

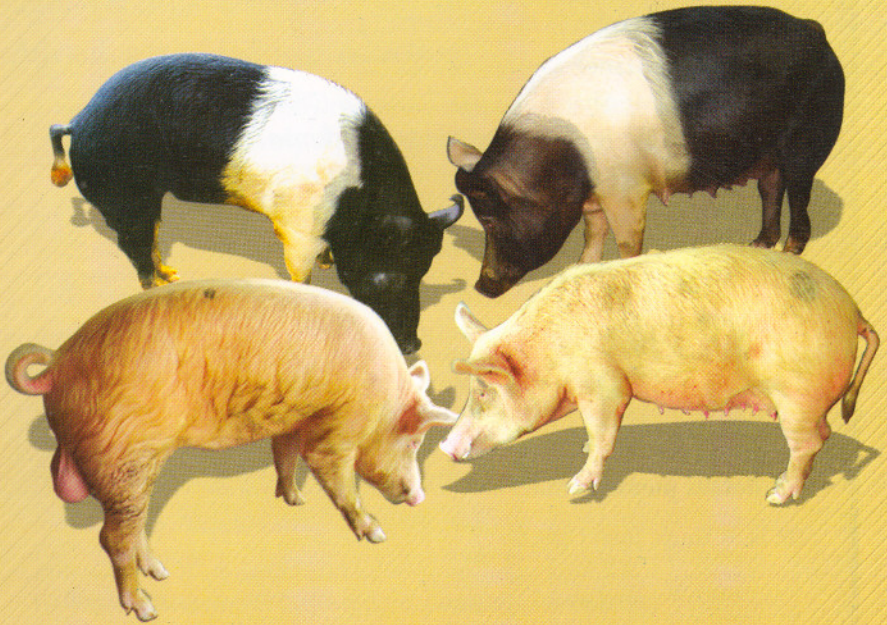


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SWINE PRODUCTION IN TRIPURA : A SCIENTIFIC APPROACH



INDIAN COUNCIL OF AGRICULTURAL RESEARCH
ICAR Research Complex for NEH Region
Tripura Centre, P.O. Lembucherra - 799 210
Tripura (west)

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Prepared by :

Dr. Chander Datt, *Scientist, SS (Animal Nutrition)*

Dr. S. K. Ghosh, *Scientist, SS (Animal Repro.)*

Dr. N. P. Singh, *Joint Director*

Dr. K. M. Bujarbaruah, *Director*

Technical assistance :

Mr. Shambhu Deb, *Technical Officer*

Mr. Jogendra Debbarma, *Stockman*

Designing :

Mr. Shekhar Ghosh

Published by :

Dr. N. P. Singh, *Joint Director*, ICAR Research Complex for NEH Region, Tripura Centre, Lembucherra - 799210, Tripura (west).

For details please contact :

Dr. N. P. Singh, *Joint Director*

ICAR Research Complex for NEH Region, Tripura Centre, Lembucherra-799210 Tripura (west), Phone: (0381) 2400047/286553 (O) 2353725 (R), Fax (0381) 2865201 / 2865537, E-mail : narendraprataps@yahoo.co.in.

Dr. K. M. Bujarbaruah, *Director*

ICAR Research Complex for NEH Region, Umiam-793103, Meghalaya. Phone : (0364) 2570257 (O), 2570302/2226808(R), Fax : (0364) 2570363/2570501, E-mail : director@icar.neh.ren.nic.in.

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SWINE PRODUCTION IN TRIPURA : A SCIENTIFIC APPROACH

In Tripura, pigs contribute 40 per cent of the total meat production. The total pig population is 2.09 lakhs out of which indigenous pigs comprise 1.14 lakhs. Pig rearing is, however, almost entirely in the hands of poor people mainly tribals with little resources who continue to follow old methods of rearing. The common village pig of Tripura (Dome and Mali, non-descript breeds) is small sized, slow grower produces small litters and has a pork of low quality. The cross bred pigs have the advantage over the local pigs as they grow faster, produce larger litter and meat is of better quality.

