

Chapter 9 - Animal Science

Technology no.1

1. **Name of technology:** Assessment of growth and performance of crossbreed (Hampshire x Ghungru) pigs under local condition
2. **Source of technology:** NRC, Pig, Rani, ICAR
3. **Year of release:** 2009
4. **Agro-climatic zone:** All zones of Assam
5. **Detail description of technology:** Crossbreed pig (Hampshire x Ghungru)
6. **Critical inputs required:** Crossbreed pig
7. **Observations to be recorded:** Growth rate, litter size, marketable weight, B: C Ratio, Farmers' reaction.

Technology no.2

1. **Name of technology:** Dual purpose poultry breed
2. **Source of technology:** Assam Agricultural University
3. **Year of release:** 2015
4. **Agro-climatic zone:** All zones of Assam
5. **Detail description of technology:** Dual purpose poultry breed 'Kamrupa'
6. **Critical inputs required:** Poultry breed 'Kamrupa'
7. **Observations to be recorded:** Mortality, growth rate, egg production, B: C Ratio, Farmers' reaction.

Technology no.3

1. **Name of technology:** Assessment of growth and performance of crossbreed (Duroc x Hampshire x Ghungru) pigs under local condition
2. **Source of technology:** NRC, Pig, Rani, ICAR
3. **Year of release:** 2010
4. **Agro-climatic zone:** All zones of Assam
5. **Detail description of technology:** Crossbreed (Duroc x Hampshire x Ghungru)
6. **Critical inputs required:** Cross breed pig
7. **Observations to be recorded:** Growth rate, litter size, marketable weight, B: C Ratio, Farmers' reaction.

Technology No. 4

1. **Name of the Technology:** “Lumsniang” Upgraded Pig variety
2. **Source of the Technology:** Division of Livestock Production, ICAR RC for NEH Region, Umiam-793103
3. **Year of release:** 2017
4. **Agro Climatic Zone:** North Eastern Hill Ecosystem
5. **Detail description about the technology:**

Pig husbandry has special significance for improving the social economy status of the tribal



Fig.1. “Lumsniang” Up graded

farmers in northeastern India. Since pork is the most preferred meat, almost every rural household rear 1 – 2 non-descriptive local pigs. These nondescript pigs attain low body weight gain, poor growth rate and low litter size at birth. Therefore the division successfully developed crossbred pig variety with NiangMegha (Khasi local) as indigenous germplasm and Hampshire as exotic germplasm for better adaptability and performance in hill ecosystem of the north eastern region of India. Further the institute has successfully studied the performance, adaptability and stability of different economic traits for over more than 15 years and developed the crossbred pig variety named as “Lumsniang” based on the locality and its features.

“Lumsniang” crossbred pig variety with the following features:

- Better adaptability in hill ecosystem
- Climatic resilient traits including the body physiology suitable to hill ecosystem
- Promising growth rate and feed conservation efficiency
- Suitable and well adapted to low input tribal production system
- Good mothering ability with higher litter size at the time of birth and weaning
- Higher litter weight at birth as well as weaning
- Good body condition of sow remain excellent up to 6th farrowing
- Excellent carcass quality and consumer preference in the region.
- Better disease resistance capacity

With the introduction of upgraded pig variety, the productivity of pig was increased

significantly in the term of body weight (average adult pig body weight increased from 4-50 Kg to 90-110 kg) and litter size at weaning (mean litter size from 4.87 to 7.34). The upgraded pig developed by the division is one of most popular and widely accepted technology by the farmers. The pig variety attained higher body weight gain (294g Vs 183g/day) and higher litter size at weaning (8.56 ± 0.77 Vs 5.23 ± 0.54) as compared to local non-descriptive pigs in the low input tribal production system. The upgraded pig attains double the body weight of local non-descriptive pigs at the age of 12 months. The adult upgraded pigs were sold by the fattener farmers @ INR 11000 –13000/pig as compared to the earlier local adult pig @ Rs 6000-700/pig. The breeding farmers harvested 2-3 extra piglets per farrowing compared to the earlier system and farmers sold each piglet @ INR 2500-3000/. The beneficiaries got INR 17000-20000/unit through selling the piglet/ farrowing and Rs 5000-7000/ extra per unit than earlier system.

