

Briones, Roehlano M.; Espineli, Isabel B.

Working Paper

Towards Competitive Livestock, Poultry, and Dairy Industries: Consolidated Benchmarking Study

PIDS Discussion Paper Series, No. 2022-20

Provided in Cooperation with:

Philippine Institute for Development Studies (PIDS), Philippines

Suggested Citation: Briones, Roehlano M.; Espineli, Isabel B. (2022) : Towards Competitive Livestock, Poultry, and Dairy Industries: Consolidated Benchmarking Study, PIDS Discussion Paper Series, No. 2022-20, Philippine Institute for Development Studies (PIDS), Quezon City

This Version is available at:

<https://hdl.handle.net/10419/284557>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Towards Competitive Livestock, Poultry, and Dairy Industries: Consolidated Benchmarking Study

Roehlano M. Briones and Isabel B. Espineli



The PIDS Discussion Paper Series constitutes studies that are preliminary and subject to further revisions. They are being circulated in a limited number of copies only for purposes of soliciting comments and suggestions for further refinements. The studies under the Series are unedited and unreviewed. The views and opinions expressed are those of the author(s) and do not necessarily reflect those of the Institute. Not for quotation without permission from the author(s) and the Institute.

CONTACT US:

RESEARCH INFORMATION DEPARTMENT
Philippine Institute for Development Studies

18th Floor, Three Cyberpod Centris - North Tower
EDSA corner Quezon Avenue, Quezon City, Philippines

publications@pids.gov.ph
(+632) 8877-4000

<https://www.pids.gov.ph>

Towards Competitive Livestock, Poultry, and Dairy Industries:
Consolidated Benchmarking Study

Roehlano M. Briones
Isabel B. Espineli

PHILIPPINE INSTITUTE FOR DEVELOPMENT STUDIES

June 2022

Abstract

This benchmarking study is undertaken to compare domestic performance of LPD industries in the Philippines, with other large LPD producers and consumers in Asia, namely China, Thailand, and Vietnam, supplemented with figures from major global players. In the case of swine, in the Philippines, unit cost of production of commercial farms is lower than in backyard farms owing to economies of scale. Cost per unit in commercial farms in the Philippines is among the highest of the countries studied, mostly due to higher cost of feed and grower stock. As with swine, economies of scale allow commercial broilers to reduce cost per kg of broiler. Cost per unit for commercial scale broiler farms is among the lowest in Philippines compared with China, Thailand, and Vietnam. High tariffs on corn imports is driving up the cost of livestock and poultry feed. Finally, Dairy cattle and buffalo milk at semi-commercial scale can be profitable, though the business case for backyard dairy needs to be strengthened. The Philippines has implemented a set of regulatory and support policies for the LPD industries, covering regulations, support programs, trade policies, Policy recommendations of the study are as follows: 1) Undertake a comprehensive review of trade policies affecting the value chain towards greater competitiveness of the LPD industries; 2) Earmark the collections from tariffs on pork and chicken imports to fund regulatory services and production support; 3) Invest in research and data collection as inputs to policy and program development; 4) improved delivery of technical assistance, regulatory services, and production support. 5) Reset the oversight system over the LPD industries in terms of regulatory compliance, zoning, imposition of grades and standards, food safety and animal welfare; 6) Focus on upgrading technology and business practices for backyard operators using a collaborative approach to extension. 7) Strengthen FOs to encompass most or all backyard operators to facilitate delivery of government assistance, technical and regulatory services, and realize gains from economies of scale and scope.

Keywords: agricultural benchmarking, value chain, competitiveness

Table of Contents

1. Introduction	1
2. Profiles by industry	2
Overview of LPD value chains	2
Swine industry.....	4
Philippines.....	4
International comparison.....	6
Chicken industry	7
Philippines.....	7
International comparison.....	9
Dairy industry	11
Philippines.....	11
International comparison.....	12
3. Competitiveness analysis.....	13
Productivity indicators	13
Cost and returns	14
Swine	14
Chicken	16
Dairy.....	17
4. Policy environment.....	19
Regulatory policies.....	19
Development programs.....	20
Trade and price policies.....	20
5. Recommendations	22
Summary.....	22
Recommendations	22
References.....	24

List of Tables

Table 1: Swine inventory, China, Thailand, and Vietnam, 2010 – 2020, '000 head	6
Table 2: Chicken inventory, China, Thailand, and Vietnam, 2010 – 2020, '000,000 head	9
Table 3: Dairy production and imports, Philippines, 2016 – 2020, '000 tons liquid milk equivalent.....	11
Table 4: Liquid milk production by source, Philippines, 2013 – 2015 (%).....	11
Table 5: Milk production in China, Thailand, and Vietnam, in tons, 2010 - 2019.....	12
Table 6: Feed conversion ratios for swine, chicken, and milk production	13

Table 7: Cost and returns of swine production, by scale of operation, Philippines, 2018 (Php)	14
Table 8: Cost and returns, swine farms, selected countries (Php per kg, carcass-weight)...	15
Table 9: Cost and returns of broiler production in Pampanga, 2017, by scale of operation (Php per kg, live-weight)	16
Table 10: Cost and returns of broiler farms, (Php per kg, dressed-weight)	17
Table 11: Financial projections, semi-commercial dairy cattle farm, 2010 (Php '000)	17
Table 12: Financial projections, 5-cow dairy buffalo farm (Php '000)	18
Table 13: Cost and returns of commercial dairy farm, ASEAN Plus countries (Php per kg)	19
Table 14: Corn wholesale prices in selected countries, in USD per kg, 2011 – 2020	21

List of Figures

Figure 1: Map of ASF zoning status as of 06 August 2021	1
Figure 2: Value chain diagram for the swine, chicken, and dairy industries	3
Figure 3. Swine Annual Inventory, Philippines, 2010-2020 ('000 head)	5
Figure 4: Supply and utilization of pork, Philippines, 2010-2019 (tons, carcass-weight)	5
Figure 5: Farmgate prices, swine, selected countries, in USD per kg (liveweight)	7
Figure 6: Value production, chicken, Philippines, 2010 – 2020, constant 2018 prices (Php billions)	8
Figure 7: Chicken inventory, 2010-2021 (as of 01 January), Philippines, in million head	8
Figure 8: Supply and utilization of dressed chicken, Philippines, 2010-2019 ('000 tons)	9
Figure 9: Farmgate prices, chicken (liveweight), selected countries, in USD per kg	10

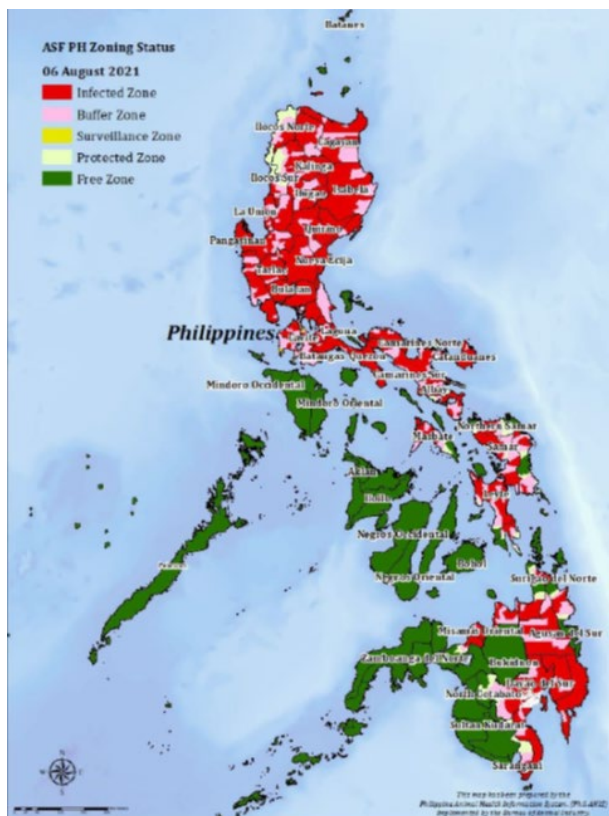
Towards Competitive Livestock, Poultry, and Dairy Industries: Consolidated Benchmarking Study

Roehlano M. Briones and Isabel B. Espineli¹

1. Introduction

Livestock, poultry, and dairy (LPD) industries are major contributors to Philippine agriculture, but have received comparatively little attention from government spending and policy. Recently though two developments have refocused public attention on these industries. First is African swine fever (ASF), which has wreaked havoc on the swine industry (Figure 1). From one case in July 2019, the disease spread nationwide, affecting as many as 12 regions, 50 provinces, and 541 cities/municipalities (FAO, 2021), sparing only the western seaboard. Second is the coronavirus pandemic which has impacted LPD logistics and access of the population to conventional market outlets for buying LPD products, namely restaurants, wet markets, and even supermarkets.

Figure 1: Map of ASF zoning status as of 06 August 2021



Source: BAI (2021).

