



USAID
FROM THE AMERICAN PEOPLE

Indonesia's Poultry Value Chain

Costs, Margins, Prices, and Other Issues

August 2013

This publication was produced by Nathan Associates Inc. for review by the United States Agency for International Development.

Indonesia's Poultry Value Chain

Costs, Margins, Prices, and Other Issues

DISCLAIMER

This document is made possible by the support of the American people through the United States Agency for International Development (USAID). Its contents are the sole responsibility of the author or authors and do not necessarily reflect the views of USAID or the United States government.

Contents

Abbreviations	v
Glossary	vii
Preface	ix
Executive Summary	xi
1. Poultry in Indonesia	1
Industry Size	1
Importance of Industry to Food Security	2
Location of Industry	2
Commercial Broiler	3
Commercial Layer	4
Native Chicken	5
2. Stakeholders	7
The Integrators	7
Feed Mills	9
Parent Stock Breeding Farms	9
Broiler Farmers	10
Village Poultry Farmers	10
Contractors	10
Market Traders	10
Processors	11
Retailers	11
Animal Health Companies	11
Equipment Suppliers	11
Consumers	12
Government of Indonesia	12
3. Costs and Margins	13
Methodology	13
Cost and Margins for Broilers	15

Modern Slaughter/Processing	18
Costs and Margins for Day Old Chickens	19
Cost and Margins for Eggs	19
Conclusion on Margins	21
Transport Costs	21
Conclusion on Transport Costs	22
Native Chickens	22
4. Prices	23
Day Old Chicken Prices	23
Broiler Prices	23
Regional and Seasonal Price Issues–Broilers	24
Egg Prices	26
Conclusion	27
5. Industry Efficiency Issues	29
6. Feed Issues	31
Conclusion	33
7. International Competitiveness	35
Exporting Countries	35
Importing Countries	37
International Benchmarks	38
Conclusion	39
8. Likely Industry Development	41
Regional Development	44
Product Development	44
Conclusion	44
9. Monitoring the Industry	45
The “Real” or “Normal” Price of Broilers	45
Data Collection	46
Appendix A. Costs of Production	
Appendix B. Population and Production, 2011	
Appendix C. Estimate of Corn Production and Imports, 2006-2012	

Illustrations

Figures

Figure 1-1. Relationship between Broiler, Egg, and Wet Corn Production by Region	3
Figure 1-2. Broiler Sector Value Chain	4
Figure 1-3. Commercial Layer Sector Value Chain.	5
Figure 1-4. Native Chicken Sector Value Chain	6
Figure 3-1. Breakdown of Broiler Costs	15
Figure 3-2. Cost per kg Broiler to Consumer in Wet Market	15
Figure 3-3. Breakdown of Costs in Broiler Chain to Consumer	16
Figure 3-4. Broiler Margins per Bird to Consumer	16
Figure 3-5. Margins on Sales for Each Subsector in Broiler Value Chain	17
Figure 3-6. Costs and Margins for 1.6kg Bird to Wet Market versus 2.2kg Bird to Modern Slaughterhouse	18
Figure 3-7. Broiler DOC Costs and Margin ex Hatchery	19
Figure 3-8. Commercial Egg Costs to Consumer	20
Figure 3-9. Margins in Layer Chain	20
Figure 3-10. All Indonesia Transport Costs for Broilers to Consumer and Percentage Breakdown of Transport Costs by Activity	21
Figure 3-11. Transport Cost for Egg Production and Percentage Breakdown of Transport Costs by Activity	22
Figure 4-1. Relationship between Broiler, Egg, and Corn/SBM Index Prices	24
Figure 4-2. Broiler Price by Time by Province, January 2008-November 2012	24
Figure 4-3. Average Broiler Price by Province, 2009-2012	25
Figure 4-4. Egg Price by Province, January 2008-November 2012	26
Figure 4-5. Average Egg Price by Province, 2008-2012	27
Figure 6-1. Broiler Finisher Feeds Price Jakarta	31
Figure 6-2. Corn Supply and Demand Scenario for Indonesia	33
Figure 7-1. Major Broiler Producers and Exporters, 2012	36
Figure 7-2. Exports of Poultry, Corn, and Soybean Mean, 2012	36
Figure 7-3. Cost of Live Broiler Production, December, 2012	38
Figure 8-1. Broiler Consumption versus GDP per capita, 2011	41
Figure 8-2. Egg Consumption 2007 versus GDP per capita 2011	43

Tables

Table 1-1. Size of Indonesia's Poultry Industry, 2007-2011	1
Table 1-2. Size of Indonesia's Poultry Industry ex Government Volumes by Subsector	1
Table 2-1. Financial Performance of Value Chain Integrators, 2008-2011	8
Table 2-2. Indonesia's Feed Milling Capacity	9
Table 3-1. Key Livestock Assumptions, National Average	13
Table 3-2. Key Pricing Assumptions	14
Table 4-1. Prices and Volumes for Broilers and Layer DOCs, 2011-2012	23
Table 4-2. Possible Causes of Provincial Price Variation	25
Table 5-1. Efficiency Issues Facing the Industry and Possible Remedies	29
Table 6-1. Import Volumes of Feed Raw Materials, 2011	31
Table 6-2. Volumes and Values of Imports for Broiler and Layer Feeds	32
Table 7-1. Imports and Local Production, 2012	38
Table 8-1. Estimates of Broiler Production, 2011	42

Table 8-2. Growth Scenarios for Indonesia's Poultry Meat Sector to 2020	42
Table 9-1. Industry Data Worth Monitoring	46

Abbreviations

ASOHI	Association of the Indonesian Poultry Drug and Vaccine Suppliers.
CPI	Charoen Pokphand Indonesia
DDS	Distillers dried solubles
DOC	Day old chicken
DGLS	Directorate General of Livestock (Ministry of Agriculture)
DWt	Dressed weight (carcass weight)
EU	European Union
FCR	Feed conversion ratio
FS	Final stock (broilers)
GDP	Gross domestic product
GAPPI	Association of the Indonesian Poultry Producers
GoI	Government of Indonesia
GOPAN	Association of the National Chicken Farmer Organizations
GP	Grandparent stock
GPMT	Feed Miller's Association
GPPU	Poultry Breeder Companies Association
HE	Hatching egg
HIMPULI	Native Chicken Farmers Association
HPAI	Highly pathogenic avian influenza
JCI	Japfa Comfeed Indonesia
LWt	Live weight
MMT	Million metric tons
MT	Metric tonne
MOA	Ministry of Agriculture
MOT	Ministry of Trade
PS	Parent stock
PINSAR	Indonesian Poultry Market Information Center
RM	Feed raw material
Rp	Indonesia Rupiah
SBM	Soybean meal
SG&A	Sales, general and administration expenses
SEADI	Support for Economic Development Analysis in Indonesia
SOPs	Standard operating procedures
SSEN	Survei Sosial Ekonomi Nasional
USD	US dollar = 9600Rp

Glossary

Broiler

A broiler is a chicken bred for meat production. Common strains are Cobb, Ross, and Indian River. Birds are placed as day old chickens on broiler farms where they are grown to market weight, which in Indonesia is around 1.5kg live weight. This takes 30-32 days. In that time the birds will consume about 2.4kg of feed. The feed conversion ratio is about 1.6:1 (=2.4 feed/1.5kg live weight). The dressed weight of Indonesian chickens (without head and feet) is about 67 percent.

Breeder (parent stock) farms

Broiler breeder farms raise parent stock (PS) that produce fertilized eggs for the production of broiler day old chickens. The males and females are separate genetic lines. Males are bred more for meat and females for eggs. The breeding birds come from “grandparent” breeding farms and are reared to 22 weeks when they become sexually mature and start egg production. Males are placed with the females at a 1:10-12 ratio to ensure adequate egg fertility. Each female will lay about 170 eggs for the next 42 weeks. This cycle is then repeated when the producer puts another flock of birds into sheds. Parent farms are owned by integrated companies or by specialized breeding companies. Layer breeder farms produce laying breeds. Because the birds are bred for egg production they are smaller than broiler breeders and lay more eggs. The males of the egg laying strains are sold for meat in Indonesia but produce much less meat than broilers and take longer to raise.

Contractors

Indonesian processing companies (“integrators”) use contractors to supply broilers to the processing plant or to the traditional wet market. The integrator arranges feed supply, day old chicken supply, and the catch and delivery of grown birds to the market, along with technical advice to the farmers. Usually the contractor will provide batch credit for growing the chickens (requiring significant funding) and may share in the risk of mortality. The contractor will usually pay bonuses for superior performance (lower feed conversion ratio and mortality). In countries where all birds are processed the integrators will be the “contractors.” In Indonesia, with its large number of farms and geographic spread, specialized operators take on this role, working closely with integrators and their broiler farm clients.

Feed Mills

Feed mills are large operations that have raw material storage capacity (often in silos). They have grinders for grinding grain, mixers for mixing feeds, steam conditioners and presses for pelleting feeds, coolers, crumblers, packing facilities, finished product stores and load-out facilities. Feeds come in "mash", "crumble", and "pellet" forms. They are designed to provide a perfectly balanced diet for each type of stock. Feeds contain such ingredients as corn, rice

polish, soybean meal, minerals, and vitamins. The protein content is usually around 16-17 percent for laying birds and 20-22 percent for broilers.

Hatchery

Hatcheries may be part of the breeding farm or an independent operation to which hatching eggs are delivered. Incubation takes about 21 days and is often in two steps. Initial incubation is in “setters,” machines in which temperature and humidity are closely controlled. Blowers or fans circulate air to ensure uniform temperature, and heating or cooling is applied. The setter phase lasts about 18 days at which point the eggs are transferred to hatcher. On hatch day (day 21) the chicks are removed, inspected, and vaccinated. About 83 percent of the eggs are “hatchable.” Chicks are then sorted (often by sex for broilers and always for layers), counted, and placed in chick boxes for delivery to broiler farms.

Integrator

An integrator performs all or most broiler production. They usually own breeder (PS) flocks, hatcheries, feed mills, and processing plants and may own broiler farms or use contract growers. They provide the chicks, feed, medication, and technical advisers who supervise farm production. Integration reduces costs by coordinating each stage of production. In Indonesia the integrators are companies like Charoen Pokphand and Japfa Comfeed, who own breeding farms and feed mills and also supply day old chickens and feed to independent farmers. In Indonesia, completely integrated operations—in which the integrator manages and funds the entire broiler growing process—are only just developing and the integrators usually use third-party (or sister company) contractors to coordinate with the broiler farms and the funding of the broiler growing operation.

Layer

Laying stock are supplied from layer breeding farms. They are reared until sexual maturity (rearing phase) and begin laying eggs at approximately 18 weeks of age. The birds are usually housed in cage units but floor systems are increasing being used to address welfare issues. Layers will lay around 316 eggs until 72 weeks of age when they are sold for processing.

Native chicken

Native chickens are breeds specialized for joint production of meat and eggs. They are much hardier than broiler or layer chickens and suited for scavenging in village environments. They have less meat than broilers and the meat is much darker due to the exercise that the birds get. This is preferred by many customers and the price of native chickens (“ayam kampung”) can be double that of broiler chickens. The breeding of native chickens is usually very informal and takes place at the village level, but specialized native chicken breeding units are developing.

Processing plant

When birds are large enough, they are shipped to processing plants for slaughter. These are specialized and fully automated slaughterhouses have strict food safety rules and waste treatment facilities. Plants in Indonesia process up to 10,000 birds per hour. When chickens arrive they are stunned, killed, bled, scalded, plucked, gutted, washed, chilled, weighed, portioned (or sold as whole birds), packed, chilled or frozen. They may be deboned and used for further processing (cooked, sausages etc.) in an adjacent section to the processing plant, or on another specialized site.

Preface

Indonesia's large population spread over more than 17,000 islands makes food security challenging. Poor logistics-related infrastructure and regional imbalances in food demand and supply exacerbate the problem. Poultry is an important source of income for poor households in Indonesia and can be an important source of livelihoods in rural areas, both in terms of income and employment. Poultry is also an important source of protein. In a normal year, Indonesian farmers produce approximately 1.285 million tons of poultry meat, representing 62 percent of total domestic meat production. This is supplemented by the production of 1.2 million tons of eggs. Poultry (chicken) is considered a strategic food under the decree of Coordinating Ministry No KEP-11/M.ECON/02/2010 and has an increasing role in the Indonesian diet. For these reasons, the Ministry of Trade is concerned by fluctuations in the price of chicken meat over the past five years and the high disparity in price among regions (and cities).

The Trade Policy Analysis and Development Agency (TRECDA) of the Ministry of Trade requested SEADI's support in conducting this value chain study of the poultry sector. The purpose of the study is to help MOT better understand the cost components of each part of the poultry value chain in Indonesia and provide recommendations for domestic and international trade-related policy reforms. A specific request was made to identify transport costs in the industry. The value chain approach identifies and assesses cost factors that contribute to retail prices. With accurate information on the food supply chain available, policies can be reformulated to support efficiency in food distribution, to prepare preemptive measures to assist development of the industry, and to avoid excessive price increases and disparities among regions.

An industry cost structure database would also allow MOT to understand how competitive the industry might be in an export scenario and a section of this study addresses Indonesia's international competitiveness.

Executive Summary

The broiler and commercial egg industries in Indonesia are large. According to statistics of the Government of Indonesia the value of the poultry meat sector is Rp42 trillion and the commercial egg sector Rp28 trillion. But, if industry estimates are assumed, the government statistics appear to underestimate volumes in both sectors by about 40 percent. The government should review industry production statistics to ensure correct data are collected and published.

Margins in the broiler and egg sectors are evenly spread across production subsectors and with no subsector taking margins that could be considered excessive. This suggests that both industries are highly competitive. Margins represent a fair return for investment and risk for activity in both sectors.

Transport costs in the broiler and commercial egg sectors are 4.7 percent and 5.1 percent of selling price, respectively. The largest transport cost is for raw material transported from port to the feed mill, where inefficiencies are due to port and road infrastructure, both beyond the control of industry.

Prices in the broiler and egg sectors vary by region because of regional differences in feed, transport and cost structures but all price differences are explainable. The co-efficient of variation of prices between provinces, as currently undertaken, shows only that there is variability (explainable) and does not indicate instability in the market, as has been suggested.

The industry has many inefficiencies but improvement is constrained by a structure based on small farms, with poor infrastructure and inadequate bio-security. Larger integrators' investment in modern broiler growing facilities will address some inefficiencies but will mostly affect industry development (product development, food safety and sustainability), and will not reduce costs.

Because Indonesia imports so much of its raw material, feed costs are based on an import parity cost structure. Estimates of corn production shortfalls suggest that this will continue and corn will need to be imported for a long time, if not forever. That means that even if corn production increases, feed prices will not decline as corn price will continue to be set at import parity.

The cost of broiler production in Indonesia, relative to other countries, is very high and will remain so, thereby preventing Indonesia from becoming a significant exporter. Any exports will be to niche Asian markets and be in small volumes. However, the opportunity for Indonesia to substantially increase local production through increasing demand is substantial.

As GDP rises, the consumption of poultry products in Indonesia will increase. The rate of increase will follow what has happened globally and likely to be biased towards what has

happened in Asian countries, particularly Malaysia. Tools exist to predict how the industry will develop and government and industry should cooperate in developing accurate production volumes and projections, especially as they relate to the many issues that will affect both parties (e.g., location of expansion, infrastructure, environment, bio-security, corn use, foreign exchange demands).

The poultry meat sector is projected to grow 70 percent to 90 percent by 2020, if GDP increases by 6 percent per annum. The layer industry is projected to grow at around 50-60 percent of the broiler sector.

1. Poultry in Indonesia

Indonesia's poultry industry has several sectors, namely poultry breeding, commercial broiler and egg production, and village poultry production. The industry is supported by feed millers, corn producers, raw material suppliers, equipment suppliers, the animal health industry, the transport industry, contractors, processors, traders, retailers and customers, financiers, and the government.

INDUSTRY SIZE

Industry statistics vary widely. Government statistics show the following production levels.

Table 1-1

Size of Indonesia's Poultry Industry, 2007-2011 (metric tons)

Item	2007	2008	2009	2010	2011
Layer meat (DWt)	5,862	57,274	55,055	57,712	60,110
Native chicken meat (DWt)	294,899	273,546	247,725	267,636	283,135
Broiler meat (DWt)	942,784	1,018,734	1,101,765	1,214,339	1,270,438
Total Poultry Meat	1,243,545	1,349,554	1,404,545	1,539,687	1,613,683
Native hen eggs	230,472	166,618	160,921	175,528	179,605
Commercial eggs	1,382,139	1,323,606	1,318,915	1,379,607	1,449,115
Total eggs	1,612,611	1,490,224	1,479,836	1,555,135	1,628,720

SOURCE: Directorate General of Livestock (Ministry of Agriculture).

