these are mainly confined to small and uneconomical units without any proper management inputs. Almost all the piggery development activities are based on the traditional method of rearing, which to a large extent does not increase productivity nor improve the quality of the products. ILRI's "Training Manual on Small Holder's Pig Management", would be of immense benefit to the all pig breeders and producers of the region. The series of Manual that is being published by ILRI are the results of ILRI's in-depth study of the pig system in the North East and thus would be of more relevance to improving pig production through better management interventions.



(L.H. Thangi Mannen)

Dr. K.M. Bujarbaruah, FNAAS

Vice Chancellor

Assam Agricultural University

Jorhat- 785013, Assa, India

Phone: +91 0376 2340013

E-mail: vc@aau.ac.in

Foreword

It is a matter of pride that Indian economy is growing between 8-10 percent and our sincere appreciation for this growth to the industry, service, agriculture and other sectors. It is however, a matter of concern that agriculture sector, due to its decelerating growth being almost static over 2 percent, has not made the desired contribution to the national economy. Within agriculture, the Animal Husbandry sub-sector nevertheless has been able to contribute handsomely with 4.5 percent growth in dairy and 6-8 percent growth in meat sub-sector because of which the planners and policy makers today have widely accepted the Animal Husbandry sub sector as a viable not only to address rural poverty but also to provide insurance coverage at the time of crop failure etc.

It has been observed that although the contributors of meat sub sector is relatively higher, bulk of this contribution is coming from poultry sub sector (10-12 percent). Therefore, if we have to maintain an overall growth of around 8 percent, a concerted effort to push up the production and productivity level of other meat producing animals like pig will have to be made since it has been observed that in popularity rating among the consumers, pork consumption has an edge over the meats particularly among the economically disadvantageous population of India. In order to push up the growth, it is essential that the farming population engaged in piggery sector is equipped with pig production “know how” through equipping a chain of technology delivery agents- in this case the persons who are already trained in pig production. The continuous training of these ambassadors for building the competitiveness of the growers who are, by and large resourceful farmers, is very vital and critical for appropriate technology injection.

I am happy that Dr. Rameswar Deka, Scientific Officer, International Livestock Research Institute has made a sincere endeavour to bring out a training manual which covers different aspects of not only the production and pig health protection issues but also the marketing aspects of the production through value addition. I am sure the manual will be a sort of handbook for both the training providers and the trainees besides benefiting the student community and other stake holders engaged in development of piggery sub sector in the country.



(K.M. Bujarbaruah)

Preface

In India, 72% of the population lives in rural areas. 57% that is over 100 million of households keep livestock. It is an important source of livelihood for them (NSSO, 2003: Unit Level Data, 59th Round, Land and Livestock Holding). Many of these (32%) small-scale livestock keepers have no access to their own land. The number of rural landless households is likely to increase due to further subdivision of land holdings. Livestock are thus becoming an increasingly important source of income for smallholders and the landless.

With the growth of income and employment, the demand for livestock products is increasing rapidly. But smallholder livestock keepers are not adequately equipped to capture these emerging market opportunities. Among tribal communities in North East India and parts of Central and Eastern India pigs are the most important livestock species and pork is the preferred meat.

Pig production systems in tribal areas are based on traditional practices which have not changed much over the years. Many pig producers are poor and cannot manage more than 2 to 3 pigs using their own household labour and feed resources. But this small number of pigs is very important for their livelihood and on many occasions serves the purpose of savings and insurance for poor families. Although there are considerable opportunities for enhancing the productivity of these systems, they have been often neglected in the past, and their contribution to livelihoods and potential for income generation has been underestimated. This manual has been developed with the objective of building the capacity of smallholder pig producers to bring about incremental changes in their production practices and to transform subsistence farming in to small scale commercial farming.

This manual has been prepared based on ILRI's field experience and understanding of pig systems in North East and Central India, especially under National Agricultural Competitiveness Project (NAIP) and in consultation with wide range of stakeholders. The content was also reviewed by a number of local experts. It is expected that the manual will address the immediate requirements of many small scale producers in a number of similar regions and production systems in India. Several photographs and illustrations are included for easy understanding of the subject matter.

The design of this learning module supports the "training of trainers" approach and addresses the production and management issues confronting smallholder pig producers. Trainers can use the content as source materials for delivering the training and in providing the necessary advice to the small scale producers. It is assumed that the users of this manual have some understanding of the pig production systems and are familiar with participatory approaches to research and development. We also expect the trainers to use locally relevant examples to make the delivery context specific.

We would like to further field test the manual and have plans to continuously update the content based on the experiences and lessons learned. Therefore, we look forward to receive inputs and suggestions from its users to make the content current and relevant.

Dr. Iain A. Wright
Regional Representative, Asia
ILRI- Delhi, India

Ms. Purvi Mehta Bhatt
Head, Capacity Strengthening (CaSt)
ILRI- Nairobi, Kenya

Acknowledgment

I express my sincere thanks and gratitude to Dr. Dhireswar Kalita, Principal Scientist, All India Coordinated Research Project (AICRP) on Pig, Dr. A. B. Sarkar, Former Professor and Head, Department of Animal Production and Management, College of Veterinary Science (C.V.Sc), Khanapara, Guwahati, Dr. P. Khala, Deputy Director, Department of Veterinary and Animal Husbandry, Govt. of Nagaland, Dr. Apurba Bora, VAS, Department of Animal Husbandry and Veterinary, Govt. of Assam, Dr. Bijoy Choudhury, VAS, Department of Animal Husbandry and Veterinary, Govt. of Assam, Dr. P.N. Konwar, Assam Livestock & Poultry Corporation Ltd. (ALPCo), Ms. Ratna Bharali, Journalist and Dr. Basanta Deka, Proff. Handique Girls College for reviewing and editing the manual.

My sincere thanks also goes to Dr. Jiten Saharia, Professor, Department of Livestock Production Management, Dr. Bibeka Nanda Saikia, Professor, Department of Animal Nutrition, Dr. Jayanta Kumar Saikia, Professor, Department of Livestock Production Management and Dr. Rumi G. Sarmah, Research Associate, Goat Research Station, Barnihat, all from C.V.Sc., Assam Agricultural University, Khanapara, Guwahati for reviewing the relevant section of the manual and making valuable suggestions.

I am grateful to the National Agricultural Innovation Project (NAIP) being implemented by ILRI and its partners in Mon District of Nagaland which gave us the opportunity to experience and understand the smallholders' needs, expectations, level of understanding, useful methods of training, and the requirement for follow up support through participatory approaches.

At last but not the least, I would like to extend our sincere thanks to many pig producers in Assam and Nagaland who contributed immensely during the time of training need assessment and field testing of the training manual.

Rameswar Deka

Index

Sl. No.	Session	Page
1	Inauguration and introduction	1
2	Understanding the prevailing pig system in the area with its importance on livelihood	2
3	Prevailing housing systems of pig, their advantages and disadvantages and scope of improvement	5
4	Available breeds of pig in North East and Central India and criteria for selection of piglets	14
5	Restraining and Transportation of live pig/ piglets	20
6	Care and management of pregnant and lactating sows and neonates	26
7	Care and management of growing and finishing pigs and boars, maintenance of farm records and daily routine	31
8	Reproductive cycle of pigs	37
9	Selection of breeding animal and breeding management	40
10	Feeding different categories of pigs for optimum production	44
11	Computation of ration with locally available feed resources	51
12	Cultivation of food-feed crops for feeding of pigs	55
13	Common diseases of pigs and their preventive measures	60
14	Mode of transmission of germs and clean and hygienic practices for prevention and control of diseases	66
15	Minor surgical problems of pigs	72
16	Economics of a small piggery unit	75
17	Credit and insurance schemes relevant for pigs	83
18	Field visit	87
19	Annexure: Feedback form	88
20	Bibliography	90

Proposed Training Schedule

Day	Session	Topic	Time
1 st day		Registration	9.30 - 10.00 am
	Session 1	Inauguration and introduction	10.01 - 11.15 am
		Tea break	11.16 - 11.30 am
	Session 2	Understanding the prevailing pig system in the area with its importance on livelihood	11.31 am - 1.00 pm
		Lunch break	1.01 - 2.00 pm
	Session 3	Prevailing housing systems for pigs, their advantages and disadvantages and scope of improvement	2.01- 4.15 pm (including 15 minutes tea break)
2 nd Day		Participants' reflection of Day 1	10.00 - 10.15 am
	Session 4	Available breeds of pig in North-East and Central India and criteria for selection of piglets	10.16- 11.30 am
		Tea break	11.31- 11.45 am
	Session 5	Restraining and transportation of live pigs/piglets	11.46 am - 1.00 pm
		Lunch break	1.01 - 2.00 pm
	Session 6	Care and management of pregnant and lactating sows and neonates	2.01 - 4.15 pm (including 15 minutes tea break)
3 rd Day		Participants' reflection of Day 2	10.00 - 10.15 am
	Session 7	Care and management of growing and finishing pigs and boars, maintenance of farm records and daily routine	10.16 - 11.30 am
		Tea break	11.31- 11.45 am
	Session 8	Reproductive cycle of pigs	11.46 am - 1.00 pm
		Lunch break	1.01 - 2.00 pm
	Session 9	Selection of breeding animal and breeding management	2.01 - 4.15 pm (including 15 minutes tea break)

4 th Day		Participants' reflection of Day 3	10.00 - 10.15 am
	Session 10	Feeding different categories of pigs for optimum production	10.16 - 11.30 am
		Tea break	11.31 - 11.45 am
	Session 11	Computation of ration with locally available feed resources	11.46 am- 1.00 pm
		Lunch break	1.01 - 2.00 pm
Session 12	Cultivation of food-feed crops for feeding of pigs	2.01- 4.15 pm (including 15 minutes tea break)	
<hr/>			
5 th Day		Participants' reflection of Day 4	10.00 - 10.15 am
	Session 13	Common diseases of pigs and their preventive measures	10.16 - 11.30 am
		Tea break	11.31- 11.45 am
	Session 14	Mode of transmission of germs and clean and hygienic practices for prevention and control of diseases	11.46 am- 1.00 pm
		Lunch break	1.01 - 2.00 pm
Session 15	Minor surgical problems of pigs	2.01- 4.15 pm (including 15 minutes tea break)	
<hr/>			
6 th Day		Participants' reflection of Day 5	10.00 - 10.15 am
	Session 16	Economics of small piggery unit	10.16 - 11.30 am
		Tea break	11.31- 11.45 am
	Session 17	Credit and insurance schemes relevant for pigs	11.46 am - 1.00 pm
		Lunch break	1.01- 2.00 pm
Session 18	Open discussion, questions and clarifications on field visit	2.01- 4.15 pm (including 15 minutes tea break)	
	Field visit, feedback and valedictory	10.00 am - 4.00 pm	

Note: The suggested time table is only indicative, facilitator may modify the time table as deemed fit locally.

Classroom training :	27.00 hours
Field visit :	6.00 hours
Total time :	33.00 hours
Total days :	7 days

Training Tools and Materials

- Black board/white board
- Chalk pencil/white board marker
- Flip charts, chart paper
- Cards
- Marker
- Masking tape
- Display board
- LCD projector with accessories (wherever possible)
- Feed samples
- Disinfectants samples

Common technical terms used in this manual

Swine/Hog	:	It includes all types of domestic pigs
Boar	:	Adult male used for breeding
Sow	:	Adult female use for breeding
Piglet	:	Young pig of either sex
Gilt	:	A young female kept for breeding
Sty	:	Pig shed
Farrowing	:	Act of parturition (delivery)
Castration	:	Act of disfunctioning the reproductive system of animal
Weaning	:	Separation of piglets from their mother at a certain age
Creep area	:	An area of access to piglets separated from the sow lying area
Service	:	The act of mating or copulation
Litter	:	A group of piglets born to a sow in single farrowing

DAY 1

Registration of the participants

SESSION: Inauguration and Introduction

1.1 Facilitator

Key resource person of the training who will facilitate the course and bridge linkages between the sessions.

1.2 Session Objectives

At the end of the session, participants should be able to:

- Know each other and their background,
- Understand the purpose and objectives of the training,
- Understand the level of knowledge of the participants on pig system before the training,
- Set the ground rules for the training.

1.3 Training Methods/Guides

- **Welcome address:** Organizer/facilitator will welcome the participants and explain the objectives of the training.
- **Self-introduction:** Facilitator will ask the participants to state their name, address, occupation, years of experience on pig rearing.
- **Expectation from the training:** Facilitator will ask the participants to explain their expectations from the training. He/she will write down the key points in a flip chart/white board/black board in order to revisit the same at the end of the training.
- **Pre-training feedback:** Facilitator will distribute the feedback form (enclosed at Annexure) amongst the participants. Ask them to put tick marks in the boxes under the “Before Training” column. After the evaluation, he will collect the forms and use the same at the end of the training to compare the differences.
- **Ground rules:** Facilitator will ask the participants what general behavior they expect to experience in order to run the training smoothly and effectively, he will list all suggestions in a flip chart and post the flipcharts where it is visible throughout the training.■

SESSION 2: Understanding the Prevailing Pig System in the Area with its Importance on Livelihood

2.1 Resource Person

Person who is well versed with the livelihood issues and socio-economic aspects of pig production and marketing.

2.2 Session Objectives

At the end of the session, the trainee and the trainers should have similar understanding on:

- Prevailing pig production and marketing system in the locality,
- Major problems faced by the pig producers,
- Economics of pig keeping,
- Role of pig on the livelihood of the poor/small pig keepers,
- Scope for improvement of the prevailing production system.

2.3 Training Methods

- Participatory discussion on the above topics one by one.
- Resource person will facilitate the discussion and provoke the participants to respond.

2.4 Contents

2.4.1 General idea for the resource person on the prevailing pig system in North-East (NE) and Central India

2.4.1.1 Production Issues

- **Number of pigs kept by each household:** Majority of households rear only 1-3 pigs mainly because of scarcity of feed and labour.
- **Breed type:** Majority of the pigs is indigenous or their crosses that are managed by traditional practices. Generally black coloured cross breed pig is preferred in NE and Central India. White pigs are preferred in Mizoram and Northern India. Due to indiscriminate cross breeding between indigenous pigs and Large Black/Hampshire/Large White Yorkshire/Ghungroo and others, it is difficult to recognize the exact breed or breed type.

- **Rearing objective:** Majority of the pig rearing households rear pigs for selling purpose, while a small section of households also rear pigs exclusively for own consumption or religious and social purposes. Pure indigenous pigs are mainly kept for own consumption in certain areas owing to its perceived better taste.
- **Herd type:** About 80-90% households rear pig for meat purpose (fattening). Only 10-20% households rear pig for breeding purpose (with some exceptions). Producers feel that rearing of pig for breeding purpose is more laborious, time consuming, more risky and needs technical expertise.
- **Housing system:** Housing system varies from place to place. Majority of households rear pig in a small pen (house) or an enclosure made out of locally available materials. A small percentage of households also rear pigs either in scavenging (let loose for grazing) or in scientific housing system.
- **Major feed resources:** Kitchen waste/hotel waste, jungle forages, residue of country liquor (rice bear), rice polish, wheat bran, maize, etc. are the major sources of feed for pigs.
- **Major disease problem:** Swine fever, foot and mouth disease (FMD), parasitic infestation (internal and external), seasonal flu, diarrhea, piglet anemia and minor surgical problems like atresia ani, maggotted wound, hernia, are the major disease problems.
- **Economics of pig production:** Roughly the economics of pig production can be worked out by using the formula:
Total income earned from a pig - cost of production (cost of purchasing piglet + cost of feed+ cost of medicine/treatment + labour + transportation cost + others).
- **Use of money:** The income generated from pig is mainly used for meeting various household expenses like paying school fees/hospital bill, buying ornaments/grocery items/clothes/farm inputs, repairing of house, meeting expenses for social occasions like marriage, death, etc.

2.4.1.2 Marketing issues

- Pig selling is relatively easier than other livestock species because of its higher demand in the market. Pig wholesalers/retailers generally create a network through traders/local key informants in an area and procure pig from the farm gate with the help of the network.
- Price of slaughtered pig is fixed based on expected live/dress weight of the pig, which is roughly assumed by the traders. There are reports of some level of exploitation of the producers by the traders while assuming the live/dress weight.
- The demand for pork is increasing rapidly as non-traditional pork consumers also

have started consumption of pork. Market opportunity for selling pigs is growing across the NE and Central India.

2.4.1.3 Livelihood importance

- Tribal communities mainly rear pigs as an important supplementary source of income. Pigs also have an important role to play in social custom and belief of the tribal society.
- Pigs helps in accumulation of capital as investing small amount of money on every day, one can earn a good return at the end of the production cycle to meet any urgent need. Therefore, it serves the function of saving and insurance to many smallholder producers.
- For most of the tribal families, pigs contribute about 15-30% of the total household income in a year. It is regarded as one of the major sources of income to undertake any planned activity of the family.