As a result of ASF, retail prices soared in late 2020 and early 2021; pork belly price rose by 9 percent during December 2020, hitting Php 400 per kg. The meat Consumer Price Index (CPI) grew 7.5 percent over the last quarter of 2020. Hence, to manage price spikes, government opted to temporarily reduce pork tariffs, to the consternation of domestic swine producers.

This benchmarking study is undertaken to compare domestic performance of LPD industries in the Philippines, with other large LPD producers and consumers in Asia, namely China, Thailand, and Vietnam, supplemented with figures from major global players. The aim of the benchmarking is to guide program interventions for boosting competitiveness and resiliency of these industries, and inform legislative actions accordingly.

The study draws on previous literature, secondary data from official sources, and interviews of key informants who are active players in LPD.

¹ Research Fellow and Research Analyst, respectively, Philippine Institute for Development Studies.

2. Profiles by industry

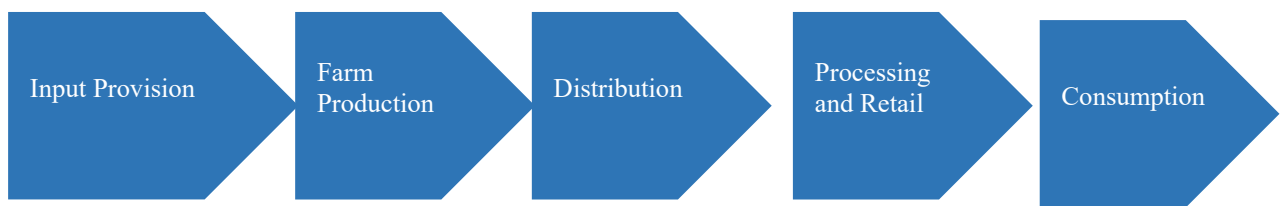
Overview of LPD value chains

The livestock industry covers swine, bovine animals, and small ruminants (mainly goats and sheep); most widespread in the Philippines are swine. Among dairy animals, cattle and buffalo are the main sources of milk. Meanwhile poultry covers chicken, duck, turkey, geese, and other farmed birds; in the Philippines the most common poultry is chicken, in turn divided into farming for meat (i.e. “broilers” for modern breeds, “native chicken” for traditional breeds), and production of eggs from layers.

The LPD value chains may be represented in diagram form as in Figure 2. The value chain begins with producers of farm inputs, which supply farm operators, categorized by scale as commercial or backyard (see Box 1 for definitions).

In the case of swine and chicken, input supply involves breeder farms and importers of breeders. These supply producers of grower pigs, day-old chicks, and ready-to-lay pullets. Another key input is feeds, produced by millers, which are distributed to farm operators by agri-supply stores; the latter also provide pharmaceutical and related inputs. Other necessary services are veterinary. The larger commercial operators may provide most of these inputs in-house as integrators, i.e. owning their own breeder farms, feed mills, and employ veterinarians.

Figure 2: Value chain diagram for the swine, chicken, and dairy industries



Swine, broiler, and layer

Local breeder farms Importers of breeds Producers of growers/day-old chicks/pullets Feed millers Agri-supply stores Veterinary services	Independent backyard growers Commercial growers Cooperatives/Associations Contract growers	Dealers Assembler/wholesalers Wholesalers Integrators Importers	Slaughterhouses Egg product processors (e.g. powdered egg) Meat processors Retailers	Institutional buyers Household consumers
--	---	---	---	---

Dairy

PCC/NDA, SUCs – artificial insemination, Napier grass, and other inputs, breeder animals Agri-supply stores Veterinary services	Backyard Farmers Cooperatives/Associations The output of farm operators goes to distributors, then to processing and retail, and terminating among institutional buyers (e.g.	Milk Collectors	Processors (e.g., pasteurized milk, flavored milk, cheese, sweets, yoghurt) Distributors Retailers	Institutional buyers Household consumers Export markets
---	---	-----------------	--	---

Sources: Authors’ compilation derived from key informant interviews.

Dairy value chain is rather different hence is represented separately. Inputs are available from agri-supply stores, though for the Philippines, the Philippine Carabao Center (PCC) and National Dairy Authority (NDA) also provide inputs, breeder animals and semen for artificial insemination. While many dairy operators grow their own forage, e.g. napier grass, other farmers or farmer groups may be supplying forage to dairy operators.

Among dairy operators, “small-scale” covers 1 to 20 head, while “semi-commercial” exceeds 20 head; however, in the Philippines the typically herd size is 20 - 25 head. The latter tend to be members of dairy cooperatives. Nearly all dairy producers produce at small or semi-commercial scale. Milk produced by dairy operators are purchased by milk collectors, for further processing into packaged fresh milk, pasteurized milk, flavored milk (e.g. chocolate), yogurt, cheese, butter, and so forth.

Box 1:**Definition of backyard and commercial farms**

For the swine industry, a commercial operator is one that satisfies one of the following:

- At least 21 head of adults and no young;
- At least 41 head of young
- At least 10 head of adults and 22 head of young.

For the chicken industry, a commercial operator is one that satisfies one of the following:

- 500 layers or 1,000 broilers
- 100 layers and 100 broilers (if raised in combination)
- 100 head of duck

A backyard operator is one that is not a commercial operator.

Source: PSA (2013).

Swine industry*Philippines*

After recovering from disease problems in the late 2000s, the swine industry has suffered an even more catastrophic decline in the late 2010s to the present owing to ASF.

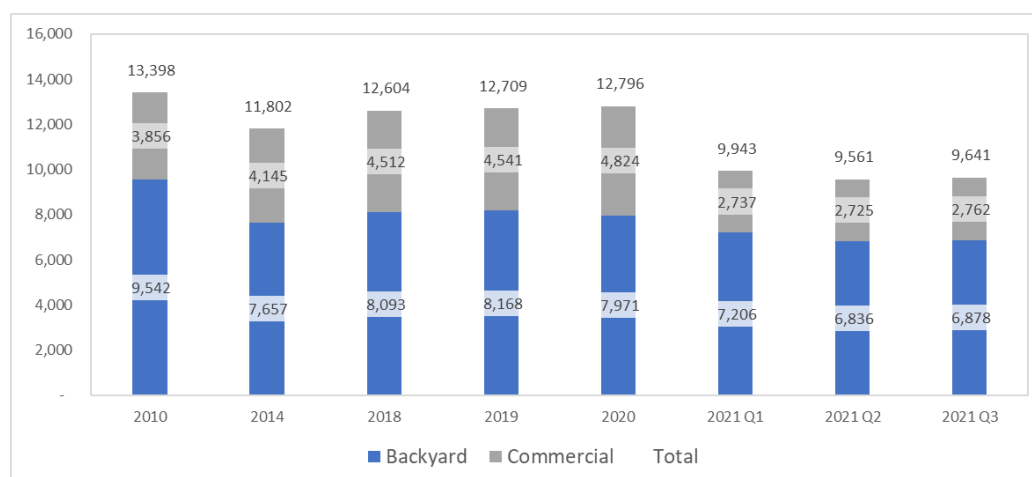
Inventory in commercial swine farms are on an increasing trend in the past decade (Figure 3). After dealing with diseases such as Porcine Circovirus, Porcine Reproductive and Respiratory Syndrome, Porcine Epidemic Diarrhea, Pseudorabies, Hog Cholera, and Swine Influenza, the industry continued to recover based on beginning-year inventory up to 2020.¹

The dominant production system for swine is backyard production involving small-scale producers, though the share of commercially-grown pork has been increasing.

The Figure also shows inventory distinguished by production system, valid at the start of the period indicated. Backyard farms are clearly the dominant system (accounting for an average of 2/3 of total inventory over the decade). Over time, though, the share of commercial farms has been increasing.

Both farm types suffered severe losses in 2020 and 2021. Among backyard raisers, inventory loss has been linked to poor biosecurity, impact of zoning, and prevalence of swill feeding (Mendes, 2021). While commercial inventories have shrunk farther, this is likely due to the relative ease of expansion of backyard growing in ASF-free areas.

