

Sustainability Assessment of the Philippine Native Pig (*Sus philippensis*) Production in Bataan, Philippines

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Abstract: We conducted this study to determine the present status, prospects, economic potential, and sustainability of Philippine native pig production in Bataan. We randomly selected and assessed a total of 100 pig farmers using survey questionnaires. The results showed that backyard producers dominated production (99.07%). The respondents' native pigs were non-descript because of a lack of proper characterization. Local needs dominated supply and demand, with 76.89% of the pigs sold on a wholesale basis without considering the actual pig weight, and 76.15% of the pigs picked up by buyers. The operating system was farrow-to-finish (78.15%), and there was no breeder operation. The lack of concern extended to the provision of a proper housing system and equipment. Pigs were raised in a group or communal system in 84.92% of cases, which encouraged premature breeding by denying smaller and weaker animals the opportunity to compete for food and better spaces. The feed types provided lack the necessary nutrition, resulting in slower growth and failure to reach maximum potential. The very low percentage of feeding commercial feeds (13.85%) was due to the high cost of the feeds. The practice of inbreeding, at 68.52%, stemmed from a lack of awareness about its negative effects. There was a very low percentage of people practicing proper animal health management. The lack of record-keeping prevents us from analyzing the economic potential of raising native pigs. These findings suggest the need to introduce science and technology interventions to sustain the Philippine native pig production in Bataan.

Keywords: breeding system, economic potential, non-descript, Philippine native pig, prospects

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INTRODUCTION

Native animals are considered an important factor in the agricultural production system in the Philippine countryside. They enhance the food supply, offer high-quality protein food, and serve as a source of livelihood. One of these animals is the Philippine native pig. The

country's native pig is the result of indiscriminate crossbreeding between domesticated wild pigs and introduced pig breeds. After a long process of natural selection, it has evolved into a group that is able to survive and reproduce in natural environments even with

minimal human intervention. Through a process of natural selection, the native pig has developed unique patterns of behaviour that enhance its fitness for local conditions and resilience to extreme climatic occurrences. Other important characteristics of a native pig are its adaptability to local environmental conditions, apparent resistance to diseases, and the unique texture and taste of its meat. These are enough reasons to invest in research and development initiatives to improve the native pig in the Philippines (Yap Jr., 2017).

There is a notion that raising native pigs is not sustainable because of the belief that this breed's growth is slow, resulting in a slower rate of return on investment. Others believe that the native pig industry in the country will persist as a minor contributor to the local swine sector. Press Reader (2016) asserts that the native pig industry holds significant potential for generating business prospects and employment opportunities, especially for small players. The market offers native pig meat as the best alternative to commercially sold pork meat, and with the growing demand for organic products, we anticipate native pig meat to emerge as a formidable contender in the pork market. The advantages of raising and breeding native pigs include their high demand in the lechon industry, their high-value meat, their adaptability to native conditions, their economic benefits, their relative health (their cholesterol content is lower than that of commercial breeds), and their organic nature. The target market includes the lechon (roasted pig) industry, breeders, and medical researchers. Longganisa (sausages), bagnet (deep-fried pork), tapa (bacon), etag (cured and aged slabs of pork in salt), organic, and pork meat are among the meat products it produces (The Mail Man, 2015). The aforementioned circumstances prompted the researchers to conduct a descriptive survey study to assess the sustainability of Philippine native pig production in the province of Bataan. The result may help Philippine native pig producers become more competitive with commercial (imported) pig growers in terms of profit and technology. We conducted this research primarily to assess the current state, future prospects, economic potential, and sustainability of Philippine native pig production in Bataan. This information served as a foundation for devising scientific and technological interventions to enhance its production efficiency. Specifically, the research aimed to determine the current native pig population on a commercial and backyard scale, as well as the supply and demand, pricing, and delivery systems. It also examined production and management practices, including the system of operation, housing conditions, feeds and feeding systems, breeding practices, health management, and an economic analysis of raising native pigs.