These figures equate to per capita consumption of 6.7kg poultry meat (5.3kg from broilers) and 6.8kg of eggs or 108 eggs per capita. Meanwhile, industry estimates of consumption are closer to 9.3kg of poultry meat and 9kg of eggs. GPMT (feed miller's association) states that broiler consumption is 7.1kg per capita, consistent with 8.6kg of poultry meat. Commercial egg value is only 67 percent of the value of the poultry meat sector.

Table 1-2

Size of Indonesia's Poultry Industry ex Government Volumes by Subsector (Rp trillion per 1.6MMT)

Broilers	Meat	Eggs
DOC	4.843	0.421
Feed	25.218	19.496
Farm	6.477	3.283
Post farm	5.063	4.800
Total sales	41.600	28.000

IMPORTANCE OF INDUSTRY TO FOOD SECURITY

Survei Sosial Ekonomi Nasional (SSEN) states that in 2011 Indonesians spent 1.85 percent of their income on meat (62 percent of which is poultry) and 2.88 percent on eggs. This implies that Indonesians spend 55 percent more on eggs than on meat. Rice is 7.48 percent, fish 4.27 percent, milk 4.32 percent, beans 1.26 percent, fruit 2.15 percent, oil 1.91 percent. While the breakdown of poultry consumption requires clarification¹ the combined spending is 4.73 percent of income, some 10 percent above fish and milk, out of an average household spending of 49 percent on food items. Poultry therefore represents 9.6 percent of the total food budget (plus the large poultry component of ready meals), so is significant from a food security viewpoint.²

LOCATION OF INDUSTRY

The poultry industry is spread throughout Indonesia, with significant egg production in East Java, a reflection of the availability of locally grown corn and the ease of transporting eggs from to the markets in West Java. Broiler production is countrywide but focused in West Java (Bandung), close to its fresh bird markets that lack an adequate cold chain. Village poultry exists across Indonesia.

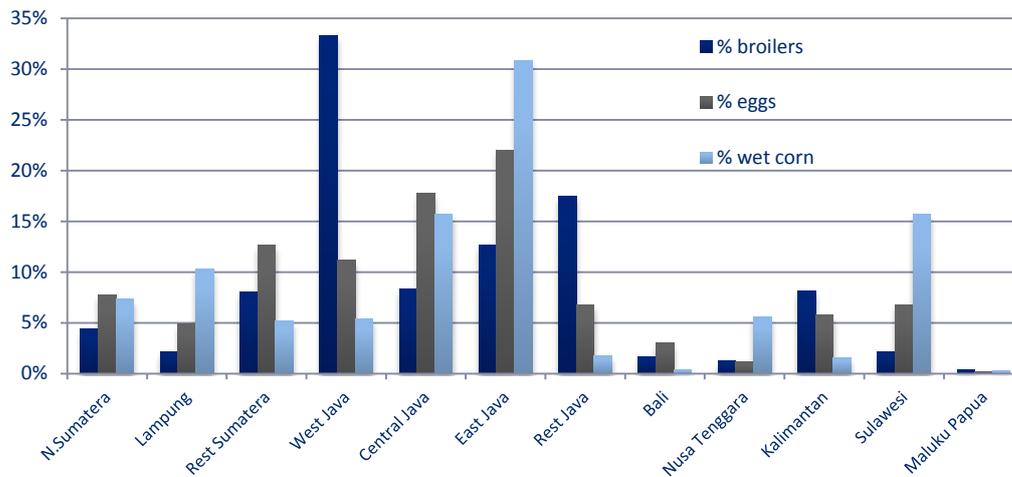
Broiler and egg production, by region, is highly correlated to the population (R^2 0.87 and 0.90, respectively). This has evolved due to the historical demand for live birds—which cannot be transported efficiently over even medium distances in Indonesia due to high temperatures and poor road infrastructure—and high demand for fresh eggs. The development of the industry therefore follows the development of the wet markets around the large populations of West, East and Central Java. This has been supported by the development of feed production capacity close to the ports of major population centers around Jakarta and Surabaya.

Figure 1-1 shows the percentage of production by area along with wet corn production (tabular data on regional production of broilers and eggs is in Appendix B). Most broilers are produced in West Java while East and Central Java supply most eggs. East and Central Java, along with Sulawesi, produce most of the corn. Corn production in East and Central Java drives egg production because much of the feed is produced using local corn and concentrate. Lampung, Sulawesi, and East Java have a net corn advantage, while West Java needs to import much of its corn.

¹ Poultry production statistics multiplied by market prices suggest that broiler consumption (in Rp) is about 60 percent higher than eggs. SSEN statistics state that 28 percent of food spending is on ready meals (and alcohol), suggesting considerable spending on broilers (particularly) and eggs in this category. Data should exist to isolate the broiler and egg spending but that is beyond the scope of this study.

² The observation that 10.5 percent of food spending is on tobacco (SSEN data) may suggest ways of addressing food security.

Figure 1-1
Relationship between Broiler, Egg, and Wet Corn Production by Region



COMMERCIAL BROILER

The commercial broiler-breeding sector in Indonesia relies on the supply of imported grandparent stock (GPs) from Cobb, Ross, and Indian River pure lines in Europe and the United States. The GPs in turn supply parent stock (PS) day old chickens (DOCs) to PS farms throughout Indonesia. These farms rear the birds until point of lay (22 weeks) and then enter the laying phase to around 64 weeks. The hatching eggs are incubated and hatched in hatcheries in the PS operation (a 21-day process), or as standalone units throughout the country, to produce the final stock (FS) commercial broiler DOCs that are sold to broiler farmers. Since the length of the cycle for both GP and PS is over a year, the PS progeny of a GP import will be producing commercial broilers up to 2.5 years later. So, in effect, the commercial broiler DOC supply is controlled by the quantity of GP imports (which is controlled by the MOT) with occasional shortfalls in PS being supplemented by PS DOC imports (controlled by the MOA).

The commercial broiler DOCs are grown in company farms owned by the large integrators (10 percent), contract farms (70 percent), or independent farms (20 percent). The average farm size is small, with a capacity for 5,000-20,000 birds. Birds are grown to 1.0-2.0kg (average of around 1.4kg at 30 days of age). Mortality on broiler farms is 6-7 percent. Average feed conversion ratio (FCR) is about 1.6-1.7:1, with significant variation throughout the country due to widely differing housing, animal health, and management practices.

Contract farms produce some 70 percent of the broilers. In this system the contractors (who may or may not be independent of the integrator) pay for the DOCs, feed, and medicines and give farmers a growing fee with a bonus for superior performance. This system is used as the significant funding and management of a large number of farms (>20,000) would be difficult for the integrator to do, so a specialized function is set up via the contractors.

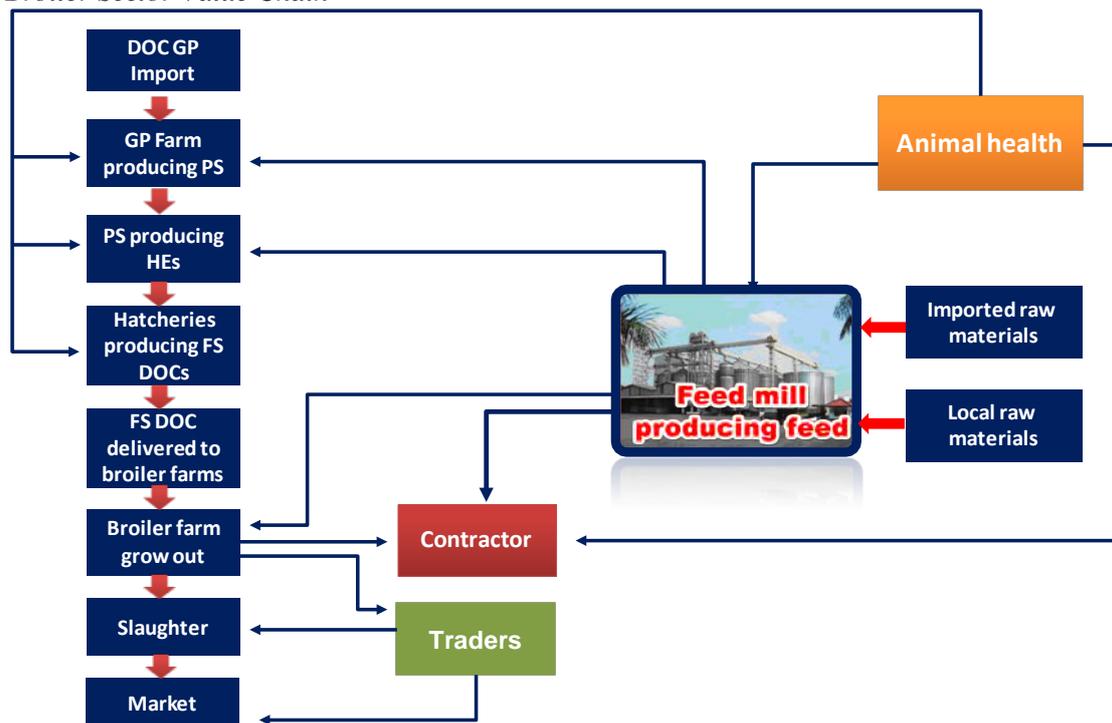
Feed is supplied from nearby feed mills, delivered in bags (no bulk feed in Indonesia) to farms usually by contract truckers. The farmer supplies any litter (many birds are on elevated slates), water, power, and gas.

Grown broilers are collected from farms for delivery to company-owned slaughterhouses (processing 10-15 percent of the broilers) or are collected by agents and enter the wet market system. Agents may sell directly to the wet market retailer who will slaughter the birds in simple facilities before trucking to the wet market stall. Alternately, birds may be sold through a chain of agents, who act as consolidators and distributors, all taking margins on the way through. Seventy-five to 80 percent of birds will be sold through the wet market system. Birds processed by integrators will be sold through the developed cold chain (to supermarkets, food service) as whole or cutup/deboned birds, or further processed into shelf stable (sausages) or frozen products (nuggets).

Birds sold in traditional markets are presented with head on/feet on³, but sold on a head off/feet off basis. There is a preference for a carcass weight around 1kg, and 90-100 percent of birds are cut up by the retailer. Prices of components (when sold separately) show little variation,⁴ with wings being sold at the same price as breast, or when wings are discounted, the discount may only be 3-8 percent.

A typical flow of activities in the commercial broiler sector is contained in Figure 1-2.

Figure 1-2
Broiler Sector Value Chain



COMMERCIAL LAYER

The commercial layer industry has only one GP farm (Isa breed) that has a 60 percent market share of the commercial layer sector, while Lohmann and Hyline PS are imported. There are

³ Head on, feet on presentation to demonstrate that health birds were slaughtered. When purchased, the head/feet are sold separately.

⁴ This has implications for the MOT if imports of selected cuts are considered as a means reducing selected product prices.

15 PS operators in East Java, North and South Sumatra, South Sulawesi, and South Kalimantan. Hatcheries are spread nationally and receive hatching eggs from the PS farms. The hatched DOCs are sold to commercial layer farms nationally that vary in size from 1,000-1m birds and average 30,000 birds. The birds are reared on the laying farm to point of lay (18 weeks) then undergo a laying phase of up to 18 months. In this time birds may lay up to 400 eggs (24kg). Cull birds are slaughtered (as are culled PS) and enter the wet market slaughter system. Eggs are sold to traders then into the market system with most eggs being sold in wet markets by weight. In supermarkets eggs are sold in various pack sizes.

A typical flow of activities in the commercial layer sector is contained in Figure 1-3.

Figure 1-3
Commercial Layer Sector Value Chain

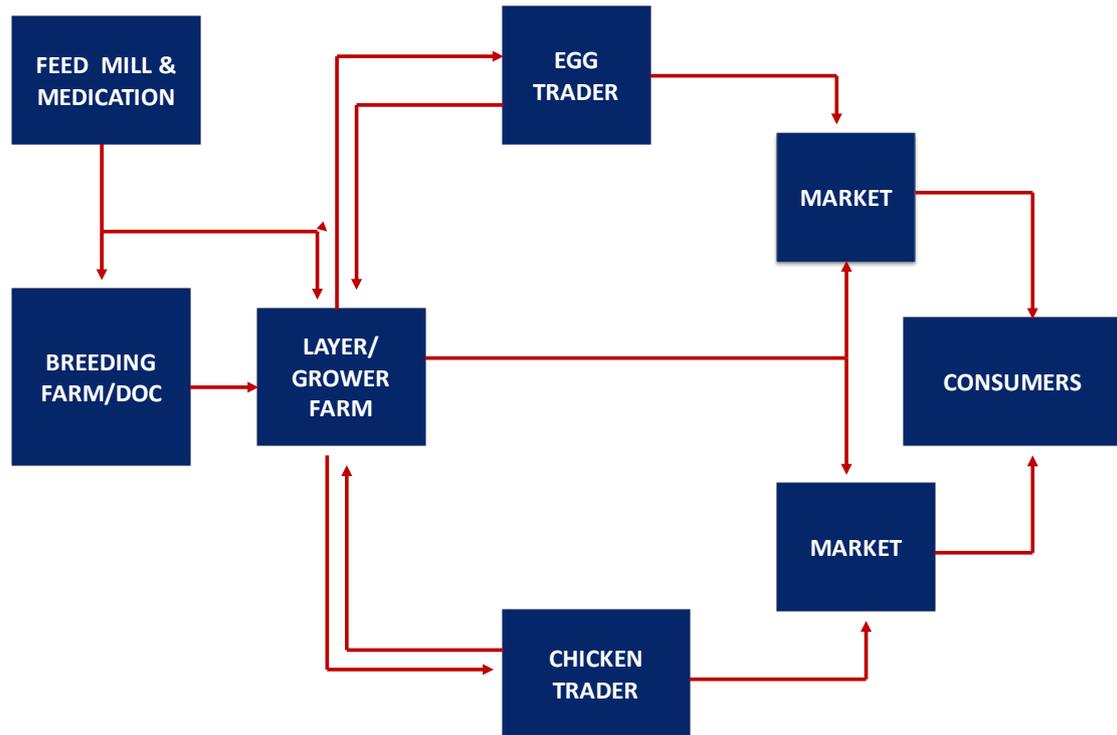


NATIVE CHICKEN

Native chicken supplies about 15 percent of Indonesia's poultry meat. HIMPULI states that 22 million households in Indonesia raise native chicken, 1 million of which have more than 30 birds. Most birds are fed scraps and cheap feeds; only 70 percent of commercial native chicken production uses complete feeds. Industry sources state that 10 percent of these birds are confined and fed commercial feeds while the rest scavenge.

A typical flow of activities in the native chicken sector is contained in Figure 1-2.

Figure 1-4
Native Chicken Sector Value Chain



2. Stakeholders

Major production stakeholders are breeders, feed millers, broiler farmers, processors, local slaughterhouses, and regional market players (traders and wet market operators), along with ancillary supply chain operators (notably animal health and equipment). Large integrators control the key sectors of DOC and feed supply, in addition to an increasing volume of contract broiler growing and processing. Any discussion of the industry is dominated by a recounting of the activities of these companies.

THE INTEGRATORS

Chareon Pokphand

CPI has approximately 12 feed mills across Indonesia with 4.5MMT capacity and a 33 percent market share in poultry feed. Mills include Banten, two in East Java, Medan (N Sumatra), Semarang (Central Java), Lampung, and one being built in West Java. CPI has Cobb 500 and Ross 308 broiler PS and Isa Brown layer PS. PS operations have been extended to East Nusa Tenggara and Papua. CPI has at least five broiler processing plants (two in Banten, Medan, Sidoarjo and Surabaya; owns its own broiler farms; and uses contract broiler growing for most of its live bird supply. It is a market leader of further processed products (Golden Fiesta, Fiesta, Champ and Okay brands) with processed chicken sales in 2011 up 19 percent from 2010. In 2011 feed produced 77 percent of sales revenue, DOCs 13 percent, and processed chicken 9 percent.

Japfa Comfeed Indonesia

JCI has 11 feed mills across Indonesia (Medan, Padang, Lampung, Bati-Bati, Makassar, Tangerang, Cirebon, Sragen, Sidoarjo, Surabaya, Banyuwangi) with a market share in poultry feed of 25 percent. JCI (through Multibreeder Adirama Indonesia) has Indian River broiler PS and Lohmann Brown layer PS. It has seven broiler slaughterhouses (in Pekanbaru, Banjarbaru, Lampung, Bogor, Pabelan, Grobogan and Bali through Ciomas Adisatwa) and increased processed chicken sales by 56 percent in 2011. It has a significant market share in frozen and shelf stable processed products through So Good Foods. It has corn driers in Pare Pare and Lampung and its bag making operation in East Java produces 5,700 MT of polypropylene bags.

