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Research Report

Reforming Trade Policy to Lower Maize Prices in Indonesia

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Reforming Trade Policy to Lower Maize Prices in Indonesia

by Imelda Magdalena Freddy, Hizkia Respatiadi, and Gede Endy Kumara Gupta

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Executive Summary

In the first half of 2018, the consumption of maize for animal feed reached 8.60 million tonnes, more than 70% of total Indonesian maize consumption in that period. From 2009 to 2018, maize consumption for animal feed grew every year by 477,780 tonnes. Despite the implementation of a free hybrid maize seeds program, known as UPSUS (*Upaya Khusus / Special Effort*), domestic maize production only increased by 294,440 tonnes per year. These circumstances contributed to high maize prices in Indonesia, which reached more than twice the international market price in August 2018.

High maize prices impact animal feed producers because they use maize as a raw material. High prices also impact land animal farmers who must pay a high price to feed their animals. In turn, high maize prices also contribute to increases in the price of chicken eggs, chicken meat, and beef, which affects the 21 million farming and 35 million non-farming households that are net maize consumers.

The implementation of ministerial regulations MOA 57/2015 and MOT 21/2018 has aggravated the problem as they contradict each other when specifying who is authorized to import maize and what documents are required by legal importers. Both regulations impose long procedure for obtaining import license, which can take up to 53 working days to complete. As the result, imports are unable to lower maize prices in Indonesia.

We propose a two-stage policy reform to lower maize prices that also provides sufficient time for relevant stakeholders to adjust to the new policies. The first stage represents the adjustment period. Within the first five years of reform, the government should discontinue the UPSUS program in areas where farmers prefer to use higher quality commercial hybrid seeds. The government must support farmers as they complete the shift from traditional seeds to more productive, disease-resistant hybrid seeds and they must work together with the private sector to improve the post-harvest process. Further, these changes must come with specific targets for productivity increases and quality improvement in maize.

After five years, the second stage of policy reform should begin. The government should revise MOT 21/2018 and MOA 57/2015 to allow more qualified importers from both state-owned enterprises and the private sector to compete fairly and in the most transparent manner with the domestic market. The government should resolve contradictions between the two regulations so that they are easier to follow and result in the desired effects.

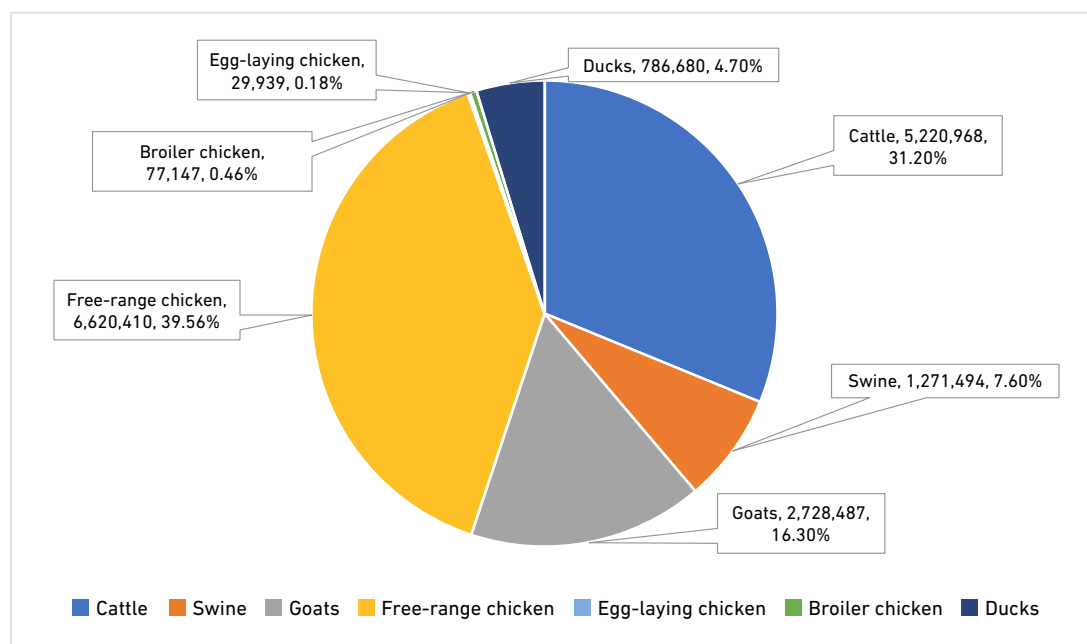
This timeframe should leave sufficient time for domestic maize producers to improve their quality and productivity with support from the government, thus positioning them better to compete with imported maize when the market is opened. Most importantly, these reforms will help the maize market become more competitive, lowering maize prices and benefiting both animal feed producers and land animal farmers. As a result, this will lower consumer prices for protein-rich food items.

Current Situation

Maize is one of seven strategic food commodities in Indonesia, alongside paddy rice, sugar, soybeans, poultry, chili, and beef (Ministry of Agriculture, 2015a, p. 2). Official statistics estimated that there were 5.10 million maize farming households in the country, representing around one-fifth of the 26.13 million farming households in Indonesia (Ministry of Trade, 2017, p. 2; Statistics Indonesia, 2013, p. 10).

In 2018, maize consumption in Indonesia reached 12.20 million tonnes, higher than in neighboring countries such as Malaysia (4 million tonnes), Thailand (5.40 million tonnes), and the Philippines (5.55 million tonnes) (US Department of Agriculture [USDA], 2018e, p. 18, 2018f, p. 9, 2018h, pp. 9–10, 2018g, p. 15). In Indonesia, maize is used as food for human consumption as well as to feed land farm animals.¹ Chicken farming (broiler, egg-laying, and free-range chickens)² makes up the largest proportion of land animal farming among Indonesian households, representing 40.20% of the total, followed by cattle and goat farming at 31.20% and 16.30% respectively, as seen in Figure 1 (Statistics Indonesia, 2014, p. 83).

Figure 1
Number and Proportion of Land-Animal Farming Households in Indonesia



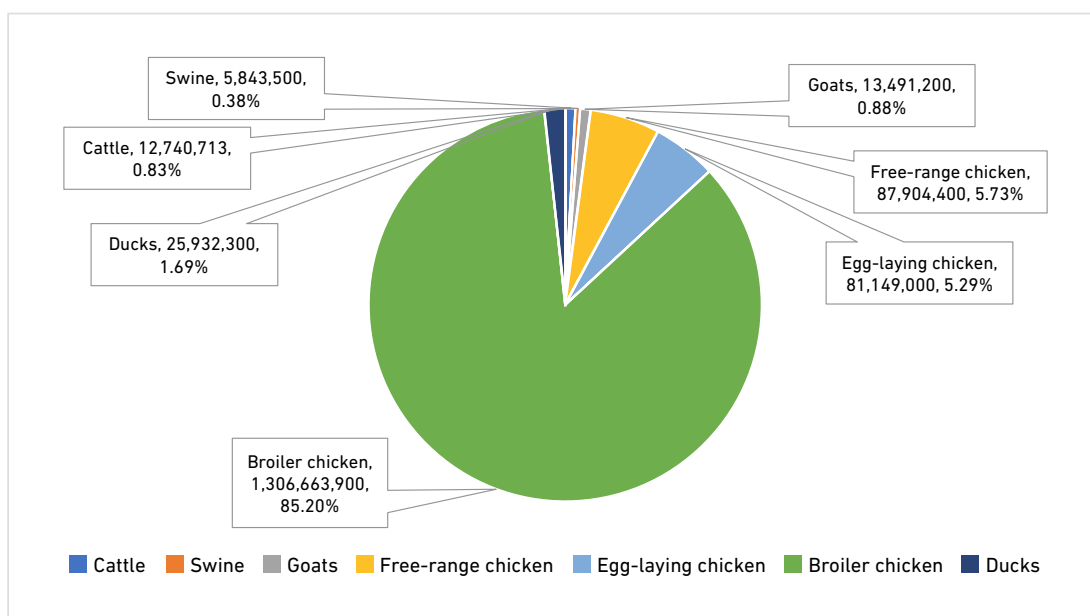
Source: Statistics Indonesia (2014)

¹ We do not include fish and other water animals in this paper, as their feed mainly consists of soybeans (Tangendjaja, 2014, p. 31).

² In this paper, when referring to broiler chickens and egg-laying chickens we are writing about chickens that spend most of their lives in cages and are most commonly raised on chicken farms. Broiler chickens are raised to become poultry meat, while egg-laying chickens are raised to produce table eggs. Meanwhile, free-range chickens are those that are typically raised by households or individuals, mostly in villages. These chickens are allowed to roam freely outdoors for at least 51% of their lives (US Department of Agriculture [USDA], 2015). Free-range chickens are used as source of either or both poultry meat or chicken eggs by their owners.

The overall population of animals tells a different story. As can be seen in Figure 2, broiler chickens are the largest population of land animals farmed in Indonesia by far, representing 85.20% of the total population. Free-range and egg-laying chickens were the second and third most populous, making chicken 96.22% of the total farmed land animal population. Meanwhile, ruminant animals such as cattle and goats represented 0.83% and 0.88% of land animals farmed, respectively (Statistics Indonesia, 2014, p. 84).

Figure 2
Land Farm Animal Population in Indonesia



Source: Statistics Indonesia (2014)

Table 1 illustrates the ration formula³ for different animal feeds. In all land animal feed, maize and its derivative products make up between 51% and 65% of the ration formula. This far exceeds the ration of soybeans, which contribute between 5% and 26%, or of rice, which provides between 6% and 30%, depending on the animals. Other ingredients, such as cassava, coconuts, palm oil, and minerals make up no more 7% of any feed. This supports evidence provided by a representative of feed maize producers in Indonesia, who stated that at least 50% of feed prices are determined by maize prices (Representative of Indonesian Employers' Association [APINDO], Personal Interview, 9 July 2018). This representative added that around 70% of the price of animal products is determined by the price of their feed.

