



**INVESTMENT,  
INNOVATION,  
INTEGRATION –  
PATHWAYS TO A FOOD  
SECURE ASIA BY 2025**

Policy Brief

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**Tamara Nair  
Jonatan A. Lassa**

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## Abstract

*Asia's food demands are increasing and evolving, and will continue to do so in the future. With high numbers of hungry and undernourished, rapid population growth, increasing rural-urban migration and the ever present threat of climate change, securing food for the region will be fraught with challenges. Increasing the production and availability of food will no longer be the only areas to focus on in time to come. However, Asia's rising wealth and economic growth present several opportunities to meet these challenges.*

## Introduction

The UN Food and Agriculture Organization (FAO) defines food security as 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”.<sup>1</sup> In trying to establish food security for Asia, there are a multitude of factors that need to be considered, especially so for a continent that is so vast in its geography and so diverse in terms of its cultures, religions and communities.

Asia still relies on other regions of the world for a fair portion of its food supply. For example, in 2011, the continent took on average about 75 per cent of the world's soybeans exports and 43 per cent of maize.<sup>2</sup> Following current demographic trends and projections, Asia will continue to demand and import more food in the future. This will undoubtedly impact global supply and demand dynamics. Unfortunately, despite impressive economic growth, Asia is still home to a staggering number of hungry and undernourished people with South Asia accounting for half of all undernourished people in the region.<sup>3</sup> Addressing the needs of the hungry will require, in addition to greater access and availability of food, relooking at the complex nature of human insecurities including unemployment, gender and cultural or ethnic bias and even unfair economic competition.

With increasing populations and rural-urban migration, there is also the necessity to consider urban food needs in the major cities of Asia, as the population numbers in cities increase. With changes in diets, such as a greater reliance on processed foods as a result of increased ‘eat-out’ rates, due consideration needs to be given to new food demands and nutrition security. In addition, sanitation and food safety are equally important components that need to be considered. Apart from these changes, there is now an increasing awareness about losses and wastage of food.

As an overarching concern, the effects of climate change are expected to affect the production of food directly, through alterations in agro-ecological conditions and indirectly, by influencing growth and income distribution thus affecting demands for food commodities.<sup>4</sup> Climate change effects are deemed to affect (i) food availability; (ii) access to food; (iii) the stability of food supplies; and (iv) the utilisation of food;<sup>5</sup> all four of the constituent factors that define food security. In order to be able to provide enough food in the future, a second green revolution will be required. Science and technological innovation are going to be of critical importance in achieving this.

<sup>1</sup> FAO. *The State of Food Insecurity in the World 2001*. Rome. 2001:p. 49

<sup>2</sup> FAO Stat (website). United Nations Food and Agriculture Organization (2014). <http://faostat3.fao.org/> retrieved 22 January 2015

<sup>3</sup> Teng, P and Escaler, M. ‘Food Security in Asia’. In: W. Hofmeister, P. Rueppel and J. Wong (Eds). *Food Security: The role of Asia and Europe in Production, Trade and Regionalism*. Singapore: East Asian Institute; European Centre; Brussels, Belgium: European Policy Centre. 2014

<sup>4</sup> Schmidhuber, J and Tubiello, F. N. ‘Global Food Security under Climate Change’. *Proceedings of the National Academy of Sciences* 104 (50) Dec 2007. pp. 19703 – 19708

<sup>5</sup> Ibid

These issues above complement and reinforce our understanding in terms of productivity and accessibility of food that is required for the future. They point to the fact that stressing on greater production and availability of food, albeit still vital, might not be the only areas to focus on in time to come. It is important for food policies to be assessed through a “seed to fork” framework, taking entire supply chains into consideration.

The International Conference on Asian Food Security (ICAFS) took place from 21–22 August 2014 at the Grand Copthorne Waterfront Hotel in Singapore with the theme “Towards Asia 2025: Policy and Technology Imperatives”. The main objective of

ICAFS 2014 was to comprehend future trends and challenges brought about by changes in a myriad of areas including demographic, consumption patterns, declines in agricultural performance, environmental challenges, natural resource depletion and climate change. The conference also sought to address issues pertaining to the future of food policy and technology that contribute to Asian food security. This RSIS Policy Brief examines key outcomes of the conference with regard to changing dynamics of food and suggests how Asian food security might be secured through greater investments in research, technology and greater regional integration to ensure favourable conditions for the production, trade and distribution of food commodities.



Securing food for Asia

Margaret W. Nea / flickr

<sup>6</sup> IPCC. ‘Summary for policymakers’. In: Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White. *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. 2014

<sup>7</sup> Porter, J.R., I. Xie., A.J. Challinor., K. Cochrane., S.M. Howden., M.M. Iqbal., D.B. Lobell, and M.I. Travasso. Food Security and Food Production Systems. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White.(eds). Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA: 2014. pp. 485-533.