Figure 3. Swine Annual Inventory, Philippines, 2010-2020 ('000 head)

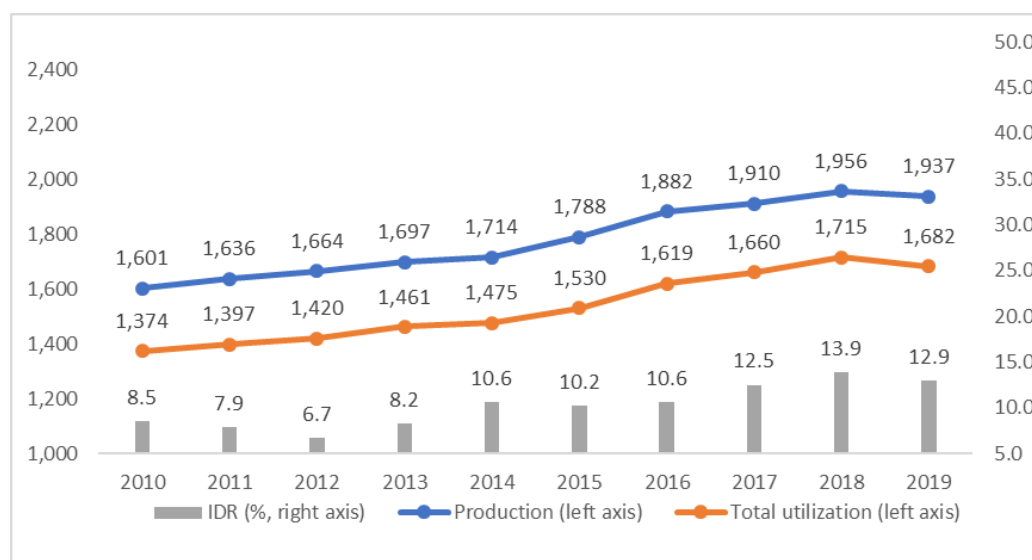


Source: PSA (2021).

Pork supply, imports, and consumption in the Philippines has been decreasing since 2019.

Figure 5 shows production rather than inventory trends, juxtaposed with utilization, including the import dependency ratio (IDR), which is the ratio of imports to the sum of domestic production and imports. Production has been consistently increasing from 2010 to 2018, contrary to the fluctuating trend in inventory; however, a sharp decline was already observed in 2019. For 2020 (not shown in the Figure), the production of swine fell further to 1.5 million tons, 11% lower than in 2019 (PSA, 2020a).

Figure 4: Supply and utilization of pork, Philippines, 2010-2019 (tons, carcass-weight)



Source: PSA (2021a).

Also shown are utilization trends in terms of net food disposable. There has likewise been an increasing trend since 2010, and typically far above the output of the domestic swine industry; hence the gap must have been filled by imports. The IDR at first declined from 2010 to 2012,

before rising to 13.9 percent in 2018. The import dependency ratio fell back to 12.9 percent in 2019, with importers securing only 287 thousand tons of foreign pork, as the DA banned importation of pork from countries affected by ASF (including some EU countries).² Importation fell further to just 165 thousand tons in 2020, bringing the import dependency ratio to just one-tenth of available supply (PSA, 2021b). The loss of both domestic production and availability of pork imports have been the key drivers behind elevated pork prices.

International comparison

China is by far the largest producer of pork worldwide, while Vietnam is among the top ten; China and Vietnam have also been hard hit by ASF but not Thailand.

In 2019 China was the top global producer of pork at 42.6 million tons; Vietnam meanwhile produced 3.3 million tons. In both countries, owing to ASF, these levels are 29% and 8% off their respective production peaks. In contrast, Thailand, where pork production is only half of the Philippines, has been riding an upward trend since 2010, demonstrating its success in containing ASF.

Table 1: Swine inventory, China, Thailand, and Vietnam, 2010 – 2020, ‘000 head

	2010	2015	2016	2017	2018	2019	2020
China	467,652	458,029	442,092	441,589	428,171	310,407	
Thailand	7,624	7,675	6,854	7,546	7,861	7,651	7,460
Vietnam	27,373	27,751	29,075	27,407	28,152	19,616	22,028

Source: Country Reports.

Production is likewise dominated by small-scale producers in China, Vietnam, and Thailand.

In Thailand, about 92 percent of swine growers owned under 50-head, while 0.02 percent had large farms with over 5,000 pigs. Because there are few barriers between pigs, people, and wildlife, inadequate bio-security and poor hygiene of small pig production systems are posing a challenge. Meanwhile, in Vietnam, about 97 percent of swine-growing households are into small-scale production, while only 3 percent are into large-scale production. Similarly, in China, about 90 percent of swine farmers raised fewer than 50 pigs, though the ASF has been forcing large-scale consolidation.³ Backyard operations involving 5 head or fewer has almost disappeared, with most herd sizes ranging from 20 to 49; farms with over 10,000 head have increased their production share most rapidly.

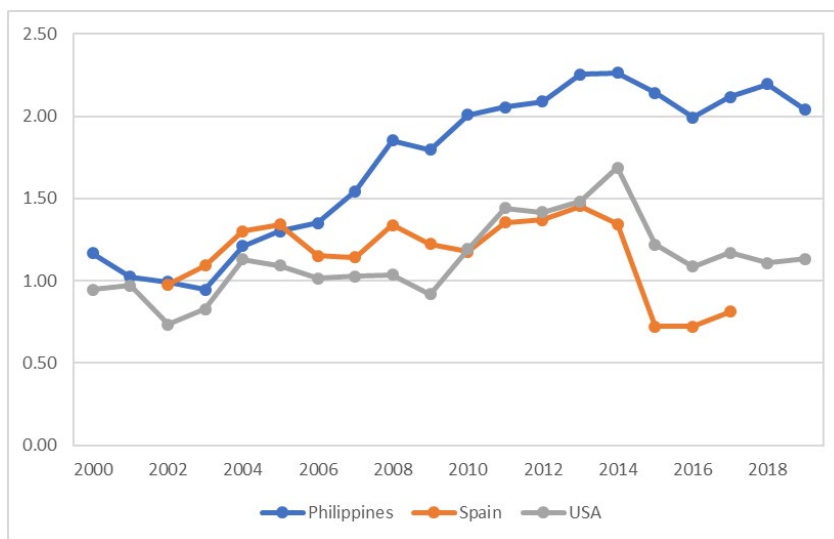
Except China, none of the ASEAN Plus countries are major importers; the top exporters are in Europe and North America.

The Philippines ranks 36th worldwide as importer of pork; the top five global importers are China, Japan, Italy, Germany, and Poland (Trademap, 2021). The main sources for the global market are Spain, USA, Germany, Canada, and Denmark, the world’s top five exporters. In ASEAN, Thailand, Vietnam, and Singapore are top pork exporters. Recently the world market has been rocked by the ASF pandemic which has affected EU, though the disease has bypassed North America for now. Pork prices per kg have gone from USD 1.36 in 2017, up to USD 1.44 in 2018 (6 percent increase); it dipped to USD 1.28 in 2020, but soared to USD 2.08 per kg in 2021 (63 percent higher).

Farmgate price of swine in the Philippines is high compared with prices in exporting countries, with the gap widening in recent years.

Back in 2001, the farmgate price of pig in the Philippines was only 5 percent higher than in USA; by 2019, the farmgate price was nearly double that of USA (Figure 5). Over time, producer price in the Philippines rose by 88 percent from 2001 to 2019, reaching USD 2.00; in USA the producer price rose by just 17 percent. The farmgate prices in the main exporting countries contrast sharply with those of China, Thailand, and Vietnam; on the upper bound are farmgate prices of China, which ranged from USD 2 to 3 per kg in 2012 – 2019, while that of Thailand and Vietnam ranged from USD 1.80 to USD 2.10 in the same period, similar to the price range in Philippines (FAO, 2021).

Figure 5: Farmgate prices, swine, selected countries, in USD per kg (liveweight)



Source: FAO (2021).

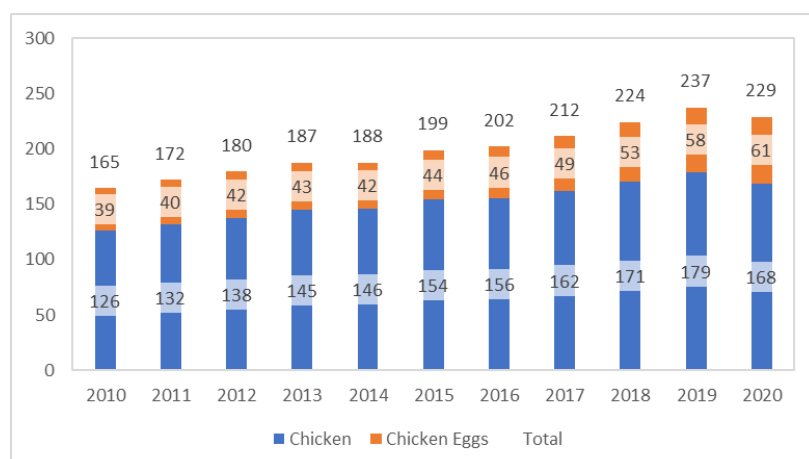
Chicken industry

Philippines

Industry supply was on an upward trend throughout the 2010s, but the COVID19 pandemic led to a sharp reversal in 2020.

Figure 6 shows trends in value of production in constant 2018 prices for the chicken industry. While the meat component comprises the majority of the industry by value, about a quarter of industry output consists of egg. In 2018 the industry was worth Php 224 billion, rising by 6 percent in 2019, before falling back by 3.4 percent in 2020. The steep loss in demand owing to public health restrictions owing to the pandemic led to a cutback in both meat and egg supply.

