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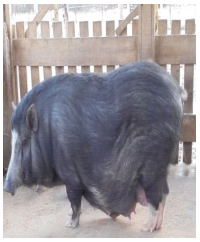
A case study on different factors affecting and managements of *Tenyivo* pig



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Introduction : Pig farming is becoming one of the most important farming techniques for commercial purposes. It provides immediate insurance coverage as well as employment opportunities. The country's overall livestock population is 535.78 million (20th livestock census). The country's overall pig population is 9.06 million (20th livestock census). Pig population has decreased by 12% since the last Census (19th livestock census). Pigs make up 1.7 per cent of the world's livestock population (20th livestock census). The population of pig in major state like Assam is (2.10 million). Pork is a significant source of protein in the human diet, as well as a supply of bristles and excrement. In India, pig farming is a promising source of meat production.

The Native Naga pig, or *Tenyivo* as it is known locally, can be found in the districts of Chakesang, Mao and Angami in Nagaland, which is located in India's far northeastern corner, near Myanmar's border. The name *Tenyivo* means "pig from Angami" in English. Suho is the name given to it by the Sema tribe, whereas votho is the name given to it by the Lotha tribe. This is a little pig breed with white hooves (often referred to as "the pig with white stockings") and a moderately long straight tail with a white tip. Small ears and marks on the extended face, neck and shoulders are common. Their bodies are dark, hairy and have a potbelly. At adulthood, individuals weigh between 25 and 35 kg. The animals mature swiftly, with a shorter gestation period and a shorter interval between litters than the average. The *tenyivo* breed is a hardy breed that may thrive without a lot of attention in terms of nutrition and disease treatment. Their meat is delicate and leaner than that of other breeds. The most famous local delicacy produced with this pig's blood and a blend of local herbs is a local sausage. Pickled pork, smoked pork with fermented soya beans and pork with bamboo shoots are all made with it. Although the animals are raised for personal and family usage, the meat is rarely marketed commercially. This indigenous pig breed is endangered because, like other local pigs, it is being crossed or replaced with improved, imported breeds. Due to its distinctive traits and importance in numerous tribes' festivals, the T*enyivo* is still the favorite breed for many in Nagaland.

Tenyivo pigs have a long, tapering snout, small erect ears and attentive eyes. It has white patterns on the forehead, sides and legs and is mostly black. The tail is normally lengthy and ends in a white switch. Pigs can weigh anything between 35 and 50 kg as adults. The population is believed to be between 60,000 and 70,000 people. Another distinguishing trait of *Tenyivo* is that it has outstanding maternal qualities as well as exceptional meat quality with a particular flavour.

Gestation period : The female pig's gestation (pregnancy) period is 114 days. She'll be ready to breed again in 5-7 days after her pigs have been weaned (removed from nursing). If the litter of pigs is weaned around 21 days, she will enter estrus (heat) around 26-28 days following farrowing (giving birth). The analysis of variance of gestation length of the pigs indicated no significant effect between the pigs among the different districts. The mean gestation length of indigenous pigs belongs to Kohima, Peren and Phekocalities were found to be 116.27 ± 0.17, 115.97 ± 0.20 and 115.94 ± 0.22 days, respectively. The gestation length in the present study was in good range with Irgang and Robinson (1984). However, Das and Karunakaran (2003) observed higher value than the present observation. The difference may be due to disparity in the management system and the different climatic condition of the geographical location.

Birth weight : Locality did not exert significant effect on litter size at weaning in indigenous pigs of Nagaland. Litter size at weaning in present study was within the

reported (maximum weight 0.791 male and 0.729 gram female and minimum weight 0.321 male ad 0.258-gram female) range of *tenyivo* pigs and similarly results found Mishra *et al.* (1985), Miachieo (1991) and Bhowal (1992). However, comparatively higher average litter size at weaning was reported by Sharda and Singh (1982), Dhingra (1987), Jogi (1995) and Chauhan *et al.* (1994).

Weaning weight : The locality showed no significant effect on litter weight at weaning in indigenous pigs of Nagaland. Litter weight at weaning of indigenous pigs of Nagaland was in good agreement with the values as reported (maximum 5.056 kg male and 4.035 kg female and minimum 1.097 kg male and 1.049 kg female) range

by Singh and Devi (1997). The average litter weight at weaning however, comparatively found lower than the observations made by Dhingra (1987), Jogi (1989), Mishra *et al*. (1990), Bhowal (1992), Das and Mishra (1992) and Chauhan *et al.* (1994).

