RICE BOWL INDEX

2016

Collective Responsibility

The Rice Bowl Index© is a tool designed to facilitate positive productive dialogue, collaboration and action between governments, the private sector and other key stakeholders in the area of food security. It assesses how robust a country's capacity is to address the challenges of food security.

The Index is funded by Syngenta Asia Pacific and governed by an Advisory Board. More information regarding the RBI governance and the Board can be found at www.ricebowlindex.com

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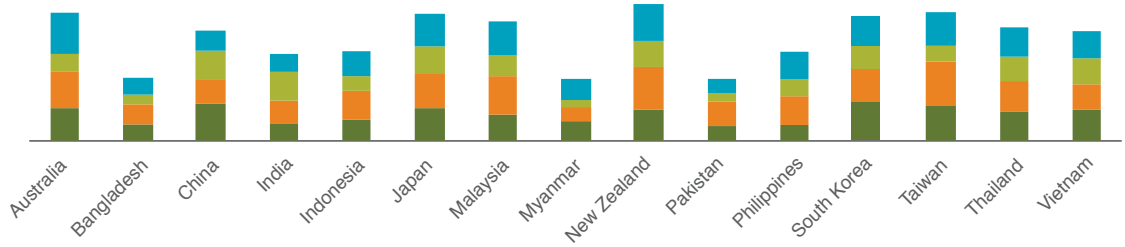
Overview of 2016 Results

Rice Bowl Index (RBI) scores declined by an average of -1.9% from 2015–2016. This is in stark contrast to the improvement observed over the last two annual reports – average scores improved by 2.7% and 3.3% from 2014–2015 and 2013–2014 respectively.

2016 Composite Scores



POLICY & TRADE
2016 saw an average DECLINE of nearly -5% across the 15 countries

FARM-LEVEL
Almost universal DECLINE, with only Indonesia and Myanmar improving

ENVIRONMENTAL
TAIWAN enjoyed the largest growth in this rubric

DEMAND & PRICE
INDONESIA saw the largest improvement in this rubric—over 15%

Largest Increase & Decline

4.7%
Taiwan's improvement was a result of strong performance in both Policy & Trade and Environmental Factors.

-11.8%
Pakistan saw a deterioration of its score in all four rubrics, with the most pronounced drop occurring in Policy & Trade—a decline of over 30%.

Growth & Demographics

RBI SCORE GROWTH

10-YEAR AVERAGE	2015	2016
2.5% GROWTH	2.7% GROWTH	-1.9% GROWTH

GROWING MIDDLE CLASS

42%
of Asia's population is expected to make up the **middle class** by 2018.

Learn more and explore the index at www.ricebowlindex.com

2015–2016 RBI Progress

Now in its fifth year, the RBI is designed to assess the robustness of food security systems[1] across 15 countries in Asia. By providing insight and analysis the aim is to make a meaningful contribution to the policy debate surrounding food security and to move the discussion to a solutions focused dialogue.

RBI Vision	RBI Strategy	2015–2016 Plan	2015–2016 Progress
To improve lives in Asia by helping enable a robust and sustainable food system	Robust analytical insight: • Continuously improve index analytics • Develop and communicate relevant insights • Strengthen research evidence base of the Index	1. Refine index data indicators 2. Launch new public-facing platform 3. Develop full year report 4. Develop regular topical briefs 5. Expand RBI board to incorporate wider disciplines and geographies	• Key indicators updated • New website launched in late 2015 • Report published August 2015 • Several White Papers and policy briefs issued • Board increased with three new members
	Solutions-driven engagement: • Catalyse food security discussion within key stakeholder groups • Support better decision-making processes with policy makers	6. Identify more platforms for communication 7. Engage key regional bodies 8. Engage selected government agencies 9. Communicate RBI at relevant conferences and events	• Increased Twitter presence > 100% • Participated in key regional forums in Indonesia, Philippines, Singapore and Australia • Continued dialogue with ASEAN Secretariat and governments in Indonesia, Philippines and India
	Promote more inclusive discourse on solutions for and approaches to food security across Asia	10. Coordinated stakeholder engagement 11. Challenge the status quo through regular updates and discussion papers	• Several media engagements by Board members • Policy papers and briefs published through the year

[1] The RBI is not a measure of a country's level or status of food security, but rather assesses how *robust* a country's capacity is to address the challenges of food security in a sustainable manner.

Executive Summary

With declining food prices, it would appear that in the last 12 months, food security has improved, but the conundrum is that food security robustness – which is the focus of the RBI – has declined across almost every country in Asia. For the first time since its launch in 2012, this year's RBI scores declined – by an average of 1.9% from 2015 to 2016, meaning countries food security systems are less robust and hence less able to withstand shocks than they were at this time last year. The change is in stark contrast to improvements of 2.7% and 3.3% from 2014 to 2015 and 2013 to 2014 respectively, and provides a warning that the region's food security remains at risk and we must collectively continue to address the issue. Among the four rubrics, Policy and Trade saw the largest drop in performance, down by an average of 4.9% across the 15 countries, while Demand and Price saw the largest improvement of 2.5% reflecting generally low commodity prices during the period. Environmental and Farm-Level Factors declined by 2.5% and 3.0% respectively, driven in large part by dryness across the region over the last 12 months.

The trajectory of RBI results also points to a decline in food security robustness over the remainder of forecast period. This will be driven by an expected increase in commodity prices, making food more expensive and increasing the price of key inputs including oil making food production more expensive.

The challenge of food security is therefore no less significant now than it was five years ago when the first RBI report was released. Food security across the region remains at risk because it is complex and in order to address the challenges this represents, a multi-stakeholder holistic value chain approach is required to sustainably tackle it.

The RBI Advisory Board believes collaboration is critical collective responsibility to drive further improvement. Collective responsibility is needed to empower smallholders; drive the efficient operations of the food value chain; improve nutrition security; support the introduction of better technology for smallholders; and improve outcomes for women involved in agriculture. This year's annual RBI report is focused on steps that can be taken to further empower smallholders and develop an understanding of the contribution they make to improving the region's food security robustness.

Empowering means creating access – to technology, to knowledge (extension and R&D), to land title and to markets, but also for smallholders as consumers, ensuring

access to safe and nutritious food. Empowering also means inclusivity – of women, of youth and of rural communities in the development of markets and establishing reasonable social safety nets.

Resilience of smallholders can be enhanced through the creation of partnerships, driven by collaboration mitigating and managing risk, improving information availability and reducing transaction costs. Collaboration should aim to create functioning markets with price transparency, improve information flows and communication, transportation and storage, as well as provide access to finance, knowledge transfer and extension while improving equality. Such collaboration helps smallholders to establish a degree of countervailing power through collective decision making in production, purchasing and marketing as well as establishing a collective voice.

The inter-relationships, brought about through improved collaboration are reflected in the four rubrics of the RBI and in the importance of achieving balance between them as a means of improving overall food security robustness. The Index considers *robustness* to be present when there is a balance between the four rubrics.

One of the most significant developments in the last year has been agreement by the 193 member states of the United Nations (UN) to adopt the Sustainable Development Goals (SDGs). In a global environment plagued by numerous development and security issues, the significant expansion of the SDGs from the narrower Millennium Development Goals reflects the breadth of challenges facing the global community. The breadth and interdependent nature of the SDGs mirror the complexity of food security, given they seek to address the multiple, cross-cutting issues brought on by rapid urbanisation, climate change, water and food scarcity, environmental degradation, pandemics affecting different societies, income inequality and social injustice.

As with the SDGs, the RBI Board believes food security must be viewed through a number of lenses – political, social, economic, physical, infrastructural, financial and the ecosystem. These lenses are captured in the four rubrics and 33 indicators of the RBI. They reflect the production, movement, sale, consumption and sustainability of food as part of an integrated and complex system and underscore that food security cannot be considered in isolation from the broader political, socio-economic and

physical environments. The changes seen this year in food security robustness are a direct consequence of this complex environment.

Looking forward, despite short term down trends over the forecast period, the food security landscape for Asia remains positive. The results of the RBI do however show that food security cannot be taken for granted. In the past year, a significant number of Asia's people have been lifted out of absolute poverty, although the number of malnourished people in Asia remains stubbornly high and must be a focus of policy makers moving forward. We can expect that an increased focus on food safety, food waste and food quality will drive demands from consumers for improvements in food value chain infrastructure like transport to markets, post-harvest storage and services, cold storage and improved processing, with a stronger commitment to also improving environmental outcomes.

The RBI Advisory Board strongly believes that food (and nutrition) security is a collective responsibility that requires a holistic systems approach. This report makes the case for greater collaboration to empower smallholders and over the next year the Board will look to consider other drivers of food security robustness including improving nutrition security, value chain integration and the adoption of new technology. Exploring these issues is entirely consistent with the vision of the RBI to improve lives in Asia by helping enable a robust and sustainable food system and with the purpose of the RBI set out in the first report some five years ago: *'translating complexity into an opportunity for action'*.

01

2016 Review and Outlook

2016 marks the fifth year of the RBI. Launched in 2012, the RBI is designed to facilitate dialogue, collaboration and action between governments, the private sector and other key stakeholders involved in food security. It is not a measure of a country's level or status of food security, but rather assesses how robust a country's capacity is to address the challenges of food security in a sustainable manner.

The challenge of food security is no less significant now than it was five years ago with a clear recognition that a multi-stakeholder approach is required in sustainably tackling the challenge. Governments still talk about it, the media still reports on it and NGOs, the private sector and farmers themselves continue to work, increasingly together to find solutions to the challenge. It therefore prompts the question – one which the RBI Advisory Board deliberated on at its recent annual meeting:

Are we making progress on food security and what have we learned in the last five years?

Food security remains at risk because it is complex. Recalling the 2012 RBI Report which adopted the Food and Agriculture Organization's (FAO) definition of food security…

'Food security [is] a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life'

… as the basis for the makeup of the RBI's four rubrics, it is the combination and interaction between Farm-Level Factors, Demand and Price, Policy and Trade and Environmental Factors that allows policy makers to focus on 'different levers' to help improve a country's food security robustness.

But to do this sustainably over time, there needs to be far greater collaboration through the food value chain. No one entity, organization or government has full responsibility or complete capability to address the food security challenge, yet collectively the right outcomes can be achieved.

A snapshot from the last five years of the RBI underscores the complexity of the food security challenge, while showing considerable progress in performance and making the point that no one solution nor approach provides the answer. It is a complex, multi-dimensional issue which requires a similar response.

The initial 2012 White Paper examining the results of the Index concluded the Policy and Trade environment within a country has a longer-term impact on the overall robustness of a country's food security system, and that a more stable and predictable policy environment, supported by free and open markets improves the overall robustness.

In 2013, it was noted that the Policy and Trade environment across Asia had become more conducive to food security robustness during the preceding 12 months. Policy and Trade dimensions was a major cause of volatility during the year, contrasting its generally benign effect over the past decade. The concept of 'Food Security Robustness' was further contextualised exploring the concepts of 'Food Self-Sufficiency', and 'Food Self-Reliance'.

In 2014, the RBI Advisory Board and annual report assessed the importance of economic and regional integration and the role that intra-regional trade plays in enabling countries to ensure food security for their populations. Regional food security continued along a positive upward trajectory but with recognition that the level of political influence surrounding food security is likely to increase.