Figure 6: Value production, chicken, Philippines, 2010 – 2020, constant 2018 prices (Php billions)

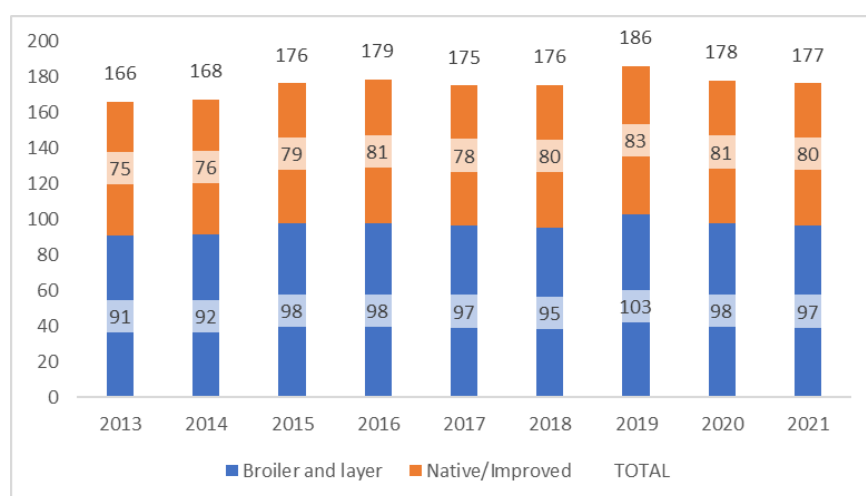


Source: PSA (2021).

A significant share of the poultry industry is also contributed by backyard producers.

Inventory trends from 2013 onward are shown in Figure 7. Chicken inventory falls from 2019 to 2021, following the trend in production, as operators adjusted their inventories in response to contraction in demand. By number of head, native/improved chicken approaches half (45 percent) of the total. Native chicken consists of indigenous breeds, often mixed with commercial breeds, hence “improved”; these breeds are usually grown under longer production cycles and at a backyard scale; broilers and layers meanwhile are grown in both commercial and backyard scales. Although PSA provides no separate statistics on backyard broiler and layer, one estimate places the backyard share of the broiler industry at 20 percent (Poultry World, 2020).

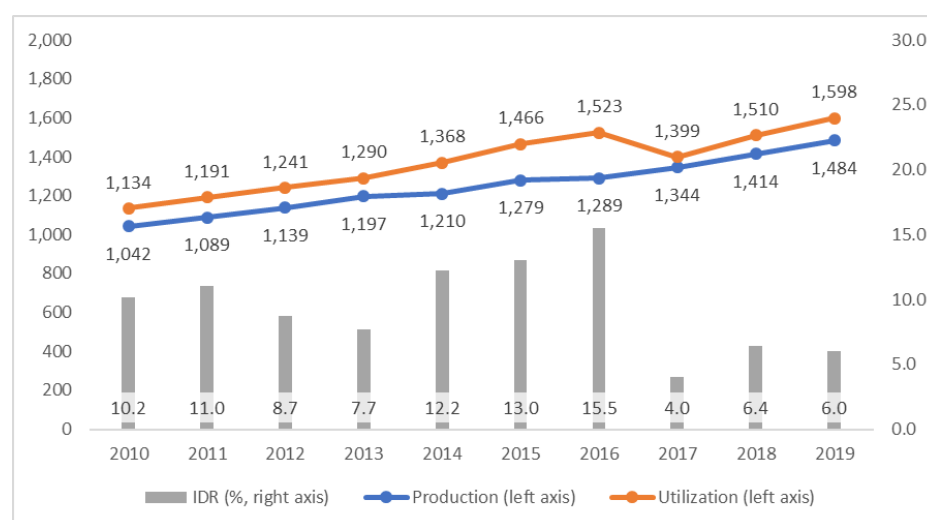
Figure 7: Chicken inventory, 2010-2021 (as of 01 January), Philippines, in million head



Source: PSA (2021).

Figure 8 shows a consistently rising trend in production of dressed chicken from 2010 to 2019. By 2020, production of dressed chicken (not shown in the Figure) had fallen by 6.1 percent (PSA, 2020b). Utilization (equal to net food disposable) is consistently above production owing to imports; the IDR started out at 10 percent in 2010, peaking at 16 percent in 2016, before falling dramatically in 2017 to 4 percent. The IDR then rose slightly, up to 6 percent the following years. Imports of dressed chicken reached 115 thousand tons in 2019, before shrinking by 6.3 percent in 2020 (PSA, 2021c). The decline in imports is consistent again with the decline in demand owing to the COVID19 pandemic.

Figure 8: Supply and utilization of dressed chicken, Philippines, 2010-2019 ('000 tons)



Source: PSA (2021)

International comparison

Production has been increasing Thailand, and Vietnam, but not in China, a global top producer.

Chicken inventory in China reached 5.2 billion head in 2019, making it a top global chicken producer. That of Thailand and Vietnam reached 0.31 and 0.38 billion head respectively, compared with Philippines' 0.18 billion head (Table 2). Inventories have been increasing in Thailand and Vietnam, but in China the number of chickens has been falling compared with 2010.

Table 2: Chicken inventory, China, Thailand, and Vietnam, 2010 – 2020, '000,000 head

	2010	2015	2016	2017	2018	2019	2020
China	5,303	4,792	5,164	5,137	5,191	5,247	-
Thailand	131	165	259	284	304	313	327
Vietnam	218	259	277	300	317	383	409

Source: Country Reports.

Backyard systems are widespread in Vietnam, while commercial-scale production is dominant in Thailand and has advanced considerably in China.

Chicken farms in Thailand are divided into backyard farms, independent commercial growers, and contract growers. The industry is currently dominated by big corporations, with just 10 to 12 firms controlling around four-fifths of broiler production. In China, chicken production has been consolidating in the past decades; currently chicken is the most industrialized among the livestock industries. About 43 percent of production originates from farms of 10,00 head or more.⁴ Large scale farms (over 100,000 head) account for 55 percent of output, while the share of small scale farms (under 2000 head) is down to 10 percent. On the other hand in Vietnam, about 99% of chicken-growing households are in the small-scale category.

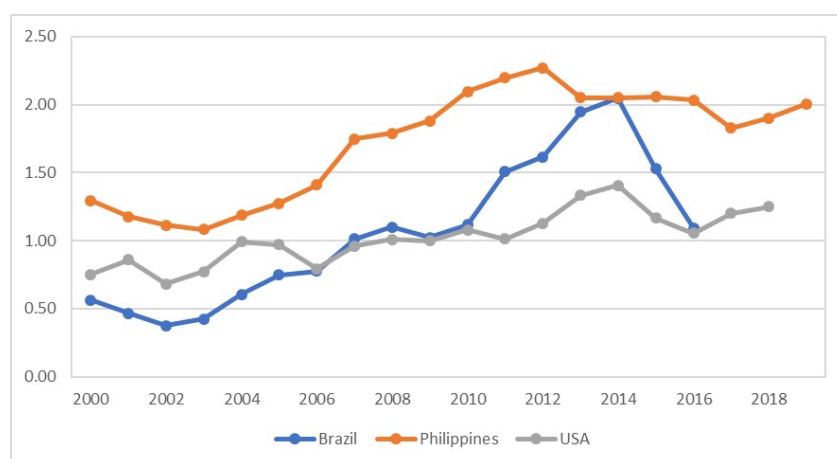
On the import side, the world market is dominated by China and Europe, while the large global exporters include Brazil, USA, Europe, and Thailand.

In 2020, the world’s biggest importer of chicken meat and offal was China, at around USD 3.5 billion worth, followed by large Western European countries (Germany, UK, and France). Meanwhile the world’s largest chicken exporter in 2020 was USA, which sold USD 5.6 billion worth of chicken products. The fourth largest exporter is Thailand, which exported USD 914.6 million worth in 2020.

Though farmgate price of chicken is now lower compared to its peak in 2011, prices are still much higher than in exporting countries.

In the Philippines, farmgate price of chicken were consistently rising from 2003 to 2012, Producer price then declined up to 2019, reaching USD 2 per kg. Nonetheless, a wide gap persists between producer price of Philippines and major exporting countries such as Brazil and USA. In the case of USA, the price gap in 2001 was 37 percent; by 2018 the difference had widened to 52 percent.

Figure 9: Farmgate prices, chicken (liveweight), selected countries, in USD per kg



Source: FAO (2021).

Based on FAO (2021), chicken producer prices in Thailand ranged from USD 1.05 to 1.10 in 2017 – 2018, which is similar to prices achieved among the top exporters. For China however,

producer prices were in the high range, at USD 2.0 to 2.5 per kg, despite a high degree of industry consolidation in that country.

Dairy industry

Philippines

While dairy production in the Philippines has been increasing, almost all of the country's milk is obtained from imports.

Domestic production of milk has shown a rising trend, reaching 26,710 tons in 2020, up from 21,160 tons in 2016, based on National Dairy Authority (NDA) data (Table 3). However, this domestic supply is miniscule compared with demand, the difference is made up by imports, which in 2020 approached 3 million tons. The IDR for dairy is consistently close to 100 percent.