MATERIALS AND METHOD

The researcher cannot secure Institutional Animal Care and Use Committee (IACUC) approval because the university, including in the province of Bataan, Philippines, still lacks an established IACUC. Instead, the researcher secured a Certification of Ethical Approval from the BPSU-Peninsula Research Ethics Committee (REDO.PROJ.AC.2018.01) prior to conducting this study. We conducted this study in the province of Bataan, Philippines, collaborating with the Local Government Unit-Municipal Agriculture Offices (LGU-MAO), Office of the Provincial Agriculturist (OPA), and Provincial Veterinary Office (PVO) to pinpoint the precise locations of native pig raisers from the municipalities of Dinalupihan, Hermosa, Orani, Samal, Abucay, Pilar, Orion, Limay, Mariveles, Bagac, Morong, and City of Balanga. Using Slovin's formula, the researchers selected and assessed 100 ($N = 100$) farmers who are raising Philippine native pigs from among the 131 participants. The researchers conducted face-to-face interviews with the respondents using a prepared questionnaire. The questionnaire outlines the current native pig population inventory on both commercial and backyard scales, marketing systems such as the current supply, demand, pricing, and delivery system, production systems such as the systems of operation, housing, and housing conditions, the types of feeds given to the native pigs, management practices such as feeding, breeding, and health management, and an economic analysis to determine the current production cost and income derived by the participants in raising Philippine native pigs. We analyzed all the collected data using basic descriptive statistics like frequency distribution, percentage, mean, and ranking.

RESULTS AND DISCUSSION

This chapter presents all the information gathered during the study's conduct, including an analysis, interpretation, and discussion of the current status of Philippine native pig production, its operational system, housing system, feeds and feeding practices, breeding, health management, current production costs, and income.

Current status of production. Table I presents the current status of Philippine native pig production among the selected respondents.

Table I. Current status of Philippine native pig production in Bataan

<i>Item</i>	<i>Mean</i>	<i>Rank</i>
<i>Gender of native pig raisers (respondents):</i>		
<i>Female</i>	40.83%	2
<i>Male</i>	59.17%	1
<i>Number of native pig per farmer (head)</i>		
	12.87	
<i>Scale of production:</i>		
<i>Commercial</i>	0.93%	2
<i>Backyard</i>	99.07%	1
<i>Supply:</i>		
<i>Local/Regional/National Market</i>	84.71%	1
<i>Personal/Family use</i>	15.29%	2
<i>Demand:</i>		
<i>Local/Regional/National Market</i>	84.52%	1
<i>Personal/Family use</i>	23.17%	2
<i>Method of selling:</i>		
<i>Wholesale (per head)</i>	76.89%	1
<i>Wholesale (per batch)</i>	3.98%	3
<i>Retail</i>	2.56%	4
<i>Personal/Family use</i>	18.05%	2
<i>Pricing (PhP):</i>		
<i>Grower/Finisher(price/hd)</i>	3, 286.81	
<i>Piglet/Starter (price/hd)</i>	1, 495.07	
<i>Culled (price/hd)</i>	6, 825.00	
<i>Retail (price/kg)</i>	150.00	
<i>Delivery system:</i>		
<i>Picked up by buyers</i>	78.15%	1
<i>Delivered to buyers</i>	3.69%	2

The native pigs they raised were considered non-descript. The scale of production depends on the extent, whether commercial (>20 sow-level) or backyard (<20 sow-level). The supply and demand considerations were for local, regional, national, or personal use. The market entails buying, selling, and pricing finishers, growers, starters, piglets, culled sows, boars, and dressed weights on a wholesale (per head or per batch) and retail basis, as well as those for personal or family use. Buyers may pick up delivery or hauling systems, while the raiser may deliver them on a live weight or dress weight basis.

The respondents' gender during the survey was 59.17% male and 40.83% female. They raised an average of 12.87 heads, for a total of 1,081, composed of 87 boars, 254 sows, 95 gilts, 186 piglets, 181 starters, 265 growers, and 13 finishers. The highest number of Philippine native pigs was in the municipality of Orani, with a total of 245 heads composed of 8 boars, 42 sows, 7 gilts, 13 piglets, 118 starters, and 57 growers, while the least number was in the municipality of Pilar, with 30 heads comprising 7 boars, 9 sows, 2 gilts, 5 piglets, and 7 growers.

Backyard producers dominated production, with a mean of 99.07%, while only 0.93% were involved on a commercial scale. The municipality of Orani, Bataan, established a commercial Philippine native pig production, operating at a level of 20 sows. This finding

confirms the preference of Bondoc et al. (1998) for raising native pigs due to their low input requirements and disease resistance. Many local special food preparations or dishes commonly incorporate native pigs. Manipol et al. (2014) also found out that the value chain of the Philippine native swine comprised small-scale holders. Local needs clearly dominated the supply (84.71%) and demand (85.52%), with the respondents using the remaining 15.29% of the supply and 23.17% of the demand for personal or family use. The highest supply, with an average mean of 100%, was in the municipalities of Abucay, Morong, Orion, and Bagac. The highest mean for personal use was in the municipality of Hermosa, with 45.45%. This absolutely indicates that the Philippine native pigs raised by the respondents are for local demand and personal use. The Food and Fertiliser Technology Centre for the Asian and Pacific Region has expressed that native animals have significantly enhanced the cultural, social, and economic standing of rural farming communities. The growing population around the world prompted a demand for more produce, which led to intensive farming and the use of exotic commercial breeds and hybrids. But as people become more conscious of their health, natural products show potential for choosing native chicken and pig when it comes to animal production (Santiago,