Others

Sierad has three feedmills in Sidoarjo (East Java), Tangerang (Banten), and Lampung (South Sumatra). Its market share for feed is around 8 percent. Malindo has a capacity of 0.9MMT with 7 percent of the poultry feed market from mills in Cakung, Cikande, and Gresik. Wonokoyo's feedmills in East Java and West Java produce about 0.6MMT of poultry feed per annum (about 5 percent market share). It has Cobb PS broilers and Isa layer PS.

CP, JCI, Sierad, and Malindo are listed companies. Their financial performance is summarized in Table 2-1.

Table 2-1
Financial Performance of Value Chain Integrators, 2008-2011 (000,000 Rp)

Structure	2008	2009	2010	2011
CP (GROWTH 2008-2012, 35%)				
Sales	13,311,141	14,569,267	15,077,822	17,957,972
Net profit	253,977	1,619,418	2,219,861	2,219,861
% Net profit	1.9%	11.1%	14.7%	12.4%
Assets				8,848,204
JCI (GROWTH 2008-2012, 23%)				
Sales	12,666,000	14,340,000	13,956,000	15,633,000
Net profit	305,000	637,000	959,000	617,000
% Net profit	2.4%	4.4%	6.9%	3.9%
Assets				8,266,000
SIERAD (GROWTH 2008-2012, 73%)				
Sales	2,332,000	3,243,000	3,643,000	4,029,000
Net profit	27,000	37,000	61,000	23,000
% Net profit	1.2%	1.1%	1.7%	0.6%
Assets				2,642,000
MALINDO (GROWTH 2008-2012, 53%)				
Sales	1,729,647	1,868,616	2,036,519	2,639,481
Net profit	9,042	75,970	179,906	203,966
% Net profit	0.5%	4.1%	8.8%	7.7%
Assets				1,327,801
TOTAL				
Sales	30,038,788	34,020,883	34,713,341	40,259,453
Net profit	595,019	2,369,388	3,419,767	3,063,827
% Net profit	2.0%	7.0%	9.9%	7.6%

SOURCE: Company annual reports

The weighted average growth of the companies from 2008 to 2012 was 34 percent, reflecting the underlying growth in the sector. The growth in broiler processing (via CP and JCI) is much higher than this, reflecting industry trends.

Some interviewees expressed the belief that large integrators were making excessive profits from the industry. The listed companies alone have total invested assets of US\$42.22 billion. This is a very significant commitment to the industry and a weighted average net profit of 7.6 percent is commercially acceptable. The entire industry relies on these companies, who alone have the financial, physical, and human resources to import and process the genetic and feed raw material base to the industry and to develop technology, processes, products, and services to take the industry to the next level (see later).

FEED MILLS

There are 68 feed mills in Indonesia with a capacity of up to 18.5MMT. With national coverage, there is ample capacity to supply a growing poultry sector. All major mills produce pelleted and crumbled feed for broilers and pelleted and mash feed for layers. All feed is in bags, which increases production and transport costs.

Table 2-2
Indonesia's Feed Milling Capacity

Region	No. of Feedmills	Capacity ('000MT)
North Sumatra	8	2,250
South Sumatra	4	1,500
West Sumatra	1	250
Banten	11	3,500
DKI Jakarta	4	750
West Java	8	2,000
Central Java	6	1,500
East Java	20	5,250
South Sulawesi	5	1,250
South Kalimantan	1	250
Total	68	18,500

SOURCE GPMT.

GPMT, the feed miller's association, represents 40 feed mill companies and coordinates feed issues with the government, especially issues related to raw material imports. GPMT states that layer feed production is 5.4MMT, of which a significant component is concentrate, used on average at 35 percent of the complete diet. It says that broiler feed is 5.5MMT per annum. Feed production in 2012 was 12.3MMT so there is about 50 percent surplus capacity.

Feed raw materials are imported through major international traders and shipped in Panamax and Handimax vessels. Since 75 percent of the raw materials are imported (and 100 percent of the soybean meal is imported), corn and soybean meal exporters (United States, Brazil, India) have a significant interest in Indonesia's poultry industry. The American Soybean Association and US Grain Council are very active in promoting their products

PARENT STOCK BREEDING FARMS

The breeding sector is largely in the hands of the large integrators. CP (Cobb and Ross) and JCI (Indian River) own GP broiler operations and operate the majority of parent farms for these breeds. Sierad, Malindo, Wonokoyo, and others operate the balance of the PS farms. Isa owns the only layer GP operation, and that operation supplies 60 percent of the layer parent stock. CP and JCI use Isa and Lohmann breeds and own the majority of the PS farms for these breeds.

The breeding sector is represented by

- **GAPPI, the Association of the Indonesian Poultry Producers.** This association represents the large companies that have feed, PS farms, contract growing and processing. GAPPI members have important roles in other associations.

- ***GPPU, the Poultry Breeder Companies Association.*** This is effectively the PS farm association, principally responsible for breeding DOCs for the broiler and the layer industries. It represents 90 large breeding companies

There are now few breeding companies in the world and Indonesia has access to the best genetics in the world. Cobb-Vantress, Aviagen (Ross) and Hendrix (Isa) offer significant assistance by providing standard operating procedures and international benchmarking.

BROILER FARMERS

Broiler farm ownership is dominated by small independently owned farms (averaging 5-20,000 bird capacity) that produce birds by contract for the large integrators (60-70 percent of production) or are independent (20 percent of production). The integrated companies are developing larger farms (100,000 capacity with higher quality hardware) currently representing some 10 percent of total production, but will grow. The broiler farm sector is represented by

- ***GOPAN, the Association of the National Chicken Farmer Organizations.*** This politically active association represents the demands of all poultry farmers.
- ***PINSAR, the Indonesian Poultry Market Information Centre,*** represents independent small farmers largely by providing market intelligence on a daily basis.

VILLAGE POULTRY FARMERS

Native chicken raised in villages supply 15 percent of Indonesia's chicken meat and eggs. While much of the output is consumed by the producer, there is a significant market for "ayam kampung" chicken, priced at a significant premium. This sector is represented by HIMPULI (the Native Chicken Farmers Association). Given that 22 million households are reported to produce village chickens (with 1 million farms having more than 30 birds), this sector is huge when measured by the population involved.

CONTRACTORS

Sixty to seventy percent of broiler birds are grown through a contract growing system. The system's managerial and logistical requirements are huge when compared to the average farm size, so major integrators use contractors to meet these requirements. Contract truckers transport feed raw materials and finished feed. Contractors organize (and fund) broiler growing for the large integrators. This requires considerable working capital so banks also have a stake in the industry's profitability.

MARKET TRADERS

Traders supply and distribute final products. Corn farmers in Indonesia have very small acreages so corn consolidation and distribution is a major task involving many tiers of traders. This results in significant trader margins that adversely affect corn farmers' profitability and impedes the development of corn production.

Traders also control post-farm consolidation and distribution of eggs and broilers. Traders can be catchers, collectors, and consolidators and may slaughter birds for sale to the market retailer or on-sell live birds to a second (or even third) level of trader who will undertake the slaughter.

PROCESSORS

The number of modern slaughterhouses and processing plants is increasing, and integrators are developing national coverage. This trend is enabling production of higher quality birds that are distributed through the cold chain and have a shelf life of up to 10 days. The rapid rise of further processing is being driven by the development of supermarkets and by supply-driven demand for shelf stable and frozen products. Meanwhile, small slaughter operations in the backs of houses supply wet market traders with dressed birds. The sustainability of such operations is in doubt because of food safety concerns.

RETAILERS

Most of Indonesia's eggs and broilers are sold in traditional wet markets. Broilers are delivered to the market slaughtered with head and feet on without any cooling or ice. Typically a retailer will sell 50kg of chicken per day with 50-100 retailers common in a market. The quantity of broilers sold cut up varies but appears to be 90-100 percent.⁵ Purchase of a whole bird for cut up on site is common.

Broiler meat is also sold through the modern cold chain to supermarkets and the food service sector. The share of further processed products is growing, with frozen products such as chicken nuggets holding significant shelf space in supermarkets where retail margins are 30 percent.⁶ This supply is led by CPI and Ciomas (JCI), who report significant growth in the fresh and frozen sectors.

Eggs are sold as branded products in supermarkets by weight and in packs (6,10,12 piece etc.). Eggs are sold in the wet market by weight.

ANIMAL HEALTH COMPANIES

Animal health represents some 1-2 percent of the cost of production of live birds, with the majority of this cost being vaccination, feed additives (vitamins, enzymes, anti-coccidials), and farm medications. ASOHI, the Association of the Indonesian Poultry Drug and Vaccine Suppliers, represents 16 provincial branches and aims to coordinate production and distribution to the private and public sectors, with the government being a major purchaser of poultry drugs and vaccines for smallholder development programs. Companies like Evonik (major supplier of amino acids) offer significant technical assistance to the industry.

EQUIPMENT SUPPLIERS

Most broiler farms use basic construction materials (bamboo) so shed construction is not a major industry. These farms normally have manual feeders and bell drinkers manufactured in Indonesia. Cages are the main equipment on layer farms. As the industry develops so will the henhouse construction and automatic equipment sectors. Feed mill, slaughterhouse, and processing equipment is sourced from EU and China.

⁵ Ex Bogor market survey.

⁶ Prices observed for products in supermarkets were as follows. Whole chicken Rp 40-56,000/kg. Bone in breast, legs, thighs, wings up to Rp 70,000/kg, boneless breast up to Rp 82,000/kg. Frozen breaded products Rp 60-100,000/kg.

CONSUMERS

All Indonesians accept poultry so the entire population has a significant stake in the sector. Consumers vary in spending power and demand characteristics but all have a stake in product volume, price, and quality and food safety is becoming a significant issue, highlighted by Indonesia's experience with avian influenza. While the government wants to improve food safety by modernizing the retailing of broiler meat and shutting down wet markets, this will take time to achieve.

GOVERNMENT OF INDONESIA

The poultry industry is a significant employer. Industry sources state that three million people are employed in the industry. The industry also imports a significant quantity of raw material (estimated at Rp47trillion – US\$4.9billion) delivered mill so it has a big impact on foreign exchange requirements. It uses 6MMT of locally produced corn so the efficiency of its poultry production (to reduce imports) is important to the government. Imported and local raw material movements rely on the government maintaining or increasing port capacities and capabilities. A significant quantity of feed, chickens, and eggs are transported by road, so related infrastructure must also be adequate. The industry is already a significant user of electricity, and water use will increase in volume and concentration as the slaughter sector modernizes. Not least, integrators are significant contributors of tax, while much of the industry seems to escape taxation.

3. Costs and Margins

We have quantified the cost structure and margins of the broiler and layer value chains separately and present our quantification method below.

METHODOLOGY

From the placement of day old parent stock to the final sale of broilers and eggs to the consumer, we broke the value chain into input and output activities. We then used our own broiler production model and local data to calculate outputs and costs of live bird production. Data on post-farm costs were taken from interviews. We made breed standard assumptions for the inputs (feed) and outputs of parent stock farms (total eggs, hatching eggs) and hatcheries (hatchability). Farm and hatchery costs were estimated on the basis of Asian benchmarking.

Input/output assumptions quoted in interviews were used for broiler farms (farms costs, live weight, FCR and mortality) and layer farms (farm costs, egg production, mortality). These are likely to be overstated, meaning broiler farm and contractor margins may be overstated in our analysis. The relationship between farmer and contractor margins will vary as risks and rewards are shared under varying scenarios (e.g. credit terms, mortality risk). Our assumption is that the contractor margin will be greater than the farmer margin because contractor investment and risk are greater.

Our assumptions are biased towards the interviews that were all done around Jakarta, Tangerang, and Bogor. Regional differences in livestock performance, feed costs, post-farm costs, prices, and margins will be minor relative to the overall analysis; we attempt to explain these via the final price differences among provinces. Table 3-1 provides details on our assumptions about livestock; Table 3-1 provides details on our assumptions about pricing.

Table 3-1
Key Livestock Assumptions, National Average

	Broiler	Commercial Layer
Hatching eggs per breeder	166	225
Hatchability	82%	80%
Mortality	6%	8% in lay
FCR	1.6:1	2.2:1 for layer feed
Kill weight (LWt)	1.6kg	

Note: Broilers in Indonesia are weighed on the farm with a full crop compared with weighing at a slaughterhouse with empty crop in the developed world. This means that the FCR is being understated by some 3-4 percent relative to international commercial benchmarks. The FCR of 1.6:1 that is used compares to a Cobb breed standard of 1.5:1. Also, breed differences in hatching egg production will result in a range of production across Indonesia. Prices for feed, DOCs and eggs and broilers were taken from market statistics.

Table 3-2
Key Pricing Assumptions

	Broilers	Layers
DOC cost (Rp/DOC) ex hatchery	3,500	5,000
Average feed cost (Rp/kg)	6,500	4,600
Broiler price ex farm (Rp/kg LWt)	15,300	
Broiler price retail (Rp/kg DWt)	26,000	
Egg price (Rp/kg egg)		16,000

Note: Figures as of December 2012 around Jakarta/Bogor – as a base case. Average Feed cost will vary as to whether it is sold ex mill, ex trader or ex contractor, as well as there being regional price differences. Since 20% of layer feed is estimated to be ex home mixing, this cost reflects this.

Data on feed mill production costs were taken from interviews, as were data on transport costs in the value chain. Because feed is the major cost item in live bird and egg production, we also attempt to identify the SG&A and income tax component of producing feed.

In identifying margins in the value chain one must standardize definitions. Our approach is to quantify as much information as possible and then define “margins” as follows.

DOC margin	Gross margin before SG&A, before tax
Feed margin	Net margin after SG&A, after tax ⁷
Farm margin (broiler and layer)	Gross margin ⁸ before tax (if any)
Trader/consolidator/s margin	Gross margin ⁹ before tax (if any)
Retailer margin	Gross margin ¹⁰ before tax (if any)

The reason for taking feed margin as net margin is due to the availability of financials for four listed companies whose feed sales represent about 75 percent of total feed sales—hence we can attempt to allocate SG&A and tax costs. In addition, feed milling operations have significant SG&A and financing costs that other stakeholders do not have so the use of net margin for feed mills and gross margins for others is probably more equitable than using gross margins for all—although that can be easily done.¹¹ The DOC margin is small so we did not attempt to quantify SG&A (with these costs being relatively high for a breeding operation with a significant sales force). Retailers in local markets will have minimal investment, SG&A, and tax so their margin (as owner-operators) is largely a return on labor. Larger retailers' (supermarkets) margin is taken as gross margin, but they will have significant costs (e.g., marketing, labor, power).

Our base case analysis is for birds sold fresh in traditional markets. An analysis for chicken processed in modern plants follows later.

⁷ Assumed to be 7.4 percent after analysis of financial statements of listed companies

⁸ To cover return on investment and management. External labor included in farm costs.

⁹ To cover all costs (return on investment, costs of credit, management, staff costs) but not transport.

¹⁰ To cover costs of running market retail outlet.

¹¹ The addition of the SG&A, financing costs, and tax to the net margin will produce the gross margin.

COST AND MARGINS FOR BROILERS

The cost and margin structure of broilers starts with the purchase of the PS DOC, through the PS farm onto the hatchery producing the commercial DOC to the broiler farm. Feed is supplied ex-feed mill with costs broken down to raw material cost CIF, transport to the mill, feed production costs, SG&A, finance costs, tax, and estimated feed mill margin (data are tabulated in Appendix A). Broiler farm operating costs and margins are calculated before the bird leaves the farm where it then has costs associated with trader margin, transport, slaughter, and retail margin. See Figure 3-1.

