



## Bringing systemic change: Pig Breeding in Nepal

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Pig breeding in Nepal has taken big strides in the last five years. New breeds were introduced in 2014 by Samarth-NMDP through artificial insemination using frozen semen and this is making a positive impact in pig breeding at the national, regional and village level. Artificial insemination was initially introduced in the form of frozen semen but this has diversified into fresh semen to accelerate the availability of new breed. The conception rate through fresh semen is around 80 - 90%, almost at par with natural conception whereas conception rate through frozen semen is at 60 - 65%. Through the application of fresh semen from the new improved breeds, the inbreeding practices at village level has reduced significantly. In addition, the growth of fattener pig has also improved significantly by the adoption of cross breeding system in the villages as well as at the commercial pig herd. As a result, 18,174 farmers have introduced new breeds to their herd which has increased the growth and weight of the pig, increasing productivity. This has translated into positive income change of NPR 13,612 for 9,960 village farmers. With the production of quality meat, slaughterhouse in rural and areas have started approaching farmers to access quality pork and this has increased the smallholder farmers market access.

At the policy level, the government of Nepal introduced pig mission program in 2015 where a commitment of NPR 50 million was made to improve pig breeding by preserving the gene and improving the quality of pig. This was to ensure the future benefit of the sector on a large scale. In the first year, the pig mission program was launched in 10 districts to improve breeding function at district and village level. In the second year, 5 additional districts were added including the entire breeding value chain for the pig sector from pure bred breeder farmers, commercial breeders and village level breeders. In the fiscal budget 2016/17, the government allocated budget to set up special pig zones, where all the facilities would be

established to produce hygienic pork from healthy pig seed stock. This would ensure the production of quality pig and promote pork as a safe meat to eat. At the national level, the assurance of quality will encourage more people to eat pork, driving up the demand. At the international level, there is already demand from neighboring countries and having quality assurance only increases the demand.

To ensure the sustainability of pig breeding and to have a robust system in place, the government of Nepal has drafted the pig breeding strategy, which is in the process of being endorsed by the Ministry of Livestock Development. The pig breeding strategy is a living document which will provide guidelines for drafting upcoming plans and policies for the government as well as for the private sectors (both new entrants and existing) to improve pig breeding.

## 1. The untold story: What changed in pig breeding?

In 2012, Samarth-NMDP started its work in the pig sector by conducting a sector wide research to analyse major constraints. The research confirmed three major constraints in the pig sector: breed, feed and animal husbandry. Of the three, breed was the most prominent constraint as there was an immediate need for genetic improvement in order to bring a systemic change in the pig sector. However, the sector was relatively unknown, it was neglected by the government and there was limited funds available for bringing about necessary growth and changes in the sector. The technical capacity of government staff was very low and the government farms had poor quality breed stock. Additionally, there was an imminent problem with in-breeding across the country leading to low quality breed, low productivity and slow growth. There were also limited market players to intervene in the sector due to low economic incentives.

In Nepal, the pig breeding function is divided into three tiers: national, regional (district) and village level. At the national level, the private agencies involved are Pokhara Livestock (P) Ltd. and Kulung Bangur Farm and the government agencies involved are Nepal Agriculture Research Center (NARC) and Department of Livestock Services (DLS). The government agencies are mandated to conduct research, maintain, multiply and transfer purebred pig breed stock and are the main source of purebred pig breed stock to commercial and village breeders. However, they have limited herd size and they lack the capacity to maintain pure breed stock. At the regional level, commercial breeders are multipliers who buy purebred seed stock from NARC and DLS, multiply their herd size and sell to the market. There are about 50-60 commercial breeders who specialise in pig breeding. At the village level, breeder farmers keep one boar and provide services to around 20 sows in the local village. As a fee for the service the breeder farmer keeps one boar from the piglets born, and they continue the services for the future. Due to this practice of using the locally born piglets for breeding, the in-breeding at village level was quite high and is one of the reasons for deteriorating quality of pigs.

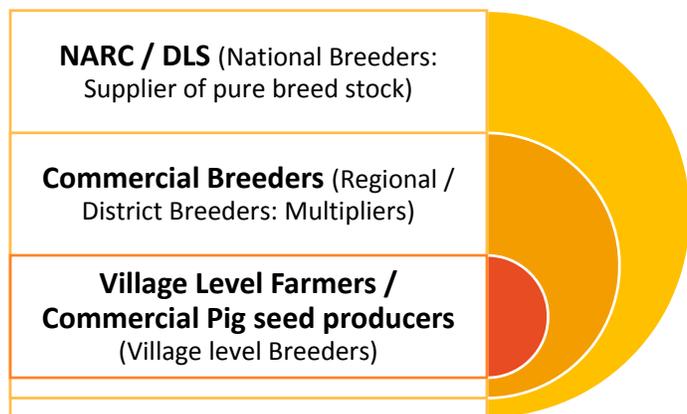


Figure 1: Pig breeding in Nepal

## 1.1. Partnership and sustainability

Realising the need to address the breeding constraints identified by the research, Samarth-NMDP started designing its intervention. Samarth-NMDP had a strong technical team led by Dr. Nanda Shrestha who was also instrumental in guiding both Samarth-NMDP and government team to bring systemic changes in pig breeding in Nepal.