“ In all land animal feed, maize and its derivative products make up between 51% and 65% of the ration formula. ”

³ Ration formula means the proportion of ingredients. For example, if maize takes 60% of the ration formula, then the other 40% consists of other ingredients.

Table 1
Ration Formula for Animal Feed Ingredients in Indonesia

Feed Ingredients	Ration Formula (%)				
	Chicken Types			Duck	Swine
	Free-range	Broiler	Layer		
Maize (forage/kernel)	49	56	49	35	42
Maize (bran)	-	-	-	8	12
Maize DDGs*	-	-	3.5	10	5.5
Maize gluten meal**	2	-	2.5	2	-
Soybean meal	13.5	26	21	12	15
Rice bran	30	6	11	25	14
Animal by-product	2.5	4.5	4.5	3	-
Rapeseed meal	2	2	0.5	3	3
Fish meal	-	-	-	1	1.5
Palm oil	1	3.5	2	1	-
Palm Kernel Expeller**	-	2	3	-	7
Others	-	-	3	-	-
Total	100%	100%	100 %	100%	100%
Total maize-based ingredients	51%	56%	55%	55%	59.5%

Feed Ingredients	Ration Formula (%)	
	Cattle	Goat
Maize (forage)	15	23
Maize (kernel)	50	27
Maize (bran)	-	9
Rice bran	15	9
Soybean meal	5	17
Dried cassava	5	7
Copra/dried coconuts	5	6
Mineral	2	1
Calcium	2	1
Urea	1	-
Total	100%	100%
Total maize-based ingr.	65%	59%

Notes:

Ruminant animals such as cattle and goats require a different set of feed ingredients compared to swine and avian animals (e.g., chicken and ducks). This is due to the digestive system of ruminant animals, which have colonies of microorganisms inside their forestomach (rumen) to help digest their food and provide them with essential nutrients (Ffoulkes, 2016, p. 2).

* : Maize DDGS: Maize-based Distiller Grains: the main by-product of the distillation of alcohol from maize grain (UN-FAO, 2014).

** : Maize/corn gluten meal (CGM) is a by-product of the manufacture of maize starch (and sometimes ethanol) by the wet-milling process. It is protein-rich feed, containing about 65% crude protein (DM), and is used as a source of protein, energy, and pigments for livestock species (UN-FAO, 2018).

*** : PKE: Palm Kernel Expeller (PKE) is a by-product of the palm oil extraction process from the fruit of the palm (Agrifeeds, 2014).

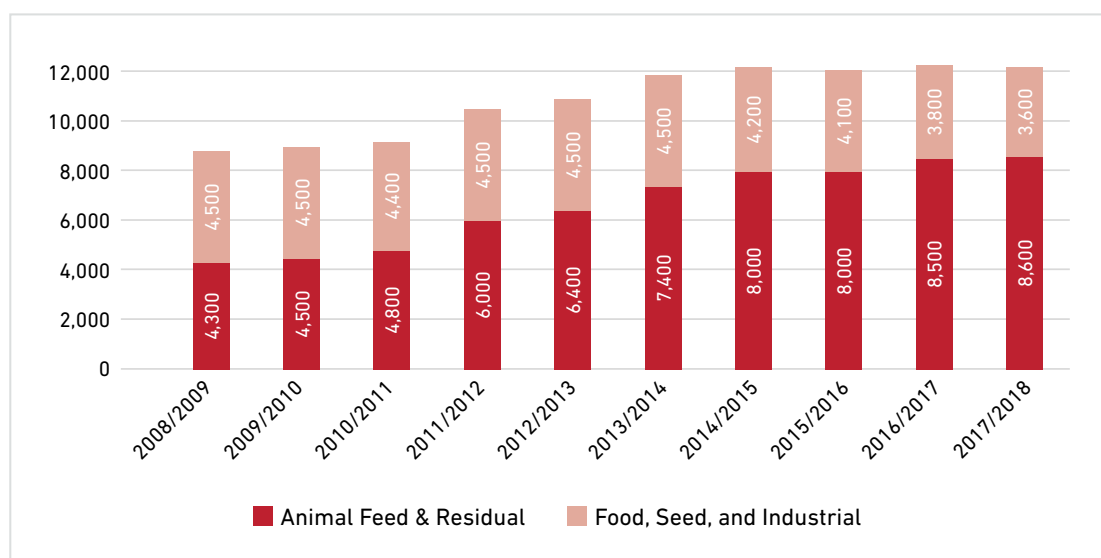
Sources are collated from Ffoulkes (2016, pp. 2–6); Rohaeni, Amali, Subhan, Darmawan, & Sumanto (2008, p. 128); Tangendjaja (2014, p. 31); UN-FAO (1999, p. 56); University of Wisconsin (2010).

In August 2018, the national average maize price in Indonesia reached IDR 6,266 per kilogram, more than two-and-a-half times the international market price of IDR 2,364 per kilogram in the same period.

In August 2018, the national average maize price in Indonesia reached IDR 6,266 per kilogram (Ministry of Trade, 2018a, p. 45), more than two-and-a-half times the international market price of IDR 2,364 per kilogram in the same period (The World Bank, 2018). High maize prices have a significant impact on land animal farmers. To illustrate, consider a cattle farmer. A cattle farmer must feed each of his cattle (assuming each cow weighs 300 kilograms) around 7 kilograms of feed every day, or around 210 kilograms every month (Ffoulkes, 2016, p. 7). This feed should be a mix of 15% forage⁴ and 85% concentrate,⁵ both of which are mainly made from maize. The contribution of maize to the total ration formula for cattle feed is 65%. If we calculate the maize-based feed ingredients by using the national average maize price in Indonesia as of August 2018, the farmer must spend around IDR 850,000 per month per cow to buy maize-based feed ingredients.⁶ On the other hand, if the farmer was paying the international market price for maize, he would have saved more than IDR 530,000 per month per cow.⁷

High maize prices in Indonesia have both demand and supply side causes. The demand side is primarily driven by the demand for animal feed. From 2008/2009 to 2017/2018, the estimated average maize consumption through animal feed reached 6.65 million tonnes⁸ (USDA, 2011 - 2018) or 60.95% of the average maize consumption during that period. Over the same period, maize consumption through animal feed increased every year by an average of 477,780 tonnes. At the same time, average maize consumption through the food industry decreased annually by 100,000 tonnes. Figure 3 represents maize consumption in Indonesia through animal feed and other uses.

Figure 3
The Use of Maize in Indonesia (000 tonnes), 2009/2010 to 2017/2018



Source: USDA, 2011–2018

Note: USDA collects the data from the period of early October to the end of September in the following year.

⁴ Forage refers to plants, either fresh or preserved, which provide energy to the livestock and maintain their rumen motion (Ffoulkes, 2016, p. 2; University of Maryland, 2017, p. 2).

⁵ Concentrate refers to mixture of animal feed ingredients which provide extra nutrients required by the livestock to balance the requirements of their rumen microorganisms (Agriculture and Horticulture Development Board [AHDB], 2010; Ffoulkes, 2016, p. 3).

⁶ Maize-based ingredients in cattle feed: 65% → 65% x 210 kg per month = 136.5 kg → Prices in Indonesia → 136.5 kg x IDR 6,266 per kg = IDR 855,309

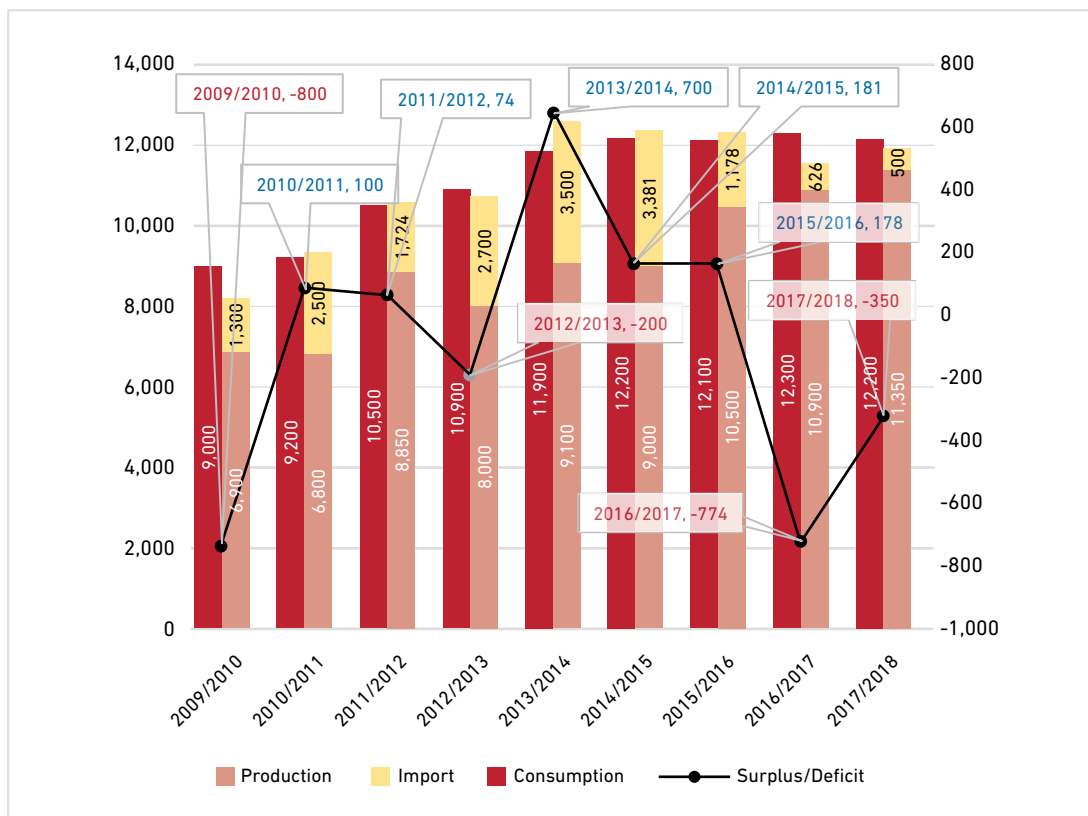
⁷ Indonesia vs International Market Prices → (IDR 6,266 – IDR 2,364) x 136.5 kg = IDR 532,623

⁸ 1 tonne = 1 metric ton = 1,000 kilograms

On the supply side, maize production and productivity in Indonesia are lagging behind other maize-producing countries. In 2017/2018, maize production in Indonesia reached only 11.35 million tonnes, far less than top producers such as Brazil (94.50 million tonnes), China (215.89 million tonnes), and the USA (376.61 million tonnes). In terms of productivity, Indonesia produced only 3.24 tonnes maize per hectare, compared to neighboring Thailand, which produced 4.45 tonnes per hectare and larger producers Brazil (5.37 tonnes/ha), China (6.09 tonnes/ha), and the United States (11.38 tonnes/ha) (Capehart, Liefert, & Olson, 2018, p. 1; USDA, 2018d, p. 18, 2018g, pp. 9–10, 2018a, p. 2, 2018b, p. 8).

