

PIGGERY SUBSECTOR IN MEGHALAYA: A REVIEW



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Published by:

Meghalaya Basin Development Authority (MBDA),

Lower Nongrim, Shillong Meghalaya-793014

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Executive Summary

Pig farming is an integral part of the household livelihoods system in Meghalaya however the domestic production is inadequate to meet the demand for pork. The estimated annual import of meat is around 8000 tons. The major source of meat in Meghalaya is cows or bullocks, pig and poultry and it is estimated that 40% are cattle, 11.25% pig and 18.36% goats among the meat that are imported from other states.¹

Although the market for pork is expanding and demand is high within the state and nearby states as well. However the domestic production has not been growing in the same proportion to meet the rising demand.

Inherent advantages of Pig farming as livelihoods

- Pig rearing is an integral part of the traditions in the state
- Marginal land holder (22% in the state²) depends on pig farming for livelihoods
- Pig rearing has a high social acceptance and is used for festival and religious community offerings
- High proportion of rural employment for women is generated through pig farming
- Supply of animal protein in diet can be ensured
- Pig is highly prolific and good converter of waste food/rotten grains/vegetable waste

Based on field observation and FGDs it was found that almost 90% pigs reared in the state are local breeds. Management practices differ significantly between Khasi hills and Garo hills area. Whereas area near to Shillong has adopted cross bred pig farming with improved housing and feeding practices, Garo hills still rear pig under tethering and with traditional feeding system. This is because of weak extension work and unavailability of cross bred pigs in Garo hills. Also, most part Garo hills are plain and have open space for pig grazing

Major constraints of Pig farming:

- Accessibility, Availability and cost of pig feeds

¹ Meghalaya State development report

² Ibid

- Unavailability of cross bred piglets (more in Garo hill region)
- Absence of financial products and services for pig farming
- Lack of vaccines and vaccination
- Predominance of traditional management practices
- Absence of transparent pricing system
- Absence of certification of quality grading and healthy pigs
- Lack of sale –purchase information aggregation
- Difficult Transportation of pigs from remote areas
- Unavailability of Technical Human resource for Nursing and management of pig
- Absence of Pig rearer’s group or cooperatives in the state
- Least participation and role of private business stakeholder
- Less community participation in service delivery and quality monitoring

Recommendations

Based on the above constraints identified, study recommends the following key processes, change/interventions to enhance competitiveness of pig farming in the state -

- Establish pig feed plants and Total mixed ration plant at cluster level to provide low cost balanced pig feed supply to pig units
- Promote Entrepreneurship based pig breeding centers in villages
- Design and implemented financial products (Credit/Insurance/leasing) for pig farming
- Develop area specific low cost package of practices (Micro plan). A micro Plan could be a village or area level plan of feeding based on seasonal cropping, forest produce. This plan need to be significantly context specific rather than one recommendation for whole region
- Develop Village based cadre to ensure door step delivery of primary health care and extension services
- Develop a live body weight and grading based transparent pricing system

- Certification of quality grading and healthy pigs
- Creation of data base of saleable pigs in a cluster through mobile based data collection system
- Building Pig farmer's organization at village and cluster level
- Developing participatory learning tools and a learning platform
- Facilitate private player's role in business linkages
- Establish Vaccine production center for swine fever in the state
- Promote Rural Entrepreneurship development program for pig breeding units
- Establish Institutions to train rural youth in Livestock Nursing and management

1. Overview of Sub Sector

Pig Meat Production Scenario

In most of the part of Meghalaya, pig farming is integral to family livelihoods. Population of Pig has shown following trend -

Table 1: Livestock population in millions (2003)

Region	Cattle	Buffalo	Goat	Sheep	Poultry	Pig
Meghalaya	1.12	0.22	0.36	0.020	3.2	0.52
NE state	11.48	0.91	4.36	0.23	36.46	3.82
All India	185.18	97.92	124.36	61.47	489.01	13.52

Within the livestock population, pig population has shown a growth rate of 147% between 2003 and 2007 whereas sheep has shown decline in same period³. Cross bred/ exotic pig rearing has shown the highest growth rate followed by improved poultry (100% Growth). Large ruminant has seen growth less than 20% within same time period⁴.

Table 2: District wise population of Pig in 2007 has shown following trend -

S. No.	Name of District	Pigs		Total Pigs
		Crossbred	Indigenous	
1.	East Khasi Hills	28671	90686	119357
2.	Ri – Bhoi	4044	38426	42470
3.	West Khasi Hills	9272	76438	85710
4.	Jaintia Hills	13776	56432	70208
5.	East Garo Hills	9466	46071	55537
6.	West Garo Hills	2152	126194	128346
7.	South Garo Hills	2776	19953	22729
	State (Overall)	70157	454200	524357

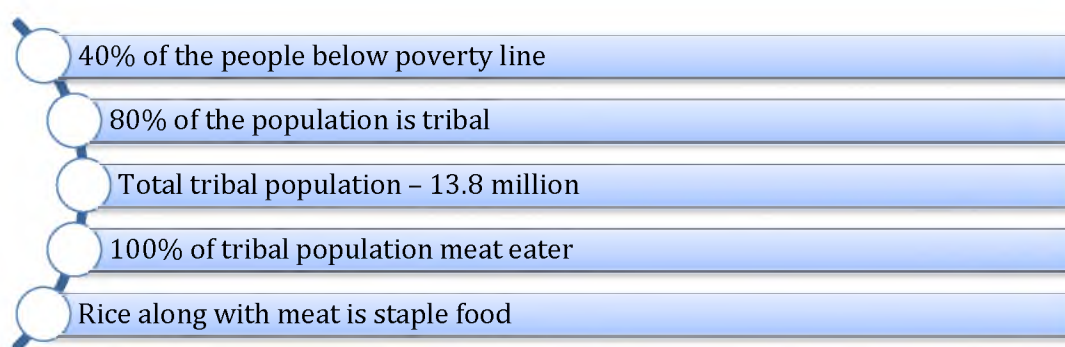
³ Livestock census 2007

⁴ K.M Bujarbaruah, Director, 'Status and strategies for Pig production in North east', ICAR Research Complex for NEH region

Demand and supply status

The Northeast states have 28% of total pig population in India, of which Meghalaya accounts for 20%. Over 95% of the population of Meghalaya is non-vegetarian which accounts for a high demand of meat and eggs. On an average it works out to be 4 Pigs per 100 persons in India however for the Northeast states it works out as 18 pigs per 100 persons⁵.

Overall, the socio economic context of North East and demand for meat can be understood from following facts –



Meat production in Meghalaya has grown from 16000 tons in 1972 to 34000 tons at end of 9th five year plan. For pork, in 2006-7, 9996 tones were consumed of which 8543 tons were produced in state (85.46%).

State imports around 8000 tons of meat annual from outside of state. Major source of meat in Meghalaya are cows/bullocks, pig and poultry. It has been estimated that 40% of cattle, 11.25% pig and 18.36% goats for meat are imported from outside state. The state has a high deficit of pork and seasonal demand of pork (around New Year) goes up so high that the deficit in supply leads to skewed growth and pork price in the state. From the interviews conducted during this study, it was found that at present pork is sold at Rs 240 per kg which 20% higher than last year price of Rs 200 per kg. However state has price variation of 10% in meat price within State.

Products

The state consumes almost entire pork meat as fresh meat and processed products account for less than 2%. Demand and consumption of fresh pork meat is high and people prefer fresh pork rather than its processed product. However various dishes with pork meat are prepared at

⁵ Ibid

household level and small roadside dhabas which perform a key role in serving pork dishes to travelling passengers and the locals.

Market

Pork meat market is largely local and local meat shops procure pigs from the surrounding area and sell meat. Large cities like Shillong get pigs from villages of around 100 Km⁶. However, the long hours involved in the transportation of pig meat for marketing (except import from other states) are not seen to occur at a significant level. This in turn, reduces the indirect cost of pig transport and processing within the state.

As demand has been on the rise, at some places organized market have come up wherein meats of various livestock are sold at one place. Other by product of pig farming like hairs, manure, and blood has not been significant marketable product or channel is absent.