2.4.1.4 Advantages of pig rearing

- Pig is an efficient converter of low quality feed (e.g. kitchen garbage) to high quality meat/animal protein.
- Efficient converter of feed into meat than other livestock species like cattle, goat or sheep. They need less feed per kg gain of body weight.
- Initial investment on pig, shed and equipment is relatively less than on other livestock species.
- Dressing percentage is higher than cattle/goat/sheep, resulting in higher profit.
- Return on investment is quicker (less than one year).
- Industry expands rapidly as sows give birth 8-12 piglets in single farrowing.

2.5 Group Work

The participants will be divided into small groups and each group will be asked to work out the economics of keeping small number of pigs by an average household in the area. The facilitator will guide the groups to work out the economics. After working out the economics, each group will explain the findings to other groups. ■

SESSION 3: Prevailing Housing Systems of Pigs, their Advantages, Disadvantages and Scope of Improvement

3.1 Resource Person

An experienced veterinarian.

3.2 Session Objectives

By the end of the session, the participants will be able to:

- Explain different housing systems with strengths and weaknesses,
- Design a suitable housing system for a pig farm.

3.3 Training Methods

- Participatory discussion to understand the prevailing housing systems
- Explanation with the help of illustrations and photographs of housing

3.4 Contents

3.4.1 Prevailing housing systems of pigs in North-East and Central India

3.4.1.1 Open ranging

Under this system, pigs are let loose throughout the day and night. Pigs scavenge in the homestead/road side/fallow lands/riverside/jungles and gather its required feed. Some of the pig producers used to travel from one place to another with their herd of pig in search of feed. The system is no more popular mainly due to the growing scarcity of grazing land and also increased concern of the public because of the damage caused by pigs to the crop and land.



Fig 1: A herd of pigs under open ranging condition
(Courtesy: FARMER)

3.4.1.2 Tethering

Pigs are confined in the homestead/road side by tying on the chest with a short/long rope. Most of the required feed and water are supplied to the tethered pigs. A small part is also scavenged by them. Pigs are kept throughout the day and night under the open sky.

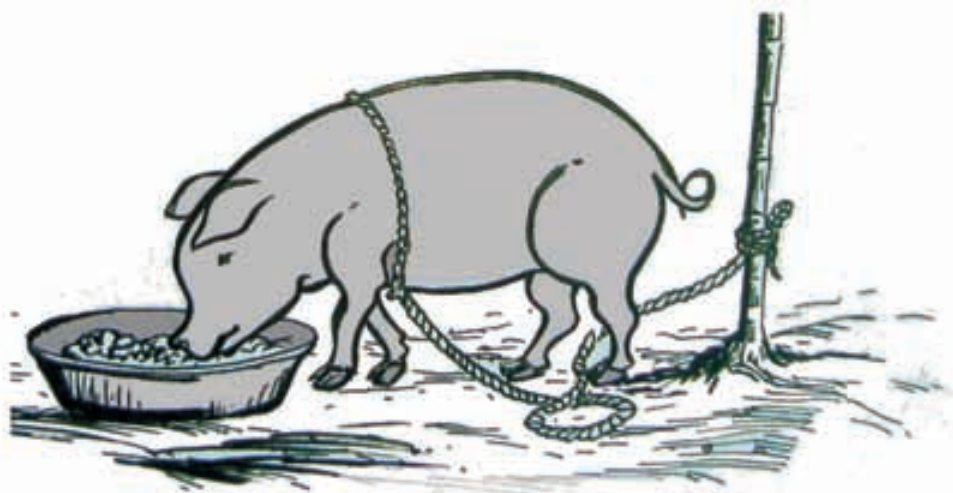


Fig 2: A tethered pig

3.4.1.3 Open enclosure

Pigs are housed in an enclosure made out of locally available materials with or without temporary roof. All required feed and water are supplied inside the enclosure. Generally the floor of enclosure is earthen and it remains quite muddy and dirty.

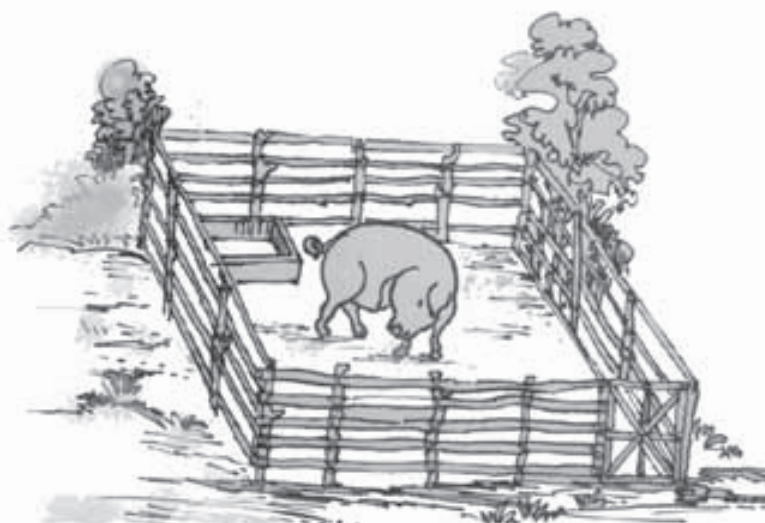


Fig 3: An open enclosure

3.4.1.4 Penning

Pigs are housed in a small pen or room made up of locally available materials like bamboo, timber, stem of tree, thatch, plastic, etc. In plain areas, the pen is constructed on the ground (may or may not

be concrete), while in the hilly areas, pen is constructed on a platform made up of locally available materials like timber, bamboo, stem, etc. All required feed and water are provided to the pigs inside the pen.

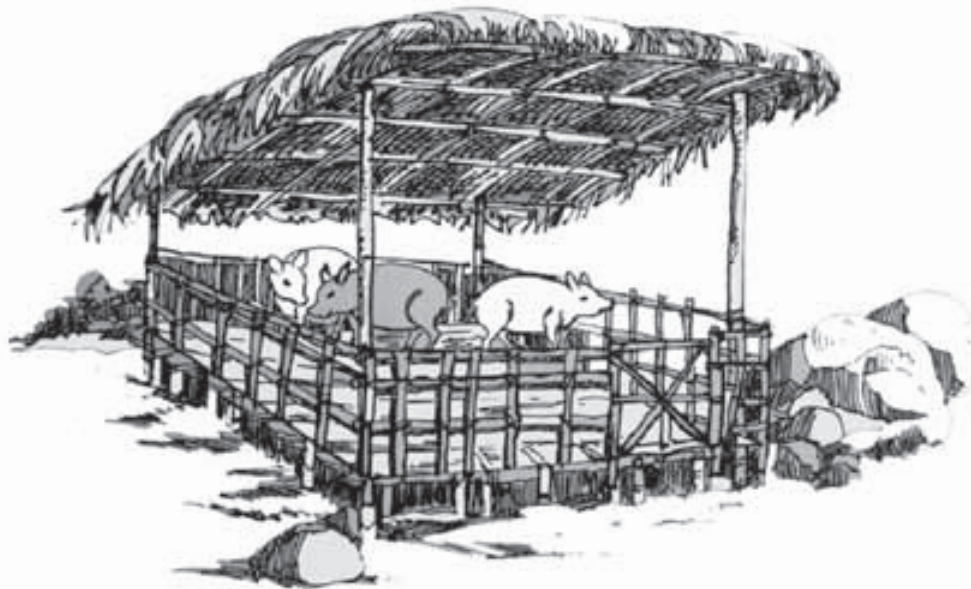


Fig 4: A platform type pen

3.4.1.5 Scientific housing

Mainly, the elite group of producers, government or organised farms construct pig sty as per the norms of pig housing prescribed in books. In this system, there is provision for pen (closed area), paddock (open area), feed and water trough, drainage system, concrete floor and permanent roof. All required feed and water are provided to the pigs inside the pig house.



Fig 5: A concrete pig sty (gable type)

Table 1: Advantages and disadvantages of different housing systems

Housing Systems	Advantages	Disadvantages
Open range	<ul style="list-style-type: none">☞ No housing cost☞ No feed cost☞ Less of labour	<ul style="list-style-type: none">☞ Exposed to adverse climatic condition (heat , cold and rain) and predators☞ Poor growth☞ Higher incidence of diseases and mortality☞ Cause damage to crops and environment☞ Not suitable for management of high quality pigs
Tethering	<ul style="list-style-type: none">☞ No cost of housing other than a simple rope☞ Movement of pigs is restricted resulting little/no damage to the crops☞ Lesser cost of feeding	<ul style="list-style-type: none">☞ Noise and odour may cause uncomfortable stay for the owners☞ Rope may cause injury to the pigs☞ Pigs get exposed to adverse climatic conditions☞ Poor growth of pigs
Enclosure	<ul style="list-style-type: none">☞ Easy to construct☞ Cost of construction is low☞ Can be shifted from one place to another☞ Pigs cannot damage the crops	<ul style="list-style-type: none">☞ Pigs are not protected from adverse climatic conditions and predators☞ Floor remains quite muddy and dirty☞ Drainage system is poor☞ Temporary in nature☞ Higher incidence of diseases
Pen system	<ul style="list-style-type: none">☞ Construction cost is reasonably less☞ Pig gets some level of protection from hot, cold and rain☞ Better growth of pigs☞ Relatively lesser incidence of diseases☞ Prevent entering of reptiles, rats and other small wild predators	<ul style="list-style-type: none">☞ Difficult to clean regularly because of smaller size of the pen☞ Earthen floor remains quite dirty and muddy☞ Needs repairing almost every year☞ Requires strong foundation. If it is platform type, broken platform may cause injury to pigs

Scientific housing	<ul style="list-style-type: none"> ☞ Proper breeding is possible ☞ Record keeping is easier ☞ Well protected from extreme environmental conditions ☞ Better hygiene and sanitation ☞ Prevents wastage of feed and water ☞ Lower incidence of diseases ☞ Higher growth performance 	<ul style="list-style-type: none"> ☞ Higher cost of construction ☞ Higher labour requirement ☞ Higher cost of feeding and management
--------------------	--	---

3.4.2 Points to be considered in construction of pig sty

3.4.2.1 Location

- An open, elevated (to avoid water logging) space sufficiently exposed to sunlight should be selected for construction of sty.
- At least 50 meters away from the residential house.
- Nearer to a drainage system or fish pond for easy disposal of farm waste.
- It should have an approach road.
- Nearer to veterinary hospital, market, bank, etc.

3.4.2.2 Orientation of the house

- The house should be well-ventilated and directed longitudinally in North-South direction to allow sunlight in the morning as well as in the afternoon. Sunlight helps to keep the floor dry. It also lowers the chance of diseases in the farm.

3.4.2.3 Type of pig house

- Pig house may have single or double rows of pens or rooms. In large commercial farms, double rows of pen facing each other are constructed (with a corridor in between for movement of the attendants) while in small farms, single row pen is constructed.
- Depending on single/double rows of pen, type of roof may vary. Generally, in single

row pen house, roof is of shed type (single roof and slopes towards one side). While in double row pen house it is mainly of gable type (double roofs, slopes towards both sides).

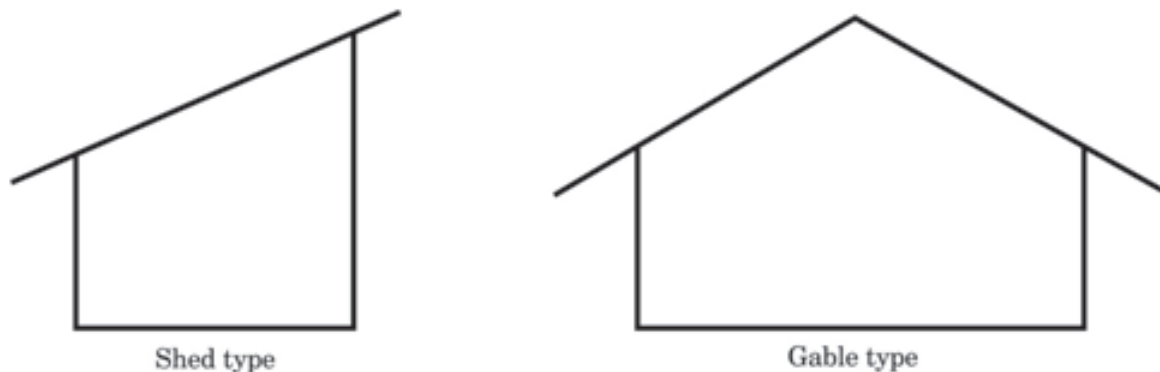


Fig 6: Schematic diagram of a shed type and gable type roof

3.4.2.4 Floor

- The floor should be concrete, little rough to avoid slipperiness. It should be slightly sloped for easy drainage of urine and dung. Earthen floor should be avoided as far as possible.
- In case of platform type, floor material should be strong and durable to avoid injury to the pigs and to reduce the cost of repairing time.
- Floor space should be adequate as per the requirement of number of pigs. Inadequate floor space may lead to higher disease incidence and lower productivity. The pigs should live comfortably.

3.4.2.5 Drainage system

- A drain of about 1 feet wide and 0.5 feet depth should be constructed on the sloped-side of the floor.
- Two manure pits should be constructed for disposal of farm wastes and to convert them into farm manure. When one is filled, the other should be used.
- Drain should be gradually sloped towards the manure pit.
- If the pig farm is integrated with fishery (piggery-cum-fishery) or crops, the drain should be constructed in such a way that the farm wastes flow to the fish pond or crop field. Adequate care should be taken to drain out only the required quantity of farm wastes to the pond/ crop field in appropriate time.

3.4.2.6 Construction materials

- Ideally, concrete material should be used for construction of pig sty. However, for smallholders, it may not be affordable;

- To reduce the investment on housing, floor should be constructed with concrete, while wall and roof can be made of locally available housing materials like bamboo, jungle wood post, thatch, tree leaves (e.g. palm tree), tin, plastic, etc.
- Thatch/tree leaves is preferred for construction of roof to maintain lower room temperature, as compared to tin roof.
- If the producer is financially weak, it is suggested to invest less on housing and invest sufficiently on purchasing piglets, feeds, etc. These are more important components for a productive farm. Once earning increases, the owner can gradually improve the housing.

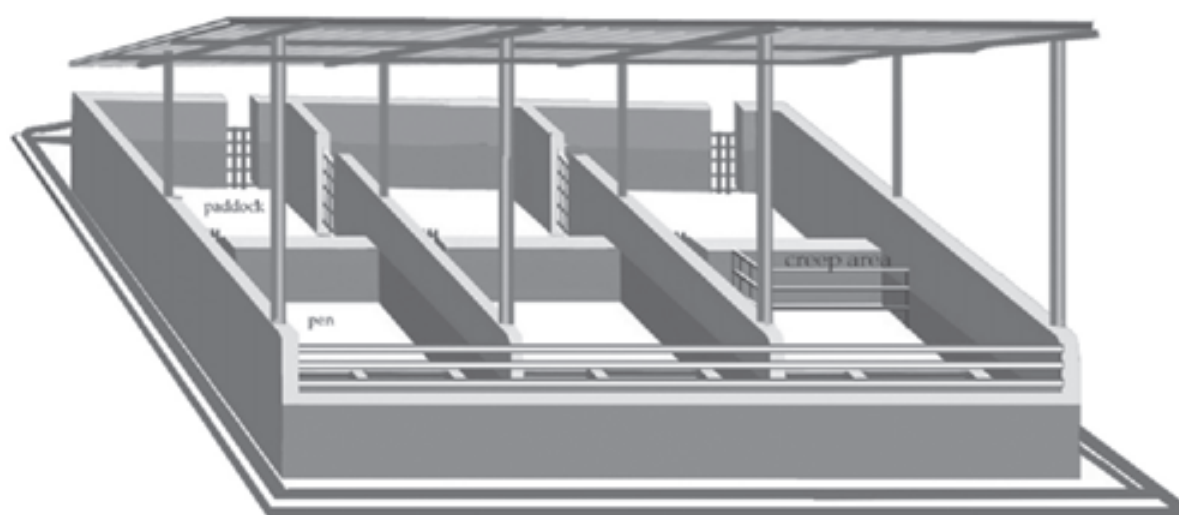


Fig 7: Three-dimensional view of a pig sty (shed type)

3.4.2.7 Feeding and water troughs

- Under scientific housing system, feeding and water troughs are part of the floor plan. These are constructed on the floor adjacent to a wall. The feeding and water troughs should be 1 ft. deep and 1.5 ft. wide. The feeding trough should be longer than the water trough.
- Those who do not construct concrete floor may use aluminum bowl for feed and water. As a low cost measure, tyre, wooden block, concrete bowl, etc. Can also be used as feeding trough.

3.4.2.8 Wall

- Walls should be constructed up to 3.5 feet height above the plinth area. The part above 3.5 feet may be covered with wire/ bamboo netting to prevent crows and other predators.

- In high altitude areas, height of the house should be lower in order to reduce heat losses from the surface. Lower houses also protect the pigs from cold winds. In plain areas height of the sheds may be raised a little for free circulation of air.

