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NTS POLICY BRIEF

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A new paradigm for food security: Robustness as an end goal

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Food security at the national level is now recognised to be dependent on a complex set of factors which interact and collectively influence the availability of food, its supply chains, its affordability and its utilisation. Threats to one or more of these factors may exert effects on other factors such that the overall food security situation is jeopardised. Countries therefore need to have the means to stay robust so that the disrupting effects of some factors may be ameliorated by others. Achieving a high level of food security robustness ensures more stable and sustainable food access for current and future populations.

Introduction

Prior to the 2007–2008 crisis when food prices spiked and food supply disruptions were seen, nations had enjoyed access to an ample supply of affordable food as a result of the Green Revolution. The crisis led to the realisation that the global food system is now fragile. Over the years, many countries have become dependent on the global food supply chain to provide additional supply of food for their growing populations. As a result of such increase in connectedness, the global food system has become more vulnerable to destabilising factors such as the decision of governments to temporarily halt food exports.[1] With more countries anticipated to increase their imports of key commodities such as soybean and corn, the threat of future instability is a real concern.

Large swings in food prices have serious implications. Basic economics explains that producers benefit from high prices while consumers bear the costs. However, in reality, the situation is more complex. Most affected by high food prices are the low-income groups, especially those that allot 50–70 per cent of their income to food, and numbering among these might be farmers. The Asian Development Bank (ADB) has estimated that in Asia, a 10 per cent increase in domestic food prices could push 64 million more people into poverty.[2] This can undermine poverty alleviation efforts and lead to instability and unrest.

Given the importance of food security, how then can it be conceptualised and implemented? According to the Food and Agriculture Organization of the UN (FAO), it 'exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life'.[3] This is a relatively comprehensive definition covering various aspects of food security. However, in 2007–2008, export restrictions imposed by net food exporting countries led to supply disruptions, resulting in price volatility in some 40 countries. As a result of this experience, many countries began to focus much more on ensuring stability through an adequate supply of food while some countries advocated increasing their self-sufficiency in key food items. This NTS Policy Brief examines the implications of such approaches, and suggests that food security should be framed using a broader, more inclusive paradigm.

Policy approaches for achieving food security

Governments, cognisant of the repercussions of food price spikes and supply interruptions, have been seen to respond in various ways. Aside from long-term policies that aim to increase domestic production, short-sighted policies such as export restrictions, increased reliance on imports and domestic price support were implemented during the 2007–2008 crisis.

Self-sufficiency, self-reliance and resilience

Food security policies undertaken by countries may be categorised based on their objectives. The *food self-sufficiency* approach focuses on the domestic production of food and minimises dependence on trade.[4] In its extreme case, this means no imports at all of the designated food items. Another approach is *food self-reliance*. While not discounting domestic production, it relies on international trade as an instrument to supplement domestic sources of food.[5] Examples of countries that have employed such policy options are the Philippines and Indonesia. Both countries increased their rice imports to address local demand and stabilise prices. At the same time, both have also expressed the goal of becoming self-sufficient in rice due to its political importance as a barometer of government performance; and have re-directed resources to R&D efforts and direct farm-level interventions to achieve this.

A related approach which depends heavily on imports is *food resilience*.[6] This approach is grounded on having diverse sources for key food items. For example, during the food crisis, Singapore – a net food importer which obtains 90 per cent of its food from

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overseas sources – adopted a strategy of self-reliance that placed high emphasis on resilience, i.e., finding alternate sources of rice. The resilience strategy works best if the sources are regionally and economically diverse and subject to different destabilising factors. Many countries with a high level of sufficiency in important food items do in fact also indirectly support a resilience strategy through their private sector. Others, such as Singapore, intervene to help the private sector identify new sources of imports.

Limitations of current approaches

No one approach to food security is able to alleviate the uncertainty and vulnerability that is inherent with food supply. A food self-sufficiency approach is still significantly vulnerable to factors such as volatility in the prices of production inputs, availability of land, labour and capital, and natural disasters and hazards such as flooding and drought. Food self-reliance and resilience approaches are vulnerable to the environmental hazards affecting the various sources of food supply as well as the trade policies of partner countries. These approaches are also dependent on the import capacity of a country, which in turn is linked to whether a country has the income-generating goods and services to finance food imports.[7] Given the increasing complexity of food security and the pressing challenges posed by rising populations, rapid urbanisation and climate change – and the limitations of current approaches – there is a need for a new paradigm for achieving food security.