Employment

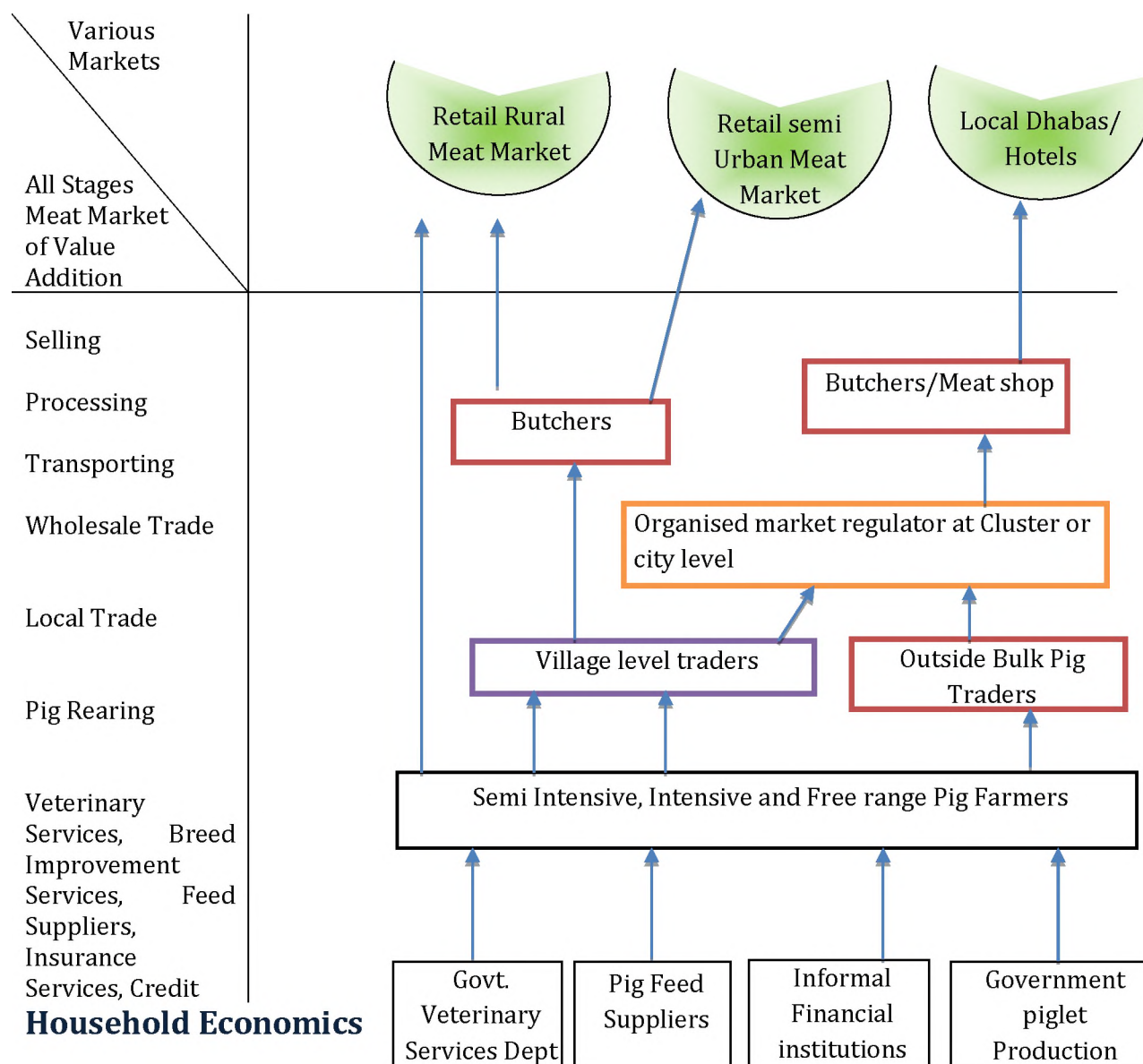
Pork sub sector has generated the highest employment in production of pigs followed feed supply, meat sell and transport. It has been an employment provider to women and marginal and vulnerable poor families, which many times have no other significant assets to depend on. Now it is also emerging as an organized farm business and providing an alternative source of livelihoods to rural youth. This trend is, however, still at an emerging level.

⁶ Based on key informant interview with traders undertaken in study

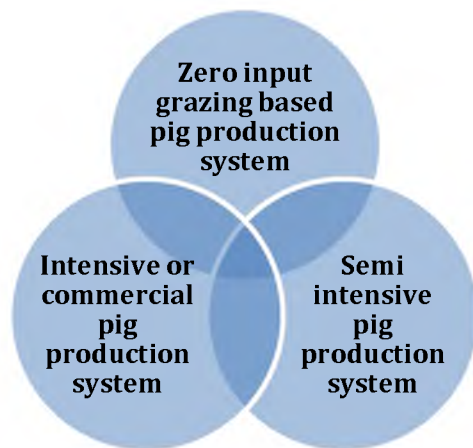
Sub Sector Map

Sub sector framework views the interrelations from pre-production (input) to production to the consumption networks in which business actors utilize competitive resources and operate within a formal or an informal institutional environment. Pig sub sector map in Meghalaya presently operates largely at local level on forward linkages. However, backward linkage like input support has high dependence on outside state supply.

In seasons of high demand like New Year celebrations, pork supply from other states increases in the state. Forward linkages are largely provided by local cluster level traders, who purchase, procure and sale pigs to local meat shop/butchers. A part of such supply also goes to larger cities like Shillong market.



Pig farming in Meghalaya has three systems of production –



However, it was observed during the study that, the semi intensive system of pig rearing comprises of over 75% of the total pigs reared in state with various housing and feeding regime followed. Two types of unit, fattening unit of 2 to 3 piglets and breeding unit with 1-2 sow and 1 boer is the common household holding size. However, the fattening units far surpass the breeding unit. Normally

one breeding unit for 20 to 25 fattening unit is observed. (See ***Annexure 1*** for details on household economics of Pig farming)

2. Preproduction stage – Inputs and process

Inputs

Pig farming in state requires a number of inputs and services to convert it into a saleable product like pork.

Breeding Stock

Meghalaya has 17% cross bred pigs and 83% of indigenous pigs⁷. Crosses of exotic breeds like Hampshire, White Yorkshire, and saddle black are common. Indigenous pig breeds like Ghunghroo, T and D are also available in the field.

Crosses of Hampshire



Ghunghroo



Crosses of White Yorkshire



Khasi and Jantia Hills – Pig Breeds

Garo Hills –Local Pig breeds



Table 3: Production performance of pig Breeds⁸

Productivity Traits	Available Pigs productivity		
	Khasi Local	Hampshire	Crossbreed
Litter size at birth (kg)	5.50	7.83	7.60
Litter size at weaning (kg)	3.05	5.42	7.20
Individual wt. At birth (kg)	0.485	1.30	0.90
Individual weight at weaning (kg)	4.97	10.02	10.30
Weight at 180 days(kg)	11.35	31.45	30.00
Age at first farrowing (days)	367.47	441.25	335.00
Inter farrowing interval (days)	194.52	227.64	192.00

There seems to be a regional variation in preference of pig breed –Khasi hills have a high proportion of cross bred pigs, whereas in an area like Garo region, there is a higher spread of local pig breed rearing. It has been largely observed that the area near cities and towns have higher proportion of cross bred pigs and remote rural areas rear indigenous pigs or breeds of nearby areas. Ghungharoo (breeds of Bengal) is a very common indigenous pig breed in RiBhoi and Khasi hills area.

Although pig farmers are now aspiring to get better feed and more efficient breeds, the availability of such piglets is a constraint. Besides, based on the views of the people spoken to during the FGD, feeding of local pig is much cheaper than exotic breed as local pigs are well adapted to local feeds and graze easily.

Piglets of crossbred and indigenous breeds are supplied by some village based small breeding farmers and government pig farms. Meghalaya have 10 district level pig breeding farms and one regional pig breeding farm. Regional pig breeding farm is at Kyrdekulai.

Supply of crossbred piglets is high in demand but low in supply. Cluster based breeding units are operating with a lower sow and boar ratio. Breeding service by good quality boar is a paid service with either one piglet or Rs 500 per breeding.