Figure 3-1
Breakdown of Broiler Costs (Rp/kg DWt)

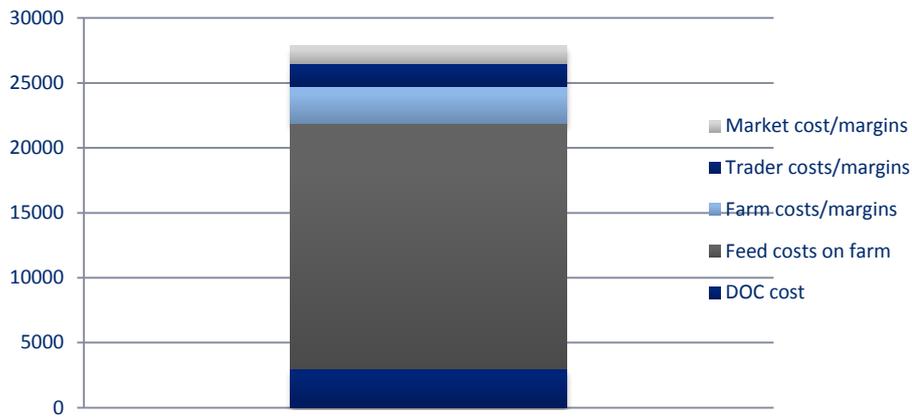
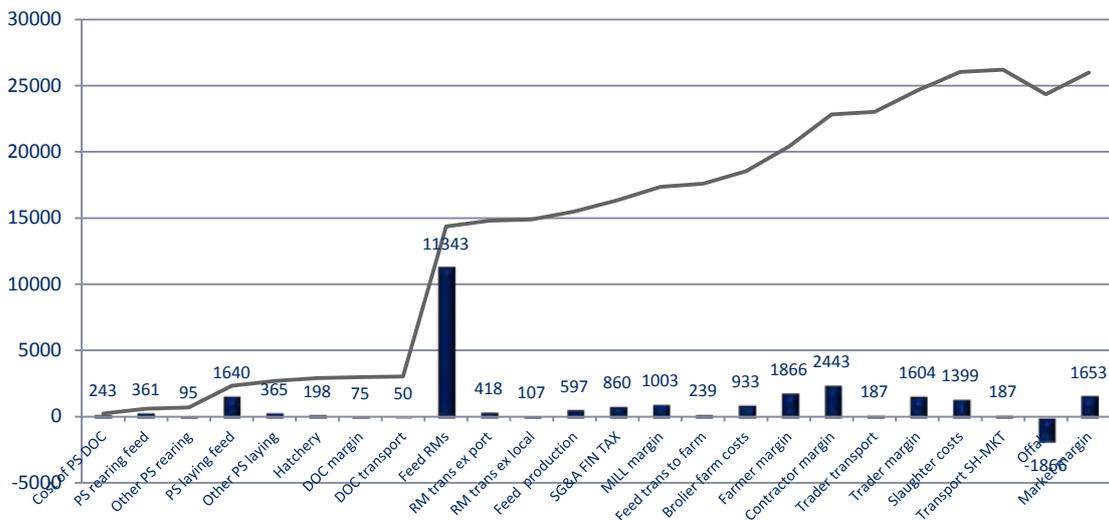


Figure 3-2 shows the buildup of costs by activity and time, from the PS farm, through the feed mill and broiler farm to the market. Costs are provided for each activity and cumulated.

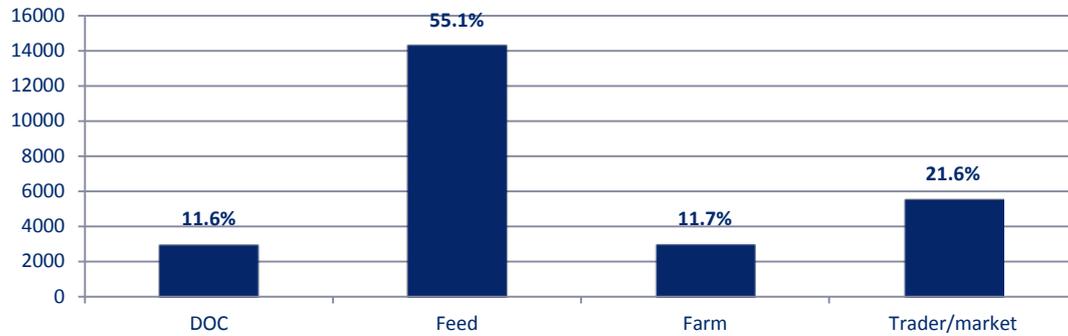
Figure 3-2
Cost per kg Broiler to Consumer in Wet Market (Rp/kg DWt)



The breakdown of costs in each subsector of the broiler chain, as the industry usually thinks of it, is presented in Figure 3-3.

Figure 3-3
Breakdown of Costs in Broiler Chain to Consumer

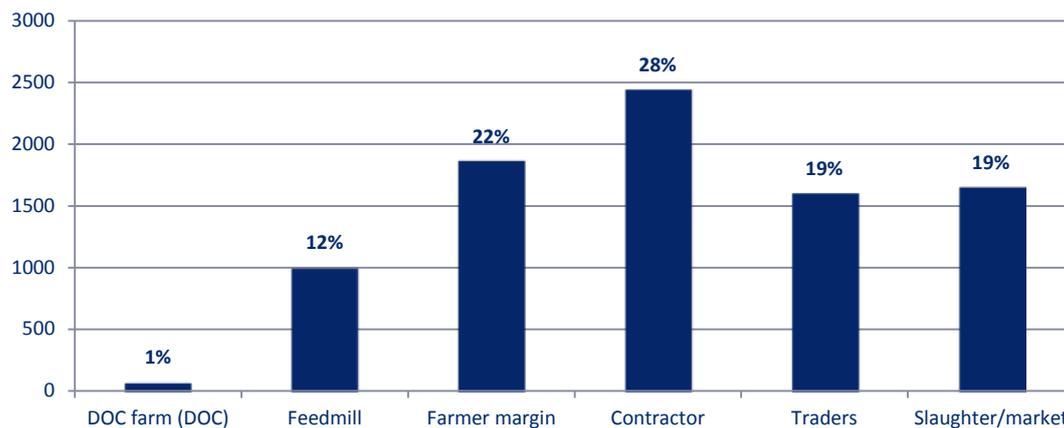
Rp/kg dressed weight and as percent of total costs by subsector in the chain



The DOC price and margin is 12 percent of the final price, feed cost and margin is 55 percent,¹² farm production costs and margins are 12 percent, and post-farm costs and margins are 12 percent. Total margins (as defined) in the total chain are 33 percent of the selling price of the chicken into the market. Figure 3-4 presents a breakdown, with no attempt being made to isolate transport margins. Thirty-seven percent of the margins are post farm.

Figure 3-4
Broiler Margins per Bird to Consumer

Rp/Kg DWt and as percent of total margin by sector



The margins are shown in Figure 3-4 as total margins (Rp/kg DWt) and as a percentage, by sector, of the total. The DOC margin component is very low because the cost of the DOC is only 11 percent of the final price, but also it seems that the DOC price (and margin) was low

¹² But higher if we include the feed component of the DOC cost. Also, this is farm gate price ex mill and does not include any contractor margin.

when this analysis was done and that DOC prices should increase to ensure viable margins. Feed mill margins represent 12 percent of total margins as we have used net margins. If we had used gross margins, the feed mill margin would be about 24 percent of the total, but as discussed the net margin is a better indicator of real profit as SG&A, finance, and tax costs are significant. Farmers take 22 percent of the margin, while contractors take 28 percent. The farmers' margins will depend on any bonus (or discounts) they get above the average payment by contractors and will vary, as livestock performance varies, from batch to batch. That the contractors' margin is the highest (as a percentage of total margins) is expected because they bear the market risk on price and performance, provide the full batch funding/credit, and bear significant administration costs that we have not deducted from the gross margin.

Twenty percent of farms are independent and don't use a contractor. These famers take responsibility for finance, farm risk, and market demand. It is likely that many make lower margins as they struggle to fund and manage variable production and marketing variables. That is why there has been a move to use contractors, who provide a more stable production base for the farmers. Integrators who produce birds directly (upwards of 10 percent of production) also act as contractors and traders. This involves higher costs but also higher margins (due to efficiencies that can be built into this system) and this production model will increase.

Of interest to any subsector is the margin to be made on sales. This margin (as we defined) at each stage of the value chain (as a percentage of the sales) is as follows:

Figure 3-5
Margins on Sales for Each Subsector in Broiler Value Chain (%)

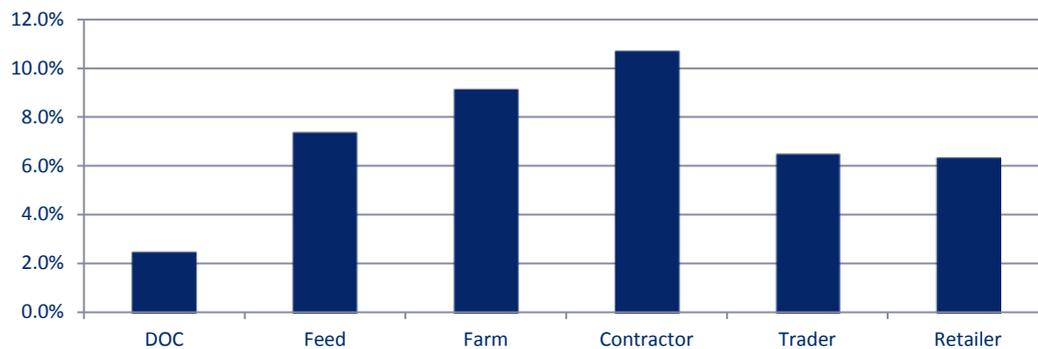


Figure 3-5 shows that margins are spread evenly across the supply chain and fairly represent the reward to investment and risk, and in no case are excessive. The fact that the farm, contractor, trader, and retailer are making between 6 percent and 10 percent gross margins also suggests these are highly competitive sectors, as are the DOC and feed sectors.¹³ As noted, the higher margin for contractors is justified on the basis of their high investment and risk.

¹³ The DOC margin for a DOC price of Rp 3000 (end 2102) is abnormally low and will increase as DOC prices return to Rp 3500.

MODERN SLAUGHTER/PROCESSING

The preceding analysis relates to selling birds into the traditional market. If we change the production model to one in which 2.2kg live weight birds (with a 1.8:1 FCR) are produced and delivered directly from a farm to a modern slaughterhouse, with a yield of 78 percent and an increased processing cost of Rp 6700/bird¹⁴ and an increased selling price of Rp 45,000, then we have the cost structure shown in Figure 3-6 and tabulated in Appendix A.

Figure 3-6

Costs and Margins for 1.6kg Bird to Wet Market versus 2.2kg Bird to Modern Slaughterhouse
Rp/kg of final DWt bird



This model demonstrates the following:

- Farmer and contractor payments and margins will increase to reflect the increased weight and time that birds are on the farm along with the increased working capital requirements.
- The higher yield achieved from a heavier bird will reduce DOC costs per kilogram.
- Feed cost will increase per kilogram live weight due to the deterioration in FCR, but this is more than offset by the yield improvement.
- The elimination (or reduction) of traders eliminates a nonproductive margin.

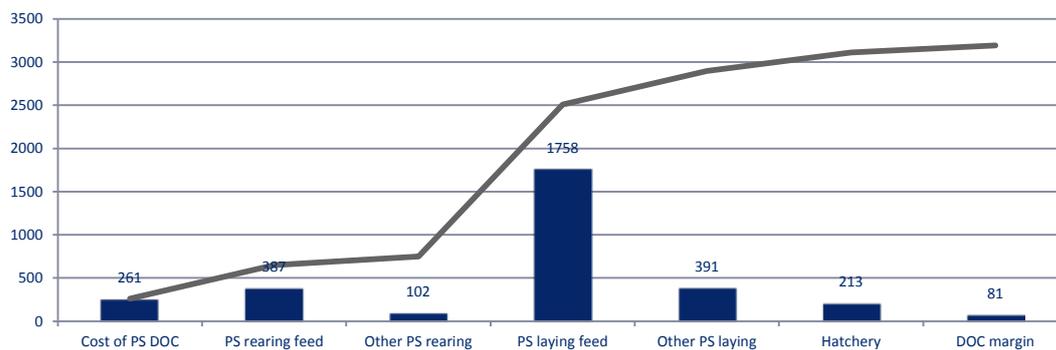
¹⁴ This is an illustrative best estimate cost only as birds that go to modern slaughterhouses will be processed in different ways (whole, cutups, deboned with different packaging options) so each product will have a different cost structure and selling price. This cost includes sales costs.

- Slaughter costs are significantly higher but so is quality, enabling an increased margin via sales to supermarkets¹⁵ and food service.
- Margins to the slaughterhouse increase significantly, as they need to, to cover the investment. Conversely, modern slaughterhouses generally need to receive a higher price than the wet market price to justify the investment. The margin (after sales costs) in the above example is 18 percent. This will increase as products are further processed (higher investments) and sales and marketing costs increase.
- Supermarket margins are assumed to be 26 percent in the above example. This will vary by outlet and will increase as product value (via further processing) increases. Typically supermarket retail margins for poultry are 20-30 percent for fresh product and for further processed products like nuggets between 30 to 40 percent.

COSTS AND MARGINS FOR DAY OLD CHICKENS

The influence of the DOC supply chain and the margins taken there (as a proportion of total broiler costs) are often exaggerated. The costs and margin in the broiler DOC supply is estimated to be as follows. The total cost of DOCs in the price of retail broilers is 11 percent while the DOC margin is <1 percent of the price of the broiler in the market.

Figure 3-7
Broiler DOC Costs and Margin ex Hatchery (Rp/DOC)



Again, feed is the major cost for rearing and laying breeding stock that produce the DOCs. At Rp 3000 per DOC the margin would be only 2.5 percent of the DOC price, and if the price was Rp 3500 the margin would be 16.5 percent (a more sustainable margin). This suggests, given our estimate of the DOC cost structure, that DOC will need to rise to Rp 3500-4000 to ensure viable margins.

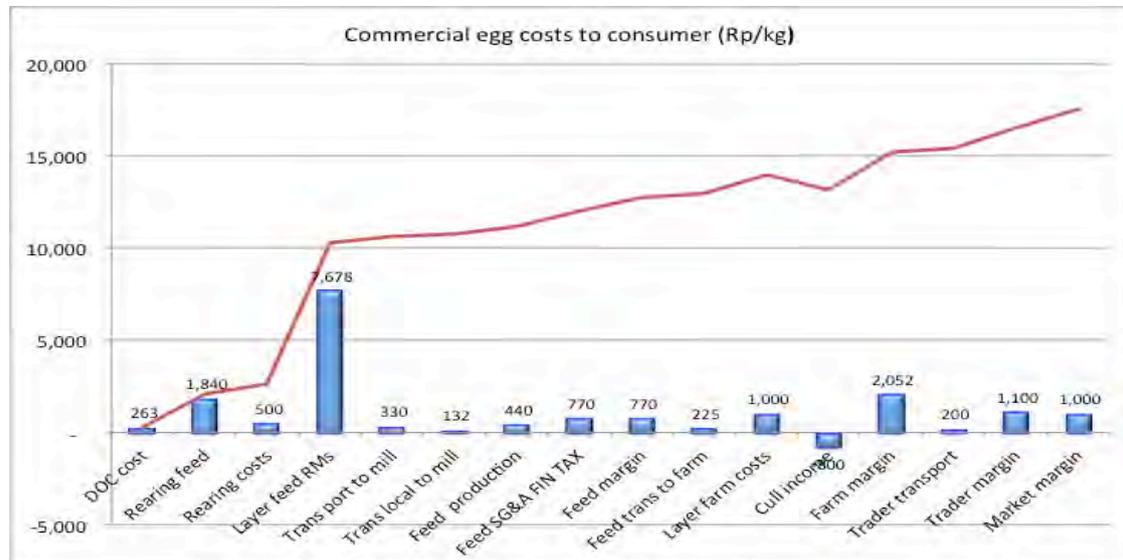
COST AND MARGINS FOR EGGS

The cost and margin structure of egg production is shown in Figure 3-8. Because the DOC cost structure for layer is relatively very low (1.6 percent of egg price), the value chain chart eliminates the detail of this function and starts with DOC cost. This again shows that feed and associated transport is the major cost item, making up 91 percent of egg production costs

¹⁵ There is an additional margin if yields can be increased further by retention of moisture via spin chilling etc. However this is difficult to achieve in a market that fries chicken, but very achievable when products are roasted or boiled.

(including DOC feed cost) and 77 percent of the retail price of eggs. Cull hen income is taken as a credit in the cost structure. Details are provided in Appendix A.

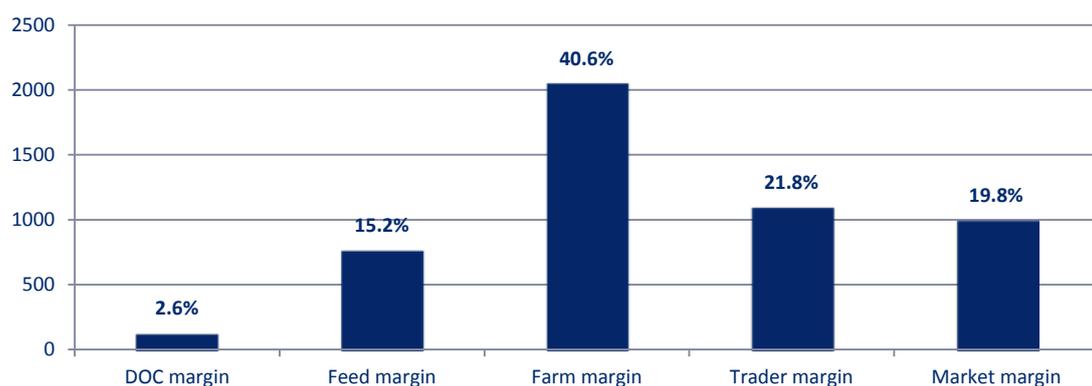
Figure 3-8
Commercial Egg Costs to Consumer (Rp/kg)



Margins (as defined) show that the DOC cost and margin is insignificant for egg production. Feed margin is around 4.5 percent of market price for eggs, while farm margin (as defined) is 12.0 percent and post farm margin is 12.9 percent of market price for eggs.

