



The Indonesian wheat market

ITS STRATEGIC IMPORTANCE TO AUSTRALIA

Purpose

AEGIC exists to increase value in the Australian grains industry.



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Introduction

Wheat is by far the principal crop grown and exported by Australian farmers. In aggregate, Australian farmers produce 25 million metric tonnes (mmt) of wheat on average each year, of which 18mmt (or about 70 per cent) is exported. The main export destination is Indonesia, which imports 4.2mmt of Australian wheat each year. These imports are worth \$1.2b of export revenue for Australia, with much of that revenue flowing to Western Australia (WA).

Given that Indonesia is Australia's main wheat customer, it is important for the Australian wheat industry to understand Indonesia's wheat market trends, competitor challenges and potential disruptive risks. However, it is not just because Indonesia is currently Australia's main wheat customer that a better understanding of Indonesia's future wheat demand and its competing suppliers is needed. It is geographically close to Australia, with growing wealth, a growing population and growing regional influence. For both countries' mutual economic and security benefit, it is important that Australia positions itself to be an affordable, reliable supplier of wheat that has qualities desired by Indonesian consumers, now and in years to come.

The Australian Export Grains Innovation Centre (AEGIC) is preparing a series of reports aimed at ensuring the Australian wheat industry is more fully informed about the Indonesian wheat market – its nature, prospects, trends, and inherent and emerging opportunities. Being aware of all these matters will assist the industry to strategically position itself to better serve its Indonesian customers and to address any foreseeable challenges so that the profitability of exporting wheat to Indonesia can be maintained.

This first report is an overview of the Indonesian economy, showing how economic development of Indonesia is affecting its demand for wheat and other agricultural products.



Australian wheat exported to Indonesia
(on average per year)



25_{mmt}

of wheat is produced
by Australian farmers



4.2_{mmt}

of wheat is imported
by Indonesia



\$1.2_b

of export revenue
for Australia



Indonesia's economy

Indonesia is the fastest growing economy in the G20 after China. It is the world's fourth most populous nation, with almost half of its population under 30. It also generates half the economic output of ASEAN.

Indonesia is the world's 10th largest economy in terms of GDP purchasing power parity (hence its membership of the G20). It is the world's fourth largest user of Facebook, with 84 per cent of its online population having a Twitter account.

The Indonesian economy is forecast to become the fifth largest economy in the world by 2030, surpassing the UK and Germany. Indonesia's middle class has grown exponentially from about 2 million in 2004 to an anticipated 120 million by 2020. More than 60 million low-income Indonesian workers are expected to join the middle class in the coming decade.

The consensus among economic analysts is that Indonesia will become the world's fourth largest economy by 2050 (Table 1). For instance, PWC (2017) sees Indonesia's global GDP ranking rising from eighth to fifth by 2030 and then up one further place to fourth by 2050.

Indonesia is the world's largest archipelagic country, covering more than 13,000 islands. It is one of the most spatially diverse nations in the world with a coastline 50 per cent longer than mainland Australia – in spite of Australia having four times the land area of Indonesia. The longitudinal spread of Indonesia slightly exceeds that of mainland Australia.

Indonesia is culturally diverse, with a population comprised of about 350 ethnic groups. Its economy is unique insofar as Indonesia has had the lowest volatility in economic growth of all OECD advanced economies since 2000.

Table 1
GDP ranking by country in 2016, 2030 and 2050

Rank	2016	2030	2050
1	China	China	China
2	US	US	India
3	India	India	US
4	Japan	Japan	Indonesia
5	Germany	Indonesia	Brazil
6	Russia	Russia	Russia
7	Brazil	Germany	Mexico
8	Indonesia	Brazil	Japan
9	UK	Mexico	Germany
10	France	UK	UK

Source: PWC – The Long View, February 2017



It is often assumed that Indonesia's economy is export-driven, like other emerging and post-emergent Asian countries. However, Indonesia's economic prosperity is largely underpinned by domestic consumption, a consequence of its massive population that operates as the Indonesian economy's engine room. Indonesia's large domestic economy provides it with stability and impetus for economic growth, especially as its population is projected to grow further and become wealthier.

Seventy per cent of Indonesia's GDP is based on domestic consumption. In the short to medium term, Indonesia's economic prospects are bright, fuelled by growth in its population and per capita income, and its high rate of workforce participation. However, in the longer term, Indonesia could face what is known as 'the middle-income trap', whereby as income levels and costs rise, its local manufacturers risk becoming less competitive against lower-cost countries, thereby reducing growth prospects. This problem might be compounded by not being able to compete with advanced economies in higher-value products and services that already have well-established brand recognition.

Indonesia's GDP per capita has steadily risen, from US\$857 in 2000 to US\$3603 in 2016 and its GDP growth is around 6 per cent per annum. Relative to world growth, Indonesia has experienced a high rate of growth in its per capita GDP (Figure 1). Its growth has outstripped that of several successful economies such as Korea, Japan, Singapore, Malaysia and Thailand. Only China and the Philippines – who have similar levels of per capita GDP – have experienced higher growth rates in per capita GDP.

Some other South-East Asian countries, such as Laos and Vietnam, have higher growth in per capita GDP than Indonesia, but their current levels of per capita GDP are much lower than Indonesia's.

Although Indonesia's future economic prospects appear rosy, a widely acknowledged constraint to its economic development is pervasive corruption, which remains a concern for many businesses looking to operate within Indonesia. Indonesia is ranked 88th on Transparency International's Corruption Perceptions Index 2015, alongside countries such as Albania, Algeria, Egypt, Morocco and Peru. In addition, as discussed later, Indonesia ranks poorly regarding ease of doing business.

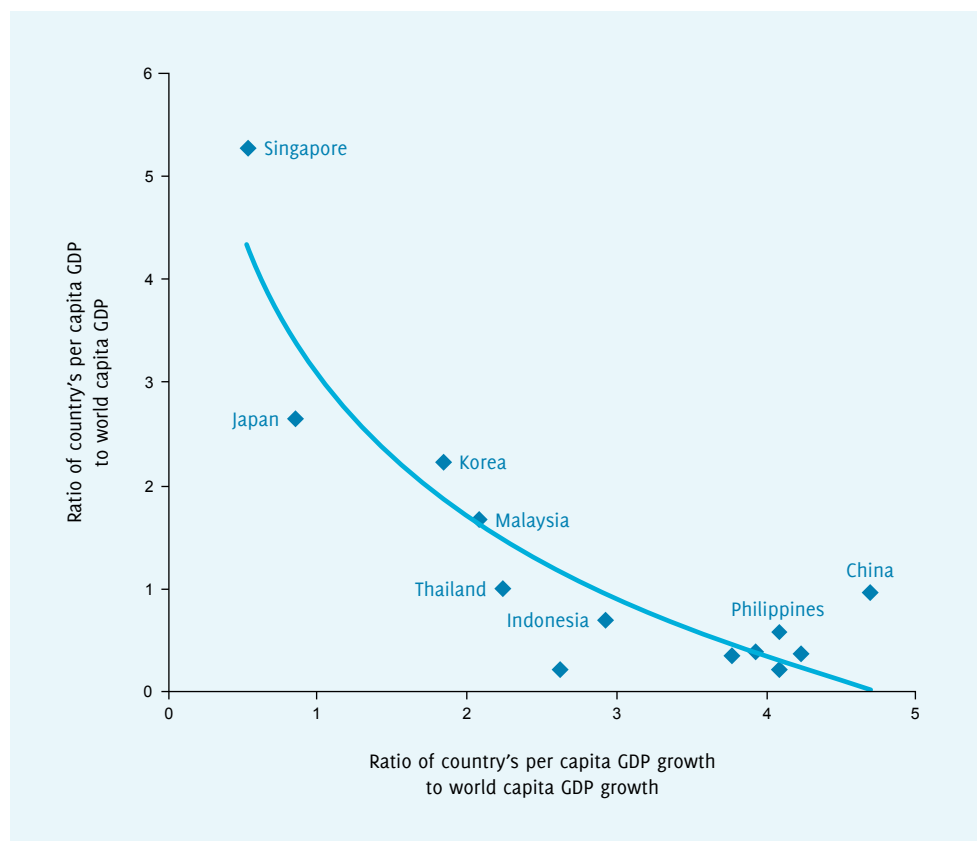
Agriculture

Agriculture is a significant part of Indonesia's economy, directly supplying food ingredients and providing a main source of employment in rural regions. Agriculture is also indirectly responsible for millions of jobs in small- and large-scale food processing and food retailing. Nonetheless, the relative economic importance of agriculture is declining. This decline is illustrative of the broader urbanisation trend underway in Indonesia, with agriculture's share of total GDP falling from around 50 per cent in 1979 to less than 15 per cent in recent years.

Crucially for Australia, Indonesia is largely unsuited to wheat production and thus relies entirely on imports to meet its wheat use requirements. Even if Indonesia could grow wheat in some parts of its land mass, the likelihood is that other competitive crops such as palm oil would offer farmers higher returns. Indonesia is the world's largest producer of palm oil and the third largest producer of rice.

