

Sustainability of production and marketing practices in hog raising: Philippine context

¹Rustom B. Obrador & ²Randall B. Pasco

Abstract

This qualitative study employed a descriptive phenomenological research design to explore the production technology and hog marketing strategies among hog raisers in selected municipalities of Quezon Province, Philippines. Twelve participants, comprising backyard, semi-commercial, and commercial hog raisers, were purposively sampled for in-depth interviews. Data analysis utilized horizontalization, a phenomenological method, to identify significant statements and cluster them into meaningful units. Findings underscored the adoption of advanced production technologies such as selective breeding and artificial insemination for enhancing pig health and productivity. Effective marketing strategies, including customer relationship management and efficient distribution channels, were crucial for market access and profitability. Sound financial management practices, including budgeting and cost control, emerged as essential for sustainability. The study contributes insights into improving productivity, profitability, and competitiveness in the hog raising industry, thereby fostering its growth in Quezon Province. Future research could explore longitudinal impacts of such interventions and conduct comparative analyses across regions to understand variations in production practices and market dynamics. Understanding consumer preferences and environmental impacts could inform sustainable strategies and regulatory frameworks, fostering growth and resilience in Quezon Province's hog-raising industry.

Keywords: *hog raising, production technology, marketing strategies, phenomenology, Philippines*

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About the authors:

¹Corresponding author. Master in Business Administration, Accounting Supervisor 2, Epsilon Maritime Services Inc. Email: rustomobrador10@gmail.com

²Doctor of Business Administration, Vice President for Student Life and Success and MBA Program Chair, Pamantasan ng Lungsod ng San Pablo, Philippines.



1. Introduction

Hog raising is a private-led industry that thrived through the years. In fact, the swine industry is a vital component of the agricultural sector in the Philippines, significantly contributing to the country's food security and economy. It is a very popular industry in the Philippines such that there is an increase of backyard producers, which dominates the swine industry and healthy viable commercial sector (Salazar et al., 2022). Despite the complex dynamics of learning (Gonzales & Villacruel, 2024), piggery farmers keep on learning and continuously seek ways to enhance the production and profitability of their operations (Kleen & Guatteo, 2023). Pork is the primary source of meat for Filipinos, with swine production accounting for approximately 60% of the total livestock output and around 70% of this came from small hold farms (Philippine Statistics Authority, 2023; Domingo et al., 2022). The industry's growth has been driven by increasing domestic demand, with pork consumption and imports rising by 7.19% (Arcalas, 2024). However, the industry has also faced fluctuations in production levels due to various challenges.

In recent years, the swine industry has encountered several obstacles that have hindered its growth. One significant issue is the outbreak of African Swine Fever (ASF), which was first detected in the Philippines in 2019. ASF has led to substantial losses in pig populations, having already slaughtered more than 5 million pigs, resulting in losses of over Php 200 billion (Fernandez-Colorado et al., 2020). Despite efforts to control and prevent the spread of ASF, occasional outbreaks had localized impacts on swine populations in certain areas (Limos-Galay et al., 2023). Additionally, high production costs, driven by the increasing prices of feed and other inputs, have put financial pressure on farmers (Wedzerai, 2022). The industry grappled with rising feed prices and supply chain disruptions during this period. The production costs and profitability of swine farmers were affected by fluctuations in the prices of raw materials, such as corn and soybeans, and the continuous decrease of live weight price (Limos-Galay et al., 2023). The COVID-19 pandemic further exacerbated these issues, disrupting supply chains and limiting market access (Dili, 2022)

In Quezon Province in the Philippines, the hog industry forms a vital component of the region's agricultural landscape, reflecting its significance in providing livelihoods and sustaining local economies (Garcia et al., 2020). Like elsewhere in the Philippines, hog raisers

in Quezon Province encounter a mix of challenges and opportunities. African Swine Fever outbreaks have posed a significant threat, triggering economic losses and necessitating stringent biosecurity measures (Mutua & Dione, 2021). Rising feed prices, market volatility, and fluctuating consumer preferences further compound the complexities faced by hog raisers (Van der Poel et al., 2020). Given these challenges, it is crucial to examine specific areas within the swine industry that require improvement. Hence, this study focuses on production technology and hog marketing strategies, particularly in Quezon Province. Production technology plays a critical role in enhancing productivity and ensuring the health of swine populations. Improving production methods can lead to higher yields and better disease management, which are essential for the industry's sustainability. On the other hand, marketing strategies are equally important, as they directly affect the profitability of swine farming. Piggery farmers face numerous marketing challenges, including volatile prices and competition from imported pork (Briones & Espineli, 2022). Additionally, inadequate infrastructure and limited access to markets hinder farmers' ability to sell their products efficiently (Blackall et al., 2020). By addressing these marketing issues, farmers can improve their income and competitiveness in the market.