Starter Feeds

Piglets require a good amount of high protein concentrate as feed to grow properly. Minerals supplements like iron and minor elements are critical for their proper growth. Rearers in general use feed grains and concentrates but adoption of mineral mixture is very limited in the

⁸ K.M Bujarbaruah, Director, 'Status and strategies for Pig production in North east', ICAR Research Complex for NEH region

state. Availability of classified special feed with a balanced nutrition as starter feed is not available in the state and people feed rice bran and broken rice grain to the weaned piglets.

Shed Requirements

Pig house is an important requirement for pig production. Its importance increases with the adoption of semi intensive form of pig farming, wherein significant amount of feed is given, as Meghalaya has wide variation in terms of pig sheds.

Khasi and Jantia hills have a semi intensive form of rearing with covered and open pig house, whereas in Garo hills pigs are kept tethered and in open space. However, the sanitary condition in such tethering practices is below the requirement level.

Small Farmers



Water

Medium Farmers



Large Farmers



Water requirement in pig rearing has been for two important purposes – one for drinking and the other for cleaning and washing of the floor so that the pig waste can be removed. In semi

intensive form where floor is made of cement or bricks, cleaning is required daily so that feces of pig gets dissolved in water and can be easily washed out. When bedding materials like rice plant is used, requirement of water gets reduced as cleaning of surface is not required.

In areas like RiBhoi district (NONGKASEN), pig farmers have adopted a bedding material on floor as practice. This reduces water requirement and also provides manure (feces and urines of pig gets mixed with bedding material and forms good manure). As people have some agricultural land in this area, paddy husk is used as a bedding material and pig manure is used for vegetable cultivation, making a good integration of agriculture and pig farming. This practice needs to be disseminated to the other areas also as this saves both water and labour and provides good manure for backyard farming.

Labour

Pig farming is largely a supplementary and backyard activity in the state. So women take control and provides almost 95% of labour required for pig farming.

By large, it has been observed that the women contribute more than 90% as the workforce at the production level and it is estimated 60% at trade and marketing level. It was observed that women involved in commercial pig farmers are less in number, even though they play a significant role in small pig breeding units across the state. (Details of labour activities and division of work based on gender is explained *in Annexure 1 and 2*)

Cost of the inputs

Pig rearing in state has two distinct businesses –

- A. **Breeding units** to produce and sale piglets
- B. **Piglets fattening unit** wherein small piglets are purchased and fattened to be sold at around 9 months to one year age.

Some of the families have combined both these business and fattens some piglets or rear male and female breeder pigs.

The cost of input varies significantly. Breeding units normally have significant cost of procuring sows and boars and feeding. Cost also varies based on selection of the breeds.

Table 4: Estimated share of total cost around various inputs

System of production	Type of unit	Procurement of animal	Housing	Feeding	Health and sanitation
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Semi Intensive – Cross bred	Breeding	15 to 20%	10% to 15%	60 to 70%	4%
	Fattening	35 to 40%	10% to 15%	50 to 60%	2%
Grazing + stall feeding	Breeding	40 to 50%	10%	30 to 40%	2%
	Fattening	50 to 60%	5%	30 to 40%	nil

As evident from production input cost share, major cost of pig farming is feeding of piglets/pigs. Major ingredient of the feed has been rice bran, broken rice, rice waste, cabbage leaves, potato, sweet potato, wild plants and roots. However, the feed comprises of large share of the total cost and business is highly sensitive to feed cost rise. Availability of feed and accessibility of same is a huge upcoming problem across the state.

Most importantly, balanced feed for pigs for the production stage and productivity is neither available nor in practice in the area. Knowledge and availability, both are a constraint in the area.

Finance

Pig farming requires both fixed cost in terms of procuring sows and boar for breeding, shed for housing construction, feed storage, feeding manger, and sanitary provisions. Working capital is required to procure piglets, to feed pigs regularly and health related expenses. As of now health related expenses are minimal in the area.

As estimated, for fattening pigs of 5 units, a shed cost of Rs 20,000 needs to be invested in Khasi hills whereas in Garo hills the present system of production (tethering) require around Rs 5000 as night shelters and protections. Working capital requirement is for a period of 6 to 9 months depending on the cycle of business. As estimated, a working capital of Rs 10 to 12000 for breeding units and Rs 10000 for 3 piglet fattening unit is required.

As of now, some sheds has been financed under the government sponsored program but pig rearers have also contributed significantly to shed construction in the state. However, investment in housing in Garo hills seems very low and need immediate attention to upscale the business and promote cross breeds.

Process (Availability and accessibility of inputs)

Pig rearers largely procure piglets through weekly haats and local markets. Price of piglets has shown a sharp rise. Normally three month old piglets cost Rs 2500 to 3500 in Khasi hills and Rs 1500 to 2500 in Garo hills. Supply of piglets with vaccination and proven genetic purity is neither demanded nor available in the area.

Balanced concentrate feed is great in demand but least in supply. People generally feed rice bran and broken rice to pigs across the state. Quality and price of pig feed in Khasi and Garo hills has high differences.

Constraints at the preproduction stage

As discussed above, pig farming in Meghalaya is highly constraint by the following pre-production factors

- **Accessibility, Availability and cost of feeds:** Feed as input and its cost had been perceived as a major constraint to adopt pig farming on a large scale in Meghalaya by the people. High transportation cost of rice bran and rice hulls from distant places and lack of storage in the monsoon season leads to high price of feed.

There has not been any total mixed ration plant or factory in the state leading to direct feeding of rice bran and broken rice, which neither provides balanced feed nor makes easy storage.

- **Availability of cross bred piglets (more in Garo hill region):** Timely and cost effective availability of crossbred piglets has been constraint in supply. Breeding units have not been properly planned /distributed to feed-piglet requirement.

Proper services of breed selection, improved management services for early piglets' care and feed after weaning, vaccination is not available at breeding units. Cross bred piglets in the Garo hills region is not available to willing pig rearers. This is because there are less number of breeding centers and there is less access to the urban market, where consumers prefer pork. Moreover, the local consumption is in favour of local pigs.

- **Absence of financial products and services for pig farming:** As a livelihood proposition and business, pig rearing requires an intensive investment. Business is quite remunerative with a short cycle of 6 to 9 months. But the financial services of credit, insurance and leasing has not been available in state for pigs, making the business unable to attract scaling up and growing horizontally and vertically. Most of the pig rearing business is operational on the same state of affairs and vertical growth of business has been low due to the absence of financial services as the up scaling requires significant investment, which has remained a constraint.

- **Water for cleaning of sheds:** Present intensive pig farming with concrete flooring requires significant amount of water daily for cleaning and washing. Availability of water is a constraint in many areas.

3. Production Stage – Activities and technology

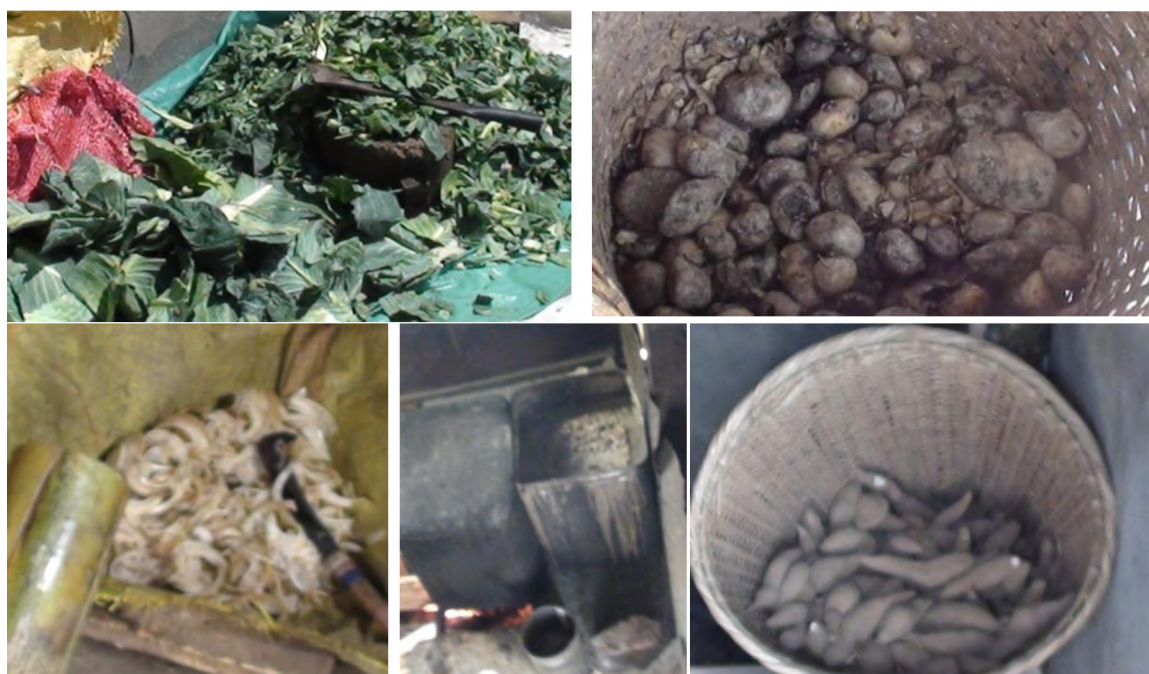
Feeding Practice

Pig feeding pattern in Meghalaya has seen significant differences between Khasi hills, RiBhoi district and Garo hills. Largely, it differs in terms of the quality of rice bran, rice hull and broken grain. Rate of feed and quality has variation within the state.