3.4.3 Provision for pregnant and lactating sow/diseased pig/boar

- Separate provision should be made for farrowing pigs, boars and diseased pigs.
- Farrowing pens should have the provision for a creep area (protected space for feeding piglets) with guard rail in one side of the pen to protect piglets from their mother before weaning.
- Breeding boars should be kept in a single pen so that they cannot disturb other males/ female pigs.
- Diseased animal should be kept in isolation in a separate house or in an extreme corner of the same house to prevent spread of infection to healthy pigs.

3.4.4 Floor space requirement

Under scientific housing system, pig house should have two parts: pen (house with roof and side wall for feeding, watering, resting, etc.) and paddock (adjacent space covered by half wall without roof mainly for exercise). Floor-space requirement may be almost same in case of pen and paddock (please see the illustration).

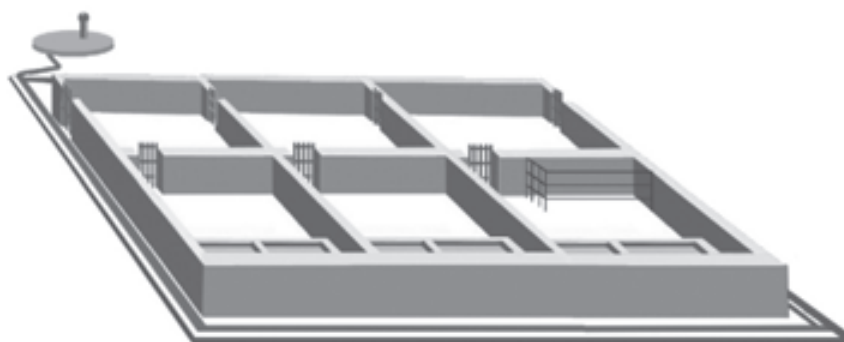


Fig 8: Floor plan of a pig sty with drainage system

Table 2: Floor space requirement for different categories of pigs

Type of Pig	Pen Size	Number of Pigs per pen
Breeding boar	10 ft X 8 ft (80 sq.ft.)	Single
Breeding sow/gilt	10 ft X 10 ft (100 sq.ft)	In group of 3-4 Pigs
Pregnant sow (farrowing pen)	10 ft X 8 ft (80 sq.ft)	Single
Weaner (1- 3 months)	10 ft X 10 ft (100 sq.ft)	8-10 piglets
Grower (3-7 months old)	10 ft X 10 ft (100 sq.ft.)	In group of 5 –7 pigs
Finisher (8-12 months)	10 ft X 10 ft (100 sq.ft)	In group of 3 –4 pigs

Under traditional farming system, floor space per pig should be relatively higher than the floor space recommended under scientific housing system (as only 2-3 pigs are reared in a single pen). Floor space should be adequate for comfortable stay of pigs and easy cleaning of the sty. Along with the pen, there should be an adjoining open space for exercise. As a thumb rule, floor space at the rate of 20 sq. ft per piglet, 30 sq. ft per grower and 40 sq. ft. per finisher may be recommended.

3.5 Group Work

The participants will be divided into 4/5 small groups and each group will be asked to design the floor plan for 5 pigs and to work out the cost of construction of the house with locally available materials. ■

DAY 2

SESSION 4: Available Breeds of Pigs in North-East and Central India and Criteria for Selection of Piglets

4.1 Resource Person

A veterinary practitioner and/or an experienced breeder.

4.2 Session Objectives

- By the end of this session the participants will be able to recognize different breeds of pig with their characteristics and to identify the best quality pigs/piglets for rearing purpose.

4.3 Training Methods

- Classroom discussion with the help of photographs and field examples

4.4 Contents

4.4.1 Available breeds of pig in NE and Central India and their breed characteristics

4.4.1.1 Large Black

This is one of the oldest breed available in England.

Breed Characteristics:

- Longer body, black in colour,



Fig 9: A large black pig

- Less hairy body coat with glossy hair,
- Slightly tall with broad drooping ear (hanging forward and downward),
- Long neck and face,
- Good milking and mothering ability,
- Good for cross breeding with local pigs,
- Aggressive in feeding and grows very fast.

4.4.1.2 Large White Yorkshire

This is a native breed of England.

Breed characteristics:

- Large in size with a long and slightly dished face,
- Body covered with fine white hair, free from curls,
- Skin pink coloured,
- Ears are long and pointed, upward and forward,
- Good milking and mothering ability,
- Due to heavy size, its use is limited in the country. Mainly found in northern Indian states and Mizoram.



Fig 10: A large white Yorkshire pig

4.4.1.3 Hampshire

The breed was originally developed in the U.S.A.

Breed characteristics:

- Generally black in colour with white belt, encircling the shoulder, extended to the fore legs,

- Short and erect ear,
- Short legs,
- Not selective in feeding, and so grows very fast,
- Sows have good mothering ability, very docile,
- The breed is well-adapted in Indian condition,
- Suitable for cross-breeding with indigenous pig.



Fig 11: A Hampshire pig

4.4.1.4 Ghungroo

The breed is understood to have originated in Nepal and West Bengal border.

Breed characteristics:

- Black in colour,
- Short nose and face,



Fig 12: A Ghungroo pig

- Drooping ear,
- Medium-sized breed,
- High prolificacy or productive capacity.

4.4.1.5 T&D (Tamworth and Desi) Breed

The breed is a cross between Tamworth breed and Desi (indigenous) pig developed by Ranchi Veterinary College, Jharkhand, India.

Breed Characteristics:

- Mostly black in colour,
- Long body,
- Elongated face,
- Slightly drooping ear,
- Medium-sized.



Fig 13: A T&D pig

4.4.1.6 Non-Descriptive

Breed characteristics:

- Smaller in size with shorter in length,
- Black in colour, sometimes with white markings,
- Belly bulges downwards (pot bellied),
- Long hair,
- Elongated face and shorter ears,
- Early sexual maturity (4 months and above),
- Shorter inter-farrowing interval,
- Poor performance in body growth and piglet production.



Fig 14: An indigenous pig

4.4.2 Selection of pig/piglet for rearing purpose

4.4.2.1 Selection of suitable breed of pig

For selection of suitable breed of pig the following points may be taken into consideration:

- Preferred breed/breed characteristics (colour, body size, type of ear, mouth etc.) based on rearing objectives (breeding/fattening),
- Availability of preferred breed locally,
- Production performances (in terms of weight gain, litter size, farrowing interval, feed habits, mortality, survivability, etc.) of existing pig population in the village/nearby villages to identify the locally best suitable breed of pig,
- Closely observing the parents of piglets about the breed characteristics and production performances,
- Discarding purchase of piglets of diseased/weak/old parents,
- Observing the pig herd for two-three days at an interval of a few days for confirmation of health status, feed habits, etc.,
- Reviewing the climatic condition, feed habit, incidence of diseases, production performance, etc. in the area from which the piglets, if needed, are to be imported.

As all these criteria cannot be observed in the market (daily/weekly), it is advisable not to buy piglets from the market. Piglets should be bought from the producer's house/pig farm directly.

4.4.2.2 Selection of piglet

While procuring piglets, one should look at the following characteristic of piglets/parents of piglets.

- The piglet should be about 8 weeks old. Piglets below 5 weeks of age should not be procured.

- Minimum weight of piglets should be about 8 kg.
- Piglets should start taking feed during the time of procurement.
- It should be healthy, active and free from any skin or other diseases.
- Piglets should have fine shiny hair coat (should not be too hairy). Body characteristic should be closer to preferred breed characteristics.
- The parents (boar and sow) should be seen to understand their breed characteristic, feed habits, health condition, mothering ability, etc.
- In case of female piglets, their available number and size of teats should be seen. There should be minimum 6 pairs (12 numbers) of teats equally distributed on both sides.
- In case of male piglets, testicles should be uniformly developed. ■

SESSION 5: Restraining and Transporting Live Pigs/Piglets

5.1 Resource Person

An experienced veterinarian in the relevant field or an experienced pig transporter.

5.2 Session Objectives

- By the end of the session, the participants should be able to explain the methods of restraining the pigs, and also the necessary precautionary measures to be taken for transporting live pigs/piglets.

5.3 Training Methods

- Participatory discussion with the help of illustrations, photographs and field examples.

5.4 Content

5.4.1 Restraining of pigs

Pigs need to be restrained (controlled) in order to check up general health, buy/sell pigs, administer medicines, conduct minor surgical operation, give identification mark, etc. The pig producers must know appropriate techniques of restraining pig for safety of the animal as well as the handler. There are different methods of restraining pig and piglets. The most common methods of restraining pig/piglets are stated below.

5.4.1 Methods of restraining piglet

Piglets can be restrained by two ways.

5.4.1.1 Restraining a piglet on its side (for injection/ vaccination/treatment)

- At first, place the piglet in a room or pen where it is to be restrained.
- After cornering the piglet, grasp its hind leg firmly with one or both hands and lift it completely off the floor with its head down.
- Hold the rear leg with one hand and use the other hand to grasp the front leg on the same side of the pig.

- Use your knee to put pressure on the side of the pig to retain the control.



Fig 15: Restraining piglets by laying on its side

5.4.1.2 Restraining a piglet by holding its rear legs (for transportation)

- At first, place the piglet in a room or pen where it is to be restrained.
- After cornering the piglet, grasp its hind leg firmly with one or both hands and lift it completely off the floor with its head down.

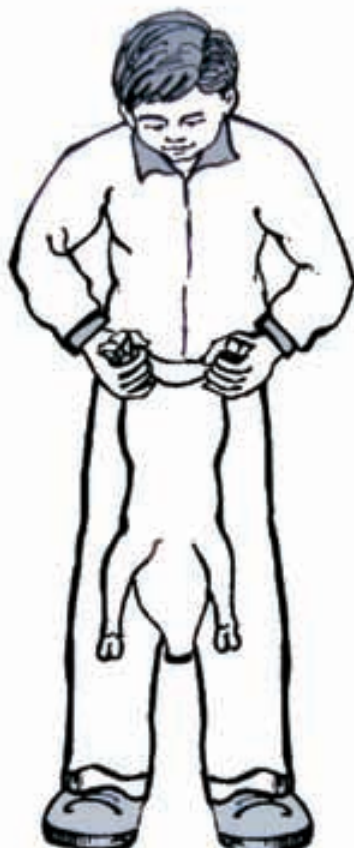


Fig 16: Restraining a piglet by holding its rear legs

- Catch the piglet by grasping a rear leg with one or both hands. Quickly adjust your grip and hold the pig's back in front of your legs. The nose is directed towards the ground.
- Lift the piglet bringing both the rear legs to about the height of your waist.

5.4.2 Restraining of older or heavier pig

For restraining heavier pigs following methods are commonly used.

5.4.2.1 By using a snare (for injection/dressing of wound/cleaning)

- For catching the pig with a snare, the pig must be confined to a very small pen, or crowded into a corner with a partition.
- A loop is prepared with a twine rope by a giving a slip knot as shown in the photograph. The strength of the material must be proportionate to the animal's size.
- With the handle of the snare in one hand, guide its loop into the mouth, over the nose or upper jaw. Make sure that the snare is above the tongue. It is pulled into the mouth. The loop should not be around the lower jaw.
- When the snare is in place, the animal is pulled forward. The pig will pull back into a rigid stance in its attempt to get away.
- When the pig is large, it cannot be restrained with only a hand-held rope snare. It should be tied with an iron rod or a post. When the rope is tied off, it is best to limit the length of the rope to a foot or less so that it cannot move forward.
- Loosen the rope gradually and move away quickly from the place.



Fig 17: Controlling heavier pig with the help of a snare

5.4.2.2 Laying the pig its side (for surgery/foot trimming/treatment/other management procedures)

- The pig is snared and firmly controlled.

- A loop is formed at the end of a 15 feet length rope and it is placed around the neck of the pig.
- The loop is positioned so that the bowline knot is on the top of the pig's neck. Then the rope is brought back and a half hitch is placed around the body immediately behind the front legs.
- The rope is taken further back along the top line and a second half hitch is placed just in front of the rear legs.
- The pig can now be laid down by its side by pulling the rope.
- As the animal responds to the tightening of the hitches, it can be guided with the rope and snare to lie on one side or the other.
- When the management task is completed, the half hitches are made loose.
- Finally the snare is removed and the pig is observed for a few seconds to see whether it is recovering properly or not.

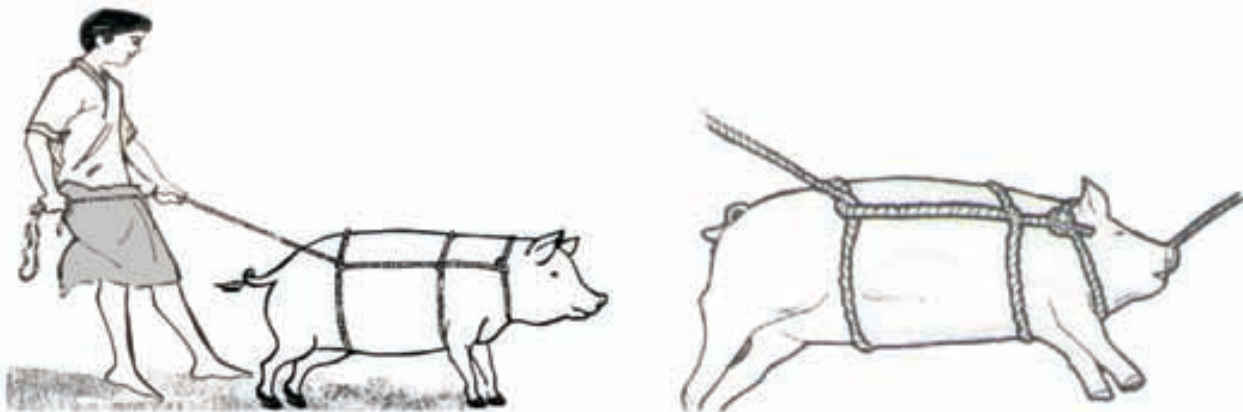


Fig 18: Restraining heavier pig by laying on its side with the help of a rope

Caution: Adequate care should be taken for restraining a pregnant pigs to avoid any injury to the foetus.

5.4.3 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.

For transportation of pig/piglet by road, truck/mini truck/auto van/pulling cart is used depending on the distance and the number of pigs to be transported. For long distance travel, train is preferred. During the process of transportation of pigs, the 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-bed in summer. In winter straw is placed on top of the sand-bed.

- Care should be taken that pigs are properly loaded. Below-capacity loading can be just as dangerous as over-loading. Partition should be used in trucks or train bogeys which are not fully loaded to keep the animals closer together.



Fig 19: Consequences of loading only a few pigs in a truck for transportation

- Breaking of journey is the single most important factor in transportation of pigs. Halting time and place should be finalized and organised before starting the journey. Any last minute hassles should be avoided.
- Animals should be fed and watered properly prior to loading. Pigs should be transported either fed lightly or should be fed 12 hours before loading depending on the distance, temperature and treatment upon arrival.
- Pigs that are over-fed or watered in excess at the time of loading defecate and urinate excessively. As a result, the floor becomes dirty and slippery and the animals feel uncomfortable. Such pigs shrink heavily and present an unattractive appearance when unloaded.
- Efforts should be made to keep the pigs quiet. Hot, excited animals experience more shrinkage and are more prone to injury or death.
- Transporter should never lose temper and should never hurry. The animals 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, each class of animals should be partitioned separately. Also, boar, sow, piglet, diseased pig should be properly partitioned.
- Whenever possible shipping, particularly when weather is too hot or too cold, should be avoided. In such weather, shrinkage and death losses are higher than in normal weather. Transportation of pigs in warm daytime should be avoided, preferring travel at night or in the evening. If required, the sand-bed should be made wet during hot weather.



Fig 20: Pigs shall not be transported during hot sunny hours of the day

- The truck is to be driven carefully, slowed down on sharp turns. Sudden stops are to be avoided. Trucks should be covered to protect the pigs from sun during the summer and cold during the winter.



Fig 21: Consequences of a sudden stop of an overloading truck

- Protruding nails, bolts and sharp objects in truck or train should be removed.
- Unloading should be done slowly and carefully. Pigs must not be dropped on the ground. The truck should be slowly and squarely positioned against the unloading dock. ■



Fig 22: Pigs should not be unloaded inhumanly

DAY 2

SESSION 6: Care and Management of Different Categories of Pigs

6.1 Resource Person

An experienced veterinary practitioner and/or an experienced pig farmer.

6.2 Session Objectives

- At the end of the session, participants should have clear understanding on day to day management of piglets, pregnant and lactating sows and boar.

6.3 Training Methods

- Participatory discussion in the classroom
- Experience sharing by the participants

6.4 Contents

6.4.1 Care and management of pregnant and lactating sow

- Pregnancy period of pig is about 114 days.
- Pregnant sows should be fed separately so that they do not have to compete or fight for feed.
- For normal growth of piglets and better milk yield, sufficient quality feed (rice polish, maize, wheat bran, oil cakes, fish, mineral and vitamin mixture) and water are needed for sows throughout the pregnancy period.
- Protein source (fish meal/meat meal/oil cakes/soybean meal), mineral and vitamin mixture are essentials during the time of pregnancy and lactation. Small-scale holders must provide such feeds, even in small quantity, during pregnancy and lactation.
- Feed should be reduced in the last part of pregnancy (after 107 days of pregnancy). Mainly laxative feed is to be provided at this time.
- Pregnant sows should be allowed to do exercise in open area or pasture land at least for some time every day. Exercises keep the sow fit and active, help to

maintain good appetite, prevent stiffness in the limbs and reduce difficulties during farrowing.