Mortality rate : Locality indicated no significant effect on mortality rate (3-4 % per year) in indigenous *Tenyivo* pigs of Nagaland. Mishra *et al.* (1985), Mishra (1987) and Deka (1988) observed higher mortality per cent than the present study. The disparity in the mortality rate might be attributed to the differences in system of management and prevailing diseases.

Factor affecting : There are many factors affecting gestation period, birth weight, weaning weight and mortality rate.

Factors influencing litter size and birth weight : However, it is pointless having large numbers of piglets born if this results in an unacceptable level of losses due to stillbirths and pre-weaning mortality. The selection index avoids this by including factors such as numbers born alive, birth weight and pigs weaned per litter. In addition, rigorous selection for number and quality of teats helps to ensure excellent milking ability, resulting in maximum piglet survival rate and large, high-quality pigs at weaning.

Genetic influences : Birth weight is an important trait that influences piglet quality and survival. Traits like average birth weight and total birth weights appear to have very high heritability; 0.25 and 0.15, respectively. As most producers know, small-large piglets of *Tenyivo* are (0.258-0.729 female and 0.321-0.791 male) piglets in grams) and non-uniform litters are the main factors that determine the pre-weaning losses of a litter. Heritability for these factors is also fairly high, showing that there is potential for genetic improvement. Traits like the number of small piglets and uniformity of litter at birth have a heritability of 0.10 and 0.07, respectively. A single focus on litter size can obviously result in lower birth weights and decreased uniformity because litter size and piglet quality traits appear to be negatively correlated. That means that a single focus on one of them indirectly promotes a selection in the reverse direction for the other traits. Overall, the focus in selection is to create more litter weight at birth made up of quality piglets. Having 15 quality piglets of 1.5 kg average birth weight results in a litter weight of 22.5 kg. This can only be achieved as a target when piglet quality and birth weights do not get compromised too much while selecting for litter size.

Environmental, nutritional and management factors: While genetics is a major influence on litter size, there are

also a large number of environmental, nutritional and management factors that are important at the farm level. By focusing on the most important of these, it is possible to improve not only litter size but also, more importantly, weaning capacity. Birth weight is notoriously difficult to influence on the farm but there are some things that can be done to improve it slightly and also to improve piglet viability at birth.

Weight at first mating : The weight of gilts when they are first bred and estrus number, strongly influence first litter size, which in turn determines subsequent litter size. This topic is dealt with in more detail in the leaflet Gilt management for maximum lifetime productivity. Age at first mating of gilt 8-11 kg weight at first mating.

Breeding technique and timing : An effective breeding, carried out at the correct time during the estrus period and which results in a high number of fertilized ova, will help to improve numbers born. Attention to heat detection procedures, semen quality, hygiene standards and insemination technique, especially good sow stimulation, will pay dividends. The use of a breeding protocol, with clearly defined times for breeding sows and gilts, which takes into account the impact of wean-to-estrus interval on the length of standing estrus, will also help to improve litter size.

Management for high embryo survival : In the early stages of gestation, the fertilized eggs implant into the wall of the uterus, a process that is not completed until about 28 days after breeding. During this period of their development, the embryos are very sensitive and may become detached from the uterine wall and die unless conditions are ideal. Therefore, sows should not be moved until at least day 28 of gestation and their environment should be quiet and undisturbed. Any stress during this time can.

Lead to embryo losses and very high temperatures or low temperature combined with a draft may result in sows returning to estrus. Research suggests that the presence of a boar in early to mid-gestation and good lighting both positively influence embryo survival.

Feeding in early gestation : Until recently, it was widely recommended to feed at a low level in the first 21-28 days of gestation as this was thought to maximize embryo survival. However, recent research and practical experience suggests that, for today's extremely lean and highly productive sows, this practice may be counter productive and lead to reduced litter size and farrowing rate. It appears that a feed intake in the range 2.4-2.6 kg for gilts and 2.6-2.8 kg for sows may be the best strategy to maximize litter size, although further evaluation of this practice is required. Further information can be found in the leaflet feeding the sow and gilt in gestation.