Figure 1
GDP growth in Indonesia and other South-East Asian and East Asian countries relative to the world average for 2016

Source: World Bank



Economic development and urbanisation: their impact on diet and implications for the food processing sector

The growth in Indonesia's per capita wealth and trends such as urbanisation are likely to affect the dietary preferences of Indonesia's population. How those preferences might change is indicated by the example of dietary changes in other countries as their per capita incomes increase. The following subsections examine in some detail how changes in income and trends such as urbanisation affect people's dietary preferences.

General considerations

Economic development entails an increase in per capita income. But how does food consumption change when incomes increase? Figure 2 helps answer that question. The chart traces dietary change in different regions of the world from 1961 to 2011.

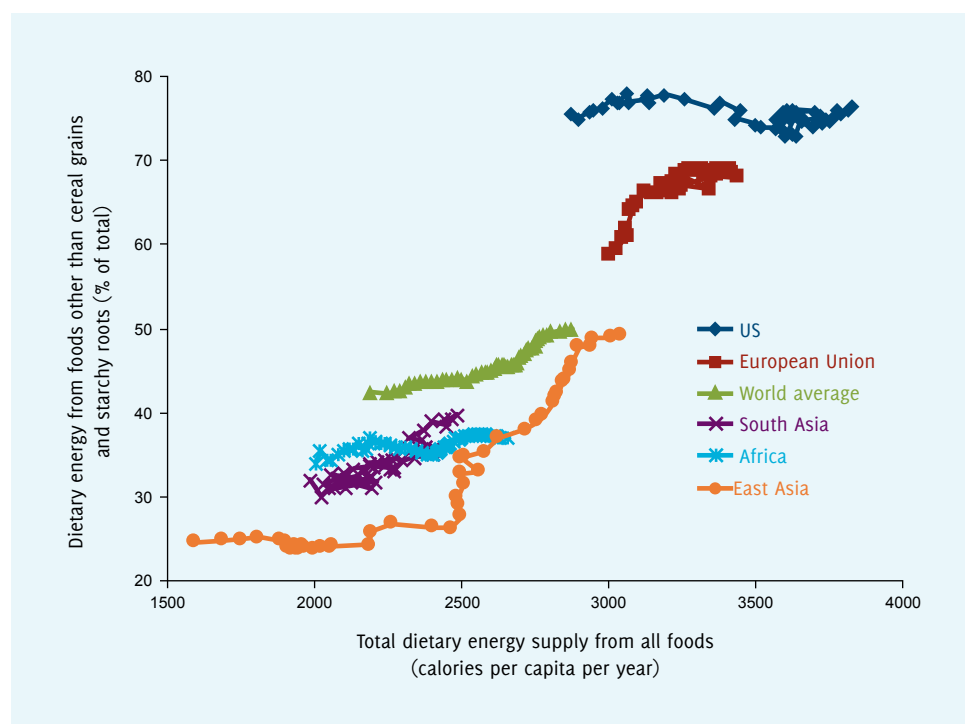
In all regions, real incomes improved over the period. In high-income countries such as the US, calorie intake (including calories from cereal grains and starchy roots) increased as incomes rose. However, the proportion of all calories coming from cereals and starchy roots plateaued. Staples such as cereal grains remained an important but nonetheless minor *direct* component of US and European diets.

In contrast, by the end of 2011 in Africa and South Asia, and despite an increase in real incomes, per capita calorie intake was still substantially less than the levels observed in the US and Europe 50 years previously. Diets in Africa and South Asia throughout the period from 1961 to 2011 remained directly dependent on cereals and starchy roots. More than 60 per cent of the per capita calorie intake in these regions came directly from cereal grains and starch roots.

East Asia strongly illustrates how a large increase in real income generates marked dietary change. Remarkable economic growth in East Asia over the past few decades helped double per capita calorie intake, the greatest increase among all regions. In addition, the makeup of the East Asian diet changed markedly. Cereal grains and starchy roots formed a much-reduced share of calorific intake as real incomes increased substantially. In the 1960s and 1970s, around three-quarters of calorie intake came from the direct consumption of cereal grains (mostly rice and wheat), yet in subsequent decades as growth in real incomes increased, more of the dietary energy came from non-staples such as meats and dairy products. Eventually, only about half of the per capita calorie intake came directly from cereal grains and starch roots.

Figure 2
Percentage of energy from
non-staple foods and total
dietary energy by region per
capita, 1961–2011

Source: Masters (2016)



More detailed evidence of how diets are affected by income is shown in Table 2, a 2013 dataset of food consumption in 180 countries. Countries are divided into quintiles of per capita GDP (36 countries in each quintile). As income levels increase, then more fruit, milk, red meat and processed meats are consumed, and less fibre is consumed. Whole-grain consumption diminishes, except when incomes are in the highest category.

Table 2
Food consumption by income grouping for 180 countries in 2013

Food type (g/capita/day)	Quintile of GDP per capita in 2013				
	Poorest nations			Richest nations	
	1	2	3	4	5
Fruit	95	115	140	146	168
Vegetables	264	198	194	204	167
Whole grains	35.9	22.6	20.5	19.1	40.8
Milk	41	62	113	129	187
Nuts and seeds	5.3	5.7	5.5	6.1	5.3
Fibre	25.0	22.8	22.0	21.1	20.5
Red meat	24	39	49	61	68
Processed meat	7.0	7.9	12.4	22.1	27.1
Sweet drinks	95	93	116	119	104

Source: Masters (2016)

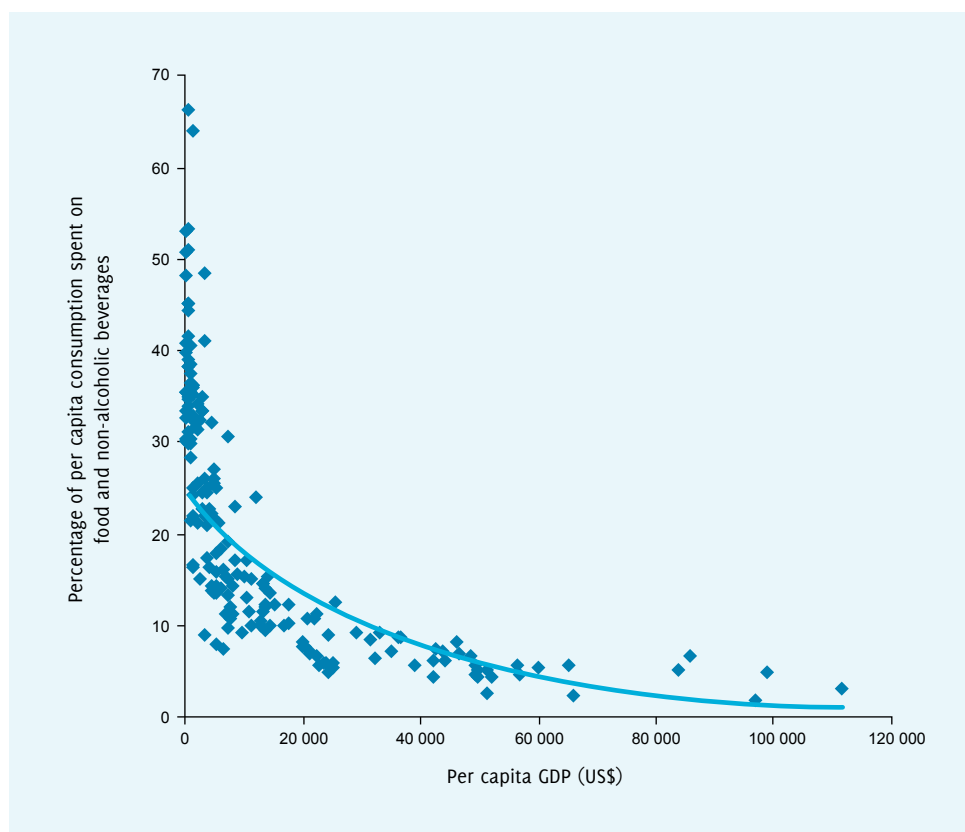
In general, as incomes increase, whole grains form a diminishing share of diet by weight and calorie intake. Also, apart from when incomes are at their highest, whole-grain consumption (grams per capita per day) declines as incomes increase. It is important to note, however, that grains are not consumed solely as whole grains but are also *indirectly* consumed as key ingredients in the production of other foodstuffs, such as red meat and processed meat. Meat production often depends on feed grains. To produce 1kg of meat from chickens, pigs, lambs and beef cattle, often takes 2, 2, 4 and 6kg of feed grain, respectively.

Hence, although whole-grain consumption mostly diminishes as incomes increase, nonetheless the increased consumption of red meat, milk and processed meat means that consumers increase their indirect dependence on grains, especially feed grains. Therefore, as incomes increase, there is a change in the composition of grains demanded by consumers, with a shift towards greater dependence on feed grains.

Grain consumption changes as incomes increase but what about food and drink consumption? How does their consumption change with income? Figure 3 helps answer that question by tracing how per capita expenditure on food and non-alcoholic beverages changes as per capita GDP increases. The wealthier a nation becomes, the smaller the proportion of their wealth (as measured by GDP) is spent on food and non-alcoholic drinks.