Table 3: Dairy production and imports, Philippines, 2016 – 2020, '000 tons liquid milk equivalent

	2016	2017	2018	2019	2020
Production	21.16	22.76	23.69	24.38	26.71
Imports	2,772.57	2,486.29	2,939.60	2,969.83	2,963.14
IDR (%)	99.2	99.1	99.2	99.2	99.1

Source: NDA (2021).

Most of the country's milk is produced by backyard operators, many of whom are organized into cooperatives.

There are four main categories of dairy operation: individual operators who sell locally, cooperative (who deliver to a collection point), commercial farms (who tend to supply processors directly), and government-owned farms which supply government feeding programs (USDA-FAS, 2020). Data on these four types are available only up to 2015 (Table 4).

In 2015 about 63 percent of the country's milk production was from cattle, and only 35 percent from carabao (the balance coming from goat). Individual small producers account for 37 percent of output. Commercial producers are an important part of dairy cattle, accounting for 23 percent of cattle milk. However, in the Philippines, even these tend to operate relatively small herd, at "semi-commercial" basis with 20 – 25 head (in contrast with large scale dairy production USA and other countries with thousands of lactating animals).

What is promising is the high penetration of cooperatives, which account for 34 percent of milk output in 2015. Milk is still produced on individual basis, but individual output is sold to the cooperative, who then sell it to collectors or processors, or themselves are large enough to do their own processing. Unlike swine or commercial broiler/layer, reliance on commercial feed is relatively low for dairy cattle and carabao. Most operators grow the bulk of their forage (e.g. Napier grass), or purchase forage from other farmers, while supplementing with commercial lactating feed concentrate.

Table 4: Liquid milk production by source, Philippines, 2013 – 2015 (%)

	2013	2014	2015
Total (in in '000 liters liquid milk equivalent)	19,526	19,728	20,386
Shares in total:			

	2013	2014	2015
Cattle	65.0	63.7	63.4
Cooperatives	27.9	24.1	23.4
Government-owned-Institutional	2.0	1.2	1.2
Commercial/Private	14.4	14.8	14.8
Individual	20.6	23.6	24.1
Carabao	33.6	34.8	34.9
Cooperatives	9.5	10.2	10.5
Government-owned-Institutional	7.7	8.2	8.7
Commercial/Private	2.3	2.4	2.5
Individual	14.2	13.9	13.2
Goat	1.4	1.6	1.6
TOTAL	100.0	100.0	100.0

Source: PSA (2016).

International comparison

Compared with Philippines, China, Thailand, and Vietnam, are major milk producers.

Milk production in China, Thailand, and Vietnam, all greatly exceed that of Philippines (Table 5). Thailand sources its milk mostly from cattle, producing an estimated 1.2 million tons in 2019. In contrast to Philippines, about 60 percent of domestic milk demand is met by local farmers.

Table 5: Milk production in China, Thailand, and Vietnam, in tons, 2010 - 2019

	2010	2015	2016	2017	2018	2019
China						
Buffalo	3,050,000	2,895,543	2,909,591	2,852,820	2,907,812	2,928,369
Cattle	36,092,096	32,173,559	31,018,548	30,772,622	31,165,002	32,444,339
Thailand						
Cattle	911,000	1,200,000	1,200,000	1,200,000	1,200,000	1,200,000
Vietnam						
Buffalo	31,651	28,124	28,105	27,923	27,464	27,211
Cattle	306,662	723,153	795,143	881,261	936,003	986,122

Source: FAO (2021).

Vietnam is behind at about 1.0 million tons. In both these countries milk production has been increasing, though in China the production trend is decreasing. Nonetheless, remained a top global milk producer at over 35 million tons in 2019. Buffalo is only a minor contributor of milk output in each of these countries, accounting for less than 10 percent.

Milk production is mostly small-scale in Vietnam and Thailand, but is mostly large-scale in China.

Vietnam has around 32 thousand dairy households, of which 66 percent are in the small-scale category. Dairy production in Thailand is likewise also a majority small-scale affair although government intervention is a major driver of demand (i.e. school milk program) and supply

(i.e. its quality and technical assistance program). In contrast, in 2020 an estimated 70 percent of total dairy farms in China were large-scale (Dairy Global, 2021). The share of farms with over 1,000 cows has increased to 42 percent in 2019, up from 10.5 percent in 2010; the share of this segment is expected to exceed 50 percent within a couple of years.

3. Competitiveness analysis

Productivity indicators

Commercial swine and chicken industry in the Philippines is approaching global norms in physical productivity.

For swine and chicken, the key productivity indicator is the feed conversion ratio (FCR), the average ratio of animal weight at slaughter to cumulative total feed consumed. The **lower** the FCR, the more productive the farm. In Philippines, for swine the FCR is estimated at 2.8 to 3.3, with large farms being on the lower end of the range owing to superior nutrient management (Table 6). Meanwhile for layers the FCR ranges from 1.48 (large farms) to 1.6 (medium farms), with small farms also being productive at 1.5. Mortality among pullets was also lower among large farms at 10 percent, versus that of small farms at 15 percent (Sison, 2014).

Outside Philippines, in Thailand the FCR was 2.80 for swine, followed by China with 2.60 average FCR across farm sizes, and then Vietnam at 2.50. For chicken production, China is least efficient with FCR of 2.57. Compare these figures with FCR among the world's top exporters; swine FCR in 2018 ranged from 2.50 for Brazil, up to 2.68 for USA (AHDB, 2020). For broilers, back in 2000, FCR in Philippines was only 3 percent above the standard set in USA (1.90 versus 1.85) even back in 2000 (Chang, 2007).

Table 6: Feed conversion ratios for swine, chicken, and milk production

	Philippines	China	Thailand	Vietnam
Swine (FCR)			2.48	2.5
Backyard	3.3	2.64		
Small		2.62	2.8	
Medium		2.60		
Large	2.8	2.55	2.47	
Chicken/Poultry (FCR)			1.6	1.9
Small	Layer = 1.5	2.71		
Medium	Layer = 1.6	2.58		
Large	Layer = 1.48	2.43	1.6	
Cattle milk (liters/day)	6		12	
Backyard		14.65		
Small		15.22	10.22	16-17
Medium		17.07	11.74	20-21
Large		20.98	13.6	24-25

Source: Country Reports.

Dairy productivity in Philippines is below that China, Thailand, and Vietnam, which are in turn below that in major dairy exporters.

For milk production, productivity is measured by daily output per cow, also shown in Table 7. Productivity is highest for large dairy farms in Vietnam, up to 25 L/day; this is followed by China at 21 L/day. Average productivity is 16.98 across farm sizes. Dairy productivity is much lower in Thailand (12 L/day), which in turn is about double that of Philippines. USDA-FAS (2020) offers a higher estimate of daily milk output in Philippines, at 8 L per day in 2020. Productivity in China and commercial farms in Vietnam are close to that of New Zealand (19 L/day), which is in turn half that of USA at 38 L/day (DairyNZ, 2020; USDA-NASS, 2020).⁵

Cost and returns

Swine

In the Philippines, unit cost of production of commercial farms is lower than in backyard farms owing to economies of scale.

Data from cost and returns for swine production is shown in Table 7 based on Curibot (2019). The commercial farm operation is estimated to produce about 89,000 kg of swine (carcass weight), in a year. This translates to total returns of nearly Php 15 million pesos (at about Php 170 per kg farmgate price). Production for the backyard farm is much lower, yielding 2,500 kg in a year, for sales equal to Php 425 thousand. Stock cost (i.e. price of grower pig) per kg of meat is identical for both types of farm, while cost of feed is higher for commercial farms; owing to the large output volume, cost per kg is much lower in commercial farms for utilities, labor, and rent.

To realize this low cost per kg, the investor will need an initial capital investment of Php 3.45 million, about Php 3.3 million more than an investor in a backyard operation. Cost and returns estimates for China, Thailand, and Vietnam, likewise confirm the presence of economies of scale that drives down cost per unit for large-scale operations.

Table 7: Cost and returns of swine production, by scale of operation, Philippines, 2018 (Php)

	Backyard	Commercial
Investment cost	148,000	3,450,000
Building	68,000	3,350,000
Vehicle	80,000	100,000
Returns	424,800	14,952,960
Output, kg deadweight	2,520	88,704
Selling price (per kg liveweight)	168.57	168.57
Operating costs per kg, deadweight	148.26	112.40
Cost of stocks	25.40	25.40
Cost of feeds	54.64	64.53
Cost of veterinary supplies	1.71	1.29
Electricity and water	6.19	0.30
Labor	14.29	3.97
Land rent	46.03	16.91
Net returns per kg, deadweight	20.31	56.17

Source of basic data: Curibot (2019).