However, the major pig feed ingredient across the state is rice bran and rice hull. Almost 30 to 35% of rice bran is met at the local level and within the state production but estimated 60% of rice bran is imported into the state. It is transported from bulk traders to cluster level traders to pig farmers largely through public transport system⁹.

Pig Feed ingredient

Meghalaya has traditional practice of feeding pigs, wild roots, sweet potatoes, potatoes, left over rice from wine preparation, banana stems, colocasia/Taro, tapioca/Cassava and many other locally available materials¹⁰. Most often these are mixed and cooked to enhance palatability of feed. However in cross bred rearing areas, backyard growing of fodder like Lucerne, cowpea and berseem are on rise. Cultivation of water hyacinth had been observed, however, on a very limited scale.



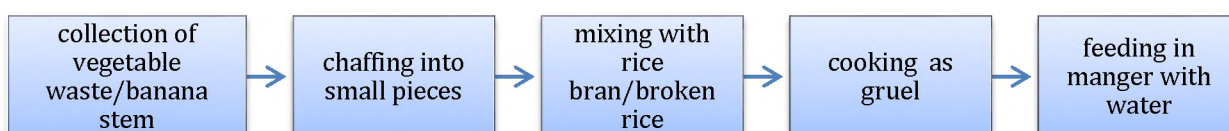
⁹ Estimation based on Traders interview

¹⁰ Training manual by ILRT

Feed preparation process

Feeding preparation in Khasi hills with a high focus on cross bred pigs has evolved and is much better than Garo hills and RiBhoi district. A typical process of feed preparation in Khasi hills as observed and based on focused group discussion, the following process is seen -

In Khasi hills, the feeds that are used are more efficient and two-time proper feeding system is

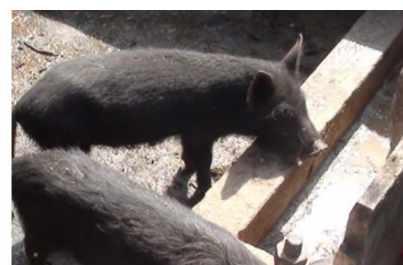
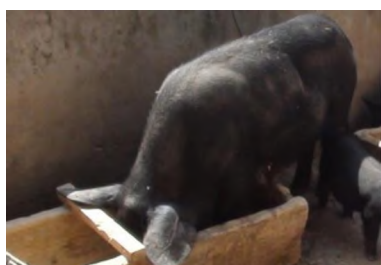


practiced. However in Garo hills, rice bran and rice hull are fed to pigs and generally put in front of pig throughout the day without cooking and mixing with other feeds. It was observed that a lot of feed gets wasted in Garo hills due low palatability and low quality of feed and has high focus on carbohydrate providing feed but have low focus on to meet protein requirement.

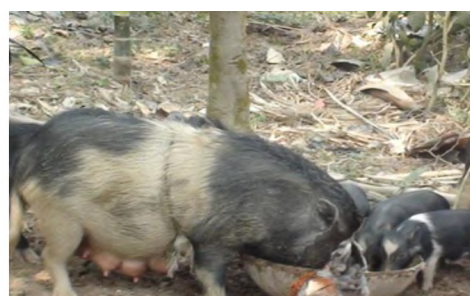
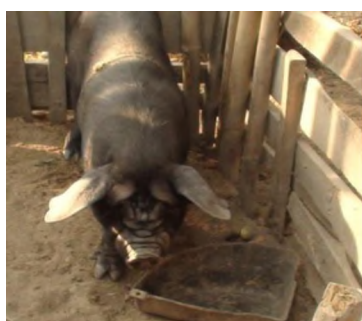
Pig feeder

Various type of pig feeds starting from wooden to cement concrete are used to feed pig across the state. People have local skills of making pig feeder and almost every pig farmer have pig feeder.

Khasi and Jaintia Hills



Garo hills



Practices of Salt and mineral mixture feeding

Pigs require significant amount of minerals specially growing piglets and lactating sows. But the practice of feeding mineral mixture has been very limited in the state. A small amount of 5g/pig/day is required and normally salt is mixed in cooked feed, which is sufficient. Awareness and availability both remain constraint on mineral mixture feeding in the state.

Clean drinking Water

Availability of clean water is a critical requirement for pig farming. Water is also required for cooling of pigs as pig have no sweat glands and wallowing is mode of regulating body temperature.

Traditional practice is to create mud in pig house to wallow but it creates unhygienic condition. It has been observed that Khasi region has adopted practice of using water splash/sprinkle to cool pigs, but Garo hills region by and large have mud wallowing in tethered condition. Rearing of pig in Garo hills seems less evolved on this account and pig houses/places are dirty and unhygienic.

Cost of feeding

Cross bred pig rearing has increased the cost of feeding and the dependence on external sources for feed availability. As supply of pig feed is a constraint in remote areas and terrain and remoteness of villages in Meghalaya did not permit easy access to market, it is an area of proper planning and discussion to take an informed choice of breeding preferences. Uses of natural wild growing feeds are more efficiently used by local pigs than cross bred or exotic breeds.

Management Practice

Profitability and efficiency in any business is function of management. Pig farming requires efficient and cost effective management of housing, sanitation, breed selection, health and feeding and finally marketing of produce.

In Meghalaya improved management practices has percolated in last decade to areas nearby towns and cities. However management practices have remained traditional and less effective once remote areas and pig farming is observed.

Some of the key management practices that were observed are described below –

Sanitation and hygiene – It has been observed that there is a significant difference between Garo hills and Khasi hills in housing pattern, cleanliness and use of improved practices. Housing condition of pigs is much better in Khasi hills than Garo hills area.

Weaning and Castration of male piglets – It has been observed the traditional means of castration through open surgery is practiced in both region and people have access to traditional and local people, who have these skills. However sanitized practices of castration and post castration care seem below desirable level across the state.

Disease Management

Diseases and especially contagious diseases is one the most important factor for loss of large number of pigs in many villages. Nutritional deficiency disease, worm infestation – both ecto and endo parasites has been observed to be significantly high in the remote village area but skill and services that take care of the same has been very low. Accessibility of first aid and preventative health care is almost unreached to remote pig farmers.

In a PRA based risk assessment exercise to identify major constraining factor and loss making factor by pig farmers have shown following results -

Following major disease had been observed in the state (based on FGD and recalled symptom analysis) –

- Swine Fever
- Gastro Intestinal Parasites
- Ecto parasitic infestation
- Swine Dysentery (Bacterial infection)
- Mineral deficiency symptoms (Anaemia)

Vaccines

Swine fever vaccine availability is a serious constraint in the state. As per sample data less 0.01% pigs are vaccinated in the rural areas against Swine fever. Supply of vaccinated piglets is a serious constraint.

Vaccines are only supplied through the Animal Husbandry Department that too in very limited scale and quantity. Coupled with it proper storage and cold chain is a weak link. Private supplies of vaccines have not been available and no commercial supply comes to pig farmers. Besides farmers have low herd size so collective effort by community for mass vaccination is required or availability of vaccines in small ampoules is need of the state. However this has remained a grey

area of intervention and least attention has been paid by service provider and policy maker on this issue.