Figure 3
Percentage of per capita consumption spent on food and non-alcoholic beverages for 180 countries ranked by their per capita GDP levels in 2011

Source: World Bank (2014)

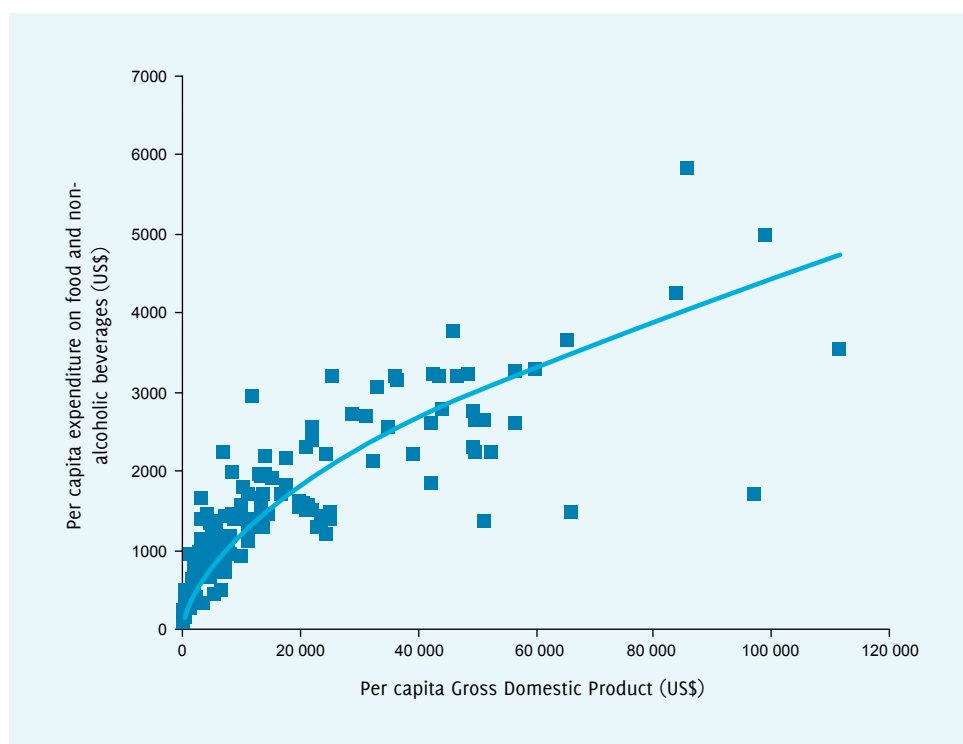


As people become richer, they tend to shift their purchases towards education, health, entertainment, travel and the quality of their housing. However, just because nations reduce the proportion of their GDP allocated to food and drink consumption as they become richer, do they also in absolute terms reduce their expenditure on these items? The answer is almost always, no.

Figure 4 shows that as nations become wealthier they spend more on food and non-alcoholic drink. Therefore, a rich country like Australia with a per capita GDP of around US\$67,000 spends per capita around US\$3650 on food and non-alcoholic beverages. By contrast, Indonesia, with a per capita GDP of US\$3350, only spends around US\$1005 on food and non-alcoholic beverages per capita. So just because a declining proportion of a nation's per capita GDP is spent on food and drink as their wealth increases does not imply actual expenditure on food and drink will diminish.

Figure 4
Per capita expenditure on food and non-alcoholic beverages as per capita GDP increases based on 180 countries for 2011

Source: World Bank (2014)



In fact, expenditure on food and drink increases. Hence, although the agrifood sector forms a smaller share of the economic wealth of a nation as wealth increases, in absolute terms the sector becomes increasingly valuable.

Practically, as a person's income increases, their consumption habits tend to change as they can afford food and drinks that are more expensive. Often, expenditure on dairy, fruit and meat consumption increases (see Table 2). An implication is that the food sector benefits from people becoming richer as they spend more on food and drink. It also means, however, that other sectors of an economy are likely to grow quicker and faster than the food and drink sector. Employment and career prospects are also greater and more varied as a nation grows in wealth. This can have implications for attracting and retaining appropriately skilled workers within agrifood industries.



AEGIC Australian Wheat for Asian Baking workshop

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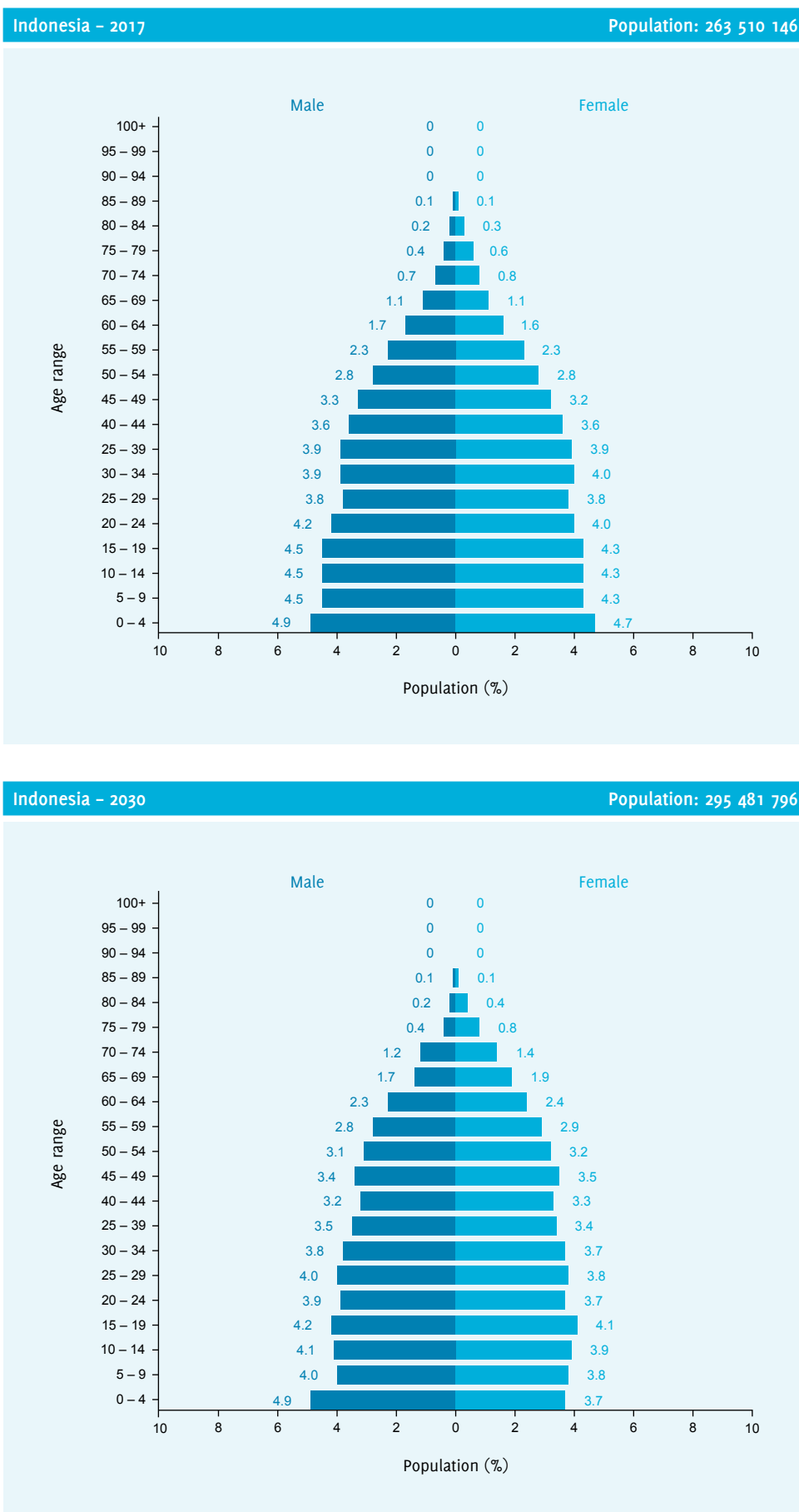
Population change

Indonesia is the world's fourth most populous country and almost half of the population of 263 million is under the age of 30 (Figure 5). Moreover, towards 2030 the dependency ratio (the ratio of the working age population to the population of the elderly and young children) will fall. An increase in the dependency ratio means an increasing proportion of the population will be earning income rather than being dependent on the incomes of others.

Towards 2030, most of the population will be under 40, displaying the dietary preferences of young adults. Moreover, this younger generation will live longer and consume more than the generation of their parents or grandparents. In the early 1960s, life expectancy at birth in Indonesia was only 48 years. Now it is around 70 years.

Figure 5
Population pyramid for
Indonesia in 2017 and 2030

Source: PopulationPyramid.net



Indonesia's food demand towards 2030 will increase due to its increase in population but also due to a change in the composition of its population, whereby an increasing proportion of its population will be of working age, earning income that supports and underpins a shift in the nation's dietary pattern. Most young people will earn significantly more than their parents did at the same age and these young people will display different consumption attitudes and behaviours to their parents. To illustrate, a McKinsey study of Indonesian consumers in 2011 identified seven main types of consumers. Often the wealthier consumers were among the young and were termed 'well-off modern adults' and 'emerging well-off youths' (see Figure 6).