In 2015, the RBI Advisory Board introduced an enhancement to the Index – a threshold analysis to support a more active comparison by rubric across countries and to allow policy makers to explore situations where a country may appear to be robust in composite but fall below the threshold in an individual rubric. While individual countries scores continued to improve in 2015, the threshold analysis confirmed that there are significant interdependencies in considering what contributes to a country's overall food security robustness. No individual Index result can be viewed in isolation of other rubrics within a country or results across countries.

For the first time since its launch in 2012, this year's RBI scores declined – by an average of 1.9% from 2015 to 2016, meaning countries' food security systems are less robust and hence less able to withstand shocks than they were at this time last year. The change is in stark contrast to improvements of 2.7% and 3.3% from 2014 to 2015 and 2013 to 2014 respectively. This provides a warning that the region's food security remains at risk and we must collectively continue to address the issue.

The decline in the region's overall food security robustness over the last 12 months points to the opportunity for continued improvement. The RBI Advisory Board concluded that collaboration is critical to drive further improvement and that this collaboration is a ***collective responsibility*** that is urgently required to:

- further empower smallholders;
- drive the efficient operation of the food value chain;
- achieve nutrition security;
- support the introduction of better technology for smallholders; and
- improve outcomes for women involved in agriculture.

Accordingly the RBI Advisory Board has determined that these core issues form the foundation of its strategic platform and as such, plan to address each of these over the coming 12–18 months with an aim to making a useful contribution to the food security debate.

The focus of this report is on ***empowering smallholders*** and developing an understanding of the contribution smallholders make to improving the region's food security robustness. According to the FAO, there are approximately 570 million farms in the world[2], the overwhelming majority (90%) of which are family farms and they are predominantly (>80%) small (>2 hectares). If each of these farms supports five people then it follows that smallholder farmers are directly responsible for the wellbeing and food security of at least 2.5 billion people.

In other words…

'Global and national food security and nutrition are closely tied to small family farms through a two-way relationship: small family farmers are likely to expe¬rience the three challenges of poverty, food insecurity, and undernutrition, yet they also play a crucial role in improving food security and nutrition. The three challenges are inextricably linked and remain primarily a rural phenomenon: approximately three-quarters of the world's poor live in rural areas, and half of the world's hungry are estimated to live on small farms.

Agriculture remains the main source of income and employment for 2.5 billion people in low income countries: 60% of these people are members of smallholder households. At the same time, food production systems in many parts of the world are heavily dependent on small family farms. This is particularly true in Asia and Africa South of the Sahara, where small farms (which are mostly family operated) provide an estimated 80% of the regional food supply. Thus, the food security and nutrition of many small family farms depends (at least partly) on their involvement in the agricultural sector, either through the consumption of food from their own production or from income earned as a result of agricultural activities… (and consequently) (t)he role of small family farms in advancing national and global food security and nutrition, as well as overall development, is increasingly seen in a broader context[3]'.

International Food Policy Research Institute's (IFPRI) 2016 Global Food Policy Report[4] also highlights the crucial role smallholders must play in the achievement of the UN's Sustainable Development Goals (SDGs), and how this is affected by smallholders' limited access to assets and services and a policy environment not fully aligned to their needs. This is shown in the graphic on page 16.

[2] The business imperative: Helping small family farmers to move up or move out. (2015). Retrieved from http://www.ifpri.org/publication/business-imperative-helping-small-family-farmers-move-or-move-out.

[3] 2014–2015 Global Food Policy Report. (2015). Retrieved from http://www.ifpri.org/publication/2014-2015-global-food-policy-report.

[4] 2016 Global Food Policy Report. (2016). Retrieved from http://www.ifpri.org/publication/2016-global-food-policy-report.

Support for Smallholders	Gains	SGDs
Invest in agricultural research and development Support efficient and inclusive food value chains Scale up productive social safety nets	Increased productivity Higher agricultural growth	**1 No Poverty**
	Increased availability, affordability, acceptability and quality of nutritious foods Improved food security and nutrition	**2 Zero Hunger**
Increase equality in access to and control of land Increase women's access to inputs, finance and insurance	Empowered women in agriculture Increased participation in rural labour markets	**5 Gender Equality**
Support efficient water management systems Invest in modern irrigation technologies	Efficient water use in agriculture Improved irrigation for water savings	**6 Clean Water and Sanitation**
Promote climate smart agriculture Improve access to climate finance	Climate change mitigation and adaption Climate readiness and efficiency of farmland	**13 Climate Action**

Source: Nwanze and Fan[5]

To improve food security, we must empower smallholders through collaboration to be more productive, more profitable and more sustainable, which is the focus of this report.

For the region to achieve a robust food security position, the contributing smallholders must also increase their robustness. In subsequent papers over the coming 12–18 months, we will explore the importance of collaborating to improve nutrition and the efficiency of food value chains, to support the adoption of technology and to improve outcomes for women in agriculture.

[5] Kanayo F. Nwanze and Shenggen Fan. (2016). 2016 Global Food Policy Report. Retrieved from http://www.ifpri.org/publication/2016-global-food-policy-report, adapted from Farming First, "The Story of Agriculture and the Sustainable Development Goals" (2015). Retrieved from http://www.farmingfirst.org/sdg-toolkit.

02

The 2016 Food Security Landscape

The 2015–2016 period has reinforced the complex nature of food security – which is a consequence of the environment in which it needs to be achieved, having geographic, political, socio-economic and agronomic dimensions. On the face of it, with declining food prices, it would seem in the last 12 months that food security has improved, but the conundrum is that food security robustness – which is the focus of the RBI – has actually declined across almost every country in Asia.

The complexity of issues may be schematically represented in the figure below, as a set of inter-linked problems – both intra country and inter-country. In 2015, this complex operating environment was overlaid with the establishment of the UN's Sustainable Development Goals and the Agreement reached at the UN Climate Change Conference (known as COP21). There was also progress on the establishment of the ASEAN Community and its Vision 2025.

SUSTAINABLE DEVELOPMENT GOALS

REGIONAL AGREEMENTS

COP21 CLIMATE CHANGE

After two years of global consultations, the 193 member states of the United Nations adopted the Sustainable Development Goals (SDGs) on 25 September 2015. In a global environment plagued by numerous development and security issues, the significant expansion of the SDGs from the narrower Millennium Development Goals reflects the breadth of challenges

facing the global community. The breadth and interdependent nature of the SDGs mirror the complexity of food security, given they seek to address the multiple, cross-cutting issues brought on by rapid urbanisation, climate change, water and food scarcity, environmental degradation, pandemics affecting different societies, income inequality and social injustice.

Source: http://practicalaction.org/blog/wp-content/uploads/2015/09/SDGs.jpg. See also Appendix 4.

Of the 17 SDGs (see Appendix 4), 16 are directly related to the goals implied in the 1996 FAO Summit statement on Food Security. That agriculture and aquaculture depend on favourable outcomes to be achieved through the successful adoption and implementation of the SDGs is to be expected: this is a near-term expectation. The longer term expectation is that action taken today to implement the COP21 agreements will not exacerbate the worsening trends of global climate change.

Nowhere is the interaction of the SDGs and COP21 more evident in terms of potential impact than in Asia given the large and rapidly growing population with an ever increasing diverse diet on one hand and the limited amount of arable land, water and other resource constraints on the other – Asia has around 60% of the world's population but only 34% of its arable land, while fewer than 10 countries globally possess more than 60% of the world's fresh water resources[6]. With about 87% of the world's small farmers in Asia, the SDG goals (1 and 10) related to rural poverty and equity are particularly relevant here.

As with the SDGs, we must also view food security through a number of lenses – political, social, economic, physical, infrastructural, financial and ecosystem and these lenses are captured in the four rubrics and 33 indicators of the RBI. They reflect the production, movement, sale, consumption and sustainability of food as part of an integrated and complex system. In other words, food security cannot be considered in isolation from the broader political, socio-economic and physical environments with the changes in the robustness – perhaps a consequence of this complex environment.

[6] Water facts and trends. World Business Council for Sustainable Development. (n.d.). Retrieved from http://www.unwater.org/downloads/Water_facts_and_trends.pdf.

Apart from the SDGs and COP21 the emergence of the ASEAN 'common market' in 2015 was a significant development, espousing better movement of goods, services and investments within ASEAN and between ASEAN and its Plus 6 partners (China, Japan, Korea, India, Australia, New Zealand). The ASEAN group of countries is a major supplier both staple commodities like rice and palm oil, through to more specialist products like spices and high value vegetables. Establishing a larger integrated market and supporting this with infrastructure investment and better logistics is likely to support improvements in food trade and food security in the short term. This year's RBI results which have shown a dip in robustness attributable to downward changes in Policy and Trade, underscore the importance of efforts by the 10 ASEAN countries to improve trade capability which will immediately improve the region's food security landscape.

We have seen over the last five years of RBI analysis that in Asia in particular, the policy environment has a major bearing on food security robustness and within this the degree to which a country sees itself as being able to meet its food needs, particularly for staple products like rice. We have previously highlighted the difference between 'self-sufficiency' and 'self-reliance' with most Asian countries opting for the latter, in which food needs are met by a combination of domestic production and imports. Countries like China, South Korea and Malaysia now have disavowed 100% self-sufficiency targets, recognising the importance of trade and specialisation and adjusting production targets to more modest levels. In contrast, despite the obvious challenges and risks of doing so (and the unlikelihood of it being achieved), some countries like Indonesia and the Philippines retain policies that target 100% self-sufficiency in key staples including rice.

The food security landscape across the 15 countries included in the RBI is further influenced by production in important exporting countries like India, Vietnam and Thailand. Over the last 12 months these countries have faced challenges with a lingering El Niño and delayed monsoon with resultant impacts on regional rice stocks and now the risk of a stronger La Niña creating more uncertainty. Interestingly, we are also seeing the impacts of shifting consumption patterns. In South Korea, for example, the per capita consumption of wheat-based products is now more than half of the cereals consumed. South Korea's national rice consumption in 2015 was only about half that of the 1970's, and in the past year, the country has had to deal with a substantial surplus production. Whether this phenomenon in the 2015–2016 food security landscape will become more widespread among Asian higher-income economies requires close observation as it will inevitably affect rice supply-demand dynamics.

Looking forward, despite short term down trends, the food security landscape for Asia remains positive. In the past year, a significant number of Asia's people have been lifted out of absolute poverty and in ASEAN for example, it is expected that the current middle class population of around 190 million people will more than double by 2020. Such a rapid increase of consumers will drive demand for more animal protein and luxury food products.

On the flip side, the percentage of malnourished people in Asia remains stubbornly at around 10%, even though sub-regions and individual countries have shown visible

progress in reducing poverty-induced malnutrition. With commodity (food prices) being low, the persistence of malnutrition and food insecurity in spite of this suggests ongoing challenges with social equity and wealth distribution, with those at the 'bottom of the pyramid' still not able to afford adequate amounts of food or nutrition each day.

Food security discussions commonly centre on food availability and much less on food loss, food waste or food quality. But the past year has seen increased attention being paid to food waste in particular. The Global Initiative on Food Loss and Waste Reduction led by FAO has seen several related initiatives launched in Asia, including one involving the private sector in 2015 to improve measurement of food waste (Business Council for Sustainable Development). Additionally, food safety has received increased attention through initiatives such as the Sustainable Rice Platform and the adoption of consistent standards like Global GAP. Viewed together we can expect that an increased focus on food safety, food waste and food quality will drive demands from consumers for improvements in food value chain infrastructure like transport to markets, post-harvest storage and services, cold storage and improved processing, with a stronger commitment to also improving environmental outcomes.

