

PIG PRODUCTION AND PORK QUALITY IMPROVEMENT IN LAO PDR

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Background

About 65 % of the working population of the Lao People's Democratic Republic (PDR) is engaged in agriculture. The agricultural sector contributes to about 24.1 % of the gross domestic product (GDP) including 6-7 % by the livestock and fisheries sub-sector (MAF 2015). In 2014, the livestock population consisted of 1.15 million buffalo, 1.76 million cattle, 32.40 million poultry, 0.48 million goats and 3.12 million pigs (with about 518.400 heads or 16.5 % of them being exotics, i.e. in Lao terms 'modern, intensive' breeds). The density of pig population is highest in the northern (40%), southern mountainous regions (33%) and central region (27%). Pig production is a common smallholder livelihood activity in Laos with almost all farm households raising a few pigs. Pigs are sold to cover household expenses such as school fees and medications, and they are an asset that can be liquidated to cover expenses in emergencies. The traditional pig management practice is based on free-range grazing of harvested or fallow lands. Breeding is generally uncontrolled with nearly negligible attempts for genetic improvement. Pig production is the most significant part of smallholder livestock management in Laos and becomes increasingly important for food supply. The pork was the second most consumed meat with estimated 12 kg per capita while meat consumption per capita per year was 55 kg (Department of Livestock and Fisheries 2015). The social demand for pork is rapidly growing; the small scale and commercial farms pig production cannot satisfy it. Consequently, the import of pre fattened pigs for slaughter from neighbouring countries is increasing about 124.000 heads per year. The main challenges of pig production in small holder systems are low growth rate (80-100 g/day), high fat content (more than 70% of carcass), lack of feed both quantity and quality and disease outbreak (mainly Classical Swine Fever, CSF).

PIG PRODUCTION SYSTEMS

Smallholder agricultural systems in Lao PDR are mixed farming systems including staple and cash crops as well as livestock free ranging production system. In this context, farmers raised pigs using in three main production systems, namely free scavenging, confinement in a small area with simple shelter provided, and penning (Phonepaseut et al., 2011).

Free-scavenging system (Extensive system): free range scavenging all the year round, and supplementing small amount of additional feedstuff for their pigs. Farmers practicing the free-scavenging system kept pigs mostly for piglet production.

Semi-scavenging system (Semi-extensive system): The semi-scavenging system was used for both piglet production and fattening. In this system, pigs were allowed to scavenge freely after the main crops had been harvested. In the free scavenging time, farmers provided small amount of feed each day and pigs had to find the rest of feed by themselves. During the planting and crops growing seasons, pigs were confined either in pen or enclosures, built near

to the villages or close to the crop production areas. At this time, pigs only received feed from their owners.

Penning system: Was found to be the most common pig production system mainly in the areas closer to the district center, and also practiced in several villages where they have improved village sanitation. Pigs in penning system have used both indigenous and crossbred, and were fed both traditional feeds, such as rice bran, maize, broken rice, cassava and green plant material and concentrates.

Pig sector development

Since 1980 Laos has introduced exotic pigs from Thailand funded by FAO through establishment of parent stock station with 120 sows. This station can provide 2,000-2,500 heads of weaned pigs to farmers per year. Consequently, FAO continued to fund establishment of 1,200 sows Pig Center for producing two lines cross bred pigs for fattening in the country. In 1988 Slovakia government supported to establish pig fattening farm with capacity of 12,000 heads or 12 tons of pork meat per year. Since 2000, Lao government strongly supported private sectors to invest in pig production via appropriate policies. Currently in the country has more than 25,000 sows and can produce about 480,000-500,000 heads of weaned pigs per year. In 2015 Laos had 641 private commercial pig farms and can produce pork 65,000 tons, including 63,000 tons (66%) from local pigs and 27,000 tons (34%) from exotic breed while in country needs 70,000-80,000 tons for consumption. Therefore we had to import the surplus pork from neighbouring countries such as from Vietnam and Thailand.

According to the government projection in 2020, the country should be increased number of sows up to 45,000 heads with 80,000-90,000 tons of pork production.