6. **Critical inputs required:** Quality Feed, deworming
7. **Observations to be recorded:** Body weight gain, Disease incidence.
8. **Contact Address for relevant information:** Division of Livestock Production, ICAR RC for NEH Region, Umiam, Meghalaya-793103

Technology No. 5

1. **Name of the Technology:** Low cost climate resilient environment-affinitive pigpen model
2. **Source of the Technology:** Division of Livestock Production, ICAR RC for NEH Region, Umiam-793103
3. **Year of release:** 2013
4. **Agro Climatic Zone:** North Eastern Hill Ecosystem

Detail description about the technology: Innovative integrated low-cost pigpen was designed and developed with locally available natural resources for high rainfall mid and high altitude temperate region in the context of climate variability. The pig housing model was evaluated and compared with conventional concrete floor pig housing in term of micro-environment, physiological adaption, performance, water use efficiency, animal welfare and behavior. The pig housing model was evaluated and compared with conventional concrete floor pig housing in term of micro-environment, physiological adaption, performance, water use efficiency, animal welfare and behavior. The results revealed that the temperature and humidity of the developed pigpen maintained were within the normal range as compared to the conventional concrete pigpen during winter as well as rainy season. In winter, temperature of conventional concrete pigpen recorded average of 62.7°F and floor temperature was 56.3°F. The low temperature in the conventional concrete pen causes stress and energy loss to the pigs during winter. However, the saw dust-floor in developed pigpen provided warm and comfortable environment to pigs. In rainy and summer season, the conventional pigpen



Fig.1. Deep litter pig housing model

has always wet floor and recorded significantly ($P < 0.01$) higher humidity and temperature-humidity index (THI) as compared the developed pen, which causes stress to the pigs. The floor in developed pigpen maintain dry and clean due the high moisture absorption capacity of sawdust floor, leading to low range of THI. The physiological parameters like heart rate, respiration rate, pulse rate within normal range during winter as well as summer/rainy season in the developed pigpen. Similarly the stress hormone, cortisol level was recorded within the normal range in developed pigpen, which is significantly higher in the conventional concrete pigpen. The microenvironment of the invented pigpen maintains within the comfort zone and well suited for physiological adaptation during extreme weather events. Since the bad odor is mainly emitted from dung, manure, urine, and waste water in the pig shed, which is absorbed immediately by the sawdust floor in the invented pen, hence the invested pigpen and its surrounding are comparatively better in terms of bad odor.

Body weight	Developed model	Concrete floor
3 months	9.75 kg	9.36 kg
6 months	64.56 kg	56.83 kg
9 months	106.83 kg	76.28 kg
Average daily weight gain	545.5 g	386.7g

Disease conditions	Developed model	Concrete floor
Leg problem	Nil	6.6%
Skin disease	Nil	4.7%
Diarrhea	Nil	10.2%
Respiratory problem	Nil	2.8%
Mortality	Nil	1.82%

The daily body weight gain and feed conservation efficiency of the pigs reared in the developed pen were significantly higher as compared to conventional pen. The cross bred pigs reared in the invented pigpen attained the body weight of 148-157 kg within one year. The diseases incidence was significantly lower in the developed pen and the method floor construction keep the floor dry and clean, hoof/nails grow normally and they were free from leg injury and leg lesion. Similarly bacterial load on the floor of developed pen was very low which ultimately lead to less incidences of diarrhea and respiratory disease conditions among pigs. The leg lesion, higher incident of diarrhea and respiratory disease are common problems in conventional pen.

The manure production in the developed pen and the conventional concrete pen was 4,100 and 1,460 kg, respectively. The quality of manure obtained in the developed model was significantly lower due to the inclusion of sawdust. In order to improve the quality and the composition of the litter, the material has to be treating with vermicomposting table.3. The innovative pigpen also provide a comfortable working space which ultimately increase the working efficiency, labor saving, obtain higher productivity, profitability and prevents environmental pollution.

There is a huge potential for the adaptation of this pigpen in the north eastern region of India, where pig population is very high. Since this model is suitable to mid and high altitude region hence the demand of the technology is high in the hill ecosystem where enough wood and bamboo are also available.