Across Asia a quiet revolution is also taking place in smallholder agriculture with the adoption of not just traditional farm technology – mechanisation, better varieties and chemistry, but with the near universal access to smart phones, an Information-Communication Technology (ICT) revolution is taking place which augurs well for food security robustness. Companies like Accenture (SE Asia) and Digital Green (India) have played and will continue to play an important role to spread ICT applications for market information access, on-farm management decision-making, and for accessing integrated downstream services.

Another noteworthy technology contribution in 2015–2016 has been biotechnology, with the commercialisation of Genetically Modified (GM) crops in Vietnam and Bangladesh. In March 2016, China declared its intention to grow GM corn within next five years, an action that has potentially wide implications for protein production given Asia imports more than a third of the world's surplus corn production, most of which is GM. The last year has also seen the conversation move to 'New breeding technologies' using non-GM biotechnology such as CRISPR-CAS9, which have potential to create new crop varieties with higher yield potential and higher tolerance to biotic and climate stresses. This could be the beginning of a game-changing era in which improved crop varieties get from 'lab to field' more quickly and at a lower cost than previous crop varieties produced using GM biotechnology.

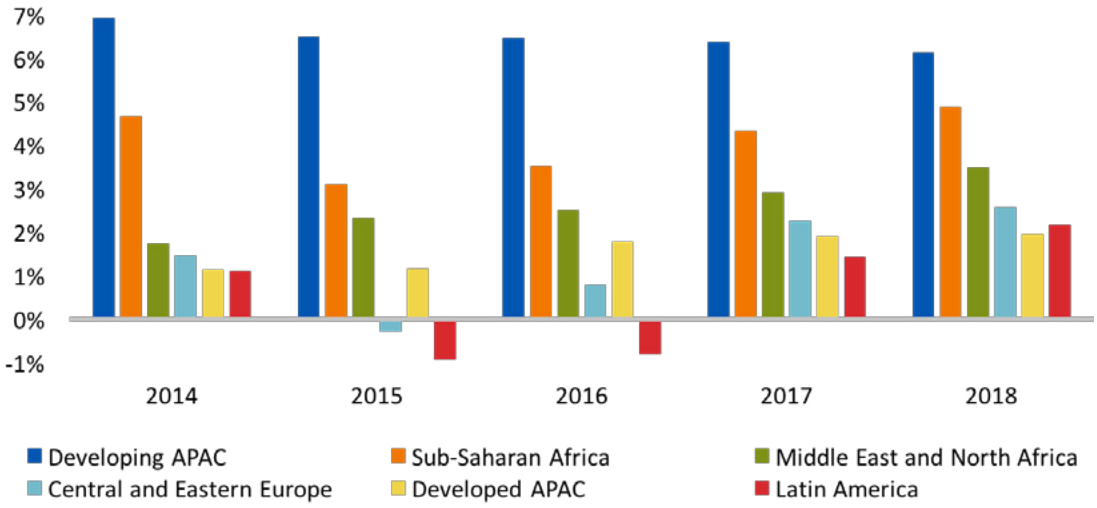
Agriculture continues to be of pivotal importance for Asia. It is a driver of inclusive growth; secures export earnings for the region; is a guarantor of food availability to its citizens; and a source of employment directly and through agriculture-related, value adding activities. Some Asian countries have chosen to focus their development policies on more 'export-oriented' agriculture (e.g. palm oil and rubber) while others have recognised the importance of both export and food security needs. These trends are well covered through the analysis and insights of the RBI.

03

2015–2016 RBI Results

Over the course of the last 12 months, global economic growth has slowed to a modest rate of 2.4%, while food prices continued to fall for the fourth year in a row – the FAO's Food Price Index fell 19% when compared to 2014. In this slowing environment, emerging Asia will continue to expand more rapidly than any other developing region[7], albeit at rates below that of recent years, as shown below.

Emerging Markets' growth by region
Real GDP growth (%YOY)



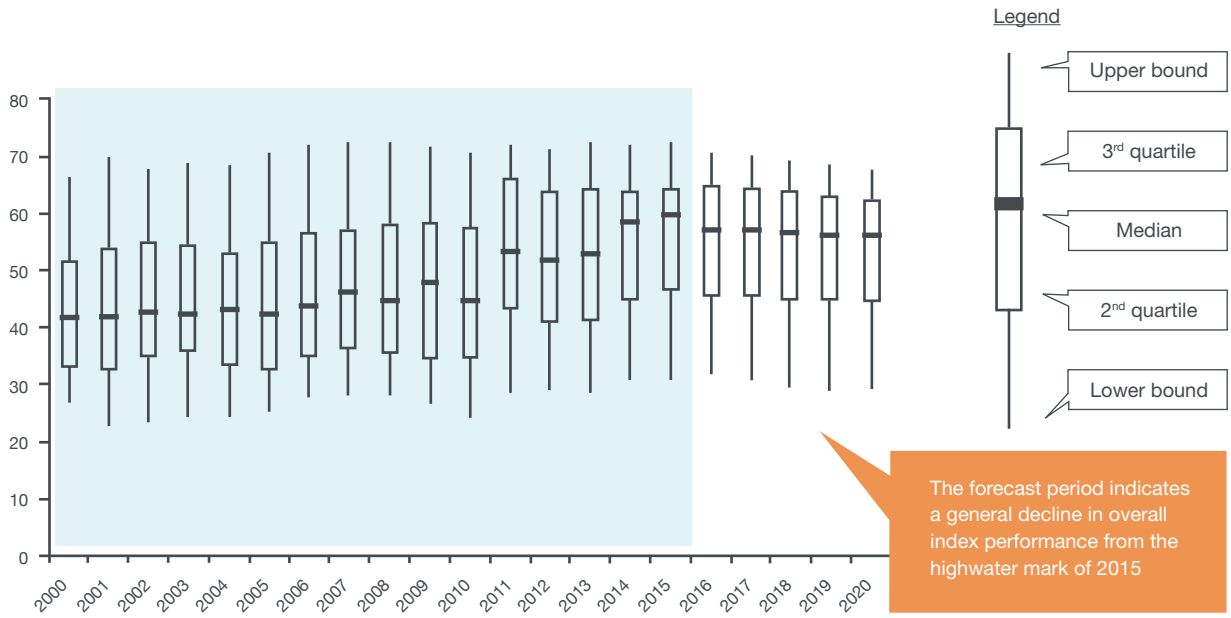
However, such a general picture masks the reality of ongoing food shocks in key markets over the last 12 months including much of ASEAN as a result of a strong El Niño and now the threat of La Niña.

Declining results…

The results of the RBI in 2015–2016 reflect this reality and across the 15 countries considered in the RBI, scores declined by an average of -1.9% over the 2015–2016 period, meaning that countries food security systems are less robust and therefore more susceptible to external shocks and impacts. This is in stark contrast to the improvement observed over the previous two reporting periods where average scores improved by 2.7% and 3.3% in 2014–2015 and 2013–2014 respectively.

[7] Frontier Strategy Group internal analysis.

Annual aggregated RBI scores across all 15 geographies



The trajectory of RBI results shown above points to a decline in food security robustness over the remainder of forecast period. While last year indicated there was improvement albeit moderated when compared to progress over the last decade, this year and looking forward we actually see a decline in robustness across the region. This will be driven by an expected increase in commodity prices, making food more expensive and increases in the price of key inputs including oil making food production more expensive. We do not expect to see marked improvement in the overall food security policy environment during the forecast period.

The results per quartile[8], included in Appendix 1, show a convergence of countries in the top quartile, consistent with the notion that once countries become robust, their performance is fairly constant. Volatility is also lower in third quartile countries (South Korea, Malaysia, Thailand and China) as they track above the aggregated score of 50. Improvements in performance take longer but are more aligned than countries in the second quartile (Vietnam, Indonesia and the Philippines). In the second quartile of countries looking out to the end of the forecast period, while all three countries see a sustained improvement – consistent with increased technology adoption and improvements in both Policy and Trade environments – there remains a significant gap between Vietnam at the top of the second quartile compared to Indonesia and the Philippines. First (or bottom) quartile countries (India, Myanmar, Bangladesh and Pakistan) remain relatively volatile in terms of performance, and like Vietnam in the second quartile, India performs consistently above the other three countries in the group. This is driven by India's consistently stronger performance in the Farm-Level factors rubric.

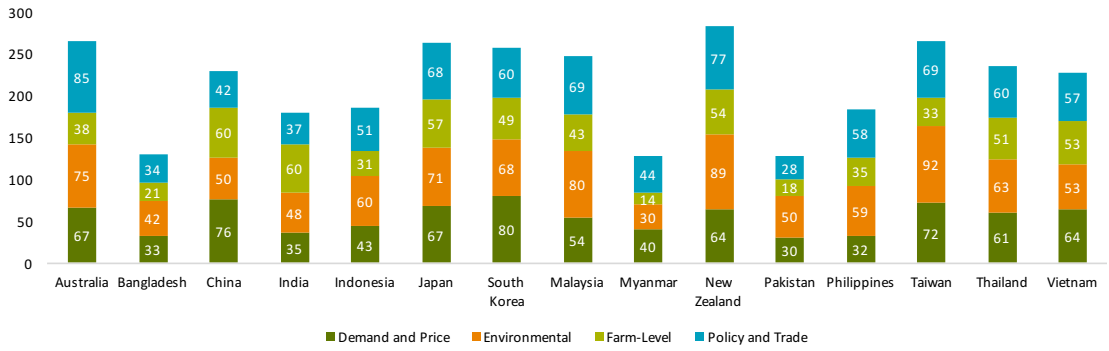
Among the four rubrics, Policy and Trade saw the largest drop in performance, down by an average of .9% across the 15 countries, while Demand and Price saw the largest improvement of 2.5% reflecting generally low commodity prices during the period.

[8] Results are broken down into quartiles with the first quartile being the lowest performing and the fourth (top) being the most robust. It is also important to recall that the Index is relative which means the results are comparative against each other so for example, all countries may improve in a particular area, relatively speaking one country may show a decline against other countries included in the RBI.

% increase or decrease by rubric by country, 2015–2016

	Policy & Trade	Environ. Factors	Farm Levels	Demand & Price
Australia	5.6%	2.7%	-5.5%	1.4%
Bangladesh	-7.3%	-5.7%	-1.9%	4.2%
China	-21.4%	-4.5%	-2.1%	1.9%
India	-22.4%	2.5%	-0.6%	2.2%
Indonesia	0.2%	-15.6%	1.5%	15.8%
Japan	-9.7%	5.7%	-2.7%	3.5%
South Korea	-7.4%	0.9%	-4.4%	2.9%
Malaysia	-4.2%	0.0%	-4.6%	1.1%
Myanmar	14.4%	-10.0%	1.9%	5.3%
New Zealand	-7.3%	2.4%	-5.3%	0.0%
Pakistan	-31.1%	-1.5%	-7.9%	-5.5%
Philippines	8.4%	-2.3%	-2.8%	-0.9%
Taiwan	10.0%	7.5%	-5.6%	1.6%
Thailand	0.5%	-6.4%	-3.4%	0.7%
Vietnam	-1.3%	-13.3%	-1.2%	3.2%

Rice Bowl Index Composite Index Scores 2016



Environmental and Farm-Level Factors declined by -2.5% and -3.0% respectively, driven in large part by dryness across the region over the last 12 months.