2. Literature review

2.1. Pig Farming

In a free-range piggery, the pig herd is rotated on pastures or cropland for the majority of their lives. The term "free range" suggests that animals are not confined in enclosures. For instance, they may be fed in a stable but have unrestricted access to paddocks. The land requirements for a free-range piggery are determined by the pig's age at suckling and sale, as well as the climate, soil type, land topography, and pasture vegetation (Miao et al., 2004). On the other hand, in a semi-intensive system, animals are allocated specific areas and are encouraged to forage on natural vegetation by roaming outside. The labor requirements, ailment incidence, and parasite infestations are quite high, despite the fact that the system necessitates less capital investment. Ready-made feeds are also available. Productivity is higher than under free range conditions, hence herd sizes are larger (Xia et al., 2020; Kester et al., 2014; Salmon et al., 2018; He et al., 2022). The housing provided for night shelter during the dry season is identical to that used during the wet season. The semi-intensive approach is suited for small-scale and beginning pig farmers (Zaw Win et al., 2019; Mathobela et al., 2024;

Lemke et al., 2006). The term "intensive production system" denotes the process of raising pigs in high-density confinement. Domestic pigs are bred until they reach slaughter weight in intensive pig farming, a subcategory of pig farming. This strategy of raising pigs from birth to weaning, breastfeeding, and weaned sows may accommodate a huge number of piglets of varying ages. Typically, pigs of comparable ages are kept in groups in a same limited partition and controlled all at once (all-in, all-out).

In terms of production system, Aspile et al. (2016) identify five categories in the Philippines, namely, farrow-to-feeder, farrow-to-finish, farrow-to-breeder-finisher, growing-finisher, and boar-for-hire. The farrow-to-breeder-finisher production system is the most profitable because it can sell more products while charging higher prices for breeder stocks (Mbaso & Kamwana, 2013). In this system, it is recommended that municipal hog raisers and traders form a cooperative, increase production volume, use a community-based approach to herd health improvement, encourage joint production of commercial and backyard swine farms, and increase efforts to raise social awareness about the environmental impact of swine production. Similarly, Farrow to finish production is more profitable because the farmers will earn income from piglets and after four months there is an additional income from selling the market hogs. However, the problem arises when the pig is affected by the disease, causing losses on the farm (Kuberka, 2024).

2.2. The 4Ps in Pig Farming

Product. In pig farming, the product refers to the pigs and pork products offered to the market. Quality and differentiation are key factors that influence consumer preferences and demand. According to Aboah and Lees (2020), high-quality pork, characterized by good meat quality and health status, can command higher prices and customer loyalty. Thus, innovations in breeding, feeding, and biosecurity measures have been essential in enhancing product quality. These emphasize the importance of adopting advanced production technologies and practices to improve the overall quality of pigs, which directly impacts their marketability (Mahfuz et al., 2020). According to Muth et al. (2020), native sows may offer sustainability benefits in terms of reduced environmental burden and public health impact. In fact, the live weight offtake per family per year was lower (274 kg vs. 607 kg) due to the fact that native sows were less prolific than exotic sows. The minimal revenue generated by the marketing of piglets and porkers from native sows impeded a more favorable outcome. Hence, one potential

strategy for development is the transition to organic production and certification, as it is believed that the sole method of improving the cost-effectiveness of native pig farming in Quezon is to increase value added.

Price. Pricing strategies in pig farming need to consider production costs, market demand, and competition. The pricing of pork products is influenced by several factors, including feed costs, labor, and health management. The fluctuating feed prices significantly impact the overall cost of production, necessitating efficient pricing strategies to ensure profitability (Chopra et al., 2021). Market dynamics, such as supply and demand fluctuations, also play a critical role in determining pork prices. This includes the competition from imported pork that affects local pricing strategies, forcing local farmers to adopt competitive pricing to maintain market share (Niu et al., 2022).

Place. It pertains to the distribution channels and market access for pig farmers. Effective distribution strategies ensure that pork products reach consumers efficiently and at the right time. The swine industry in the Philippines faces challenges related to inadequate infrastructure and limited access to markets (Limos-Galay et al., 2023). Farmers often struggle with logistics, leading to increased costs and reduced profitability. Turley and Uzsoki (2019) suggest that improving infrastructure, such as roads and cold storage facilities, can significantly enhance market access and distribution efficiency. Additionally, local markets, supermarkets, and direct-to-consumer sales are essential channels that farmers can utilize to reach their target customers.

Promotion. Promotion involves the strategies used to communicate and market pork products to consumers. Effective promotional strategies can enhance consumer awareness and drive demand. Promotional activities, such as branding, advertising, and public relations, are vital for differentiating pork products in a competitive market (Kung et al., 2021). Social media and digital marketing have become increasingly important tools for reaching a broader audience and engaging with consumers. Farmers who actively promote their products through various channels, including online platforms, tend to achieve better market penetration and customer retention (Pesci et al., 2023).

