

PIG PRODUCTION IN INDONESIA

Djoni Liano* and Pollung H. Siagian[†]

* Sub-Directorate for Livestock Farming, Directorate General for Livestock Services, Jl Harsono Rm 3, Pasar Minggu, Jakarta, Indonesia

[†]Faculty of Animal Science, Bogor Agricultural Institute, Jl Rasamala, Kampus Darmaga, Bogor, Indonesia.

1. COUNTRY OVERVIEW

Indonesia is the largest archipelago in the world. Consisting of five main islands and 30 smaller archipelagos, it has a total of 1,667 islands, 600 of which are inhabited. The country stretches along a distance of 5,100 km from west to east and 1,888 km from north to south, and spans the equator from 6° north to 11° south. The climate varies from humid to semi-arid tropical. Average annual rainfall ranges from 1000 to 3,200 mm. Administratively, Indonesia consists of 26 provinces and more than 200 districts. The human population in 1998 was approximately 204 million, with about 58% living on Java, an island that accounts for only about 7% of the country's surface area. About 60% of the population lives in rural areas and 54% of the workforce is engaged in agriculture.

2. OVERVIEW OF PIG PRODUCTION IN INDONESIA

2.1 Role of Livestock in the National Economy

The agricultural sector plays an important role in the Indonesian economy. In 1997, livestock contributed 1.7% to the national gross domestic product (GDP) and 11.6% to that in agriculture. Although the contribution of livestock to the national GDP is trending downwards, its contribution to the agricultural GDP has shown a steady increase over the last five years. As an integral part of agriculture, livestock has contributed greatly to the general welfare of farmers. Besides providing nutritious food, cattle and buffalo are also used as a financial reserve, a source of income, a provider of draft power for cropping, and a means of transportation for the rural community. Dairy cattle, especially in Java, provide milk for the urban population and income for smallholder farmers. Like cattle, sheep and goats also provide ready cash for families and are extensively used in religious ceremonies.

Although about 80% of the Indonesian population is Muslim, pigs are also an important livestock species.

The majority of pig producers are smallholders (368,000 households) and most are located on the island of Java. In the last ten years, consumers and buyers have become much more knowledgeable and discerning about the quality of pork and other pig products. Hence, they now give feedback to the seller (through the price mechanism) on their quality requirements, especially their dislike of excessive fat on the carcasses and cuts. The price premium for quality lean pork is highest for that supplied to supermarkets and five-star hotels.

2.2 Industry Services

In relation to pig production, the main emphases of the Indonesian government are on the prevention of epidemic diseases, the supply of improved breeding stock to smallholder farmers, and the provision of extension services to farmers at provincial, district, and sub-district levels.

Private industries, particularly those involved in the supply of feedstuffs and veterinary medicines, also provide some goods and services to pig producers. For example, several feed companies are involved in producing pre-mixed feeds for pig producers, but the industry is small and poorly developed in comparison with that supplying the poultry industry. Other companies, often associated with major international pharmaceutical companies, produce and/or import veterinary medicines for pigs in Indonesia. These suppliers/sellers also provide health services for pig farmers but mainly service the large commercial breeders rather than the smallholder farmers.

2.3 Industry Significance

Pig farming in Indonesia produces the third largest amount of meat for human consumption, after ruminants and poultry. In 2000, pigs numbered about 10 million. Indonesia has also exported pigs to Singapore for many years, following the closing down of pig farming in that country in 1984. The number of pigs exported has been increasing steadily. For example, 154,800 pigs were exported in 1994 but by 1998 this had grown to 260,000, valued at \$US17.5m.

Pig exports are, therefore, an important source of revenue and foreign exchange for Indonesia, especially in the current economic crisis.

In many places in Indonesia, pigs have been seen as reliable livestock that can be sold at any time for the immediate family needs, as well as being available for customary rituals. Smallholder pig farming in rural areas is considered to be less labour-intensive than some other agricultural enterprises, since only a few animals are normally reared. It is regarded, therefore, as a sideline job or business utilising cheap, locally available feeds and requiring relatively little capital.