Advantages of swine production

- They are prolific breeders and produce large litters (6-7) after a relatively short gestation period (112-115 days). So the financial returns come in a relatively short period compared to other enterprises.
- Investment is less.
- Pigs can consume a variety of feedstuffs e.g., livestock and poultry wastes, damaged grains, kitchen left over/restaurant waste, forages etc.
- Pigs are efficient converter of animal feeds to human food of high quality. A kilogram of pork can be produced from as little as 3.0-3.5 kg of feed.
- They require small area for rearing as compared to large animals.
- Dressing percentage is higher (70-80 per cent) in comparison to other livestock. A high percentage of other useful products per pig is obtained in form of blood, skin, hair, hoof, bones etc. Meat is not only rich in protein but also a good source of energy. Raw pork contains 37, 10 and 52 per cent of water, protein and fat, respectively. It possesses 6, 103, 1.5, 0.5, 0.12 and 2.70 mg per cent

of calcium, phosphorus, iron thiamin, riboflavin and niacin, respectively. The contents of oleic and linoleic acids are 22 and 5 per cent, respectively. Pig fat is also used for medicinal purpose.

- They produce manure to improve soil fertility (N 0.6%, P 0.5%, K 0.2%). Biogas can be produced from pig faeces.
- Bristles can be used for brush making.
- Last but not the least, they are profitable for small farmers in backyard system where input cost is less as they can be fed on cheaper feeds and kitchen leftovers etc.

Meat Production Scenario

Animal Resource Development Department, Govt. of Tripura has prepared a perspective plan to minimize the gap between demand and supply of meat where in pig sector has an important role to play considering the fact that it contributes 40 percent of total meat production of the state.

Table 1. Meat production scenario (2002-03) and targetted meat production (2011-12)

Sl. no.	Type of meat	Production (MT)	% of total	Target (x 10 ³ MT)
1.	Pork	3215.9	40	11.00
2.	Broiler chicken	1838.3	25	6.88
3.	Chicken & duck (Layer type)	1450.6	22	6.05
4.	Chevon	995.3	13	3.57

For achieving the target scientific management of pig farming is of paramount importance. Various aspects of scientific pig rearing have been discussed henceforth.

Breeds of choice

Good breeding stock is essential for a profitable swine enterprise. The following factors should be considered in selecting a breed: prolificacy, growth rate, temperament, carcass quality,



Crossbred (Hampshire X Local) Female



Crossbred (Hampshire X Local) Female

feed conversion efficiency, disease resistance, feeds available, market demand, etc. Generally, boars of Large White and Middle White Yorkshire, Landrace and Hampshire have been used for upgrading the native stock. The crossbred pigs (Large White Yorkshire x Desi ; 50% inheritance) have shown a good potential as their adult body weight has been recorded as 70 to 80 kg, puberty attainment at 6 to 8 months, breed twice in 16 to 18 months and are prolific breeders producing a litter size of 10 to 12. Also crossbred pigs (Hampshire x Khasi Local) with 87.5 % inheritance have been performing very well (Table 4)

Reproductive management and care of piglets

Puberty in the gilts is reached at 7-12 months of age. It is better to neglect first one or two estrus and breed the gilt at next estrus. The heat period lasts for 48-72 hours. The length of the estrus cycle is 21 days. The signs of estrus / heat are restlessness, mounting of other pigs, frequent urination, swollen and congested vulva, occasional mucus discharge, elevation of tail, pricked ears and loss of appetite. All the above mentioned signs may not be exhibited by a single sow. Heat could readily be determined by pressing loin of the sow using the palms of both hands. The estrus sow will stand motionless with cocked ears whereas the sow not in heat will object to this approach. The best time to mate is 12-36 h after the onset of estrus and repeat the same after an interval of 12-24 h to achieve higher conception rate and litter size. The average gestation period is 114 (112-115) days. A mature boar should be used for mating but it is better not to use a boar of more than 5 year old for natural service. Size of both boar and