Only three countries improved their overall composite scores in the last year: Taiwan has gained on the back of an improved policy environment and environmental outcomes while being partially offset by a fall in Farm-Level factors due to reduced cereal (rice) yields. Japan has improved marginally on the back gains in production in both the Environmental and Farm-Level rubrics as well as falls in inflation driving better Demand and Price outcomes. Thailand's aggregate performance improved on the back of better Policy and Trade scores.

In contrast, many countries saw falls in aggregate performance. Pakistan experienced the largest decline in its RBI score, deteriorating in all four rubrics, with the most pronounced drop occurring in Policy and Trade – a decline of over 30%, driven largely by downgrades in its various ecosystem vitality measurements. In New Zealand and Australia, the Farm-Level rubric dropped sharply, declining by 5 and 10 percentage points respectively, the result of falls in cereal yields and the high cost of labour. South Korea also experienced a fall in its Farm-Level rubric driven by access to water and falls in access to technology (the proxy for which is rural mobile phone subscriptions).

China's Policy and Trade rubric fell by some 13 percentage points while Farm-Level factors fell by 7 percentage points, contributing to a significant fall in the overall composite index. China's ecosystem vitality score (which reflects the efficiency and effectiveness with which a country uses nitrogen) fell by around 20%. In India the lower 2015–2016 result was the result of a weaker Policy and Trade rubric driven by falls in all three ecosystem vitality indicators and the negative impacts of an increase in biodiesel / ethanol (which substitutes food production). These shifts more than offset improvements in India's balance of trade for agricultural products.

Indonesia's Environmental Factors rubric has impacted heavily on overall performance with a 16% decline the result of sharp falls in its forestry Ecosystem Vitality Score. This fall more than offsets the positive improvements in Indonesia's Demand and Price rubric score (up 15%) as a result of a drop in inflation and improvements in the population's access to protein.

Moving quartiles…

The table on page 27 depicts the quartile value for each country through 2017 as of June 2016; it also denotes whether these results or expectations have changed since February 2016.

Results are broken down into quartiles with the first quartile being the lowest performing and the fourth (top) being the most robust.

For example, the Philippines' results currently place it in the second quartile of the entire set of RBI countries in terms of food security robustness for 2016. Back in February, the expectation was that the Philippines would be in the bottom quartile for this year and next; the improved outlook since then is represented by the noted shift of '+1'.

We also see an improvement in the overall performance of Taiwan as it has moved into the top quartile driven by significant improvements in its policy environment and environmental performance – both of which underpin a more robust food security environment that has steadily improved over the last three years moving against the declining trend across the region. Our expectation is that this improvement in performance will be maintained. As we have noted in previous reports, once a country moves into the higher echelons of food security robustness – reaching a tipping point, it tends to stabilise and remain robust.

In contrast we see that India has fallen into the bottom quartile, driven by a worsening Policy and Trade score, the result of a broad based decline in its ecosystem vitality indicators. In general, changes in a country's outlook are the result of one or a combination of three developments:

1. A change in a country's performance in terms of a particular data series – for example, cereal yield or inflation

2. A change in a country's performance for a particular data series relative to others in the region; for example, if China's cereal yield holds steady at around 61k kg/ha/year, while the yield for others countries is increasing overtime

3. A change in availability of data – this becomes more of a factor the further into the forecast period

	2015		2016		2017	
	quartile	shift	quartile	shift	quartile	shift
Australia	●	-	●	-	●	-
Bangladesh	◔	-	◔	-	◔	-
China	◕	-	◕	-	◕	-
India	◑	-	◔	-1	◔	-1
Indonesia	◑	-	◑	-	◑	-
Japan	●	-	●	-	●	-
South Korea	●	-	◕	-1	◕	-1
Malaysia	◕	-	◕	-	◕	-
Myanmar	◔	-	◔	-	◔	-
New Zealand	●	-	●	-	●	-
Pakistan	◔	-	◔	-	◔	-
Philippines	◔	-	◑	+1	◑	+1
Taiwan	◕	-	●	+1	●	+1
Thailand	◕	-	◕	-	◕	-
Vietnam	◑	-1	◑	-	◑	-1

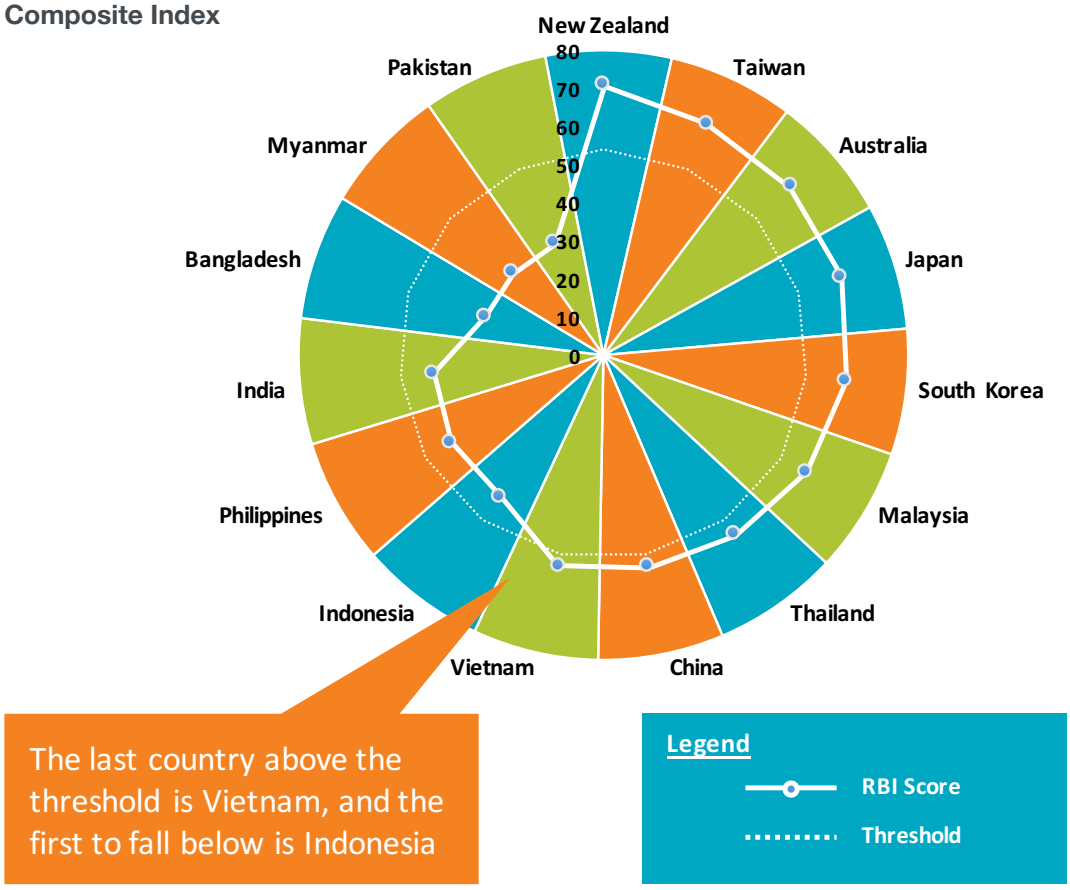
Legend ● Top ◕ Third ◑ Second ◔ Bottom

Crossing thresholds…

In 2015, the RBI introduced the concept of threshold analysis, given the aim is to be able to compare performance across countries and rubrics, without such comparisons being seen simply as a 'beauty contest', with a focus on just the score as opposed to a relative baseline mark. Threshold analysis provides this opportunity for it does not imply one country is doing better or worse than another, but rather provides an aspirational point to aim for in order to become more food security robust. Threshold analysis provides a far more useful and visual comparative tool.

It is however important to remember that the RBI remains relative and compares countries to each other, rather than comparisons in absolute terms. This means that a country's absolute scores may improve but performance may decline relative to the peer group. The Board continues to support this approach as it considers it to support a more relevant and useful comparative analysis. Forecast data does allow the RBI to look forward, but as with all forecast data it should be viewed as such.

Composite Index



In considering thresholds, the aim is to establish for policy makers what sort of thresholds[9] might need to be bridged in order to highlight where they choose to focus their efforts to improve food security robustness either with a focus on specific rubrics or overall within the region. By comparing relative performance across countries it prompts the sensible question, 'what did they do to get there'. Equally, although a country may appear to be robust when considering the composite index, it may fall below what might be considered an optimal threshold in an individual rubric. In establishing thresholds, the RBI has defined the 'desired' threshold as one standard deviation below the average performance of the top quartile.

Reflecting the overall decline in RBI aggregate scores for the year, the threshold value for 2016 declined, by 1.4%. Taiwan has moved to sit above Australia, Japan and South Korea, being one of only three countries to improve its aggregate position in the last 12 months (along with Thailand and Japan – the latter improving but by a relatively smaller amount). Thailand's improvement sees it move to sit above China, while Vietnam remains the last country to sit above the threshold considered the tipping point for food security robustness. For the countries sitting above the threshold performance is generally stable and there is less volatility between countries – implying that once a country crosses the threshold its performance can in general expect to be more stable and sustained[10].

For those countries above the threshold, the differential of the top six countries is nine points while the differential between the bottom seven countries is 25 points reflecting greater volatility and the importance of systems based solutions. The aim should be to achieve balance between the rubrics to avoid being overly dependent on one element to ensure robustness. With balance between rubrics shocks can be more effectively managed. In contrast, there is a sharp shift to the countries that fall below the threshold and hence may be considered at risk: Indonesia, Philippines, India, Bangladesh, Myanmar and Pakistan. These countries also lay below the threshold of food security robustness in 2015.

See Appendix 3 for more detailed threshold analysis by rubric.

[9] Threshold is defined as one standard deviation of all country scores below the average performance of the top quartile. By defining the threshold as relative to the top performers we highlight the aspirational nature of efforts to overcome food insecurity. Although a country may appear food secure in the Composite Index, it may fall below the threshold in an individual rubric.

[10] The Board has noted in earlier reports that an aggregate RBI Score of above 50 suggests a country's food security system is robust and able to withstand shocks and volatility. Aggregate score is the weighted score across the four rubrics out of 100 and is contrast to the Composite score which is the total of all four rubrics with each rubric being scored out of 100.

04

Collective Responsibility: Empowering Smallholders

It has been estimated by the FAO[11] that smallholder farms (farms of two hectares or less) produce an estimated 80% of the food produced in Asia and Africa. As smallholders are not only producers of food, but consumers of food, if a country can address its needs through a systematic approach which drives efficiency and removes blockages right through the food value chain, a general uplift in the wellbeing of literally billions of people – particularly those most susceptible to food security shocks, can be achieved.