Robustness: The new paradigm for food security

Food security involves four dimensions: availability, physical access, economic access and utilisation.[8] These dimensions are inherently complex, comprising interdependent indicators that influence the food security system. The main challenges are to identify the key drivers in each of the four dimensions; characterise them individually and then in an integrated form; and use them to guide further action to improve a country's overall capacity to achieve or enhance food security.[9]

With the multidimensionality of food security in mind, it is proposed that food security should be conceptualised in terms of 'robustness', defined here as a country's ability to withstand any perturbations to its food security system by having a balanced capacity to make food available; ensure that production is sustainable; and provide the necessary infrastructure and policies to support domestic production, promote trade and manage food demand and affordability. This also implies that in the event that some factors contributing to food security are disrupted, other factors may be able to compensate for the changes such that overall, food security can still be achieved. But how can governments determine their country's ability to withstand interruptions to their food security system?

A relatively new measure released in 2012, the Rice Bowl Index© (RBI), is discussed in this brief as illustrative of a tool with the capability to determine a country's food security robustness through the analysis of a set of enabling and disabling factors of food security. The tool also helps explicate 'robustness'. Specifically, the RBI (www.ricebowlindex.com) considers robustness to be present when four key rubrics of food security – farm-level factors; demand and price factors; environmental factors; and policy and trade factors – are in balance.[10] Each rubric in turn consists of a number of metrics that address the four dimensions of food security:

- *Farm-level factors*. This rubric includes metrics such as availability of arable land; access to basic infrastructure such as irrigation, roads and bridges; cost of rural labour; access to information and extension services; and access to credit which helps determine the availability of food in a country.

- *Demand and price factors*. This rubric focuses on the factors that influence physical and economic access to food as well as its utilisation, such as the consumer price index (CPI), per capita consumption of food, personal disposable income, population, urban population and oil imports (as a proxy for food processing).

- *Environmental factors*. Under this rubric, metrics such as total internal renewable water resources, annual change in forest area, electricity consumption and change in water quantity are considered because of their effects on agricultural productivity.

- *Policy and trade factors*. This rubric can be considered to address the stability dimension of food security since it looks at policies that influence the demand and supply of food within a country. It includes factors such as net agricultural trade, transportation industry value, intellectual property rights (IPR), government spending, short-term political rating and ease of doing business.

The RBI assumes that food security can be achieved if demand and supply can be brought into balance: people have access to food, farmers have the means to be productive, innovation and private sector initiatives are encouraged and the environmental prerequisites exist for providing long-term sustainability.[11] Any imbalance, therefore, would be suggestive of areas where interventions are most needed. This is demonstrated

through the findings of the Half-Year Update of the RBI for the period May–December 2012.[12]

According to the Update, the greatest variations in the 14 Asian countries analysed were seen in 'farm-level factors' and 'demand and price factors'. The latter was also the most volatile of the four rubrics. On the other hand, 'policy and trade factors' and 'environmental factors' showed little change over the period. Of the fourteen countries covered by the RBI, nine – Australia, Bangladesh, India, Indonesia, Japan, New Zealand, Pakistan, South Korea and Thailand – experienced an overall decline in total food security system robustness.[13] China and the Philippines did not experience any change while Malaysia, Myanmar and Vietnam showed improvement.

The results imply that achieving food security requires effective management of both short- and long-term dynamics. They indicate that agricultural production and commodity prices are highly volatile in the short term and that they are influenced by the longer term nature of policy change and environmental factors. Overall, the findings suggest that the capacity of the countries analysed to meet their long-term food security needs became more challenging.

Key recommendations: The path towards food security robustness

It has been argued here that today, food security has to be considered from the perspective that it is multi-dimensional, multi-sectoral and multi-disciplinary, a view supported by the RBI findings. Going forward, destabilising factors are likely to have even more of an impact on food security, and achieving robustness would be vital. Countries would need to take steps to balance the various factors affecting food security. Aside from this, policymakers, in crafting and implementing policies, would have to take into account the reality that short-term effects have long-term implications on hunger, livelihoods and poverty. The following three policy recommendations are thus suggested, the implementation of which will contribute to the achievement of food security robustness.

- ***Engage stakeholders in dialogue and consultation for better policy interventions.***

  Informed analysis could provide the basis for enhanced dialogue between the government, private sector and civil society (including consumer groups) on food security issues, and this is where tools such as the RBI could be useful. Further, it has to be recognised that government entities, though important, are but one of the many important stakeholders in the food security space. Through increased participation from stakeholders, more acceptable and realistic interventions could be identified that could help improve food availability, access and utilisation.

- ***Encourage and facilitate public-private partnerships for agricultural R&D, basic infrastructure development and interventions.***

  'Farm-level factors' (e.g., irrigation, roads and bridges, labour) are important in achieving food security robustness for those countries that rely heavily on domestic production to meet food availability needs. The RBI helps to identify, at the country level, areas that can be improved in order to increase agricultural productivity and the efficiency of the supply chain.

