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Approaches for piggery development in the north-eastern region of India: A review

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Abstract
Piggery sector is increasing its market value day by day. Pork and its product are highly demandable. This sector has open up many avenues for employment generation. Different rearing systems are being followed by the farmers and industry based piggery sector and agri-preneurs. It contributes to the national GDP. Despite the fact, many drawbacks are still creating hindrance in the growth of this sector. Hence, different approaches for piggery development in the North-Eastern Region of India have been reviewed.

Keywords: GDP, piggery, pork, agri-preneurs, industry, rearing systems

Introduction
Livestock is an integral part of agriculture farming in India. It contributes 4.1% of the total national GDP, which is the highest among agriculture and allied sectors. Among all livestock species, the pig has a huge potentiality to contribute faster economic return to the farmers, because of high fecundity, better feed conversion efficiency, early maturity, most efficient converter of kitchen waste or feed into meat next to poultry, short gestation interval, and can rear with a low input system (Kumaresan *et al.* 2007) [9] thereby it has the potentiality to meet the animal protein deficiency experienced in the country (Bujarbaruah *et al.* 2007) [4]. Pig production especially in the entire North-Eastern Region (NER) of India is an integral part of the majority of the rural population especially among the tribals and a few among the progressive farmers or entrepreneurs. Pigs act as a live source of insurance, particularly for the weaker section of the community. There are tremendous opportunities to use pigs as a medium of poverty alleviation and employment generation especially for the NER because of the food habit of the inhabitants, being mostly non-vegetarian and no social taboo associated with pig husbandry. Yet, this sector has never been able to flourish as an enterprise.
Pig is widely distributed in all the eco-regions of the country. As per the latest livestock census (20th Livestock Census), the highest pig population is observed in eastern and NER (40%). Almost every household of the NER rears at least one or two pigs each year because of socio-culture importance, meat purpose, and as a supplementary income source to improve their living standards (Bujarbaruah *et al.* 2007; Singh *et al.* 2020) [4, 14]. Unfortunately, the region procured more than 50% of live pork from the rest part of the country (Banik, 2020) [1]. This might be due to lack of quality piglets/ germplasm, still confining to the traditionally age-old breeding practices due to lack of coordinated breeding programmes, high cost of the commercially available balanced feed, feed ingredients, lack of scientific feeding management practices, limited animal health care facilities, poor awareness about vaccination against certain deadly pig diseases, the emergence of trans boundary and emerging diseases due to porous border with neighbouring countries and poor biosecurity with endemic nature of certain pig diseases such as Classical Swain Fever (CSF), Foot and Mouth Disease (FMD), Porcine Reproductive and Respiratory Syndrome (PRRS), inadequate to nil financial support system, absence of efficient post-harvest infrastructure, the poor awareness level of stakeholders and other challenges like high vulnerability to climate change and natural calamities like floods, submergence, landslides, soil erosion, etc. Therefore, concrete strategies and their strict compliance will help in augmenting pig production, thus uplifting the socio-economic status of the pig farmers of the NER. Strategies for piggery development in the region are motioned below.

1. Action plan for improvement of genetic resources of pigs and efficient breeding

The pig production system at the village level of the NER is still confined to a traditional system, mainly based on indigenous local pigs due to limited knowledge as well as a lack of breeding stock of superior germplasms/ improved pig breeds. In traditional breeding practices, the farmers select a good intact male pig after 60 days of farrowing and keep it along with the sow for mating until the sow becomes pregnant (Kumaresan *et al.* 2008) [10]. This breeding practice increases inbreeding, with poor productivity and reproduction performance including genetic defects in the subsequent generations. Therefore, a comprehensive pig breeding policy with aims to upgrade the local variety of pigs through cross-breeding with exotic pigs is required for piggery development. Because the genetic makeup of the pig has the highest impact on pig performance including muscle growth (Sahoo *et al.* 2012) [13]. Banik (2020) [1] suggested that the promotion of high-yielding crossbred pig germplasm will not only help poverty reduction and employment generation but also it will help farmers double their income in a shorter time interval. However, the promotion of high-yielding crossbred pig germplasm should preferably be through Artificial Insemination (AI) practice instead of natural service. AI in pigs is the globally accepted biotechnological tool for efficient breeding in pigs (Chutia and Mili, 2019, Singh *et al.* 2020) [5, 14]. The wide spared use of AI in the pig is not only a tool for efficient breeding but also helps in the prevention of inbreeding depression. To achieve the target each of the 8 NER states should establish a state-level Multiplier pig farm with a training center for the local farmers including a modest facility/laboratory for semen collection, evaluation, and preservation.

2. Right nutritional approaches

The pig production system in the villages of NER is mainly based on a low input system; mainly depends on jungle forages and kitchen waste. Pig farmers hardly buy any protein-rich feed ingredients or mineral & vitamin mixture. This is possible because pig producers have a lack of knowledge on pig nutrition as well as financial constraints together with hilliterian topography, and poor roads and rail connectivity. To piggery development, the region needs cheap feedstuffs infrastructure facilities for the production of low-cost balanced pig feeds with proper utilization of locally available un-conventional feed resources such as leaf meals, oil cakes, grain byproducts, root tubers like tapioca, sweet potato, leftover from kitchen/hotel/cold storage in replacing the balance rations for minimizing the cost of production, especially for low-income communities (Thomas *et al.* 2021) [16].