Figure 3-9
Margins in Layer Chain

Rp/kg egg and as percentage of total margin



As with broilers, the value of the sale increases from left to right (e.g., ex farm eggs are less than retail eggs). The margin on sales for each subsector is feed 7.8 percent, farm 14 percent, trader 7 percent, and retail 6 percent. Again, margins reflect the investment and risk in each sector.

CONCLUSION ON MARGINS

Margins for broilers and commercial eggs are spread across the industry and represent a fair return for investment and risk for each activity in both sectors.

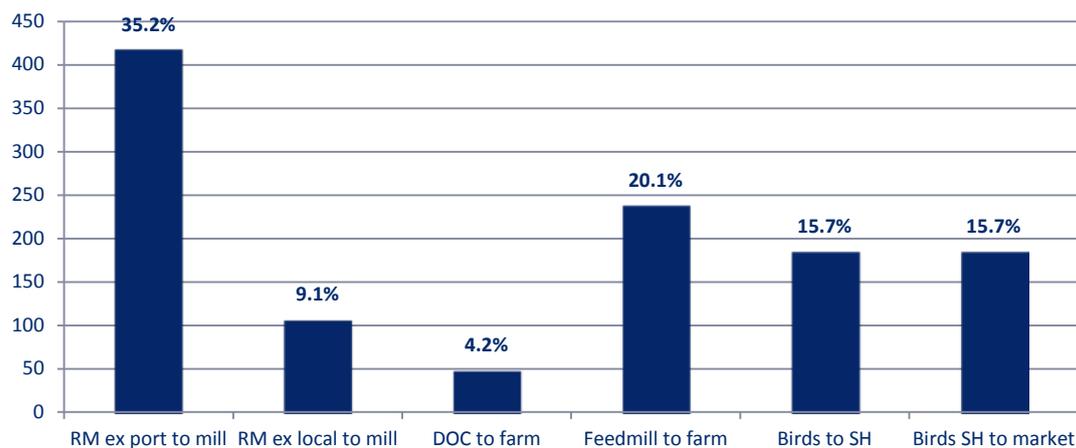
TRANSPORT COSTS

Transport costs (in Indonesia) are estimated to be 4.7 percent of the retail price for broilers. A breakdown of transport components in the broiler value chain shows that the highest cost is for imported raw materials from port to mill. This cost is elevated because of

- The high import component of Indonesian poultry feed (75 percent of broiler feed raw materials are imported).
- Inefficient port handling facilities (insufficient berths in Jakarta).
- Excess demurrage due to slow turnaround of vessels.
- Slow time for transport from port to mill requiring 2-4 times as many trucks to execute the process (with associated over capitalization of the trucking sector).

Figure 3-10

All Indonesia Transport Costs for Broilers to Consumer (Rp/kg chicken) and Percentage Breakdown of Transport Costs by Activity



Other significant transport costs are for moving feed to the farm and for moving birds from the farm to market/slaughterhouse. Both are moved in relatively small vehicles (1MT loads for live birds) and would be difficult to influence this given the poor infrastructure for farm access.

Transport is 5.1 percent of the cost of the retail price for eggs. Similar to the broiler cost profile, the highest transport cost is for imported raw materials from the port to the feed mill.

Figure 3-11

Transport Cost for Egg Production (Rp/kg egg) and Percentage Breakdown of Transport Costs by Activity



Reducing transport costs would entail massive investment in infrastructure.

CONCLUSION ON TRANSPORT COSTS

Transport costs in the broiler and commercial egg sectors are 4.7 percent and 5.1 percent of selling price, respectively. The biggest cost is for raw materials transported from port to the feed mill, reflecting inefficiencies in port and road infrastructure.

NATIVE CHICKENS

No attempt has been made to quantify costs and margins in this sector, as so much of this sector is not capable of being quantified easily.

4. Prices

DAY OLD CHICKEN PRICES

Broiler DOC prices can be volatile, while layer DOC prices are more stable. The latter is due to having fewer PS farms with more control on GP/PS numbers, and with larger layer farms (with an eighteen month production cycle) having a more stable demand for DOCs. The broiler sector is less stable in DOC production (despite government control of GP imports) and supply fluctuates. Transfers of DOCs and hatching eggs between provinces when prices vary between them exacerbates this. Prices and volumes for broilers and layer DOCs are shown in Table 4-1.

Table 4-1

Prices and Volumes for Broilers and Layer DOCs, 2011-2012

	2011	2012
Broiler DOC production (m)	1661	1946
Layer DOC production (m)	83.9	84.9
Broiler DOC price (Rp)	3200	3757
Layer DOC price (Rp)	5000	9000

SOURCE: GPPU.

Industry sources state that the current high layer DOC prices are due to a temporary shortage of layer PS, while demand is in fact increasing (above the supply level). DOC price increases reflect a return to acceptable margins (above the temporary low Rp3000/DOC of late 2012 as used in the study).

BROILER PRICES

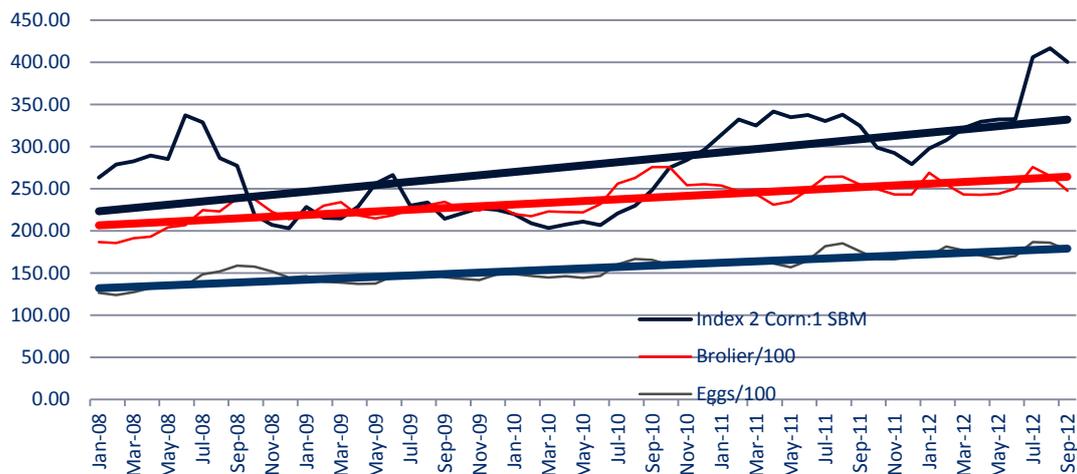
The DGLS collates the price of broilers in each province daily as the price per kilogram of dressed bird in the market (head on, feet on) and monitors egg prices at price per kilogram. Average monthly prices since 2008 are shown in Figure 4-1.

One would expect that as feed prices increase so too would broiler and egg prices. This is exactly what happens. Figure 4-1 shows broiler and egg prices versus a corn: SBM index¹⁶ of corn No2 FOB prices ex Gulf and SBM ex Chicago, to reflect diet inclusion levels. Broiler and egg prices increase as feed prices increase.

¹⁶ Used in the absence of five-year data for Indonesia feed prices (with two-year prices being highly correlated to the index – as would be expected).

Figure 4-1

Relationship between Broiler, Egg, and Corn/SBM Index Prices (Index US\$/MT, Broiler/Egg Rp/kg/100)



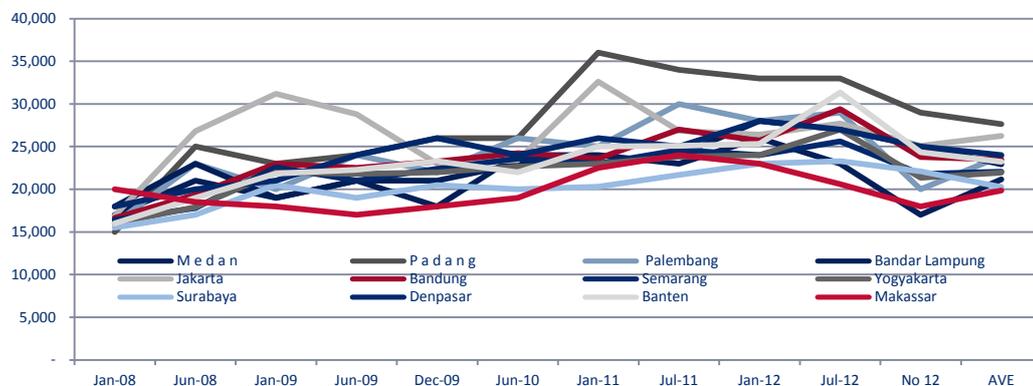
SOURCE: Ministry of Trade

REGIONAL AND SEASONAL PRICE ISSUES—BROILERS

Figure 4-2 shows broiler prices for selected provinces (major population based) for six-month intervals from January 2008 to November 2012.

Figure 4-2

Broiler Price (Rp/kg) by Time by Province, January 2008–November 2012

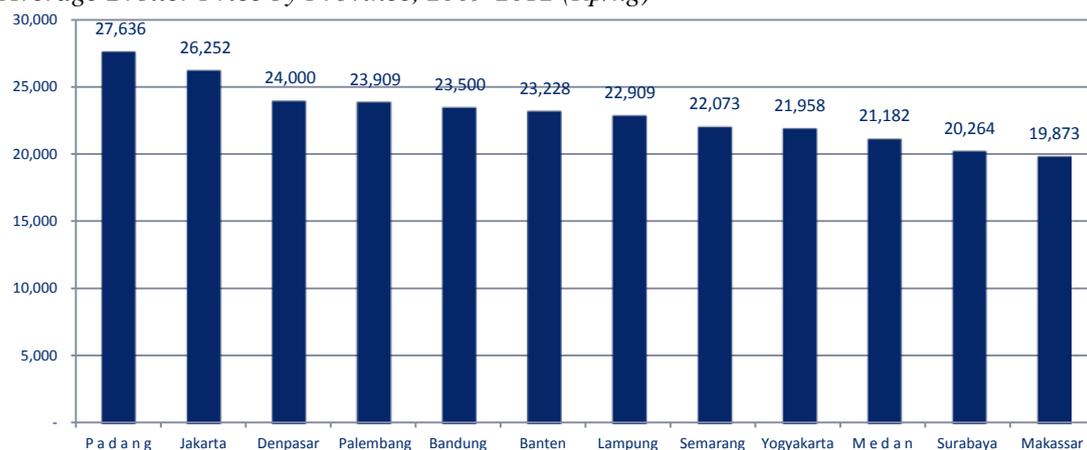


SOURCE: Ministry of Trade

While it is difficult to trace prices by province in Figure 4-2, it shows that there is some variability in price by province. Figure 4-3 presents a closer look at average prices for five years. Low population and isolated provinces are excluded as supply/demand dynamics are likely to be more complex (high transport costs) and require a more detailed study to fully explain price variance. For the selected provinces, the highest prices are in Padang and the lowest prices are in Makassar. While the value chain in each region has not been quantified, possible explanations for price differences between provinces,¹⁷ with the greatest variance from the average, are presented in Table 4-2.

¹⁷ Price differences of Rp 2000/kg were observed between three markets visited in Bogor. So such variation between provinces is expected due to supply and demand dynamics

Figure 4-3
Average Broiler Price by Province, 2009-2012 (Rp/kg)



SOURCE: Ministry of Trade.

Table 4-2
Possible Causes of Provincial Price Variation

Province	Variance from National Average Over Last 5 Years (%)	Causes of Price Variation from Mean
Padang	20	Local supply is limited so birds are transported in at a high transport cost.
Jakarta	13	Higher incomes driving demand and placing more pressure on supply. Sourced locally but higher logistics and labor costs and possible higher margin expectations.
Denpasar	4	Higher transport costs for feed. Strong demand based on tourism.
Medan	-8	Data ex industry shows that for 2011-12 the post-farm markup (retail price minus live bird cost) was Rp 10,826, compared to the average Indonesian markup of Rp10,700 in this study. Ex-farm price dropped as low as Rp 10,400 in Nov 2011 and Rp 12,300/kg in Nov 2012. Industry's explanation for this was an influx of HE and DOCs into Medan, increasing supply. This caused average price reduction.
Surabaya	-12	Lower feed costs based on local corn price.
Makassar	-14	Lower feed costs based on local corn price.

An attempt to correlate production per capita with population in various areas and provincial GDP per capita failed to show strong correlation; production statistics are suspect and provincial GDP is not necessarily a measure of purchasing power. There is only weak evidence that there is more variability in demand per capita (and therefore price) in areas where the population is lower. Muzayyanah and Maharjan¹⁸ have shown that expenditure elasticity for meat is positive, which implies that increases in income will result in increased consumption. The same study found that expenditure elasticity for eggs is negative, meaning

¹⁸ Muzayyanah M.A.U. and Maharjan K.L. Socioeconomic Determinant of Livestock Products Consumption in Urban and Rural Java, Indonesia. *Journal of International Development and Cooperation*. Vol 17, No 1, 2011, pp. 89-102

income changes have little impact on egg consumption. This would mean that provinces with higher per capita incomes will consume more poultry meat and this may be a partial explanation of higher prices. What it also shows is that as Indonesia develops and incomes rise, the demand for poultry meat will rise.

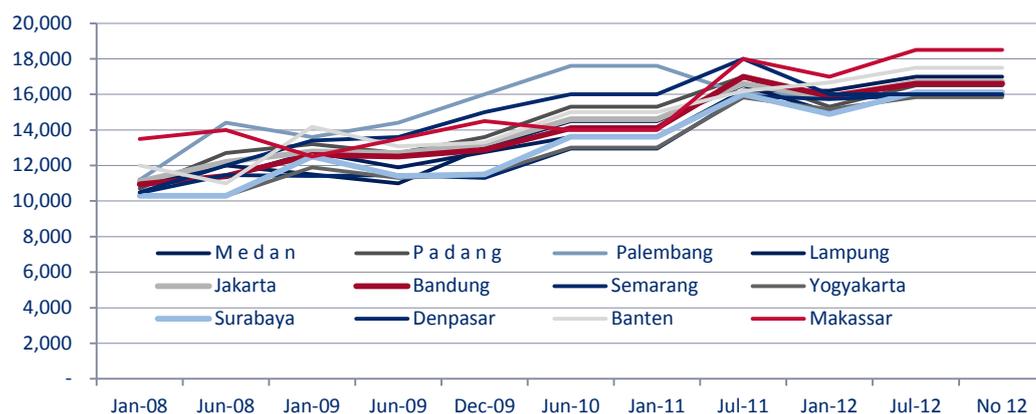
Prices of poultry in supermarkets are significantly higher, reflecting the increased quality, processing, marketing, distribution, and retail costs. Whole bird prices in Jakarta/Bogor range from Rp 40-Rp 49,000/kg DWt (50-90 percent higher). There is a much higher price difference between cuts in supermarkets than in traditional markets, with cuts being priced significantly higher than whole chicken; in traditional markets cuts are priced similar to whole birds. Native chicken prices are 150-200 percent those of broilers.

EGG PRICES

Figure 4-4 shows that egg prices have been increasing and that there is variation in prices and provinces, but this was eliminated in 2010-12, suggesting stable supply.

Figure 4-4

Egg Price by Province, January 2008-November 2012 (Rp/kg)

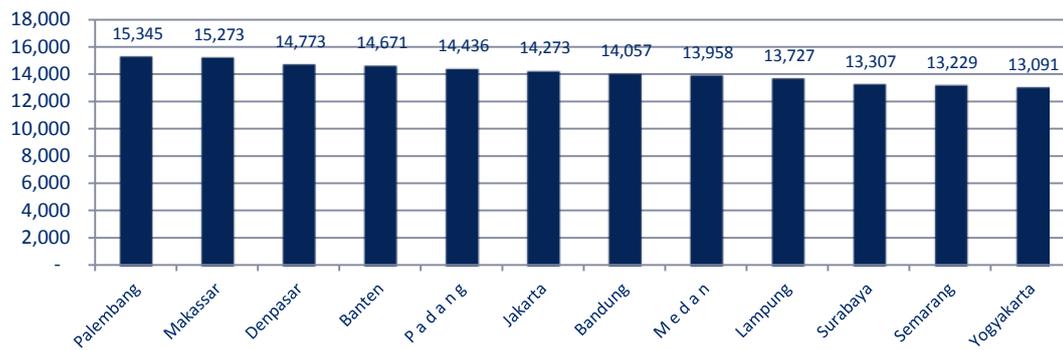


While Figure 4-4 shows that it is difficult to trace egg prices by province it also shows that for the past three years there has been less variability in price by province, than for broilers, suggesting a more stable supply/demand scenario.