## Food Security for Asia: Challenges and Opportunities

Rice remains Asia's most important crop. Cultivated throughout the region and forming the staple food in Asian diets, preserving and promoting rice security is tantamount to establishing food security in Asia. However, the production and trade of rice continues to face several challenges. These include:

### Natural resource constraints and the effects of climate change

Aside from greater competition in land and water usage and land conversion, majority of small-scale farmers, who make up the overwhelming bulk of food producers in Asia, also face increased incidences of degraded soil and polluted waters and rising land and water costs. In addition to these constraints, given greater demands for land, most agricultural production will have to take place on existing farm lands by effectively utilising available land and water resources. Global climate change can only exacerbate these conditions and contribute to reduced crop yields.

The effects of climate change can potentially influence all facets of food security, that is, production, access, utilisation and stability.<sup>6</sup> According to the IPCC Fifth Assessment Report, global temperature will see increases of ~2 to ~4°C in late 20th century levels in 2080–2100. Combined with increasing food demand, this will pose huge risks to food security globally and regionally, with increased risks to food security occurring mostly in the tropical (lower latitude) regions.<sup>7</sup>

Greater agricultural investments are required to: (i) protect income-earning capacities of small-scale farmers and increase their productivity; (ii) increase food availability and accessibility in the markets; and (iii) pursue climate change adaptation strategies. Asia offers great opportunities for investments in food and agriculture sectors. Rising incomes and development in the region provides fertile ground for such investment ventures. Further collaborations with regional experts and research institutions would also allow for mitigation and/or adaptation strategies to new climate scenarios.



Grain storage and sale

Rod Waddington/ flickr

## Population growth and urbanisation

With around 4.3 billion people, making up 60 per cent of the world's population, Asia features a high population growth rate. Aggregate Gross Domestic Product (or GDP) in the Asian region will account for more than half (52 per cent) of the world's GDP. This growth forecast by Asian Development Bank is based on the fact that about 3 billion Asians will move up to the middle class and urban populations. The changing affluence and lifestyles of the population will also bring about corresponding changes in food consumption patterns. Consequently, this points to a range of different issues and scenarios in food security that will need to be addressed by the region.

There is also the increasing number of women that are joining the workforce due to greater education and employment opportunities. In addition to these changes, there is also rapid urbanisation. The effects of growing populations, expanding middle class, increasing female employment and rapid urbanisation will also be felt through changing demands in food, especially for greater protein and vitamin sources. In addition, urbanisation trends will also contribute to greater demands in processed food. Changing demands in types of food, its storage and handling, and food safety will also require revamping of existing systems in production modes and capacities. This will require greater investments in infrastructure and re-evaluation of current supply chain networks.

Asia's population growth and economic development notwithstanding, the region is still home to a large number of the world's hungry, of which a growing proportion will be the urban poor. In the Asia Pacific region, around 40 per cent of labour remains dependent on the agriculture sector with the relatively marginal contribution of 10 per cent to GDP. Declines in younger agricultural labour should also be of future concern.

Hunger and undernourishment impose great societal and economic burdens. Opportunities for Asia to eradicate hunger can actually be achieved through its rapid economic growth, provided it is backed

by the necessary political and administrative will by making food security a top priority. Efforts at expanding agricultural output to secure food for the hungry can be through technology transfers and research partnerships within the region. Furthermore, close regional ties can lead to regional economic agreements that favour policies that are pro-poor and promote equitable market conditions.

## Food policies of China and India

The food policies of the two most populous nations in the region, China and India, in securing food for their people are likely to have major impacts on global food trade, should they enter the international markets for imports. Current trends indicate that in future, China will likely import more soybeans and corn from the international market, whereas India's foray into the market will most likely be for more pulses and edible oils.

China's domestic demands and its imports of food commodities will have huge impacts on global and certainly, Asian food production and access. In 2013, China ranked first in rice imports to meet its domestic consumption. This equated to 3.4 million tonnes of rice or a mere 1.6 per cent of China's domestic rice output.<sup>8</sup> China's entrance into the international market for more rice can have a destabilising effect that can adversely affect food security in the region.

India's National Food Security Act aims to provide sufficient food at affordable prices to achieve food and nutritional security. However, the Act has received many criticisms, especially over its main implementation method, the Public Distribution System (PDS). The vagaries of the PDS have resulted in wastage, overflowing grain stocks in storage and inefficient systems of identifying beneficiaries. India is a net exporter of rice. Changes in its domestic food production and distribution might affect its rice exporting trends. This may potentially alter the behaviour of importers of Indian rice.