2018). Observations showed that 76.89% were selling their products on a wholesale (per head) basis, 3.98% on a per-batch basis, and 3.98% on a retail basis. 18.05% of respondents indicated that they were selling for their personal use. The average price was PhP 3,286.61 for grower or finisher, PhP 1,495.07 for piglet or starter, PhP 6,825.00 for culled sow or boar, and PhP 150.00 per kilogram for dress weight. Buyers picked up 78.15% on a live weight basis, and delivered 3.69%. There were 8.88% that processed lechon, 1.88% into tapa or bacon, and 0.83% into tocino and sausage. **Production system.** The respondents' production systems for Philippine native pigs (Table II) encompass

various aspects such as the system of operation, housing conditions, and the type of feed the animals receive. The system of operation includes the following: farrow to finish, which involves raising sows to produce piglets and caring for them until they reach the finishing stage; farrow to wean, which involves raising sows to produce piglets and selling them as weanlings; fattening operation, which involves purchasing weanlings and raising them until the growing or finishing stage; and breeder operation, which involves producing breeding gilts or boars as replacement stocks.

Table II. Production system for Philippine native pigs in Bataan

<i>Production system</i>	<i>Mean, %</i>	<i>Rank</i>
<i>System of operation</i>		
<i>Farrow to finish</i>	78.85	1
<i>Farrow to wean</i>	8.12	3
<i>Fattening</i>	14.65	2
<i>Breeder</i>	0.00	4
<i>Housing system</i>		
<i>With housing</i>	63.89	2
<i>On pasture</i>	29.54	3
<i>Tethered</i>	15.89	4.5
<i>Individual pen</i>	15.08	4.5
<i>Group/ Communal</i>	84.92	1
<i>Housing condition:</i>		
<i>Indigenous/local materials</i>	51.46	1
<i>Concrete flooring</i>	11.95	3
<i>Concrete flooring and walls</i>	9.52	4
<i>Concrete flooring, walls and G.I. roofings</i>	16.76	2
<i>Feeding trough</i>	30.41	2
<i>Waterer</i>	39.64	1
<i>Properly ventilated</i>	28.58	3
<i>Properly illuminated</i>	0.93	4
<i>Feeds</i>		
<i>Commercial</i>	13.85	3
<i>Self- formulated</i>	27.31	2
<i>Others (rice bran and kitchen left- overs)</i>	48.01	1

The housing system encompasses any type of housing, be it raised on pasture, tethered, in an individual pen, or within a group or communal system. The condition of the housing, whether it was made of indigenous or local materials, with concrete flooring, concrete walls, or a combination of concrete flooring, walls, and galvanized iron roofing, is a crucial factor to consider. This study also evaluated the types of feeds to consider. This study also evaluated the types of feeds provided to the animals, including commercially available hog feeds, self-formulated feeds, and a combination of rice bran and kitchen leftovers. Observations showed that 78.85% of the respondents practiced the farrow to finish operation,

14.65% the fattening operation, and 8.14% the farrow to wean operation. None of the respondents practiced the breeder operation. 63.89% of the respondents housed their native Philippine pigs, 29.54% raised them on pasture, 15.89% tethered them, 84.92% raised them in a group or communal manner, and 15.08% raised them in individual pens. Raising pigs in a group or communal system encourages early or premature breeding. Bigger and stronger animals always have a chance during competition, either for food or for a better space. This scenario suggests conducting a training seminar on the importance of proper animal

housing to help Philippine native raisers improve their production practices. Individual pen or confinement is important to separate the boar from the herd to discourage premature breeding, to separate pregnant sows to prevent abortion, lactating ewes to improve their piglets survival, and the smaller pigs to increase growth performance. We observed that indigenous or local materials constituted 51.46% of the average housing, with 16.76% consisting of concrete flooring, walls, and galvanized iron roofing, 11.95% consisting of concrete flooring, and 9.52% consisting of concrete flooring and walls. The percentage of housing that provides a feeding trough, waterer, proper ventilation, and illumination is 30.41%, 39.64%, 28.58%, and 0.93%, respectively. Proper housing conditions and equipment provision are critical to protecting the pigs from extreme weather conditions and predators. This would likewise prevent further competition for food and space. We observed that 48.01% fed with rice bran and kitchen leftovers, 27.31% fed self-formulated feeds, and 13.85% fed commercially available feeds. Manipol et al. (2014) mentioned that the production of native pigs can be a viable source of income for swine producers who cannot cope with the high price of commercial swine feeds and for those who have limited capital. Balanga City had the highest average mean of