Government policies on the development of the pig industry in Indonesia have followed two main lines. On the one hand, agribusiness has been encouraged to develop large-scale commercial production using the latest science and technology. On the other hand, smallholder production has been encouraged through the provision of government-funded research and development (R&D) and extension services, support for the development of cooperatives, and encouragement for the provision of goods and services by the private sector.

The availability of suitable land has become a problem for peri-urban pig production, with the continuing expansion of the cities and the development of residential and industrial estates on their margins. Pig raising in such situations is seen as being socially, culturally, and environmentally offensive. Thus, smallholder pig production in peri-urban areas is under pressure and is moving more towards rural areas where small-scale production (often by housewives) fits more comfortably into the local culture and society.

3. INVESTMENT PRIORITIES FOR THE PIG INDUSTRY

The Indonesian Government, with support from the Asian Development Bank, has provided substantial support for the development of smallholder pig farming, principally by supplying breeding stock and providing extension services to farmers. It has also encouraged the private sector to invest in pig production for export.

3.1 Priorities Within Disciplines

3.1.1 Genetics

Indonesia has a number of indigenous pig breeds (such as the Bali pig, the Nias pig, and the Sumba pig) that are raised by smallholder farmers in their place of origin. Despite their lower genetic potential (reflected in slower growth rates and less efficient use of feed), they are still quite popular. However, there is now increasing interest in crossing these indigenous breeds with exotic

breeds such as Landrace, Yorkshire, Duroc, and Hampshire, and/or in using crosses between these exotic breeds. Private interests and government programs have, over the years, imported substantial numbers of such breeding stock into Indonesia with beneficial effects that flow in time to smallholder pig producers. Pig producers using such genetically superior pigs (particularly those operating at semi-commercial and commercial scales) usually also improve the standard of their management of health, hygiene, and nutrition. This leads in turn to shorter times for pigs to reach market weight of approximately 90 kg, more efficient use of feeds, lower mortality, and higher profits.

The government has invested in R&D to improve the genetic potential of pigs in Indonesia and realises that this is an ongoing task and one that must be carefully attuned to changing consumer demand. Part of this investment is channeled through the existing Breeding Centre for Pigs in Siborongborong (North Sumatra) that evaluates the strengths and weaknesses of indigenous breeds and produces improved breeds and crosses that are adapted to Indonesian conditions. However, lack of funding and insufficient human resources devoted to this task have limited the impact of the Centre.

The priority for R&D in this discipline is for government and private funding of existing work to be expanded.

3.1.2 Nutrition

The nutrient requirements of pigs in Indonesia have not yet been established for either local or imported pigs. As a result, most of the commercial pig farms have simply adopted nutrient requirements recommended by overseas bodies such as the National Research Council (NRC). Their recommendations—which are suitable for temperate and sub-tropical regions—may not be appropriate for pigs raised in the Indonesian tropics. Further R&D is required to address this important issue.

Feed ingredients for pig diets are either obtained locally or imported. A number of relatively cheap local feed ingredients are available throughout the year, namely rice bran, coconut meal, cassava chips/flour, tofu waste, palm kernel cake, and other plantation by-products such as rubber seeds and by-products of the cocoa industry. Substantial quantities of some of these ingredients are available—for example, in 1991, Indonesia produced approximately 607,100 tonnes of palm kernel cake. These feed ingredients usually contain high levels of crude fibre and some may contain toxins. Their quality is also variable and is dependent upon location of production, seasonal conditions, and postharvest handling. These factors limit the level of

inclusion in pig diets. Fermentation technology has been developed to improve the nutrient quality of some of these ingredients but has not been widely adopted.

The main imported feed ingredients are corn, soybean meal, fishmeal, meat and bone meal, and vitamin–mineral premixes. Since the monetary crisis, the prices of these ingredients have increased up to three times. Nevertheless, substantial quantities are still imported. For example, in 1998/99, Indonesia imported 904,759 tonnes of soybean meal, and 591,056 tonnes of fish meal.

It is anticipated that pig production in Indonesia would expand more rapidly if the government reduced the level of import tax on feed ingredients, government regulations about the locations of pig farms were made less restrictive, and government investment in R&D was substantially increased.

We believe that the R&D priorities for nutrition should focus on:

- improving the quality of local feeds (e.g. through the application of biotechnology); and
- finding and developing alternative protein sources that are locally available and suitable for inclusion in pig diets.