5. **Critical inputs required:** Saw dust
6. **Observations to be recorded:** Body weight gain, Disease incidence.
7. **Contact Address for relevant information:** Division of Livestock Production, ICAR RC for NEH Region, Umiam, Meghalaya-793103

Technology No. 6

1. **Discipline:** Animal Science
2. **Name of the Technology:** Innovative value Addition to Pig Bristles
3. **Source of the Technology:** Division of Livestock Production, ICAR RC for NEH Region, Umiam-793103
4. **Year of release:** 2014
5. **Agro Climatic Zone:** North Eastern Hill Ecosystem
6. **Detail description about the technology:**

Pig hair, called “bristle” is completely unutilized and burn during the conventional slaughter process (singeing) or dumped as slaughter waste on the ground, which resulted in environmental pollution as it has highly stable keratinized protein, takes long time in biodegradation. Therefore, for the first time, Division of Animal Production has investigated the bristle properties, their processing and developed pig bristles into useful value added products in the country.

An in-house methodology for bristle processing has been developed to a) remove a dirt, epithelial scales and wax,



Fig 4. Cloth washing brush



Fig 5 Shoe brush



Fig 6. Soft carpet cleaning brush

b) to destroy microbes and parasitic eggs and c) bleaching for softening and colour removal before dyeing. After proper processing, different products have been developed using the pig bristle with manual method (Figure: 2-4); 1) Coat/Jacket cleaning brush, 2) Cloth washing brush, 3) High quality shoe brush. The pig bristles are natural, more durable, stable, and flexible as compared to synthetic bristles thus different high quality end products can be made from the pig bristles. The pig bristles being flexible, structurally hard and densely packed in the brush/comb, ensures faster and better removal of dirt and dust even in deep or zigzag corners which synthetic bristles may not achieve. Long, flexible with “flagged end” (split end) bristles in dusting brush are effective for cleaning the tables, computers, printers, equipment etc., with better results. It is also a better choice for cloth washing brushes, as the pig bristles are stable and remarkably resistant to hard soaps. The bristle hair brush/comb are densely packed, it remove debris, dust and scales effectively from hair. Therefore pig bristle brushes/combs are more expensive than other brushes in western countries. Since the property of the bristle varies depending on breed, parts of body in which bristle are collected, parts of bristle (base, middle and tip), and accordingly different products were made for different purposes. The bristle requirement for each product varied depends on the size of the products (small comb/brush: 20-30g, medium brush: 50-70g and large size brush: 100-120g). Similarly the cost of production also varied depends on the size (small size brush: INR 80, medium brush: INR 100 and large size brush: INR150). Since the manual method of processing is time consuming, labour cost was the major cost involved in the production cost.

A trained person could make 4-5 medium size brushes/day using manual method. The production cost can be reduced drastically with atomization. Employment opportunities in small scale bristle processing and value added products, 3) Entrepreneurship development in small scale bristle processing and manual production of the various products or large scale processing and manufacturing the products, 4) Enhance revenue through export of processed bristle, that has high demand in the international markets, 5) Effective utilization of bristles to prevent environmental pollution and creation of a value chain.

7. **Critical inputs required:** Pig Bristles
8. **Observations to be recorded:** NIL
9. **Contact Address for relevant information:** Division of Livestock Production, ICAR RC for NEH Region, Umiam, Meghalaya-793103

Technology No. 7

1. **Name of the Technology:** Low cost portable Dummy sow with mating grunt voice system (Patent Filed Application no: 430/KOL/2013, Published on: 24/10/2014)
2. **Source of the Technology:** Division of Livestock Production, ICAR RC for NEH Region, Umiam-793103
3. **Year of release:** 2014
4. **Agro Climatic Zone:** North Eastern Hill Ecosystem
5. **Detail description about the technology:** The great advantage of artificial Insemination (AI) is that the genetic potential of best germplasm can be transferred to a large number of sows,