A recent study by the University of Adelaide[12] noted that,

'in many economies, market forces have resulted in the development of food value chains with an increasing number of food producers now directly connected with modern retail outlets such as supermarkets, hypermarkets and food processors… There has also been a shift from public to private standards… and a shift from local sourcing to sourcing via national, regional and global networks[13]. Their origins lie in the changing demands of consumers, the growth of new forms of modern food retailing and processing and the emergence of specialist providers of services relevant to these chains. They can provide safe and secure delivery of food consistent with trade patterns according to comparative advantage…

… The dilemma is that previous research has shown that these new business models often exclude smallholders. Various factors limiting smallholders market access and include high transaction costs of dealing with a large number of heterogeneous sellers, smallholders inabilities to meet new market requirements as a result of lacking the necessary skills, technology, financing, and/or inadequate infrastructure due to chronic underinvestment[14]'.

Smallholders are most often excluded from the food value chain due to one or more factors including:

- Absent or inadequate land rights;
- Inadequate or poorly functioning infrastructure;
- The absence of functioning markets;
- The high transaction costs of participating in the market;
- A lack of access to information; or
- The existence of moral hazard[15].

[11] 2016 Global Food Policy Report. (2016). Retrieved from http://www.ifpri.org/publication/2016-global-food-policy-report.

[12] Global Food Studies: Developing Smallholder Inclusive Food Value Chain Models for Local and Global Markets: Initial Literature Review and Project Design. (2015, November 16). Retrieved from https://www.adelaide.edu.au/global-food/research/smallholder-inclusive/EDF_APEC_project_Initial_literature_review_v1.pdf.

[13] Reardon, T., Barrett, C.B., Berdegué, J.A. and Swinnen, J.F.M. (2009). Agrifood Industry Transformation and Small Farmers in Developing Countries, World Development 37, 1717–1727.

[14] Op. cit.

[15] Moral Hazard is the situation in which one person makes the decision about how much risk to take, while someone else bears the cost if things go badly, from Krugman, Paul (2009). The Return of Depression Economics and the Crisis of 2008.

There is inevitable tension in the food production system for smallholders because (among other things) those producing much of the food are consumers of food and are also the most vulnerable to any system shock.

IFPRI notes that, *'(M)any smallholders earn low incomes and lack access to adequate education, land, credit and financial services, technical assistance, and markets'*, while it has been suggested the (smallholder) business model involves four key parameters: ownership, voice, risk and reward (and) these four criteria are interrelated[16]. To address the situation a systems-based approach is needed and this should be the collective responsibility of participants' throughout the value chain and in the operating environment.

The aim of collaboration must be to improve smallholder resilience and to create functioning markets with price transparency, information flow and communication, transportation and storage, finance, knowledge transfer and extension and equality. Resilience – or considered another way, empowerment – of smallholders can be enhanced through creation of partnerships, driven by collaboration mitigating and managing risk, improving information availability and reducing transaction costs. Such collaboration helps smallholders to establish a degree of countervailing power through collective decision making in production, purchasing and marketing as well as establishing a collective voice.

The inter-relationships, brought about through improved collaboration are reflected in the four rubrics of the RBI and in the importance of achieving balance between them as a means of improving overall food security robustness. The Index considers robustness to be present when there is a balance between the four rubrics[17]. Each rubric in turn consists of a number of indicators (metrics) that address the four dimensions of food security[18]:

Key enabling and disabling factors of food security

Environmental Factors
- Water stress
- Drought / Floods
- Soil / land degradation
- Loss of biodiversity, gene pool
- Climate variability, temperature rise, erratic weather patterns

Policy and Trade
- Political stability and confilict
- Protectionism and subsidies
- International trade policies
- Infrastructure including storage and transport
- Investment and innovation policies

Demand and Price
- Growing population
- Consumer income and dietary shifts
- Food reserve shortages
- Demand for biofuel
- Speculation and price volaility

Farm-level Factors
- Access to technology and innovation
- Farmer education / extension services
- Role of woman on farm
- Access to market / price / information
- Levels of investment

[16] Cotula, L. and Leonard, R. (2010). Alternatives to land acquisitions: Agricultural investment and collaborative business models, IIED/SDC/IFAD/CT, 2015. Retrieved from http://www.ifad.org/pub/land/alternatives.pdf.

[17] Rice Bowl Index Methodology. (n.d.). Retrieved from http://www.ricebowlindex.com/Pages/Methodology.aspx.

[18] These were originally outlined in the first RBI white paper published in May 2012.

What does empowering actually mean?

Empowering means creating access for smallholders… to technology, to knowledge (extension and R&D), to land title and to markets, but also as consumers, access to safe and nutritious food. Empowering also means inclusivity – of women, of youth and of rural communities in the development of markets, establishing reasonable social safety nets and the creation of adequate land rights.

According to the 2016 Global Food Policy Report, *'We need to make sure that opportunities and economic growth reach poor and marginalised people, such as smallholders, women, and youth, who have important roles to play in ending hunger and malnutrition. These groups often face constrained access to assets and markets and are at risk of exclusion from increasingly complex food value chains. Maximising the potential of commercially viable smallholder farms and empowering women and youth (is) critical for food security and nutrition… Removing these inequalities and closing the gender gap in agricultural yields could increase developing countries' agricultural output by between 2.5 and 4.0% and in turn reduce the number of undernourished people by 12–17% (100–150 million people)[19]'*.

Farming is not performed in isolation. The welfare of farmers and their food security impacts on the wellbeing of the rural communities in which they live and work along with the environment in which they farm. It is essential smallholder farmers are able produce more food of better quality in an environmentally sustainable manner and to achieve this, knowledge is required to utilise technology for impact, for the adoption of good agronomic practices and for the development of new market opportunities. If farmers can operate with price transparency and have access to information through more effective digital and mobile communication, their bargaining power is increased and transaction costs are lowered, improving profitability.

Smallholders are empowered when they are provided with access to technology, knowledge and markets as well as when policies are developed that support smallholders to break the cycle of dependence on aid and subsidies. Farmers must be capable of changing in and out of crops, of farming different plots and investing in their education and should access finance and risk management services, as well as effectively utilising crop and agronomic information (through mobile and digital platforms) and being able to spread risk.

Increasing collaboration between smallholders and through the value chain can also help manage issues of food quality, food safety and the environmental impacts of food production: – the system is not consistent in its application or performance and yet 'creating a world food system that operates for the well-being of people, as well as the planet on which we all depend is a major challenge[20]'. To consistently procure safe, affordable and high quality supplies of food that also meets reasonable environmental and social standards requires a whole of value chain approach and quite simply no one company government or organisation can operate right through the chain, meaning collaboration is in fact a necessary condition for success. Working through the value chain with collaborations and partnerships recognises that different players have different contributions to make, all of which are important.

[19] Food policy in 2015–2016: Reshaping the global food system for sustainable development. (2016). Retrieved from http://www.ifpri.org/publication/food-policy-2015-2016-reshaping-global-food-system-sustainable-development.
[20] Food policy in 2015–2016: Reshaping the global food system for sustainable development. (2016). Retrieved from http://www.ifpri.org/publication/food-policy-2015-2016-reshaping-global-food-system-sustainable-development.

The figure below sets out three simple actions that can be taken now, to empower smallholders:

Integrate into the supply chain	• Smallholders' interests and perspectives need to be taken into account at all stages of the supply chain • Empower smallholders to cater to demands of the changing market
Reduce risk	• Make access to knowledge, markets, finance and insurance widely available to help smallholders be less risk averse and in doing so adobt viable and profitable cropping patterns
Adopt technology	• A focus on mobile and digital technology for cropping knowledge, weather information and market prices will improve empowerment, efficiency and sustainability of smallholder farming

Creating partnerships is essential…

Collaborating to establish partnerships help spread risk and create viability as well as supporting entrepreneurialism and market based solutions for small farmers. Collaboration and partnership between public, private and NGO sectors can:

- Occur with the private sector to deliver investment, infrastructure (processing, storage and handling) and innovation in technology and market development
- Be driven by public sector to develop infrastructure (roads, transport, communications) and extension (knowledge and skills transfer) as well as creating adequate market governance
- Be with the NGO sector to develop counter-veiling market power and drive more inclusive policy development and innovation

An example of collaboration and partnership is Syngenta's Project Nirmiti in the eastern states of India (see the breakout box on page 36). Project Nirmiti recognises one of the fundamental tenants of partnership and collaboration – establishing smallholders as viable small businesses. The project's business model deploys enterprising smallholders to become 'Krishi Tantra Sevaks' (KTS) or Farm Technology Service Providers. These entrepreneurs, identified by local NGOs and village leaders (collaborating with Syngenta) and are then trained and supported to work with farmers in three to four neighbouring villages, providing agricultural knowhow, inputs and other allied technologies (from suppliers who collaborate with Syngenta to support affordable access). Nirmiti's business has doubled every year since its inception and now reaches more than 60,000 smallholder farmers.

Collaboration can lead to smallholder empowerment because it helps create shared goals which can improve the impact smallholders may have as participants in the food value chain. Importantly collaboration also establishes trust between value chain participants and leads to better information sharing and learning. These principles have underpinned the establishment of Grow Asia, a multi-stakeholder platform under the auspices of the World Economic forum's New Vision for Agriculture (see the breakout box on page 37).

Grow Asia brings together South East Asia's smallholders, governments, companies, NGOs, and other stakeholders, collaborating to develop inclusive and sustainable value chains that benefit farmers. It launches and supports locally-driven Country Partnerships, helping them define their strategy and focus, bring on-board new partners, and develop innovative solutions. Grow Asia enables stakeholders from different disciplines to leverage one another's expertise, share insights and learn from regional experiences. According to Ian Hope-Johnstone, sustainable Agriculture Senior Director at PepsiCo:

'Our collaborations have provided education and training to farmers, exposing them to best practices as well as methods that reduce the environmental footprint of farming. This has borne results as recent crop yields have notably increased. We have also been able to give farmers access to greater resources like high-quality seeds by trialing and registering new and better varieties of crops through support from local governments. More importantly, these efforts have helped link the smallholder farmers directly to formal markets, enhancing their incomes and contributing to local community development[21]'.

[21] Prakash-Mani, K. (2016, May 31). Q&A: How are partnerships changing Asia's food systems? Retrieved from https://www.weforum.org/agenda/2016/05/q-and-a-how-are-partnerships-changing-asia-s-food-systems/.

Collaboration for Mutual Growth: Syngenta's Project Nirmiti

Eastern India has the smallest, least productive landholding in the country. To empower smallholders in this geography with knowledge and technology, Syngenta established Project Nirmiti in 2012 in the state of Odisha. The project's business model deploys enterprising smallholders to become 'Krishi Tantra Sevaks' (KTS) or Farm Technology Service Providers. KTS are trained and supported by the project team to work with farmers in three to four neighbouring villages, providing agricultural knowhow, Syngenta's inputs and other allied technologies. They earn commission on business achieved. Syngenta partners with local NGOs and village level leaders to identify appropriate farmers who can become KTS and a well-known local NGO, Basix Krishi has worked closely with Syngenta for this purpose.

To enable the KTS to access their requirements from one source and have better earning potential, Syngenta has forged partnerships with suppliers of sprayers, farm tools, safety kits, and soil test kits. Syngenta has also partnered with a local third party service provider to set up a Centre of Excellence (CoE) which facilitates training and field activities, stocks and bills Syngenta and partner inputs as well as housing a call centre. The call centre connects with KTS and their smallholders to provide regular updates on product usage and answer queries.