sow should be similar to avoid any mating accident. Management of sows during pregnancy is important. If sows are not in good condition at farrowing (delivery), piglets would not get a good start and their growth and profit later on would be small. About 3 days before a sow is due to farrow, she should be confined to farrowing pen. The pen should be dry, clean, well ventilated, and disinfected. When farrowing occurs in cold weather, piglets should be provided heat using heat lamp as their zone of thermal comfort lies between 30 - 37^o C. Provide good bedding. At least one person should be present during farrowing. A laxative ration should be fed to sow in moderate amount just prior to farrowing. The piglets should be removed immediately after farrowing and the mucous should be cleaned of to ensure that breathing passages are clear. The weak piglets should be guided to suck mother's teat. Most of the sows farrow within 24h after milk develops in the nipple. There is marked restlessness and champing of bedding material 24 h before farrowing. The farrowing is usually complete within 1 to 6 h. The sow should not be given any feed during 24 hours after farrowing. Plenty



of lukewarm water, however, **A sow (Hampshire x Local) with her litter (10 No.)** should be made available. The sow should be lightly fed up to 7-10 day of farrowing after which they can be full-fed.

The navel cord of the piglets should be clipped and be treated with tincture iodine. Feeding of colostrum to piglets is important for immunity. Sometimes it happens that when the sow farrows she will not have any milk, then the piglets can be fed on cow's milk in small quantities at 2 hours intervals using a nipple. The sow milk is deficient in iron which is very essential for newly born piglets. Therefore, each piglet should be injected with 1ml iron (*Imferon*[®]) at 3, 7 and 14 days of age. Alternatively, teats of the dam can be applied with ferrous sulphate solution. Male piglets to be kept for meat purpose should be castrated at

2-3 weeks of age for better meat quality. Piglets should be weaned /separated from mother at 8 weeks of age.

Feeding

Feed represents about 70-75 per cent of total cost of production. Therefore, for successful swine production properly balanced diets should be fed which means that nutritional needs of pigs for carbohydrates, proteins and lipids, minerals and vitamins should be met. A balanced ration should also be economical and palatable.

Carbohydrates are the chief source of energy. Various feed ingredients like maize, wheat, rice bran, wheat bran, broken rice, potato, sweet potato, tapioca tubers etc. can be used. The rations for growing pigs should not contain more than 8 per cent fibre, however, sow rations may have 10-12 per cent fibre.



Rice brewery waste : A common feed for pigs in rural areas

Proteins are needed to form milk, meat, hide, hoof, hair, hormones, enzymes, blood cells and other constituents in the body when they are given adequate diets. Proteins are needed as sources of amino acids both indispensable (arginine, histidine, leucine, lysine, tryptophan, phenyl alanine, methionine, valine, threonine and isoleucine)

and dispensable ones which supply nitrogen, the former being dietary essential. The protein sources could be of plant origin (soybean meal, ground nut cake, mustard cake, til cake etc.) and animal origin (fish meal, meat meal etc.). Plant proteins are normally deficient in lysine while animal proteins are good sources. Therefore, a mixture of both should be used. The level of protein in the diet is very important. The protein level should be higher (15-18%) in the diets of growing pigs (12-50 Kg) than the level of 12 per cent in the diet of finisher pigs (50-70 Kg).

Lipids provide energy, add palatability, decrease dustiness of certain feeds, act as carrier of nutrients including fat soluble vitamins and sources of fatty acids. Vegetable oils are good sources of fats for swine.

Minerals perform various functions in the animal body. Lack of minerals in the diets may cause a variety of symptoms: reduced appetite, poor growth rate, rickets, posterior paralysis, goitre, anaemia, poor reproduction, health and productivity. There are about 25 essential minerals including major and trace elements. Of these, 10 are likely to be deficient in swine rations: Ca, P, Na, Cl, Co, Fe, Cu, Zn, I and Se. If B₁₂ is sufficient in the diet Co may not be needed. It is recommended to supply mineral mixture @ 1.5-2.0 per cent of the ration.