Consumer demand exceeds domestic maize production in Indonesia. From 2009/2010 to 2017/2018, average domestic maize production was 9.04 million tonnes per year and imports reached around 2 million tonnes, as represented in Figure 4. In the same period, average maize consumption was 11.14 million tonnes per year. The result was that average domestic production and imports together still fell short of national consumption by around 100,000 tonnes. From 2016/2017 to 2017/2018, the average supply was 4.59% lower than average consumption, creating an average deficit of 562,000 tonnes over those years.

Figure 4
Maize Production, Imports, Consumption, and Surplus/Deficit in Indonesia
2009–2018 (in 000 tonnes)



Sources are collated from USDA (2009 - 2018)

Note: USDA collects the data from the period of early October to the end of September in the following year.

The government reported that in January 2016 alone there were 353,000 tonnes of illegal maize imports.

Maize deficits are related to import restrictions imposed by the government. In early 2016, the Ministry of Trade (MOT) imposed its regulation 20/2016, which stipulated that feed maize can only be imported by the National Logistics Agency (*Badan Urusan Logistik/BULOG*) (Freddy & Gupta, 2018, p. 7). Various media outlets reported that the chairman of Indonesian Feed Producers Association (APPI/GPMT) stated that this policy creates uncertainty in the maize supply, since all feed producers in the country must depend on a single company to supply them with imported maize (Aziliya, 2016; Tempo.co, 2016).

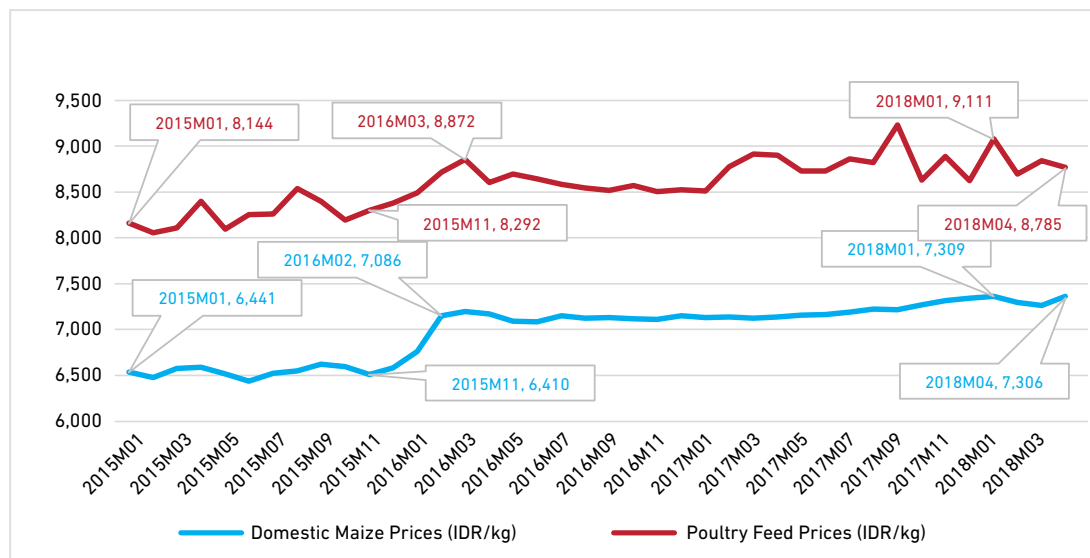
According to practitioners in the feed maize industry, some producers decided to substitute wheat for maize to ensure supply stability (Representative of Indonesian Feed Producers Association [GPMT], Personal Interview, 30 August 2018) and reported their wheat consumption as maize consumption in order, they claimed, to avoid unwanted questions from the government (Representative of APINDO, Personal Interview, 12 October 2018; Representative of National Forum of Layer Poultry Farmers [FPLN], Personal Interview, 25 July 2018). Meanwhile, other producers decided to import maize without going through BULOG so that port authorities declared their imports illegal when they managed to identify them. These imports may not have been recorded in the official statistics. The government reported that in January 2016 alone there were 353,000 tonnes of illegal maize imports (Agustinus, 2016a; KabarBisnis.com, 2016; Rachman, 2016). The ambiguity created by the substitution and misreporting of products on one hand and illegal imports on the other introduces a lack of clarity about the actual numbers of both consumption and imports.

High maize prices in Indonesia contribute to a higher price for animal feed. For example, poultry feed increased by 7.87% from IDR 8,144 per kilogram in January 2015 to IDR 8,785 per kilogram in April 2018, as is illustrated in Figure 5. This corresponded with a 13.43% increase in domestic maize prices during the same period from IDR 6,441 to IDR 7,306. Moreover, in February 2016, when the domestic maize price reached IDR 7,086 (increasing by 10.55% from its price of IDR 6,410 in November 2015), poultry feed followed a similar trend as its price increased by nearly 7% from IDR 8,292 per kilogram in November 2015 to IDR 8,872 in March 2016. As the domestic maize price reached its peak in January 2018 at IDR 7,309, the price of poultry feed was rising to one of its highest levels, IDR 9,111—higher by 11.87% than its price in January 2015.

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Figure 5

Monthly Average of Domestic Maize Prices & Poultry Feed Prices in Indonesia, 2015–2018



Sources are collated from the Ministry of Trade (2015 - 2018) and the Ministry of Agriculture (2018a)

Maize prices do not always have an instantaneous impact on the price of animal feed. Instead, changes in maize prices may take several months to have an effect on feed prices (Representative of FPLN, Personal Interview, 25 July 2018). This can be partially explained by an animal feed industry practice of holding on to backup stock rather than selling it right away to help stabilize prices when producers anticipate that maize and/or other ingredients will become more expensive. Because of reserve stocks, the feed industry does not need to increase their prices at the same time as maize prices. Although it can smooth prices, backup stock normally only lasts for a month or two, and once it is depleted the industry claims they have no choice but to increase the prices of their products accordingly.

“The increasing price of animal feed contributes to the rising prices of other food in Indonesia, including chicken eggs, chicken meat, and beef.”

The increasing price of animal feed contributes to the rising prices of other food in Indonesia, including chicken eggs, chicken meat, and beef. From 2015 to 2017, the average annual prices for these protein sources increased by 2.36% for chicken eggs, 5.22% for chicken meat, and 5.40% for beef. Table 2 illustrates the changes in these prices.

Table 2

Annual Average Consumer Prices of Chicken Eggs, Broiler Chicken Meat, and Beef, 2015-2017

Commodity	Price in 2015 (IDR/kg)	Price in 2016 (IDR/kg)	Price in 2017 (IDR/kg)
Chicken Eggs	19,648	20,473	20,580
Chicken Meat*	30,087	31,592	33,308
Beef	104,328	113,555	115,779

Source: Statistics Indonesia (2015 - 2017)

Note: *Chicken meat only includes meat that comes from broiler chickens, since this product is more common in the market—see the larger population compared to free-range chickens illustrated in Figure 2 (Statistics Indonesia, 2014, p. 84)

Existing Policies

To address high maize prices and increasing animal feed prices, the government has issued two main policy responses.

A. Increasing domestic productivity

The first policy, the regulation of the Minister of Agriculture (MOA) 03/2015, focuses on increasing maize productivity by providing free hybrid maize seeds to farmers. This policy, commonly known as UPSUS (*Upaya Khusus / Special Effort*), encourages maize farmers to switch from traditional seeds to more productive, disease-resistant hybrid seeds. Section III (A.3 and B.3) of MOA 03/2015 stipulates that the seeds must be high quality and authorizes the Ministry of Agriculture to directly manage seed procurement and distribution. Around 65% of the seeds are produced by the Research and Development Department (*Balitbangtan*) of the Ministry of Agriculture and the remaining 35% are produced through sub-contracting to private companies.

Hybrid maize is the result of cross-breeding between two different maize varieties, each with its own special traits, and it is marketed as having the potential to yield between 8 to 13 tonnes per hectare, while traditional seeds yield a maximum 7 tonnes per hectare (Ministry of Agriculture, 2018c). The recipients of UPSUS should be groups of farmers who are willing to adopt new technology and to actively participate in this program as assessed by their local governments (Ministry of Agriculture, 2018b, pp. 26–27).

The government aims to increase domestic maize productivity to 5 tonnes per hectare through this policy, which means Indonesia must increase its maize productivity by 1.76 million tonnes per hectare above the current productivity level (Ministry of Agriculture, 2015b, p. 6).