The figures provided in the Table possibly underestimate the actual cost advantage of large-scale production. Earlier data compiled by Gonzales et al (2012) show that cost of feed (as of 2009) for large commercial farms was USD 1.10 per kg (deadweight), compared with USD 1.16 per kg for small commercial farms (5 percent lower). Cost of fatteners and labor was also slightly lower (USD 0.62 versus USD 0.63 per kg for fatteners, and USD 0.02 per kg versus USD 0.03 per kg for labor). Total farm cost per kg was USD 1.88 per kg for large farms versus USD 1.92 per kg for small farms.

More updated cost figures are compared in the succeeding tables. In the following, small-scale” refers to smallest scale category in each country report, while “large-scale” represents the largest scale category.

Cost in large-scale farms is lower than in Vietnam, but higher than in China and Thailand, as well as in exporting countries, owing in part to the high cost of feed.

Estimated operating cost per kg carcass-weight for swine farms in China, Thailand, Vietnam, and Philippines, are summarized in Table 8. Among small scale farms, Philippines is the highest cost producer, based on unit cost; meanwhile Thailand is the lowest cost producer. Meanwhile among large-scale farms, Vietnam is the highest cost producer; however unit cost in Philippines still exceeds that of China, and the lowest cost producer, Thailand.

The Table provides a cost share breakdown for the more competitive industry segment, namely the large-scale farms. The largest cost components in each country is feed and grower stock. Feed cost, as well as share of feed cost in total, is higher in Philippines than in Vietnam or China; however, cost of stock is lowest in Philippines. Note that cost of production per kg of these Asian countries are higher than in global export leaders such as Spain and Denmark, at Php 86.50 (Hoste, 2020).

Table 8: Cost and returns, swine farms, selected countries (Php per kg, carcass-weight)

	CHINA (2017-19)	Philippines (2018)	Thailand (2019-20)	Vietnam (2017-19)
Small-scale farms				
Operating Cost	125.47	148.26	121.97	133.81
Large-scale farms				
Operating cost	106.97	112.40	97.53	120.44
Price	128.46	168.57	132.13	148.82
Net Revenue	21.49	56.17	34.60	28.38
Shares in operating cost (%)				
Cost of feeds	51.18	57.41	54.71	63.49
Cost of stocks	36.02	22.60	27.94	28.51
Labor	6.73	3.53	1.71	0.83
Cost of veterinary supplies	1.57	1.15	2.30	1.49
Electricity and water	0.67	0.27	1.99	0.52
Others	1.04	15.04	3.55	0.96

Source: Country Reports.

Chicken

As with swine, economies of scale allow commercial broilers to reduce cost per kg of broiler.

Data for 2018 show that cost per kg of broiler production is Php 71 per kg (liveweight) for the commercial operator but up to Php 78 per kg for the backyard operator. Commercial production involves a lower cost of feed per kg of broiler, as well as lower overhead cost (utilities, rent, labor) owing to larger output.

Table 9: Cost and returns of broiler production in Pampanga, 2017, by scale of operation (Php per kg, live-weight)

	Backyard	Commercial
Investment cost, total	27,100	3,200,000
Housing	2,600	2,500,000
Equipment	24,500	700,000
Returns	35,986	9,556,620
Output, kg	334	124,015
Selling price	108	77.1
Operating cost per kg:	77.9	71.1
Day-old chicks	15.3	21.3
Feeds	49.4	46.0
Veterinary supplies	1.8	2.0
Utilities, fuel	3.6	0.5
Labor	6.6	0.8
Land rent	1.1	0.6

Note: original figures converted to liveweight using 0.77 ratio of dress-weight to liveweight, following PSA (2013).
Source: Basic figures from Curibot et al (2019)

Note though that net returns per kg is much higher for backyard broiler as the farmgate price is much higher than for commercial operators – a difference that is confirmed by PSA data. The gap is due to the difference in supply chains supplied by backyard versus commercial operators; backyard operators sell locally, for the fresh market for same day consumption, for which consumers are willing to pay a premium. Commercial operators supply to institutional buyers, e.g. restaurants, or for cold chain supermarkets who buy in bulk.

Philippines is not a competitive producer of broiler compared with Asian benchmark countries; cost of feed and day-old chicks are the largest cost contributors.

Based on Table 10, Philippines is a high cost producer of broiler, whether comparison is made among small-scale producers, or among large-scale producers. Among the more competitive segment (large-scale producers), cost share is highest for feeds and day old chicks; Philippines has a relatively large cost share of day-old chicks, while Thailand has the highest cost share of feeds.

Table 10: Cost and returns of broiler farms, (Php per kg, dressed-weight)

	China (2017-19)	Philippines (2018)	Thailand (2019-20)	Vietnam (2019)
Small-scale farms				
Operating cost	88.75	77.90	91.65	114.91
Large-scale farms				
Cost	86.70	92.36	66.88	76.55
Price	97.02	100.08	75.15	111.36
Net returns	10.32	7.71	8.26	34.81
Shares in operating cost (%):				
Feeds	68.26	64.63	74.06	60.69
Day-old chicks	14.20	29.93	21.03	17.66
Labor	8.07	1.07	1.46	2.57
Veterinary supplies	3.33	2.86	1.43	7.51
Utilities, fuel	1.63	0.66	0.52	2.57
Others	1.49	0.85	0.72	3.65

Source: Country Reports.

Dairy

Dairy cattle and buffalo milk at semi-commercial scale can be profitable, though the business case for backyard dairy needs to be strengthened.

Table 11 shows financial projections from PCAARRD (as of 2010), for dairy cattle farm with 25 breeding cows. At the time, price per kg milk farmgate was only Php 22/liter. The projections assume productivity of just 10 liters/day per cow, lower than the global frontier, but higher than the average for the dairy production in the country. Total sales are about Php 1.46 million, though sale of animals (calves and replacement heifers) account for Php 438 - 618 thousand per year starting from year 3. Gross margin per year (gross sales less production cost) goes from as low as Php 687 thousand up to Php 1.13 million. Deducting production cost (of which the largest component is feeds, followed by labor) as well as overhead, leaves net income ranging from half to a million pesos per year. Given an initial capital investment of about Php 5 million, the IRR is 22 percent and the NPV is Php 924 thousand.

Table 11: Financial projections, semi-commercial dairy cattle farm, 2010 (Php '000)

	Year									
	1	2	3	4	5	6	7	8	9	10
Breeding cows	25	25	25	25	25	25	25	25	25	25
Animals in milk line	25	19	19	19	19	19	19	19	19	19
Milk per cow, L per day	10	12	12	12	12	12	12	12	12	12
Income:										
Sale of milk	1,581	1,457	1,452	1,457	1,452	1,457	1,452	1,457	1,452	1,457
Sale of animals	24	18	618	515	468	438	492	446	453	500
Total	1,605	1,475	2,070	1,972	1,920	1,895	1,944	1,903	1,905	1,957
Production cost:										
Feeds	591	600	655	633	639	633	639	633	639	633
Mineral salt	9	10	12	11	11	11	11	11	11	11
Breeding service	13	13	13	13	13	13	13	13	13	13

Veterinary	23	26	30	28	28	28	28	28	28	28
Labor	140	140	140	140	140	140	140	140	140	140
Total	776	788	849	825	831	825	831	825	831	825
Gross margin	829	687	1,221	1,147	1,089	1,071	1,113	1,078	1,074	1,132
Overhead	173	173	173	173	173	173	173	173	173	173
Net profit	656	514	1,048	974	916	898	940	905	901	959

Note: A constant farmgate milk price of Php 22 per liter is applied
Source: PCAARRD (2010).

Similar projections are shown in Table 12 for a dairy buffalo farm of 5 cows. Initial investment outlay is Php 515,000. Price of raw milk is estimated at Php 50 per L, increasing by 3% annually. The average cow will produce an average of 6L/day during lactation period, except the first, where productivity is just 3.5L/day.

Table 12: Financial projections, 5-cow dairy buffalo farm (Php ‘000)

	Year									
	1	2	3	4	5	6	7	8	9	10
Revenues										
Raw milk sales		23	187	344	293	331	463	682	592	615
Sale of animals			46	16	33	51	383	72	74	38
Other revenues		1	12	18	16	19	42	38	33	33
Change in asset value	100	15	105	65	105	145	-160	205	225	280
Total Farm Revenues	100	39	350	443	447	545	728	997	924	965
Expenses										
Direct material	39	62	86	96	117	147	149	156	197	252
Direct labor	21	28	32	34	44	57	63	68	74	95
Overhead expenses	15	21	26	31	40	50	57	58	62	75
Selling, administrative	1	1	1	2	2	2	3	3	3	4
Total expense	76	112	145	162	204	256	272	284	337	426
Gross margin	24	-72	205	281	243	289	456	712	587	539

Source: PCC (2016).

Total sales range from Php as low as 39,000 per year, up to nearly Php 1 million. Expenses range from Php 76,000 up to Php 426,000 per year. The biggest cost item is direct material cost, mostly due to feed. The annual gross margin per year goes from as low as - Php 72,000, up to Php 720,000. The payback period is just under six years, with NPV of 261,315.70 and an internal rate of return equal to 24%.

