

Problems and Prospects of Traditional Pig Farming for Tribal Livelihood in Nagaland

M.K. Patra¹, Sonuwara Begum² and Bidyut C. Deka³

1,2&3. ICAR Research Complex for NEH Region, Nagaland Centre, Jharnapani, Nagaland – 797 106

Corresponding author e-mail: drmanas01@gmail.com

ABSTRACT

Majority of the tribal population of North Eastern region rear pigs as integral part of their livelihood. There is growing demand for pork in NE regions especially in Nagaland and much of this demand is met from the imports from other states of India. A study has been undertaken to appraise the in depth scenario of traditional pig production systems and to identify the problems where scientific intervention could be initiated for further improvement in production. Survey was conducted with designed questionnaire in selected villages of five different districts namely, Dimapur, Kohima, Peren, Wokha and Mon based on their geographical location. A total of 200 respondents were interviewed on different aspects of socio-economic condition, routine management, health care practices and market linkages associated with pig husbandry. Majority of pig farmers belong to lower income group, small and medium land holding capacity, low education level with average family size of 5 to 8 members. Small scale low input pig farming at intensive system prevails all over the Nagaland. The major constraint faced by the farmers include high cost of concentrate feed (81.08%), non availability of proper veterinary health care (72.97%), high cost of initial inputs and lack of quality piglet (60.36%), frequent outbreak of diseases (46.85%), lack of availability good breeding boar (45.95%), lack of market linkages (45.04%) etc. Scientific interventions in utilization of non-conventional feed resources, capacity building in health care services, adoption of scientific breeding, use of artificial insemination and developing suitable entrepreneur for medium to large scale production and proper use of pig by-products could transform the traditional subsistence pig farming to a profitable enterprise.

Key words: Traditional pig farming, Socio-economic status, Tribal livelihood and Nagaland

Nagaland, one of the hilly states of Eastern Himalaya, is inhabited by tribal communities which are mostly non-vegetarian and hence, the demand for animal protein is much more compared to other parts of the country. Pig is one of the most important livestock which play an important role in improving the economic status of the tribal and weaker section of the society. Genetically pigs are superior to ruminants in converting feed to meat. Efficiency of the pigs is recorded to as twice that of ruminants (Mpofu and Makuza, 2003). The small scale pig sector has seemingly greater potential to reduce poverty (Lanada *et al.*, 2005). Pig rearing occupies an important position in farming system as it is closely interlinked with the other agricultural operation performed by the tribal people for livelihood. Pigs can be raised for their entire lifetime in enclosure as they do not contribute to loss of grazing lands (Mpofu and Makuza, 2003). Pig alone accounts for 55.38 per

cent of the total livestock population in Nagaland, but still a wide gap exists between the demand and availability of pork mainly due to traditional production system. Families usually keep an average of 1-2 indigenous or crossbred pigs for fattening with zero to minimum inputs in terms of family labour and feeding.

Due to remoteness and inaccessibility, the rural hill farmers of this region has evolved a self sustainable local resource based production system, in which pigs are mainly dependent on local vegetations, crop residues and kitchen waste (Kumaresan *et al.*, 2007; Moanaro *et al.*, 2011). Although, this system has been followed generation after generation, further improvement is required to augment the productivity. Several reports highlighted that the main purpose of keeping pigs was to obtain emergency cash and/or meeting the home consumption. It appeared as potential source of animal proteins and avenues for additional income and employ-

ment that can improve the livelihood in a sustainable manner (Petrus *et al.*, 2011). In spite of several opportunities in pig based entrepreneur, the pig farmers' faces several challenges due to high feed cost, lack of quality germplasm and health care service in daily operation. An in-depth investigation of the views, believes, perception and constraints in traditional pig farming is essential for introducing any scientific intervention for further improvement in existing production system for transforming the subsistence production to a profitable enterprise. The present study was conducted to appraise the scenario of traditional pig production and its impact on rural livelihood in Nagaland.