100% for feeding rice bran and kitchen leftovers, Abucay had the highest average mean for feeding a self-formulated diet, and Orani had the highest average mean of 33.33% for feeding commercially available hog feeds. According to 48.01% of the respondents, feeding rice bran and kitchen leftovers lacks the necessary nutrition for the animals. This practice may not encourage the Philippine native pigs to grow to their maximum potential. The low percentage of animals fed with commercial feeds (13.85%) can be attributed to their high cost. This implies the creation and testing of feed formulations tailored for Philippine native pigs to enhance the nutritional value of the feeds provided to the animals.

Management practice. Management practices for raising Philippine native pigs include restricted, ad libitum, dry, wet, individual, or communal feeding practices. Breed management included natural breeding, artificial insemination, inbreeding, and crossbreeding. The health management practices included vaccination against common swine diseases, disinfection of pens and surroundings, deworming of pigs, quarantine for newly purchased animals, and supplementation to improve the nutritive value of feeds

Table III. Management practice for Philippine native pigs in Bataan

<i>Management practice</i>	<i>Mean, %</i>	<i>Rank</i>
<i>Feeding</i>		
<i>Restricted</i>	90.65	1
<i>Ad libitum</i>	9.35	2
<i>Dry</i>	16.70	2
<i>Wet</i>	83.30	1
<i>Individual</i>	14.70	2
<i>Communal</i>	84.33	1
<i>Breeding</i>		
<i>Natural</i>	98.81	1
<i>Artificial Insemination</i>	1.19	2
<i>Inbreeding</i>	68.52	1
<i>Crossbreeding</i>	31.48	2
<i>Health management</i>		
<i>Vaccination</i>	6.55	4
<i>Disinfection</i>	8.22	3
<i>Deworming</i>	12.79	1
<i>Quarantine</i>	0.00	5
<i>Supplements</i>	11.43	2

The feeding practices, as shown in Table III, were 90.65% restricted feeding and 9.35% ad libitum. 83.30% of individuals practiced wet feeding, while 16.70% practiced dry feeding. 84.38% and 14.70% of individuals practiced group or communal feeding. This means that most of the respondents were practicing restricted, wet,

and group feeding for Philippine native pigs. Smaller pigs would always have a lesser chance to eat enough when feeding in groups. The respondents' Philippine native pig breeds were indistinct due to a lack of proper characterization. The data revealed that 98.81% of the respondents practiced natural breeding, while 1.19%

employed artificial insemination. A higher percentage of 68.52% practiced inbreeding, while 31.48% practiced crossbreeding. The practice of inbreeding by 68.52% of the respondents would result in a decline in growth and reproductive performance as well as in the disease resistance of the animals, while crossbreeding encourages hybrid vigour or heterosis and an improvement in the animals' performance. We suggest conducting training seminars on the importance of breeding and reproduction to encourage Philippine native pig raisers to practice crossbreeding and breed improvement. Only 6.55% of the respondents were practicing vaccination to immunize their animals against common swine diseases, while 8.22% were disinfecting the pens, 12.79% were practicing deworming to eliminate parasites, none of the respondents were practicing quarantine for newly purchased animals, and an average mean of 11.43% were providing feed supplements to enhance the nutritional value of their Philippine native pigs' diets.

Economic Analysis. Respondents' economic analysis of raising Philippine native pigs includes their current production costs, such as their expenditures on stocks, housing, feeds, labor, biologics, and other expenses. The earned income from the sales of piglets or weanlings, starters, growers, finishers, breeders, and culled sows and boars exceeds the production costs. The respondents lack proper financial and production records, making an economic analysis impossible. This demonstrates that the surveyed Filipino native pig raisers in the province did not prioritize record-keeping. Hence, it is an opportunity for the university to conduct trainings and seminars on production and financial record-keeping.