Figure 4-5 presents a closer look at average prices for five years. As with broilers, low-population and isolated provinces are excluded as supply/demand dynamics are likely to be more complex and require more detailed study to fully explain price variances. Still the data suggest that egg prices in these regions are not as depressed as broiler prices, likely demonstrating the demand inelasticity of eggs. Makassar egg prices are high, while Makassar broiler prices are relatively low. The reason for this is that Makassar has introduced bio-secure production (at a cost) that is producing higher prices (via food safety premiums) suggesting marketing initiatives¹⁹ for other regions.

¹⁹ Globally free range organic eggs sell for double the price of caged eggs.

Figure 4-5
Average Egg Price by Province, 2008-2012 (Rp/kg)



SOURCE MOT

Surabaya, Semarang, and Yogyakarta eggs prices reflect lower feed prices and the use of home mixed feeds in these regions. In summary, there is an explanation for regional price variation due to feed and transport costs.

CONCLUSION

Prices in the broiler and egg sectors vary by region because of regional differences in feed, transport, and cost structures and all prices are explainable. The co-efficient of variation of prices between provinces shows only that there is variability (explainable) and does not suggest that there is instability in the market, as has been suggested.

5. Industry Efficiency Issues

Production efficiency in Indonesia’s broiler production system can be monitored and costs and margins quantified as above. All of these can be benchmarked against international players (as is done later) but a summary of the differences between the Indonesian broiler industry (particularly) and international production systems is warranted for a greater understanding of the issues that face the industry. See Table 5-1.

Table 5-1
Efficiency Issues Facing the Industry and Possible Remedies

Area	Issues and Remedies
DOC supply	Imports of international standard GP and PS stock are housed in modern facilities and supported by modern hatcheries providing breed-standard production. High feed costs elevate costs. The DOC supply is more variable than in countries with fully integrated operations as long-term planning is much more difficult and DOCs are an end product rather than an input as they would be in an integration.
	Remedy—none. As integration increases DOC supply/demand will improve.
Feed supply	Feed is manufactured in modern mills with international economies of size, quality and efficiency standards—but all feed is bagged, which results in higher costs for production and transport.
	Remedy—modernization of road infrastructure (hugely expensive) and development of larger farms using bulk feeds. Long term only.
Feed cost	76 percent of the volume and 69 percent of the value of feed raw materials are imported so Indonesia is very dependent on commodity prices and foreign exchange rates. Corn is imported and will continue to be unless local production increases dramatically. This results in corn cost/price being at import parity plus 5 percent duty, resulting in high raw material costs. High raw material costs, bagging costs, and transport costs all raise production costs.
	Remedy—Increase corn production to the point that corn prices are at export (not import) parity. At that point, the drop in corn prices would greatly affect supply and corn farmers’ profits – so it may not be a viable solution.
Farm infrastructure	Farms are small and often located in areas with poor access. This results in <ul style="list-style-type: none"> • Inability to take advantage of economies of size/scale • Lower capital costs but with poorer livestock performance • The need to use bagged feed at a higher cost • Inconsistent and suboptimal operating procedures • Higher production costs
	Remedy—Develop larger farms with better bio-security and more efficient livestock performance, ideally producing larger birds to reduce production costs and improve yields—and enabling the use of bulk feeds.
Bio-security	Inadequate bio-security has severely compromised the poultry industry and resulted in the HPAI epidemic of the last decade. While the threat of additional zoonotic diseases exists, inadequate bio-security will affect ongoing livestock performance. In addition, action on the HPAI front and on traceability in the broiler production system will be required to support exports.
	Remedy—Vastly improved bio-security procedures
Farm management	Live bird performance on broiler farms is below international standards. FCR in Indonesia is quoted at 1.6:1 (and more likely to be above that) on a 1.5kg bird. The Cobb 500 standard is 1.48:1. Thus feed cost is at least 8 percent above genetic potential, thus increasing live bird costs.
	Remedy—Address bio-security, health, housing, water, feed, management issues, staff training, and SOPs.

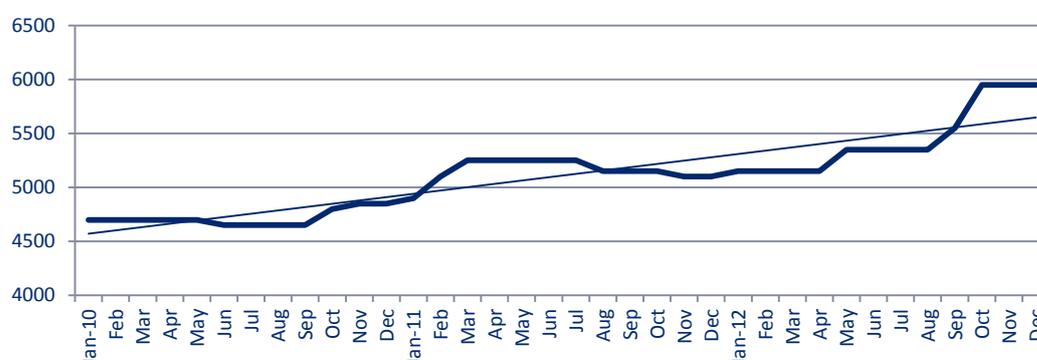
Area	Issues and Remedies
Port and road infrastructure	<p>Because 76 percent of raw materials are imported, feed mills are ideally located close to ports. Industry sources say that lack of efficient port facilities is raising transport and port costs.</p> <p>Lack of road infrastructure is a prime determinate of how farms have developed and the inability to take advantage of economies at the farm, feed mill, and transport level.</p>
	<p>Remedy—Long-term development of port and road infrastructure.</p>
Bird Size	<p>The average live weight of broilers is 1.4-1.5kg with many birds being lighter than this due to market demand (U.S. size is 2.6kg LWt). This results in poorer livestock performance, poorer use of housing, and higher processing costs—the latter being particularly relevant as supermarket demand increases.</p>
	<p>Remedy—Improvements in the environment (at a cost), production of larger birds (but only as the market develops), and a move to processed chicken where cutups dominate would lower production costs at the farm level. This is the route being taken by CPI/JCI et al but the change will take time as traditional market birds are preferred.</p>
Post Farm	<p>Most birds pass through a myriad of traders and associated slaughter operations before they reach the market. Margins are taken at all levels but, given that there are thousands of operators, the system is working as well as can be expected. Replacing the system by delivering birds directly to processing plants will result in higher cost structures that will not reduce costs (but will produce a higher quality product).</p>
	<p>Remedy—None required as there will be a market-led move to modern processing.</p>
Industry Geography	<p>The industry is spread across Indonesia, with fresh birds produced locally for a fresh/live bird market. Processing for a shelf life of more than one day and placement in cold chain distribution for interprovincial transport is very limited. Supply/demand relationships, therefore, are totally controlled in a region because product can only be transported very short distances.</p>
	<p>Remedy—Develop processed birds with a shelf life, along with a cold chain, to enable transport over longer distances, thereby reducing price variability between provinces. Doing so would require a significant improvement in infrastructure to reduce transport costs (and develop the cold chain) and the cost of birds in the cold chain would be significantly higher, so it is likely that provincial price differences will remain.</p>
Bird Specification	<p>Indonesian broilers are sold in local markets and the government monitors prices. Birds average 1.4-1.5kg LWt, with the carcass being head on/feet on but the sales price being for head off/feet off. This is a different bird than is quoted in international trade—where average bird weight would be in the range 2.2-2.5kg (U.S. average is 2.6kg). The yield difference between the Indonesian product and that quoted internationally is significantly different and per kilogram price comparisons need to be on standardized products.</p>
	<p>Remedy—Any comparison of Indonesia's traditional market prices and prices of international players must be based on standardized products.</p>
Food Safety	<p>Most birds are slaughtered in backyard facilities with no attention to food safety.</p>
	<p>Remedy—Improve slaughter facilities and impose standards.</p>
Industry Statistics	<p>The government must better predict industry development. There is evidence that baseline statistics for the broiler and layer industry show a variance of 40 percent versus actual.</p>
	<p>Remedy—Develop a robust data collection method that links all sectors in the industry.</p>
Sustainability	<p>Industry sustainability depends on many things, the impact of which varies between countries. Environment and disease are key in Indonesia, but even animal welfare could have a significant impact on the industry.</p>
	<p>Remedy—Take a proactive stance in addressing emerging issues.</p>

These inefficiencies result from poor infrastructure and the resultant industry structure (small farms, etc.). While more integration would improve things, it would be difficult to revolutionize the industry overnight and the abolition of small farms would have huge socioeconomic implications so any change will come at a cost.

6. Feed Issues

Feed prices have been increasing because of the rise in commodity prices, notably corn and soybean meal (SBM). The price of broiler finisher feed increased 27 percent in the 2010-2012 period (see Figure 6-1).

Figure 6-1
Broiler Finisher Feeds Price Jakarta (Rp/kg)



Most feed is from imported raw material (Table 6-1). Rising prices and exchange rates also affect feed cost. Corn and soybean meal are the major costs of imports. Some amino acids, all vitamins, and other high-cost ingredients are also imported.

Table 6-1
Import Volumes of Feed Raw Materials, 2011

Imports	000 MT	Imports	000 MT
Corn	3,144	Meat and bone	343
Soybean meal	2,938	Corn gluten	164
Fishmeal	100	Feather meal	196
DDGS	261	Rapeseed	143

Note: 2,000,000MT of corn was imported in 2012.

SOURCE GMPT

Indonesia does not have the right climate for large acreages of soybeans and does not have a crushing industry reliant on the import of full fat soybeans that produces SBM. All soybeans produced in Indonesia are for human consumption and none are used by the feed industry. Indonesia, however, does produce corn. The feed industry uses 6.1MMT, and 30 percent to 60 percent is produced locally.

An analysis of the likely import component of broiler feed shows that 76 percent of the volume and 70 percent of the value of feed raw materials are imported, with the majority being for the import of the protein component, where 85 percent of the protein cost in broiler feed is imported. Since layer (and PS) feeds use lower protein diets (around 16 percent versus 21 percent in broilers) then raw material imports represent 57 percent of layer raw material costs. About 70 percent of the protein import cost is attributable to soybean meal imports in layer feeds, with meat and bone meal (MBM) and distillers dried solubles (DDS) also contributing.

Table 6-2

Volumes and Values of Imports for Broiler and Layer Feeds

	Volume of Imports	Value of Imports	Protein Import Value
Broiler feeds	76%	69%	85%
Layer feeds	73%	57%	60%

In addition to having to import protein, Indonesia imports 46 percent of the cost of energy in broiler feeds via soybean and corn imports (roughly 50/50 in the cost of energy imports). About 40 percent of the cost of energy in layer feed is imported. Corn imports have varied over the years as the result of growing demand and variable local production. Not only does this affect foreign exchange demand, but it is also relevant in any discussion of Indonesia's competitive advantage in broiler production.

There is a widespread belief in Indonesia that increased production of corn will reduce feed prices. While Indonesia imports corn, the price of all corn (import and local) will be pegged to the import price ("import parity") and increased corn production will not decrease feed price.

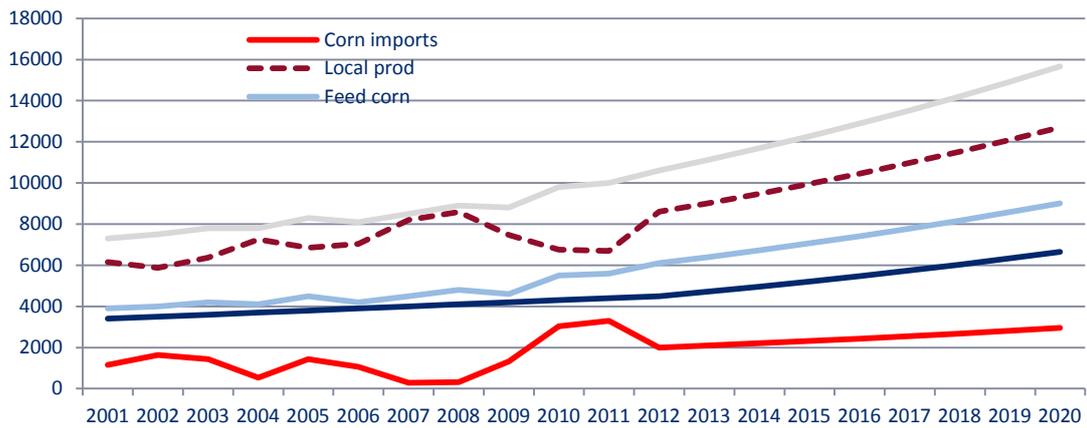
Because all imported products are priced at import parity (and corn at +5 percent duty), the cost structure of the industry is extremely vulnerable to commodity pricing. In addition, since corn is imported, the local price of corn is pegged to the "import parity" price.

The poultry industry must have corn. Projections for corn imports suggest that if the industry is to develop then corn will need to be imported for some time. Various scenarios can be simply evaluated. For example, if feed industry demand increases 5 percent per annum (say, layer 3 percent and broilers 7 percent) and human demand increases at the same rate, and if local corn production increases at 5 percent (average 3 percent per annum last 10 years) then corn will still need to be imported. If the poultry industry grows at a pace faster than 5 percent then imports will need to increase more. A possible scenario is shown in Figure 6-2 (see Appendix C for details).

Dramatically increasing corn production seems necessary to avoid the need to import. The fact that production has increased at less than 5 percent pa might suggest that increasing corn imports is more likely. However, the government has good reasons (e.g., import substitution, regional development) to provide incentives—such as credit access, hybrid seed, and fertilizer—to raise yields.²⁰

²⁰ In a technical assistance program run by IFC (World Bank) and CP in Makassar, assisted farmers who received farm input credit achieved productivity of 7.5 tons/hectare while those without credit achieved 6.6 tons/hectare. Control groups not receiving any assistance (credit, seeds or fertilizer),

Figure 6-2
 Corn Supply and Demand Scenario for Indonesia ('000MT)



SOURCE: USDA and GMPT

Higher corn yields resulting in higher production and increased farm profit must be the prime goal of agricultural development, especially as it is a key driver in reducing poverty. Farm productivity is low and it seems that there is a high cost structure post-farm (consolidation through multiple trading layers, inefficient drying, and inefficient transport). From the perspective of the poultry industry and consumers, the ideal scenario would be to turn Indonesia into a sustainable corn producer with a production surplus that would turn the pricing base for corn to export parity.

Alternate supply/demand scenarios can be easily calculated to understand the most likely scenario for corn production, demand, and the resultant need to import.

CONCLUSION

Because Indonesia imports so much of its raw material, 95 percent of feed costs are based on import parity. Estimates of corn production shortfalls suggest that this will continue and corn will need to be imported for a long time, if not forever. That means that even if corn production increases, feed prices will not decrease as corn price will set at import parity. It is recommended that the government and industry cooperate in a study so that both are aligned to common development objectives and that the government more fully understand the impact of any development plan on corn supply.

achieved only 5.7 tons/ha. Industry pointed out that incentives (hybrid seed and fertilizer) had variable uptake, as small desperate farmers often sold them for cash. So the development of sustainable incentives for corn production should be carefully formulated if the objectives are to be met.

7. International Competitiveness

The cost efficiency of Indonesia's poultry industry can be assessed using international benchmarking. Benchmarking can also further understanding of how competitive Indonesia might be in an export environment. This discussion of competitiveness is confined to broilers because international trade in eggs is very limited.

EXPORTING COUNTRIES

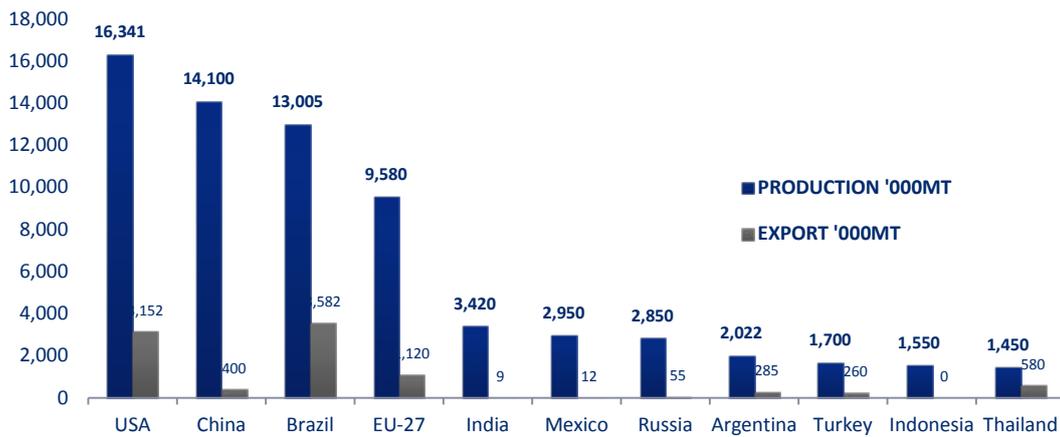
The United States and Brazil dominate poultry exports because of their favorable raw material costs. Indonesia imports so much of its feed ingredients, priced at import parity, that it has a very high feed cost structure relative to net exporters of corn and soybeans like the United States, Brazil, Argentina, and Ukraine.