B. Improving maize import mechanism

The second policy, the regulation of the Minister of Trade (MOT) 21/2018, focuses on improving the effectiveness of Indonesia's maize import policy (Paragraph b, p.1). This regulation replaced the previous maize import policy, MOT 20/2016 and its subsequent amendment, MOT 56/2016.⁹ Under the new 2018 regulation, BULOG no longer has to obtain a recommendation from the Ministry of Agriculture (MOA) before it can import maize (Article 5 (2)). Furthermore, the validity of import licenses has been extended to six months (Article 6(1)) from only 3 months stated under the old regulation.

However, this regulation did not completely liberalize maize imports—many restrictions remain. Most importantly, BULOG retains a monopoly on maize imports for animal feed production (MOT 21/2018 Article 3 (1)). This monopoly is part of the government's effort to stabilize maize and other commodity prices, as stipulated in Presidential Decree 48/2016 Article 2 (3), by managing the availability and prices of rice, maize, and soybeans. Meanwhile, MOT 21/2018 Article 3 (3) and (4) allow the private sector to import maize only for human consumption and industrial purposes. In addition, lengthy import procedures remain in force through the new regulation (MOT 21/2018

⁹ Both MOT 20/2016 and its subsequent revision MOT 56/2016 served as maize import regulation from March 2016 to early January 2018. One of the main differences between these old regulations and the current one (MOT 21/2018) lies in the requirement of obtaining a recommendation from the Ministry of Agriculture before BULOG can import maize for animal feed.

Article 5 (2)). All importers (including BULOG) must produce multiple documents, including an import license from the Ministry of Trade, an Importer Identification Number, an Import Goods Declaration, and proof of storage ownership. According to the official timeline, these documents require at least 30 working days to complete.

Analysis

A. Ideal Cultivation Practices for Maize in Indonesia

According to the maize cultivation guideline published by the Ministry of Agriculture (2009, p. 2), maize in Indonesia can grow in lowlands as well as highlands—at altitudes up to 1,800 meters above sea level. However, its optimal growth environment is land that is 50 to 600 meters above sea level. On irrigated lands, maize requires between 100 to 140 mm of rain per month, while on rain-fed land it requires up to 200 mm per month (Bogor Agricultural University, 2016, p. 2; Ministry of Agriculture, 2009, p. 2). Because of its rainfall requirements, maize should be planted near the end of the dry season and during the rainy season (from August to December).¹⁰ Once planted, maize requires around three months to fully grow and be ready to harvest (Agricultural field instructor in Sumenep, East Java Province, Personal Interview, 1 May 2018).

The maize harvest is ideally conducted during or near the end of rainy season (from November to March). Maize farmers in Indonesia normally have three harvest seasons: between November and February (49%), March and June (37%), and between July and September (14%) (USDA, 2017, p. 7). When these conditions are met, farmers have a three-month period in which they plant and grow crops that require less water, such as beans and vegetables. There are also areas in which paddy rice is the primary crop and maize serves as a secondary crop, since its water requirements, while high, are lower than the over 200 mm per month needed in rice paddies (Fuadi, Purwanto, & Tarigan, 2016, p. 26; Sudaryono & Mawardi, 2016, p. 87).

B. Farmers' Responses to UPSUS Programs

A study by the Center for Indonesian Policy Studies (CIPS) in Dompus, West Nusa Tenggara province and Sumenep, East Java province in April 2018 revealed that farmers in different areas responded differently to the UPSUS hybrid seeds program. These different areas are classified by the strength of their maize markets, which is measured through three main components: (1) the core market of buyers and sellers, (2) the implementation of Good Agricultural Practices (GAP) during cultivation and post-harvest, and (3) other support factors such as infrastructure, irrigation, and finance (Freddy & Gupta, 2018, pp. 16–21).

An area with a strong market has commercial farmers, a large number of market actors, GAP application, and access to government loan facilities (*Kredit Usaha Tani / KUT*). In these areas, farmers are reluctant to use hybrid maize seeds from the UPSUS program because they have a good understanding of hybrid maize and the technology in maize cultivation and understand that

¹⁰ In normal conditions, the rainy season in Indonesia runs from November to April (Meteorology, Climatology, and Geophysics Agency [BMKG], 2018, p. 30), while the dry season runs from May to October (BMKG, 2018b, p. 28).

UPSUS maize seeds are less productive than many commercial seeds. Moreover, farmers stated they are both financially capable and willing to buy hybrid maize seeds as long as the quality is in accordance with their expectations. These farmers therefore prefer to use premium seeds from the private sector, which guarantee higher yields than those from the UPSUS program.

An area with a semi-strong market has a majority of farmers who still plant traditional maize and fewer than half with experience planting hybrid maize. A value chain for maize exists but there are fewer market actors and so the market is less competitive, and most farmers prefer using their own capital over using the government's loan facilities. In these areas, the UPSUS free hybrid maize seeds program has effectively incentivized maize farmers to shift from traditional seeds to the more productive UPSUS hybrid seeds. Since buyers and sellers are present in these areas, even though there are fewer than in a strong market area, farmers who successfully increase their yields using UPSUS hybrid maize can be encouraged to buy commercial hybrid seeds from the private sector for the next growing season to increase yields even further.

Thin market areas are identified by only a few farmers who plant maize, most of whom are categorized as subsistence farmers. They only cultivate traditional seeds and apply only traditional cultivation techniques. Very few maize market players are present and those that are present deal mostly in traditional seeds. Maize trading happens on a micro level and only supports household consumption. Most of the land is dedicated to other commodities, including fruits and soybeans, and farmers use their personal capital to finance their farms. Farmers in thin market areas believe maize to be less profitable than more familiar crops, such as fruits and vegetables. Since the maize market in these areas is weak, it does not create a strong enough incentive for buyers and sellers to operate in the area and support a full supply chain. The number of buyers and private seed producers is severely limited, which leaves farmers without motivation to plant hybrid maize even if they are provided with free seeds. Eventually the low demand for UPSUS seeds encourages black market practices,¹¹ rendering the implementation of UPSUS program in these areas ineffective.

“ The low demand for UPSUS seeds encourages black market practices, rendering the implementation of UPSUS program in thin market areas ineffective. ”

C. Impact of UPSUS Program on Maize Quantity and Quality

After the implementation of UPSUS program in early 2015 through MOA 03/2015, both productivity and production of maize in Indonesia began to increase. The average productivity from 2015/2016 to 2017/2018 reached 3.15 tonnes per hectare, an 18.11% increase from 2.67 tonnes per hectare, the average from 2008/2009 to 2014/2015 (before the regulation was implemented). Table 3 illustrates this increase. However, this productivity level still falls short of the government target of 5 tonnes per hectare stipulated in the regulation.

¹¹ This is including the sale of UPSUS seeds outside their area of distribution, as well as re-selling of those seeds by the recipient farmers so they can use the money to purchase commercial seeds or their other needs.

Average production, which was 8.19 million tonnes on average from 2008/2009 to 2014/2015, increased by 33.25% or nearly one-third to 10.92 million tonnes from 2015/16 to 2017/2018. Even with this increase, production fell short of the average consumption level of 12.20 million tonnes from 2015/2016 to 2017/2018. From 2008/2009 to 2017/2018, domestic maize production grew by 294,440 tonnes per year, but the annual growth of maize consumption for animal feed reached 477,780 tonnes per year over the same period.

“From 2008 to 2018, the annual growth of maize production in Indonesia reached 294,440 tonnes per year, yet it cannot keep up with the annual growth of maize consumption for animal feed that reached 477,780 tonnes per year over the same period”

Table 3

Maize Production and Productivity in Indonesia, 2008/2009 to 2017/2018

Year	Area Harvested (000 ha)	Production (000 tonnes)	Productivity (tonnes/ha)
2008/2009	3,220	8,700	2.70
2009/2010	3,060	6,900	2.25
2010/2011	2,850	6,800	2.39
2011/2012	3,120	8,850	2.84
2012/2013	3,000	8,000	2.67
2013/2014	3,120	9,100	2.92
2014/2015	3,100	9,000	2.90
AVERAGE	3,067.14	8,192.86	2.67
2015/2016	3,500	10,500	3.00
2016/2017	3,400	10,900	3.21
2017/2018	3,500	11,350	3.24
AVERAGE	3,466.67	10,916.67	3.15

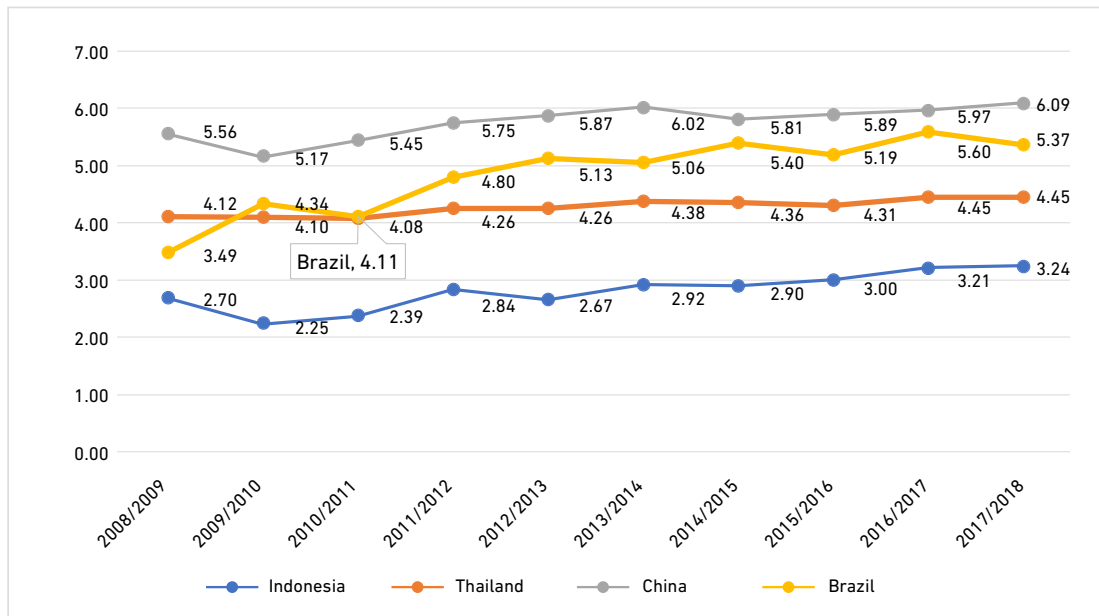
Source: USDA (2009 - 2018)

Note: USDA collects the data from the period of early October to the end of September in the following year.