Similarly vaccines for FMD, HS are available at Department level but adoption of same is less than 1% as per sample study.

Flock size

Sample based study shows that 78% pig farmer has less or equal to 2 piglets/pigs in the state. 15% farmer rear 3 to 5 pigs and only 7% farmer have more than 5 pigs/piglets. It has been evident that a large chunk of pig farmers has been engaged in backyard pig farming and mostly to fatten 1 to 2 piglets over a period of time for local consumption.

It is worthy to note that in spite of traditional activity and being in business for over generations' vertical growth of pig farming as a business has remained constraint. State has a good market and opportunity to supply pigs to NE states rather than purchase from outside, which presents a high potential to enhance pig farming both at horizontal and vertical level.

Constraints at the production stage

- **Lack of Vaccines:** Swine Fever Vaccine availability is a critical constraint across the state. Outspread of diseases is perceived as greatest risk in pig farming business and this increase with increase in scale of pig farming.
- **Lack of Mother Breeding units to supply piglets:** Availability of high genetic worth cross breed health piglets has been a major constraint perceived by the pig farmers. Village/cluster level pig breeding small centers by progressive farmers supported by the government pig farm center can go a long way in ensuring timely supply of healthy piglets at competitive price and can generate employment for significant number of progressive pig farmers and rural youths.
- **Lack of Alternative feeds, Protein and Mineral mixture feeding:** Promotion of balanced feeding of pig through use of non-conventional feeds, feed mixture block, palette concentrate feeds for piglets are major constraint as cost of feed and availability at door step is one of major hindrances to upscale pig farming.
- **Predominance of traditional management practices:** Cross bred pig farming requires improvement in management practices. Management practices in

Garohills region especially need to improve to rear cross bred pigs and grow healthy pigs.

4. Post Production Stage – Storage, Marketing and Value Addition

The gap between the demand and supply of meat becomes more acute in festive season and winter, leading to a skewed price rise. As meat is one of the major source of protein supply to tribal population of the state, it is imperative to ensure that quality pork supply is available at affordable rate and ensure the pig farmer's profitability to grow the business.

Post production process in pig farming refers to sale of adult fattened pigs to slaughtering and processing to make pork available to people for consumption.

Some of major process in this whole chain is as below

Storage

Storage practices/methods

Live pig is a major traded product and its shelf life after slaughter is very short (4 to 10 hours). It has been observed that pigs are slaughtered by pork meat seller one by one based on sale of first pig meat. Based on demand and sale, shop owner decides to slaughter new pigs and hence storage of pig happens in a live form. Most shop owners have created a small backyard pig house to store live pigs.

However risks are perceived, when meat of slaughtered pig is not sold within 8 hours. In such cases meat has high chance of spoilage. 40% of meat sellers store the meat overnight, in the household refrigerator or an ice box. However, the shop owners have shared that the chances of such storage is high in summer and very low in winter. It was also informed that such stored meat is supplied to hotels and restaurants' in early morning.

Second type of storage was observed at dhabas and restaurant level, wherein cooked pork sometimes has to be stored. Drying of pork was not reported by the sample interacted.

Access to storage practices

Most of the storage access is private and by individuals. Collective and public sector storage facility is not available.

Costs associated with storage

Cost of storage is high as each of individual business man has to purchase storage equipments like refrigerator. Cost of stored meat is fetched less than fresh meat, thus there is two loss – one

is direct cost of storage and another due to reduced price. This is idiosyncratic to meat business (perishable item) as normally price increases with storage.

Grading

Pork business as of now has no grading system. Healthy live pigs with tender age fetches a better price but price per kg live body weight decreases with dilapidated and old pigs. However end product like pork meat does not have any such grading and pork are sold at same price. The trust and market confidence of seller selling diseased, old, dilapidated gets reduced and may not have a permanent buyer. As consumer is same and regular visitor, some grading of pig happens by trader end and the price paid to producer is not always in proportion to grade or quality.

Standardization of such grading has not happened and need is to develop certain parameters to grade pigs to fetch better price. An initiative on consumer front will also be required to pay more or less as per grading of pigs slaughtered by pork seller.

Local Value addition

As per estimation 70 to 90% produce are consumed locally and pigs are slaughtered by local meat shop owners to sell meat. So value addition is largely local, which means that the value which is added in terms of transport to local market, slaughtering and cooking. Some variations in dishes are observed. However the product differentiation in terms of making it clean, dewormed, shining and decorated for festive seasons presentation has not been significant and scope is available to enhance acceptability by providing finishing feeding, using decorative products and grooming pigs for show and sale to individual households during festive season.

Marketing

Pork is the end marketable product in pig farming business, which is manually processed by cooking with spices by dhabaas and hotels. However pork meat is largely purchased by household consumer to perform end processing of cooking at household level to consume it as food.

Mostly live pork is a traded item and its form only changes when consumer demands it or immediate sale is predicted by trader.

Market Access for the products

The product has high market accessibility even if transport and information of product sale point is difficult to assess. Largely informal system of product marketing is operational, wherein

traders are available at each village/cluster and who regularly update himself/herself about potential or willing seller of pigs. Once prices negotiated, local trader procures it from doorstep of seller and transports it to nearest haat or medium level trader directly. Sometimes meat shop owner directly remain in touch with village level informant/trader and procures pig through them.

However none of respondent in study has reported difficulty in sale of pigs. It is only speculated that due to significant time involved in procurement and high cost of transporting such pig to meat shop or urban trading point, significant margin or price reduction may happen leading to low price paid to producer.

Market Norms

Market norms are simple in nature and largely set by small traders. Pig meat percentage is estimated by local traders and based on estimation a price is negotiated with producer. However use of weighing machine to estimate meat percentage is not in vogue making estimation largely a rough estimate. This most often is feared to work in favour of traders. However sale is completed at producer doorstep and responsibility of taking pig and transporting further lies with trader. Sale is almost 80% upfront cash payment basis and only 20% sample reported they have made sale of pig on credit basis. In such cases traders were neighbours or well known to seller.

Market Regulation

Pig market has been largely unregulated in Meghalaya. Of late some hygienic issue at village level production units and slaughter places had been on rise. Pig meat shops are largely operating in clusters and have a row. However at many places meat shops share just near stationery or grocery shops.

Haats are regulated by local people's representative body and as such no government regulations are operational.

Market information – access and use by the community

There are no formal processes of market information of pigs and largely it operates as informal sources. Efficiency and effectiveness of such system is low but looking into terrain and connectivity issues in the state, some alternative system may be evolved as per context to reduce time and cost in accessing information about sale, purchase and rate.

Value Addition

Value Added Products

As discussed, there exists a scope of value addition in live sales by making healthy and shiny animal more presentable. Major scope exists in use of pig hairs and pig compost.

Pork meat can be converted into many value added products like sausages, pickles and dried meats, semi cooked meat products but present deficit in supply of fresh pork and cost added with value addition products restricts such growth.

Constraints at the post production stage

- **Absence of transparent pricing system:** Pigs in Meghalaya are sold on rough estimation basis. As pig farmers invest over 6 months to one year to rear pig to sell the produce, cash is realized almost once in a year. Absence of transparent pricing system leads to exploitation by trader of gullible poor pig farmers.

- **Absence of certification of quality grading and healthy pigs:**

Healthy well fed pigs are grown largely on organic production system hardly fetch proportionate incentives in meat market as of now. If a certification by technically trained rural youths are promoted, better price realization and in turn better focus on feeding and keeping healthy pigs will be promoted.

Even piglets are sold more on number basis than health and vigour criteria. True to type breed and breed certification can add value to piglet pricing.

- **Pricing standardization and live body weight price estimation:** Rate of pork varies from 200 to 240 Rs per kg across the state but the price of per kg live body weight has higher variation within same area. As price is not fixed on live body weight, a high variation of cost of pigs had been observed, which hinders investment in adoption of best practices.
- **Lack of sale –purchase information aggregation, making procurement high cost business:** No aggregate information of sale and purchase of pigs are available at cluster/block or district level. It takes significant time and cost investment for trader to locate a saleable pig/ piglet and then to negotiate price.

- **Transportation of pigs from remote areas:** Pigs have to be transported to market places. However most of such transport happens through public transport system making pigs and people travel together. Cages used for pig transport need an improvement.