Vitamins though required in minute amounts but are essential for various body functions. Various symptoms occur due to deficiency of fat soluble vitamins viz., vit.A (xerophthalmia, conjunctivitis, blind and deformed litters in pregnant animals, reduced growth rate), vit.D (enlarged joints, broken bones, stiffness of joints and occasionally paralysis), vit.E (liver necrosis, steatitis, hair loss, nutritional muscular dystrophy, hepatosis dietetica), vit.K (delayed blood clotting time) and water soluble vitamins viz., vit.B₁ or thiamine (loss of appetite, emaciation, muscular weakness and dysfunction of nervous system, respiratory troubles), vit.B₂ or riboflavin (poor appetite, reduced growth rate, vomiting, skin eruptions and eye abnormalities, low reproductive efficiency), niacin (poor growth, enteritis and dermatitis), vit.B₆ or pyridoxine (convulsions, reduced appetite and development of anaemia), pantothenic acid (slow growth, diarrhoea, loss of hair, scaliness of skin, goose stepping gait, inability to stand), folic acid or folacin (nutritional anaemia and poor growth), biotin (foot lesions, alopecia, dry scaly skin, reduction in feed utilization, growth rate and reproductive performance), choline (slow growth and fatty infiltration of liver) and vit.B₁₂ or cyanocobalmin (slow growth and incoordination of hind legs in baby piglets, dermatitis, rough coat and sub optimal growth in older pigs). Yellow maize and green pastures supply adequate amounts of vit. A. Exposure to sunlight provides vit. D. Cereal grains are good sources of vit. E. Thiamine, pyridoxine, biotin and folacin are available

in cereal grains while other should be supplemented through vitamin premixes.

Water should be provided *ad libitum*. Young pigs and sows nursing litters have high water requirement. The requirement is more during summer than winter. A pig needs 2 - 6 litres of water daily for 45 kg live weight.

In order to rear the pigs on scientific lines it is essential to know their nutrient requirements and efforts should be made to fulfil them so as to achieve optimum production levels. The energy and protein requirements have been given in Table 2 while mineral and vitamin requirements are shown in Table 3. Normally, gilts should be given 2.25 to 2.75 Kg feed per 100 Kg body weight whereas mature sows may be given feed at the rate of 1.0-1.75 kg /100 Kg body weight.

Table 2 . Energy and protein requirements of swine at different stages of growth(ICAR,1998)

Body weight (kg)	CP(%)	TDN(%)	Digestible energy(Kcal/ Kg feed)	ADG (g)	Av. daily feed (kg)	Feed :gain ratio
10-20	18	68	3300	340	1.24	3.65
20-30	15	68	2970	430	1.70	3.95
35-60	13	68	2640	515	2.37	4.60
60-90	12	68	2640	500	2.42	4.80

CP=crude protein, TDN=total digestible nutrients, ADG=average daily gain

A typical pig ration can be prepared with the following ingredients (parts per 100 kg) : maize 40, broken wheat 10, broken rice 8, wheat bran 20, ground nut cake 15, fish meal 5, mineral mixture 1.5 and common salt 0.5. The boar should also receive balanced ration as given to gilts during flushing period. Mineral and vitamin supplements are also needed for normal growth and reproduction. They can consume kitchen/restaurant waste, broken grains, pastures, green forages like dub, napier hybrid, cowpea etc. However, it has been observed that pigs in

Table 3. Mineral and vitamin requirements of the pigs (NRC)

Mineral	Requirement	Vitamin	Requirement
A. Major (%)		A. Fat soluble (IU/kg)	
Ca	0.50-0.90*	Vit. A	1300-2200*
P	0.40-0.70*	Vit. D	125-220*
Na	0.10	Vit. E	11
Cl	0.13	Vit. K	2
K	0.17-0.30*		
Mg	0.04		
B. Trace (mg/kg)		B. Water soluble (mg/kg)	
Fe	40-150*	Vit. B ₁	1.1-1.3*
Zn	50-100*	Vit. B ₂	2.2-3.0*
Mn	2-4	Niacin	10-22*
Cu	3-6	Pantothenic acid	11-13*
I	0.14	Vit. B ₆	1.1-1.5*
Se	0.15	Biotin	0.10
		Folacin	0.60
		Choline	400-1100*
		Vit. B ₁₂	11-22*

* Higher levels are required for piglets upto 20 kg B.wt.

the villages are hardly given any protein, energy or mineral supplements and they survive mostly by scavenging or on kitchen wastes because of which their growth is very slow. In rural areas in Tripura farmers feed their pigs on rice brewery waste which was found to contain about 90 percent moisture and 19.75 per cent protein on dry matter basis. Some people also supplement common salt. Dried and ground rhizomes of wild sotti has a good potential for use as energy source.