Despite of the recent increasing trend, maize productivity in Indonesia lags behind other maize producing countries, including Thailand, China, and Brazil. From 2008/2009 to 2017/2018, the average maize productivity in Indonesia reached only 2.81 tonnes per hectare, lower than Thailand (4.28 tonnes/ha), Brazil (4.85 tonnes/ha), and China (5.76 tonnes/ha), as illustrated in Figure 6. In this period, the annual average productivity improvement in Indonesia was 60.11 kilogram per hectare per year, higher than Thailand (36.75 kg/ha/year) and China (59.52 kg/ha/year), but still behind Brazil (209.27 kg/ha/year).

“From 2008/2009 to 2017/2018, the average maize productivity in Indonesia reached only 2.81 tonnes per hectare, lower than Thailand (4.28 tonnes/ha), Brazil (4.85 tonnes/ha), and China (5.76 tonnes/ha)”

Figure 6
Maize Productivity in Indonesia, Thailand, China, and Brazil (tonnes per hectare),
2008/2009 to 2017/2018



Average Productivity from 2008/2009 to 2017/2018 (tonnes/ha)			
Indonesia	Thailand	China	Brazil
2.81	4.28	5.76	4.85

Source: USDA (2010–2018)
Note: USDA collects the data from the period of early October to the end of September in the following year.

Weather plays a major factor in maize production in Indonesia. Adverse weather may cause delays in planting, which may prevent optimal maize growth (Akinuoye-Adelabu & Modi, 2017, p. 53). In 2009/2010, maize productivity in Indonesia dropped by 0.45 percentage points from the previous period due to El Nino,¹² and this delayed the first planting season of maize by as long as two months (USDA, 2010, p. 2 & 7). Maize production in Indonesia is also susceptible to natural disasters. In 2012/2013, Indonesian maize productivity decreased by 0.17 percentage points due to the repeated eruptions of Mount Sinabung in North Sumatera, which caused harvest loss in affected areas (Safutra, 2018; Sihombing, 2018; TribunMedan.com, 2018; USDA, 2014, p. 5).

Increases in the quantity of maize produced in Indonesia in recent years cannot be attributed solely to the UPSUS program.

Increases in the quantity of maize produced in Indonesia in recent years cannot be attributed solely to the UPSUS program. Maize farmers that preferred to use commercial hybrid maize seeds to improve their productivity, and were reluctant to use less productive free seeds from UPSUS, increased their yields by more than UPSUS could have without using the program (USDA, 2016, p. 8). The CIPS study supports this claim, especially in the areas with a strong market (Freddy & Gupta, 2018, pp. 12–13). As observed in Dompus, West Nusa Tenggara and Sumenep, East Java (both are part of the main maize-producing provinces in Indonesia) UPSUS seeds produced by Balitbangtan of the Ministry of Agriculture only generated yields between 3 and 5 tonnes per

¹² El Nino (literal meaning, "The Little Boy") refers to a large-scale climate interaction between the ocean and the atmosphere typically leading to warmer-than-average temperatures and drier-than-average conditions in various parts of the world for an extended period of time (National Oceanic and Atmospheric Administration [NOAA], 2018).

hectare, less than half of what the government officially claimed they would, as illustrated in Table 4. On the other hand, UPSUS seeds produced by the private sector yield between 7 and 10 tonnes per hectare, slightly better than seeds produced by Balitbangtan, but still lower than the official yield advertised by the government, 10 to 13 tonnes per hectare. In a few extreme circumstances, the seeds from the government emitted a bad odor and were covered by mold and fleas, rendering the seeds useless. Maize farmers are generally able to identify low such quality seeds and refuse to plant them. Commercial non-subsidized hybrid maize seeds, which farmers in strong market areas used, generated up to 13 tonnes per hectare, matching their advertised yield of 10 to 13 tonnes per hectare.

Table 4

Potential Yield of Hybrid Maize Seeds in Dompu, West Nusa Tenggara and Sumenep, East Java

Source of Seeds	Variety of Genotypes (examples)	Officially Stated Potential Yield (tonnes per hectare)	Yield as Experienced by Maize Farmers (tonnes per hectare)
UPSUS Program (65%)—Produced by Balitbangtan under the Ministry of Agriculture and its licensed domestic seeds nurseries	BIMA 18, BIMA 17 and Batimurung Hibrida BIMA 2	8.27–13.6	3 - 5
UPSUS Program (35%)—Sub-contracted to private companies	BISI 2 FS 4 cross-breed with FS 9, BISI 18 FS46 cross-breed with FS47	10–13	7–10
Commercial, non-subsidized seeds	Pioneer P21 F30Y87 cross-breed with M30Y877 & NK 7328	10–13	Up to 13

Sources are collated from Center for Indonesian Policy Studies (2018, p. 12) and Ministry of Agriculture (2018b, pp. 81–82)

The CIPS study also discovered that farmers faced difficulty in obtaining UPSUS hybrid seeds produced by private companies (Freddy & Gupta, 2018, p. 13). Since Balitbangtan produced a larger proportion of the seeds (65%), more often than not the government distributed these seeds regardless of the farmers' request for seeds produced by private companies.

The UPSUS program has not been able to improve the quality of domestic maize crops in Indonesia. They still suffer from low protein content, too-high raw fiber content, and rancidification (USDA, 2016, p. 11).¹³ Farmers' limited access to drying machines and proper storage facilities contributes to this problem since it encourages poor post-harvest processes that expose harvested maize to humid air (APINDO, Personal Interview, 9 July 2018). As a result, domestic feed producers were reluctant to buy maize from domestic farmers to use as their raw material, leading to lower income for farmers and increased demand for imported maize (USDA, 2016, p. 11).

The UPSUS program has not been able to improve the quality of domestic maize crops in Indonesia.

¹³ Rancidification refers to partial or complete oxidation of maize when it is exposed to too much moisture, triggering bacterial growth that leads to unpleasant taste and odor (Lück & von Rymon Lipinski, 2000, p. 677).

“Domestic feed producers were reluctant to buy maize from domestic farmers to use as their raw material, leading to lower income for farmers and increased demand for imported maize.”

D. Contradicting Regulations

As shown in Figure 3 and Figure 4 in the previous chapter, the quantity of maize import has been decreasing in spite of growing demand for imported maize for animal feed. The lack of clarity regarding existing regulations contributes to this situation, especially two key articles in MOT 21/2018 that contradict the regulation of the Minister of Agriculture (MOA) 57/2015 on Export and Import of Plant-based Animal Feed. The contradictions are laid out in Table 5.

MOT 21/2018 states that only BULOG can import maize for animal feed in Article 3 (1). The private sector is only allowed to import maize for human consumption and non-food industrial purposes.¹⁴ On the contrary, though, MOA 57/2015 Article 1 (2), (3), and (17) and Article 4 (1) state that the private sector and other state-owned enterprises (SOEs) can import any raw material, including maize, to produce animal feed. Furthermore, MOT 21/2018 Article 4 stipulates that importers do not need a recommendation document from the Ministry of Agriculture, while MOA 57/2015 Article 16 (1) and (3) include a requirement for this document before any SOEs, including BULOG, can import animal feed made of any plant, including maize.

Table 5
Contradiction between MOT 21/2018 and 57/2015

No.	Issues	Contradiction	
		MOT 21/2018	MOA 57/2015
1.	Companies authorized to import maize for animal feed	Article 3 (1)—Only BULOG is authorized to import maize for animal feed	Article 1 (2), (3), & (17) and Article 4 (1)—Both private sector and state-owned enterprises (SOEs) in the area of animal health and husbandry are authorized to import plant-based animal feed
2.	Recommendation from the Ministry of Agriculture (MOA)	Article 4—Recommendation from MOA is no longer required	Article 16 (1) & (3)—SOEs must obtain recommendation from MOA prior to importing plant-based animal feed

Source: Ministry of Trade (2018) and Ministry of Agriculture (2015)

“The contradictions between MOT 21/2018 and MOA 57/2015 have created confusion among feed producers, who are unsure who is authorized to import maize for their raw materials and what documents importers need to import ingredients legally.”

¹⁴ Such as ethanol, talc powder, and biodegradable plastic bags (Olayide Oyeyemi Fabunmi, Lope G Tabil, Peter R Chang, & Satyanarayan Panigrahi, 2007; Ranum, Peña-Rosas, & Garcia-Casal, 2014; Whysner & Mohan, 2000).

The contradictions between these two regulations have created confusion among feed producers, who are unsure who is authorized to import maize for their raw materials and what documents importers need to import ingredients legally (Representative of FPLN, Personal Interview, 25 July 2018). As a result, there were instances when imported maize was impounded by port authorities who ruled that imports failed to meet all legal requirements (Agustinus, 2016b; Aria, 2016; Idris, 2016).