5. Institutional Support mechanisms

Being a pro-poor business and significant on scale in Meghalaya, institutional support is critical to sustain and promote this important livelihoods. Government of Meghalaya has created Animal Husbandry and Dairying as department, which is supposed to provide technical inputs and services for pig farming in the state. Of late some private sector players in livestock feed have come up to provide palette feed but such players largely eye broiler poultry farming enterprises and services and products for pig farming remain limited if not non-existent.

Infrastructure

Pig farming business infrastructure largely comprises of animal health care services through veterinary clinics or mobile units, basic transport for pig sale, training and sales counter/places.

State has veterinary hospitals, pig breeding center and training institutions in place to support pig farming. State currently has a network of 4 veterinary hospitals, 74 dispensaries, 59 veterinary aid center, 15 mobile dispensaries and 3 vigilance units. Most veterinary centers in the state are ill equipped and poorly staffed.

Accessibility, acceptability and affordability all three main constraints for the use of available infrastructure for pig farming in the state.

As a hill state, Meghalaya have many villages in remote areas and transport facility is not so frequent. Present cluster based Veterinary Hospital (VH) is not able to cater regular support to pig farmers. As awareness is low on most of new age technologies for pig farming, people hardly accepts VH as component of service provision for their pig farming based livelihoods.

Input supply

Pig farming input supply like piglets, breeds, feed and vaccines are mostly controlled by small traders and retailers. Institutional linkages and collective effort for input supply is very limited. This results in inefficiency of input supply chain and high cost to be paid by pig farmers. Most of hindrance comes in terms of unregulated low quality inputs and high transportation cost by individual pig farmers.

High potential exists in collective supply of inputs which can reduce cost, enhance accessibility and quality of inputs especially for resource poor farmers and women led pig farming business.

Technology Transfer and capacity building

With changing context of cross bred pig farming and profitability focus, capacity building of individual pig farmers and their collectives has been a critical need. Technological solutions like alternative feed promotion, low cost housing, proper sanitation, castration, vaccination and first aid medication and artificial breeding have been perceived as solutions for many of the problems encountered by poor pig farmers in the state. However a right technical solution with pro poor focus requires community consultation, low cost technology development and demand based technical solution (based on perceived problems), will be critical for state like Meghalaya where context are varied and landscape and remoteness did not permit one technical solutions for all.

Training and technical assistance situation

There are various training institutes and community based organization including NGOs, conducting technical training of pig farmers. However contextual content modification, use of interactive tools, use of audio visuals, case study based learning has remained very limited as part of training methodology and process.

As Meghalaya has regional variation in language and cultural aspects, it will be important focus on picture/video based training gets more space in methodology and local case studies form part of training and learning materials¹¹. However at present it had been observed that the training has remain a conduit to access loans and services under schemes rather than learning agenda for the participants. Opportunity for hands on learning and demonstration of improved technology had been very limited if not absent in most of training programs whose feedback solicited from pig farmers.

Constraints in institutional support

Development of pro poor production system and package for pig farming

Package of practices that are promoted in Meghalaya are similar to the ones advocated across all the states of India. However local context are too varied and terrain specific issues are dominant to decide what and which package of practices can be adopted. For example within khasi hills there are villages remote and difficult to access. Cross breeding may not be feasible option where pig feeds supply is difficult across seasons and pig breeding cannot be easily

¹¹ The Goat Trust (www.thegoattrust.org) training materials on goat based livelihoods can form a reference points.

ensured. On the other hand such villages have high local feed availability, which is used by local pigs very efficiently. So breed selection should be a collaborative decision rather a common prescription. Similarly some area of RiBhoi district have high bedding material availability (crop residues) so the use of bedding material reduces water requirement for shed cleaning and provides organic manure for field. In such cases a local package of practice should be developed and recommended.

Pig farming system development and package of practices need micro context specific changes in consultation and participation of local people. A strong PRA based analysis of resources, production system should be studied before developing a micro plan of pig farming promotion and deciding package of practices. Similarly disease frequency, type and seasonality differs significantly within the state, so the local epidemics or morbidity pattern should form the basis of planning of service provider's role and work calendar.

Absence of Pig Rearer's group or cooperatives in the state

There have been efforts under various programs to form Self Help Groups (SHGs) of men, women and youths in the villages. However aggregating activity wise group from these SHGs or forming pig farming specific group was not observed. It makes sense in the given context to form village level pig farming groups out of SHG members and provide intensive training and exposure to enable them to plan investment in pig farming. For broader business linkages cooperatives of such members or producers may be thought of. One such Multipurpose cooperative was observed in Garo hill region where rubber plantation and its product development had been taken on cooperative mode. Such cooperative can help pig farmers on input supply services and marketing end. PRADAN¹² promoted small holder poultry cooperative can provide a guidance to organize pig farmers in the state and provide backward and forward linkages.

Focus on supply rather than demand generation of services

There exist some services like supply of piglets through government pig breeding center, Animal health camps by Veterinary Hospitals and training on improved pig farming under various schemes. However it was observed that the available services are not used by pig farmers actively. Although reason for such incidences is many and varied but one of clear reason

¹² PRADAN (Professional Assistance for Development Action) www.pradan.net

Here the suggestion is observe, learn, adapt and evolve and not just copy and paste. At the cluster level, basic assumption of PRADAN model of collective purchase of input and technical services holds true to Meghalaya context, but certainly photo copy of any idea could not work in Meghalaya

is less focus on the demand generation of services and low participation of people in monitoring and deciding these services.

Centralization of products and services

Most of services even if planned are centralized to a particular place and remain confined to the boundary wall of institution promoted. Products and services have not planned initiatives to reach doorstep of pig farmer, which is critical in livestock services delivery.

Least participation and role of private business stakeholder

At present participation of large private player in feed supply, piglet supply, vaccines availability, marketing is very limited. This leads to less efficiency in product quality and delivery in the state for pig farming. A broad role for player and active participation in critical areas of product and services will be essential.

Less community participation in service delivery and quality monitoring

It has been found that community participation in present input supply and service quality monitoring is very limited. Unless and until their participation is not ensured, adoption will remain insignificant.

6. Policy and Advocacy

Pig farming is most widespread and ubiquitous livelihoods for rural poor in Meghalaya. The government is willing to provide gainful employment to women, poor, rural youths need to create an enabling policy environment to strengthen this important livelihood.

Minimum Support Price

As such pig farming did not require price controlling of output (pork) as it is growing significantly and pig farmers can get significant profit if production management gets efficient. However some support in pig feed and supplements can go a long way in enhancing the adoption. However any such support or subsidized supply should have ingrained design of enhancing the regular supply by private players rather than providing one time subsidy and then absence of product in vicinity. Accessibility and acceptability need to be worked on and affordability has to be generated by the product advantage not by subsidy.

Constraints at the Policy and advocacy level

Pig farming in the state has potential to be transformed from traditional livelihoods to profitable business venture under right policy and advocacy.

Some of critical policy constraints are

Unavailability of Swine fever vaccine within state – Unavailability of vaccine has been a major constraint for upscale this business as risk of such contagious diseases increases with higher density of pig farming. Presently vaccines are procured from Kolkata and other states. A dedicated vaccine lab in the state with state of art production facility can cater to entire north eastern states demand.

Unavailability of pallet pig feed and mixed ration block

A mixed ration feed block can be established in Khasi , Jantia and Garo hills to cater supply of total mixed ration for pig fattening to small and medium famers and pig breeding units. Such technologies had already been adopted for large livestock in hill states like Uttarakhand successfully. The plant requires usage of non-conventional feed to be chaffed and mixed in ration block so that pig farmers have balanced ration. Such system can only work on a plain zone with good transport facility as mixed block need to be kept at local distribution depot and pig farmers can easily access it.

Limited Pig breeding and piglet supply farm

As piglets are short in supply, a special scheme for same can be formulated to generate both employment and supply of quality piglets at competitive price.

Technical Human resource for Nursing and management of pig farms

State lacks extension staff and qualified technical professionals with gender equity for improved livestock farming. A special focused program can go a long way to ensure availability of such technically qualified human resource at affordable cost and door step service.