Health care

Pigs are prone to various diseases which lead to production losses. Therefore, health management is an important aspect. The normal temperature of pigs varies from 101 to 104⁰F, pulse rate from 55 to 75 per minute and respiration rate from 20 to 30 per minute. Deviations from these values would indicate unhealthy condition. Swine diseases and parasites are responsible for losses to the farmers. Swine fever, Foot and Mouth Disease, Hemorrhagic Septicemia, Brucellosis, Anthrax, mastitis and round worms are responsible for most of the disease problems. The first



Piglets provided by the Centre reared by the farmers

booster dose of FMD vaccine should be given after 6 months of age and then it should be repeated annually. Swine fever is the most frequently occurring disease. All the pigs above 2 - 3

months of age

should be vaccinated against Swine fever with annual follow up. Ascariasis, strongyle infection, coccidiosis and mange are the common parasitic diseases. Special care should be taken during monsoon for strongyle and coccidial infection. Contaminated feed and drinking water are the main sources of infection. Once the animal gets infected it becomes source of infection for others



Unhygienic condition make the pigs prone to diseases

Round worms are the most common endoparasites which cause diarrhoea, loss of weight and may lead to death. Therefore, pigs should be dewormed regularly at 6 months intervals. Worm infested pigs can be easily treated with anthelmintic drugs. Skin infections are also common if animals are not kept in hygienic conditions and may be caused by lice, ticks, mites or bacteria leading to rough and thick skin. Mange is the most serious and highly contagious disease caused by mites. It causes skin irritation, scratches and wound over the body. Infected pigs remain stunted and death may also occur.

Anthelmintic drugs useful against parasitic infection

Parasitic infection	Drug
GI parasites	Piperazine@250-300 mg/kg B.wt. in feed and water (single dose) Fenbendazole@5 mg/kg B.wt.in feed (single dose) Ivermectin @0.3 mg/kgB.wt. (S/C)
Coccidiosis	Amprolium @25-65 mg/kg of feed once or twice a day for 4-5 day Sulpha drugs
Mange	Deltamethrin@50-75ppm 2 applications at 10 days interval Ivermectin @0.3 mg/kg B. wt.(S/C)

Lactating sows may also suffer from mastitis which may lead to starvation of piglets. Causative agents may enter the teats as a consequence of teat biting by the piglets. Unclean farrowing pen favours the condition. Clipping of needle teeth and cleanliness keeps the infection under check. Clean and sanitary conditions should be maintained for keeping the pigs healthy in order to avoid losses.

Housing

Pig houses should be constructed so as to provide maximum sunlight and good ventilation. So windows should be spaced accordingly. Floors, walls and roofs can be constructed using different materials. The floor may be of wood, concrete, bricks, slabs etc. Wooden floors are warm but not permanent. Concrete floors are the best and more durable, easy to clean, non absorbent and non slippery if rough furnished. The roof must be water tight and bad conductor of heat. From this point of view, thatch is a good material for roofing but it is not durable and may harbor insects. Corrugated iron sheets and asbestos sheets are good. Plastered brick walls though better but are more costly. Wooden walls are cheaper but less durable. A farmer can choose any combination that suits him depending on requirement and capital availability.