E. Complicated and Long Procedures to Obtain Import License

The government attempts to maintain a delicate balance between affordable maize prices for the animal feed industry and land animal farmers and profitable prices for domestic maize farmers. To do this, the government imposes MOT 21/2018 and MOA 57/2015, both of which require long procedures to obtain an import license, so that the government, through the Ministry of Trade and Ministry of Agriculture, can maintain the power to grant or decline requests to import maize.

According to existing regulations, obtaining an import license as stipulated in both MOT 21/2018 Article 5 (1) and (2) and MOA 57/2015 Article 7 (2) requires a process that takes up to 26 working days for BULOG (Table 6), and up to 53 working days for the private sector (Table 7). These timelines do not include several steps that do not have a specific timeframe for completion, such as obtaining recommendations from relevant ministries. This timeframe is the result of a legal requirement to obtain all permit documents before either BULOG or private sector can apply for an import license. As stipulated in General Agreement on Tariffs and Trade (GATT) 1994 Article XI:1, ratified by the Indonesian government via World Trade Organization (WTO) Agreement Law 7/1994, prolonged import licensing procedures such as these are prohibited. Only duties and taxes may serve as trade restrictions between countries. Therefore, both MOT 21/2018 and MOA 57/2015 have the potential to trigger trade disputes with other countries, as was the case with MOT 59/2016 on beef importation (Respatiadi & Nabila, 2017, pp. 15–16).¹⁵

“Both MOT 21/2018 and MOA 57/2015 have the potential to trigger trade disputes with other countries.”

¹⁵ CIPS study discovered that MOT 59/2016 on Beef Importation triggered litigation by New Zealand and the U.S. via the World Trade Organization (WTO) because the regulation imposed a prolonged import licensing process, restricted market access for imported beef, and used sanitary and phytosanitary measures that are not in accordance with the international standard of food safety procedures (Respatiadi & Nabila, 2017, pp. 15–16).

Table 6
Procedures and Required Documents for BULOG to Import Maize into Indonesia

No.	Steps	Required Permit Documents	Legal Bases	Estimated Time of Completion (Working Days)
1	Ministry of Trade gives recommendation to import maize	-	MOT 21/2018 Article 3 (2)	Unspecified
2	Ministry of Agriculture gives Import Recommendation document	-	MOA 57/2015 Article 16 (3)	Unspecified
3	Ministry of SOEs assigns BULOG to import maize	-	MOT 21/2018 Article 3 (2)	Unspecified
4	BULOG gathers permit documents to obtain Import License as stipulated in MOT 21/2018 Article 5 (1) and MOA 57/2015 Article 7 (2)	Certificate of Customs Registration	Regulation of the Minister of Finance (MOF) 179/2016 Article 6 (1) and 8 (1)	2
		Importer Identification Number for General Purpose (API-U)	MOT 70/2015 Article 20 (1)	5
		Notification on Imported Goods (PIB)	MOF 155/2008 Article 4, MOF 226/2015 Article 9A	1
		Proof of Ownership for Storage Warehouse (TDG)	MOT 90/2014 Article 6 (4)	5
5	BULOG submits permit documents to Indonesian Importers Registration Portal (InaTrade)	All permit documents specified in No. 4	MOT 21/2018 Article 11 (1)	10 (for online registration process)
6	Ministry of Trade grants approval and gives Import License to BULOG	-	MOT 21/2018 Article 5 (3)	3
TOTAL		26 working days, not including the unspecified time required for Step No.1, 2, and 3		

Sources are collated from:

1. Regulation of the Minister of Finance (MOF) 155/2008 on Customs Notification
2. MOT 90/2014 on Warehouse Management
3. MOT 70/2015 on Importer Identification Number
4. MOF 226/2015 on Revision of MOF 155/2008 on Customs Notification
5. MOA 57/2015 on Export and Import of Plant-based Animal Feed into and from Indonesia
6. MOF 179/2016 on Customs Registration
7. MOT 21/2018 on Maize Importation

Table 7

Procedures and Required Documents for Private Sector Actors to Import Maize to Indonesia

No.	Steps	Required Permit Documents	Legal Bases	Estimated Time of Completion (Working Days)
1	Private sector gathers permit documents as stipulated in MOT 21/2018 Article 5 (2) and MOA 57/2015 Article 7 (2)	Company deeds	Law 40/2007 on Limited Companies, Article 10 (6)	14
		Business License (SIUP)	MOT 77/2013 Article 5	3
		Company Registration Certificate (TDP)	MOT 77/2013 Article 5	3
		Taxpayer Identification Number (NPWP)	Regulation of Director General of Taxation under the Ministry of Finance 20/2013 Article 4 (7), 5 (6), and 7 (1)	3
		Certificate of Customs Registration	Regulation of the Minister of Finance (MOF) 179/2016 Article 6 (1) and 8 (1)	2
		Importer Identification Number for Production Purpose (API-P)	MOT 70/2015 Article 20 (1)	5
		Notification on Imported Goods (PIB)	MOF 155/2008 Article 4, MOF 226/2015 Article 9A	1
		Proof of Ownership for Storage Warehouse (TDG)	MOT 90/2014 Article 6 (4)	5
2	Private sector submits permit documents and applies for Official Import Statement to the Ministry of Agriculture via an online process	All permit documents specified in No.1	MOA 57/2015 Article 4 (3), 22	Unspecified
3	Ministry of Agriculture requests for suggestions and inputs from Analyst Team on Demand (TAK)	-	MOA 57/2015 Article 5	Unspecified
4	Ministry of Agriculture grants approval and provides Official Import Statement	-	MOA 57/2015 Article 23	1

No.	Steps	Required Permit Documents	Legal Bases	Estimated Time of Completion (Working Days)
5	Ministry of Agriculture grants approval and provides Import Recommendation document	Official Import Statement	MOA 57/2015 Article 26	3
6	Private sector submits permit documents to Indonesian Importers Registration Portal (InaTrade)	All permit documents specified from no.1 to no. 5	MOT 21/2018 Article 11 (1)	10 (for online registration process)
7	Ministry of Trade grants approval and gives import license to the private sector	-	MOT 21/2018 Article 5 (3)	3
Total			53 working days , not including the unspecified time required for Step No.2 and 3	

Sources are collated from:

1. Law 40/2007 on Limited Companies
2. MOT 155/2008 on Customs Notification
3. MOT 77/2013 on Business License and Company Registration Certificate
4. MOT 90/2014 on Warehouse Management
5. MOT 70/2015 on Importer Identification Number
6. MOA 57/2015 on Export and Import of Plant-based Animal Feed into and from Indonesia
7. MOF 226/2015 on Revision of MOF 155/2008 on Customs Notification
8. MOF 179/2016 on Customs Registration
9. MOT 21/2018 on Maize Importation
10. Regulation of Director General of Taxation under the Ministry of Finance 20/2013

F. Trend of Maize Prices in Indonesia and the International Market

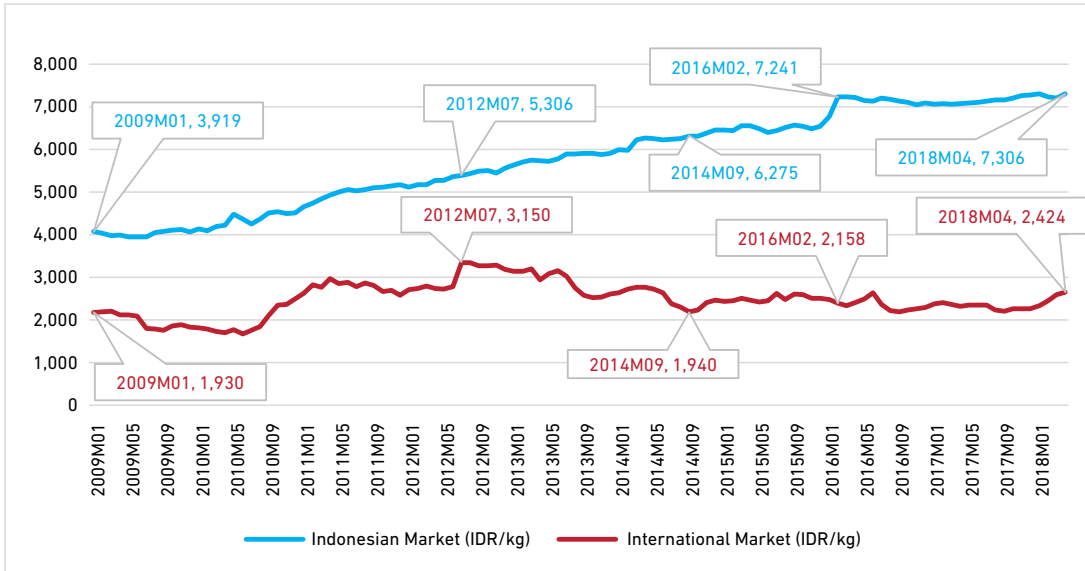
Domestic maize production in Indonesia is unable to keep up with the increasing demand for animal feed, and it is difficult for imported maize to enter the country due to conflicting regulations and a prolonged import licensing process. As a result, maize prices in Indonesia have steadily increased, as seen from January 2009 to April 2018 and illustrated in Figure 7. In April 2018, maize prices in Indonesia reached IDR 7,306 per kilogram, more than twice the price in January 2009 (IDR 3,919 per kg). In the same period, maize prices in the international market also increased but not as drastically. The price in April 2018 (IDR 2,424 per kg) had increased by 25.60% from its price in January 2009 (IDR 1,930 per kg).

The relationship between maize prices in Indonesia and the international market in the short term is different than in the long term. In the short term, every 10% change in international maize prices corresponds with a 1.85% change in the same direction in Indonesian maize prices. In the long term, changes in the international market do not have a significant impact on maize prices in Indonesia, so prices in Indonesia continuously deviate from international market prices. These calculations are explained more fully in Annex I.