7. Recommendations

Based on extensive field work, sample studies and stakeholder's views analysis, the study proposes to take a short term and long term plan to transform pig farming from traditional livelihoods to profitable business venture. Broad recommendation based on study findings stress on the following important steps that need to be taken to strengthen pig based livelihoods -

Inputs and Preproduction stage

As discussed under constraints faced by pig farmer at pre-production stage following suggestions emerge –

- **Establish pig feed plants and Total mixed ration plant at cluster level to provide low cost balanced pig feed:** Feed is the highest cost input in pig farming but quality balanced feed at affordable price is constraint. One of reason is large chunk of pig feed like rice bran, maize is imported from outside state and storage of same becomes difficult. Price of pig feed see 65% variation within 9 months in the state making it costly. Besides pigs are fed high energy feeds but protein and minerals are not been fed in proportion. Feeding according to age, productivity and performance is not *in vogue*. Promotion of readymade feed block can also ensure use of non-conventional feed and balanced feeding to pigs in intensive crossbred pig farming areas. A proper intervention on use of mixed feed or palletted feed has high chance of reducing cost and increasing storage at various levels.
- **Promote Entrepreneurship based pig breeding centers in villages:** To ensure timely and cost effective availability of crossbred piglets selected pig farmers from village may be promoted as pig breeder through technical and financial inputs. These micro breeding units can be linked with State pig breeding farm to ensure genetically high worth piglets production and supply in the area.
- **Design and implemented financial products for pig farming:** Pig farming is quite remunerative with short cycle of 6 to 9 months. Appropriate financial products for credit, insurance should be planned in association with banks to integrate financial services to pig farmers.

Community based insurance (mutuals) may be piloted in an intensive pig farming clusters to build on social capital , ensure easy access to risk protection service and enable community to access it in low cost and quick claim settlement. Looking into difficult terrain and high transportation cost mainstream insurance may not be a feasible proposition for pig farmers in the area¹³.

- **Water for cleaning of sheds:** Use of paddy plants and other dried stalks as bedding material can reduce such constraint and provide manure for agriculture.

Production stage

- **Development of area specific low cost package of practices:** Area specific low cost pig production package with right combination of breed, feed, housing and management should be developed and propagated.
- **Develop Village based cadre to ensure door step delivery of primary health care and extension services:** Pig farming requires access to improved practice knowledge and support on regular basis. Primary health care like vaccination, deworming , castration, treatment of minor wounds and minor ailments required quick, on first symptom, in low cost with focus on prevention rather than cure.

A village based cadre who himself is engaged in pig farming and can provide services to 25 to 40 pig farmers in the village through regular checkups, supervision, record updates, deworming and basic treatment can go a long way in strengthening pig farming business.

A rural youth (man or women) trained and supported over a period of time can provide such services. Basic focus of such training should be management¹⁴ rather than treatment.

¹³ Goat community based insurance piloted by The Goat Trust (www.thegoattrust.org) with 6 NGOs in Rajasthan may be studied and replicated for pig farmers

¹⁴ Livestock nurse propagated by The Goat Trust, Heifer, BAIF can be guiding factor to design such training and support package.

Post Production stage

- **Develop a live body weight and grading based transparent pricing system:** Developing a live body weight meat estimation and pricing can facilitate better profitability and save time in price negotiation process. It requires field work of data collection of pig sale over a period of time and then to procure and sale pigs based on this pricing.
- **Certification of quality grading and healthy pigs:** Healthy well fed pigs grown largely on organic production system can fetch proportionate incentives in meat market if y technically trained rural youths are promoted to certify it.
- **Creation of data base of saleable pigs in a cluster through mobile based data collection system:** Mobile applications like SMS can be used to collect data of saleable pigs by member producer and aggregate data can be made available to bulk trader on payment basis to facilitate better price and reduce time of locating saleable pigs in the area.
- **Transportation of pigs from remote areas:** Special flooring and holding in vehicles for pig transport can be designed and promoted for long distance transport.

Institutional support

- **Building Pig farmer's organization at village and cluster level:** Pig farmers organized in SHG should be facilitated to form an activity group at village level to discuss business and service related issues of pig farming.
- **Developing participatory learning tools and a learning platform:** A participatory learning platform based on visual tools and discussion points can be prepared as training learning tool for improved pig farming. A participatory research and demonstration can be planned by this group every month to propagate context useful knowledge and experiential learning.
- **Facilitate private player's role in business linkages:** Private players should be involved in proving services like feed, vaccine and piglet supply to strengthen service quality under competitiveness regime.

Policy and advocacy

- Establish Vaccine production center for swine fever in the state
- Promote Rural Entrepreneurship development program for pig breeding units , Present special Livestock breeding program (SLBP) need more focus on entrepreneurship development
- Establish Institution to train rural youth in Livestock Nursing and management

8. Conclusion

Pork production in India is limited, representing only 7% of the country's animal protein sources¹⁵. Production is concentrated mainly in the north-eastern part of the country and consists primarily of backyard and informal sector producers. According to 18th Livestock Census of India (2007), the total swine population, while small, has grown consistently over the past 50 years. For the majority tribal population in the northeast region, livestock keeping – especially pig keeping - is integral to their way of life, with 3.8 million pigs (over one quarter of the pigs in India) being reared in this region. Among the North Eastern states that have 28% of total pig population in India, Meghalaya accounts for 20%. This shows that pork as a sub-sector has a potential for further growth. There is a growing demand for pork in Meghalaya which leads to large imports from other states in India and from Myanmar¹⁶. This increase is due to increasing per capita income, urbanization and changes in lifestyle and food habits. Despite this gap in demand and supply there is significant potential for pigs to contribute to the improvement of livelihoods in Meghalaya.

The Government of Meghalaya, under the National Mission for Protein Supplements (NMPS), has been implementing some strategic schemes and policies. This has increased attention towards this sector in the recent past but is unfortunately scanty. The worth and the potential of pork production in the state has been recognized at a National level and by the Government of Meghalaya. However, for the proper implementation of these schemes and policies, there is a need for concerted and joint efforts from these various departments and stakeholders to work together for ensuring that the maximum potential of pork is reached in the state of Meghalaya. There is a need for a determined policy shift to structure development interventions in this area where the small-scale and backyard pork producers can play a crucial role.

Among many constraints, some major strategic constraints include accessibility, availability and cost of feeds which act as major constraint to adopt pig farming on a larger scale. This, along

¹⁵ Monika Suri. 'Pork Meat in India'. Botschaft New Delhi, September 2012. (Link: http://www.g-e-f-a.de/fileadmin/termine_downloads/Marktstudien/Indien/PORK_MEAT_IN_INDIA_-_Report.pdf)

¹⁶ I A Wright, R Deka, W Thorpe and M L Lapar. 'The pig sector in North East India: status, constraints and opportunities'. International Livestock Research Institute. Contributed paper prepared for presentation at the international symposium 'Sustainable Land Use and Rural Development in Mountainous Regions of Southeast Asia', Hanoi, 21-23 July 2010

with, absence of financial assistance and lack of access to vaccinations to ensure good health of the pigs have been a major constraints. Other technical constraints like lack of transportation, lack of improvement in the practices of the producers, employing old and traditional methods for pig farming have caused the sector led to a substantial fall in production in the recent years. Thus these constraints need to be considered and looked at seriously by the Government else, there would be more decrease in pork production in Meghalaya.

Thus, the study has aimed to bring out some major recommendations to ensure that pork production reaches its potential and that there is less reliance on imports leading to higher production at the local economy level. These include suggestions to the government of Meghalaya to (a) **consider establishing pig feed plants as feed** is the highest cost input in pig farming, (b) **promoting entrepreneurship based pig breeding centres in villages**, (c) **designing and implementing financial products customized to pig farmers** like community insurances and so on. Lastly and most importantly, developing a village based cadre to ensure door step delivery of primary health care and extension services along with certification of quality for grading healthy pigs.

Considering that such recommendations, explored in the report, are taken up seriously and they are implemented, there can be a change in the number of farmers keen on taking up pig rearing and production. Finally, if some measures are taken by the stakeholders, it is quite likely that Meghalaya will become an important hub for pork production, among the various protein meat, not only in the region but in the country.