Often these groups shared three characteristics:

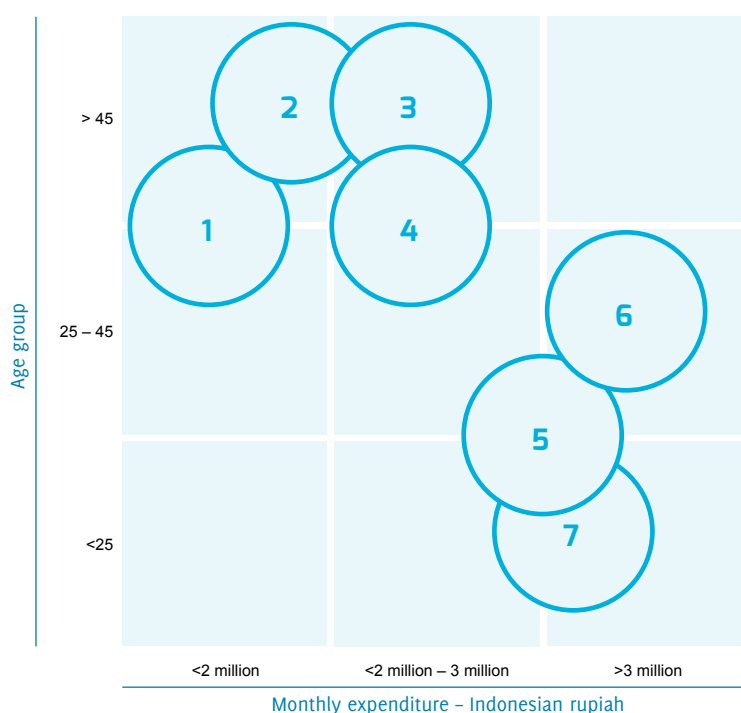
- i) They resided in urban areas;
- ii) They were not frugal in their spending habits; and
- iii) They were optimistic about their futures.

For Australia's grains industry, the prospect of richer, growing populations in many parts of Asia, especially in Indonesia and China, offers the prospect of growing demand for grains, especially feed grains, but also increased demand for grains used in a variety of grain-based foods, such as noodles, breads, biscuits, pastries and cakes.

Figure 6
Types of consumers in Indonesia

Source: Budiman et al. (2012)

1. **Pragmatic strivers**
 - Low spend
 - Being rich equals success
 - Open to fake products
2. **Middle-aged conservatives**
 - Low spend
 - Very strong family orientation
 - Conservative, but love shopping
3. **Middle-aged optimists**
 - Mostly middle class lower tier
 - Individualistic
 - Like small luxuries and are risk takers
4. **Frugal middle class**
 - Very strong family orientation
 - Nationalistic
 - Have clear financial goals
5. **Virtuous well-offs**
 - Contented, affluent class
 - Unwilling to pay a premium for better brands
 - Focus on needs rather than luxury
6. **Well-off modern adults**
 - Most affluent, mostly urban
 - Being rich equals success
 - Spend time on shopping
7. **Emerging well-off youths**
 - Most affluent, optimistic about future growth
 - Individualistic, take risks
 - High affinity toward the internet and technology



Indonesia and South-East Asian food consumption

Associated with Indonesia's economic development is not only a rise in per capita income but also greater urbanisation (Table 3), with agriculture, as already mentioned, playing a lesser role in the total value of a nation's economic activity as the country's GDP increases (see Figure 8). Poor countries in South-East Asia, such as Myanmar and Cambodia, have a high proportion of their populations in rural regions. By contrast, a far richer country like Malaysia is more urbanised, and Australia, another rich country, is one of the most urbanised countries in the world.

Among South-East Asian countries, Indonesia has by far the largest population and land area (Table 3). Its per capita GDP is less than that observed in Malaysia and Thailand, but well above levels observed in Vietnam, Cambodia, Lao PDR and Myanmar. Economic development in South-East Asian countries, including Indonesia, will see continuing rises in per capita income, higher populations and more people moving to urban areas. Accompanying these changes will be changes in consumer habits, as previously stated, with rising incomes encouraging a gradual shift from staples like cereals to protein-based diets.

An illustration of dietary change is the fall in the relative importance of rice in diets, most pronounced in Thailand and Malaysia, which have the highest per capita income (see Table 3). Household consumption data in five South-East Asian countries (Indonesia, Myanmar, Philippines, Thailand and Vietnam) reveal an income effect, whereby wealthy households consume less rice than poorer households. Hence, as individual wealth increases, eventually the prominence of rice diminishes.

However, offsetting this income effect is population growth that will ensure the total demand for rice and many other grains will increase over the next decade in these countries. But as this growth in population slows, income growth will become more important and will play an increasing role in fashioning each nation's diet. In addition, the location of populations will change as urbanisation occurs, and as discussed later, rural households are more traditional in their diet and consume more rice. Over the next 10 years, the rural population of South-East Asia will start to decline and by 2020 the region's urban population will exceed its rural population.

Table 3
Key economic and population statistics for South-East Asian countries

Country	Population (million)	GDP per capita (US\$)	Rural population (%)	Agricultural land (km ²)	Agricultural area per capita (ha)
Indonesia	257.6	3 346	46.3	570 000	0.22
Philippines	100.7	2 904	55.6	124 400	0.12
Vietnam	91.7	2 111	66.4	108 737	0.12
Thailand	68	5 815	49.6	221 100	0.33
Myanmar	53.9	1 161	65.9	126 450	0.23
Malaysia	30.3	9 768	25.3	78 390	0.26
Cambodia	15.6	1 159	79.3	54 550	0.35
Lao PDR	6.8	1 818	61.4	23 690	0.35
Australia	24.1	67 792	11.3	4 062 690	16.86

Note: GDP is measured in current 2015 US\$
Source: World Bank

Over the next 10 years, the rural population of South-East Asia will start to decline and by 2020 the region's urban population will exceed its rural population.



In Indonesia, there is a wide spatial spread in population density, GDP growth and GDP per capita (Figure 7). Indonesia's population and GDP are concentrated in Java and Sumatra, with much wealth and population density centred on Jakarta particularly. The spatial extremes of population density and wealth in Indonesia create a range of economic and political issues yet also create diversity in market opportunities.

According to UN data, between 2017 and 2030, Indonesia is forecast to become one of the five countries with the largest increases in urban population, with the non-urban population actually decreasing.

Poor and middle-class people (a majority of the Indonesian population) principally consume rice, cassava, maize and processed soybean. However, the yearly per capita consumption of wheat flour is now above 22kg, having risen from 17kg in 2004. Wheat consumption has increased by around 6 per cent per annum. In the 1990s, wheat was the only cereal in Indonesia whose consumption per capita surged.

The link between wheat consumption and lifestyle changes of Asia due to urbanisation is increasingly well documented (Fabiosa, 2006; Pingali 2004). Bourgeois and Kusumaningrum (2008) found the correlation between wheat imports and the number of urban people yielded a positive coefficient of 0.94 (a close to perfect correlation) while the same coefficient for the rural population was much smaller at 0.69.

Most people who live in the cities adopt a more diversified diet, including consumption of bread, pastries and cakes, whose consumption has grown at an annual rate of more than 15 per cent since the mid-1990s.

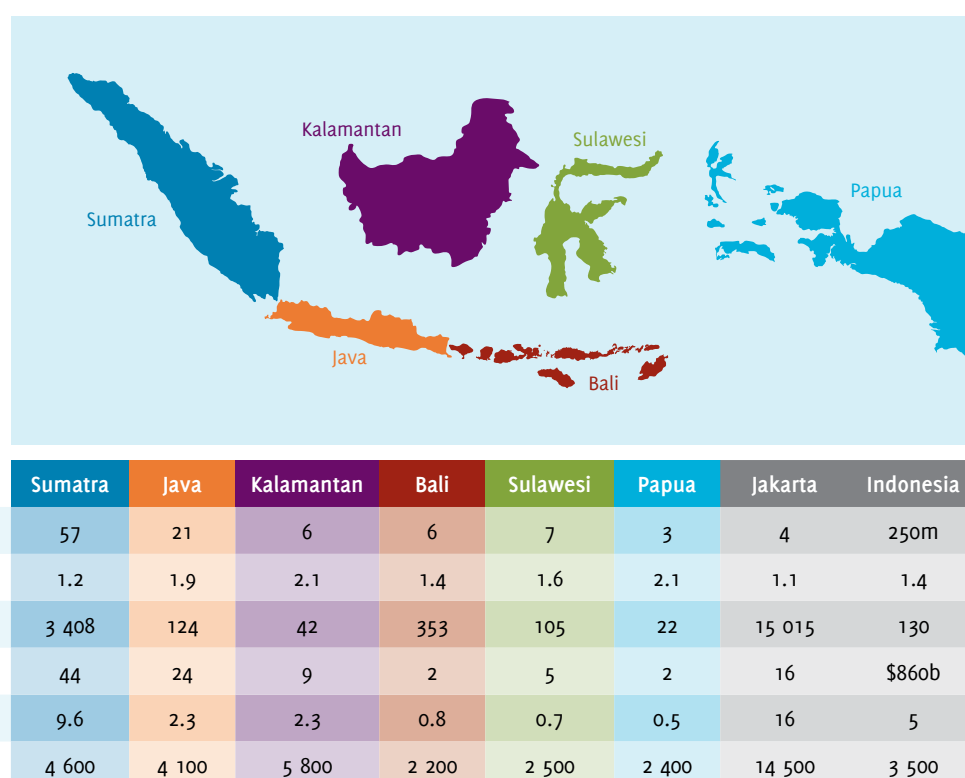
Indonesia's urban population has also increased sixfold since the mid-1970s, and processing industries continue to develop wheat-based products that make cooking easier for working people. For example, the market for instant noodles has experienced strong growth, with 60 per cent of wheat flour currently used in their production, a figure that doubled between 1987 and 1997 (USDA, 1997).