METHODOLOGY

The present study was conducted in Nagaland, one of the seven sisters of the North East Region. The state is bounded by Assam on the West, Myanmar on the East, Arunachal Pradesh and part of Assam on the North and Manipur on the south. It covers a geographical area of 16,579 sq. km and lies between 25°60' and 27°40' Latitude North and 93°20' and 95°15' Longitude East of the Equator. The altitude ranges from 100 m to 3840 m with climatic condition varying from sub-tropical to sub-temperate. The annual rainfall varies from 1500-2500 mm occurring over the period of seven months from April to October. The temperature ranges between 4°C - 35°C.

Demography : According to the 2011 census, the total population of Nagaland is 19.80 Lakh with an average density is 120 per sq km. The state is predominantly rural with 71.03 per cent of the population living in villages, generally situated on high hill tops or slopes overlooking the verdant valleys. The tribal population comprised 86.24% of total population. Shifting cultivation is the mainstay of the economy of tribal flock of the region since time immemorial and animal husbandry is an integral component of farming system practiced for livelihood and nutritional security. As of 2013, about 10% of rural population is below the poverty line; among the people living in urban areas 4.3% of them are below the poverty line. Nagaland has a high literacy rate of 80.1 per cent. Majority of the population in the state speaks English, which is the official language of the state.

Distribution of pig population : As per livestock census 2012, among various livestock, pig population stands first out of the total livestock population followed by

cattle and goat. The total pig population in Nagaland is 0.503 million of which 24.42 per cent are indigenous type (Table 1). The distribution of total pig population mostly located at rural areas (86.05%). Among the rural pig population 73.02 per cent are crossbred where as in urban areas the crossbred population is about 91.38 per cent. In rural areas out of 3, 04,297 household 37.94 per cent families are engaged in pig farming however, in urban areas only 12.60 per cent household are directly involved in pig farming. The numbers of pigs available per 1000 household is 181.

Table 1. Pig population statistics for Nagaland

	Age	Rural		Urban		Gross total
		Exotic /CB	Ind*	Exotic /CB	Ind*	
Male	<6 mo	84064	32335	17264	1911	135574
	>6 mo	83102	31480	18288	1950	134820
Female	<6 mo	74510	26508	14357	1023	1025819
	>6 mo	74869	26594	14265	1168	116896
Total		316545	116917	64174	6052	503688

Ind*=Indigenous

Source: Livestock census data, 2012

A questionnaire was prepared to conduct the survey on traditional pig production system. All together 200 farmers were interviewed for generating the primary data in the present survey study. The data were collected from five districts viz., Dimapur, Kohima, Peren, Wokha, and Mon out of total 11 districts in Nagaland. Four villages were selected in each district and minimum 10 farmers were interviewed from each village by using designed questionnaire through random sampling. All the data collected in present study was tabulated. The data presented in percentage scale for comparison of each attributes.

RESULTS AND DISCUSSION

Socio economical profile of the respondents: The majority of pig farmers interviewed in present study belong to rural areas of Nagaland. The socio-economic status of the respondents reflected that the majority of pig farmers belong to small and medium land holding capacity with average family size of 5 to 8 members. The education background was mostly (44.14%) below class X. Agriculture (45.04%) and livestock farming

39.63 per cent and less than 60,000 in 41.44 per cent respondents (Table 2).