Annexure 1: A typical household economics of Pig farming

Estimated Economics of 3 piglets in 6 Months			
A. Fixed cost	(Semi Intensive rearing)		
	Unit cost	No of units	Cost (INR)
Breed Type	Crosses on Hampshire or White Yorkshire		
A1. Housing	20,000	1	20,000
A2. Feeding manger	500	1	500
Total A			20,500
B. Recurring cost			
B1. Cost of piglet	3,000	3	9,000
B2. Feeding cost of piglets @1.5 kg per day@rs12 per kg (average)	16	540	8,640
B3. Health care and Insurance cost	50	3	150
Total B			17,790
C. Other costs			
C1. Interest on capital @ 12% (6 Months)			1,230
C2. Depreciation of Fixed cost @20% annual			1,025
Total C			2,255
Gross payments (B+C)			20,045
D. Receipts			
Sale of 3 piglets	3	8,000	24,000
D4. Sale of manure			500
Gross Receipts			24,500
Net profit in 6 Months			4,455
Monthly profit			742
Total Investment (A+B)			38,290

Annexure 2: Typical day work profile of pig farming (Based on FGDs)

Time	Activity for pig farming	Gender wise responsibility
In between 6 Am to 8 Am	Cleaning floor, washing feeder	Female
8 to 10 AM	Feed preparation and Feeding of pigs	Female / Male in absentia
10 to 12 Am	Water to piglets	Female/ Male in absentia
4 to 6 PM	Feeding of piglets /pigs	Female/ Male in absentia

Annexure 3:Major functions and role of family members in pig rearing as livelihood

Activity	Decision maker/Actor (based on 9 FGDs)
Decision to start backyard pig farming	Female for backyard (1-2 piglets), Male for commercial scale
Purchase of piglets / Pigs	Either
Castration of male piglets	Male
Purchase of feeds	Male
Routine production work	Female
Marketing of fattened pigs	Either

Annexure 4: A Case study

A case study of meat shop owner has shown following margin share by producer and meat seller –

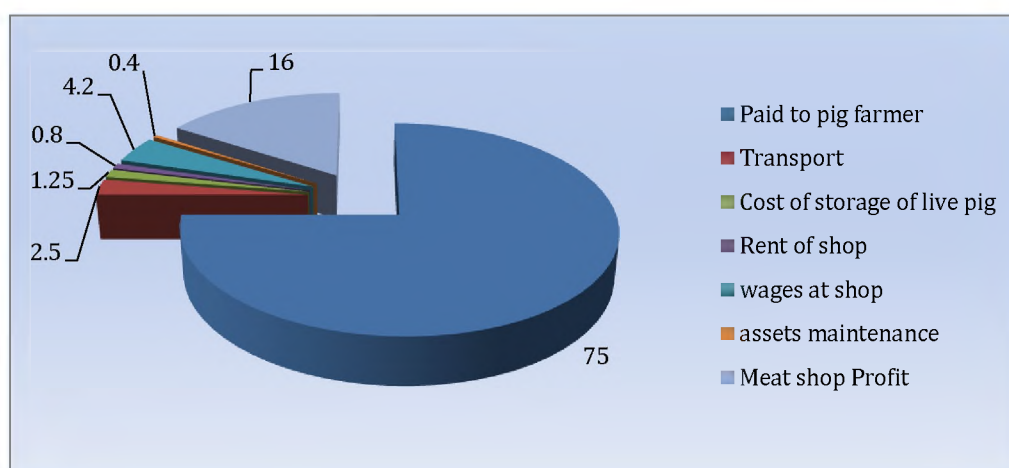
Place – Seven Miles, Upper Shillong

Years in business –15 years

Average daily pork sale – 50 to 60 kg

Cost items	Cost paid (₹)
Purchase of pig from village (50 Kg meat estimated)	9,000
Cost of transport (own vehicle)	300
Cost of feeding at home (during storage)- Average 3 days	150
Total cost of pig	9,450
A. Procurement cost per kg of meat (50 kg estimated)	189
Selling cost	
Rent of shop @ 200 per day and average 2 pig slaughtered and sold per day	100
Wages to 2 person involved in procurement and sale	500
Consumables and maintenance of assets	50
Total cost	650
B. Per kg cost @ 50 kg	13
Total per kg cost of pig meat (A+B)	202
Consumer paid per kg price	240
Profit per kg	38
Profit if meat sold 50 kg per day	1,900

Estimated percentage of payment shared between Pig rearers and meat seller



Annexure 5: Production and management practices followed by the pig farmers

Salient observations of production and management practices followed by the farmers are presented below.

Sl. No.	Production and management practices	Frequency and percentage (N=100)
<i>Housing practices</i>		
1.	Pigsty constructed with:	
	1. Bamboo and woods	100
	2. Others	0
2	Construction of floor:	
	1. Bamboo and Wood (raised floor type)	100
	2. Concrete	0
4	Floor space requirements:	
	1. As recommended	3
	2. Less than recommended	97
5	Feeding/ water trough:	
	1. Bamboo, woods iron vessels, tyres etc	98
	2. Others	2
6	Water storage facility:	
	1. Present	16
	2. Not Present	84
7	Electricity facility	
	1. Present	11
	2. Not Present	89
<i>Breeding practices</i>		
1	Types of pig in the farm:	
	1. Cross-bred	92

	2. Indigenous	8
2	First service at the age:	
	1. 10-12 months	55
	2. Above 1 year	45
3	Service time:	
	1. Once immediately after onset of heat	25
	2. Twice after 12 hrs interval	75
4	Service of sow:	
	1. Natural service with boars	25
	2. Artificial insemination	75
5	Rearing of boars for breeding purpose:	
	1. Reared	16
	2. Not reared	84
6	Litter size at birth	
	1. 5 numbers or below	7
	2. 6-8 numbers	75 (Average 7)
	3. Above 8 numbers	18
7	Litter size at weaning:	
	1. 4 numbers or below	8
	2. 4-6 numbers	62 (Average 6)
	3. Above 6 numbers	30
8	Sow farrowed in one year:	
	1. Once	26
	2. Twice	74

Feeding practices

1	Method of feeding	
	1. Scavenging	0
	2. Scavenging followed by evening ration	0
	3. Stall fed	100

2	Types of ration used:	
	1. Kitchen waste	50
	2. Concentrated feed only	0
	3. Kitchen waste with concentrated feed	50
3	Quantity of concentrated feed supplied:	
	1. 1 kg or less	50
	2. 1-2 kg	40
	3. Above 2 kg	10
4	Boiling of feeds:	
	1. Boiled	100
	2. Not boiled	0
5	Feeds additives:	
	1. Used	70
	2. Not used	30
6	Use of locally available weeds with Feeds:	
	1. Used	100
	2. Not used	0
7	Time of feeds supplied to pigs:	
	1. Once in a day	0
	2. Twice i.e. Morning and Evening	95
	3. Thrice i.e. Morning , Noon and Evening	5

Health care practices

1	Use of antibiotic:	
	1. Used	72
	2. Not used	28
2	Vaccination:	
	1. Practiced	82
	2. Not Practiced	18
3	Deworming of pigs:	

	1. Used	64
	2. Not used	36
4	Use of ectoparasitic drugs:	
	1. Used	39
	2. Not used	61
5	Giving of iron injection to piglets:	
	1. Used	12
	2. Not used	88

General Care and Management Practices

1	Cutting of needle teeth of piglets	
	1. Practiced	2
	2. Not practiced	98
2	Weaning of piglets within 2 months:	
	1. Practiced	100
	2. Not practiced	0
3	Castration of Male piglets after weaning:	
	1. Practiced	100
	2. Not practiced	0
4	Special care to pregnant sow	
	1. Taken	36
	2. Not taken	64
5	Special care to sow after farrowing	
	1. Taken	80
	2. Not taken	20
6	Treatment of repeat breeding sows	
	1. Treated	15
	2. Not treated	85
7	Clean of pigsty	

1. Daily	5
2. After two days	30
3. Once in a week	65

Source:

- Rahman, S Barthakur and G Kalita. 'Pig production and management system in Aizawl District of Mizoram, India'. Livestock Research for Rural Development 20 (9) 2008. Link: <http://www.lrrd.org/lrrd20/9/rahm20139.htm>
- Training Manuel for Smallholders' Pig Management. Link: <http://www.ilri.org/ilrinews/index.php/archives/7962>