Enhanced rural labour productivity, mechanisation and greater job and income prospects in urban regions further fuel urbanisation. This leads to a decline in the agricultural and fisheries sectors' share of GDP and national employment (Figure 8). As more of the population resides in cities, lifestyle and dietary change, combined with higher per capita incomes, favour greater consumption of wheat-based foods (e.g. cakes, pastries, breads), often due to their convenience and variety.

Although farm production will play a decreasing role in the economies of many South-East Asian countries, including Indonesia, food manufacturing and export will play more important roles. The region is increasingly becoming a net food exporter, with around US\$139b in exports in 2014, compared with US\$90b of food imports.

Hence, a likely future for Australia's grains industry is that it will be an exporter of grains to many South-East Asian countries with those imported grains then being converted into food products for local consumers and other regional or international consumers. Increasingly, many South-East Asian countries like Indonesia are becoming net food exporters.

Figure 7
The spatial spread of population and GDP in Indonesia in 2014



Urbanisation and diet

The past 100 years or so have seen an unprecedented shift in human populations away from agricultural production towards urban-based societies. Over a century ago, there were nearly seven rural people for every city dweller. Recently, however, the global urban population outnumbered the rural population for the first time in history. This milestone was reached many decades ago in several developed economies and in the past decade in Indonesia. The rural population in Indonesia now forms only 46 per cent of the nation's population (Table 3). However, by 2030, 71 per cent of the country's population is projected to reside in urban areas.

Indonesia's urbanisation trend is not concentrated just in Jakarta. Higher rates of economic growth and urbanisation are projected in the country's 'second tier' cities, such as Pekanbaru, Pontianak, Karawang, Makassar and Balikpapan. Balanced urbanisation such as this means less likelihood of bottlenecks and supply chain congestion that otherwise would hamper economic development. In addition, it means that dietary trends associated with urbanisation will be widespread.

Over the past two decades, the Indonesian diet has undergone a radical transformation from the classic rice-centric diet to one featuring more grain-based foods and animal protein. While it may be tempting to characterise this change as a 'Westernising' diet, it may be more useful to consider these trends as markers of a rapidly urbanising population.

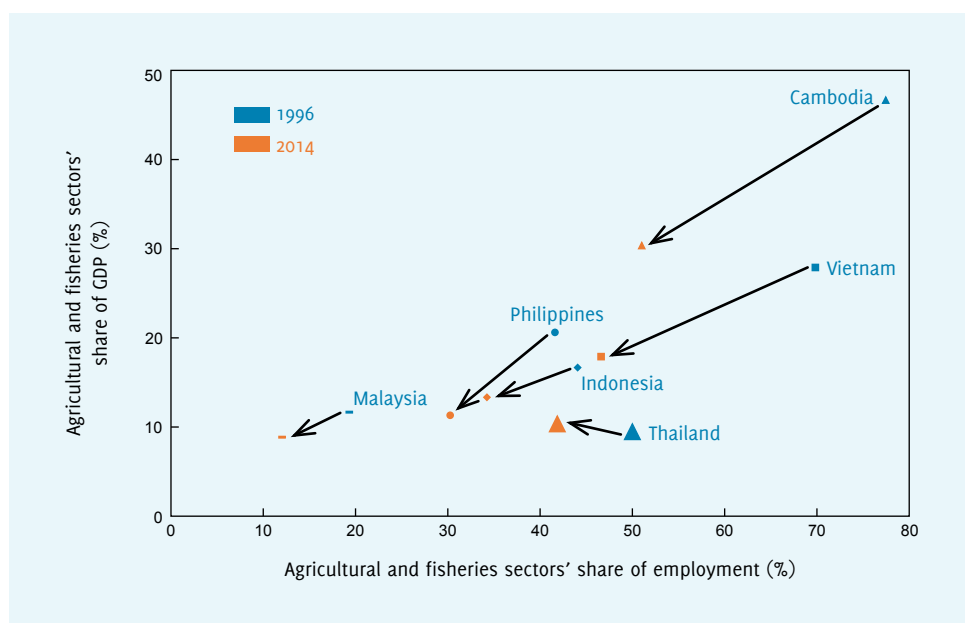
This is particularly the case with Indonesia, whose love affair with instant noodles has seen it become the world's number one consumer of such noodles in only a few short decades. It is often assumed that noodles are a traditional Indonesian staple alongside rice. However, the widespread consumption of noodles (particularly instant noodles) is a relatively recent phenomenon. No food product better defines the transformation of the Indonesian diet more than instant noodles, yet if we focus on Westernisation, the instant noodle story is lost.

In the case of Indonesia, urbanisation drives change in dietary patterns for two main reasons – convenience and affluence. The average Indonesian office worker may often have insufficient time to prepare a traditional rice-based dish. Instead, they are increasingly turning to instant noodles and Western-style baked goods, such as bread. These types of foods can be quickly prepared or purchased cheaply to be eaten 'on the run' or during their lunch break.

Urbanisation is typically accompanied by rising affluence, higher GDP per capita and more disposable income. This is one of the reasons why Jakarta makes up around 12 per cent of Indonesia's population yet accounts for over 17 per cent of consumer expenditure. While rural-dwelling Indonesians continue to base their diet around cheap traditional staples such as rice and tempeh (a fermented dish made with soybeans), increasingly cashed-up city dwellers have enough disposable income to afford Western-style baked goods, including bread, cakes and cookies.

Figure 8
The changing economic importance of agriculture in South-East Asian countries in terms of share of GDP and employment: 2014 vs 1996

Source: World Bank



Dietary and nutritional issues in Indonesia and other South-East Asian countries

As an emerging middle-income country, Indonesia has made enormous gains in poverty reduction, cutting the poverty rate by more than half since 1999, to 10.9 per cent in 2016. Nonetheless, this still means that out of a population of 263 million, more than 28 million live below the poverty line. About 40 per cent of the nation's population remain vulnerable of falling into poverty, as their incomes hover marginally above the national poverty line.

The Global nutrition report (2014) mentions Indonesia as one of 117 countries with three main nutritional problems in children, namely stunting, wasting and excessive weight or obesity. Winichagoon (2017) reports recent Indonesian surveys that identify a high prevalence of vitamin D insufficiency in children and women, possibly due to changing lifestyles, food habits and less exposure to sunlight from urbanisation. The Indonesian government is aware of the country's nutrition-related health issues and now allocates around 2.5 per cent of its annual general government expenditure to nutrition-specific and nutrition-sensitive interventions (DI, 2017). Between 2013 and 2015, the Indonesian government increased its expenditure on these issues by 50 per cent.

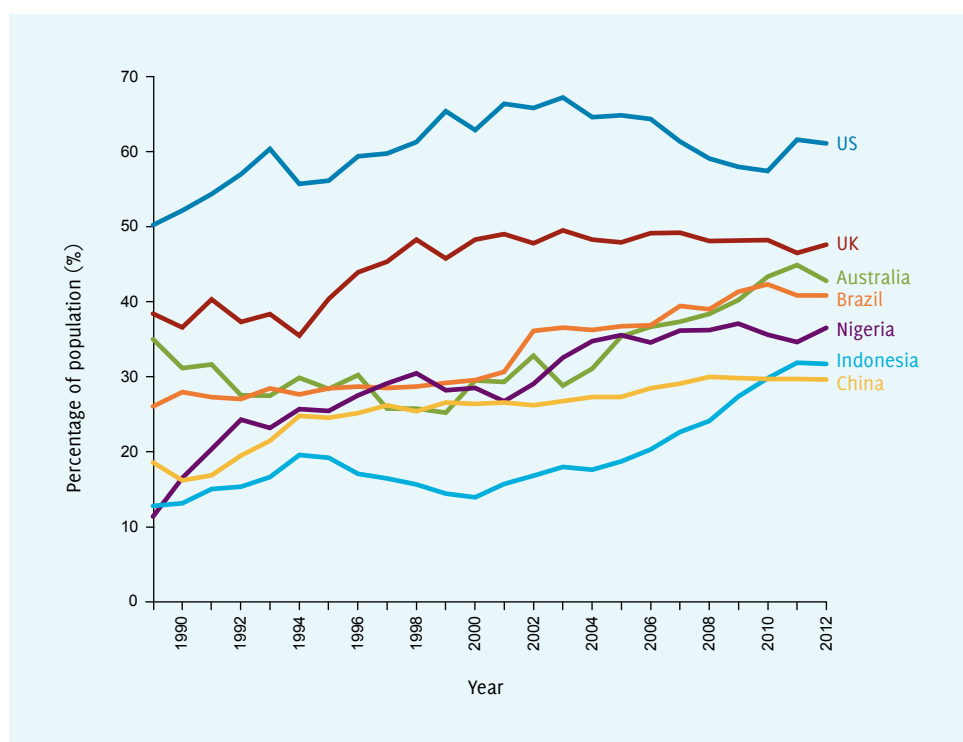
Fortunately, the problems of malnutrition, stunting and wasting are often remedied by the growing wealth of a nation.

