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## Swine feeding and rearing practices in the Peren district of Nagaland, India

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**Abstract**

A survey of locally available feed resources, feeding and management practices of pigs followed by farmers was observed in the six circles of Peren district of Nagaland, India. A total of 120 farmers were selected randomly for the study. Various locally available plant feeds at two different seasons was documented in this region and depending upon the season the availability of the fodder also alters. In most of the households pigs were fed with kitchen waste mixed with green roughages after cooking and fed twice in a day without addition of any feed supplements. Crossbred pigs were mostly preferred for rearing than local pigs because of more weight gain. Most of the farmers have temporary housing with provision of two adult animals per sty. Health related problems were also observed during both the season and was found that piglet mortality and occurrence of infectious disease is very high during summer season. Very few farmers practice vaccination and most of the farmers choose indigenous method of treatment. From this study it can be inferred that majority of the pig rearers were not aware of scientific rearing and feeding management practice, which results in low production performance, high mortality and more prone to occurrence of disease in pigs. Suitable feeding, management and healthcare strategies are necessary to understand the baseline situation, improve the existing condition and to overcome the constraints.

**Keywords:** Swine rearing, local household, strategies, constraints, Nagaland

**Introduction**

An animal husbandry and livestock sector plays a very critical role for development of rural livelihood and economy. India is one of the largest livestock wealth in the world and a quarter of the agricultural gross domestic product is contributed by the livestock sector [1]. Out of the various livestock species, pig has a great potential to contribute to faster economic return to the farmers, because of certain inherent traits like high fecundity, better-feed conversion efficiency, early maturity and short generation interval. Therefore pig finds an important place as it being reared by socio-economically weaker sections of the society. Hence, pig farming requires small investment on buildings and equipments, so it has immense potential to ensure nutritional and economic security for the weaker sections of the society [1].

Nagaland is one of the hilly states of Eastern Himalaya, is populated 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. The Peren district of Nagaland is located at semi hill terrain and it known as rice bowl of Nagaland. The altitude of the district varies from 800 mts to 2500 mts above sea level consisting of total geographical area of 2300 sqkm. The district has total land area of 230000 hectares and the cultivable land area is 29305 hectares (15<sup>th</sup>National Census, Govt. of India). The climatic condition of Peren District, which is known as "the Green District of Nagaland," varies from sub-tropical to sub-temperate with annual rainfall varies from 1500-2500 mm period from April to October. During peak summer period temperature ranges from 30-39 °C while during winter period (November to January) temperature ranges from 4-15 °C. The major tribes/ inhabitants in Peren district belong to Zeliangs and Kuki tribes [2]. The varieties of fodder resources are available in the Peren district due to its highly fertile soil and less leaching effect depending upon the season. The vegetation covers of the district is 73.68% with effective forest cover of 38% dominated by numerous types of trees, bamboo, cane and broom grass of different species.

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 of the Peren district. Pig population in Nagaland is 0.88 million, out of which indigenous pigs accounts 0.5 million and

cross-bred pigs accounts 0.38 million<sup>[3]</sup>. The Peren district is abundant in varieties of nonconventional feed resources (NCFR) for pig feeding. The forage available for feeding pig during rainy and summer season are sweet potato, colocasia, taro, yam, tapioca, fig, spanish needle, stylo, borra hispida species etc. Occurrence and availability is abundant during summer and rainy season compared to winter season. So, piggery sector having great prospective, but barely any attempt has been made to establish the pig rearing system followed by the farmers. Therefore, the present study was undertaken to understand the prevailing production and management practices followed by the farmers of Peren district and reasons thereof.

### Materials and methods

The study was carried out at Peren district of Nagaland, India which is located at semi hill terrain and it known as rice bowl of Nagaland. The study was purposively carried out in this district because as the district is in semi hill terrain and varieties of fodder resources are available due to highly fertile soil and less leaching effect depending upon the season. For this study six circles of Peren district e.g., Jalukie, Athibung, Nsong, Tening, Pedit (Ngwalwa) and Peren were selected. All together 180 farmers were selected randomly considering 20 farmers in each circle. There were all together 105 number of villages in the Peren district. Data collection was done from 10 farmers from each circle of various villages on various feeding and management aspect and analyzing the problems faced by the farmers in each aspect. A designed questionnaire was prepared to collect the primary data through random sampling. To compare each attributes tabulated data were expressed as percentage basis.