The estimated cost and returns for actual farms in China, Vietnam, and Thailand (Table 13) are not comparable to the preceding financial projections. Nonetheless it is useful to note that cost per kg of milk is lowest in Vietnam, and highest for China, with Thailand close hind. Producer price is also highest in Vietnam and lowest in Thailand, Hence, gross margin is highest in Vietnam at 52 percent of producer price, compared with 14 percent in China and 10 percent in Thailand.

Table 13: Cost and returns of commercial dairy farm, ASEAN Plus countries (Php per kg)

	China, small Scale (10 – 50 head) 2017 - 2019	Vietnam, modern factories 2019	Thailand, large company (> 201 head) 2020
Cost	26.54	17.35	25.66
Revenue	30.79	36.05	28.49
Gross margin	4.26	18.70	2.83

Source: Country reports.

4. Policy environment

Regulatory policies

The government imposes regulations to protect human and animal health, the environment, and animal welfare; regulations are more weakly enforced over backyard farms.

LPD industries have numerous economic, physiological, and environmental impacts, which has led to various regulations from both national and local governments to manage these impacts. Food safety regulations are authorized by the Food Safety Act of 2013 (RA 10611), while regulations on meat safety and inspection are provided by the Meat Inspection Code of 2003 (RA 9296). Meanwhile rules and regulations on transportation of live animals are governed by DA Administrative Order (AO) No. 19, series of 2006, while Memorandum Circular (MC) No. 12 Series of 2017 lists requirements for importation of live animals.

DENR requires establishments above a certain size to have an environmental impact management and site development plan, including wastewater treatment and air pollution control (Presidential Decree 1586). Under the Local Government Code of 1991, each LGU implements a Comprehensive Land Use Plan; farming (including livestock, poultry, and dairy farming) are not allowed inside urban zones, or else not allowed to expand. The Animal Welfare Act of 1998 (RA 8485) meanwhile provides the overarching law for animal welfare in the country, designating BAI to oversee and maintain safety and sanitary stands in animal keeping, including livestock and poultry.

The current program to manage ASF is the National Zoning and Movement Plan for African Swine Fever (AO 22 Series of 2020). The Plan involves identification of Free, Protected, Surveillance, Buffer, and Infected Zones, and specifies allowed and prohibited transportation across zones. Subsequently, AO No. 6 (Series of 2021) promulgated Guidelines on the Implementation of the Recovery, Rehabilitation, and Repopulation Assistance Program for ASF-affected and Non-ASF Affected Areas. The DA is now implementing the Integrated National Swine Production Initiatives for Recovery and Expansion (INSPIRE), which focuses on hog repopulation and stabilizing supply of pork; as well as the Bantay ASF sa Barangay program to enhance biosecurity of the industry (Abao and Haas, 2021).

According to industry observers, the large backyard sectors in both livestock and poultry industries have proliferated all over the countryside, rendering implementation of regulations less effective for this production system, compared with large scale commercial operators. Andico and Pena (2019) confirm in their study that backyard producers do implement basic biosecurity practices such as deworming, disinfection, provision of pens, and burying of dead pigs. However there were still areas of improvement, especially when pig-raising is treated as

a hobby rather than the main livelihood. The authors also affirm that membership in a pig raising association is encouraged to support good biosecurity practices. However this should be contrasted with the finding of PSA (2012) that, as of 2011, that membership in enterprise organizations covered just 2.7 and 1.2 percent of smallhold livestock and poultry farm operators, respectively.

Development programs

Except for dairy, government has mostly relied on private sector investment to promote the development of the LPD industries.

The Philippine Carabao Law of 1992 (RA 7307) creates the Philippine Carabao Center (PCC) to undertake R&D activities for the carabao industry, including encouraging backyard carabao dairy. The National Dairy Development Act of 1995 (RA 7884) establishes the NDA as an agency in charge of dairy industry development in the country, and empowers it to establish rules and regulations towards attainment of the provision of the Act. Annually the PCC and NDA receive appropriations from the national government for industry development.

For livestock development (including poultry), the Livestock Development Council (LDC) was set up under PD 914 of 1976. In 2004 though the LDC was absorbed, together with the National Agriculture and Fisheries Council (NAFC), into the Philippine Council for Agriculture and Fisheries (PCAF) by EO 366 Series of 2004. Livestock and poultry development though have largely been relegated to the private sector (Domingo and Olaguera, 2017).

Trade and price policies

Poultry, swine, and corn are among the highly protected sectors of Philippine agriculture, while dairy is a sector open to international trade.

Direct production support for livestock and poultry industries have been minimal, nor does government implement a direct price support policy for the LPD. It does however implement a strong indirect price policy through trade restrictions. The main form of trade restrictions is most favored nation (MFN) tariffs, which are charged to all trading partners under the WTO Agreements. Imports of swine meat are charged duties of 40 percent out-quota, i.e. above the minimum access volume (MAV), and a lower but still high duty of 30 percent in-quota (within MAV). For poultry meat tariffs are charged a uniform rate of 40 percent.

Meanwhile, mechanically deboned meat (MDM), usually from chicken, is charged a lower tariff of 5 percent. MDM is an input to the processed meat industry (e.g. hotdogs). For ASEAN countries, tariffs on swine and chicken meat are set at just 5 percent; note though that ASEAN countries are only a minor source of imports of meat products of the Philippines.

Corn, a major component of the livestock and poultry value chain, is priced relatively low in Thailand, but relatively high in Philippines, in part due to high corn tariff.

In both swine and poultry, feed is the main driver of cost. Price per 50-kg of swine feed in EU exporting countries range from Php 13,000 to 16,000 in 2018 (based on figures in Hoste, 2020). It is also an important component of poultry feed. Hence, corn price is a major driver of feed cost, indirectly therefore driving the cost of pig and chicken meat. Table 14 shows corn wholesale prices in selected Asian countries; Philippines is at the upper bound of corn price (USD 0.42 to 0.44 per kg), followed by China (USD 0.28 to 0.38 per kg), Vietnam (USD 0.22 to 0.29 per kg), and finally Thailand (USD 0.19 to 0.24 per kg).

Table 14: Corn wholesale prices in selected countries, in USD per kg, 2011 – 2020

	2015	2016	2017	2018	2019	2020
Philippines	0.42	0.39	0.37	0.40	0.44	-
China	0.38	0.30	0.28	0.31	0.30	0.34
Thailand	0.23	0.21	0.19	0.24	0.23	0.23
Vietnam	0.27	0.22	0.26	0.26	0.27	0.29

Source: Country Reports for the other countries.

One reason for the high price of corn in Philippines is high tariffs, equivalent to 50 percent most favored nation (MFN) rate for imports above minimum access volume (MAV), and 35 percent for imports within MAV. The MAV stands at 217,000 tons per year, unchanged for many years (USDA, 2020).

Fortunately for the feed industry, the ASEAN rate is only 5 percent, hence the country is currently sourcing about 80 percent of its imports from ASEAN countries (Vietnam, Myanmar, and Thailand). However, supplies from these countries are limited compared with supplies from USA, Argentina, Brazil, and other global maize exporters.

To address supply contraction due to ASF, government implemented a temporary easing of protection for swine producers.

EO 124 Series of 2021 introduced a direct price policy for pork and poultry, namely a ceiling on retail prices for Metro Manila for two months (from February 2021). EO 128 reduced MFN rates effective for pork imports, April 2020 down to 10 percent and 5 percent, for out-quota and in-quota quantities respectively, for a period of three months; then 10 and 20 percent for the succeeding nine months; and reverting back to status quo after 12 months. Finally, EO 133 s.2021 authorized the increase of the MAV of pork meat from 54 210 metric tons (MT) to 254 210 MT for 2021.

While dairy industry is supported by direct expenditure programs, it receives little protection from trade policy.

In 2021, the budget of NDA was Php 333,908,000, while that of PCC was Php 595,703,000. However, unlike livestock and poultry producers, dairy producers receive little protection from foreign competition. Tariffs on milk are only 3 percent, and on concentrated milk range from 0 to 1 percent. The very open trade regime is consistent with the nearly 100 percent import penetration mentioned earlier.

5. Recommendations

Summary

Livestock and poultry sectors have flourished on their own by virtue of private sector development. Very prominent in the LPD industry of the country is the backyard sector, although a burgeoning commercial sector has emerged in livestock and poultry (but not in dairy). The proliferation of backyard systems implies relatively low entry barriers and a high degree of inclusion for these industries; however, it also implies a greater difficulty in enforcing regulations, imposing product standards, and delivering production support.

Data clearly show a structural shift in the swine industry towards consolidation and rising share of commercial operators, though backyard production remains dominant. Ultimately though maturity of the industry will be accompanied by full consolidation, as observed in the major exporting countries in Europe and the Americas, as well as in Thailand at least for chicken.