Lactation length : The length of the lactation period has a significant effect on litter size. Over the range 14 to 28 days, each additional day suckling typically leads to extra 0.1 piglets born in the subsequent litter. Litter size does not appear to increase with lactation lengths of more than 28 days. Balancing the cost of extending lactation length with the productivity benefits, suggests an optimum length of 24-25 days. Irrespective of lactation length, producers should avoid variation in weaning age resulting from variation in weekly farrowing numbers, because this will impact growth rate and pig flow in the nursery and finishing stages, leading to irregular production and reduced margins.

Weaning to breeding interval : The interval between weaning and breeding or, more correctly, weaning to standing estrus, is probably the most important indicator of subsequent productivity, especially litter size. Litter size will be highest where the wean-to-breed interval averages 6 days or less and where 95 per cent of sows are bred by 7 days after weaning. Weaning to mating interval as a trait has been in the *Tenyivo* pig breeding value estimation for quite some time. It has received continuous emphasis, which has never been large. However, through the years a significant genetic improvement has been realized in most maternal lines of around 1 to 2 days. Results from our benchmark data show that our breeding stock averages a relatively short weaning to estrus interval of 5.8 days. A shorter duration of the weaning to estrus interval results in a related longer duration of estrus. Young females, especially gilts after their first weaning, tend to take longer to show estrus and will benefit from special attention. Using a higher lysine diet (1.2-1.3 % total lysine), where possible, or feeding 0.5kg/day of a concentrated top-dressing for the last 7 days of lactation and upto breeding, will help to reduce body weight loss and consequently hasten the onset of estrus. A high feed intake between weaning and breeding is also essential to maximize litter size. Feeding four times per day or ad libitum, provision of plentiful clean water and good trough hygiene will all help to achieve this. Housing sows in groups after weaning has been shown to result in a shorter wean to estrus interval compared to sows housed in stalls. Provision of adequate lighting – a minimum of 100 lux and preferably 150 lux, for a period of 14-16 hours per day will help to stimulate a rapid onset of estrus. Good boar contact is also an important factor, especially in the 2-3 days prior to expected estrus.

Parity distribution : Litter size increases until the third parity and then tends to decline as sows get older. Also, the number of stillborn pig's increases with age and birth weight becomes more variable as sows get older. Therefore, in order to achieve consistent litter size and the highest quality piglets, herd parity structure should be stable. This requires a regular flow of gilts into the herd, a high number of females in the most productive 3 to 6 parity range and strict culling on age after 7-8 parities. Conversely, an unbalanced parity structure caused by uneven gilt introduction, high dropout rates in young females or poor culling policy will result in unwanted variation in average litter size and birth weight over time. This will have many negative implications for the growth and efficiency of pigs from weaning to market. More information on parity management can be found in the leaflet achieving the correct parity structure.

Increasing piglet birth weight : Birth weight is the most important determinant of weaning weight, one of the key components of weaning capacity. Although it is difficult to influence, there are several things that may improve it. The most widely practiced of these is increasing sow feed levels in the last 21-28 days of gestation, typically to 2.6-2.8 kg for gilts and 2.8-3.0 kg for sows. While the impact on birth weight is generally small, this technique has been shown to positively influence piglet viability. Recent French research suggests that the addition of oils to the diet (total 5% oil) may lead to fewer stillborn pigs, improved survival of smaller piglets and higher weaning weights. Correct feed levels throughout the breeding cycle and attention to sow health will also contribute to improving birth weight.

Conclusion : Pig production is the most significant part of smallholder livestock management. This case study was aimed at assessing the performance, factors affecting productivity and challenges to intensive pig farming. Information on management practices, challenges and prospects of the industry was gathered through questionnaires administered to farmers, key informant interviews and stakeholder's focus group discussions. Results showed most farms had good level of management but the breeding practices were uniformly erratic in all the farms and different breeds were crossed anyhow. The performance indices varied greatly between farms, indicating great potential for improved productivity. We recommend improved housing, breeding practices, feeding and biosecurity measures so as to improve on performance and productivity of peri-urban pig farming. Nutritional management of pigs to optimize growth demand pig specific and place specific determination and provision of nutritional requirement. The biological and economic performance and place the understanding of nutrient dispositioning at the center of any ability to optimize production response. Real time measurement of response to nutrient supply, the comparison of that response with the predicted expectation and the immediate on-line adjustment of nutrient supply are all seminal to management.

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