The prevalence of stunting declines by an estimated 3.2 per cent for every 10 per cent increase in per capita income, and a 10 per cent rise in per capita income translates into a 7.4 per cent fall in wasting. Well-nourished children are 33 per cent more likely to escape poverty as adults (DI, 2017). Hence, as Indonesia's per capita wealth increases, these nutritional issues in children should diminish.

Indonesia's nutritional issues, however, are not confined to children. According to Ministry of Health Indonesia (2013), the number of adults overweight or obese in Indonesia increased from 10 per cent and 11.7 per cent respectively in 2010 to 11.5 per cent and 14.8 per cent respectively in 2013. In addition, the percentage of overweight or obese adults living in Jakarta in 2013 was 14 per cent and 20.8 per cent respectively. Being overweight or obese are increasingly common problems in many countries, with women being more affected than men. Obesity levels are often greater at higher levels of calorie intake and Indonesia has experienced an accelerated lift in its per capita calorie consumption since the mid-2000s (Figure 9). Hence, although increasing per capita wealth helps remedy some nutritional problems such as stunting, other nutritional problems such as obesity then arise. Income growth can thus be a double-edged sword.

Figure 9
Trends in calorie
over-acquisition in
selected countries

Source: IFPRI (2014), based on unpublished data from FAO



Rice consumption

The pattern of rice consumption is changing in Indonesia. In rural regions, among most income groupings, per capita rice consumption is increasing (Figure 10) and among low-income groups in particular. However, as incomes grow and urbanisation continues, per capita rice consumption is destined to fall. In urban communities, among all income groups (apart from the lowest income quintile), per capita consumption of rice is declining. In general, except for low-income groups in rural areas, income growth is no longer an important driver of higher rice consumption. In most areas, the move from rural to urban jobs will mean lower rice consumption, perhaps sharply lower.

The findings of Timmer (2014) regarding the pattern of rice consumption in Indonesia as affected by income level are also supported in the more recent generalised work of Liu (2016). Liu examined dietary patterns and incomes in 146 countries. As shown in Table 4, richer countries devote a smaller share of their food consumption to grain staples. On average, around 16 per cent of their food expenditure is on rice and other cereal-based products. By contrast, the poorest group of countries allocate 22 per cent of their food expenditure to rice and other cereal-based products. Moreover, there are important differences in the composition of the grain food items purchased by consumers in the various countries allocated to the various income classes. In richer countries, rice consumption accounts for only 9 per cent of purchases of rice and other cereal-based products. By contrast, in the poorest group of countries, it accounts for 24 per cent of food expenditure on rice and other cereal-based products. The implication, supported by the findings of Timmer (2014) for Indonesia, is that as incomes increase, rice consumption diminishes in relative importance compared to wheat and other cereal products, and less of the food budget is allocated to rice and other cereal-based products.

Figure 10
Changes in rice consumption
by income quintile groupings
in urban and rural regions

Source: Based on Timmer (2014)

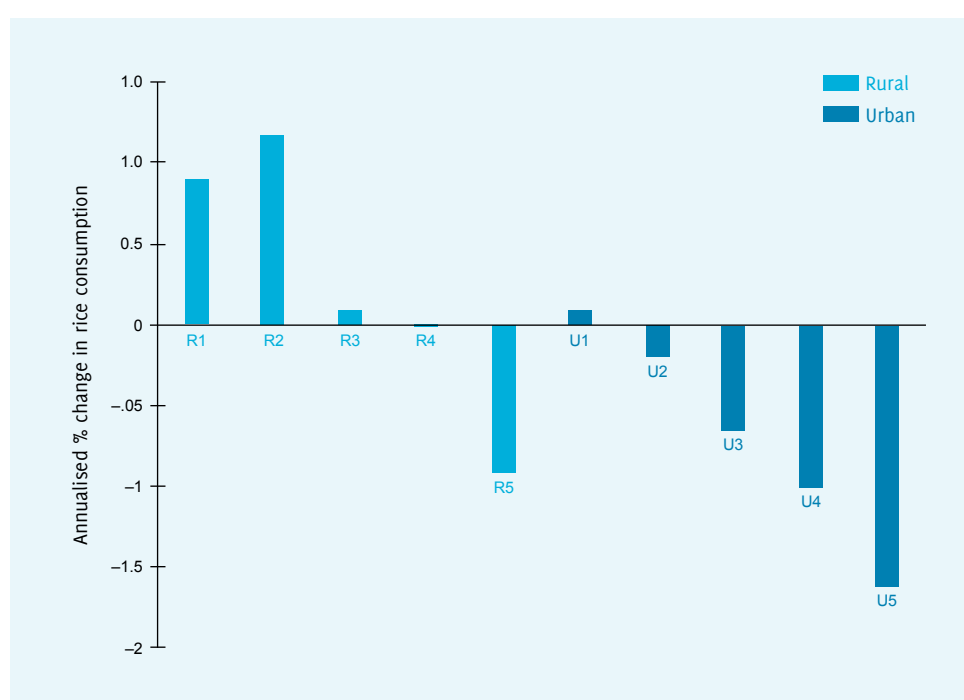


Table 4
Budget shares and commodity consumption

Commodity	Income quartiles				All countries
	Highest 1st	2nd	3rd	Lowest 4th	
Rice	8.92	15.46	32.92	38.64	24.03
Other cereals	11.27	18.01	32.48	40.96	25.73
Bread	37.96	39.70	21.52	13.66	28.19
Bakery and pasta	41.85	26.84	13.07	6.75	22.05
Entire group	15.92	17.49	22.71	32.51	22.20

Source: Abstracted from Lui (2016)

When Liu more closely examined the price and income elasticities of demand of dietary components of the grain staples group in 129 countries, she found that at low incomes (the 4th income quartile in Table 5), the consumption of rice and other cereals was price inelastic, indicative of the staple nature of these products in the diet. In this same low-income group, bread, bakery products and pasta consumption, however, was price elastic, suggesting that any lowering of the real price of these products would result in proportionally greater consumption of these products. By contrast, in the high-income group, the opposite was true. The demand for rice was price elastic while the demand for bread, bakery products and pasta was price inelastic.

These different demand responses for rice versus bread, bakery products and pasta are likely to result from fundamental differences in diets, attributable mostly to cultural heritage, the nature of local agriculture and economic history. Moreover, when amounts of a product are initially demanded in low volumes, often the associated demand response for that product is more price elastic.

Hence, in richer economies where diets are traditionally wheat-based and rice is little consumed, then the demand for rice is often more price elastic, as shown in Liu's findings. Conversely, in many poorer nations whose diets are underpinned by rice consumption, the consumption of wheat-based products is often more price elastic.

Table 5
Price and income elasticities of demand within the grain group

Items	Highest income (1st quartile)		2nd quartile		3rd quartile		Lowest income (4th quartile)		All	
	Income	Price	Income	Price	Income	Price	Income	Price	Income	Price
Rice	1.17	-3.21	1.07	-1.38	1.05	-0.88	1.03	-0.52	1.05	-0.98
Other Cereals	0.88	-1.10	0.91	-0.82	0.95	-0.47	0.96	-0.36	0.94	-0.57
Bread	1.02	-0.48	1.02	-0.50	1.03	-0.59	1.07	-1.53	1.03	-0.62
Bakery and Pasta	0.98	-0.36	0.98	-0.50	0.95	-0.98	0.92	-1.54	0.97	-0.61

Source: Abstracted from Lui (2016)

WHERE ARE FOOD INGREDIENTS AND FOOD PURCHASED?

Associated with urbanisation and rising incomes are changes in the places where food ingredients are purchased and food is consumed. Mini-marts, hypermarkets and supermarkets are increasingly important as suppliers of food ingredients, particularly in urban regions.



MINI-MARTS, HYPERMARKETS AND SUPERMARKETS

These retail outlets first appeared in Jakarta in the 1970s, before expanding to other major population centres soon after. Consumers using these retailers have traditionally been heavily price-conscious; however, in recent years more and more shelf space is taken up with imported food items that have typically commanded a small premium. At the top end of the food retail market, more than half of all retail stock-keeping units are imported products.

The fastest growing retailers are mini-marts. This market is highly concentrated, with Indomaret and Alfamart alone operating almost 7000 stores, accounting for three-quarters of all outlets in this channel. These convenience stores are the equivalent of the 7-Eleven chain of stores in many developed countries. Their ubiquity and convenience make them attractive outlets to food ingredient buyers and processed food consumers such as busy office workers.



PASARS ('WET MARKETS' OR TRADITIONAL RETAILERS)

Despite the rise of mini-marts and other supermarket-style retailers, most food is still purchased via pasars. This is particularly the case for basic ingredients such as rice, flour and noodles. Consumers typically visit pasars daily or every other day and buy only what is needed to produce dinner later the same day. These smaller retailers play a large role in the daily lives of many Indonesians and are unlikely to disappear anytime soon. They are often cheaper than larger format stores and have had many years to cement relationships with customers.

The predominant risk to this sector, however, is their reputation for occasionally inadequate food safety controls.