- The farrowing pen (a separate pen/room where pig will give birth to piglets) and utensils should be cleaned thoroughly with potassium permanganate or phenyl or any antiseptics 20 days prior to the expected date of farrowing. The farrowing pen should be dried before keeping the sows there.
- Provision of bedding has to be ensured after the pregnant sow crosses 90 days of pregnancy.
- If the farm does not have separate farrowing pen, the existing pen should be expanded for comfortable stay of the pregnant sows. Provision for a creep area (by putting a partition) should be made within the sty for safety of the piglets.
- Pregnant sows should be shifted to farrowing pen at least 2 weeks before farrowing so that they get familiar with the surrounding environment.
- A pregnant sow should not be shifted to a new pen where other pigs are already there. They may treat her as an intruder and may cause injury.

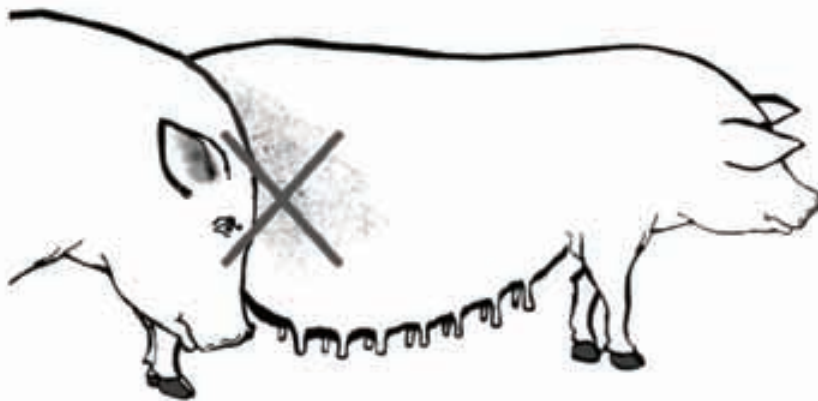


Fig 23: Pregnant animal may be injured by other pigs if it is housed together

- In cold climatic condition (especially in hills), the surrounding walls of the farrowing pen may be covered with gunny bag during cold hours to protect piglets from cold.
- The pregnant sows should be cleaned with soap and watered before farrowing.
- Plenty of clean drinking water should be provided to the sows on the day of farrowing.
- The sows may show symptoms of nervousness roughly 24 hours before farrowing. During this period dry, clean paddy straw is to be provided to help the sows for nest making.
- The sow should not be provided feed 12 hours before and after farrowing. About

half of the regular feed should be given 24 hours before and after farrowing.

- Sows normally do not need any assistance during farrowing. As the labour pain starts, she should not be disturbed in any way. Only the familiar attendant should attend her.
- The farrowing process normally takes 1-6 hours.
- Placentas are expelled out by the sow 1-2 hours after farrowing. It should not be eaten by the sow. Placenta should be collected immediately and buried.
- The sow, after farrowing, has to be cleaned with water. The young ones should be allowed to suck.
- The first feed has to be given 12 hours after farrowing. The amount of feed is to be increased gradually every day. The normal level of feed should be given after one week.
- Adequate feed should be provided to lactating sow with protein, vitamins, minerals and water to produce sufficient milk for its piglets.
- The udder should be examined for lack of milk, inflammation and number of functional teats.
- If the sow does not yield adequate milk, it may be offered a mixture of Ostocalcium and Vimeral medicine on the advice of a doctor. Sow can also be treated with Oxytocin injection.

6.4.2 Flushing

It is a process of giving extra amount of feed to the gilt or sow just before 2 weeks of breeding or service. It ensures the sow's good health and gaining of body weight from about 2 weeks before breeding until mating. The flushed animals should be fed 0.5-1 kg extra feed/day.

6.4.3 Care and management of neonate/piglet

- The newborn piglets should be cleaned, especially the mucous from the mouth and nostril with a clean cloth followed by vigorous rubbing of the newborns to stimulate respiration, if necessary.
- The naval cords of the piglets should be cut with a sterilized blade 2-3 cm away from the naval and it should be tied with clean thread. Tincture of iodine is to be applied over the cut portion.
- The piglets are placed in a dry, clean place/ bedding and they are assisted in suckling sow's milk (colostrums- the first milk).

- The weak piglets should be assisted and placed on the teats of breast part and the strong/ healthy piglets should be placed on teats of lower part to obtain an equal healthy group of piglets.
- It should be ensured that the piglets get colostrums for the first five days of their life.



Fig 24: A litter of piglets

- Piglets are born with 4 pairs of teeth, two pairs each in upper and lower jaws, called as needle teeth. It has no importance in piglets. The needle teeth should be clipped as soon as possible after birth by using teeth cutter to avoid injury to sow's teats during suckling.
- Care should be taken to prevent the mother from falling on the small piglets. For this purpose, there should be a creep area/box at one side of the farrowing pen for feeding and resting of piglets.



Fig 25: A sow with her newborn piglets

- The neonates should be administered with iron injections on the 4th and 14th day of farrowing to prevent piglet anemia. The udder of the sow may also be layered with iron tonics or ferrus sulphate mixed with molasses to avoid piglet anaemia.

- If the mother is unable to feed the piglets, make extra provision for milk (cow or goat milk). Alternatively, piglets may be taken to another lactating mother for suckling.



Fig 26: Piglets from a Large White Yorkshire sow are suckling milk from a Large Black sow

- If the milk production of the sow is very less, an experienced veterinarian has to be consulted. Generally, deficiency in minerals and vitamins during the time of pregnancy causes low production of milk. Two teaspoonfuls twice a day of a mixture of Ostocalcium and Vimeral medicines may be provided.
- Timely weaning (separation of piglets from mother) of piglets has to be ensured. This helps the sow to come into heat again quickly. During weaning, the mother is removed from the pen instead of removing the piglets.
- Male piglets to be reared for fattening purpose should be castrated at the age of 1.5-3 months (before or after weaning).
- De-worm the piglets should be carried out after weaning. De-worming should not be done during stress period (after transportation, disease, etc.) or hot hours of the day.
- Piglets purchased under bank loan or insured under any insurance company need identification mark, viz. ear notching, ear tag, ear tattoos, etc. which should be given before weaning. In rural condition, local identification marks with scissors, ink etc. may be given. ■

SESSION 7: Care and Management of Growing and Finishing Pig, Boar and Maintenance of Farm Record

7.1 Resource Person

An experienced veterinary practitioner and/or an experienced pig farmer.

7.2 Session Objectives

- At the end of the session, participants should have clear understanding on day to day management of growing and finishing pigs, boars, maintenance of farm records.

7.3 Training Methods

- Participatory discussion in the classroom
- Experience sharing by the participants

7.4 Contents

7.4.1. Care and management of growing/finishing pig

This period is considered from weaning to the age of slaughter.

- Normal weaning period is 8 weeks (56 days). However, under good management condition, piglets can also be weaned after 5 or 6 weeks. Under traditional farming system piglets should not be weaned before 50 days of age.
- Piglets should be weaned in groups so that they do not develop the stress of isolation.
- Periodic examination of faecal samples is recommended. Feed de-worm drugs at every 6 months interval.
- Vaccination of piglets is essential to protect from Swine Fever, FMD, etc. Record of vaccination should also be kept.
- As they grow, male and females should be separated.
- Poor grower and diseased pigs should be culled.
- Adequate feed and water should be provided on every day.
- Cleaning of the pig and pig sty are essential at least once every day.
- Adequate care should be taken to prevent skin diseases and other communicable diseases.

7.4.2 Care and management of the boar

- A boar should be fed twice a day. Over-feeding or under-feeding should be avoided.
- 2-2.5 kg concentrate feed per day with adequate water is needed depending upon the body weight of the boar. Requirement of traditional feed is higher as such feed has poor nutritive value.
- Traditional feed must be supplemented with protein source like fish meal/ meat meal/ soybean meal/ egg to maintain a strong and healthy body of the boar.
- Temperamental/ nervous animals are to be handled with care.
- Breeding should be done before feeding and best time is morning and evening.
- Boar to sow ratio should preferably be 1:4. In community level, a breeding boar against 10 sows also works.
- Same boar should not be used for breeding more than one female in a week.
- Slippery floor should be avoided as this might lead to injury of the legs during the time of mounting.

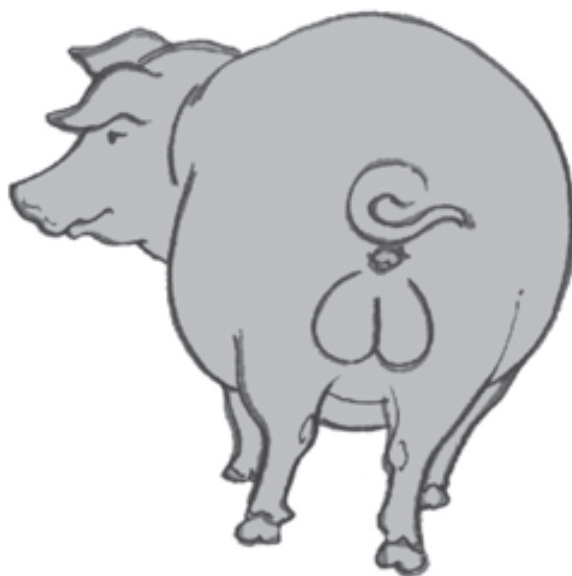


Fig 27: A boar with a pair of well-developed testicles

- Boar should not be allowed to be fatty and lethargic. Sufficient space for exercise should be given. Allow to do exercise by providing free run-out in uncovered area or free access to pasture. Exercise on sunny days may prove to be fatal.
- General health examination of the boar including the screening of ecto and endo parasites should be carried out periodically.

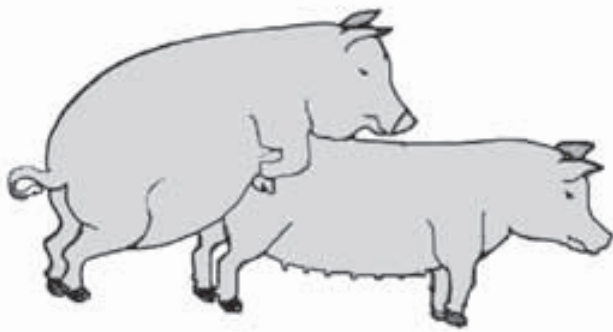


Fig 28: A fatty boar finds it difficult to mount a sow, but not a thin boar

7.4.3 Culling

Unproductive or less productive pigs may be eliminated from the herd periodically. It is unprofitable to keep feeding the unproductive animals. Sows after 5 farrowings may be culled as the litter size normally declines. Sows with defective teats, producing small litter (less than 8 piglets) and yielding less milk may be culled. Gilts that fail to conceive after 3 services and the sows with very high inter-farrowing interval (more than 3 months) period should be eliminated from the herd. Similarly, infertile boars, too heavy boars, aged boars (after 5 years), defective boars and surplus boars need to be eliminated. Such practices ensure better profitability of the pig farms.

7.4.4 Wallowing

Pigs have few sweat glands on top of the nose. As the pigs do not sweat, they need to wallow in mud or water in summer to keep the body cool. Rolling in mud cools them off naturally. It is specially needed for fattening and breeding animals. A wallow of 3 meters length, 2 meters width and 45 cm depth will easily hold a herd of 20 pigs of various ages. Mud wallow is not desirable as it cause insanitary condition. Under farm condition, pigs should be washed or sprinkled with cool water during hot hours of the day.

7.4.5 Calendar for daily operation

Pig producer should prepare a daily work calendar to perform the daily tasks properly, orderly and timely. This increases the production performance of the farm and labour efficiency.

Table 3: A sample calendar of daily operation for small pig producers

Time	Farm operation (regular)	Farm operation (occasional)
7.00 - 9.00 am	<p>Put boars/ sows/ gilts in the pasture or allow them to scavenge with the help of a tether</p> <p>Clean the pig sty and utensils</p> <p>Observe the behavior of the animals</p> <p>Segregate the diseased pig (if any)</p> <p>Segregate the sows in heat (if any)</p> <p>Prepare the feed for pig</p> <p>Bring the breeding animal from pasture back to pig sty</p> <p>Provide one third of the required daily ration with adequate water</p>	<p>Treatment of sick animal</p> <p>Vaccination of pigs</p> <p>Castration, removal of needle teeth, ear tagging etc.</p>
10.00 am - 12.00 pm	<p>Wash the pigs with water or allow them to wallow</p> <p>Clean the surrounding of the pig sty and dispose the pig manure</p> <p>Collect or buy feed/fodder</p> <p>Chop the fodder into pieces (if required)</p> <p>Collect or buy fire wood for cooking of feed</p> <p>Prepare feed or provide one third of the prepared feed</p>	<p>Sell pigs/ piglets</p> <p>Do the necessary management in the pasture garden</p> <p>Treat the pigs</p> <p>Repair the pig sty</p> <p>Sanitize the pig sty</p>
4.00 am - 5.00 pm	<p>Prepare feed or supply remaining one third of prepared feed to pigs with adequate water</p>	<p>Transfer pregnant sows to farrowing pen</p> <p>Wean the piglets</p> <p>De-worm the pigs</p> <p>Transport the pigs/piglets</p> <p>Make entries in the farm record</p>

7.4.6 Different records to be maintained in a pig farm

Table 4: Stocking record

Month	No. of boar	No. of sow	No. of growers	No. of piglets		Pig died	Total stock
				Male	Female		

Table 5: Daily feeding register (For the month of.....)

Date	No. of pigs	Feed in the stock (kg)	Feed purchased (kg)	Amount spent for purchasing (Rs.)	Feed issued from the stock (kg)	Balance in stock (kg)	Remarks

Table 6: Breeding record

Sl. No.	Sow number/ name/ identification	Date of service	Boar No./ name/ identification	Expected date of farrowing

Table 7: Farrowing record

Sl. No.	Sow number/ name/ identification	Date of farrowing	No. of pigs born alive	No. of males in litter	No. of females in litter	No. of pigs born dead	Total piglets at wean

7.4.6 Formula for determination of weight of pigs

$$W \text{ (in pound)} = G^2 \times L$$

where W = weight in pound (1 kg = 2.2 lbs)

G = heart girth (in inch)

L = body length from point of shoulder (poll) to the base of the tail (pin bone) (in inch)

7 pounds should be added to the weight of a pig if it weighs less than 150 pounds.

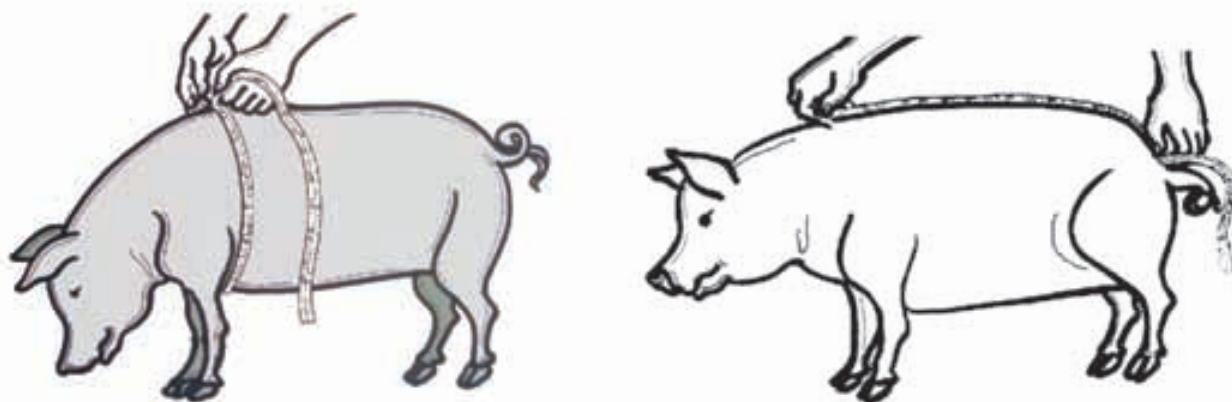


Fig 29: Measurement of heart girth and body length

For accurate measurement of weight, hanging balance or platform balance should be used. ■



Fig 30: A hanging balance

DAY 3

SESSION 8: Reproductive Cycle of the Sow

8.1 Resource Person

An experienced veterinary practitioner (specially gynaecologist) and/or a successful pig breeder.

8.2 Session Objectives

At the end of the session, participants should have fair understanding on reproductive cycle of the sow.

8.3 Training Methods

- Participatory discussion on the topic
- Explanation of the reproductive cycle of a sow by drawings on the black /white board

8.4 Contents

8.4.1 Puberty

It is the period when reproductive system starts functioning with appearance of first estrus (heat symptom).