The project is well supported by Syngenta's local commercial teams. The teams identify new geographies for project implementation, participate in training the KTS and solving problems. They also facilitate supply of inputs at an agreed price. Partner companies' support with timely product supply, training and promotional support to the KTS.

Over time, Project Nirmiti has grown beyond Odisha to other states of Eastern India, including Jharkhand and Assam. Replicability and scalability are built into the business model, with each state having a local CoE partner and if required, an NGO partner. Corporate partners join the project at each location depending on the requirement of that region. Since 2012, Project Nirmiti has reached 1,200 villages so far and almost 60,000 farmers and business conducted by the CoE has doubled every year.

Experience shows that if every stakeholder and partner benefits from the model by way of productivity gain, income gain, increase in market share and/or higher brand equity, the stakeholder's interest in staying connected and collaborating within the model grows.

Collaborating for Sustainable Agriculture in South East Asia: Grow Asia

Grow Asia is a multi-stakeholder partnership that aims to reach 10 million smallholder farmers by 2020, helping them access knowledge, technology, finance, and markets to increase their productivity, profitability, and environmental sustainability by 20%.

Grow Asia brings together South East Asia's smallholders, governments, companies, NGOs, and other stakeholders, collaborating to develop inclusive and sustainable value chains that benefit farmers. It launches and supports locally-driven Country Partnerships, helping them define their strategy and focus, bring on-board new partners, and develop innovative solutions. Grow Asia enables stakeholders from different disciplines to leverage one another's expertise, share insights and learn from regional experiences. Today Grow Asia collaborates with 261 partners across five Country Partnerships (Cambodia, Indonesia, Myanmar, Philippines and Vietnam), reaching over half a million smallholder farmers. Partners in-country collaborate through Working Groups that co-design, co-implement, and co-fund value chain initiatives that benefit smallholder farmers.

Scaling Solutions

To enable the success of value chain initiatives on the ground, Grow Asia is collaborating with partners to pilot solutions that have the potential to generate large-scale impact such as: innovative finance and mobile technology use.

Financial Solutions: Grow Asia's Regional Finance Working Group is brainstorming and testing financial solutions that support smallholder farmers. The group is collecting case studies of solutions that address financing needs for smallholders; assessing financial inclusion trends and gaps in ASEAN, and developing solutions for long-term financing to enable smallholders to replant plantation crops.

Digital Solutions: Grow Asia aims to support mobile-based solutions as determined by country partners to help farmers gain access to markets, finance, and information on agronomy, pests, weather, and prices. Grow Asia is working with partners to explore the opportunity to jointly develop a mobile-based digital platform, which would be open-source and pre-competitive.

Sharing Knowledge

Tapping one another's strengths is a key benefit of working in multi-stakeholder partnerships. To facilitate the sharing of knowledge, Grow Asia is enabling partners to access information and interact.

Grow Asia Exchange: The Exchange provides an online repository and learning hub for Grow Asia partners. It is a one-stop shop for information across disciplines, such as case studies, policy papers, value chain analyses, impact assessments, training manuals and toolkits. The Exchange facilitates interaction with experts about the application of their research and fosters peer-to-peer learning among partners from different disciplines and across countries.

Learning Partners' Network: The Network connects Grow Asia partners to researchers, including universities, think tanks, development practitioners and consultants. It facilitates the dissemination of research findings, provides an organised platform where experts are available to provide support, and identifies market-led research needs to grow the existing knowledge base.

For more information visit: www.growasia.org

05

Moving Forward

This year's results show that food security cannot be taken for granted. On fast glance, falling commodity prices and low oil prices would seem to be net positive but such developments cannot be viewed in isolation and as a system in most countries covered by the RBI, we have seen food security robustness decline over the year.

In concluding last year's report the Board noted that there exists a paradox in that the most food secure richer nations are the ones with deficient food production capacity while the food insecure poorer member states have the most abundant agricultural resources but are also the most vulnerable to price shocks, underscoring the point that food trade can be an effective means of achieving food security and that domestic food production to give self-sufficiency does not necessarily equate to food security[22]. Such developments underscore the point for policy makers that achieving food security robustness requires a holistic system approach, including all participants in the food value chain, collaborating closely and empowering smallholder farmers in particular – a message which the Board has sought to clearly make the case for in this year's report.

The Board strongly believes that food (and nutrition) security is a collective responsibility. While this report has made the case for greater collaboration to empower smallholders, there are a number of other elements the Board believes require deeper exploration as part of such an approach:

1. The Board continues to explore issues relating to nutrition security. In last year's report, the Board noted it would consider introducing a fifth rubric relating to nutrition and in the last year a deal of work has been done to consider how this might work. The Board has concluded that while nutrition security is an essential element of food security robustness, the availability of data and how this might be structured consistent with the existing RBI rubrics makes it difficult to create it as a fifth rubric at this point. However, the Board also recognises that nutrition security is so significant and completely intertwined within the food security system that it must not be ignored in any discussion and as such, the Board is committed to further developing its work on nutrition security over the coming 12 months.

2. A key feature of the food value chain is consolidation / integration. Vertical and horizontal integration is occurring to create value and improve efficiency and the implications of this for food security need to be better understood. Consolidation will be a topic the Board considers as the RBI results update over the course of the year.

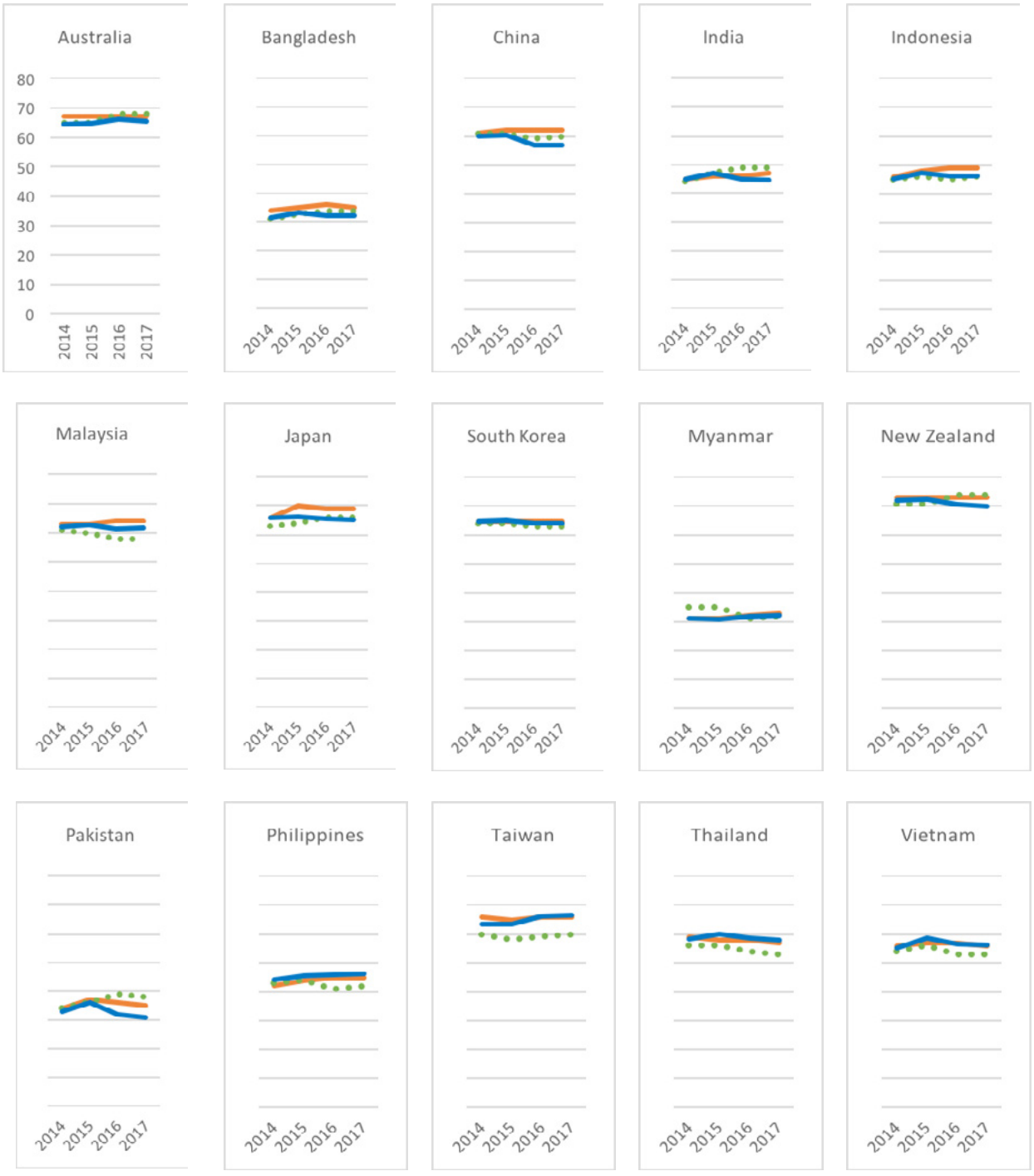
[22] Teng, P., Caballero-Anthony, M., Lassa, J., & Nair, T. (2015). Towards Asia 2025: Policy and technology imperatives. Summary of the main findings of the second international conference on Asian food security held in Singapore on 21–22 August 2014. Food Sec. Food Security, 159–165.

3. Technology and innovation are key drivers of performance, and when considered as part of the 'access triangle' with access to knowledge and access to markets, provide enormous scope for improving the robustness of food security across all of the countries covered by the RBI. The role that technology can play and the constraints on making this happen will be reviewed by the Board in the coming 12 months.

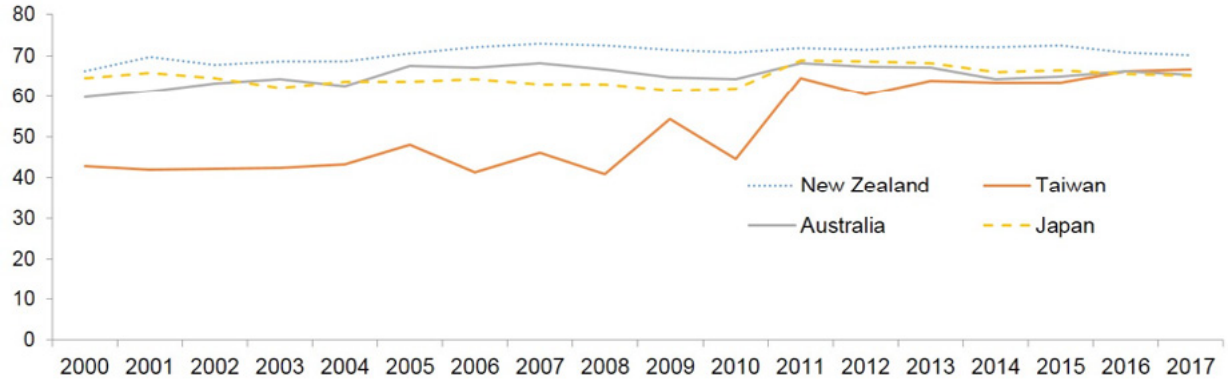
These three elements, combined with this report provide the roadmap for the RBI over the coming year. Exploring these issues is consistent with the vision of the RBI to improve lives in Asia by helping enable a robust and sustainable food system and is aligned with the purpose of the RBI set out in the first report five years ago: *'translating complexity into an opportunity for action'*.