Brick floor with wooden protection-poor upkeep



Brick floor, pucca walls with bamboo roof -better housing under rural condition

An ideal pig farm should be well connected with the market. A good arrangement for piggery is to have sties (pig house) of about 12 x 8 feet on each side of passage (5-6 feet). This is feeding passage. The floor should be slightly sloppy for better drainage. Windows should be high up. Along the back of the pens there should be an open area for exercise. Farrowing pen should be



Concrete floor, pucca walls with asbestos roof

10 x 10 feet. The guard railings made of galvanized iron pipes (2 inch dia.) may be fitted about 8-10 inches away from the walls of the farrowing pan in order to prevent crushing of the piglets. The pig sty preferably should have an open yard with some natural shade. Separate house should be constructed for boars. The house should be at higher level than the surrounding. Pigs are more sensitive to high temperature due to absence of sweat glands and are unable to dissipate excess heat. Hence shades and wallow should be used during hot weather. The waste disposal should be managed properly. The pit or tank should be located 100 feet from any water supply. The storage capacity will depend on number of animals, daily excreta production, desired storage time and extra water added.

Maintenance of birth, young / adult stock, health, feed, service, sow/boar performance, mortality etc. is of vital importance for successful swine enterprise.

Pigs in farming system

Pigs can be integrated in various farming systems like horti-piggery - fishery wherein the pig excreta is diverted to fish pond having composite fish culture and economic growth of fishes is obtained without any supplementary feed. Normally 30 to 40 pigs are required per 10000 sq.m. of pond area.

Marketing

The market weight of the pigs has been set to be 70.0 Kg in India which they attain in 6-7 months of age. Market for the pigs should be chosen carefully. Good care of the pigs should be taken during transportation. However, it is mentioned here that the people involved in pig farming do not have strong financial and technical background and market system is highly unorganised with practically no price fixation system. Thus, there is an urgent need to educate the farmers, establish purchase

centres in or near to production areas, give incentives, update price, to grade and test the quality of final product.

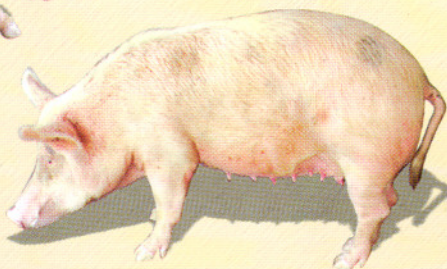
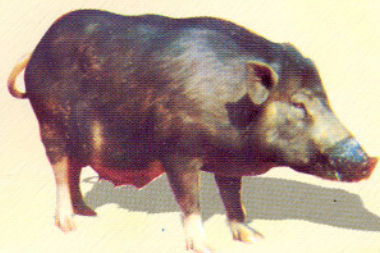
Lastly, it is also highlighted that crossbred pigs (Hampshire x Local) are performing very well (Table 4) at ICAR Research Complex, Lembucherra and piglets are being provided to the local farmers at reasonable price. This cross has been developed at ICAR Research Complex for NEH Region, Barapani, Meghalaya. This breed is popular among the farmers mainly due to their faster growth rate, high prolificacy and less disease susceptibility.

Table 4. Production traits of crossbred (Hampshire x Local) pigs at ICAR, Tripura Centre

Production trait	Value
Litter size at birth (No.)	8.80
Litter size at weaning (No.)	7.15
Weaning age (days)	56
Individual wt. at birth (Kg)	1.10
Individual wt at weaning (Kg)	10.45
Weight at 120 days (Kg)	32.50
Weight at 180 days (Kg)	55.00
Age at first farrowing (days)	340
Dressing percentage	75-80

Therefore, the farmers/ entrepreneurs should take well care of breeding, feeding and management, disease and parasite control of pigs for efficient and profitable pork production. A good marketing sense is also an important ingredient for efficient pig production.

It is hoped that the scientific points as mentioned above will help the farmers particularly tribal people and others related to pig husbandry to fetch them more profits and provide better nutrition.





Local non-descript breed: Mali



Local non-descript breed: Dome



Large White Yorkshire-Male
(State Govt. Farm)



Large White Yorkshire-Female
(State Govt. Farm)



Hampshire X Khasi Local-Female



Pigs in Integrated Farming System



Wallowing during hot weather



Slaughtering in the local market- unhygienic