“Maize prices in Indonesia continuously deviate away from the international market prices. It grew from twice higher in January 2009 to more than three-times more expensive in April 2018.”

Figure 7

The Trend of Maize Prices in Indonesia and in the International Market, 2009–2018



Sources are collated from the Ministry of Trade (2009–2018), the World Bank (2009–2018), and x-rates.com (2018).

Maize prices in Indonesia responded to increases in maize prices on the international market. For example, after an unprecedented summer in the United States caused by excessive heat and a lack of rainfall (The World Bank, 2012, p. 2) in the first half of 2012, the international maize price increased by 22.95% from IDR 2,562 per kilogram in June 2012 to IDR 3,150 per kilogram in July 2012. In the same period, maize prices in Indonesia followed the same trend, increasing by 0.76% from IDR 5,266 per kilogram to IDR 5,306 per kilogram.

However, when maize prices in the international market went down, maize prices in Indonesia did not necessarily follow suit. For example, while large maize-producing countries enjoyed less expensive chemical fertilizers, fuel, and transportation costs due to declining oil prices in the second half of 2014 (The World Bank, 2015), the international maize price decreased by 6.09% from IDR 2,066 per kilogram in August 2014 to one of its lowest levels on record, IDR 1,940 per kilogram, in September 2014. However, maize prices in Indonesia increased by 1.19% during the same period, from IDR 6,201 per kilogram to IDR 6,275 per kilogram. And in early 2016, when the Ministry of Agriculture was about to impose restrictions on maize import as stipulated in MOT 20/2016 (the precursor of MOT 21/2018), maize prices in Indonesia reached one of the highest recorded levels, increasing by 7.13% from IDR 6,759 per kilogram in January 2016 to IDR 7,241 per kilogram in February 2016. At the same time, maize prices on the international market decreased by 3.48% from IDR 2,236 per kilogram to IDR 2,158 per kilogram.

G. The Scenarios

There are four potential scenarios in the maize market, depending on which maize trade policy the government decides to pursue. All scenarios are summarized in a matrix in Annex II.

Scenario I—Business as Usual

The government maintains its existing policies. The UPSUS hybrid seeds program continues regardless of reluctance of farmers to use these seeds over commercial hybrid seeds. Domestic maize production might keep growing, but it remains unable to match the demand for animal feed, and productivity remains short of the government target. Imports remain restricted as the contradictions between MOT 21/2018 and MOA 57/2015 are left unaddressed, maintaining confusion among importers and animal feed producers about how to import the maize that they need. As a result, maize prices in Indonesia remain expensive and higher than the international price. This will lead to high prices for animal feed and corresponding high prices for protein-rich food commodities such as chicken eggs, chicken meat, and beef. This will affect all net maize consumers, including around 21 million farming households and more than 35 million non-farming households.¹⁶

Scenario II—Discontinuing the UPSUS hybrid seeds program

In the second scenario, MOA 03/2015 on UPSUS hybrid seeds program is revised. Section III (A.3 and B.3) of this regulation is changed to add UPSUS discontinuation procedures for areas with strong and thin markets, allowing commercial, non-subsidized hybrid seeds from the private sector to take the place of government seeds in strong market areas. Farmers who have experience planting hybrid seeds prefer to use the commercial seeds due to their higher quality anyway. UPSUS seeds should therefore be used instead to introduce hybrid seeds to farmers who have never planted them before, especially in areas with a semi-strong maize market. While this might improve the domestic maize production and productivity, there is no guarantee that the resulting yields will have the quality that the animal feed industry needs. This is due to poor post-harvest process, since farmers have only minimal access to drying machines and proper storage facilities. As a result, the animal feed industry will continue to rely on imported maize, for which access remains restricted under this scenario. Net maize consumers will still suffer from high food prices, as in the first scenario.

Scenario III—Removing import restrictions and clearing up contradictions

This scenario focuses on improving the import process in two ways. First, by clearing up the contradictions between MOT 21/2018 and MOA 57/2015 so it becomes clear who is authorized to import maize and what documents are required. Second, the government should remove import restrictions by revising MOT 21/2018 Article 3 (1), authorizing not only BULOG, but also all qualified SOEs and private sector businesses who want the opportunity to import maize for animal feed. The government should also revise MOT 21/2018 Article 5 (1) and (2) and MOA 57/2015 Article 7 (2) to simplify and shorten the process of obtaining an import license for both SOEs and private sector importers. The process should instead focus on speedy and reasonable identification and quality checks. In this scenario, the government must perform their role as regulator by ensuring that competition between importers is fair and transparent. All of this will make the import process more competitive and increase the options for animal feed producers

¹⁶ The total number of households in Indonesia was 61.39 million (Statistics Indonesia, 2017b, p. 86), with 26.10 million of them work in the agricultural sector (Statistics Indonesia, 2013, p. 10). From this number, around 5.10 million of them work as maize farmers. Those who work as farmers of other crops (26.10 million – 5.10 million = 21 million) and those who do not work in the agricultural sector (61.39 million – 26.10 million = 35.29 million) are classified as net maize consumers.

and land animal farmers who require imported maize. As a result, animal feed prices will become more affordable as will prices for protein-rich food items such as chicken eggs, chicken meat, and beef.

This scenario is likely to be met with resistance from domestic maize farmers because they are not ready to compete with better-quality imported maize. Their inability to compete would discourage them from improving their productivity, making them reluctant to switch to hybrid maize seeds provided by both the UPSUS program and the private seed producers.

Scenario IV—Reducing the UPSUS hybrid seed program, clearing up contradictions on import regulations, and reducing import restrictions

The fourth scenario refers to a combination of the second and third scenarios, in which MOA 03/2015 on UPSUS free hybrid seeds is reformed, import restrictions in MOT 21/2018 and MOA 57/2015 are revised, and contradictions between MOT 21/2018 and MOA 57/2015 are cleared up. In this scenario, the impact of revisions to MOT 21/2018 and MOA 57/2015 and of clearing up contradictions between these two regulations is the same as explained in the third scenario. The discontinuation of the UPSUS hybrid seeds program will allow better-quality commercial hybrid seeds from the private sector to gain a larger market share among the maize farmers, contributing to further increases in productivity and production of domestic maize. As in the third scenario, however, the increase in imported maize might discourage domestic farmers from working to increase their productivity by using hybrid seeds.

Recommendations

Government policy to improve domestic maize production and productivity as stipulated in MOA 03/2015 has not been able to match the increasing demand for maize, especially for animal feed. At the same time, the low quality of domestic maize makes the animal feed industry reluctant to use it in production, so they rely on imported maize that meets their standard. Despite these circumstances, maize imports are restricted by the government through MOT 21/2018, which states that only BULOG is authorized to import maize for animal feed. This regulation and MOA 57/2015 create a long and complicated process to obtain an import license, making it difficult for importers to help meet market demand. All of these factors contribute to high maize prices in Indonesia, which reached more than two-and-a half times the international market price in August 2018.

Based on the scenarios projected in the previous section, we propose a two-stage policy reform to lower maize prices while providing sufficient time and opportunity for relevant stakeholders to adjust to the new policies. These stages are necessary to answer the policy dilemma faced by the government when it comes to maize prices: if prices fall, domestic maize farmers might suffer, but if prices keep increasing, animal feed producers, land animal farmers, and food consumers will suffer.

The first stage represents the adjustment period. Within the first five years of reform, the government should implement the second scenario, in which they revise MOA 03/2015 Section III (A.3 and B.3) by discontinuing the UPSUS program in areas where farmers prefer to use higher quality commercial hybrid seeds and in areas where there is no reason yet for maize production to develop—strong and thin market areas. Seeds from UPSUS should only be used to introduce the hybrid seeds to farmers who have never planted them before, especially in areas with a semi-strong market.

“Within the first five years of reform, revise MOA 03/2015 Section III (A.3 and B.3) by discontinuing the UPSUS program in areas where farmers prefer to use higher quality commercial hybrid seeds and in areas where there is no reason yet for maize production to develop.”

During this period, the government must support farmers as they complete the shift from traditional seeds to more productive, disease-resistant hybrid seeds and they must work together with the private sector to improve the post-harvest process. This could be done by providing training for farmers and creating opportunities for the private sector to invest in the villages, for instance, by operating and renting access to drying machines and proper storage facilities for maize farmers.

All of these preliminary reforms must come with clear and specific targets for productivity increases and quality improvement. Without such targets, adjustment efforts (and subsequently, reform efforts) might fail, causing maize prices to rise further and hurting consumers. Implementing policy adjustments through such domestic-farmers-focused policy will give this

reform a better chance at garnering support from both the public and members of legislature.

After five years, the second stage of policy reform should begin. The government should implement the fourth scenario by revising MOT 21/2018 Article 3 (1) and Article 5 (1) and (2) as well as MOA 57/2015 Article 7 (2) to allow more qualified importers from both state-owned enterprises and the private sector to compete fairly and in the most transparent manner with the domestic market. The government should also resolve the contradictions between MOT 21/2018 and MOA 57/2015 so that they are easier to follow to ensure maize is legally imported and competition is increased.

This timeframe should leave sufficient time for domestic maize producers to improve their quality and productivity with support from the government, thus positioning them better to compete with imported maize. Most importantly, these reforms will help the maize market become more competitive, lowering maize prices and benefiting both animal feed producers and land animal farmers. This will lower consumer prices for protein-rich food items such as chicken eggs, chicken meat, and beef that are important to Indonesian consumers.

The government must support farmers as they complete the shift from traditional seeds to more productive, disease-resistant hybrid seeds and they must work together with the private sector to improve the post-harvest process.

After five years, the second stage of policy reform should begin by allowing more qualified importers from both state-owned enterprises and the private sector to compete fairly and in the most transparent manner with the domestic market. The government should also resolve the contradictions between MOT 21/2018 and MOA 57/2015 so that they are easier to follow to ensure maize is legally imported and competition is increased.