The first step was to find strong partners and private sector players, NARC and DLS were identified as they had the willingness to bring changes in pig breeding. The decision was then made to partner with NARC and DLS but there were strong concerns about sustainability in working with the government. A sustainability check was carried out by Samarth and the partnership was signed with NARC and DLS. As part of the partnership, Samarth contributed by establishing Artificial Insemination (AI) laboratory; importing genetic germplasm of pure bred pig to strengthen pig units; facilitating a system for selective breeding; and providing technical support to strengthen the capacity of the partners’ staff on AI.

For implementing genetic improvement program, there was a minimum requirement of 200 breeding sows per breed. The government farms could not fulfill that capacity and it was necessary to bring national level private breeders with large herd size. An expression of interest was released and two private companies, Kulung Bangur Farm and Pokhara Livestock Private Limited (PLPL) were selected and partnerships were signed in the same capacity as NARC and DLS.

Function/Rule	Current Picture			Future Picture	
	Who does?	Who pays?	Mismatch	Who will do?	Who will pay?
<b>Technical capacity</b>	NARC/DLS	Samarth	Low technical capacity	NARC/DLS/Private sector	Government
<b>Infrastructures</b>	NARC/DLS	NARC/DLS	Inadequate infrastructure	NARC/DLS/Private sector	Government/Private sector
<b>Equipment / Frozen semen</b>	NARC/DLS	Samarth	Inadequate equipment for breed improvement	NARC/DLS/Private sector	Government/Private sector

Figure 2: Assessing sustainability of NARC and DLS

Following the partnerships, Samarth-NMDP explored the international market in search for pig herds with good gene pool in the form of frozen semen. After an extensive search Samarth-NMDP identified Swine Genetic International (SGI) in USA. SGI is known for having pig herd with good gene pool with characteristics of fast growth, high feed conversion rate (2.6 kg per 1 kg feed), lean meat and low back fat thickness. Based on these characteristics, 900 doses of frozen semen were imported from SGI of which Samarth contributed to 575 doses and the partners contributed to 325 doses of frozen semen.

## 1.2. Implementation of pig breeding

### 1.2.1. Artificial insemination through frozen semen:

Implementation for artificial insemination through the use of frozen semen for pure breed stock was initiated by the four partners in their own farm. To enhance the capacity a training was provided on lab establishment, operation and performing artificial insemination to staff from the farms, technicians, and scientists. After the training, the partners completed 104 artificial insemination and 289 purebred piglets were produced. The purebred piglets were distributed to commercial breeder farmers for multiplication and dissemination of pure breed stock. In addition, a mechanism and software for selective breeding and genetic evaluation was also developed with technical assistance from Samarth-NMDP.

### 1.2.2. **Village Hybrid Program:**

Cases of in-breeding, use of low quality feed and poor husbandry practices are prominent in villages. This has resulted in low productivity, poor health, slow growth and reduced weight of pigs. To address these issues, Samarth partnered with 42 commercial breeders in six districts to promote and provide cross bred pigs to village level farmers. At the village level, awareness programs were conducted on the adverse effects of in-breeding and advantages of out-breeding and cross breeding. Through this program, 1,961 village breeder farmers were aware of the benefits of cross breeding and accessed cross breed pigs. The program is still ongoing at the village level where hybrid pigs are being produced for farmer access and benefits.

### 1.2.3. **Introduction of fresh semen AI:**

Artificial insemination through frozen semen to introduce new genes in Nepal was a big success. However, frozen semen was expensive and could not be accessed by the large farming populations. Thus, Samarth-NMDP partnered again with NARC, RARs Tarahara, Kulung Bangur Farm and PLPL for production and marketing of fresh semen AI to multiply herds and transfer the benefits to the farmers. In addition to production and marketing trainings were conducted and completed but the dissemination process was halted by the identification of Porcine Reproductive Respiratory Syndrome in fresh semen. Following the disease identification, all the herds were segregated and in six months, the herd were disease free and fresh semen AI was brought into the market. As of now, many fresh semen doses have been produced and 90 sows have been inseminated with an average production is 11 piglets per sow. The partners are now in the process of selecting dealers to disseminate fresh semen.

## 2. Where do we stand?

The first step to address the constraints in pig breeding was completed through the introduction of pure breed stock through partnership with public and private partners. Through the activities in the partnership the technical capacities were enhanced, artificial insemination through frozen and fresh semen were introduced and marketed and, awareness on benefits of cross breeding was disseminated among the farmers. Based on the successes, the public sector has shown positive impact by committing funds and programs in the pig sector. However, the sustainability of the system lies within the willingness and skills of the public and private actors, which is very pertinent for the sector. The systemic change is already triggered, but the public, private sectors and PEAN need to work together to maintain the quality seed stock and promote pig and pork industry at large.

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