<sup>8</sup> Wong, J and Chen Gang. 'China's Food Security: Emerging Challenges from Climate Change.' In: *China and Non-Traditional Security: Global Quest for Resources and its International Implications* workshop. 31 October 2014. Nanyang Technological University, Singapore

## Greater scope for technological and scientific innovations

Rice-producing countries in Asia have great potential to feed its people and create a food secure environment for the region by closing the gap between actual yield of rice and the potential yield, and by increasing the potential yield of rice. There has been a variety of scientific developments available for this to happen and it can contribute to enhanced rice production and distribution, thus increasing availability and access to food.

Scientific and technological breakthroughs in rice production are important factors when planning for the future of food. New innovations are also able to address climate change challenges. In order to adapt to climate change, research and development in agriculture are now focussed on increasing rice productivity and creating varieties that are resilient to multiple abiotic stressors such as drought, salinity, heat, and submergence and flooding as well as biotic stressors such as diseases, leaf blast and pest attacks.

Greater investments in agriculture have proven positive returns. However, Official Development Assistance (ODA) from major donors (for example, the EU, Japan and the U.S.) has been decreasing over time. The returns on investments in agriculture are high and have huge potential to contribute to hunger eradication, especially in terms of establishing food security in impoverished regions. Greater progress in international policy vis-à-vis agricultural research, together with more open trade, will help in ensuring that all countries can benefit from such innovations and can go a long way in establishing food security in the region.

Another challenge for Asia lies in accessing private equity to support public sector works and future research. This will be especially important for the development of infrastructure and for committing greater funds to research and development that will be vital to address food security challenges of the future. The creation of favourable environments for private sector investment becomes imperative because of an increased awareness of attractive returns such investments bring about.



*Rice plants in tissue culture*

*IRRI/ flickr*

## **New paradigms: AEC 2015 and greater integration**

Economic integration and trade facilitation in the region are effective steps in establishing food security. Regional supply chains in Asia are still constrained by lack of efficiency and lack of effectiveness. The ASEAN Economic community (AEC) 2015 can be a forum to provide opportunities for member states to improve trade logistics and supply chains including improving infrastructure in cold storage, establishing information networks, and ensuring food safety and quality standards. Establishing food security in the region must include all aspects of food production and distribution – a “seed to fork” approach. By increasing connectivity within the region, it becomes easier to facilitate the smooth transfer of goods and allows greater monitoring of quality standards.

Despite possible benefits, several issues still need to be addressed at the country (as well as regional) level before the AEC can be instrumental in realising the region’s food security goals. These include issues of customs, food safety regimes, transparency, and corruption. Increased connectivity also magnifies the importance of bio-security across the board. In addition, there are concerns whether there is necessary infrastructure to address potential problems like movements of pests and diseases, the absence of which will place regional supply chains in positions of extreme vulnerability in the event of pest/disease outbreaks.

## **Key Recommendations**

The following are the key recommendations that were indicated at ICAFS 2014.

### **1. Greater investment in agriculture and agricultural technology**

- There should be greater commitments to increase spending in agricultural research and development. Agricultural investments have already produced favourable results in Asia, as well as other parts of the world. Asia has great potential to increase production of food crops and address the needs of its growing populations and this potential can be tapped by supporting scientific and technological research and development.
- Favourable environments should be created for the private sector to take advantage of the investment opportunities in agriculture and food sectors in Asia, which will be brought about by the increasing wealth and growth rates in

the region. Private sector players should be encouraged to take a leading role in terms of investments in new technologies and solutions for future challenges to food security, which includes the effects of climate change.

- Greater regional collaboration in technology and scientific innovation, and close monitoring of food policies in big countries such as China and India will be important for securing food for the rest of the world and most certainly for the rest of Asia.
- It is thus crucial to develop a business model that would increase productivity in the agriculture sector. This new model must also take into account rural-urban movements by 2030-2040 and the urgency to create opportunities that will attract a younger labour force into the agriculture sector.



## 2. Natural resource conservation and climate change adaptation

- Addressing natural resource constraints and improving environmental quality can be achieved via land conservation, better water management and reduction of land conversion. These will require sustainable intensification of farming practices and diversification of natural resource-based livelihoods.
- Governments should not delay climate change adaptation implementation. This will cause it to be too late to deal with the risk of climate change. Further research in downscaled impacts of climate change and its effects on food production should be well supported, both financially and operationally. Such scientific findings can lead to the creation of more adaptive varieties of food crops that will be essential in future climate settings.
- There should be greater commitment of funds for scientific research especially for the development of 'climate-smart' crops that can help buffer food production in uncertain climatic conditions in the future.
- Water management, eco-efficiency, precision agriculture, and breeding are areas open for technological innovations. Another way to improve availability is to avoid food losses and waste and create alternative protein sources. New technologies can improve the structuring of food, diversify the sources of protein and prolong food preservation.