CONCLUSION

The study's findings led researchers to draw the following conclusions:

Backyard producers in Bataan dominated the production of Philippine native pigs, surpassing the commercial scale. Local needs and personal use were the primary drivers of supply and demand. If the native pigs are heavier, selling them on a wholesale basis instead of a liveweight basis would be highly disadvantageous. The farrow-to-finish system dominated the operation. We observed that none of the respondents participated in the breeder operation. The respondents showed minimal concern for the provision of a proper housing system and equipment. The respondents raised pigs in a communal or group system that encouraged early or premature breeding. The types of feed provided lack the necessary nutrition for the animals. The low percentage of animals receiving commercial feeds is primarily due to the high cost of these feeds. We should formulate and test feeds

specifically designed for native pigs in the Philippines to enhance their nutritional value. The practice of inbreeding may result in a decline in growth and reproductive performance as well as in the disease resistance of the animals. Most were not aware that crossbreeding encourages hybrid vigour, or heterosis, and an improvement in the animals' performance. To encourage Philippine native pig raisers to practice crossbreeding and breed improvement, we suggest conducting training seminars on the importance of breeding and reproduction. The low percentage of respondents who practiced vaccination, disinfection, deworming, quarantine, and supplementation indicated their ignorance of the importance of these health management practices or their belief that the Philippine native pigs' resistance to pests and diseases rendered them unnecessary. The respondents did not practice record-keeping, resulting in a lack of documentary evidence on their expenses and income from raising native pigs. Therefore, the lack of financial and production records precludes conducting an economic analysis.

Backyard raisers that dominate Philippine native pig production in the province should be provided with technical and financial assistance, while those with financial capability could engage in commercial production to fill the gap between supply and demand. Government interventions, policies, and guidelines can also enhance the selling process and pricing system. A standard pricing system should be in place specifically for native pigs. We should encourage value-adding to boost the farmers' income. To determine the most appropriate and economical housing and facilities for the animals, the province must study the development of the most suitable housing and facilities for Philippine native pigs. Trainings and seminars on the importance of proper animal housing can also be helpful to improve production practices. We also encourage feed formulation and feeding trials using locally available feedstuffs to identify the most suitable feeds for Philippine native pigs. Callo-Etis (2015) recommends using indigenous feedstuffs to grow native pigs with better feed efficiency and lower feed costs per kilogramme of weight gain, replacing certain amounts of commercial rations. We must discourage group feeding, as it only benefits the largest and strongest animals. Separating smaller animals from the larger ones would increase their chances of survival. To have a reliable source of breeder stocks, Bataan should establish a breeding station for Philippine native pigs. It is crucial to conduct a thorough characterization of the native pigs raised in Bataan to ensure accurate identification. In order to preserve the true "native" pigs, we must first set and certify minimum standards (Bondoc and Ramos, 1998). The results indicate that enhancing the production of Philippine native pigs in Bataan requires the introduction of science and technology interventions, including breed characterization to pinpoint the best

native breeds, marketing system development, housing design and facilities, feeds, health programs, value-adding, and record-keeping. Training the respondents in keeping financial and production records would enable economic analysis.

CONFLICT OF INTEREST

There is no conflict of interest on the author's part in any financial, personal, or other relationship with other people or organisations related to the material discussed in the manuscript.

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LITERATURE CITED

Bondoc O, Ramos S 1998. "Findings of a survey of native pigs in some provinces of the Philippines".

Available at <http://agris.fao.org/agris-search/search.do?Record ID= PH1998100836>

Callo-Etis 2015. "Economic Potential of Raising Philippine Native Pigs on *Trichanthera (Trichanthera gigantea)* Diets" <https://ejournals.ph/article.php?id=3744>

The Mail Man 2015. Growth Industry: Philippine Native Pig Raising and Breeding. www.agricultureph.com - The Philippines' Web Magazine on Agriculture. Available at <http://www.agricultureph.com/2015/12/growth-industry-philippine-native-pig.html>

Manipol N, Flores M, Tan R, Aquino N, Baticados G 2014. "Value Chain Analysis of Philippine Native Swine (*Sus scrofa philippinensis*) Processed as Lechon in Major Production Areas in the Philippines" *Journal of Global Business and Trade*, Vol.10, No.1, pp. 77-91. Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2999245

Santiago R C 2018. Native Pig Raising. Available at <http://www.agriculture.com.ph/2018/10/25/native-pig-raising/>

The Philippine Star June 30, 2013. "Native swine project helps raise farmers' income". Available at <http://www.philstar.com/agriculture/2013/06/30/959756/native-swine-project-helps-raise-farmers-income>

Yap Jr. J 2017. "Improving native pig production in the Philippines". Available at <http://www.panaynews.net/urban-farmer-improving-native-pig-production-in-the-philippines/>