8.4.1.1 Factors influencing puberty

- Age at puberty varies among different breeds.
- Improper nutrition delays puberty.
- Poor body condition delays puberty.

Female pigs usually attain puberty around 6-8 months of age when they attain about 50 kg of body-weight. Male requires about 7 -8 months to attain sexual maturity.

8.4.1.2 Estrous cycle

- The average length of the estrous cycle is 21 days with a range of 18-24 days.
- Heat sign remains for 1-3 days.
- Best time to mate the sow is 12-36 hour (15-24 hour) after onset of heat (standing heat), second service at 12 hours after the first service is advocated to get higher conception rate and litter size.

8.4.1.3 Signs of heat

The signs are:

- Frequent urination,
- Swollen vulva and pink vaginal mucous membrane,
- Presence of sticky mucus at vulva,
- Attempt to mount or ride other pigs,
- Tail upright, and flicking up and down,
- Standing reflex: when pressure is applied on the back of a female pig on heat, it does not move.

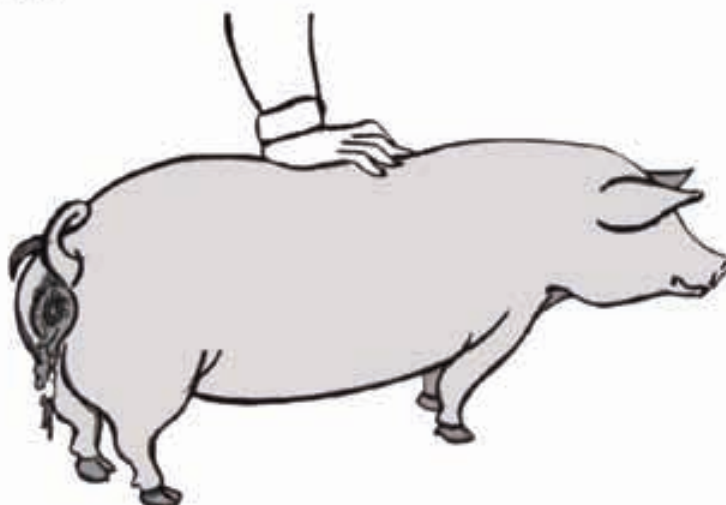


Fig 31: A sow on standing reflex

Table 7: Onset of puberty in different breeds

Breed	Age at puberty
Exotic breed	6- 8 months
Cross breed	7- 8 months
Indigenous pig	4-7 months

8.4.1.4 Points related to pig reproduction

- Male or female pigs are generally used for breeding after 7/ 8 months of age when they attain sexual maturity. Gestation period: 114 days \pm 5 days, i.e. 3 months, 3 weeks and 3 days.
- Piglets suck mother's milk till 5- 8 weeks of age. Thereafter piglets should be separated (weaned away) from their mother.
- Sows again come into heat after 1 or 2 weeks of weaning and should be re-bred in next estrus cycle.
- Production cycle again starts with mating of sow with boar.

8.4.1.5 Flow chart of the reproductive cycle of the sow



Total time for one cycle is 164 days. In normal condition, 2 cycles (or litters- piglets born from single farrowing) are possible in one year with average feeding and general management regime. However, in the field condition, generally 3 cycles are expected in almost two years. ■

SESSION 9: Selection of Breeding Animal and Breeding System

9.1 Resource Person

An experienced veterinary practitioner and/or a successful pig breeder.

9.2 Session Objectives

By the end of the session, the participants should be able to explain:

- Selection criteria of breeding boar and sow,
- Prevailing breeding systems in field condition and scope of improvement.

9.3 Training Methods

- Participatory discussion on the topics with reference to field problems.

9.4 Contents

9.4.1 Parameters for selection of breeding male (boar)

Producers, who do not rear boar for breeding purpose, may need to identify the best quality boar available in the locality. The following parameters for selection of boar should be kept in mind.

- The boar should show true breeding character.
- Boar should be healthy and masculine. The body should be long and deep with strong legs, strong back and neck with smooth shoulders. Boar should be active and alert.
- Age of the boar should not be below 7 months at the time breeding. Preferably a boar of 1 to 2 years is selected for breeding purpose.
- It should have both the testicles well-positioned and size should match with its body size and age.
- There should not have any injury on the body or physical deformity.
- The boar should be free from any parasitic, infectious or contagious disease.
- The boar should be free from any stress during the time of breeding.
- Boar should have good sex libido.

9.4.2 Parameters for selection of breeding female (sow)

- A healthy sow having a history of one delivery (farrowing) with a healthy litter (piglets from a single farrowing) is preferred for breeding.

- Age of the sow should not be below 7 months.
- The sow should be feminine in appearance with small neck and good looking eyes besides being active.
- The sow should be free from any disease. Skin should be good. It should be of wrinkle-free.
- It should not be too fatty.
- Udder should be well-developed with minimum 12 functional teats, 6 in each row and the condition of the teats should be good.
- The sow should have good mothering ability.

9.4.3 Points to be considered for successful breeding

- Only one boar should be allowed to serve one sow.
- Though only one service is enough to fertilize the ova in the female, it should be repeated towards the end of the heat (about 12 hours after first service).
- The service should be supervised and the records like service date, sow name/ number/ boar name/number and the expected farrowing date should be recorded.
- Flushing is recommended for a 10-14 day period before expected date of breeding as this increases ovulation rate especially in first litter gilts.
- Feeding broad spectrum antibiotics just prior to mating has shown to have increased litter size.
- Feed intake should be reduced immediately after mating, as high level of feeding tends to reduce implantation of embryos.

9.4.4 Systems of breeding

Main objective of breeding is to produce superior quality piglets through combining good quality parents (genes). Different methods like in-breeding, out-breeding, cross-breeding, etc. are practiced.

9.4.4.1 In-breeding (mating of related pigs)

It is the method of breeding between close relatives such as brother-sister, mother-son, father-daughter, cousin brother-sister, etc. Mating of individuals within 4-6 generations may be termed as in-breeding.

Advantages

- In-breeding is used to produce distinct families within a breed.
- In-breeding increases the ability of a pig to show its characteristics distinctly on the progeny (next generation).

Disadvantages

- In-breeding causes depression reducing the productive and reproductive performances of the animals in subsequent generations.
- The animals show genetic abnormalities in the subsequent generations.
- Due to in-breeding, most of the animals die before weaning age.
- There is loss of fertility and survivability in in-bred animals.

9.4.4.2 Out-breeding or out-crossing (mating of unrelated pigs)

It is the method in which unrelated animals are mated.

Advantages

- Undesirable characters are not passed on to the next generations.
- The adverse effects of in-breeding are absent.
- Pure breed characteristics are retained.

Disadvantages

- Out-crossing continued for 20-30 generations may not retain the positive effects.

9.4.4.3 Cross breeding

It is the method of mating sows of one breed by boars of another breed.

Advantages

- Cross-breeding commonly makes new generation piglets more productive and healthier than their parents.
- Good/superior qualities of the two breeds manifest in the cross-bred progeny.

Disadvantages

- Expensive to maintain the exotic breed.
- The individual breed characteristics gradually disappear.

9.4.5 Types of breeding

9.4.5.1 Natural breeding

- In this breeding method a male (boar) having better (superior) breed characteristics is used for mating. Largely, natural mating (fee based) is practised in India. Only a small section of pig producers have their own boar. Generally neighbour's boar is used without giving much importance on breed and quality of boar.

- Use of the neighbour's or community boar involves a cash amount varying between Rs.200/- to Rs.1000/-. Sometimes the owner collects a piglet as the breeding fee.
- To produce better piglets with larger litter size only the best quality boar available in the locality should be used.
- The poor quality boars may be gradually replaced by good quality boars to improve the genetic make of pigs in the locality.

9.4.5.2 Artificial Insemination

- In this method the semen is collected hygienically from the boar having better breed characteristics and then the semen is scientifically processed in the laboratory.
- Artificial Insemination (AI) with liquid semen is practised mainly in Mizoram of North-East India. This can be tried in other states as well. ■

SESSION 10: Feeding Different Categories of Pig for Optimum Production

10.1 Resource Person

An experienced veterinary practitioner and/or an experienced pig producer.

10.2 Session Objectives

At the end of the session the participants should be able to explain:

- Different categories of feed stuff with their sources and importance of feeding,
- Prevailing feeding system in field conditions.

10.3 Training Methods

- Classroom discussion on feed stuffs, their nutritional values and requirement for pig in different age groups using photographs, feed samples and field experience.

10.4 Contents

10.4.1 Main components of nutrients

Feedstuff consumed by pig gets digested in the body. In the process the nutrients are absorbed by the body for its growth and maintenance. For better growth and production performance of the pigs the feedstuff should contain the following nutrients:

- Water,
- Protein/ essential amino acids,
- Carbohydrates,
- Vitamins,
- Minerals,
- Salt,
- Feed additives,
- Some essential fatty acids.

10.4.1.1 Water

Water is one of the most important nutrients in pig diet. Only clean drinking water should be provided to a pig. Dirty water, the source of many germs, causes number of diseases. Even wet feed should be supplemented by fresh water.

Functions

Water serves to

- Regulate body temperature.
- Remove waste products.
- Assist in digestion, absorption, transportation and utilization of nutrients.

Lack of water intake may lead to constipation.

Table 9: Minimum daily water requirement for pigs

Body weight of pig (kg)	Daily water requirement (lit.)
Newly weaned	1.0-1.5
Up to 20 kg	1.5-2.0
20-40 kg	2.0-5.0
Finishing pig up to 100 kg	5.0-6.0
Sows and gilts	5.0-8.0
Sows in lactation	15-30
Boars	5.0-8.0

The daily water requirement may vary based on season, temperature, type of feed, health condition and breed of animal.

10.4.1.2 Protein

Functions

- Protein is important to build new tissue for growth and reproduction. Protein also repairs worn out tissues and helps in production of milk. In general, protein is needed for growth, maintenance and production.
- Protein provides energy.
- Lack of protein in diet leads to loss of body weight.

Source of protein

Protein is available in both plant and animal sources.

Plant source: Ground nut cake (GNC), till oil cake (TOC), soya flakes/soya bean meals, mustard oil cake (MOC), cotton seed oil cake, sunflower meal, etc.

Animal source: Meat meal, fish meal, blood meal, bone meal, dried milk, milk whey.

Pigs should be given adequate amount of both animal and plant protein source for better growth.

Table 10: Protein requirement for different categories of pig

Category of pig	Protein requirement (% of total required feed)
Suckling piglets (creep ration)	22%
Weaner (grower ration)	18-20%
Breeding boar and pregnant sow (finisher ration)	15%

10.4.1.3 Carbohydrates

Functions

- Carbohydrates provide heat and energy for the normal body functioning and day to day activities of pig.
- Carbohydrate helps in fattening of pig.

Sources

- Cereals like rice, maize, wheat, oats, grain, sorghum, barley, etc.
- By products of grains like rice polish, rice bran, rice meal, wheat bran, etc.
- Carbohydrates constitute about 70% of total required feed per day.
- Pig requires large quantities of energy and moderate quantities of protein (15-25%) for growth and development.
- Pig has a single stomach and so it cannot digest more fibrous feed unlike ruminants (cattle, goat and sheep). Fibrous feed like jungle forages, green leaves, etc. should not be fed to pigs in high proportion (more than 20%).

10.4.1.4 Vitamins

- Vitamins (A, D, E, K, B-complex and C) are needed in minute quantity for absorption and utilisation of different feed nutrients.
- Deficiency of vitamins in feed cause numbers of ailments in pigs including poor growth, weakness, anaemia, low production of milk, etc.
- Vitamins are obtained mainly from different green forages. Some of the vitamins are also produced in the body (digestive system).
- External supply of small quantity of vitamins especially during pregnancy and lactation help better growth of piglets and increase milk production.
- Mixtures of required vitamins and minerals (eg. milkmin, medimix, etc.) are

available in the veterinary clinics. Mixtures can be provided 1-2 teaspoonful per pig per day.

10.4.1.5 Minerals

- Minerals are essential in formation of bone, blood, teeth, muscle and milk.
- It helps in maintenance of normal fluid level in the body.
- Supply of minerals in feed is essential especially during the time of pregnancy and lactation in order to stimulate normal growth of piglets, increased milk yield and to prevent disease like milk fever.
- Mineral mixture (eg. agrimin, milkmin, kelmin etc.) can be purchased from the veterinary pharmacy/clinic. It is required only in small quantity, say 1-2 teaspoonful per pig per day.
- Iron and phosphorus should be added separately as sow's milk is deficient in iron.

Pigs are most likely to suffer from mineral deficiencies. A number of factors are responsible for this. These are,

- Pigs are fed mainly cereal grains or their byproducts (rice polish, wheat bran etc.). Minerals, particularly calcium, are relatively low in these feeds.
- Pigs do not normally consume large amount of roughage which balances mineral deficiencies.
- Pigs reproduce at a younger age than other classes of livestock. For this reason mineral requirement is higher in pigs.
- Pigs are fed to grow at a maximum rate for an early market, before they become mature.

10.4.1.6 Salt

Salt is an essential item in pig ration. Higher amount of salt may lead to toxicity. An amount of 5gm/day is adequate.

Deficiency

- May lead to birth of hairless pigs.

10.4.2 Commonly used feed stuff by small pig producer

Pig producers in rural areas are not much aware about the nutrient- composition of different feedstuffs and importance of feeding different nutrients to a pig. They provide only those feedstuffs which are readily available in the area at little or no cost. The commonly used feedstuffs with their possible sources of nutrients are mentioned below.

Table 12: Commonly used feed stuffs by small pig producers and possible sources of nutrients

Feed ingredients	Source of nutrient
Residue of country liquor/rice bear/ <i>juguli</i>	Energy
Hotel/ kitchen waste	Not specific (mainly energy)
Rice polish/ rice bran	Energy
Wheat bran	Energy
Maize	Energy
Fish meal	Protein
Mineral and vitamin mix (occasional)	Mineral + vitamin
Vegetables	Mineral + vitamin
Colocasia/taro	Energy
Tapioca/cassava	Energy
Lucerne, cowpea, berseem etc.	Protein and vitamins
Banana/fruits (occasional)	Mainly energy
Egg	Protein
Water hyacinth	Not specific
Green forage/jungle forage	Not specific

- The table shows that locally available feedstuffs are rich in energy but deficient in other nutrients. These feeds cannot support normal growth and reproduction of pigs.
- For normal growth and reproduction of pigs, producers should add feed ingredients rich in protein (oil cakes, fish meal, meat meal, etc.), mineral and vitamin particularly during young age, pregnancy and lactation.

Table 13: Feed requirement for different categories of pig

Categories	Age	Feed
Weaner pigs	2-4 months	0.25-0.75 kg/day
Grower pigs	5- 6 months	0.75 -1.50 kg/day
Adults	7-10 months and above	1.50-2.50 kg/day
Sow	Pregnant/lactating	2.50-3.50 kg/day

Source: Handbook of Animal Husbandry, ICAR, Delhi

The quantity of feed in the table applies to concentrate feed available in the market. When kitchen waste, pastures, residue of rice bear, garbage, etc. are fed to pigs with concentrates the quantity should be assumed after boiling the mixture on total solid basis.

10.4.3 Pasture in swine feeding

As the pigs are single stomach animal, they can digest only smaller quantity of pasture (green forage/ leaves) than cattle or buffalo. Their capacity to utilize pasture is limited. Still pastures are useful for the pigs.

- It is cheaper.
- It is a good source of vitamins and minerals.
- It provides a major portion of the protein requirement of the animal.
- It brings savings in grain consumption.
- It Increases profit margin.
- It keeps pigs healthier and productive.



Fig 32: Collection and chopping of jungle forages for feeding pigs

Good pasture can replace about 10-20% of concentrate. Percentage of pasture in pig ration should be less for piglets as well as for fattening pigs. Piglets cannot digest more fibrous feed, while fatteners cannot deposit high fat for weight gain. Pregnant and growing pigs and boars may be fed with more pasture.

Pasture should be chopped into small pieces and boiled before feeding pigs. Boiling kills the parasites and germs available in the pasture and increase the digestibility.

10.4.4 Use of by-product and waste product

- By-products of oil extraction industry (oil cakes), milling industry (wheat bran, rice bran, etc.), dairy industry (whey, skimmed milk), slaughter house (meat meal, bone meal) and fishing industry (fish meal) form good sources for pig feeds.

- Garbage or kitchen waste is the food discarded by restaurants, hotels, supermarkets, institutions, meat/ fish markets and homes.
- The wastes have different chemical compositions. This helps in the production of pigs significantly.
- Major problem of feeding garbage to swine concerns sanitation and disease.
- Garbage acts as a vehicle for different transmissible diseases like swine fever. Research suggests that about 25% of pork samples in NE India contain swine fever virus. Therefore, garbage feeds must be boiled before feeding. ■



Fig 33: Cooking of feedstuff for feeding pigs

DAY 4

SESSION 11: Computation of Ration with Locally Available Feed Resource

11.1 Resource Person

An experienced veterinary practitioner and/ or experienced pig producer.