Table 2. Socio-economic profile of the respondents engaged in pig farming in Nagaland

Variables	Categories	%
Family size	Up to 4members	27.02
	5 to 8 members	72.97
Land holding	Landless	6.30
	Marginal	19.81
	Small	26.12
	Medium	34.23
	Large	13.51
Education	Illiterate	20.72
	Below class X	44.14
	Up to class X	18.00
	Class XI &XII	9.00
Income source	Graduate & above	8.11
	Agriculture	45.04
	Agric & Livestock	22.52
	Service	9.00
	Business	11.71
Annual income	Other	11.71
	Below 10000- 29000	39.63
	Margin 30000- 59000	41.44
	Medium 60000- 90000	9.00
	Above 100000	9.91
Access to veterinary care	Yes	17.21
	No	82.88

Purpose of rearing : In the mountainous farming system, the major income sources were from agricultural crops, animal husbandry, off-farm activities and the income from pig constitutes high share of household income, which is in consonance with the findings of Epprecht (2005). This system aims to get medium output from nearly zero input and mostly based on the locally available resources. The motive of keeping pig is usually differ from one farmer to another. About 69.23% of the farmers indicated that they reared pigs for both income generation and home consumption. Sale of pigs normally occurred in case of emergency need for cash or during celebrations in Christmas, weddings ceremonies. Often, farmers slaughtered their pigs to meet up the unexpected needs or when there was nothing to feed their pigs. The purpose of pig rearing is for fattening (34.23%), breeding (33.33%) and for dual purpose both fattening and breeding (32.43%). Again for fattening purposes, people preferred mostly (42.34%)

the male pigs than female.

Breed preference: Majority of the household reared pig in intensive system and most of them rear 1-2 pigs at the backyard. The farmers (62.16%) generally preferred to rear crossbred pigs and 29.74% were still involved in rearing of local pigs and just 8.10% of them initiated rearing of exotic pigs (Table 3). People mostly preferred the black colour (74.77%), short snout pig which is quite similar with the findings in Mizoram. Reported reason for preference of black coloured pigs was that they were less affected with skin infections (Kumaresan *et al.*, 2009). The breed like Large Black cross, Burmese Black and Hampshire cross were popular in the region. The indigenous Naga Local pig is available with the respondents in remote districts. The piglets are mostly (93.33%) procured from local market and just 5.55 per cent people collect the piglets from any organized farm.

Table 3: Preference attributes of pig farmers in Nagaland

Variables	Categories	%
Purpose of rearing	Breeding	33.33
	Fattening	34.23
	Both	32.43
Breed	Local	29.74
	Crossbred	62.16
	Exotic	8.10
Sex preference	Male	42.34
	Female	23.42
	Both	34.23
Colour	Black	74.77
	Black&white	23.42
	White	1.80
Piglet procurement	Local market	87.39
	Organised farm	6.31
	Outside Nagaland	6.31

Housing management : Free range or semi intensive systems were not very popular in Nagaland. In traditional farming practices, respondents mostly followed the intensive housing system with temporary pig sties built with locally available resources made of wood or bamboo and the roof material is made of CGI sheet and thatch type which is quite similar with the housing pattern observed in other parts of North East (Kumaresan *et al.*, 2009). Complete box type housing without any open run area was used by the farmers. Majority of them rear 1-2 pigs in single pen (45.9%) and in group (9%). The scientific housing system with

required spacing in open and covered area was practiced by none of the farmers. The floor was normally made of concrete (31.53%), katcha (36.04%) and with wooden/bamboo plank (29.73%). The wall was mainly made of wood (43.24%), bamboo (22.52%) or concrete (11.71%). The roof was either made of CGI sheet in 50.45% or thatch in 16.2% cases (Table 4).

Table 4: Types of low cost housing used for pig farming in Nagaland

Variables	Categories	%
Housing: Pen type	Single	45.90
	Group	9.00
Floor	Wooden	29.73
	Bamboo	2.70
	Katcha	36.04
	Concrete	31.53
Wall	Wooden	43.24
	CGI	6.31
	Bamboo	22.52
	Concrete	11.71
Roof	CGI	50.45
	Thatch	16.2

Table 5. Types of feeding systems and feed ingredients used for traditional pig farming