In Indonesia, farm production costs inclusive of farm margin are 8-12 percent of live bird costs (with margins varying considerably). International figures are closer to 12-15 percent because of the higher cost of shedding (with environmental controls resulting in improved livestock performance). Independent or sister company contractor funding of production in Indonesia adds a layer of margin that would be in the integrators' margin in countries where integrators fund livestock growing. Post-farm processing costs are low in the traditional market scenario but those products do not meet international standards. Products processed in modern poultry plants in Indonesia that do meet quality standards will have costs similar to those in other Asian countries (based on investment and wage structures), and further processed products will have cost structures related to material mix and labor depending on the specification.

The major exporters of broiler meat are also major producers whose large domestic markets act as a cushion if and when tariff or phytosanitary issues reduce exports.²¹

²¹ This was critical to Thailand when HPAI significantly affected exports

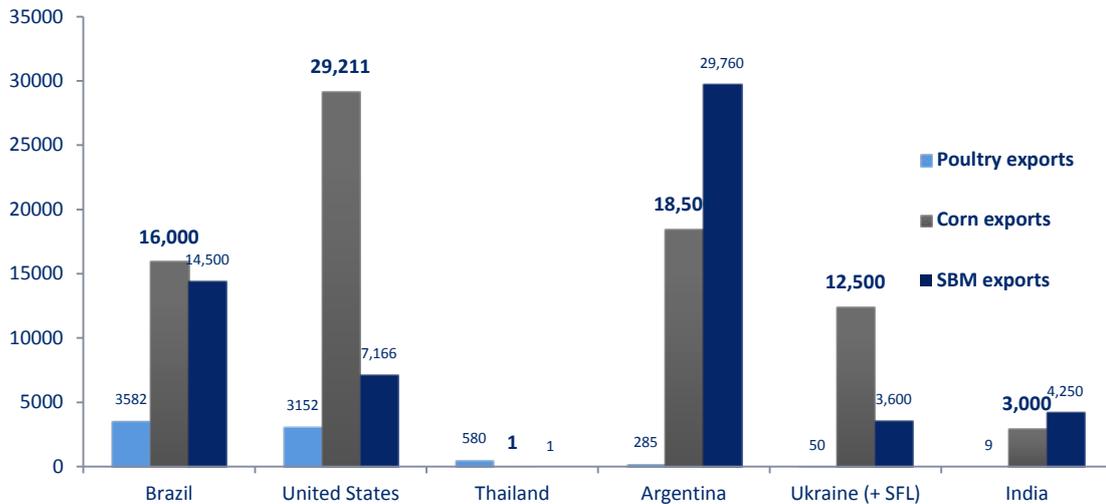
Figure 7-1
Major Broiler Producers and Exporters, 2012 ('000MT)



SOURCE: <http://www.indexmundi.com>

Poultry exports are dominated by Brazil and the United States. While the EU exports 1.1MMT (mainly to Middle East and Asia) it also imports 0.7MMT (so net exports are only 0.4MMT). So, effectively, Thailand is the third largest exporter.

Figure 7-2
Exports of Poultry, Corn, and Soybean Mean, 2012 ('000MT)



SOURCE: <http://www.indexmundi.com>

Major exporters are net exporters of corn and soybean meal. Their cost structure at point of production is at export parity minus transport to port and port handling costs, versus Indonesia whose cost for corn and soybean meal is at import parity, which includes exporting country transport costs, plus shipping and Indonesian port handling and trucking costs. Given the cost of feed (and the cost of the corn and soybean meal component being some 70 percent of feed cost) this places Indonesia at a significant competitive disadvantage.

The United States exports a significant quantity of dark meat, a co-product of the high demand for white meat (breast) in the United States. Brazil's exports are more of a whole bird nature while Thailand's are all processed and cooked products.

A review of the export data reveals two significant anomalies. Thailand is the third largest exporter yet is also a net importer of corn and soybean meal while India is a net exporter of corn and soybean but does not export any significant poultry tonnage.

Thailand's competitive advantage was established over 20 years. The industry has modern production systems in a country with relatively efficient infrastructure (i.e., large farms with roads enabling bulk feed delivery) and considerable economies of size and scale. It developed its export product mix around high labor content dark meat (leg) products for Japan (yakitori sticks) and high value cooked products from white meat (breast) for the EU market. While their live birds costs do not match those of United States or Brazil, their competitive advantage in high quality labor—associated with high quality, safe, traceable production that addresses EU requirements for animal welfare—gives them a competitive advantage. That said, a significant component of their exports are fresh products that were banned during the HPAI outbreak and this ban significantly affected the industry (the ban was recently lifted).

The other anomaly is India, which exports raw material but not poultry products. India's live supply chain is the fifth largest in the world but, like Indonesia's, is based on small growers. Traceability is not controlled, food safety is a concern, and the processing industry is even less developed than in Indonesia. India's advantage in live bird cost (and labor cost) could be transferred to export products, but only after local product volume is significant—otherwise any export investment would be vulnerable to market changes (i.e., a ban on phytosanitary grounds). Since the poultry industry is growing rapidly in India, it is likely that its status as a net exporter of raw materials will soon change and significant exports will not be an option.

In contrast, Ukraine has developed its industry over the past 10 years to be the most modern and efficient in the world and with a cost of production among the world's lowest. Significant investments are being made in processing and this poses a threat to Thailand and other exporters. This is important because global export markets that may be attractive to Indonesia (i.e., Japan, EU, the Middle East) will have emerging challenges that will affect any ambitions Indonesia has for significant exports.

If Indonesia is to develop significant export tonnage²² then it will need to follow the Thailand model of increasing integration through the development of in-house broiler growing (required to ensure export standards), compartmentalized to suit the constraints of the local industry structure. However, Indonesia will be able to develop low volume, niche market sales, as it has in the past.

IMPORTING COUNTRIES

Japan is the major importer with much of its product coming from Thailand (labor-intensive products). Thailand also exports to the EU (mostly cooked product) with the United States and Brazil being major exporters of frozen product to other countries.

²² Between 1997 and 2004 Indonesia exported up to 3,000MT per annum, mainly to Japan but the country's AI status has resulted in a loss in this market. Imports peaked at 14,000MT in 2000 and averaged 5,000MT per annum during 2005-2009.

Table 7-1
Imports and Local Production, 2012 ('000MT)

2012	Imports	Local Production
Japan	840	1280
EU-27 (with significant exports)	750	9580
Saudi Arabia	750	600
Mexico	640	2950
<i>Selected Asian countries</i>		
Singapore	145	60
Philippines	145	785
Korea, Republic Of	110	735
Viet Nam	53	785
Malaysia	50	960

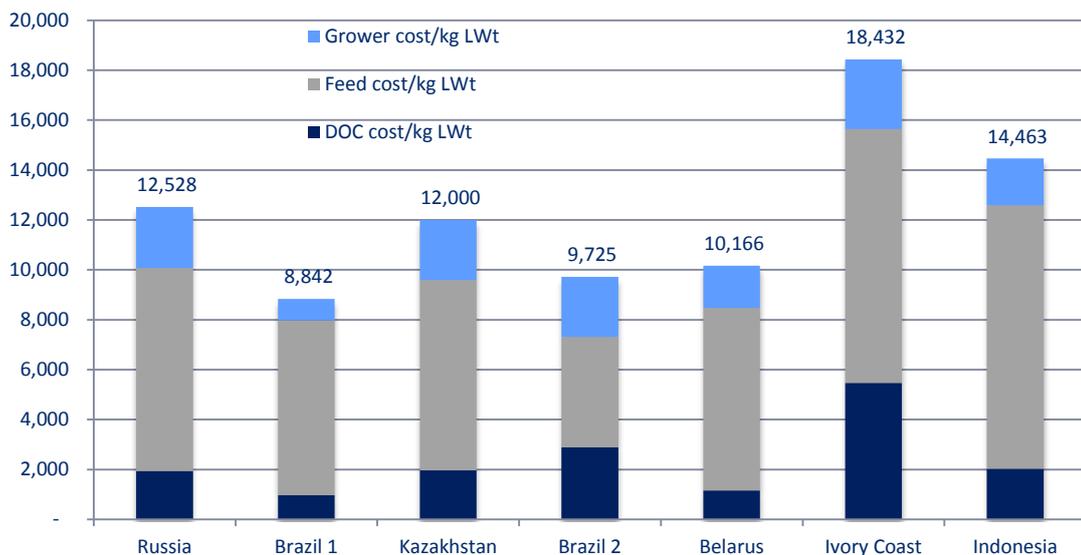
SOURCE. Indexmundi

While the EU is the second largest importer it is a net exporter (in the EU and to the Middle East). In Asia (excluding Japan), Singapore, Philippines, and Korea are major importers with much of Asian imports being for further processing.

INTERNATIONAL BENCHMARKS

Figure 7-3 shows data on the cost of production of broilers in different countries. The Indonesian figures are taken for a 2.2kg bird with an FCR of 1.8:1, as used in the costing for the modern Indonesian processing plant (Appendix A).

Figure 7-3
Cost of Live Broiler Production, December 2012 (Rp/kg LWt)



SOURCE. International Finance Corporation

This shows that live bird costs (ex-farm) are higher in Indonesia than in other countries, except for the Ivory Coast (not a renowned broiler producer and clearly a very high cost

producer whose DOC costs are abnormally high for some reason). The Indonesian live bird cost is 56 percent higher than the average in Brazil.²³ Sources state that the cost of production of live broilers in Malaysia is slightly less than in Indonesia (they also import most feeds) and that Indonesian costs are roughly double those in Ukraine, which has the world's lowest cost structure. Worldpoultry.net quoted Thailand's cost of production mid-2012 at Rp 11,100/kg.

CONCLUSION

The cost of broiler production in Indonesia, relative to other countries, is very high and will remain so, thereby eliminating Indonesia as significant exporter. Any exports will be into niche Asian markets and be in very small volumes. However, the opportunity for Indonesia to substantially increase local production through increasing demand is substantial, as we will now see.

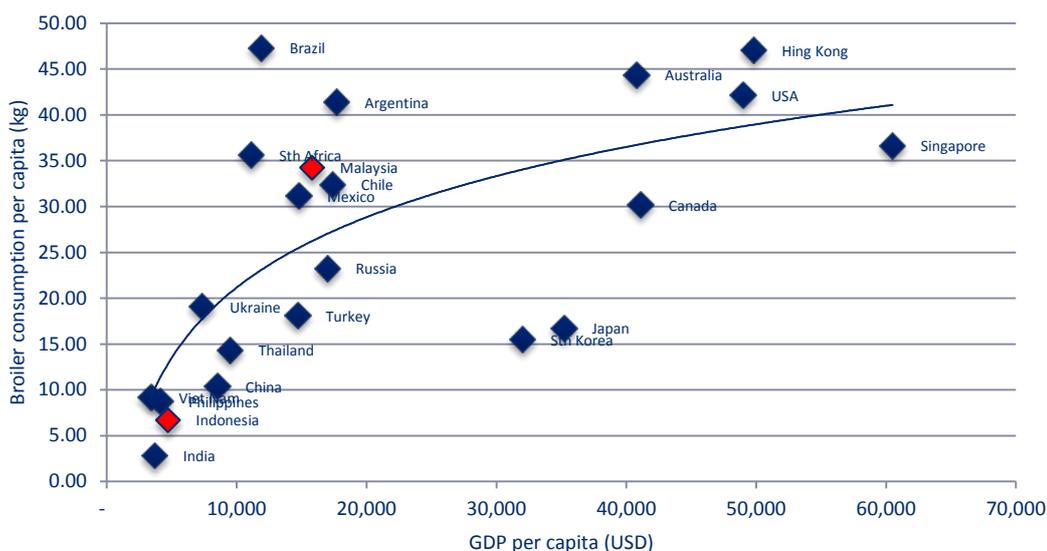
²³ Note that production costs vary in Brazil. This is due to different production systems, costs, and accounting practices. This is why any in-depth comparison needs to be based on standardized data. However the tabled data serves the point of illustration of live production cost variances between countries.

8. Likely Industry Development

As stated earlier, poultry consumption increases as incomes rise. Thus, Indonesia's poultry industry is set to develop as incomes rise, and this may be accompanied by a shift in product specification as food safety demands increase. This will have significant impact on raw material demand, production systems, product development, marketing systems, foreign currency demands along with the infrastructure and environmental footprint. Knowledge of how the industry will develop (how big, when and where) is critical to the Government of Indonesia and the industry.

Consumption of poultry products has increased in recent years as incomes have increased and production costs have fallen, largely because of efficiencies in poultry production due to improved genetics and production systems. In general, demand for poultry increases with income, especially at the level of lower incomes, until meat consumption reaches maximum levels. Figure 8-1 shows that Indonesian consumption is very low, with the likely trend being close to the trend line. One could argue it will track Malaysia's growth because of the common diet. In such relationships, however, there are always anomalies (e.g., Brazil's consumption is much higher because of dietary habit but also because Brazilian chicken is much cheaper, and China is below the trend line because of the large pork consumption).

Figure 8-1
Broiler Consumption versus GDP per capita, 2011



SOURCE: Indexamundi

Estimation of the trend line for a given economy is a powerful tool for predicting the growth rate in the industry and assessing its impact. It can be observed from Figure 8-1 that Indonesian poultry consumption will increase significantly. But at what rate? We can examine

various scenarios but for the purposes of illustration let's assume that Indonesia will track the consumption of Malaysia (with the caveat that the productivity gap between the two is significant and may affect the rate of GDP growth). The difference between Indonesia and Malaysia in Figure 8-1 is a GDP per capita gap of \$11,100 and a consumption gap of 27.5kg per capita (i.e., consumption will increase 2.47kg per US\$1000 increase in GDP per capita).

Figure 8-1 is based on chicken production of 6.7 kg per capita.²⁴ This figure is in question as it does not correlate with stated feed consumption or DOC production in Indonesia. Using broiler feed consumption as the base figure, the total poultry meat consumption could be around 2.24MMT or 9.3kg per capita.

Table 8-1
Estimates of Broiler Production, 2011

Source	'000MT per annum	Kg per Capita per Annum
GOI broiler consumption	1,270	5.3
GOI total poultry consumption	1,613	6.7
Broiler consumption based on feed use	1,900	7.9
Total poultry consumption based on feed use	2,243	9.3

Note: Broiler consumption based on feed use: Figures are based on a yield of 67% and an FCR of 1.8:1 with an allowance of 0.4MMT of broiler feed being fed to male layer strain and village poultry

SOURCE: GOI and GMPT.

We can model various scenarios of likely development based on variable assumptions for

- 2011 base production (government versus industry)
- GDP growth (6 percent versus 7 percent)
- The growth curve that Indonesia will follow (Malaysia or 90 percent of it)

The results are presented in Table 8-2.

Table 8-2
Growth Scenarios for Indonesia's Poultry Meat Sector to 2020

Production Bases	Increase MT	Increase %
MALAYSIA PRODUCTION TRACK: 6% GDP GROWTH		
2011 GoI production base	1,926,814	119
2012 Industry production base	1,744,643	78
MALAYSIA PRODUCTION TRACK: 7% GDP GROWTH		
2011 GoI production base	2,343,154	145
2012 Industry production base	2,121,619	95
90% OF MALAYSIA PRODUCTION TRACK: 6% GDP GROWTH		
2011 GoI production base	1,687,189	105
2012 Industry production base	1,505,017	67

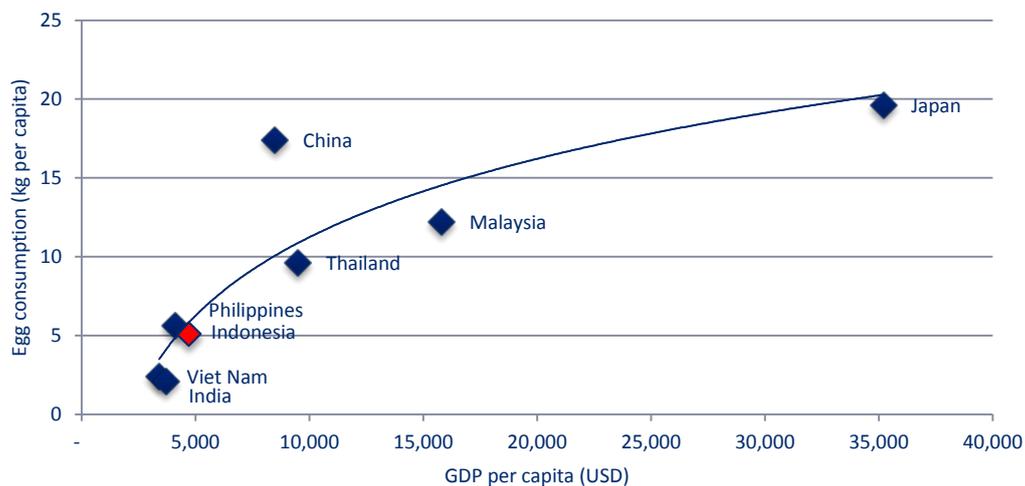
²⁴ Assuming 240m population

This shows wide variance in possible growth scenarios, depending on the assumptions made. If we assume the industry’s 2011 production assumption then we find that the likely growth rate by 2020 will be 70-90 percent (or around 6-7 percent per annum). But if we assume government figures then growth could be almost double that (due to the low base production used and the assumption that there would be “catch-up” in volumes). All scenarios will pose challenges that will need to be addressed by the government, not least of which is corn supply. The corn requirement for broilers is 2.5 times the DWt produced so in the above scenarios the difference between the lowest and highest growth rates would mean a difference of 2.1MMT in corn imports, as well as associated soybean meal and other feed imports.