### Results and Discussion

Among the prominent animal husbandry activities in the Peren district of Nagaland, piggery is one of the major practices followed by almost all of the people in this region. Pig production is small scale and mostly backyard practice with no scientific feeding and rearing (Fig.). The breed of pig used for backyard rearing are some nondescript local pigs and crossbred include Hampshire cross, large black and large white Yorkshire etc. are most common.

### Feed availability and feeding practices

Peren district is considered as green district of Nagaland<sup>[2]</sup>. It was observed that seasonally available nonconventional fodders formed the main sources of roughage in backyard piggery along with some household kitchen waste (Fig. 1). Among the cultivated fodder the chief fodder is maize, cowpea and different varieties of local legumes. There is vast feasible area for maize cultivation in this area. On an average the availability of green fodder and indigenous grasses were found to be 5.85 and 10.9 quintal/year/pig<sup>[2]</sup>. The mostly available nonconventional local forages and indigenous grasses are the main source of swine feeding<sup>[4]</sup>. The main nonconventional forage and tree leaves used predominantly for feeding of pigs in this region are sweet potato, colocasia, tapioca (Fig. 1), borra hispida spp. (Fig. 1), fig leaves, Spanish needle etc. In some fodder variety *i.e.*, sweet potato, colocasia, whole plant *i.e.*, leaves, stem and tuber overall parts are used for swine feeding. While concentrate ingredient availability is very less. Only rice cultivating areas of the district rice bran is available. Maize fodder and grain is available during winter season but availability to pig is very

less (30%)<sup>[2]</sup>. Among the oil cakes mustard oil cake (MOC) and til oil cake (TOC) is available in limited quantities. In Aizawl district of Mizoram also stall feeding was followed by almost all of the farmers and this is unlike the scavenging system commonly seen in other parts of the country<sup>[5, 6]</sup>. Most of the household of Peren district rearing is semi-intensive (68%) with half a day; pigs are allowed for scavenging while night time kept in indoor sty and fed on kitchen waste and some local roughages (Table 1). Out of the 180 household farmers surveyed, only 6.32% fed their pigs with readymade commercial concentrate feed in small quantities procured from market. The locally available roughages were chaffed and boiled before feeding (74%). The application of feed supplements is very less among the respondents. Most of the respondents fed their pigs twice daily (82%) *i.e.*, morning and evening. During the whole day an adult pig was given 2-3 kg kitchen waste mixed with boiled green roughages but concentrate was not given very often with a quantity of 0.5 kg consisting of basically wheat bran mixed with broken rice, rice brew etc.<sup>[7]</sup>. Alcohol - rice distilling residues/Apong/yonkgin/Joogli is popular form feed for pig in Assam which is distillery waste from rice. These are mixed with other feeds, such as rice bran and broken rice mainly for feeding of boar for fattening<sup>[6, 8, 9]</sup>. Half (50%) of the farmers fed kitchen waste to the pigs with small quantity of concentrates (maximum one kg) in view of high cost of feeds<sup>[5, 6]</sup>.

**Table 1:** Feeding pattern of pigs

| Particular                        | Types/ category                     | Percentage frequency N=180 |
|-----------------------------------|-------------------------------------|----------------------------|
| System of feeding                 | Intensive/ sty fed                  | 32                         |
|                                   | Semi- intensive                     | 68                         |
| Types of feed offered             | Concentrate feed only               | 6.32                       |
|                                   | Concentrate mixture + Kitchen waste | 23                         |
|                                   | Kitchen waste + green roughage      | 70.68                      |
| Application of processing methods | Boiling/ cooking                    | 74                         |
|                                   | Soaking/ wet feeding                | 20                         |
|                                   | Grinding                            | 6                          |
| Additional supplement             | Offered                             | 20                         |
|                                   | Not offered                         | 80                         |
| Feeding frequency                 | Once in a day                       | 10                         |
|                                   | Twice in a day                      | 82                         |
|                                   | Adlibitum                           | 8                          |

**Rearing aspect of pigs in the Peren district of Nagaland:** It has been observed (Table 2) that the main purpose of rearing is for pork (77%) and very few respondents kept breeding stock. Most of the farmers (62%) rear only 1-2 numbers of pigs for either household consumption or to sell in the market. Generally crossbred of 6-12 months of age group are preferred by most of the farmers than the local breed. The main source of piglet procurement is local market. Involvement of government sector or other government agencies are very less. In Mizoram, the farmers preferred to rear cross-bred on their farms since in their opinion crossbred pigs have better growth performance, healthier than indigenous one, large litter size, low mortality rate and high back fat thickness. The advantages of adopting artificial insemination were that it is cheap and easily available, they get improved progeny and they save on cost of rearing breeding boars. The farmers preferred Hampshire and Saddle Back breed for crossing<sup>[5]</sup>.