STREET VENDORS (WARUNGS)

Februhartanty and Worsley (2017) examined consumer behaviour regarding the frequency of food purchases from street vendors or warungs in five countries, including Indonesia. They found regular food shopping at street vendors was highest among Indonesians (51.5 per cent), with food being purchased around twice a week. Foods commonly bought were snack foods. Indonesian food purchases from street vendors was due to their practicality. Family members not engaged in preparing the family's main meal were more likely to purchase foods from street vendors.

Urbanisation of the population supports the use of *warungs*. Office workers are less inclined to prepare elaborate meals and consequently rely on *pasars* (i.e. traditional food retailers) or *warungs* due to their convenience. There is an observed shift towards a greater proportion of food purchases being prepared foods and beverages. For example, Table 6 shows consumer data from Indonesia's national quarterly socioeconomic survey. In urban regions, expenditure increases over time as households purchase more prepared foods and beverages. Moreover, urban households consistently spend more of their household food budget on prepared foods and beverages compared to rural households.

Table 6 demonstrates the change in behaviour towards increased reliance on ready-made meals and processed food products and beverages. Purchases of meat as a share of food expenditure are also increasing slightly for urban households. By contrast, the share of food expenditure devoted to cereal purchases is declining in both rural and urban areas, which mostly reflects less consumption of rice. However, for wheat, consumption is increasingly via flour used to make processed foods such as noodles, breads and cakes. Since 1990, the per capita consumption of wheat flour in Indonesia has steadily increased from about 8kg and is now more than 22kg (Figure 11).

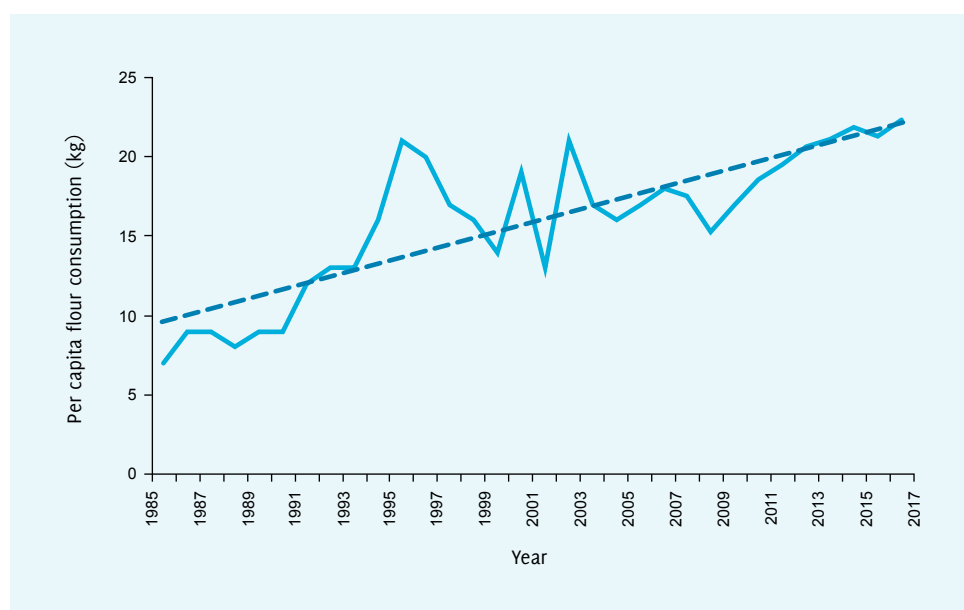
Table 6
Some food item shares of urban household food expenditure (%) and their difference relative to rural households, 2013–17

Year	Prepared food and beverages		Meat		Cereal	
	Urban	Difference between urban and rural household expenditure shares (%)	Urban	Difference between urban and rural household expenditure shares (%)	Urban	Difference between urban and rural household expenditure shares (%)
2013	31	13	4	1	13	- 8
2014	32	13	4	1	12	- 8
2015	32	12	5	2	13	- 8
2016	34	12	5	2	11	- 7
2017	37	11	5	1	9	-6

Source: Indonesia – National Socio-Economic Survey (SUSENAS)

Figure 11
Per capita flour consumption in Indonesia (kg/capita)

Sources: CDMI (2017) and APTINDO



The per capita increase in flour consumption indicates that the consumption of wheat-based products is also increasing, enabling Indonesia's milling industry to expand. In 1998 there were four main flour mills in Indonesia. By 2015 there were 30 mills (Table 12), and 27 are currently operating. The total capacity of current mills is 11.5mmt per annum. It is believed that these mills run at 60–70 per cent capacity, with domestic supply of flour being almost the sole source of flour in food production. The Indonesian government controls the introduction of new milling capacity via licences.

As would be expected, milling capacity is heavily concentrated on the main island of Java. Despite the number of mills, the sector remains heavily concentrated with mills controlled by the Salim Group. Of these mills, by far the biggest is Bogasari, which alone has more than 50 per cent market share. According to APTINDO, the country's peak body for flour mills, the sector's capacity is expected to grow to more than 14mmt by 2024–25.

Due to low labour costs, a cheap rupiah and economies of scale, Indonesia's flour millers are generally competitive by global standards; however, this is gradually diminishing as the cost of labour and variable costs such as utilities increase. That said, increased costs have, in recent times, been offset by an abundance of low-cost wheat in the global market.

About two-thirds of the flour produced in Indonesia is used by small and medium-sized operators producing wheat-based products. Small-scale producers of noodles, many street vendors, bakers and traditional Indonesian pastry sellers are included in this group. The users of the remaining third of flour production are instant noodle manufacturers, medium-sized and large bakeries and biscuit makers. Noodle production dominates 70 per cent of Indonesia's wheat flour consumption. Of the remainder, 20 per cent goes to the bakery industry and 10 per cent for cakes, biscuits and household use.

Figure 12
The locations of Indonesia's main flour mills, 2015



Area	Mill	Location
1	Halim Sarigandum	Medan
1	Jakaranatama	Medan
1	Agri First	Medan
1	Cerestar	Medan
2	Crown Flour Mills	Tangerang
2	Mustafa Mesindo	Tangerang
2	Bungasari FM	Cilegon
2	Nutrindo (Mayora)	Cilegon
2	Pundi Kencana	Cilegon
2	Eastern Pearl	Cilegon
2	Cerestar	Cilegon
2	Horizon	Bekasi
2	Wings Group	Bekasi
2	Bogasari	Jakarta and Cibitung

Area	Mill	Location
3	Panganamas	Cilacap
3	Sariinti	Semarang
3	Sriboga	Semarang
4	Agrofood	Mojokerto
4	Wings Group	Gresik
4	Cerestar	Gresik
4	Wilma	Gresik
4	Murti Jaya	Gresik
4	Pakindo	Sidoarjo
4	Asia Raya	Sidoarjo
4	Purnomo	Sidoarjo
4	Pioner	Sidoarjo
4	Bogasari	Surabaya
5	Eastern Pearl	Makassar

Implications for Australia's wheat industry

Indonesia is by far Australia's most important wheat export market. It accounts for almost one quarter of all wheat exports from Australia. Less well known is the fact that Indonesia is poised to play an even bigger global role in wheat importation, with implications for Australia's wheat industry.

Driving Indonesian growth in wheat imports are its growing population, increasing per capita income and greater urbanisation. The combination of these trends means many things need to go pear-shaped before Indonesia's consumption of wheat will diminish.

Australia exports annually around \$2.7b of agrifood products to Indonesia, with almost \$1b of that coming from WA. Around \$1.2b (or 4.2mmt) of wheat is exported annually to Indonesia from Australia and much of those exports come from WA. The likelihood is that exports to Indonesia will continue to grow due to the combined impact of rising incomes and the rising population in Indonesia that affect consumer diets.

Implications for Australian wheat exports arise from the demographic, economic and dietary changes underway in Indonesia.

First, emerging urban centres cannot be ignored by marketing and market development activities, as these urban centres constitute a growing source of demand for wheat-based products. In addition, region-specific or localised product opportunities may arise as local palates evolve and diverge. For example, in Japan there are regional differences in the preferred traits for noodles. Hence, it is not too difficult to imagine similar nuanced regional differences arising in Indonesia. These preferences may become the basis for commercial market segmentation and differentiation of wheat products.

Second, urbanisation affects distribution channels for wheat-based products, with supermarkets becoming increasingly important as food outlets. In addition, urban-based, time-pressed workers are likely to display a preference for foods such as noodles that can be prepared quickly and consumed easily. These dietary changes will affect the quantities and types of wheat that will need to be imported.

\$2.7b
of agrifood products

\$1.2b
of Australian wheat

exported from Australia
to Indonesia annually



Third, of indirect importance to Australian wheat exports to Indonesia, is how Australian export businesses might invest higher up the supply chain for wheat products to capture value-adding opportunities for grain sold to Indonesia.

Although commercial growth opportunities in wheat-based food sales are highly likely, it does not necessarily follow that these are opportunities for Australian businesses to capture easily. The World Bank ease of doing business rankings (see Figure 13) identify several challenges facing any overseas company investing in Indonesia. Figure 13 contrasts the ease of doing business in Australia, Russia and Indonesia. In Indonesia, there are clear difficulties in starting a business, registering the business, enforcing contracts and ensuring taxes are paid.