Pig varieties

Nation-wide pig breed survey was performed from 1996 to 2004. The interview covered many areas of interest connected to pig production, i.e. management, breed, food and feeding system, and reproduction performance. Regarding to this result can distinguish in to three varieties by phenotypic characterization namely:

1. Indigenous breed (fatty pig)
2. Exotic breed (Large white, Landrace and Duroc)
3. Improved breed (Black pig)

1 Indigenous breed

Based on the aforementioned criteria, pigs were classified into four types. The phenotype, the reproductive performance and dissemination of the four types are presented following.

Type 1: Local names - Moo Chid, Moo Markadon, Moo Boua

The first type is scattered countrywide. The pig is of relatively small size compared to other types existing in the country. Its body length, circumference of the girth and the height is 75-92 cm, 72-85 cm and 46-54 cm, respectively. The ears are small, short and directed forward. The coat colour is mainly black and legs are white. Gilts show first oestrus at the age of about 6 months (between 182-197 days) and with body weight of 21-31 kg. The weight of mature sows is about 42-48 kg. The age at first farrowing is approx. 360 days. There are 1.5 litters per year with 7-8 piglets per litter. Normal weaning age is three months with an average weaning weight of the piglets of 7.8 kg. Mature males have lower body weight than females, i.e. the average body weight is 20.5 kg at the age of 170-200 days, and the maximum body weight of boars is between 18-30 kg.

Type 2: Local names - Moo Lat

The second type is mostly present in upland areas (Luangprabang, Oudomxay, Xaysomboun), but also in some lowland territories (Saravane and Savannakhet provinces). This breed is quite bigger than the first type. Body length is 85-100 cm; the girth and height are 84-102 cm and 51-70 cm, respectively. The ears are short and directed forward and the face is strait. Legs and the front of the face are white.



Figure 1

Type 1: Local names

Moo Chid, Moo Markadon, Moo Boua



Figure 2

Type 2: Local names - Moo Lat

The age of the first oestrus is between 189-586 days with 39 kg of body weight. These varying data depend on typical extensive keeping systems, where management is nearly negligibly. The weight of mature sows is about 47-61 kg, and the youngest age of first farrowing is around 360 days. Depending on management systems, sows have 1.5-1.8 litters per year and 7-8 piglets per litter. Normal weaning period is 60-90 days with an average of 9.5 kg of piglet's weaning weight. Mature males of this type have also lower body weight (25 kg) than females and maximum body weight of boars can reach 30-50 kg.

Type 3: Local names - Moo Nonghad or Moo Hmong

This type is specifically found in the Nonghad district, Xienkhouang province. It is quite big with body length of 100-105 cm, girth circumference of 115-130 cm and height of 55-76 cm. It is 2-3 months and the weaning weight is 8 kg on average. The maximum body weight of boars is between 60-80 kg.

Type 4: Local name - Moo Deng or Moo Berk

The fourth type is easy to identify due to its phenotype. It has brown colour and is apparently larger than any other pig breed existing in Lao PDR. This pig is a well-adopted and stabilized cross-bred one (Berkshire x local pig). It is kept only in the southern part of Laos, particularly in Mounlapamok and Khong districts, Champasack province. Body length, circumference of the girth and the height are 88-120 cm, 84-116 cm and 60-70 cm, respectively. It has a short and bent face, and large sized hanging ears. The weight of mature sows is around 65-90 kg, and the first farrowing age is between 330-360 days. They have 1.5-1.8 litters per year with 7-10 piglets per litter. Piglets are normally weaned at the age of 2-3 months and a weight of 8.5 kg. The maximum body weight of boars is similar to sows. The body is mostly black and in the abdominal region rose coloured. It has a short and bent face, and the medium sized ears are directed forward. The age at the first oestrus is between 150-180 days with 30-40 kg of body weight. The weight of mature sows is between 65 and 85 kg. The age at first farrowing is 10-11 months. There are 1.5-1.8 litters per

year with 7-10 piglets per litter. Normal weaning age of the piglets is 2-3 months and the weaning weight is 8 kg on average. The maximum body weight of boars is between 60-80 kg.