2.3. Technology in Hog Raising

Technological advancements in hog raising have the potential to significantly enhance productivity and efficiency. Precision farming technologies, such as automated feeding systems, climate control, and health monitoring, have been shown to improve the overall management of swine farms (Tzanidakis et al., 2020). However, the adoption of these technologies remains a challenge for many small-scale farmers due to high costs and lack of technical expertise (Smidt & Jokonya, 2021; Dhillon & Moncur, 2021; Mhlanga & Ndhlovu, 2023; Wakweya, 2023; Puppala et al., 2023). According to Mahfuz et al. (2021), while advanced technologies can lead to better disease management and increased yields, many farmers still rely on traditional methods, which can be less efficient and more prone to issues such as disease outbreaks.

2.4. Profitability Potential and Challenges in Pig Farming

Pig farming is a type of animal husbandry that involves the cultivation and nurturing of domestic pigs for food purposes, which is one of the oldest businesses of the Filipino people. The industry encompasses both commercial and backyard scale operations. One reason this firm has prospered is the Filipinos' love of pork.

According to Magagula and Tsvakirai (2022), a significant number of individuals do not believe that the agricultural industry is profitable. It is a complete misconception that they believe it will not be worth it because they will somehow get their hands soiled. In reality, the piggery industry has the potential to generate hundreds of thousands of pesos on a monthly basis. As per the PSA Swine Situation Report (2021), the average annual swine production was 2,133.45 thousand metric tons. With the exception of 2019 and 2020, in which output decreased by -1% and -6.71%, respectively, the production rate has increased annually. The decrease in production was the result of the African Swine Fever (ASF) that affected the industry during the specified period. The maximum production was recorded in 2018, with a value of Php 277,531.80 million, at 2,319.76 thousand metric tons. The ASF pandemic's high swine prices resulted in a 0.9 percent increase in the gross value of production in 2020 (Php 249,655.00 million) compared to the previous year. However, ASF virus affected the socioeconomic and livelihood of hog raisers in the Philippines (Wedzerai, 2022) that led to

significant losses in pig populations and increased biosecurity costs (Fernandez-Colorado et al., 2020).

According to Shahini et al. (2023), pig rearing has the potential to provide a more substantial economic benefit to small and marginal producers or rural impoverished individuals from the lowest socio-economic strata than other livestock species. Hence, Belal (2023) suggests that backyard pig raising has the potential to be a profitable endeavor and a source of additional income for farmers in any pig production systems, such as intensive production, semi-intensive production, and extensive or free-range (scavengers). However, high production costs, particularly for feed and health management, are major concerns for farmers. According to Vonderohe et al. (2022), the economic sustainability of swine farming is heavily impacted by these costs, which have been exacerbated by global supply chain disruptions and increasing prices of raw materials. Thus, efficient management practices and cost-saving technologies are essential to enhance profitability.

3. Methodology

The study adopted a qualitative research and a descriptive phenomenological research design to gain deeper insights into the production technology and marketing strategies employed by piggery farm owners or hog raisers in specific municipalities within Quezon Province in the Philippines. It provides a more detailed examination of the phenomena under inquiry, allowing researchers to identify underlying meanings, motives, and patterns in participants' reactions (Creswell & Poth, 2018).

The participants of the study were composed of twelve (12) hog raisers in selected municipalities of Quezon Province, seven of whom were backyard hog raisers, two were semi-commercial farm owners, and three were commercial farm owners who have experienced working in their farm and selling their pigs. Participants were chosen through the purposive sampling method, which involves the researchers deliberately selecting the site and individuals for the study.

Prior to data collection, permission was secured from relevant authorities and participating farmers, ensuring informed consent. Participants were fully informed about the study's purpose, procedures, and their rights, including the right to withdraw at any time. Confidentiality of the gathered data was strictly maintained; personal identifiers were

anonymized to protect participants' privacy. Data were securely stored and only accessible to authorized research personnel, ensuring that sensitive information remained protected. These measures ensured the ethical integrity of the research process and the trust of participants. Then, an interview was conducted to each participant to get the necessary data for analysis and interpretation. A well-structured interview questionnaire was prepared ahead of time, which was validated by the experts of the field. The aim is to get factual information about the current production and marketing strategies of hog raisers.

This research used horizontalization as the analysis method, a technique rooted in phenomenological analysis. At the initial stage, it was ensured that no statement or experience is prematurely discounted. By meticulously examining each data point with the same level of attention, this can identify significant statements and cluster them into meaning units. The significant statements were used to develop clusters of meaning, which were then used to compose a textural description (what the participants experienced) and a structural description (how the participants experienced the phenomenon). This was done in order to form conclusions and recommendations (Husserl, 1931; Gasparyan, 2021).

4. Findings and Discussion

4.1. Production Technology

4.1.1. Breeding Management

Selection, breeding and high genetics. Hog farmers use selective breeding techniques to improve desired features in their herds, such as growth rate, feed efficiency, and disease resistance. They may utilize artificial insemination or genetic selection to improve the genetic makeup of their pigs, aiming for superior offspring with higher market value.