3.1.3 Health

The principal diseases affecting pig production in Indonesia are hog cholera, brucellosis, erysipelas, and diarrhoea in piglets.

Hog cholera. In 1996, piggeries in Indonesia experienced very high mortalities as a result of hog cholera. Some smallholder pig farmers even gave up raising pigs as the death of one animal could result in the death of all animals in their herd. Since then, farmers have been much more aware of the dangers of this serious viral disease and have vaccinated more of their pigs at their own expense. For example, the proportion of pigs vaccinated in North Sumatra increased to about 76% in 1999/2000 from 30% in the year before. In recent years, Japan, through the Japan International Cooperation Agency (JICA), has provided effective technical aid to Indonesia with the purpose of:

- improving the accuracy and speed of diagnosis of hog cholera;
- preparing programs to deal with outbreaks of the disease; and
- transferring technology in the production for hog cholera vaccine for use in eradicating the disease.

Brucellosis. In Indonesia, especially around Jakarta, brucellosis is an important disease, with 89% of

infections being caused by brucellosis biotype 1 and 11% by biotype 3.

Erysipelas. Erysipelas, an infectious bacterial animal disease mainly attacking pigs, is caused by *Erysipelothrix rhusiopathiae* or *E. insidios*. This disease was reported to occur in 1964, 1979, 1981 and 1991 in West Java, Jakarta, North Sumatra and central Java, respectively.

Neonatal diarrhoea. This condition occurs in most piggeries in Indonesia with prevalence varying between 13 and 44% and averaging about 25%. Mortality of piglets as a result of this condition varies between 12 and 32% and averages about 18%. Piglet neonatal diarrhoea has been found to be associated with enterotoxigenic *Escherichia coli*.

3.1.4 Housing and environment

Housing. Although the pens used by smallholder pig farmers are not as good as those in commercial piggeries, these farmers understand their function as places for modifying the micro-environment of the pigs. The pens are usually made of relatively cheap local materials.

Environment. Unfortunately, Indonesia is not yet taking pollution caused by farm effluents as seriously as it is taken, for example, in European countries. The high nitrogen and phosphorus contents of pig effluent have a high potential for polluting waterways, rivers, and lakes. Both substances speed up the growth rate of algae which may then cover the water surface, adversely affecting water quality, depressing fish growth, and potentially blocking the waterways. How serious this environmental pollution is on a national basis has not yet been determined. However, pollution surrounding animal farms is often serious, as evidenced by unpleasant odours and algal growth on water surfaces.

Smallholder pig farmers in rural areas often handle pig wastes in simple but very effective ways by collecting them for use as fertiliser on agricultural land. Serious environmental problems arise, however, with semi-commercial and commercial pig production, particularly in peri-urban areas. Here, cultural (religious), odour, and pollution problems often come together to cause serious problems and social conflict. Some peri-urban piggeries have had to go out of production as cities have spread into their less densely populated fringes, and this is likely to occur with increasing frequency.

Environmental management is clearly a very serious, under-emphasised issue for the pig industry in Indonesia. The long-term physical and social welfare of Indonesian society requires that much greater emphasis

be placed on the development of efficient production systems that make sustainable use of natural resources (soil, water, flora and fauna). Thus, the environment issue is one that will require increasing and substantial involvement of the various levels of government (in formulating policies, regulations, and monitoring procedures, and in supporting R&D to address the numerous problems).

3.1.5 *Product development and quality*

The national policy towards livestock production is directed at increasing the welfare and income of smallholder farmers by improving the productivity of their farming systems. One way in which this can be achieved is by producing products that are closely in line with consumer demand. In recent years, consumer demand for pig products has become much more sophisticated and there is now a strong demand (and high prices) for carcasses and cuts with a higher proportion of lean meat. Although a common system of carcass grading has not yet been adopted, market weight (90–100 kg) and backfat thickness are characteristics of rapidly increasing importance.

This change in consumer preferences is having, and will continue to have, a major impact on many aspects of pig raising, particularly by smallholders. Government-funded R&D centres/stations are playing an important role in dealing with this matter by improving the genetic potential of breeding stock and in formulating improved pig diets. Commercial pig farmers have also helped or collaborated as they have raised breeding stock with the genetic potential for lean meat that will in time influence the genetic potential of smallholder pigs.