Variables	Categories	%
System of Feeding	Stall fed	93.69
	Scavenging	1.80
	Scavenging + Morning and evening	4.50
Concentrate	Maize	36.00
	Broken rice	52.25
	Rice husk	54.95
	Rice brew	25.22
	Wheat bran	35.10
	Other	61.26
Crop residue	Colocasia	47.74
	Tapioca	18.92
	Sweet potato	17.12
	Other	61.26
Kitchen waste	-	67.56
	-	67.56
Frequency of feeding	Once	0.00
	Twice	73.87
	Thrice	26.13

Feeding management: Unlike other parts of India, scavenging system is not permitted in Nagaland. Our survey revealed that most of the respondents (93.69%) were practicing stall feeding; only 4.5 per cent farmers followed scavenging along with morning and evening

ration and mere 1.8 per cent practices only scavenging (Table 5). The feed ingredients used by the farmers mainly included kitchen waste, concentrate mixture of broken rice, wheat bran, rice brew and maize. Besides this, farmers also fed to their animal the tuber crops like colocasia, tapioca, sweet potato and many non conventional grasses, tree leaves either cooked or as raw form which is in consonance with the findings of (Lemke et al., 2006; Kumaresan et al., 2009; Moanaro et al., 2011). The feeding frequency was twice daily in most of the cases (73.87%), although some farmers adopted feeding schedule for thrice (26.13%) daily. The local made wooden or spare rubber tires were used as feeder and waterier by majority of the farmers.

Table 6. Health care practices performed by the small holder pig farmers in Nagaland

Variables	Categories	%
Causes of piglet mortality	Farrowing	17.12
	Cold stress	56.67
	Large litter	9.91
	Crushing	19.82
Major diseases noticed	Diarrhoea	44.14
	fever	54.05
	FMD	9.91
	Mange	44.14
Disease occurrence	Endoparasites	45.04
	Diarrhea	63.06
	Respiratory problems	33.33
	Anaemia	18.92
Disposal of animal	Reported to Vety. Doctor	11.71
	Treated by themselves	57.66
	Indigenous method	30.63
Disposal of animal	Buried	90.99
	Thrown	7.21
	Consumed	1.8

Health care management: The health care practices in remote rural areas are mostly depending on indigenous technical knowledge (ITKs) and in peri-urban region through veterinary practitioners. Mortality of young piglet was appeared as major concern in traditional pig production system. The main causes for piglet mortality were cold stress (56.67%) and piglet diarrhoea (44.14%), crushing by the mother (19.82%, Table 6). In grower and adult animals, very often dis-

eases remain undiagnosed due to poor veterinary services in the region. However, the commonly occurring diseases affecting the grower and adult pigs were diarrhea (63.06%), swine fever (54.05%), endoparasite (45.04%), mange (44.14%), and respiratory problem (33.33%). The response of the farmers towards the health condition of the pigs indicated that the farmers do not vaccinate their pigs and maximum of them treat by themselves (57.66%) by using medicine or locally available treatment for pigs such as using some plants for de-worming, using fish meal with the feed when the animal is not eating and just 11.71 per cent of the farmer called on veterinary doctor for treatment. Our observation is similar with previous finding of *Lemke et al. (2006)* on handling of disease animal under low input system in North Vietnam. The sick animals were often slaughtered for home consumption or sell in roadside market. The animals which have died due to disease people use to bury (90.99%), or thrown in jungle or ditches.

Marketing: There is no proper market linkage exists in rural areas. The livestock produce at rural areas are mostly consumed at locally. The survey result revealed that the piglets were sold at 2 to 3 months age to the farmers directly or to the local traders at Rs 2500-3500 (86.49%). The castrated males fetched more price than the female at same age. The adult animals were sold at Rs. 90 to 200 /kg depending on remoteness of the locality (Table 7). Farmers used scientific method for weighing after slaughtering the animal in 58.56 per cent cases, indigenous method for weighing (22.52%) and by visual observation (18.92%).