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Annex I

A. Data Source and Data Period

We analyze the relationship between the logarithm (log) of the domestic retail price (same as consumer price, **PD**) of food items in Indonesia expressed in Rp/kg and the log world price for same food items (**PW**) expressed in USD/kg, while controlling for movements expressed in rupiah/dollar exchange rates (**ER**), also in logarithm form. All logarithms are natural. The monthly average data on retail prices (**PD**) were obtained from Statistics Indonesia (2017a) and Ministry of Trade (2018b) from January 2009 to April 2018 (112 observations). World prices (**PW**) were obtained from the World Bank Database (The Pink Sheet) (2017), while the nominal rupiah/dollar exchange rates (**ER**) were obtained from the X-Rates Exchange Rates Converter (2017), both are from the same period as the retail prices.

This paper combines qualitative and quantitative analysis. For the quantitative method, we used error correction models (ECM). An ECM is a dynamic model in which the movement of the variables in any periods is related to the previous period's gap from long-run equilibrium (cointegrated). Furthermore, if the series is cointegrated, and the ECM validated, then it will encompass any other dynamic specification—such as the partial adjustment mechanism.

The first step entails estimating a long-run relationship between domestic prices (**PD**) and world prices (**PW**), while controlling for foreign exchange rates (**ER**) by using the two-step method of (Engle & Granger, 1987), called the symmetric ECM test. According to this approach, if the variables are cointegrated of the same order, then for those variables integrated of order one (I(1)) with a cointegration relation of the form as in equation (1):

$$PD_t = \alpha_0 + \beta_1 PW_t + \beta_2 ER_t + \varepsilon_t \quad (1)$$

would produce a stationary $\hat{\varepsilon}_t$ term (error term/residuals) after estimating this equation with an OLS (ordinary least square) procedure, where α and β are estimated parameters. If the residuals of equation (1) are stationary, then an error correction mechanism exists.

Second, the ECM is specified by using lagged residuals from the co-integrating regression in equation (1) as error correction terms (ECT) and using Δ as the difference indicator (differencing means subtracting P_{t-1} from P_t) as follows in equation (2):

$$\Delta PD_t = \alpha_0 + \beta_1 \Delta PD_{t-1} + \beta_2 \Delta PW_t + \beta_3 \Delta PW_{t-1} + \beta_4 \Delta ER_t + \beta_5 \Delta ER_{t-1} + \beta_6 ECT_{t-1} + v_t \quad (2)$$

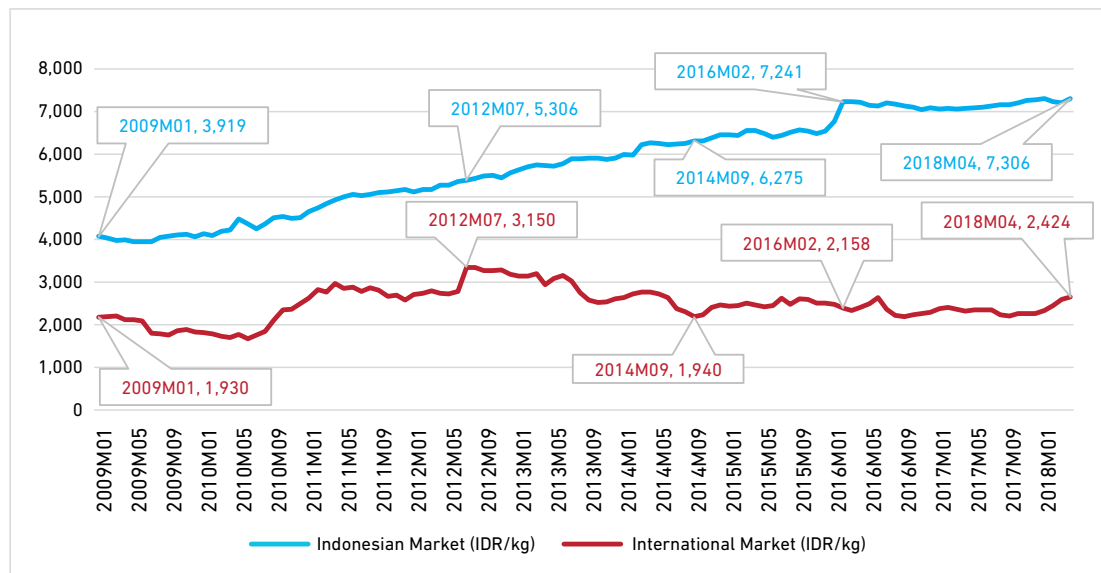
B. Preliminary Findings

Maize prices in Indonesia steadily increased as seen from January 2009 to April 2018 (Figure 8). In April 2018, maize prices in Indonesia reached IDR 7,306 per kilogram, more than twice the price in January 2009, IDR 3,919 per kilogram. In the same period, maize prices on the international market increased but not as drastically, by 25.60% between April 2018 (IDR 2,424 per kg) and January 2009 (IDR 1,930 per kg).

Maize prices in Indonesia responded to increases in maize prices on the international market. For example, when the international maize price increased by 22.95% from IDR 2,562 per kilogram in June 2012 to IDR 3,150 per kilogram in July 2012, the price of maize in Indonesia followed the same trend as it was increased by 0.76% from IDR 5,266 per kilogram to IDR 5,306 per kilogram.

However, when maize prices in the international market went down, maize prices in Indonesia did not always follow the same trend. For example, the international maize price decreased by 6.09% from IDR 2,066 per kilogram in August 2014 to one of its lowest levels at IDR 1,940 per kilogram in September 2014. On the contrary, maize price in Indonesia increased by 1.19% during this period, from IDR 6,201 per kilogram to IDR 6,275 per kilogram.

Figure 8
The Trend of Maize Prices in Indonesia and in the International Market, 2009–2018



Sources are collated from the Ministry of Trade (2009–2018), the World Bank (2009–2018), and x-rates.com (2018)

As shown in Equation 1 results below, in the long run, changes in the world maize price do not affect domestic maize price changes.

$$PDmaize_t = 5.627 + .277 PWmaize_t + 0.09^{**} ER_t$$

(**): denotes significance at 5% of confidence level

And as shown in Equation 2 results below, in the short run a 10% increase in the world maize price current period causes an instantaneous 1.85% increase in the domestic price current period, *ceteris paribus and vice versa*

$$\Delta PDmaize_t = 0.003979 + 0.001\Delta PDmaize_{t-1} + 0.185^{***}\Delta PWmaize_t + 0.092\Delta PWmaize_{t-1} + 0.001\Delta ER_t - 0.671^{***}ECT_{t-1}$$

(***): denotes significance at 1% of confidence level

Annex II

Table 8
Scenario of Recommendations for Maize Trade Policy

<i>Maize Prices Stay High</i>			
<i>Supply shortage</i>	<p>1. Business as Usual The government maintains its existing policies.</p> <hr/> <ul style="list-style-type: none"> • UPSUS hybrid seeds program continues despite farmers' reluctance to use them • Domestic maize production grows, but unable to match the demand for animal feed • Maize imports are restricted due to prolonged licensing process and contradictions between MOT 21/2018 and MOA 57/2015 • Maize prices in Indonesia are higher than international prices • High maize prices lead to high prices of animal feed, which then lead to high prices of protein-rich food items (e.g. chicken eggs, chicken meat, and beef) for the consumers • 21 million farming-households and 35 million non-farming ones are affected by maize high prices 	<p>2. Discontinuing UPSUS Hybrid Seeds Program This refers to discontinuation of UPSUS hybrid seeds program for areas with strong and thin markets, and allowing commercial, non-subsidized seeds that have higher quality to take the place of UPSUS seeds in these areas.</p> <hr/> <ul style="list-style-type: none"> • UPSUS is only used in areas with semi-strong market to introduce hybrid seeds to the inexperienced farmers • Domestic maize production grows due to higher productivity of non-subsidized seeds, but the maize quality remains below the requirements of animal feed industry • Maize imports thus are still required, yet they are restricted due to same cause as in the 1st scenario • Maize prices remain high, with the same impacts as in the 1st scenario 	<i>Supply shortage</i>
	<p>3. Removing Import Restrictions and Clearing Up Contradictions This refers to clearing up the contradictions between MOT 21/2018 and MOA 57/2015 to make import procedures clearer. This also relates to providing authorization to import maize not only to BULOG, but also all qualified SOEs and private sector to encourage fair and transparent competition among the importers.</p> <hr/> <ul style="list-style-type: none"> • Animal feed industry as well as land animal farmers will enjoy more options from the increasing number of maize importers • More affordable animal feed leads to cheaper protein-rich food items • Might discourage domestic maize farmers from improving their productivity as they cannot compete with better-quality imported maize, thus leads to lower domestic maize production • Might be difficult to obtain support from members of legislature 	<p>4. Reducing UPSUS Hybrid Seeds Program, Clearing Up Contradictions on Import Regulations, and Reducing Import Restrictions This refers to the combination of the 2nd and 3rd scenarios. This will only works best if the 2nd scenario is used as adjustment period before entering the 3rd scenario.</p> <hr/> <ul style="list-style-type: none"> • The government must support farmers in shifting from traditional seeds to hybrid seeds; and they need to work together with the private sector to improve post-harvest process • As domestic maize farmers improve their productivity and maize quality, they will have better position to compete with imported maize • Fair competition between domestic maize and imported maize, as well as between maize importers will lead to more competitive maize prices, benefitting animal feed producers and land animal farmers • This will lower consumer prices for protein-rich food items 	<i>Risk of supply shortage reduced</i>
<i>Maize Prices Become Lower</i>			

Source: CIPS data analysis, 2018

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