11.2 Session Objectives

- By the end of the session, the participants should be able to compute a balanced pig ration incorporating several ingredients.

11.3 Training Methods

- Participatory discussion on formulation of a pig ration
- Use of black board/white board for explaining the calculation
- Exhibition of small quantities of different required feed ingredients brought to the classroom to show the participants practically how to mix the ingredients
- Group work (flipchart and marker are to be used for presenting group work).

11.4 Contents

11.4.1 Nutrient requirement for different categories of pig

- **Pre-starter pig** (pigs of 7-21 days age group, body weight 1- 4 kg)
Piglets start nibbling at food when they are about two weeks old and after three to four weeks, they start consuming feed. Pre-starter ration increases growth rate and reduces demand on sow's milk. The ration should be rich in protein and vitamins and low in fibre content. 24% protein and a higher proportion of antibiotic are to be incorporated with feed.
- **Starter pig** (pigs of 21 days to 56 days age group, body weight 5-15 kg live wt.)
During this stage, protein requirement of pig may be relatively lesser than pre-starter stage. About 20-22% protein is required during this stage.
- **Grower pig** (13- 34 kg body weight)
Protein requirement reduces with age. About 18% protein is required for a growing pig. Energy requirement increases with age.

- **Growing and finishing pig** (body weight 35-60 kg growing pigs, 60 kg and above -finishing pigs)
As protein requirement decreases, energy requirement increases for excessive fat deposition.
- **Adult male pig (boar)**
Boars should be fed economically to keep them in active to avoid fattening. They should not be over-fed or under-fed.
- **Adult female pigs (gilts, sows)**
Gilts and un-bred sows should be fed adequate amount of nutrients to keep them active but not fatty.
- **Pregnant sow**
Sows may be fed on concentrate with little pasture supplementation. Adequate good quality feed should be provided to pregnant sows with mineral and vitamin mixture. It helps to maintain normal growth of the sows and the fetus.
- **Feeding lactating sows**
Sows receiving adequate ration produce 2.5-3.6 litter milk per day. Adequate ration with sufficient water is required for milk production for the benefit of the piglets.

11.4.2 Compound concentrate feed

- Pig ration can be either home-made or ready-made.
- It is a mixture of number of feed ingredients having sources of protein, energy, fat, vitamin and minerals. The mixture is prepared to provide all required nutrients to the pigs.
- Producers interested to prepare feed mix locally should understand the principle of composition of compound feed.
- Requirement of nutrients to pigs varies according to age and stages of life (refer to the section above).
- Concentrate feed can be prepared at home or mills by incorporating different feed ingredients (e.g. maize, rice polish, wheat bran, soyabean meal, oil cakes, mineral mixture, etc.) as per requirement of different categories of pig.
- Most economic and available feed ingredients should be selected to prepare ration. Maize, wheat, rice, etc. should form basic ingredients (about 70-75%). Protein supplements like oil cakes, fish meal, and meat meal should constitute about 15-25% of total quantity. Mineral supplements and salt should be provided in the ration (about 5%).
- Compound concentrate feed is available in the market in several trade names.

Cost is Rs.10/- to 18/- per kg depending on quality and location of the market.

- Compound concentrate feed is mainly used by the government farms and well-managed private farms. Smallholder producers generally do not depend on concentrate feeding because of higher price and inadequate availability.
- Pure bred/ high quality cross-bred pigs can grow faster if they are fed with 100% concentrate feed. However, for the indigenous or poor quality cross-bred pigs feeding 100% concentrate is a wastage.
- When concentrate feed is not possible, some fish meal/ meat meal/ soybean meal should be provided particularly during the early age, pregnancy and lactation. Small amount of mineral and vitamin mixture should be added to the protein source to feed the pigs during these critical stages.



Fig 34: Compiled concentrate feed

Examples of feed formula used for preparing pig rations

Table 14: Feed formula for different categories of pigs

Category of pigs	Energy source		Protein source		Min +Vit source	Salt (%)	Total
	Maize (%)	Wheat bran (%)	GNC (%)	Fish meal (%)	Min.mix (%)		
Piglet (starter ration)	60	9.5	20	8	2.0	0.5	100
Grower (grower ration)	53	22.5	20	5	2.0	0.5	100
Adult (finisher ration)	40	32.5	20	5	2.0	0.5	100

Table 15: Feed formula for different categories of pigs

Ingredients	Weaned pig (18-20% protein)	Grower (15-17% protein)		Gilt and sow (14-16% protein)
		12 weeks- market age	months 9-12	
Maize	55	58	60	50
Groundnut cake	17	15	8	13
Wheat bran	20	20	25	20
Rice polish	-	-	-	10
Fish meal/ Soya meal	6	5	5	5
Mineral mixture	1.5	1.5	1.5	1.5
Salt	0.5	0.5	0.5	0.5
Total	100	100	100	100

Source: Animal Nutrition and Feeding Practices, S. K. Ranjhan

11.4.3 Some points to be considered in feeding management

- Mouldy feeds should be avoided as these might lead to aflatoxicosis (a feed- borne disease with a heavy mortality particularly in young piglets).
- Water should be provided from a hygienic source to avoid water- borne diseases. Water may be periodically treated with potassium permanganate.
- In absence of concentrate feed, sweet potato, legume forages (e.g. stylo) , broken rice (up to 20%), rice polish (up to 15 %) together with some protein source (fish meal/ oil cakes), vitamins and minerals (mineral mixture available in veterinary clinics) could form the feed .
- If green leaves/vegetables/forages are used, the leaves and vegetables should be chopped into pieces and then it should be boiled to increase the digestibility of the ration as well as to reduce the chance of infectious diseases.
- Instead of collecting and feeding jungle forages, pig producers should cultivate some food-feed crops/ forages (e.g. maize, sweet potato, colocacia/ taro, tapioca/ cassava, stylo, water spinach, azola, etc.) at the homestead. Many of these crops can be cultivated as a mixed crop in a small plot of land.

11.5 Group Work

Participants will be divided into small groups and each group will be asked to prepare a pig ration incorporating locally available feed resources and to work out the cost of per kg feed.■

SESSION 12: Cultivation of Food-Feed crop for Feeding Pig

12.1 Resource Person

An animal nutritionist/an agriculturist.

12.2 Session Objectives

- At the end of the session the participants should be able to explain the importance of cultivation of food-feed crops for feeding the pigs and method of their cultivation.

12.3 Training Methods

- Classroom coaching with the help of photographs, examples, etc. on the use of food-feed crops and their method of cultivation in the backyard as a mixed crop
- A field-visit to a plot of land under cultivation (wherever possible)

12.4 Contents

12.4.1 Importance/advantage of cultivation of food-feed crop

- Pigs cannot digest large quantity of fibrous feed. Jungle forages mainly fill the stomach but does not provide required nutrients to the pigs.
- Nutrient contents of different jungle forages are not known. Some of the forages may also contain anti- nutritional factor which is harmful. Therefore care should be taken while selecting these forages for feed.
- Availability of forages depends on the season, region and traditional belief and knowledge of the local people.
- Cultivation of food-feed crops (used for both human and animal consumption) for feeding of pigs may reduce the requirement of concentrate. Nutrient compositions of these feed-stuffs are better known than many jungle forages.
- Maize, sweet potato, colocacia, tapioca, etc. can be grown in a small plot of land as mixed crop. Leaves of these crops can be cut/plucked several times in a year to feed the pigs. Tubers are rich in energy and are good feed for pigs/food for human. It reduces time for collection/ gathering of forages.

- Some of the crops (e.g. sweet potato vines) can be fed without cooking, saving time and fire wood.



Fig 35: A plot of food-feed crops in the backyard



Fig 36: A plot of land under styto cultivation

12.4.2 Methods of cultivation of food-feed crops

Table 16: Methods of cultivation of food- feed crops (in Assam's condition)

Name of crops	Sowing time	Manuring (per hectare or 7.5 bigha)	Harvesting	No. of cut	Yield (ton/ ha)
Maize Variety: i. Ganga 5 ii. African tall iii. Vijay	April- Aug	N:P:K= 50:60:30	70-80 days	One	35-45
Sweet potato Variety: i. Pusa red ii. Kalmegh iii. Dergaon white iv. Dergaon red	1 st - May-June 2 nd - September- October. As irrigated crop – October- November	i. Urea- 80 kg/ha(10.5 kg/bigha) ii. Super phosphate- 310kg/ ha(40kg/bigh a) iii. Muriate of potash- 135 kg/ ha (16kg/ bigha)	3 ¹ / ₂ - 4 months	Two	20-30

Tapioca	April -May	i. Urea- 85 kg/ha (10 kg/bigha)	8-10 months	one	25-35
Variety:		ii. Super phosphate- 235kg/ ha (30kg/bigha)			
i. H-43		iii. Muriate of potash- 85 kg/ ha (10kg/ bigha)			
ii. H-97					
iii. H-165					
iv. H-865					
v. H-2304					
Colocasia/ taro	April- June	FYM/ compost @12 t/ha.	6-8 months	one	12-16
Variety:		N:P:K= 80:60:120			
i. Paka kachu					
ii. White Gaurya					
iii. Panchamukhia					

*N- Urea (46%)

P₂O₅- Single super phosphate (16%)

K₂O- Muriate of potash (60%)

Source: Package of Practices of Fodder Crops prepared by CVSc, AAU

Standard methods of cultivation of different food-feed crops (courtesy: CVSc, AAU)

12.4.2.1 Sweet potato

- It can be grown on a variety of soils except clay. Best suited to fertile sandy loam and deep loam. Good drainage needed
- It requires a warm humid climate with a mean temperature of about 22° C under rain-fed condition. It requires a fairly well-distributed rainfall of 750 to 1500 mm annually.
- The land should be ploughed or dug to a depth of 15-25 cm and brought to fine tilt. Ridges of 25-30 cm height are made at 60-75 cm apart. Vines are planted on these ridges.
- Propagation of sweet potato is done by means of vine cuttings and planting. Cuttings of 20-25 cm length are planted on ridges at a separation of 20-30 cm. While planting, the central part of the cuttings is buried deep in the soil exposing the two cut ends.

- Care should be taken to ensure sufficient moisture in the soil at the time of cuttings.
- Since sweet potato is susceptible to water logging, proper drainage facilities should be provided.

12.4.2.2 Tapioca

- Cassava/tapioca can be grown on all types of soils except saline, alkaline and ill-drained soils. It grows best in hot and humid climate with well-distributed rainfall (1500 to 2000 mm annually).
- Tapioca can be cultivated profitably on hill slopes, wastelands and lands where normal cultivation is difficult. The land should be ploughed two or three times or dug to a depth of 25- 30 cm (9"-11").
- It is propagated from cuttings obtained from mature healthy stems having 2-3 cm diameter. The basal 10 cm and the top one-third length should be discarded. The remaining portion should be used.
- Planting is done in a square alignment with a spacing of 90 cm × 90 cm (3' × 3').
- April-May is the best planting season in Assam and other NE states. Cuttings are planted vertically (after smoothening the lower portion) and basal 4-6 cm (2-2.5//) is buried inside the soil. Flat or ridge method of planting can be adopted considering the soil type, topography and presence of water.
- Irrigation is not necessary for tapioca when the rainfall is well distributed.

12.4.2.3 Colocacia

- The best soil is sandy loam or alluvial with abundant organic matter.
- The land should be ploughed 2-3 times after applying adequate quantities of organic manure and wood ash.
- Spacing needed is 60 cm from row to row and 45 cm from plant to plant.
- Planting is done on well-prepared land in pits filled up with burnt earth and ashes. When plants grow to about 30 cm height, the soil around is loosened and the earth level around the plant is elevated (the process is called 'earthing up').
- Weeding and earthing up should be done at 35-40 days after planting when plants attain a height of about 30 cm. All dead leaves should be plucked off.

12.4.2.4 Maize

- Well-drained soil should be selected. One ploughing is followed by 4-5

harrowings (dragged over ploughed land to break up or spread the soil) and planking. Spacing from row to row is 25 cm and plant to plant is 10 cm.

- Nitrogen should be applied in two split doses. The first split dose should be applied along with the full dose of phosphorus and potash at sowing time. The second split dose of nitrogen should be applied 4 to 5 weeks after sowing.
- Irrigation is important to maintain optimum soil moisture conditions. Frequency of irrigation will depend upon rainfall intensity. Water-logging should be avoided.
- One cutting in a year after 70-75 days of sowing yields optimum level.■

SESSION 13: Common Diseases of Pig and their Preventive Measures

13.1 Resource Person

An experienced veterinary practitioner.

13.2 Session Objectives

At the end of the session the participants should be able to explain the major diseases of pigs and their preventive measures.

13.3 Training Methods

- Participatory discussion on major prevailing diseases of pig
- Listing the major prevailing diseases of pig in the area in a flip chart and explaining the control measures
- Group work

13.4 Contents

13.4.1 Assessment of diseased pig

Pigs should be observed every morning at least once. Any pig with sign of disease should be separated immediately from the healthy flock. A veterinarian or local paravet staff should be contacted for necessary treatment/advice.

Table 17: Sign of healthy and diseased pigs

Character	Healthy Pig	Diseased Pig
Skin and hair	Shining and healthy	Dull
Tail	Neatly curled	Tail hang straight
Eyes	Bright with no discharge	Dull with discharge
Movement	Easy, a resting pig relaxes, and breathes evenly and quietly	Not found in relaxed state, and breathing is fast.
Appetite	Normal	Does not feed itself normally
Stool	Normal	Diarrhea/ constipation
Body	Round and fleshy	Pot-bellied
Discharge	No discharge from any part of the body like nose, mouth, vulva, anus	Abnormal discharge from any opening
Temperature and pulse	Within range	Above the range

Source: Why and How of Pig Farming in North-Eastern Region of India, Technical Bulletin No.18, ICAR-NEH

Table 18: Normal respiration rate and temperature of pigs

Character	Normal range
Respiration	
Young	50/minute
Old	13-15/minute
Temperature	39° C (102°F)

Source: Why and How of Pig Farming in North- Eastern Region of India, Technical Bulletin No.18, ICAR-NEH



Fig 37: Steps involved in measurement of temperature of a pig



Fig 38: Measurement of respiration of a pig

13.4.2 Most prevailing diseases of pig and their possible treatment and control measures

Table 19: Most prevailing diseases of pigs with cause, mode of transmission, symptoms and preventive measures

Name of the disease	Cause	Mode of Transmission	Symptoms	Preventive measures
1. Swine fever	Virus	i. Direct contact with an infected pig. ii. Through contaminated utensils iii. Visitors, birds and flies.	i. High temperature 105- 107°F ii. Vomiting and diarrhea (off flavor) iii. Conjunctivitis and nasal discharge iv. Nervous sign like convulsion, tremor etc. v. Loss of appetite	i. Vaccinate the pigs against swine fever. ii. Isolate the diseased animals. iii. Thoroughly clean and disinfect the pig house, utensils and surrounding. iv. Warn neighbours about the occurrence of the disease.
2. Foot and Mouth Disease (FMD)	Virus	i. Direct contact ii. Contaminated feed, water, garbage , etc. iii. Visitors, birds, flies.	i. High fever 104- 106°F. ii. Appearance of vesicle followed by ulceration on mucous membrane of the mouth and foot iii. Lameness and difficulty in eating iv. Profuse sticky and foamy salivation	i. Vaccinate against FMD. ii. Separate the infected pigs. iii. Clean the lesions of foot and mouth with potassium permanganate. iv. Apply antibiotic/ antiseptic solution/ ointment, if required. v. Clean and disinfect the farm house, utensils and surroundings.

3. Swine Dysentery	Bacteria	i. Contaminated feed and water ii. Contaminated soil	Diarrhea/dysentery ii. Yellow to gray soft faeces iii. High fever 104-105°F	i. Treat the animal with antidiarrhoeal drugs. ii. Clean the farm house with disinfectant and keep it dry. iii. Provide water with electrolyte sufficiently.
5. Piglet anaemia	Iron deficiency		i. Piglets become dull, weak and anemic. ii. Skin develops wrinkles and roughness. (generally observe in piglets of intensive system.)	i. Iron injection on 4 th and 14 th day of age ii. Supply iron salt (ferrous sulphate) on the sow's udder around the teats so that the piglets receive iron while sucking their mother.
6. Parasitic Infestations	Internal parasite e.g. round worm, tape worm, etc.	i. Contaminated feed, water, soil, grass, etc.	i. Roughness of body coat and stunted growth ii. Pot-bellied condition iii. Loss of appetite iv. Weight loss v. Diarrhea or constipation	i. Administer deworming drugs at 6 months interval. ii. Clean and disinfect the farm premises and surrounding. iii. Do not allow pigs to scavenge in dirty and damp place.
	External parasites, e.g. lice, tick, mite, etc.	i. Direct physical contact ii. Close association of the pigs in dirty environment	i. Itching, irritation and restlessness ii. Scab, abrasion of hair and loss of hair	i. Treat the pig with appropriate medicine. ii. Clean the pig with soap water and use Neem oil or Ascabiol. iii. Separate the affected pig from others. iv. Burn the floor/wall (concrete) with blow lamp.