3.1.6 *Reproduction*

Data on the litter size of pigs raised by smallholders indicate that small litters are common, with averages litter sizes of 7.5, 6.5, and 6.4 head at birth, and 6.3, 6.1, and 6.0 at weaning for indigenous, crossbred, and exotic breeds, respectively. Such litter sizes are well below those of commercial piggeries. The low litter size in exotic breeds when raised by smallholder farmers is probably due to poor feed quality and quantity. In general, knowledge and understanding about reproduction among smallholder pig farmers is not high. For example, there is little understanding of the value of flushing for increasing ovulation, and of the need for good care (particularly nutrition) during pregnancy, in order to avoid mortalities.

Artificial insemination (AI) is hardly practised at all in pig farming in Indonesia. Apart from the unavailability of the required facilities and infrastructure, pig farmers do not consider AI important since those who do not

have a boar can readily hire one for a fee to mate to a sow in heat.

3.1.7 *Socioeconomics and technology transfer*

Smallholder pig farmers generally raise only a small number of pigs as pig production at this scale is usually thought of as a side business. Hence, there is little consideration or understanding of the whole production system. Support, such as training and visits to successful semi-commercial pig farming enterprises, will be required to help smallholders make the transition from side business to commercial operation. R&D centres have an important role to play in this transition by assisting smallholder farmers to increase the efficiency of their production systems and the scale of the operations. Extension workers can also support such changes but, in some cases, they may not have the ability or the experience to do so.

In order to improve farming among smallholder pig farmers, three approaches can be taken—the technical, the integrated, and the agribusiness approach. The technical approach, for example, can help reduce mortality through disease prevention and eradication (by vaccination programs, extension activities, the use of animal quarantine stations, and by providing improved access to veterinary services). The integrated approach is aimed at increasing productivity by large-scale establishment of production technology, economic and social management programs (e.g. the provision of packages of production technologies, and assistance in organising smallholder pig farmers into farmer groups and cooperative institutions). The agribusiness approach is an effort to accelerate development by integrating the four major aspects of agribusiness—farm inputs, production, processing, and marketing. As an illustration, industrialisation of smallholder pig farmers would require full integration with the commercial production systems, taking account of these four aspects. It would be expected to bring benefits to all parties.

3.2 **Priorities Between Disciplines**

To develop pig farming in Indonesia, especially that by smallholder pig farmers, we consider that the most important disciplinary areas requiring R&D attention are environment, and socioeconomics and technology transfer.

3.2.1 *Environment*

This topic includes all aspects of production systems that affect the wellbeing of both the pigs and the human population in the immediate vicinity. It takes into account climatic, structural, health, nutritional, cultural, and social factors. The most important factor concerning the business of pig farming relates to the fact that the majority of Indonesian people are Muslim

and not allowed to consume pork. They also tend to object to the development of pig farming around their area—a fact that must be taken into account in planning, managing, and developing pig farming enterprises. The 1997 experience in reallocating pig farming from the capital city of Jakarta is instructive. The reallocation to a particular area in West Java was in the end unsuccessful for socio-cultural reasons rather than technical ones.

3.2.2 *Socioeconomics and technology transfer*

Pig farming contributes about 12% of the national meat production. Pigs therefore rank third after beef and poultry. Changes are occurring in the principal locations of pig farming in Indonesia, with significant increases occurring in north Sumatra, Nusa Tenggara, Bali, North Celebes, West Kalimantan and Riau.

The reality of much of Indonesian pig farming is that the productivity of the pigs of the dominant group of

pig producers—smallholders living in rural areas—is very low. This is principally because they still use very simple technologies in rearing their animals (mainly local breeds with some crosses with exotic ones) and unconventional, poorly balanced feeds, with the eventual result that their own living standards are well below average. Support from the government and foreign countries, therefore, is needed to overcome the many problems (particularly in access to better breeding stock, training in all aspects of pig raising, and awareness of the environmental implications of pig farming) faced by smallholder pig farmers.

4. REFERENCES

Livestock Development in Indonesia. 1998. Directorate General of Livestock Services. Agriculture Department, Jakarta, Indonesia.