Annotated Exemplars:

“I use high genetics. High genetics is better than ‘chopsuey’ or unknown breed pigs in terms of quality but it still varies on proper management of the farm. High genetic pigs are fast grower and nice body built.” (Participant 2 - Translated)

“Before the genetics of my pigs were not important. It is just chapseuy (unknown breed) but when I compare it with other farms, they are more profitable. Then I decided to improve the genetics of my pigs because high genetics is a fast grower and good quality meat.” (Participant 7 – Translated)

Table 1*Thematic analysis of production technology*

Coded Responses	Codes	Categories	Themes
<p>Fewer number of birth piglets during farrowing date</p> <p>Old boar can result to weaker egg cell while gilts have long period of time before in heat that can add to expenses</p> <p>High genetics is better than “chapseuy” or no/unknown breed, but it depends on management of the farm</p> <p>Piglets are fast grower but the only problem we see is high genetics are prone to stress and diseases</p> <p>Established high genetics is very important in a farm to achieve high profit because it can produce fast grower pigs</p>	<p>Selection, Breeding, and High Genetics</p>		
<p>Proper monitoring & management of sows (performance, expenses, number of piglets produce, checking of reheat)</p> <p>Giving an extra effort on taking care of the pigs</p> <p>Determine and address immediately the problem encountered inside the farm</p>	<p>Husbandry and Farm Management</p>		
<p>Minimize the feeds expense because instead of raising boar I choose to buy quality semen for AI. Additionally, in AI you can also choose breed that you want to inseminate in your sow</p> <p>This AI lessen the expenses of the farm because we don't have to buy expensive high genetics boar worth 250k just to use for natural mating</p> <p>Thru AI, many sows can inseminate using semen from 1 boar</p>	<p>Artificial Insemination</p>	<p>Breeding Management</p>	
<p>Cough and colds of pigs the basic problem of the farm</p>	<p>Treatments</p>		<p>Production Technology</p>
<p>Sows are not easily getting pregnant because of the infections or long dry period</p>	<p>Housing</p>		
<p>Piglets scouring due to climate change</p> <p>Limited facilities can result to not good production</p>	<p>Facilities and Equipment</p>		
<p>Using Luntian Cooperative feeds results to low fat fatteners</p> <p>Before we used low quality of feeds such as "Palyat" but the problem is our sows are too thin and their piglets are malnourished, now we used Luntian feeds which is very high in nutrition so we get the heavy weight of our fatteners and the piglets of our sows are big</p>	<p>Swine Nutrition</p>	<p>Swine and Housing Management</p>	
<p>I think it is better to have a system that can be used in day-to-day operation. This system will update the owner when the pig gives vaccine or vitamins. Monitoring of overall operations</p>	<p>Advanced System</p>		

Longevity genetic-economic indicators for net merit, fluid merit, cheese merit, and grazing merit are provided to the dairy industry (Vanraden et al., 2021). These indices place animals in order of combined genetic merit for traits that are important economically. Several indexes are provided to help choose among several management and milk payment plans. Regular updates to the indexes provide new functionality and reflect anticipated expenses for the upcoming years. The most current update was made in August 2021 and contains details on the recently assessed characteristics of early first calving, heifer livability, and feed saved.

Prospective dams and bulls that are marketed commercially are the subject of genetic relationships data from the Council on Dairy Cattle Breeding (CDCB). In contrast to pedigree analysis, which can only provide an average based on relationships, these data represent the actual percentage of genetic variants (alleles) that are shared. This more precisely prevents inbreeding. Furthermore, the CDCB forecasts certain recessive disorders, which makes it possible to prevent possible carrier-to-carrier mating without the use of animal testing. Through genomics, the haplotypes influencing fertility were identified and are currently used in mating. As of 2022, 27 conditions have been documented (Cole et al., 2022). Recessives recently introduced are AHC (curly calves in Ayrshires), HH6 (early embryonic death in Holsteins), and JNS (neuropathy with splayed forelimbs in Jerseys).

Husbandry and farm management. Good farm husbandry practices are essential for the production of secure, high-quality food. From the acquisition and rearing of healthy animals, as well as their welfare, to the ultimate slaughter or milking process, all farm measures are included. The purpose of farm management is to ensure the health of livestock by providing them with optimal living conditions and appropriate, contamination-free forage and water. Animals are bred in accordance with risk analysis, and these risks are mitigated to guarantee the safety of food production. Proper records are kept to facilitate tracing.

Annotated Exemplars:

“Proper monitoring and management of sows (performance, expenses, number of piglets produce, checking of reheat.” (Participant 8)

Artificial insemination. Reproductive assistance technology, such as artificial insemination (AI), have greatly increased pig farm output rates in recent years. Conversely, the FAO (2016) reports that pork is the most consumed form of red meat globally as a result

of its exceptional rate of food conversion, which has led to a significant demand for global food security. As a result, integrating AI reproductive procedures allows for better production conditions, lower costs, and increased efficiency.