13.4.3 Roles and responsibilities of the producer to overcome the disease problem

- The pigs should be closely observed once every morning while they are offered feed
- In case of any abnormality, the animal should be observed further to know if the symptom is because of any disease or some stress or unfavourable condition.
- If the symptom is because of perceived threat of disease, immediately a veterinarian should be consulted to prevent further deterioration.
- The history of the disease has to be explained to the veterinarian without any hesitation, and his advice followed thoroughly.
- The diseased animal has to be separated from the healthy flock. Separate arrangement for feeding the diseased pig has to be made.
- The animal has to be vaccinated against major viral diseases. Without vaccination, deadly viral disease like swine fever cannot be treated successfully with medicine.

Table 20: Vaccination schedule for pigs (may vary from company to company)

Disease	Vaccine	Age of vaccination	Dose	Immunity
Swine Fever	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	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

Note: Vaccine should be stored at 4° C temperature right from the point of production to injection of the vaccine. It should never be exposed to normal room temperature even during the time of transportation. Therefore, while the vaccine is transported from the point of procurement to the farm, it should be transported in a thermos flask with ice. During the time of vaccination, it should not be kept under room temperature for long time.

- De-worming drugs are to be provided after every six months, especially before onset of monsoon and after monsoon.

- If any external parasite (flies, tick, lice etc.) is observed, the animal should be treated at the earliest.
- Special care should be taken for weak pig/ piglet. Such animal may be offered additional good quality feed adding little mineral and vitamin mixture.
- The pig sty must be cleaned thoroughly every day. Water-logging and deposition of farm waste near the farm should be avoided.
- Visitors should not enter in the farm premises without cleaning their hands and feet. A provision of footbath containing potassium permanganate solution has to be made at the entrance of the farm.

13.5 Group Work

The participants will be asked to share their usual practice of treating diseased pigs. Additionally, one or two participants may be asked to tell their success stories in treatment of pigs.■

DAY 5

SESSION 14: Mode of Transmission of Germ and Adoption of Hygiene Practice for Prevention and Control of Germ

14.1 Resource Person

A veterinary practitioner/veterinary medicine specialist.

14.2 Session Objectives

- Understanding the mode of transmission of germs/causative agents
- Understanding different hygienic practices for prevention and control of diseases

14.3 Training Methods

- Participatory discussion
- Experience sharing
- Group work

14.4 Contents

14.4.1 Mode of transmission of infectious agents

To control infectious diseases it is helpful to understand how organisms are disseminated and gain access to the pig. Properties of an organism determine how long it survives inside the body of the pig, how infectious it is and how easily it can be transmitted. The methods by which disease spreads include the following:

- Direct contact with the infected pigs, including newly purchased pigs,
- Contamination through sneezing, coughing, animal excreta, etc.,
- Transmission by mechanical means like vehicles during transportation,
- Spreading from mechanical equipments, boots and clothing,
- Infection transmitted by human (e.g. influenza),
- Movement of birds, rats, mice, flies, dogs, cats and wildlife (e.g. wild boars,

- Environmental contamination in the pig farm resulting from, e.g. moving pigs into a contaminated pen and movement of contaminated faeces along defecating passage,.
- Contaminated feed and water,
- Air-borne transmission in aerosol droplets or dirt,
- Biting insects.

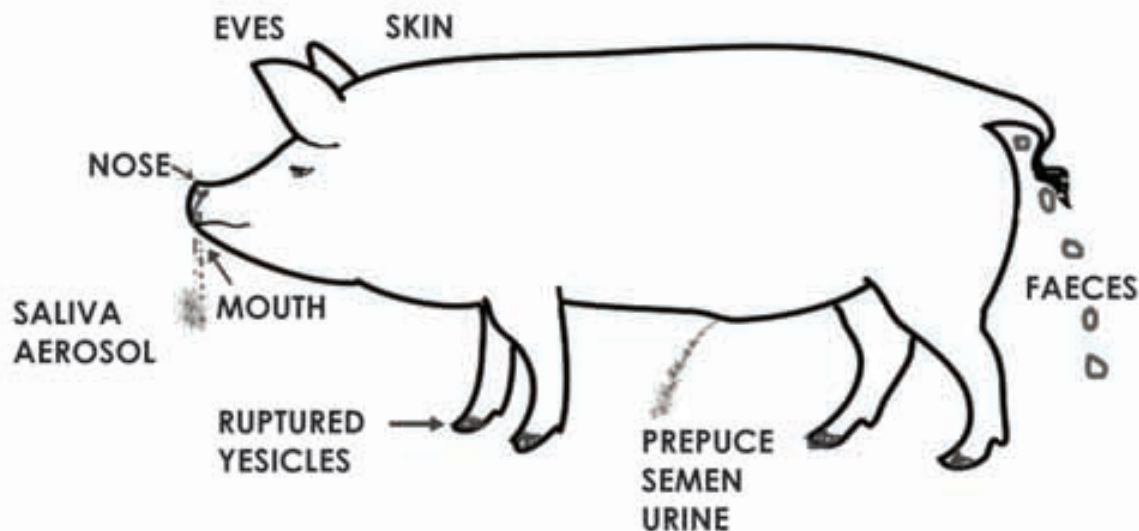


Fig 39: How organism enters and leaves the body (courtesy: www.pigsite.com)

14.4.2 Sanitation

It is the process of adopting hygienic measures to reduce diseases and create conditions for better health.

Popular proverb says, “**Prevention is better than cure.**”

“Pigs are often thought to be dirty, but actually keep themselves cleaner than most pets. They are seen lying in mud because they do not have sweat glands and constantly need water or mud to cool off.”

-The (U.S.) National Pork Producers’ Council

14.4.2.1 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 longevity of animals.
- Helps in minimizing contaminations and production of good quality meat and meat products.

14.4.2.2 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 parts on floor, walls, roof/ceiling should be cleaned thoroughly at least once in a month.
- Proper disposal of manure, feed wastes and other excreta is essential every day to prevent breeding of flies.
- Drainage system for liquid excreta and the manure pit should be constructed properly.
- Watering and feeding utensils should be cleaned thoroughly every day with disinfectant like potassium permanganate, bleaching powder, etc.
- Proper cleaning should keep the floor dry.
- In case of earthen floor, 15 cm top soil should be replaced by new soil/ sand. The floor should receive sunlight.
- The floors, walls and partitions, mangers, etc. should be washed with water containing a reliable disinfectant (1/2 kg of lime in one gallon of water and disinfectant).
- The surroundings of the pig sty should be disinfected at a regular interval. The site must be free of any garbage.
- Dead animal should be disposed properly by burring it away from the human habitation.

14.4.2.3 Special sanitation programme when pigs in a flock suffer from disease

- Diseased animals should be separated to prevent healthy pigs from catching infection, and also to keep the diseased animals under observation.
- Curative treatment should be given to the suspected animals. It should be provided in isolation until they are free of infection.

- The contaminated premises and utensils are to be cleaned thoroughly using hot water and disinfectant. Pig sty and its surrounding may be disinfected with lime, phenol and formalin etc.



Fig 40: 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 for wound dressing.
- All waste products including blanket, thrown off by the sick animals may be infectious and must be immediately buried or rendered harmless.



Fig 41: Disposal of dead carcass through burial method

- Discharges from nose, mouth, skin, eyes, uterus, dung and urine can become dangerous sources of infection. To prevent the spread of these infectious discharges, all persons other than the attendant of diseased animals should stay away from infected pens, utensils, clothing, etc.
- Dry sweeping or dusting throws the infective organism to air to settle elsewhere. As a precaution, all surfaces should be moistened before sweeping and scrapping.
- All infected manure and bedding materials should be burnt.
- Finally, the attendant should disinfect his/her hands, arms, boots and other articles of wear.
- Animals in good health should be washed or bathed once or twice a week.

14.4.3 Disinfectant

- Compounds used to kill germs are called disinfectants.
- Causative agents of many diseases are extremely small and may remain for indefinite period in dust, cracks and crevices of buildings. This necessitates disinfecting the entire premises.

Table 21: 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, rinsing utensils	Utensils and floors	Little capacity to disinfect, but effective cleansing agent
Lime	½ kg lime per gallon of water as whitewash + 5% phenol.	Sprinkling, dusting of powder of lime alone.	Floors, walls and grounds	Use freshly prepared solution.
Potassium permanganate	1:10,000 solution in water.	Splashing (wet the surface with the solution)	Floors, gutters, and troughs	Disinfection action is due to oxidizing capacity
Phenol	2-5% solution 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: Principles & Practices of Animal Health & Hygiene by Dr. Neeraj (1998)

14.5 Group Work

The participants, divided into small groups, should design a Hygiene and Sanitation drive in their community with the use of required antiseptic/disinfectant to prevent transmission of diseases. ■

SESSION 15: Minor Surgical Problem of Pig

15.1 Resource Person

A veterinary practitioner (surgeon).

15.2 Session Objectives

By the end of the session the participants should have brief idea on different minor surgical problems of pigs (e.g. castration, cutting of needle teeth, hernia, atresia ani, wounds, etc.).

15.3 Training Methods

- Discussion on the minor surgical problems of the pigs
- Sharing of the trainer's field experiences on the minor surgical problems with the trainees (correcting the minor surgical problems is not under the purview of this manual)

15.4 Contents

15.4.1 Castration

It means removing or making dysfunctional the testes of a male pig to prevent from breeding a female pig.

Purpose of castration

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

Time of castration: Any time of the year.

Age of castration: 1.5-3 months of age.

Treatment: By a qualified veterinarian or a trained paravet to perform the castration.

15.4.2 Atresia ani (no anus)

It is a condition of a pig where the rectum ends blindly. The anus is not formed. The condition is found mainly in newborn piglets. Affected piglet cannot defecate, resulting enlargement of abdomen. Surgical correction of the rectum is the only way to treat the animal. This should be done by an experienced veterinary practitioner.

15.4.3 Clipping needle teeth

The needle teeth and canine teeth are very sharp in piglets and are often routinely clipped. This prevents damage to the facial skin of other piglets in the event of fighting among them. It also prevents damage to the sow's udder. If the volume of sow's milk is adequate for the number of piglets in the litter, clipping of the needle teeth may be unnecessary. However it is usually done to avoid future problems. This can be done by a veterinarian or an experienced paravet.

15.4.4 Ear notching

It is an identification system of pig. It is used mainly in organized breeding farm especially if pigs are insured. There are several methods of identification, one of which is ear notching.

The notches are placed in the margins and tips of the ears to enable identification of pigs. This can be done by a veterinarian or an experienced paravet.

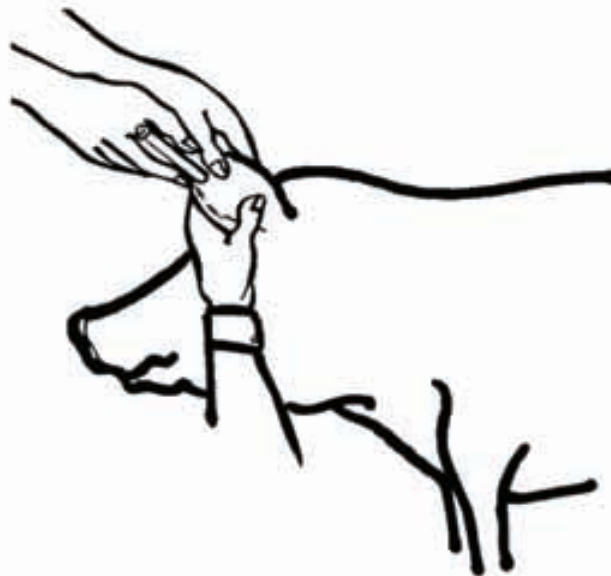


Fig 42: Ear notching of a pig

15.4.5 Foot rot

It is a condition of foot-infection caused mainly by germs (streptococcus and staphylococcus). The condition may occur due to unhygienic floor condition. This can be treated by a veterinarian or an experienced paravet.

15.4.6 First Aid to cut wound

Cut wounds generally have even edges, sometimes bleeding is profuse. This can be treated by a veterinarian or an experienced paravet (under the supervision of a

veterinarian). Such cases should be treated immediately. Regular dressing and use of antibiotics help in early recovery. Unhygienic condition may lead to maggoted wound or septicemia(a condition in which infection spreads to the whole body).

15.4.7 Dressing of maggoted wound

Maggoted wound can be detected by presence of an offensive smell, dribbling of blood mixed exudates. Maggots are seen in the wound. This can be treated by a veterinarian or an experienced paravet (under the supervision of a veterinarian).■

SESSION 16: Economics of Small Piggery Unit

16.1 Resource Person

Experienced pig producers or a veterinarian having experience on pig farming.

16.2 Session Objectives

At the end of the session, the participants should be able to explain the requirements to start a small backyard farm or a commercial farm. They should know the probable investment and economics of such a farm.

16.3 Training Methods

- Classroom discussion

16.4 Contents

16.4.1 Points to consider before starting a new pig farm

- The entrepreneur should be ready to devote time and energy for management of the farm. One should not solely depend on others' labour for management of the farm.
- Initially, the size of the farm should be within manageable limits from all aspects. It may even be necessary to start first with the help of the family members.
- Pig farm should be started with either one of the two objectives: (a) market-oriented backyard farming (rearing of 1-5 pigs with household labour and feed resources) to supplement income, or (b) commercial farming (more than 10 pigs) as a source of self-employment.
- If the pig farm is started to supplement income, one can avail micro-credit facilities offered by several micro-credit lending institutions like NGOs, NEDFi, RGVN, BASIX, etc.
- For a bigger loan to start a larger farm the producer can approach commercial banks like SBI, UBI, PNB, IB, etc.
- Improvement of infrastructure like land development, boundary fencing, farm building, etc. should be taken up depending on the flow of profit.
- Initial investment should concentrate on components such as piglet, feed, health care, management, etc.
- Only good quality piglets have to be purchased and fed adequately to ensure more production and more profit. The health care measures must not be ignored.
- Consultation with a veterinarian or experienced person to learn about the suitable breed, housing system, etc. is helpful.

- Before purchasing piglets, different pig breeding farms may be visited in the area to assess performance and history of different pig herds. Ideally, piglets should be procured from same the agro-climatic condition.
- The pigs should be vaccinated with good quality vaccine against prevailing diseases like swine fever.
- De-worming drugs have to be administered periodically.
- Cleanliness of the farm must be maintained.
- Food-feed crops like maize, tapioca, colocacia, sweet potato, etc. as mixed feed for the pigs may be cultivated.
- The pigs should be insured with a reputed insurance company.
- Different market opportunities should be explored before the pigs/ piglets achieve market weight/ age. Producers should know how to weigh the pigs through heart girth method or weighing balance.
- Loan, if any, must be repaid timely to build reputation with the bank.