A more positive yet different aspect of future sales of wheat-based foods in Indonesia may be a change in how some of these foods are ordered and purchased. For example, Indonesia has a growing population of wealthier, technologically savvy youth. There are currently more than 220 million mobile phone user accounts in Indonesia, which means that most households have more than one mobile phone subscriber. Hence, sellers of wheat-based foods may increasingly use phone-based technologies to directly connect with their customers. These technologies will allow wheat-based food trends to be discerned more quickly. Flour makers can then gear up to produce the wheat flours best suited to producing those foods experiencing increased demand.

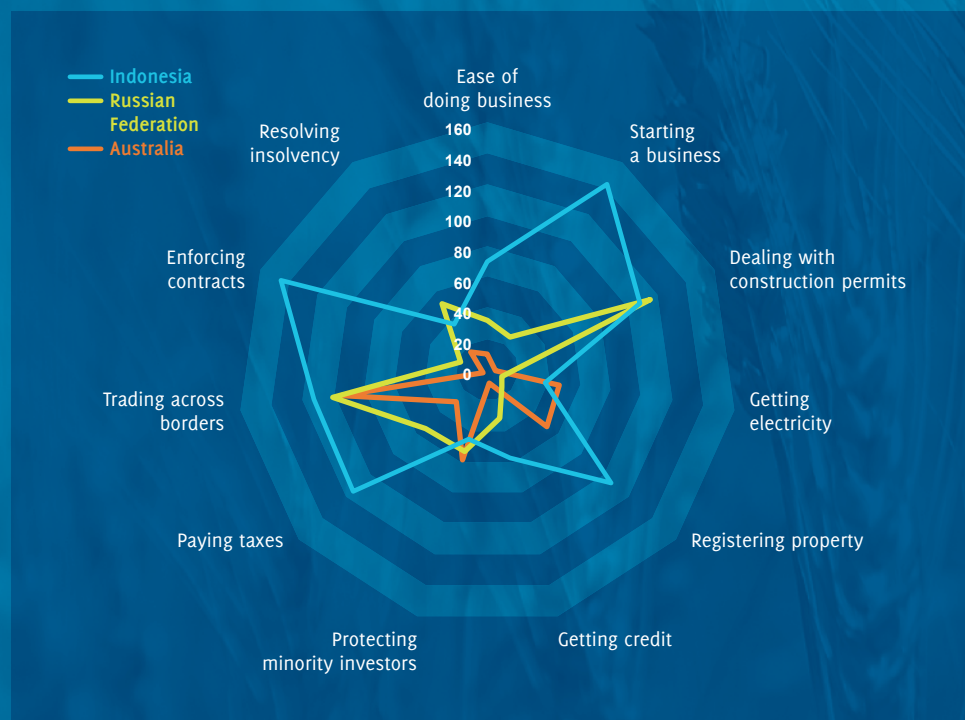
One challenge facing Indonesian policymakers is managing the balance between rapid urbanisation on the one hand while maintaining agricultural output on the other.

Urban expansion can entail encroachment on farmland, reducing the total area available to food producers. In addition, some newly arrived urbanites, who were previously food producers, are now solely food consumers. Increasingly, Indonesia's agricultural sector needs to produce more with less, and so some combination of increased agricultural productivity and food importation is likely to be needed to underpin future economic growth and food security.

Australia can play a key role in helping Indonesia meet its caloric needs by providing stable access to wheat (which Indonesia cannot grow in an economically feasible manner) and some animal protein (i.e. cattle). Having access to a stable supply of calories and protein frees Indonesia to focus on the production of crops and animals that represent the best use of Indonesia's land, water, capital and labour resources.

Being reliant on imports for some agricultural products also frees Indonesia from some environmental problems. For example, agricultural production in Indonesia is already associated with around 75 per cent of the country's greenhouse gas emissions, deforestation and peat land degradation. Imports can lessen these environmental problems while delivering food security and developing regional security through mutually beneficial trade ties. By providing affordable wheat, Australia also helps Indonesia meet its rice self-sufficiency goal. Increased importation of wheat does not displace any Indonesian local supply of wheat. It allows Indonesia's flour industry to support the urbanisation trend that results in lower per capita consumption of rice and thereby facilitates Indonesia's political goal of self-sufficiency in rice production.

Figure 13
Ease of doing business
indicators for Indonesia,
Russia and Australia
Sources: World Bank data
for June 2017



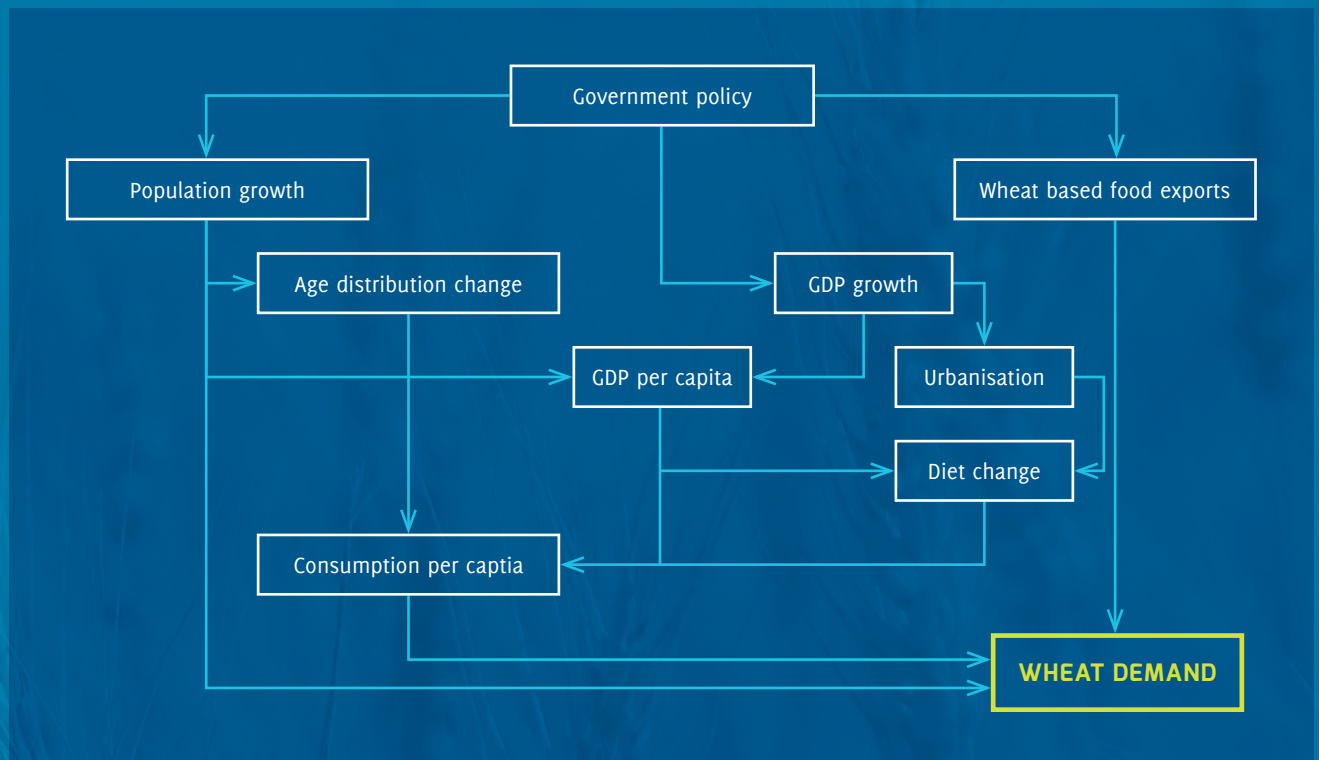
A broad range of metrics trending in the right direction supports the optimistic outlook for wheat demand in Indonesia:

- a growing population, particularly a growing urban population
- a median age that is low by global standards
- steadily increasing life expectancy
- declining poverty
- rising disposable income
- rising per capita consumer spending.

Figure 14 outlines the interrelationship between various factors that in combination support this prospect of growing volumes of wheat being imported by Indonesia and Figure 15 shows why Indonesia is an unambiguous wheat export opportunity for Australia.

Figure 14

Factors affecting wheat demand in Indonesia



Checklist for opportunity



INCOME GROWTH

Indonesia's per capita income is rising rapidly, increasing 40% in a decade.



URBANISATION

Indonesia is rapidly urbanising, leading to less rice consumption and more wheat consumption.



LIMITED DOMESTIC SUPPLY

Indonesia has little land suited to wheat production. It relies on wheat imports.



POPULATION GROWTH

Each year Indonesia has another 2.8m people to feed.



PROXIMITY

Indonesia is on Australia's doorstep.



TRADE POLICY

Indonesia does not restrict milling wheat trade.

Figure 15
Summary of the factors
highlighting Indonesia as a
continuing wheat export
opportunity for Australia

In the context of the Australian export grains sector, Indonesia's unambiguously rosy demographic and income story provides Australia with the opportunity to focus on wheat export activities. Comparatively little time needs to be spent pondering or assessing whether Indonesia is or is not a market that Australia should focus on. Instead, the more challenging and useful question to answer is:

How should Australia position its wheat offering to Indonesia to serve Indonesian needs while delivering value for Australian grain producers?

This key question is addressed in subsequent AEGIC reports.

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