Annotated Exemplar:

“Minimize the feeds expense because instead of raising boar I choose to buy quality semen for AI. Additionally, in AI you can also choose breed that you want to inseminate in your sow.” (Participant 5 - Translated)

“This AI lessen the expenses of the farm because we don't have to buy expensive high genetics boar worth 250k just to use for Natural mating.” (Participant 8 – Translated)

Insemination efficacy has been enhanced by the development of techniques that allow for the insemination of a reduced number of spermatozoa in a smaller volume. This is particularly critical when employing high-value spermatozoa that have been degraded, such as through sex sorting or chilling and thawing. Numerous devices have been created for intrauterine or post-cervical insemination, which enables the implantation of sperm in the posterior horn or uterine body of multiparous sows. Post-cervical AI permits a threefold decrease in the quantity of spermatozoa inseminated in comparison to conventional transcervical AI, whereas deep intrauterine AI permits a five-to-20-fold reduction. The practice of post-cervical insemination varies between and within countries. The risk of cervical or uterine tissue injury, the expertise necessary for catheter handling, and the use in sows alone may all contribute to the development of limitations. Barium alginate membranes have been demonstrated to facilitate single insemination through the encapsulation of semen (Kantale et al., 2021). Laparoscopy enables the insemination of a negligible quantity of spermatozoa (0.3×10^6) into the oviducts of anesthetized swine. Nevertheless, the likelihood of polyspermic fertilization is substantial. It is not advisable to employ it in practice due to the surgical intervention.

Numerous investigations have implemented ultrasound to investigate the timing of fertilization, insemination, ovulation, and oestrus. The fundamental observation is that ovulation occurs at the commencement of the latter third of oestrus, irrespective of the duration of oestrus. Individual pigs' spontaneous ovulation times cannot yet be precisely predicted. However, predicting oestrus duration by observing its beginning after weaning has gained

widespread support in AI practice for calculating the expected timing of ovulation (Singh et al., 2022). AI should be timed as near to ovulation as feasible, ideally 12 to 24 hours before it. In practice, ultrasonography examination of ovarian morphology has proven beneficial for pig fertility management (Małopolska., 2021). The potential to provide shortcuts in AI timing and develop farm-specific techniques for improving AI management is evident in the determination of the time of ovulation in relation to oestrus behaviour and AI management in representative numbers of sows on successive days.

4.1.2. Swine and housing management

Housing. Housing systems play a crucial role in pig production, providing shelter, protection from harsh weather conditions, and space for pigs to move and express natural behaviors. Modern hog production facilities often incorporate climate-controlled environments to optimize temperature and humidity levels, promoting optimal growth and health. Some hog raisers utilize innovative housing designs like deep-litter systems or hoop barns, which offer benefits such as improved waste management and reduced environmental impact.

Annotated Exemplar:

“Cleanliness, disinfection and limit access to the farm from other people to avoid spread of viruses. We only give feeds 2 times a day from starter stage until we sell our fatteners to minimize the expenses (with conviction shown on her face)”
(Participant 3 – Translated)

Pigs raised in bleak conditions frequently show signs of restlessness and frustration (Albernaz-Gonçalves et al., 2021). Environmental enrichments obviously boost pig welfare by allowing them to express natural, species-specific behaviors, contributing significantly to the creation of a welfare-friendly farm environment. On the other hand, the true effect of enrichments on pigs is determined by a variety of criteria, including the type of enrichment, the appropriate quantity, location, maintenance, and safety. Not all inputs to barren farm environments are appropriate enrichment for pigs (Van de Weerd & Ison, 2019). Pig enrichments should be tasty, chewable, safe, and replaced or renewed on a regular basis to keep the animals interested (EU, 2016). According to the Commission Recommendation (EU) 2016/336 (EU, 2016), straw, green fodder, miscanthus, and root vegetables may constitute 'ideal' pig feed components. When used as bedding, these materials encourage roots, provide a comfy resting space, and absorb excrement. ASF outbreaks in Europe have linked virus-

infected straw, green fodder, or hay to the disease (Woźniakowski et al., 2021). Furthermore, the use of natural enrichments, such as straw, is restricted in some parts of the world due to increased production costs (including straw and labor) when compared to dwellings with slatted floors. When substrates are employed as environmental enrichments, slatted floor housing systems may cause slurry system management issues (Tuyttens, 2005). Pigs should be served hay or silage in racks that are positioned above the floor in no-bedding systems, as per Nannoni et al. (2019). Pig enrichments, including straw in racks, peanut shells, fresh wood, maize cobs, natural cords, shredded paper, and pellets, are considered "suboptimal" by Commission Recommendation (EU) 2016/336 (EU, 2016). Although deep-bedded straw systems may appear to be welfare-friendly, they are not without health and welfare concerns. Studies looking into the relationship between straw bedding use and sanitary issues and pathogen development have shown inconsistent results (Tuyttens, 2005). Furthermore, pigs' floor type preference (deep-bedding vs. slatted floor) is determined by thermal circumstances, as when temperatures are high, the animals prefer to sleep on concrete floors to cool down. Pigs prefer straw to concrete flooring particularly in warmer weather; however, they prefer substrates such as peat and compost over straw (Tuyttens, 2005).