**Table 2:** Rearing and preference pattern

| Particular               | Types/ category   | Percentage frequency N=180 |
|--------------------------|-------------------|----------------------------|
| Number reared per family | 1-2 numbers       | 62                         |
|                          | 2-5 numbers       | 20                         |
|                          | <5 numbers        | 18                         |
| Purpose of rearing       | Meat purpose      | 77                         |
|                          | As breeding stock | 23                         |
| Breed preference         | Local breed       | 22                         |
|                          | Crossbred         | 78                         |
| Stock/ category          | Piglet            | 30                         |
|                          | Boar              | 50                         |
|                          | Breeder           | 10                         |
|                          | Lactating sow     | 10                         |
| Age group preference     | <6 months         | 20                         |
|                          | 6-12 months       | 70                         |
|                          | >12 months        | 10                         |
| Sex preference           | Male              | 50                         |
|                          | Female            | 50                         |

### Housing pattern

Usually pigs were reared in semi-intensive system where pigs are allowed to move freely during daytime and kept inside during night time (Table 3). Generally temporary type of housing (83%) is mostly preferred by the respondents as it is cost effective and made up of locally available material e.g., bamboo, firewood. The roof material used is polythene sheets, tin, thatch attached for protection. The main reason explained

by cent percent respondents is the low cost involvement and easy movability of the pig sties from one place to another. Most of the farmers' pigsties location is side corner (62%) of the house for easy assimilates and monitoring. It was observed that most of the sty the floor is 2-5 sqm made up of cemented material for easy cleaning and in a single sty generally two numbers of adult pigs were kept. In case of pregnant and lactating sow most of the respondents (56%) have separate sty but there is no provision of creep area for piglets. This is one of the main reasons of piglet mortality in traditional rearing practices of pigs [6]. In Assam, majority of the farmers (50%) had housing with concrete floor and walls and the roof was either made of CGI sheet or thatch, 30 per cent used locally available wooden/bamboo for constructing the pig sty and rest 20 per cent kept their pigs in the open by tethering their pigs with a rope to a tree in the backyard [9, 10]. The free range scavenging system is a traditional system predominates in large areas of the NE states, especially in the rural village [11]. The local pigs were scavenge for the bulk of their food around homesteads, kraals and adjacent areas and fed some form of supplementary feed later in the day, often in the form of cassava, cracked cereal grains or household scraps. Productivity of these village pigs is generally low, with litter sizes of three to five piglets and low growth rates [12]. The prospective of these basic production systems for wealth creation is imperfect, but it makes a significant contribution to the livelihoods of the poor peoples of NE region [6].

**Table 3:** Housing pattern

| Particular                                 | Types/ category                         | Percentage frequency N=180 |
|--|---|----------------------------|
| System of rearing                          | Intensive/ sty fed                      | 14                         |
|  | Scavenging + morning and evening ration | 86                         |
| Types of housing                           | Temporary                               | 83                         |
|  | Permanent                               | 17                         |
| Location of pig sty                        | Back side                               | 28                         |
|  | Side corner of house                    | 62                         |
|  | Down corner of house                    | 10                         |
| Provision of pregnant or lactating sow sty | Yes                                     | 56                         |
|  | No                                      | 44                         |
| Environment protection measures            | Taken                                   | 65                         |
|  | Not taken                               | 35                         |
| No. of animals/ sty                        | Single                                  | 12                         |
|  | Double                                  | 85                         |
|  | Multiple                                | 3                          |

**Health care aspect of the respondents:** It has been observed that (Table 4) piglet mortality is very high (77%) in backyard rearing practice. This may be due to lack of proper nourishment of the sow during pregnancy, crushing of piglets by the mother sow, lack of adequate dietary supplementation, environmental stress and managerial error etc. Mortality is higher during summer season (77%) may be due to environmental stress during summer compared to winter season (63%). So, piglet mortality is of major concern in traditional rearing of pig in Peren district of Nagaland.