3. Setting up nucleus pig herd villages

There is a need of the hour to establish breeding stocks of superior germplasms, may be of pure exotic breed, well-developed crossbred, or pure indigenous breed in each village of NER for easy accessibility of superior quality piglets. This will be helpful in the fast distribution of improved germplasm to the farmers from the nucleus herd.

4. Augmenting value addition in processed pork products

Existing pork processing and market chains are very unsatisfactory in our country (Thomas and Sarma, 2017) [15]. Further, the value addition of pork and pork products is at the infancy stage as compared to developed countries. At the same time, the demand for processed pork products such as sausages, curries, bacon, ham, and salami is ever-increasing in the country in recent times. So, processing technologies need to be refined/standardized, and validated to tap the potentiality of pork products (Thomas *et al.* 2021) [16]. The value addition and preparation of processed pork products, the factors such as palatability, colour, aroma, tenderness, juiciness, and flavor must be given due importance for the widespread acceptance by the consumer.

5. Strengthen the health care facilities

The NER of India bears a constant threat of trans boundary emerging diseases through its porous borders owing to its unique geographical location (Barman *et al.* 2016) [2]. For example, the recent outbreaks of African Swain Fever (ASF) had affected many families in Assam and Arunachal Pradesh due to the death of pigs as well as the killing of pigs as a control measures strategy (Bora *et al.* 2020) [3]. Apart from ASF, this region has also reported several other emerging diseases of pigs such as PRRS (Rajkhowa *et al.* 2015) [12] and porcine circovirus-2 infections (Mukherjee *et al.* 2017) [11]. For piggery development, the region much has research laboratory facilities with BSL IV and vaccine production facilities for disease diagnostic, handling of Zoonotic diseases, disease surveillance mechanisms, and ensuring the availability of biological products. A policy decision is therefore needed for strengthening biosecurity measures with special reference to trans boundary and infectious diseases, and vaccine production to manage threats of emerging zoonotic disease/ endemic nature of certain pig diseases such as CSF, FMD, and PRRS.

6. Credit inflow to the farmers

Most of the piggery farmers are small and marginal farmers, undertaking piggery farming in an unorganized way with their land and some are tenant farmers due to high working capital to start commercial pig farming at a large scale in the region. Also, the farmers' access to financial institutions is very low in the region. At the same time, the government-sponsored schemes extend credit inflow to Self Help Groups (SHGs) but not to individual members. NABARD is one of the leading finical institutes offering bank load for undertaking pig farming on scientific lines in the region. For piggery development, maximizing credit inflow to the farmers with insurance coverage for the pigs of small-scale producers will help in the risk-taking ability of the low-income pig rearing communities, thus piggery development in the region.

7. Disseminating cheaper housing patterns and scientific manage mental practices

Dissemination of simple, affordable pig houses for the poor rural populations could be the major intervention for boosting pig production in the region (Bujarbaruah *et al.* 2007) [4]. The low-cost pig house should have ample sanitation, proper ventilation, and better hygiene conditions to control parasites and pathogens affecting pigs. Also, dampness in the pig house should be avoided for optimal growth (Kumaresan *et al.* 2008) [10]. Therefore, the dissemination of simple, affordable pig houses with due attention to scientific pig husbandry especially on periodical

deworming, timely vaccination, and feeding management will help in piggery development in the region.

8. Promoting intensive and integrated pig farming in NE India

Most of the farmers in the region rear pigs in their backyard with the minimum shelter to utilize garbage and leftover grains available to produce meat for family use should move towards an intensive system of production involving good breeding stocks and better nutritional input to produce marketable quality pork and pork products (Das and Bujarbaruah 2005) [6]. In areas with a shortage of land to grow feeds and in large cities, the intensive swine production system is economically viable because of the availability of industrial by-products. Also, the integration of pig farming with other livestock and crops could result in effective and full utilization of the inputs such as feed, land, manpower, capital, etc. (Das *et al.* 2012) [7]. Further, integrated pig farming can surely play a role in increasing the employment opportunities, nutritional security, and income of rural populations and has received considerable attention in recent years.

9. Intensification of the capacity building programme

Emphasis should be given to the capacity building of the farmers on scientific rearing of pigs, feeding, breeding management, health care, vaccination, and production of value-added pork products through various short courses/ training, off-field demonstrations at the farmer's doorstep, etc.

Conclusion

The commercial pig framings are gaining steady momentum in the entire NER of India. Many educated youths are adventuring into commercial pig framing considering the huge demands of the pork market in the region. Yet, superior germplasm of pigs, feedstuffs, vaccination, food safety issues, public health problems, effluent management, and environmental pollution associated with the piggery sector are increasingly becoming bottlenecks. Therefore, it is inevitable that substantial Government support is needed through subsidies, investments, and favorable policies for medium to large-scale industrial operations and smallholder farmers for piggery development in the region.

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