leading to faster genetic improvement of large population. For the successful AI operation, good quality semen is collected in appropriate manner and diluted in a suitable extender and preserved either in liquid or frozen state. Dummy sow is essentially required for semen collection. Since the cost of dummy sow is one of the major initial investment cost for starting a semen processing unit. Generally the existing dummy sow equipment is imported from abroad (IMV technologies, France and Minitube, German), which is highly expensive. The existing design is more suitable for the larger exotic pigs but not suitable/comfortable to the small indigenous as well as cross bred pigs. Further the existing dummy is heavy weight (60 kg) and fixed type model, it is difficult to move/ transport from one place to another. The recent patented product galvanized dummy sow (IMV technologies, France) without leather coating is highly expensive and did not have the grunting sound voice system. The imported dummy supplied by commercial supplier is not convenient to crossbred or indigenous breeds. The institute designed and developed a low cost portable dummy sow with innovative grunting sound (mating songs) effect for better sexual stimulation, quick training of young boars, and to obtain better semen quality and quantity, and suitable for all types of pig.



Fig 7 Dummy sow

Advantage of the invented dummy sow

- Made up of low cost commonly available material and simple design.
- Simple and low cost height adjustment mechanism.
- Extra feature of mating grunt voice system for boar stimulation
- Design suitable and comfortable to all types of pigs
- It is easy to dismantle and transport hence portable model
- Faster sexual arousal/ stimulation and obtained higher semen volume and spermatozoa/ ejaculate
- Higher number of boar trained at faster rate

Since AI is the simple and cost effective technique for genetic improvement of pigs through upgrading/ cross breeding of local pigs with high yielding pigs, Many central and state departments have proposed the Mission Mode project on AI in pigs in the NE region of India in the 12th five year plan. Establishment of semen processing and supply units continue to increase in different pig breeding farms and boar stud under government and private farms in many south-east-Asian countries. Since the cost of dummy sow is one of the major initial investment cost for starting a semen processing unit, the demand of the product is expected to increase many folds in the developing countries. Further, demand for the dummy sow will increase in research institutes/universities for the reproductive biology research in which semen /and spermatozoa is basic requirement.

Commercialized through non-exclusive licensing with NGOs (Mawphlang Welfare Society) including in-house pig bristle processing methodology and training of educated tribal youth.

The NGO paid royalty fee and made MOU with Institute.

6. **Critical inputs required:** Maintenance
7. **Observations to be recorded:** NIL
8. **Contact Address for relevant information:** Division of Livestock Production, ICAR RC for NEH Region, Umiam, Meghalaya-793103

Technology No. 8

1. **Name of the Technology:** Rural Poultry Production with Improved Chicken Varieties
2. **Source of the Technology:** Division of Livestock Production, ICAR RC for NEH Region, Umiam-793103
3. **Year of release:** 2006
4. **Agro Climatic Zone:** North Eastern Hill Ecosystem
5. **Detail description about the technology:** Low input system, better survivability, good scavengers, attractive plumage color, escape from predators, more tolerant to diseases and better productivity. Its eggs and meat are more preferable by the consumers in the region. The backyard poultry farming with improved varieties like Vanaraja and Gramapriya under low input system. They are allowed for scavenging during day time in the backyard along with supplementation of kitchen wastes, cereal grains etc in the morning and evening. The birds should be vaccinated and de-wormed periodically.

Performance comparison

Parameters	Desi chicken	Gramapriya	Vanaraja
Annual Egg production (Nos.)	50-60	150-170	130-150
Live body weight (Kg.)	1-1.5	2.2.5	2.5-3.5

It is very popular for backyard poultry production. The Improved Chicken Varieties provide two fold higher income as compared to Desi chicken.

6. **Critical inputs required:** Balanced Feed
7. **Observations to be recorded:** Body weight gain, egg production
8. **Contact Address for relevant information:** Division of Livestock Production, ICAR RC for NEH Region, Umiam, Meghalaya-793103.