16.4.2 Backyard pig farming as a supplementary source of income (costs are indicative and may vary from place to place/time to time)

A. Cost of the animals

Sl. No.	Item	Cost (Rs.)
1	One female piglet, 2- month old @ Rs.2000/- each	2,000
2	Two castrated male for fattening purpose @ Rs.2000/ each	4,000
3	Transportation cost	500
	Sub Total	6,500

B. Civil Structure (with locally available materials- floor rough concrete and roof with tin)

Sl. No.	Item	Cost (Rs.)
1	Construction of pig sty of 80 sq.ft with locally available materials for 1 sow @Rs.70/sq.ft	5,600.00
2	Construction of pig sty of 80 sq.ft for 2 fatteners	5,600.00
	Sub Total	11,200.00

C. Utensils and miscellaneous items

Sl. No.	Item	Cost (Rs.)
1	One bucket	150.00
2	Two bowls	300.00
3	One rope	50.00
	Sub total	500.00

D. Total capital investment (A+B+C) = Rs. 18,200/-**E. Working capital (first year)**

Sl. No.	Item	Cost (Rs.)
1	Feeding for one year	
	One sow x 365 days x average 2 kg x Rs.12/-	8,760.00
	Two fatteners x 300 days x 1.5 kg x Rs.12/-	10,800.00
	Total	19,560.00
	Replacement of 70% of feed with locally available feed resources (residue of country liquor, hotel waste, kitchen waste, forages etc.)	13,692.00
	Actual feeding cost	5,868.00
2	Collection/ procurement cost of locally available feed resources (lump sum)	3,000.00
3	Breeding cost of one sow	800.00
4	Medicine, vaccine and de-worming drugs/ animal @ Rs.300/-	900.00
5	Labour (farmer's own)	0
6	Cost of cultivation of sweet potato, tapioca, colocacia, etc.	1000.00
7	Transportation cost and miscellaneous	1000.00
	Total recurring cost	12,568.00

F. Total investment in first year (D + E) = Rs. 30,768.00

G. Total Income in First Year

Sl. No.	Item	Cost (Rs.)
1	Selling of two fatteners at 12 months age (10+2) @Rs.8000/ pig	16,000.00
2	Selling of 8 piglets from 1 st batch @Rs.2000/- piglet	16,000.00
	Gross income	32,000.00

H. Gross profit (G - E) = Rs. 19,432.00

I. Net income (H - cost of 2 fatterer piglets) = Rs. 15,432.00

Economic Statement (Second year onwards)

E. Working capital (second year onwards)

Sl No.	Item	Cost (Rs.)
1	Feeding for one year	
	One sow x 365 days x average 2.5 kg x Rs.12/-	10,950.00
	Two fatteners x 300 days x 2 kg x Rs.12/-	14,400.00
	Total	25,350.00
	Replacement of 70% of feed with locally available feed resources (residue of country liquor, hotel waste, kitchen waste, forages etc.)	17,745.00
2	Actual feed cost	7,605.00
3	Collection/ procurement cost of locally available feed resources (lump sum)	3,000.00
4	Breeding cost of one sow	800.00
5	Medicine, vaccine and de-worming drugs/ animal @ Rs.300/-	900.00
6	Labour (farmer's own)	0
7	Cost of cultivation of sweet potato, tapioca, colocacia, etc.	1000.00
8	Transportation cost and miscellaneous	1000.00
	Total recurring cost	14,305.00

F. Total income in first year

Sl. No.	Item	Cost (Rs.)
1	Selling of two fatteners at 12 months age (10+2) @Rs.8000/ pig	16,000.00
2	Selling of 16 piglets (keeping 2 piglets for fattening) from 1 st and 2 nd batch @Rs.2000/- piglet	32,000.00
	Gross income	48,000.00

G. Gross profit (F - E) = Rs. 33,695.00

H. Net profit (G - cost of 2 fattener piglets) = Rs. 29,695.00

16.4.2 Commercial pig farming as a source of self-employment (5 sows + 1 boar + 4 fatteners)

A. Cost of the animals

Sl. No.	Item	Cost (Rs.)
1	One male piglet at 2 months old @Rs.2000/- each	2,000.00
2	Five female piglets at 2months old @Rs.2000/ each	10,000.00
3	Four castrated male for fattening purpose @ Rs.1500/ each	6,000.00
4	Transportation cost	2,000.00
	Sub Total	20,000.00

B. Civil Structure (with locally available materials- floor rough concrete and roof with tin)

Sl. No.	Item	Cost (Rs.)
1	Construction of pig sty (with locally available materials) of 80 sq.ft for one male pig/ boar @Rs.70/sq.ft	5,600.00
2	Construction of pig sty of 100 sq.ft for 4 gilts/sows @Rs.70/sq.ft	7,000.00
3	Construction of pig sty of 100 sq.ft for 2 fatteners and 2 growers @Rs.70/sq.ft	7,000.00
4	Construction of a farrowing pen of 80 sq.ft @Rs.70/sq.ft	5,600.00
5	Construction of an isolated pen for diseased animal of 50 sq.ft @ Rs.70/sq.ft	3,500.00
	Sub Total	28,700.00

C. Utensils and miscellaneous items

Sl. No.	Item	Cost (Rs.)
1	Two buckets	300.00
2	Five bowls	1000.00
3	Ropes	200.00
	Sub total	1,500.00

D. Total Capital Investment (A+B+C) =Rs. 50,200.00

E. Working Capital (first year)

Sl No.	Item	Cost (Rs.)
1	Feeding for one year	
	One boar x 365 days x average 2 kg x Rs.12/-	8,760.00
	Five sows x 365 days x average 2 kg x Rs.12/-	43,800.00
	Four fatteners x 300 days x 1.5 kg x Rs.12/-	21,600.00
	Total	74,160.00
	Replacement of 50% of feed with locally available feed resources (residue of country liquor, hotel waste, kitchen waste, forages etc.)	37,080.00
	Actual feeding cost	37,080.00
2	Collection/procurement cost of locally available feed resources (lump sum)	5,000.00
3	Medicine, vaccine and de-worming drugs/animal @ Rs.400/-	4,000.00
4	Labour (farmer's own)	0
5	Cost of cultivation of sweet potato, tapioca, colocacia, etc.	5000.00
6	Transportation cost and miscellaneous	4000.00
	Total recurring cost	55,080.00

F. Total investment in first year (D + E) = Rs. 1,05,280.00

G. Total Income in First Year

Sl. No.	Item	Cost (Rs.)
1	Selling of four fatteners at 12 months age (10+2) @Rs.8000/- pig	32,000.00
2	Selling of 40 nos. of piglets (8 piglets x 5 sows) from 1 st batch @Rs.2000/- piglet	80,000.00
	Gross income	112,000.00

H. Gross profit (G - E)

= Rs. 56,920.00

Deduction (purchasing cost of 4 fatteners)

= Rs. 8,000.00

I. Net profit

= Rs. 48,920.00

Economic statement (second year and onwards)

E. Working Capital (second/third year)

Sl No.	Item	Cost (Rs.)
1	Feeding for one year	
	One boar x 365 days x 2.5 kg x Rs.12/-	10,950.00
	Five sows x 365 days x 2.5 kg x Rs.12/-	54,750.00
	Four fatteners x 300 daysx 2.0 kg x Rs.12/-	28,800.00
	Total	94,500.00
	Replacement of 50% of feed with locally available feed resources (residue of country liquor, hotel waste, kitchen waste, forages etc.)	47,250.00
	Actual feed cost	47,250.00
2	Collection/procurement of locally available feed resources (lump sum)	10,000.00
3	Medicine, vaccine and de-worming drugs/animal @ Rs.500/-	5,000.00
4	Labour (farmer's own)	0
5	Cost of cultivation of sweet potato, tapioca, colocacia etc.	7000.00
6	Transportation cost and miscellaneous	5000.00
	Total recurring cost	74,250.00

F. Total income in second/ third year

Sl. No.	Item	Cost (Rs.)
1	Selling of four fatteners at 12 months age (10+2) @Rs.8000/- pig	32,000.00
2	Selling of 80 nos. of piglets (8 piglets x 5 sows x 2 farrowings) @Rs.2000/- piglet (keeping 4 piglets for fattening)	1,60,000.00
	Gross income	1,92,000.00

G. Gross profit (F-E) in second year = Rs. 1,17,750.00 ■

DAY 6

SESSION 17: Credit and Insurance Schemes for Pig

17.1 Resource Person

A bank/insurance officer or a person having experience on the relevant field.

17.2 Session Objectives

At the end of the session the participants should have brief idea about some of the prevailing credit and insurance schemes and the process of availing them.

17.3 Training Methods

- Description of different schemes with simple calculation
- Distribution of leaflets, brochure, etc. of the bank and insurance companies (if available)

17.4 Contents

17.4.1 Credit Schemes

17.4.1.1 Micro-credit schemes

What is micro-credit?

- Small amount of credit (no specific limit but generally varies from Rs.5000/- to Rs. 25,000/- for an individual and Rs.20,000/- to Rs.4,00,0000/- for SHGs offered by micro- credit lending institutions/ NGOs with little or no paper work.
- The loan is meant for taking up any income generating activity (e.g. livestock and poultry rearing, livestock trading, cottage milk processing, etc.).
- Repayment process by an individual to NGOs is quite flexible. Repayment may be daily/ weekly/ fortnightly/ monthly basis. However repayment procedure by NGOs to bank/ financial institution may be monthly/ quarterly.

Need for micro-credit

- Poor people depend on local money lenders who charge normally very high; (5-10% per month or 60-120% per year). Micro credit ensures abolition of exploitation by money lenders.

- Poor people do not approach banks for the complex procedure to be followed. The micro-credit system follows simple procedure for the needy (on a small scale). This system is friendly to the smallholders.
- Commercial banks are not interested to extend small loans because of higher operation cost. The micro-system operates with less cost and plays a positive role for smallholders.

Benefits of micro credit

- Individual borrower need not approach any bank or financial institution.
- They need not submit any collateral security or mortgage anything.
- There is no legal problem.
- Paper work, if any, is little.
- Repayment procedure is friendly.
- Loan can be obtained locally from an NGO in a short time.
- Interest rate is much lower (about 16- 24% per year).

17.4.1.2 Financing of Joint Liability Group (JLG) by SBI

- Joint Liability Group (JLGs) is another model for providing credit to those who remain uncovered by formal financial institutions.
- The tenant farmers and farmers with small land holdings without proper revenue records are adopted by the banks in groups. Guarantee is provided by the members of JLG. It reduces transaction costs of both the bank and the borrowers and helps in loan recovery.

General features of JLG

- A JLG is an informal group comprising of 4 to 10 individuals coming together to avail bank loan either on individual basis or by the group as a whole. They mutually become the guarantor of each other as a group.
- The JLG members offer a joint undertaking to the bank that enables them to avail loans.
- The management of the JLG is kept simple with little or no financial administration within the group.

Loan limit

Maximum amount of loan is restricted to Rs. 50,000.00 per individual.

Rate of interest

As applicable to SHGs.

Margin and security norms

No collaterals may be insisted upon against the loans to JLGs. It may, however, be ensured that the mutual guarantee offered by the JLG members are kept on record. Margins as per the usual norms may be applied.

17.4.2 State Bank of India's loan for piggery

This is a scheme for supporting commercial pig farm.

Purpose of loan

Loan is offered for construction of shed, purchase of piglets, feeds and equipments, etc.

Eligibility

- Individual farmers who are experienced in rearing pig and marketing of pork.
- Applicant's age should be less than 65 years.

Loan amount : Depending upon the project cost or the requirement of the farmer.

Margin : 15-25%

Period of loan : 5-6 years

Moratorium period : 6 months to one year.

Repayment : Half-yearly installments.

17.4.3 Pig insurance scheme

Following insurance companies insure livestock on a small scale.

- New India Assurance Company Limited
- United India Insurance Company Limited
- Oriental Insurance Company Limited

These companies offer coverage of risk from diseases and accident to the livestock mainly raised under government schemes or bank loan. In general, insurance companies are not very keen to insure livestock.

Criteria of existing schemes

Capability : Indigenous/cross-bred/exotic pigs

Age group : 6 months to 3 years

Identification : Ear tagging/hot branding/tattooing

Scope of cover : Death due to disease and accident

Valuation : As per sliding valuation scale given below for indigenous pigs only.

Maximum sum insured: Rs. 1050.00 (old rate), Rs.5000.00 (revised rate)

Age	Value in Rs.	Note
2-3 months	350.00	<ul style="list-style-type: none"> ▶ For cross- bred and exotic pigs, valuation should be done by a qualified veterinary surgeon at the time of proposing insurance. ▶ Premium is based on the peak valuation; claim amount is determined by the valuation table.
3-4 months	450.00	
4-5 months	550.00	
5-6 months	650.00	
6-7 months	750.00	
7-8 months	900.00	
8-19 months	1050.00	

Exclusions

Common exclusions: As per cattle insurance scheme item Nos. 7(A)

Specific exclusions:

- Partial disability of any type whether permanent or temporary.
- Permanent total disability.
- Disease contracted prior to and within 15 days of commencement of risk.
- Breeding and farrowing risks.
- Swine fever disease is covered by the policy if the animal is successfully inoculated against the disease and Veterinary Certificate to the effect is supplied to the Company.

Claims

- Immediate intimation
- Veterinary Certificate of death in Company's form.
- Post- mortem report, if required, and
- Ear tag, if applied.

Limit of liability

80% of sum insured. ■

SESSION 18: Field Visit

The trainees are divided into two groups. One group will visit a backyard farm and another group will visit a commercial farm and will try to understand the following topics in consultation with the farmers:

- Housing system, cost of construction, durability, advantage, disadvantage, etc.,
- Breed reared and production performances,
- Breeding system and breeding management,
- Care and management of pig/piglet/sow/boar,
- Daily routine of the farmer,
- Feeding schedule of pig and sources of feed,
- Major diseases prevailing in the farm,
- Preventive measures adopted by the farmer,
- Marketing issues,
- Problems faced by the farmer and the coping mechanism adopted,
- Economics of the farm,
- Bank loan/ insurance availed by the farmer. Future plan of the farmer.

At the end of the visit, both the groups will note the key learning points and explain the same to all the trainees. They will also respond to the queries of the other group members. ■

Annexure

Use the following evaluation form before and after the training to evaluate the knowledge of the participants and effectiveness of the training.

Subject	Knowledge (use tick mark)				Usefulness of the learning to improve the system (use tick mark)		
	Before training		After training		Not useful	Useful	Very useful
	Yes	No	Yes	No			
Importance of pigs on livelihood							
Advantage and disadvantage of different housing systems							
Knowledge on improved/scientific housing system							
Knowledge on different methods of controlling pigs							
Knowledge on methods of transportation of pigs							
Knowledge on different breeds of pigs and their characteristics							
Knowledge on breeding management							
Knowledge on selection of piglets/ pigs							
Knowledge on management of breeding boar, sows, growers and piglets							
Knowledge on feed and feed requirement of different categories of pigs							
Knowledge on composition of concentrate feed							

Knowledge on cultivation of food feed crops							
Knowledge on management of hygiene and sanitation of pig							
Knowledge on prevailing diseases of pig							
Knowledge on credit and insurance schemes							
Knowledge on economics of smallholder piggery unit							
Total							
Give marks out of 10 (10 is the best, 0 is the worst)							
Content of the training manual							
Resource person							
Teaching method							
Venue and logistics							
Food							

BIBLIOGRAPHY

- Banerjee G.C. 1998- A textbook of Animal Husbandry (8th edi), Oxford and IBH publishing co. Pvt. Ltd. New Delhi.
- Battaglia Richard A. and Mayrose Vernon B, 1987- Handbook of Livestock Management Techniques, Surjeet Publications.
- Baxter Seaton, 1984- Intensive Pig production, Granada publishing ltd.
- Bujarbaruah, K.M, Das A., Bordoloi, R.K., Naskar, Kumaresan, A. 2006- “Why” and “How” of Pig Farming in North Eastern Region of India, Technical Bulletin No.18, ICAR-NEH
- Cunningham J.G. and Klein Bradley G.- Textbook of Veterinary Physiology (4th edi), 2009, Saunders, an imprint of Elsevier Inc.
- Deka R. & Thorpe W, 2007- Assam’s Pig subsector Current status, constraints and opportunities, International Livestock Research Institute (ILRI), New Delhi
- Deka R. & Thorpe W, 2008- Nagaland’s Pig subsector Current status, constraints and opportunities, International Livestock Research Institute (ILRI), New Delhi
- Deka R. & Wright I., 2009, Potential for Livelihood Improvement through Livestock Development in Jharkhand, International Livestock Research Institute (ILRI), New Delhi
- Ensminger M.E. and Parker R.O.- Swine Science , 1970 (4th edi) The interstate, Printers and publishers, Inc.
- Grandin T. 2005 (2nd edi)- Livestock handling and Transport.. CABI publishing
- Hui, Y.H., Nip Wai- Kit, Rogers Robert, W. and Young Owen A., 2005- Meat Science and applications
- ICAR, 2002- Handbook of Animal Husbandry (3rd edi), ICAR, Pusa, New Delhi
- Leman A.D., Straw B.E., Mengeling W.L., Allaire S.D. and Taylor D.J.1992, (7th edi)- Diseases of Swine, Wolfe Publishing ltd.
- Menitt J.I.,1983- Livestock husbandry tech., Granada Publishing Ltd.

Pal Mahendra- Zoonoses

Pond W.G. and Maner J.H., 1974- Swine Production in Temperate and Tropical Environments, W.H. Freeman and Company, San Francisco

Popesko Peter, 1975- Atlas of Topographical anatomy of the domestic animals, (2nd edi), W.B. Saunders company Philadelphia, London, Toronto.

Prasad J. and Neeraj (1998) Principles and Practices of Animal Health and Hygiene, Kalyani publishers. P 227-237

Prasad J. 2009; Goat, Sheep and Pig Production and Management (3rd edi), Kalyani Publishers, Ludhiana

Ranjhan, S.K., 1977; Animal Nutrition & Feeding Practices, Vikash Publishing Home Pvt. Ltd.

Rastogi S.R.- Essentials of Animal Physiology

Roberts Stephen J., 1982- Veterinary obstetrics and Genital diseases (Theriogenology) 2nd edi), CBS Publishers and distributors.

Sainsbury David, 1963- Pig housing. Farming Press Ltd. Wharfedale Road, IPSW/CH, Suffolk

Sapre, V.A, 1996; A Handbook for Veterinary Physician, Nagpur

Sastry N.S.R. and Thomas C.K., 2005- Livestock Production Management. (4th edi) Kalyani Publishers.

Saxena C.B. and Saxena R.K., 2003 (1st edi)- Pig Production planning, management and Monitoring. International Book Distributing co.

Serres H., 1992- Manual of Pig Production in the tropics, CABI Publishing

Thapliyal D.C. and Misra D.S., 1996 (1st edi)- Fundamentals of Animal Hygiene and Epidemiology, International Book distributing co.

Tomar S.S, 2005; Textbook of Animal Breeding, Kalyani Publishers, New Delhi

www.thepigsite.com