Facilities and equipment. Efficient waste management is essential for mitigating environmental pollution and complying with regulatory requirements. Hog raisers may implement strategies such as composting, anaerobic digestion, or utilization of waste as fertilizer to manage manure effectively while minimizing odor and nutrient runoff. Adoption of environmentally sustainable practices, such as utilizing renewable energy sources or implementing water recycling systems, may further enhance the sustainability of hog production operations.

Annotated Exemplars:

"Monitoring of Sow when to farrow is important. Must meet the cycle per month. I have to be monitored all the operation of the business. Proper Monitoring and Management. Cleanliness is also important." (Participant 5 – Translated)

"I have trained my caretaker on how to handle our farrowing section, I just monitored and instruct them what will they do. Our sow also has proper breeding management as they give to farrow at the same day just to minimize the work of our caretaker." (Participant 8 – Translated)

Hog raising facilities and equipment are crucial for successful pig farming operations. These facilities are designed to provide a comfortable and hygienic environment for pigs while ensuring efficient management practices. Strong and secure fencing is necessary to prevent pigs from escaping and to keep predators out. Fencing materials may include wood, wire mesh, or electric fencing. Automatic or manual feeding systems are used to provide pigs with a balanced diet. This equipment includes feeders, troughs, and hoppers designed to minimize wastage and allow easy access to feed, fire extinguishers, emergency lighting, and secure storage for chemicals are essential for ensuring the safety of both pigs and workers. Overall, investing in high-quality facilities and equipment is essential for the success and sustainability of hog raising operations, ensuring the well-being of the animals and maximizing productivity.

Swine nutrition. Proper nutrition is essential for maximizing growth rates and overall health in pigs. Hog raisers carefully formulate diets tailored to the specific nutritional needs of different stages of pig development. They may incorporate locally available feed ingredients and supplements to ensure balanced nutrition while minimizing costs. Utilization of feed additives such as probiotics, enzymes, and growth promoters may also be employed to enhance feed efficiency and overall performance.

Annotated Exemplars:

“Using Luntian Coop feeds results to low fat fatteners. Giving malunggay leaves before giving feeds.” (Participant 3 – Translated)

“Before we used low quality of feeds such as ‘Palyat’ but the problem is our sows are too thin and their piglets are malnourished, now we used Luntian feeds which is very high in nutrition so we get the heavy weight of our fatteners and the piglets of our sows are big.” (Participant 4 – Translated)

Sound feeding practices that meet necessary nutrient requirements are critical to the health and well-being of pigs at all phases of production. Pigs should be fed a diet that is nutritionally balanced and suitable for their age. Pigs necessitate a diet that is more concentrated and less fibrous than that of cattle, sheep, or horses. Their nutritional needs change as they grow, and the diet should meet them at different periods of development and production.

Swine nutrition begins with six fundamental nutrients: water, carbs, fats, protein (amino acids), minerals, and vitamins. Each of these nutrients is essential for proper maintenance, development, reproduction, breastfeeding, and other metabolic processes. Nutrient requirements are influenced by a variety of factors, including lean growth rate, gender, dietary energy density, environmental temperature, congestion, parity, gestation stage, and numerous sow productivity parameters.

Profitability of commercial swine operations is influenced by a number of variables, such as pig genetic potential, environment, feed consumption, component supply, and market prices. While creating the most profitable and efficient feeding and management system, each of these factors needs to be taken into consideration. Every distinct manufacturing unit may require a different final feeding and management strategy, and these strategies may also change in response to shifting economic and environmental conditions. The producer's job is to control every aspect so that output and profit are optimized. 65 to 75 percent of the total expenditures of producing hogs are attributed to feeding, of which 75 percent are supplied during the grow-finish stage. A nutrition and feeding management program need to be carefully planned in order to enhance profitability.

Advanced system. Advancements in production technologies, such as automated feeding systems, precision farming tools, and data analytics, are increasingly being embraced by hog raisers to improve efficiency and productivity. Integration of digital platforms and sensor-based technologies enables real-time monitoring of key parameters such as feed consumption, growth performance, and environmental conditions, facilitating informed decision-making and proactive management.