Use of information and communication technology in agriculture

F. Fiondella (IRI/CAFS)/Flickr

### 3. Integrated regional development and economic integration

- Increased market integration within the region will allow for better perspectives on levels of food insecurities within countries and the region as a whole, and allow for greater proactive planning.
- Concerted efforts at de-politicisation of the food sector are necessary for freer trade in agricultural commodities. Global trade and international supply chains make it no longer relevant to think of food security from a strictly national perspective.
- Increased use of common monitoring tools in the region, such as specific indices that account for dimensions that affect food security in the region, can establish baseline figures and guide investments and research in targeted sectors.
- Standardised practices can also help point to potential risks to food security through natural causes by monitoring aspects of the natural environment, health and safety dimensions, and natural disasters, as well as those caused by socio-political reasons, such as political instabilities, trade and macroeconomic policies.
- Increased commitments in creating enabling conditions for trade facilitation (through customs regulation, trade documentation, customs clearance, trade enforcement and infrastructure development) should be put in place with the objective to reduce transactional costs.
- Greater investment in automation and information technology and inter-agency coordination and cooperation among customs and other government agencies to increase efficiency would also be effective in promoting the smooth flow of food trade in the region.

## Conclusion

The path to achieving food security in a dynamic and developing Asia is littered with challenges in the form of large numbers of hungry and undernourished groups in the region, increasing populations and rapid urbanisation. Climate change effects serve to exacerbate these conditions. It is no longer feasible now to focus on increasing the production and availability of food and neither is it relevant to frame food security solely in terms of national interests.

The International Conference on Asian Food Security (ICAFS) discussed several pertinent issues that highlight current trends and challenges facing food in the region. Although Asia presents numerous opportunities for securing food for all in the future, it will require greater efforts, not only in increasing production and availability but in focussing on a host of other factors, including changing trends in food demand, food safety, nutrition security and food storage and handling. This list is not exhaustive and it is in addressing these issues that we might move towards a food secure region by 2025.

## About the Authors

**Tamara Nair** is Research Fellow at the Centre for Non-Traditional Security (NTS) Studies at the S. Rajaratnam School of International Studies (RSIS), where she works primarily on food security but is also involved in studies in migration and development issues in the region. With a background in Political Science and Geography from the National University of Singapore, she also has a Graduate Diploma in Education from the National Institute of Education in Singapore. Tamara has a Masters in Environmental Management, a Graduate Diploma in Arts Research and a PhD in Development Studies from the University of New South Wales in Sydney, Australia. Before joining the Centre for NTS Studies, she was involved in an international project looking at climate change and 'cultures of resilience' focusing on major waterways and communities (in Asia, Australia and the U.S.) in relation to their adaptation mechanisms in the face of climate change. She also served as a co-editor for a proposed special edition volume of the *International Journal of Water Governance*. Tamara has taught in private and government schools in Singapore prior to her postgraduate studies.

**Jonatan A. Lassa** is Research Fellow with the Centre for Non-Traditional Security (NTS) Studies, S. Rajaratnam School of International Studies (RSIS), Nanyang Technological University (NTU), Singapore, where he researches on climate change, food security and (environmental) risk governance issues. Jonatan holds a PhD from the Faculty of Agriculture at the University of Bonn, Germany, and has studied Social Science and Interdisciplinarity at the Center for Development Research (ZEF) at the University of Bonn. He also has an MSc in environment and international development from the University of East Anglia, U.K. Prior to joining the Centre for NTS Studies, Jonatan was a senior research fellow with the Institute of Resource Governance and Social Change (IRGSC). He has also previously served as a PhD researcher with the United Nations University Institute for Environment and Human Security in Bonn (2007–2010) and as an Indonesia postdoctoral fellow at Ash Center, Harvard Kennedy School (2011). In his professional career, he has also worked with the UN, international NGOs and the private sector.

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- Provide a platform for scholars and policymakers within and outside Asia to discuss and analyse NTS issues in the region.
- Network with institutions and organisations worldwide to exchange information, insights and experiences in the area of NTS.
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- Contribute to building the institutional capacity of governments, and regional and international organisations to respond to NTS challenges.

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It is also a founding member and the Secretariat for the Consortium of Non-Traditional Security (NTS) Studies in Asia (NTS-Asia).

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S. RAJARATNAM  
SCHOOL OF  
INTERNATIONAL  
STUDIES

**Nanyang Technological University**

Block S4, Level B4, 50 Nanyang Avenue, Singapore 639798

Tel: +65 6790 6982 | Fax: +65 6794 0617 | [www.rsis.edu.sg](http://www.rsis.edu.sg)