  Such an exercise could help guide efforts to reform policy to achieve more efficient allocation of limited resources. It could, for example, highlight decreasing investment in agricultural research prior to 2007–2008 as one of the factors behind the decline in agricultural productivity. This is one area where a partnership between the government and the private sector can be instrumental. In the area of biotechnology, both the public and private sector can collaborate in the creation of disease- or pest-resistant seed varieties and its commercialisation. In the area of technology adoption, both the public and private sector could benefit by working with civil society and farmers' groups.

  Infrastructure is another area on which the public and private sector can work together. Irrigation facilities, networks of roads and bridges, and ports and communications facilities are important in linking farmers to markets. Such infrastructure implies improved access not only to food but also to cheaper production inputs and information on modern farming techniques that could help farmers increase their productivity.

- ***Improve existing policies to incorporate a holistic approach and focused coordination in attaining food security robustness.***

  While engaging with stakeholders and investing in agricultural R&D and infrastructure are important, these measures should be implemented within the context of an understanding of the inherent complexity and multidimensionality of food security. Specifically, the RBI for the latter half of 2012 highlighted the need for holistic and integrated policies for achieving food security robustness. Agriculture, albeit significant, is but one of the many areas contributing to robustness. It is therefore important that, at the national level,

there be an entity formed with the responsibility and authority to foster a holistic, inter-government agency, inter-disciplinary approach to national food security.

Conclusion

Governments should aim for robustness in their food security systems, and policies to achieve this should take a holistic, inclusive approach. At the same time, achieving food security robustness is a task that should not be exclusive to the public sector. As a result of the inherent complexity of food security systems, cooperation and collaboration with the private sector and other stakeholders is essential. There is also a need to review existing policies to take into consideration the challenges brought about by growing populations, rapid urbanisation, increasing scarcity of natural resources and climate change.

Notes

[1] Paul P.S. Teng and Maria C.S. Morales, 'Rethinking food security: Robustness as a paradigm for stability', *RSIS Commentaries No. 111* (Singapore: S. Rajaratnam School of International Studies (RSIS), 2013), http://www.rsis.edu.sg/publications/Perspective/RSIS1112013.pdf

[2] Asian Development Bank (ADB), *Food security and poverty in Asia and the Pacific: Key challenges and policy issues* (Manila: ADB, 2012), 8, http://www.adb.org/publications/food-security-and-poverty-asia-and-pacific-key-challenges-and-policy-issues

[3] World Food Summit, *Rome Declaration on World Food Security* (Rome: Food and Agriculture Organization of the UN (FAO), 1996), http://www.fao.org/docrep/003/w3613e/w3613e00.HTM

[4] Panos Konandreas, 'Trade and food security: Options for developing countries', in Food and Agriculture Organization of the UN (FAO), *Multilateral trade negotiations on agriculture: A resource manual* (Rome: FAO, 2000), http://www.fao.org/docrep/003/x7353e/X7353e10.htm

[5] Ibid.

[6] Agri-Food & Veterinary Authority of Singapore (AVA), 'Food supply resilience education', accessed 1 July 2013, http://www.ava.gov.sg/Food+Supply+Resilience+Public+Education.htm

[7] Alexander C. Chandra and Lucky A. Lontoh, 'Regional food security and trade policy in Southeast Asia: The role of ASEAN' (Series on Trade and Food Security Policy Report no. 3, Manitoba: International Institute for Sustainable Development, 2010), 3, http://www.iisd.org/tkn/pdf/regional_food_trade_asean.pdf

[8] Paul Teng and Margarita Escaler, 'The case for urban food security: A Singapore perspective', *NTS Perspectives*, no. 4 (Singapore: RSIS Centre for Non-Traditional Security (NTS) Studies, 2010), 4, http://www.rsis.edu.sg/nts/HTML-Newsletter/Perspective/PDF/NTS_Perspectives_4.pdf

[9] Syngenta and Frontier Strategy Group, *Rice Bowl Index: Translating complexity into an opportunity for action* (Singapore: Syngenta, 2012), http://www.ricebowlindex.com/SiteCollectionDocuments/ricebowl-whitepaper.pdf

[10] Syngenta, 'Methodology: Explaining the Rice Bowl Index', accessed 1 July 2013, http://www.ricebowlindex.com/Pages/Methodology.aspx

[11] Syngenta, 'Rice Bowl Index'.

[12] Syngenta, 'Changes: Changes by rubric', 2012, accessed 1 July 2013, http://www.ricebowlindex.com/Pages/Changes.aspx

[13] Ibid.

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