RBI Vision	RBI Strategy	2016–2017 Plan
To improve lives in Asia by helping enable a robust and sustainable food system	Robust analytical insight: • Continuously improve index analytics • Develop and communicate relevant insights • Strengthen research evidence base of the Index	• Continue to refine index data indicators • Improve the interactivity of the public-facing platform • Improve links to global open data • Develop full year report • Develop three white papers on nutrition, consolidation and technology adoption. • Expand RBI board to include stronger smallholder / farmer representation
	Solutions-driven engagement: • Catalyse food security discussion within key stakeholder groups • Support better decision-making processes with policy makers	• Identify new platforms for communication • Engage key regional bodies – eg ASEAN, APEC • Engage selected government agencies across at least one third of the countries covered by the RBI • Significantly increase communication of RBI at relevant conferences and events
	Promote more inclusive discourse on solutions for and approaches to food security across Asia	• Improve media engagement and profile of the RBI to widen the audience for better debate, engagement and understanding • Drive deeper engagement with policy makers and influencers in, using the RBI as a catalyst for a more robust conversation • Engage with leading academic institutions to utilise RBI in academic / policy discourse • Challenge the status quo through regular commentary and public engagements

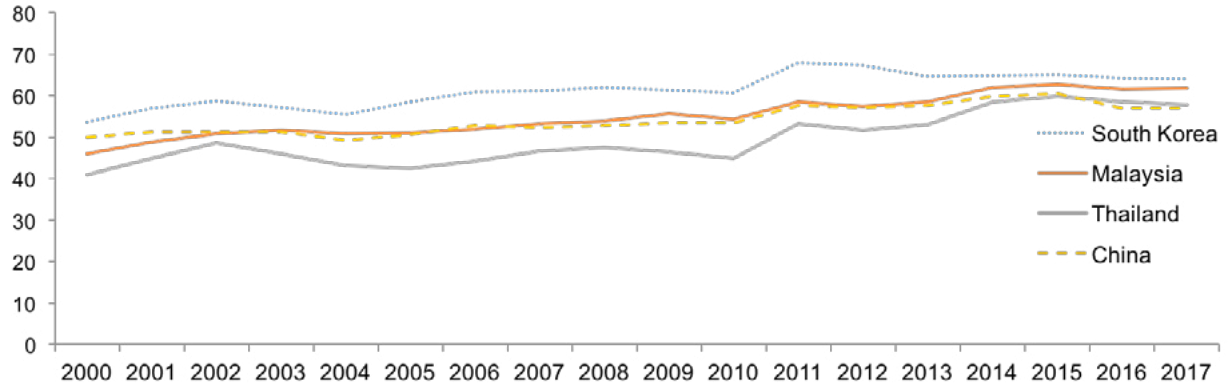
Appendix 1 – RBI Scores by Country and Quartile



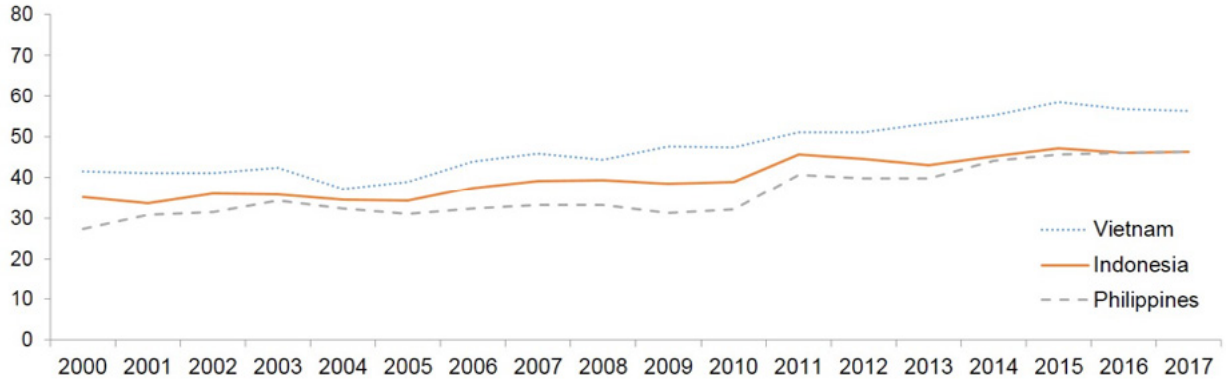
RBI Results by Quartile 2016 – Fourth (top) quartile



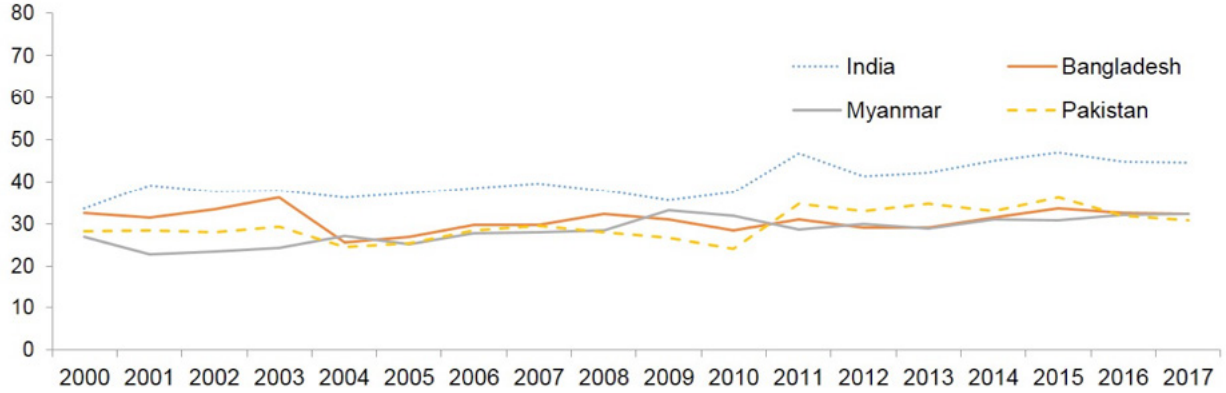
RBI Results by Quartile 2016 – Third quartile