In this region the most commonly occurring infectious disease of pig is swine fever, piglet diarrhoea, skin diseases and among the deficiency diseases include piglet anaemia, mineral related deficiency, diseases of skin and hair etc., ectoparasitic disease like mange, endo parasitic disease e.g., Taeniasis and Paramphistomiasis is most commonly observed. The prevalence of occurrence of infectious diseases are more during summer season whereas nutritional deficiency diseases

are more prone (67%) during winter season because of lack of availability of green forages which form the main portion of the ration of household pigs. For treatment most of the respondents (68%) opt for indigenous method of treatment and very few rearers inform to the veterinary services. A large majority of the respondents were not practicing (91%) vaccination, deworming (64%), application of iron injection (94%) etc. This may be due to lack of knowledge and public awareness among the respondents. Regarding disposal of the dead carcass most of the rearers prefer to buried (58%) it in isolated area and some rearer are throw the carcass in the jungle (42%). Shyam *et al.* [9] also opined that majority (70%) of the farmers never vaccinated their pigs against diseases whereas only 30 per cent of them practiced vaccination. Similarly, 80 per cent never dewormed their pig stock and only 10 per cent of the farmers gave iron injection to their piglets to prevent piglet anemia [13].

**Table 4:** Health related aspect of pigs reared by farmers at Peren district of Nagaland

| Particular                                   | Types/category       | Percentage frequency<br>N=180 |
|--|----------------------|-------------------------------|
| Piglet mortality                             | Summer               | 77                            |
|  | Winter               | 63                            |
| Occurrence of infectious disease             | Summer               | 59                            |
|  | Winter               | 41                            |
| Occurrence of nutritional deficiency disease | Summer               | 33                            |
|  | Winter               | 67                            |
| Ecto- Parasitic disease                      | Summer               | 61                            |
|  | Winter               | 39                            |
| Endo- Parasitic disease                      | Summer               | 88                            |
|  | Winter               | 12                            |
| Treatment method use                         | Indigenous           | 68                            |
|  | Veterinarian         | 21                            |
|  | Paravet              | 11                            |
| Vaccination practice                         | Practiced            | 9                             |
|  | Not practiced        | 91                            |
| Deworming practice                           | Yes                  | 36                            |
|  | No                   | 64                            |
| Application of iron injection                | Yes                  | 6                             |
|  | No                   | 94                            |
| Disposal of dead carcass                     | Buried               | 68                            |
|  | Thrown in the jungle | 32                            |

**Marketing aspects**

Majority of people prefer pork of mature pigs and 66% prefers bacon (Table 5). Demand of pork was high during winter season. The primary markets should be created at in rural areas and regulated markets in district level, where the price of pig depends on breed, its FCR. The price of breeder should be 25% more than porker. Apart from that modernization of slaughter houses are needed to ensure public health and enhance competitive market standards of meat and related by products [6].

**Table 5:** Marketing aspect of pigs

| Particular                       | Types/ Category | Percentage frequency<br>N=180 |
|----------------------------------|-----------------|-------------------------------|
| Demand of pig in the form of     | Pig meat        | 60                            |
|                                  | Piglets         | 40                            |
| Meat type preference by customer | Bacon type      | 66                            |
|                                  | Lean meat       | 34                            |
| Demand of pork                   | Summer          | 37                            |
|                                  | Winter          | 63                            |
| Market age                       | >12 months      | 86                            |
|                                  | <12 months      | 14                            |
| Market weight of local breed     | >40 kg          | 77                            |
|                                  | 50-60 kg        | 17                            |
|                                  | <60 kg          | 6                             |
| Market weight of local breed     | >40 kg          | 12                            |
|                                  | 50-60 kg        | 55                            |
|                                  | <60 kg          | 33                            |



**Fig 1:** Swine feeding and rearing practices in Nagaland

**Conclusion**

It was observed that majority of the pig rearer were not aware of scientific rearing and feeding management practices, which results in low production performance, high piglet mortality and more prone to occurrence of disease in pigs. The major constraints of the farmers of Peren district of Nagaland were less availability of green forages during winter period, high cost of concentrate feed, lack of AI facility and lack of breeding stock as most of the farmers rear pigs for fattening only, lack of disease treatment facility and lack of proper marketing network. To improve the existing condition and to achieve the goal of economic pig production it is important to determine the available feed resources of the regions and application of adequate feed storage facility for lean period besides identification of non-conventional feed resources. Further some of the costlier feed ingredients are to be replaced with locally available feed ingredients. To improve the productivity of local pigs improved breeding policies includes propagation of superior porcine germplasm through artificial insemination (AI) and side by side pure line

production farms with exotic breeds are also to be established at least one in each circle to monitor the genetic advancement of the indigenous pigs and also to make the exotic pig germplasm available on pig farming needs to be transferred to the ultimate user. Along with that establishment of market facilities, incentive in the form of subsidy to take up pig breeding farm, establishment of organized slaughter house, rendering proper health care measures and to train the extension workers on the latest technology developed on pig production to be transferred to the ultimate user i.e. the farmer are the other aspect to improve pig production scenario in the Peren district of Nagaland.

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