Technology No. 9

1. **Name of the Technology:** Turkey Farming and Quail Farming
2. **Source of the Technology:** Division of Livestock Production, ICAR RC for NEH Region, Umiam-793103
3. **Year of release:** 2011
4. **Agro Climatic Zone:** North Eastern Hill Ecosystem

5. Detail description about the technology: Turkeys have unique qualities of hardiness and adaptability to diversified agro-climatic conditions. They are mainly reared for meat purpose. Turkey meat contains lower fat and cholesterol. Good demand for turkey meat in northeastern hill region especially during Christmas and New Year seasons. Japanese quail farming have a bright scope to provide alternative to chicken farming. Quail is reared both for meat and egg production. Quail meat and egg have high nutritive value with good taste. Quail has unique qualities of hardiness and adoptability to diversified agro-climatic conditions. Quail farming requires less housing and capital investment.

Turkeys can be reared under free range or intensive system. Allow for scavenging during day time with supplementation of grains, kitchen wastes etc. under free range system. Turkey can be produced at the farmers' field by utilizing local broody hen. Regular vaccination and deworming should be followed. Japanese quail can be reared under deep-litter and cage system. Japanese quails are resistant to many diseases as compared to other poultry species and as such do not require vaccination

6. Critical inputs required: Balanced Feed

7. Observations to be recorded: body weight gain, egg production

8. Contact Address for relevant information: Division of Livestock Production, ICAR RC for NEH Region, Umiam, Meghalaya-793103

Technology No. 10

1. Name of the Technology: Compacted feed block making device (portable)

2. Source of the Technology: Division of Livestock Production, ICAR RC for NEH Region, Umiam-793103

3. Year of release: 2000

4. Agro Climatic Zone: North Eastern Hill Ecosystem

5. Detail description about the technology: Feed management tools for livestock owner for maximum utilization of locally available crop residues. It works manually and anybody can operate with minimum instruction. Quantity of the feed ingredients to be incorporated in



Fig. 10. System of rearing: A: Turkeys under free-range system B: Turkeys under deep litter system C: Hatching of turkey eggs by local broody hen D: Newly hatched poultry by local broody hen E: Feeding and watering of turkey poultry



Fig. 11. System of rearing: A: Brooding B: Japanese quail under deep litter system
C: Japanese quail eggs D: Japanese quail meat

the block might be determined as per the nutrient requirement of the animal and nutritive value of the feed ingredients.

Feed ingredient should be mixed properly before preparing the feed block. It helps to supply nutrients to the animals in right proportion in balance form. The daily capacity of preparation is 3-4 blocks per hour. A feed block weighing about 3-4kg can be prepared at a time. Raw material used are chopped paddy straw, concentrated mixture (crushed maize, mustered cake, wheat bran), dried tree leaves, other agro industrial byproducts like spent grains, etc, binding material like bentonite, etc, mineral mixture and common salt.

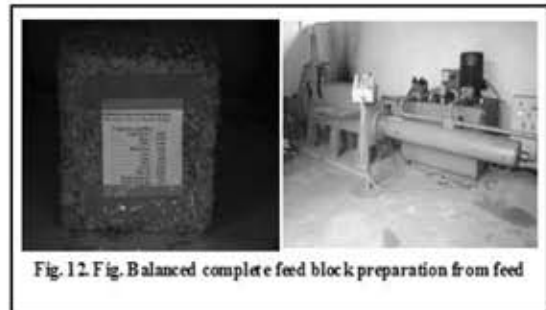


Fig. 12 Fig. Balanced complete feed block preparation from feed

The balance ingredients are mixed well before adding to the block making device. About 2.5 sq.ft space is required for storing the device. Cost of machine is Rs8000-10,000/- (depending upon cost of iron). Feeding complete feed blocks (CFB) having 1:1 roughage to concentrate ratio, with chopped and ground paddy straw to crossbred HF lactating dairy cattle resulted in an increase in the daily average milk production and intake of DM, with a smaller reduction in the digestibility of nutrients. Feeding maize kadabi in the form of complete feed block (CFB) increased the palatability and growth in crossbred calves. The keeping quality of these blocks can be prolonged with incorporation of urea. An Average Daily Gain (ADG) of 779g was attained in HF crossbred calves by strategic supplementation of concentrate @ 1.75 to 2.25% of body weight to meet the growth demand along with mixed green grass in rainy season and paddy straw in winter as sole source of roughage.

The devices cost effective, simple in operation with minimum labour, reduces cost of feeding and space requirement for storage, easy to transport and increases feed intake, feed efficiency and production.