RBI Results by Quartile 2016 – Second quartile

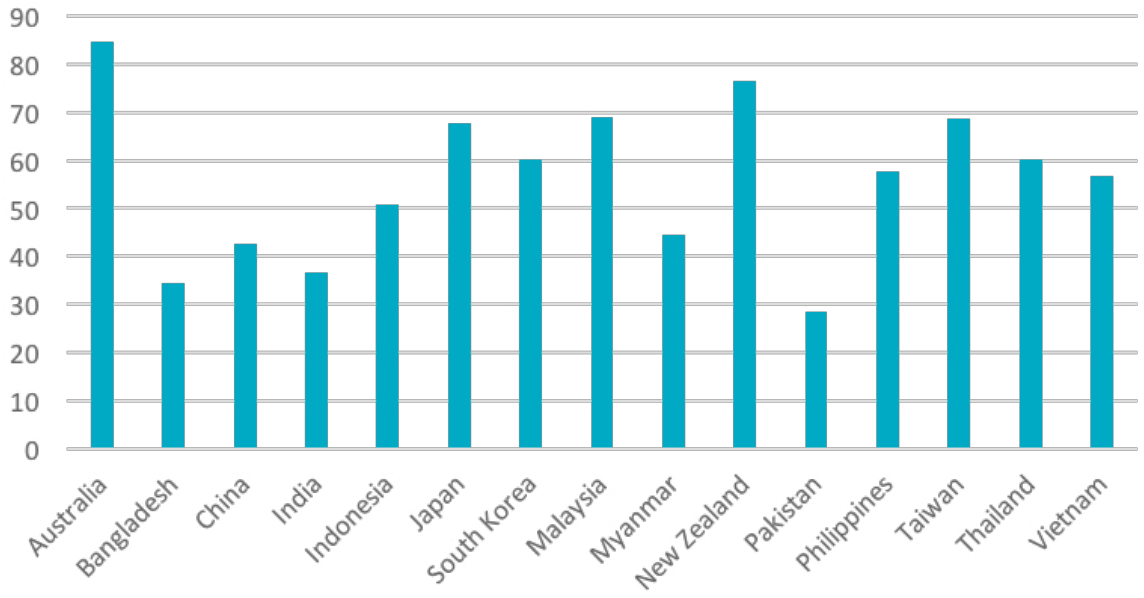


RBI Results by Quartile 2016 – First (bottom) quartile

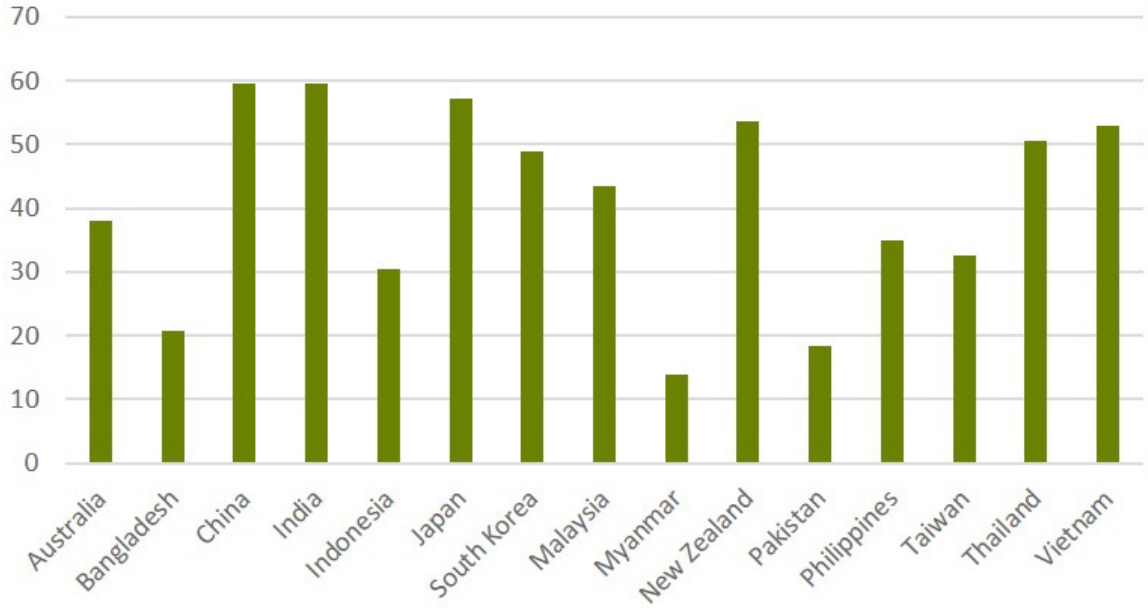


Appendix 2 – Rubrics by Country

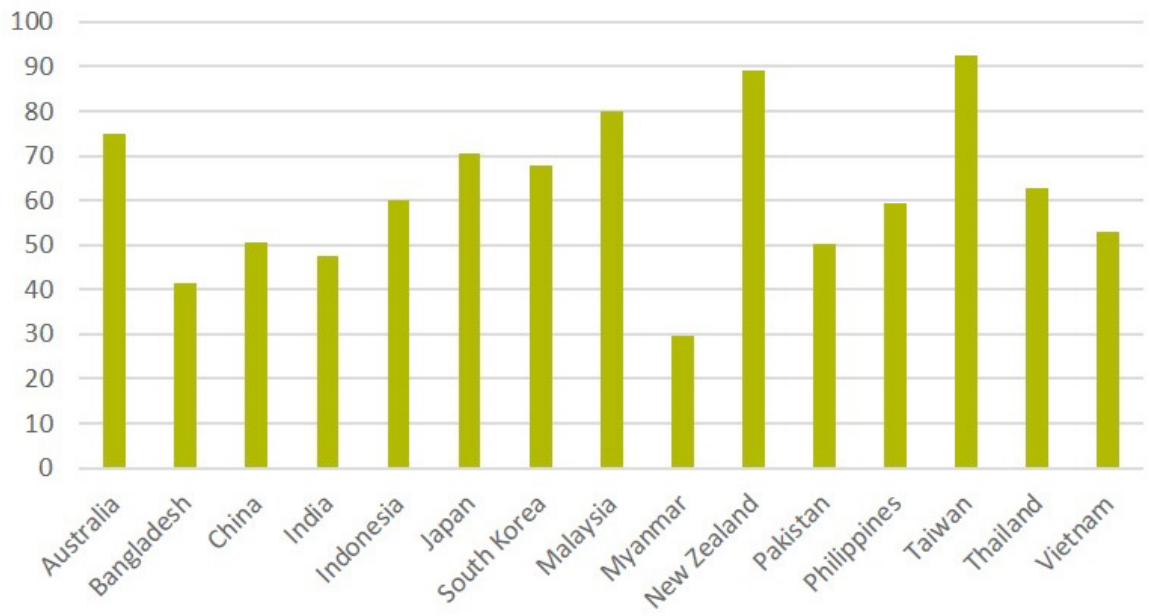
Rice Bowl Index Policy and Trade Scores 2016



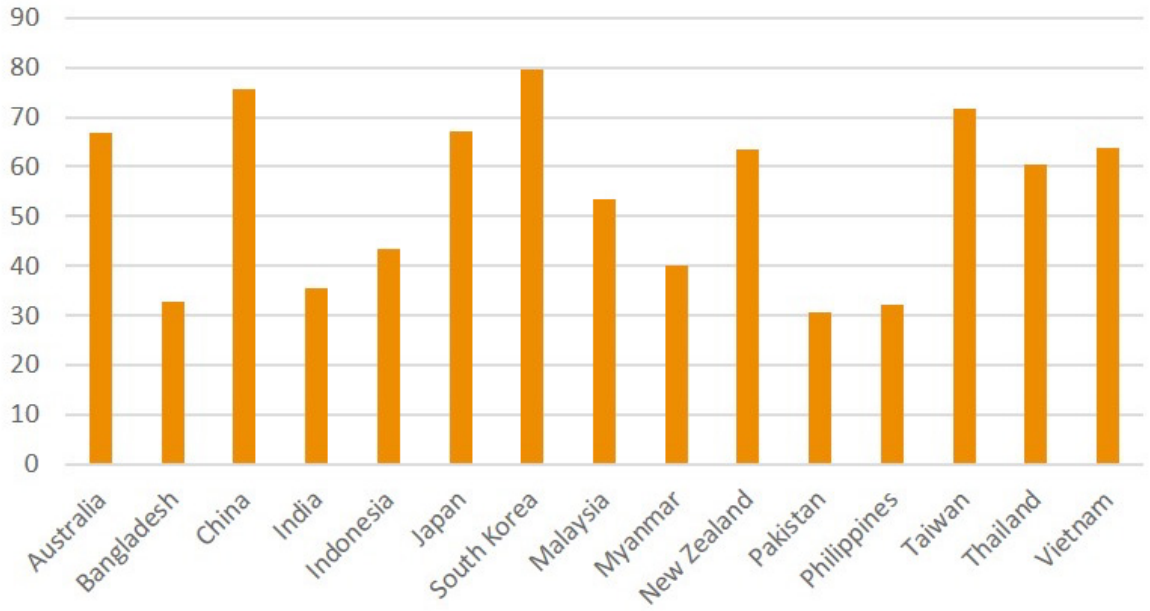
Rice Bowl Index Farm-Level Scores 2016



Rice Bowl Index Environmental Scores 2016



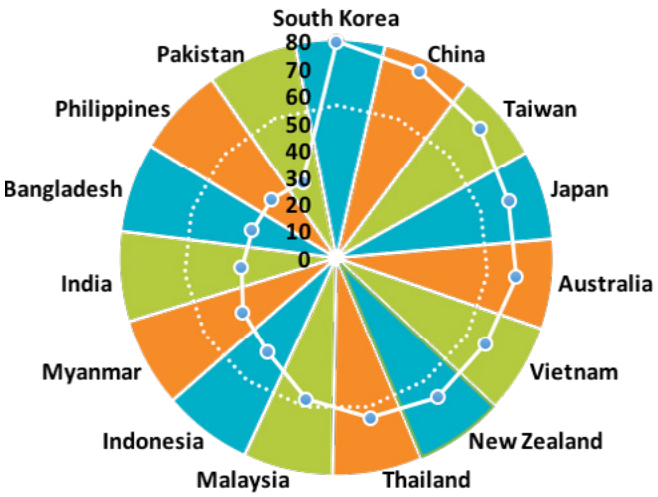
Rice Bowl Index Demand and Price Scores 2016



Appendix 3 – Thresholds

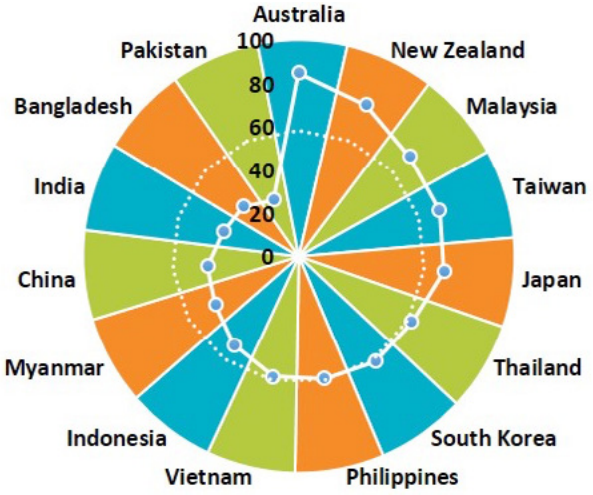
- Threshold defined as one standard deviation of all country scores below the average performance of the top quartile
- By defining the threshold as relative to the top performers we highlight the aspirational nature of efforts to overcome food insecurity
- Although a country may appear food secure in the Composite Index, it may fall below the threshold in an individual rubric

Demand and Price



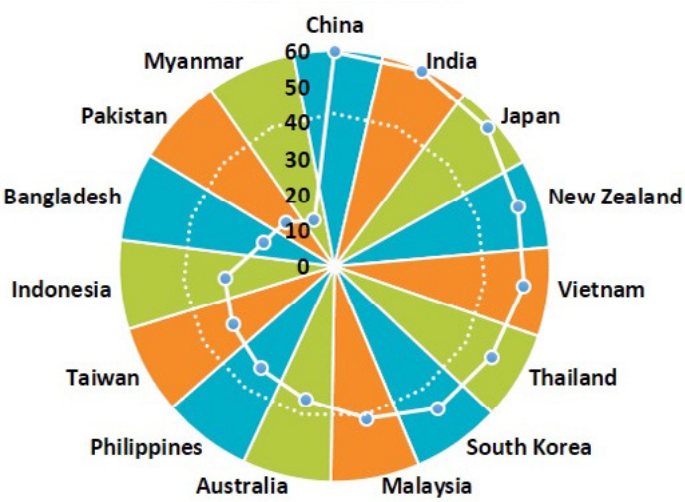
Fewer countries sit above the threshold than for the aggregate RBI results. The eight countries sitting above the threshold (down to and including Thailand) are the same as for 2015, albeit with a fall in the performance of Vietnam and an improved state of affairs for New Zealand. The drop off in performance below the threshold is more moderate when compared to 2015.

Policy and Trade



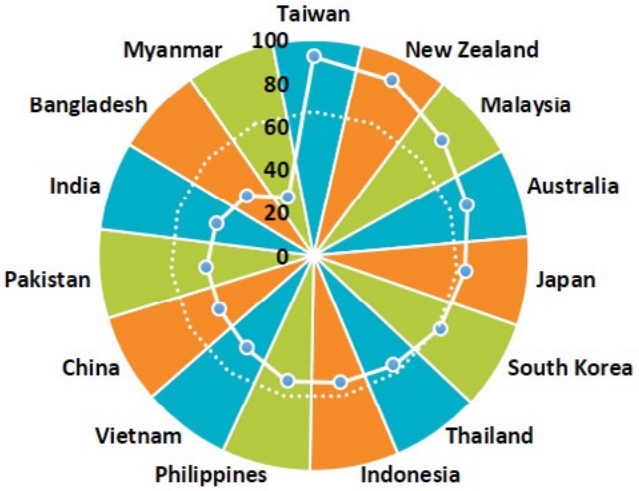
As in 2015, the threshold for performance is higher for the Policy and Trade rubric than for other rubrics although this year seven countries sit above the threshold compared to five last year, with improvement coming from the Philippines and Vietnam. This aside we can see that the hurdle for good performance is higher – which makes sense – because achieving robust outcomes is more complex and takes more time; consequently there is also less volatility in the curve (results). The benefits or dis-benefits of policy change are unlikely to be significant in one reporting period, but we should note with concern that countries generally perform less well when it comes to making policy decisions that support food security robustness.

Farm-Level Factors



Looking at the thresholds for Farm-Level factors underscores the value in looking at individual rubrics, for in this case, a country that has very robust food security, Australia, actually falls below the threshold here. This result reflect the extreme volatility of agricultural production in Australia, while the continuing strong Farm-Level performance of China and India shows the dependence of these countries on actual on farm production for ensuring food security. As in 2015, there is also a very wide spread of results (46 points between China and Myanmar) which reflects variability in production across Asia.

Environmental Factors



The threshold for Environmental Factors remains high (more countries are below the threshold than for any other rubric), reflecting both the lag between investing in the environment and the actual improvement in results and equally the challenge of actually improving environmental performance as a key tenant of food security robustness. Indonesia's performance has worsened considerably falling below the threshold, while Thailand has also slipped down. The predominance of developing countries below the threshold is notable but not surprising, for countries will first focus on ensuring a reasonable supply of food their population and then look to manage the environmental impacts of doing so. This short term thinking must eventually change lest the sustainability of agriculture production systems is put at risk.

Appendix 4 – Sustainable Development Goals

Goal 1.	End poverty in all its forms everywhere
Goal 2.	End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3.	Ensure healthy lives and promote well-being for all at all ages
Goal 4.	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5.	Achieve gender equality and empower all women and girls
Goal 6.	Ensure availability and sustainable management of water and sanitation for all
Goal 7.	Ensure access to affordable, reliable, sustainable and modern energy for all
Goal 8.	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9.	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Goal 10.	Reduce inequality within and among countries
Goal 11.	Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12.	Ensure sustainable consumption and production patterns
Goal 13.	Take urgent action to combat climate change and its impacts
Goal 14.	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15.	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16.	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17.	Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development

Source: http://www.undp.org/content/undp/en/home/sdgoverview/post-2015-development-agenda.html

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