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Figure 3.

Type 3: Moo Nonghad or Moo Hmong



Figure 4

Type 4: Moo Deng or Moo Berk

2. Exotic varieties

Since 1980 Lao government had introduced 120 sows and 10 boars of exotic breed from Thailand namely: Large white, Landrace and Duroc.



Presently no more other exotic breed has introduced.

3. Improved variety

Since 2012 Livestock Research Center (NAFRI) has developed cross bred pig (NTxLRxDR) focused on improvement of litter size, growth rate, and meat quality for smallholder farmers who use local feed resources. An improved variety has higher ADG (> 500 g/day) and litter size (> 8 piglets) and less fat content.



Black pig herd

Mating systems

The smallholder production system dominates in Lao PDR and is characterized by low inputs and low outputs. The traditional livestock management practice is based on free-range grazing of harvested or fallow lands. Breeding is generally uncontrolled with nearly negligible attempts for genetic improvement. For small and medium size of farms (<100 sows) they use natural insemination method while large commercial farm they adopt AI by fresh or liquid preservation semen which process in their farms.

Research on semen processing

Presently, liquid semen preservation and artificial insemination are used in Laos only in “exotic” breed however it could be beneficial to use this method in preservation and development of the native swine population too. Different extenders were tested in a pilot study to determine how they influence sperm motility of liquid preserved Indigenous boar semen. Semen was collected by gloved-hand method from three mature indigenous boars. Motility and morphology were determined immediately after collection. Only ejaculate with more than 80% motile and less than 15% abnormal cells were included in the trial. Mixed semen samples were diluted 1:5 with three different extenders (BTS, MRA and Acromax) and preserved at 17 C for five days. Motility was assessed every day during the preservation period. Live/dead cell rate was determined after Giemsa staining. There was no significant difference in the motility and dead cell rate between extenders during storage. However, after day 2 sperm parameters tended to be better in MRA extender. On day 3 more than 60% motile cells were observed only in MRA, and this declined to 45% on day 5. It was evident that all investigated extenders could be used to store semen for insemination within two days after collection, and MRA can be used for storage of semen for 3-4 days. However, without doubt, further studies are needed to improve liquid preservation of indigenous boar semen.

Limitations and opportunities to develop pig production

Limitations:

Although pig production has growth considerably, but still encounter obstacles in ways that limit such as:

- Pork does not meet domestic consumption demand due to the transition from natural based production system to intensive commercial production not done firmly and promptly. For this reason mainly we still import from neighboring countries.
- Supplying good quality of concentrated and commercial animal feed still not secure and the price is quite high and cannot compete with imported feed.

- Limited source for supplying good quality breed especially for parent stock replacement, entrepreneurs have to import.
- Pig disease still outbreak mainly CSF and PRRS lead to loss of parent stock.
- Lack of cooperation between government and private sector (PPP) in terms of policy development for promoting pig production comprehensively.
- Lack of funds due to not be able to access source of long term credit with low-interest. They cannot consider pig production as professional.
- Lack of setting up an official groups or cooperatives that not be able to negotiate or access policies from the government efficiently.
- Lack of a technical staff with professional skill (quantity and quality) both at central and local levels.
- Slaughterhouses not meet technical standard, lack of monitoring of standard sanitary products (SPS).

Opportunities

- Lao located in the center of region with high density of citizens who have demand on pork increasingly. In addition, domestic consumer is significant increased. For this reason it is expected that the market and demand of pig product in the country and neighboring countries continues to rise.
- Liberalization of trade, a member of WTO and open to the Asian Economy Committee (AEC) is a good opportunity for Lao PDR to open the production and market of live pigs/pork to the region.
- Lao PDR has the facility in adaptation of techniques and technology on farm management from neighboring countries as well as regional which have the advanced lesson, knowledge and experience.
- The government of Laos has priority and is committed to a national agenda by trying to create policies to promote livestock production more clear and precise than the past. This is a great opportunity to stimulate the production grow up gradually.
- Many donors assist to improve quality of implementing Sanitary and Phytosanitary measures this will upgrade quality of Lao products to the international markets.