Annotated Exemplars:

“I use AI once, and my pigs are not high breed or high genetics.” (Participant 3)

*“Strict biosecurity inside the farm to prevent disease. We have a trusted employee inside the farm, we are calm that everything goes well when he is there.”
(Participant 12 – translated)*

“I think it is better to have a system that can be used in day-to-day operation. This system will update the owner when the pig will give vaccine or vitamins. Monitoring of overall operations.” (Participant 1)

Pig farms throughout the nation and the globe have been transformed by modern pig farming technology. A successful pig farm today is one in which producers employ technology to their advantage. In doing so, farm operations benefit both workers and animals. Automated livestock operations and jobs can improve animal care. The farm benefits from increased productivity, efficiency, and profitability. The optimal conditions for the rearing, feeding, housing, and care of pigs at all phases of their lives are established by those who employ current pig farming methods. Another area in which pig husbandry technology has advanced is the pursuit of optimal environmental conditions for the development of pigs, with a particular emphasis on maintaining the temperature of adolescent pigs. It is imperative to ensure that the temperature of the pigs is maintained at the optimal level for their overall health, and this is particularly important during the processes of farrowing and nursery management. Farrowed piglets require extra heat to perform and grow properly. A technologically advanced pig farm is both productive and profitable. The financial benefits of implementing pig farming technology not only boost pig production efficiency, but also assist farmers better manage their operations. Automated solutions provide savings by lowering expenses in areas such as energy, feed, and disease control. Technology can efficiently combine production and animal care, resulting in a successful pig farm.

4.2. Marketing

4.2.1. Customer Relationship Management

Customer satisfaction and loyalty. Customer satisfaction and loyalty are essential components of success in hog raising, as they contribute to a stable market, repeat business, and positive word-of-mouth referrals. Consistency in meeting buyer requirements is another key factor. Whether it's specific breed preferences, weight specifications, or delivery schedules, hog raisers must strive to consistently fulfill these demands to satisfy customers. This reliability builds trust and confidence in the product and the producer. Handling customer complaints or issues promptly and professionally is vital for maintaining satisfaction and loyalty. Resolving problems quickly and effectively indicates a dedication to customer service and can transform a potentially unpleasant experience into a positive one, so boosting loyalty. Building customer loyalty in hog raising often involves offering incentives or rewards for repeat purchases. This could include discounts on bulk orders, special promotions for loyal

customers, or membership programs with exclusive benefits. These initiatives encourage buyers to stick with a particular hog raiser, rather than seeking alternatives.

Annotated Exemplars:

“Loyal to customer or buyer...” (Participant 6 – Translated)

*“We provide what buyer’s preferences. If they need 90 kilos up, we give them.”
(Participant 9 – Translated)*

Table 2

Thematic analysis of hog marketing

Coded Responses	Codes	Categories	Themes
Loyal to customer or buyer We provide what buyer’s preferences. If they need 90 kilos up, we give them	Customer Satisfaction and Loyalty	Customer Relationship Management	Hog Marketing
I sell my meat in low price and provide quality of meat because it is too young and fresh I let my trusted agent sell my pigs to our buyer. I can easily harvest my pigs because the agent has more buyers	Good Relationship Sales Agent		
Luntian Cooperative schedule the harvest date of our pig	Contract-to-Buy		
We wait for a maximum of 15 days before we decide to sell the fatteners	Expansion of Selling Schedule	Promotional Activities and Distribution Channels	
We use facebook to find buyer and we promote by posting our pigs to show them that our pigs are quality and high genetics I also post my pigs thru social media to share my knowledge. It can also attract customer because marketing now a days is in thru online	Social Media		
Accessible to the buyer Not prone to any disease	Strategic Location		
Maintaining a close range around the optimal market weight leads to higher profit margins. Good liveweight for selling Market Trends and Prospects... You are going to hold your pig until it reaches the higher price in order to increase profit	Market Timing		
We have piglets’ production so we sell it when they are totally condition and age of 45 to 60 days old Based on harvest date and feeds consumed. I extend the date and add extra sack to meet heavy weight Based on consumed feeds allotted to that batch of fatteners	Harvest Parameters		

Good relationship. Maintaining a good relationship with customers is paramount in hog raising to ensure a steady market, repeat business, and positive reputation. Transparency and honesty play key roles in building trust with customers. Similarly, special promotions or discounts, providing after-sales support, or even arranging personalized delivery options are employed. By prioritizing these aspects, hog raisers foster strong relationships with customers, ensuring their continued success in the industry.

Annotated Exemplar:

“We ensure that our piglets are high quality and fast growers even if the price of our piglets is high other than the farm, we make sure that it can provide profit to the customers” (Participant 10 – Translated)

Sales agents. Collaborating with retailers such as grocery stores, butcher shops, and specialty food stores expands hog raisers' reach and accessibility to customers. This includes the challenges of negotiating partnerships with retailers, the importance of product placement and visibility in-store, and the impact of branding and packaging on consumer purchasing decisions.

Annotated Exemplars:

“When my feeds is from Luntian, Luntian will buy my pigs, when I used other feeds then I find my other hauler. The problem in Luntian coop. they less 10 pesos on liveweight price base on the back fat of fatteners that’ s because I prefer to find other buyer.” (Participant 9 – Translated)

“The target market of our piglets is the INSPIRE program of the Government. Government created a farm which operated by small hog raisers in selected municipalities to raise market pigs.” (Participant 4 – Translated)

Contract-to-buy. Hog raisers may sell their products directly from their farms, offering customers the opportunity to purchase pork products onsite. Themes might include the customer experience of visiting the farm, the emphasis on freshness and traceability, and the role of farm tours or educational experiences in attracting customers.