Table 7. Market status of piglet and pork in Nagaland

Variables	Categories	%	
Selling price of live animal	Piglet (Rs)	2000-2500	86.49
		2600-2800	3.60
		3000-4000	9.91
	Adult (Rs/Kg)	90-100	34.23
		110-120	26.13
130-140		17.21	
Method of weighing	150-160	22.52	
	Scientific	58.56	
	Indigenous	22.52	
	Visual	18.92	

Constraints in pig farming: The pig farmers face mul-

iple constraints while transforming zero-input small scale backyard farming to medium scale commercial pig farming. The major constraint include high cost of concentrate feed (81.08%), non availability of medicine, vaccine and veterinary health care (72.97%), high cost of initial investment in housing and piglet procurement (60.36%), frequent disease outbreak and mortality of piglets and adult stock (46.85%), lack of availability of good breeding boar (45.95%), availability of market linkage (45.04%).

Possible solution in improvement of pig farming: From the study it is appeared that there is immense potential to augment the productivity of small holder pig farming and bridge the gap in production and demand of pork in Nagaland. Scientific intervention in operational techniques through proper capacity building program with the help from Government or NGOs the problems of the farmer can be minimized. Thus, the pig rearing enterprise can be open in a large scale which can fulfill the protein supply of the state. The major steps can be taken as:

Making availability of quality feed ingredients: Our survey study has shown that the high price of feed ingredients is one of the major obstacles in pig farming. The North East as a whole and Nagaland in particular produce enough maize round the year, but the important protein sources for pig i.e., soybean and ground nut is not cultivated in large scale. Therefore, the import of soybean and groundnut powder is only option for meeting the requirement. High cost of transportation and poor road connectivity makes it further expensive in remote pocket of North East. The cultivation of soybean and groundnut has been demonstrated and is now under popularization stage for meeting the demand of vegetable protein source. Several non-conventional plant sources with high crude protein have been identified for incorporation in pig ration which could be cultivated in large scale for meeting the deficiency of protein (Moanaro et al., 2011).

Making availability of quality pig germplasm: Making availability of improved pig germplasm at farmers' door step is another approach in improvement of pig production. Inbreeding is a major issue in indigenous pig population for declining productivity. Introduction of quality pig germplasm has been initiated by ICAR under Mega Seed Project on Pig at Nagaland.

Faster propagation of elite germplasm is now been under popularization program through artificial insemination techniques. Establishment of breeding unit at each district is the earnest need for meeting the demand of quality pig germplasm.

Extension of health care services: Nagaland with its porous international border possesses huge threat for emergence of exotic diseases like PRRS and frequent occurrence of outbreak of swine fever, FMDs etc. Inefficient health care services and lack of availability of medicines and vaccines aggravate the situation further and often leads to failure of pig production system. Capacity building in developing trend man power and making availability of vaccines and medicines for prevalent diseases through different agencies could transform the health care situation and augment the productivity further.

Market linkage for inputs and pig produce : Suitable market linkages for procurements of inputs like quality germplasm, feeds, feed supplements and disposal of farm produce i.e., piglets, pork and by-products (bristle, hoof, blood, bone etc.) is necessary for continuous flow of resources and output in pig farming. As there is no big commercial enterprises engaged in pig farming,

organizing the small holder pig farmers through co-operative approaches could be an alternative. Similar approaches have been made through Nagaland Pig Farmers' Association in formation of a state level organization to look after the market linkages.

CONCLUSION

From this study it is concluded that the pig husbandry is still solely depend on small scale production system. The production system is traditional with zero to minimum input involvement and low remunerative. Considering the demand of pork in the region, immense opportunities prevail in improvement of productivity through adopting scientific interventions in routine management and health care services. Entrepreneurship development in major sectors like feed formulation and supply, establishing pig breeding unit, artificial insemination facilities, mobile vaccination services, pork processing and use of pork by-product could make the enterprises a profitable one and generate employment opportunities for farmers and youth engaged in this livestock sector.

Paper received on : September 20, 2014

Accepted on : October 23, 2014

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