Demand will also be product driven. For example, the development of low-cost shelf-stable chicken sausages has increased demand. How the industry develops vis a vis product mix and product quality is another subject given the significant cost differential between traditional market and supermarket chicken. Traditional market retailers see little threat from processed chicken due to this differential and that their chicken is perceived to be “fresher” than product ex modern slaughterhouses. The challenges posed by volume growth will be greater for the government than the challenges posed by shifts in the product mix. Still, both should be tracked and forecast.

Per capita egg consumption also increases with income with dietary preferences affecting ultimate intake (using 2007/2011 data for Asia below). Since 2007 Indonesian egg consumption has increased to 6.8kg per capita (1.63MMT) but extrapolation of feed sales suggests consumption may be more like 9kg per capita (2.16MMT), thus posing various growth scenarios, as for poultry meat. An analysis should be undertaken on the layer industry to also understand the likely growth rate.

Figure 8-2
Egg Consumption 2007 versus GDP per capita 2011



Note that if we assume the above curves, the broiler and egg industries will develop at different growth rates, suggesting egg production will grow at around 50-60 percent of the broiler industry.

It is worth noting the value of eggs and broilers vis a vis protein content, independent of any consideration of dietary preferences. Using current prices of whole dressed chicken (53 percent yield of meat at 20 percent protein) and eggs (13 percent protein), the cost per 100gm

of protein is Rp509 for eggs and Rp1230 for boilers. From a food security standpoint egg production should be encouraged as the more economic protein source. From a marketing standpoint this offers an opportunity for the egg industry to develop sales.

REGIONAL DEVELOPMENT

The industry is now spread nationally due to demand for fresh product, inefficient infrastructure, development of small farms, high transport costs, population base and lack of a cold chain, with feed production needing to be close to ports. How the industry develops will depend on many factors including regional demand (with the fastest growing cities being outside Java), local corn supply, development of integration, retail development, cold chain development, import policy (FTAs et al) and sustainability (land, environment, water, bio-security, urbanization), and government policies. However a full geographic spread of production will continue for a long time.

PRODUCT DEVELOPMENT

McKinsey states that 40 million will join the consuming class by 2020 and 85 million by 2030.²⁵ The product demand profile of these people will be vastly different than the current average demand profile and will follow the trends seen in supermarket development in Indonesia (increased food safety, added value products etc.) How fast this will develop requires further evaluation and should be linked to the GDP/volume increase predictions, along with predictions for growth in supermarkets, fast food, cold chain development etc.

CONCLUSION

As GDP rises, the consumption of poultry products in Indonesia will increase. The rate of increase will follow what has happened globally and likely be biased towards what has happened in Asian countries, particularly Malaysia. Tools exist to predict how the industry will develop, and government and industry should cooperate to develop accurate industry production volumes and projections, especially as they relate to the many issues that will affect both parties.

²⁵ McKinsey, "The new Indonesian consumer," 2012.

9. Monitoring the Industry

The interest of the Ministry of Trade, and no doubt other ministries, in the poultry industry is based on a desire (1) to understand the “real” or “normal” cost/price of broilers, and (2) to know what data should be collected in order to understand industry price structure, issues, and development.

THE “REAL” OR “NORMAL” PRICE OF BROILERS

The price of broilers in Indonesia can be analyzed to demonstrate costs and margins in the value chain. Both of these can then be benchmarked against international players, as detailed above.

There are two main areas of costs. By far the major cost is feed, dominated by raw material costs. As shown in the report, Indonesia relies heavily on raw material imports resulting in most raw material costs being at import parity. This makes Indonesia a high poultry feed cost country. A high proportion of raw materials are imported, so costs can be monitored from FOB prices quoted internationally and by adding freight and associated costs. Variation due to volume discounts, actual countries of origin, negotiated shipping costs, etc., must be acknowledged.

It can be assumed that Indonesian feed companies have the capability and size/scale to be efficient acquirers of raw materials. Likewise, their feed mills are capable of being efficient feed producers. As noted, costs will be higher because all feed must be bagged and because local transport costs are high. Feed mill margins can be monitored indirectly via the four listed companies; doing so shows that margins are normal because the number of players in the sector results in significant competition.

Farm costs are relatively low because production systems are simple, if inefficient in their lack of bio-security and substandard housing and management. But, given the large number of farms competition is significant. The cost of funding broiler production (via batch credit for DOCs and feed) is significant and usually done by contractors. There seems to be sufficient competition in this sector to ensure that margins reflect the product and risk involved.

Post-farm margins are taken by traders and market retailers. Competition in these sectors is huge so there is no scope for margin mining. As the market develops there will be increasing margins taken by processors and supermarkets but given the price pressures that will exist in the market (versus traditional market broiler prices) competition will be significant.

Given the reliance on imported raw materials, the level of margin in each component of the value chain, and the fact that no sector (DOC, feed, farm, contractor, trader or retailer) dominates margins, we can state that the cost structure of broiler production in Indonesia is

“real.” That said, improving efficiencies can reduce cost, but achieving those efficiencies will pose challenges for government and industry alike.

DATA COLLECTION

Significant data can be obtained from the industry to assess efficiency and for use in planning. The MOT may want to monitor the data described in Table 9-1.

Table 9-1
Industry Data Worth Monitoring

Subject	Issues and Recommendations
Prices	The MOT monitors poultry industry prices and uses the co-efficient of variation in price as a measure of price stability. Regional price differences can be explained so this method is not a measure of price “stability.”
	Recommendation. Continue to monitor prices. Modify statistical analysis to exclude real cost variances between regions if the co-efficient of variation is used as a measure of price stability.
Production and consumption	DGLS measure production statistics for broilers and eggs by region. Their methodology is based on GP/PS volumes in each region. A review of industry data suggests DGLS is underestimating production for both sectors by some 40 percent. A fuller review would be required to confirm this but suffice it to say that if these data are important enough to collect then the results of doing so should be correct. Interprovincial trade of poultry products is significant so it would be useful to understand consumption levels by province.
	Recommendation. Establish what data are required and how they are to be used. Evaluate how data are collected and projected and undertake a circular review using all available data (industry and GoI) in order to establish a robust method for future data collection. Inputs into this will be GP/PS, DOC production, feed production etc. Cooperation between government and industry will be required. Collection of consumption data at the provincial level may be useful for regional authorities as a guide to future supply/demand dynamics and how they influence interprovincial trade.
Demand elasticity	There is evidence that the poultry industry, particularly the broiler industry, will grow rapidly. This will pose challenges for Indonesia with regard to raw material supply, location of the expansion, environmental issues, etc. The report outlines how knowledge of demand elasticity can be used in planning industry development. Possible determinants of demand for broilers are GDP, broiler/beef/fish price and consumption etc. – all of which would need to be measured.
	Recommendation. Capability exists in Indonesia to undertake such studies and this is encouraged (e.g., a PhD subject could be “Demand elasticity for broilers and eggs as a determinant of poultry industry growth issues in Indonesia over the next 10 years”).
Gross Domestic Product	The key determinant of demand for poultry products is GDP and related data (PPP). This is measured at a country level and its projection is critical for industry planning. Provincial GDP is also measured but this does not seem to be a measure of provincial per capita spending power.
	Recommendation. If analysis of regional development of the industry is required, robust data are required on per capita purchasing power. This may exist.
Corn production	Corn production is measured by province. The large variance between stated production volumes and use of corn by the poultry industry seems to be related to moisture content (with stated production being ex farm before drying and possibly categorizing forage corn area/yield as feed/human corn). This variance seems to be frustrating for industry when reconciling production and import requirements.
	Recommendation. Standardize production statistics to also include “as used” volumes (13-15 percent moisture).
Listed company health and strategy	The poultry industry is dependent on the investment and technology of large integrated companies. Their financial strength is critical for industry maintenance and development. Four of these are listed companies (representing 75 percent of feed output) so their financial strength is easily monitored. Their future investments—size, scope, and location—will be critical to industry development; and the impact of this development on infrastructure, environment etc. is of interest to industry and the government.
	Recommendation. Develop and maintain a strong and trusting relationship with industry leaders.

Subject	Issues and Recommendations
International benchmarking	<p>Livestock performance, costs, and prices can be benchmarked against international players. Raw material prices are the easiest to benchmark as commodity specifications are likely to be standard across products (corn, SBM). Livestock performance and costs are a little harder to benchmark as it is more difficult to standardize systems. Likewise, extreme care must be taken to standardize any comparison between Indonesian market prices for broilers versus import parity prices because Indonesian broilers are small (lower yields) and yields are further reduced by them being head on, feet on. This could result in a variance in yield between Indonesian broilers and imported product of up to 20 percent.</p> <p>Recommendation. Do not undertake any benchmarking unless products are standardized and any comparisons made are fully understood.</p>
Price/feed cost ratios	<p>A common determinant of industry costs and strength is the price/feed or price/corn ratio. The relevance of any ratio needs to be fully understood as corn alone does not account for the impact of soybean meal, or full feed costs.</p> <p>Recommendation. If deemed useful, then a standardized chicken price/feed price could be easily developed for Indonesia and would be useful aid to understanding why prices may be affected by variance in feed costs (e.g., in Makassar).</p>
Retail and food service development	<p>As more supermarkets and fast food outlets using chicken (KFC, McDonalds) are established, modern processing for fresh and frozen broiler products will increase. This could lead to more supply in traditional markets coming from better processing (food safety); this, in turn, would enable the government to impose changes on how broilers are processed and sold to ensure food safety.</p> <p>Recommendation. Track retail development in supermarkets and fast food.</p>
Livestock performance	<p>While it does not affect the MOT directly, a key determinant of broiler costs is the efficiency of livestock performance, particularly mortality and FCR rates. Accurate diagnostics of livestock performance with appropriate corrective action plans are critical if the industry is to ensure lowest cost production and this should be a priority for any poultry producer.</p> <p>The MOT /MOA may be interested in the impact of gross changes in livestock performance due to, say, a disease outbreak (as would have occurred with the HPAI outbreak). But this could be assessed via discussion with the industry.</p>
Websites for prices and industry information	<p>Many websites provide industry statistics and information and quote international prices for raw materials and chicken. In using these for comparative purposes it is critical to ensure that information is standardized. Sites that may be used include the following:</p> <p>http://www.brazilintl.com/agsectors/soya/soybeans-charts/chart_01.htm#.UP0zW-jRyYU</p> <p>http://www.brazilintl.com/agsectors/soya/soja.htm#.UP0zO-jRyYU</p> <p>http://www.indexmundi.com/commodities/?commodity=chicken</p> <p>http://www.indexmundi.com/agriculture/</p> <p>http://www.thepoultrysite.com/</p> <p>http://gain.fas.usda.gov/Lists/Advanced%20Search/AllItems.aspx</p> <p>http://www.agricommodityprices.com/</p> <p>http://www.worldpoultry.net/</p> <p>http://www.wattagnet.com/</p>

This list of potential data for monitoring is extensive (but not exhaustive) so care needs to be taken in establishing what the MOT needs to know to manage its role and then to populate a database accordingly, ensuring that the necessary standardization is present and the output of any analysis understood.

Appendix A. Costs of Production

Table A-1
Cost of Production for Broilers, including Parent Stock Farm Costs

	Sold in the Market (Rp/kg DWt)	Cumulative (Rp/kg)
Cost of PS DOC	243	243
PS rearing feed	361	604
Other PS rearing costs	95	699
PS laying feed	1640	2339
Other PS laying costs	365	2704
Hatchery costs	198	2902
DOC margin	75	2977
DOC transport	50	3027
Feed raw material costs	11343	14370
Raw material transport costs of imported materials ex port	418	14788
Raw material transport costs ex local supply	107	14895
Feed mill production and bag costs	597	15492
SG&A, financial and tax costs	860	16352
Feed mill net margin	1003	17355
Feed transport costs to farm	239	17594
Broiler farm costs (energy, water, animal health etc.)	933	18527
Farmer margin	1866	20392
Contractor margin	2443	22836
Trader transport birds to consolidation and slaughter	187	23022
Trader margin	1604	24627
Slaughter costs	1399	26026
Transport from slaughter to market	187	26213
Offal recovery value	-1866	24347
Market margin	1653	26000

SOURCE: Industry interviews and production assumptions.

Table A-2

Cost of Production for Market Broilers versus Modern Processed Broilers

	Sold in Market (Rp/kg DWt)	Cumulative (Rp/kg)	Sold ex Modern Processing (Rp/kg DWt)	Cumulative (Rp/kg)
DOC cost	3027	3027	1961	1961
Feed raw material costs	11343	14370	11438	13399
Raw material transport costs of imported materials ex port	418	14788	421	13820
Raw material transport costs ex local supply	107	14895	108	13929
Feed mill production and bag costs	597	15492	602	14531
SG&A, financial and tax costs	860	16352	867	15398
Feed mill net margin	1003	17355	1011	16409
Feed transport costs to farm	239	17594	237	16646
Broiler farm costs (energy, water, animal health etc.)	933	18527	1196	17842
Farmer margin	1866	20392	2093	19935
Contractor margin	2443	22836	2600	22536
Trader transport birds to consolidation and slaughter	187	23022	150	22685
Trader margin	1604	24627	508	23194
Slaughter costs	1399	26026	4007	27201
Transport from slaughter to market	187	26213	359	27560
Offal recovery value	-1866	24347	-419	27141
Processor margin			6000	33141
Supermarket margin	1653	26000	11859	45000

Table A-3
Cost of Production for Eggs

	Sold in the Market (Rp/kg) (Per kg egg)	Cumulative (Rp/kg)
DOC cost	263	263
Rearing feed	1,840	2103
Rearing costs	500	2603
Layer feed RMs	7,678	10281
Trans port to mill	330	10611
Trans local to mill	132	10743
Feed production	440	11183
Feed SG&A fin tax	770	11953
Feed margin	770	12723
Feed trans to farm	225	12948
Layer farm costs	1,000	13948
Cull income	-800	13148
Farm margin	2,052	15200
Trader transport	200	15400
Trader margin	1,100	16500

Appendix B. Population and Production, 2011

Province	Population ('000s)	Broiler (MT)	Eggs (MT)
N. Sumatera	12982	56516	76902
Lampung	7608	27313	48586
Aceh	4494	5140	1980
W. Sum	4847	17064	60247
Riau	5538	38518	1169
Jambi	3092	15395	3925
S. Sum	7450	27	48569
Bengkulu	1716	2352	469
Babel	1223	17872	928
Riau IS	1679	6054	7476
Rest Sumatera	30039	102422	124763
West Java	43053	423126	110820
Central Java	32383	105839	175059
East Java	37477	160360	216889
West, Central , East Java	112913	689325	502768
Banten	10632	88069	42537
Jakarta	9608	108642	0
Yogyakarta	3457	25634	24031
Rest Java	23697	222345	66568
Bali	3891	21136	30061
W. Nusa Tenggara	4500	15266	10359
E. Nusa Tenggara	4684	239	705
Total Nusa Tenggara	9184	15505	11064
W. Kalimantan	4396	27234	16582
C. Kalimantan	2212	6849	549
S. Kalimantan	3627	36367	30798
E. Kalimantan	3553	32813	9473
Total Kalimantan	13788	103263	57402
N. Sulawesi	2271	5329	7838
C. Sulawesi	2635	8132	4877
S. Sulawesi	8035	10976	49860
ES. Sulawesi	2233	997	1782
Gorontalo	1040	1520	2316
W. Sulawesi	1159	245	151
Total Sulawesi	17373	27199	66824
Maluku	1534	125	304
N. Maluku	1038	353	143
W. Papua	760	454	349
Maluku Papua	2833	4479	1062

SOURCE. GoI.

Appendix C. Estimate of Corn Production and Imports, 2006-2012

Year	Corn Imports	Local Production	Feed Corn	Human	Total Consumption
2006	1069	7031	4200	3900	8100
2007	294	8206	4500	4000	8500
2008	317	8583	4800	4100	8900
2009	1321	7479	4600	4200	8800
2010	3041	6759	5500	4300	9800
2011	1500???	8500	5600	4400	10000
2012	2000	8600	6100	4500	10600

SOURCE: USDA.