Government has primarily supported the livestock and poultry industries indirectly through trade policy, though there are some inconsistencies owing to a high price policy on corn, a key animal feed ingredient that is itself benefiting from high tariffs. On the contrary for the dairy sector, the trade regime is much more open, though part of the government budget is being used for production support.

The status quo in terms of policy has come under strong challenge owing to neglect of livestock and poultry have become untenable owing to unprecedented external shocks brought about by ASF (for swine) and COVID19 (for poultry). Government has been compelled to open up trade policy in swine, at least temporarily; a strong clamor has built up over the past months towards building up competitiveness with joint stakeholder action and strong government support.

Recommendations

In view of the findings of this study, several recommendations are provided, clustered around the following five points:

1. Undertake a comprehensive review of trade policies affecting the value chain towards greater competitiveness of the LPD industries.

Whereas respective industry advocates tout the benefits of the current protection regime, there is little discussion about the costs. As discussed previously, the protection policy for corn drives up the cost of domestically produced feeds, and therefore cost of livestock and poultry farming, both due to the higher feed cost, and higher cost of growers and day-old chicks. Meanwhile further downstream, the protection policy for livestock and poultry production penalizes consumers. In conjunction with production support to enhance competitiveness, the set of trade policies should be carefully re-calibrated towards greater efficiency and equitable treatment of stakeholders, including consumers. One measure that can be explored may be a gradual phaseout of industry protection in conjunction with implementing of the remaining recommendations of this study, with funding drawn from meat import tariffs.

1. Earmark the collections from tariffs on pork and chicken imports to fund regulatory services and production support.

Reducing indirect support by trade policy should be accompanied by increased production support through expenditure programs. The remaining recommendations below require more

public funding to implement; such funds may be obtained by earmarking existing tariff collections on pork and chicken imports.

2. Invest in research and data collection as inputs to policy and program development.

There needs to be increased funding for R&D priorities such as the following (DOST, 2017): breed development; reproductive biotechniques; animal nutrition; conservation and improvement of native animals; vaccine, biologics and diagnostics development; and production and management decision support systems. For the last item, the statistics and monitoring system must address lack of industry-related data, such as profile of the backyard sector, updated dairy industry situationer, feed inventory and prices, monitoring of animal health and disease, and a complete registry of backyard operators in LPD.

3. Develop government institutional capacity at both national and local levels towards improved delivery of technical assistance, regulatory services, and production support.

NDA and PCC are distinct agencies attached to DA; there is a need for similar agencies livestock and poultry industries. Moreover, a single entity over LPD, by consolidation of related units and agencies in the national government, may be considered, in order to focus efforts, and attain a unified perspective on industry development.

Once national agencies have been consolidated, the national government may then initiate a program of capacity building for LGUs on land use planning, monitoring and enforcement, extension service, and community organizing (see below). Beyond capacity building, national-local government linkage needs to be tightened so as to balance local autonomy with accountability (Domingo and Olaguera, 2017).

4. Reset the oversight system over the LPD industries in terms of regulatory compliance, zoning, imposition of grades and standards, food safety and animal welfare.

The current ASF crisis represents a rare opportunity for a “great reset” in swine industry, to cover as well poultry and dairy. A reinvigorated political will may be asserted to institutionalize biosecurity measures, geographic consolidation, a system of food safety and product grading, especially for packaged and processed meat and dairy.

5. Focus on upgrading technology and business practices for backyard operators using a collaborative approach to extension.

Backyard industries can be made more efficient and profitable through appropriate technology, and animal husbandry practices. While extension work is now the mandate of LGUs, there is every reason to pursue collaborative approaches in conjunction with SUCs, national agencies, and the private sector, which has an active program of contract growing and input distribution. Finally, the technical assistance should also focus on business development and adoption of digital technologies, especially in e-commerce, supply chain traceability, animal health monitoring, and so forth.

6. Strengthen FOs to encompass most or all backyard operators to facilitate delivery of government assistance, technical and regulatory services, and realize gains from economies of scale and scope.

The study has also established the greater competitiveness of commercial scale operation. However, it is neither feasible nor equitable to force consolidation of the huge backyard sub-

sector into commercial operations. An intermediate solution is to incentivize membership of backyard producers in accredited FOs. Key to the incentive scheme is a program of technical and financial assistance conditional on such membership. Capacity development, technology transfer, regulatory compliance, and delivery of other production services are more efficiently coordinated through these organizations.

References

- Abao, L.N., & Haas, M. (2021). Livestock and poultry update: Philippines. Voluntary Report:RP2021-0032. United States Department of Agriculture – Foreign Agricultural Service. https://apps.fas.usda.gov/newgainapi/api/Report/DownloadReportByFileName?fileName=Livestock%20and%20Poultry%20Update_Manila_Philippines_06-18-2021.pdf
- Agriculture and Horticulture Development Board [AHDB]. 2020. 2018 Cost of pig production in selected countries. Warwickshire, UK: AHDB.
- Andico, W., and S. Pena.2019. Biosecurity practices in high throughput Philippine backyard pig herds: a multiple correspondence analysis. *International Journal of Veterinary Sciences* 18(4):316-323.
- Dairy Global. 2021. <https://www.dairyglobal.net/Market-trends/Articles/2021/1/Country-report-Uncovering-Chinas-dairy-sector-696381E/>. Accessed 30 September 2021.
- DairyNZ. 2020. New Zealand Dairy Statistics 2019-20. Hamilton, NZ: Livestock Improvement Corporation and DairyNZ.
- Domingo, S., M. Rosellon, P. Lorenzo, A. Manejar. 2021. Domestic Benchmarking of the Philippine Livestock, Dairy, and Poultry Industries. Report submitted to NEDA. Quezon City: PIDS.
- Domingo, S., and M.D. Olaguera. 2017. Review of High-Value Agriculture in the Philippines with Comprehensive Subsectoral Focus: Livestock Industries. Discussion Paper Series No. 2017-51. Quezon City: PIDS.
- FAO. 2021. *ASF situation in Asia & Pacific update*. Rome: Agriculture and Consumer Protection Department.
- Gonzales, L., R. Dy, M. Galvez-Dacul, A. Gonzales, D. Macabasco, S. Reyes, Florence Mojica-Sevilla. 2012. Benchmarking the Livestock and Poultry Industries. Los Baños: STRIVE Foundation, Center for Food and Agribusiness, University of Asia and the Pacific, and DA – Livestock Development Council.
- Hoste, R. 2020. International comparison of pig production costs 2018: Results of InterPIG. Wageningen Economic Research Report 2020-007. 30 pp. Wageningen: Wageningen Economic Research.
- NDA. 2021. Philupdates. <https://nda.da.gov.ph/index.php/en/industry-data/philupdates>. Accessed 30 September 2021.
- SEARCA and NEDA. 2021. International Benchmarking Study of the Philippine Livestock, Dairy, and Poultry Industries. Final Report: International Component. Los Baños, Laguna, Philippines: SEARCA.
- PCAARRD. 2010. Profitability Analysis: 25 Dairy Cow Module. Profitability Analysis 11/2010. Los Baños: PCAARRD.

PCC. 2016. 5-Cow Start-up Dairy Buffalo Farm Business: An Investment Overview. Dairy Buffalo Business Series 1 of 6. Munoz, Nueva Ecija: Philippine Carabao Center.

Poultry World. 2020. <https://www.poultryworld.net/Meat/Articles/2020/4/Philippines-Chicken-overtakes-pork-as-preferred-protein-576305E/>

PSA. 2013. Metadata for Agricultural Statistics in the Philippines. Quezon City: PSA.

PSA. 2016. Dairy Industry Performance Report May 2016. Quezon City: PSA.

PSA. 2020a. Swine Situation Report January – December 2020. Quezon City: PSA.

PSA. 2020b. Chicken Situation Report January – December 2020. Quezon City: PSA.

PSA. 2021. PSA Openstat. openstat.psa.gov.ph. Accessed 30 September 2021.

South China Morning Post. 2017. <https://www.scmp.com/news/china/policies-politics/article/2098877/chinas-backyard-pig-farmers-squeezed-sector-scales>. Accessed 30 September 2021.

USDA National Agricultural Statistics Service. 2020. Milk Production 2020. Washington, D.C.: USDA.

USDA-FAS. 2020. Dairy and Products Annual Philippines. RP2020-0074. Manila: USDA.

¹ Diseases affecting Philippine swine industry in 2010 listed in https://www.pig333.com/articles/philippines-swine-industry-situation-and-outlook_4176/.

² <https://www.bworldonline.com/phl-defends-bans-on-european-pork>

³ <https://www.scmp.com/news/china/policies-politics/article/2098877/chinas-backyard-pig-farmers-squeezed-sector-scales>.

⁴ iatp.org/sites/default/files/2017-05/2017_05_03_PoultryReport_f_web.pdf

⁵ Computed from 23,390 lbs. per cow in 2019.