Annotated Exemplar:

“We just message or call the buyer and talk about the transaction.”

Hog contracting is becoming more popular, partly because many producers find it difficult to secure sufficient funding. Coordinating the production of pigs, from genetics and nutrition to the retail meat counter, is another application of contracting. Nowadays, a little but increasing portion of hogs are raised, fed, or sold under contract. The buyer assures the seller of a minimum price (the floor price) for the hogs, and the seller consents to provide a predetermined quantity of hogs to the buyer at a later time. The seller often gets paid the difference between the floor price and the delivery market price, less any discounts. The discount covers the buyer's expenditures for supplying the guaranteed minimum price, including options premiums and other contract-related variable costs. Only the risk of changes in hog prices is mitigated by both floor price contracts and forward fixed price contracts. The additional risks related to hog farming still rest with the producer. Many larger manufacturers employ contract production to reduce risk and required capital so they can increase their own production more quickly. Although farmers, feed dealers, investors, and other people are frequently interested in raising hogs, they are frequently unable or unwilling to supply the labor, facilities, and equipment required. As a result, they look for producers who would provide the labor and tools in return for a set salary or a cut of the earnings. The ensuing interactions between the producer and owner differ greatly in terms of the nature of each party's obligation. Young or strapped for cash producers, aspiring farmers without the means to buy a herd, and producers with underutilized facilities find these contractual agreements appealing.

4.2.2 Promotional Activities and Distribution Channels

Expansion of selling schedule. Exploring opportunities for market expansion beyond local or regional markets, including export markets, can help in the diversification of revenue streams and lessen the risks associated with domestic market volatility. Adapting products and marketing strategies to meet the preferences and regulatory requirements of international markets is essential for success in global trade.

Social Media. By leveraging digital marketing and social media engagement effectively, hog raisers can build brand awareness, engage with customers, drive sales, and cultivate a loyal following that supports their business growth.

Annotated Exemplar:

“Yes we use FB to find buyer and we post our pigs.” (Participant 6 – Translated)

“I have always posted my pigs on social media to attract customers just to show that the pigs inside my farm have high genetics.” (Participant 9 – Translated)

A website is also beneficial; however, Facebook's posts, shares, and likes provide a substantially broader audience. It is also beneficial to engage in LinkedIn, Instagram, and Twitter. This can assist in establishing a connection with consumers.

Strategic location. Developing effective promotional strategies, such as advertising campaigns, promotions, and discounts, help increase brand visibility, stimulate demand, and drive sales.

Annotated Exemplar:

“My marketing strategies is I post it through social media to expand my target market so they know that I have available pigs for sale.” (Participant 6)

Market timing. One key factor in market timing is monitoring market trends and demand. Hog raisers need to stay informed about fluctuations in market prices, as well as seasonal variations in demand. For example, there may be increased demand for hogs during certain holidays or special events, which can affect pricing. Additionally, understanding the lifecycle of hogs is crucial. Hogs are typically sold at specific weights, and the optimal time to sell depends on the growth rate of the animals and the desired market weight. Selling too early may result in lower prices due to smaller sizes, while waiting too long can lead to increased feed costs and potential oversupply in the market. Weather conditions can also influence market timing. Extreme temperatures or adverse weather events can impact feed consumption and growth rates, affecting the timing of sales. Monitoring weather forecasts and adjusting production schedules accordingly can help mitigate risks associated with weather-related market fluctuations. Ultimately, successful market timing in hog raising requires a combination of careful planning, monitoring market dynamics, and adapting to changing conditions. By understanding market trends, the lifecycle of hogs, weather patterns, and economic factors, hog raisers can optimize their sales timing to maximize profits and maintain a competitive edge in the industry.

Harvest parameter. Harvest parameters in hog raising refer to the specific criteria used to determine when a hog is ready for slaughter and processing. These encompass a combination of factors including weight, age, body condition, backfat thickness, health status, feed efficiency, and market demand. By carefully monitoring and managing these parameters, hog raisers can ensure that hogs are harvested at the optimal time for maximizing meat quality and profitability.

5. Conclusion and Recommendations

The study reveals crucial insights into hog production and marketing, highlighting the importance of advanced production technologies, such as selective breeding and artificial insemination, along with proper swine and housing management to ensure pig health and productivity. Similarly, effective marketing strategies, including customer relationship management, promotional activities, and efficient distribution channels, are essential for enhancing market access and profitability.

For future research, it is advisable to delve into comparative analyses across different regions to provide valuable insights into regional variations in production practices and market dynamics. Additionally, studying consumer behavior and preferences regarding locally produced pork, along with environmental impact assessments of hog raising practices, would contribute to developing sustainable strategies and informed regulatory frameworks for the industry's growth and resilience.

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ORCID

Rustom B. Ombrador - <https://orcid.org/0009-0005-1677-6262>

Randall B. Pasco - <https://orcid.org/0000-0002-0748-076X>

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