



Feeding Asia in the 21st Century: Building Urban – Rural Alliances 10-12 August 2011

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SECURITY STUDIES



INTERNATIONAL CONFERENCE ON ASIAN FOOD SECURITY 2011 – FEEDING ASIA IN THE 21ST CENTURY: BUILDING URBAN-RURAL ALLIANCES

OFFICIAL CONFERENCE REPORT

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Executive Summary

The International Conference on Asian Food Security (ICAFS) took place on 10–12 August 2011 at the Grand Copthorne Waterfront Hotel in Singapore. ICAFS 2011, themed ‘Feeding Asia in the 21st Century: Building Urban-Rural Alliances’, was convened in the context of complex and multifaceted challenges throughout food systems in Asia. The conference sought to address timely questions relating to these challenges, and foster discussions among a range of stakeholders from Asia’s food sectors.

Many food security questions centre upon the need to sustainably and equitably feed and nourish a larger, more urban and increasingly affluent Asian population in the face of spiralling food prices, changing agricultural practices, natural resource and environmental concerns (such as water and arable land) and the growing number of undernourished in the region. In order to formulate a multifaceted and integrated global strategy to tackle this unique set of circumstances, ICAFS 2011 brought together an array of experts from across public, private, civil society and academic spheres.

These participants examined a range of issues at the urban-rural interface in the key dimensions of food security: food availability, physical access, economic access and utilisation. These dimensions, along with a high-level forum, a session framing the scope of Asian food challenges and a capstone session, constituted the organisational structure of the ICAFS 2011 proceedings. The conference culminated with the ‘ICAFS Statement on Feeding Asia in the 21st Century’, which can be found at the conclusion of this Report along with a full conference programme. The following outlines key elements of the ICAFS 2011 proceedings.

High-level Forum

- Southeast Asia is currently facing escalating food challenges. Significant food price fluctuations in 2007–2008 and again in 2010–2011 have served as the most recent reminders of the potential volatility of regional food systems, and these highly publicised events have underscored the stakes involved in the food security sector.
- Population growth, urbanisation, economic development and greater affluence, changing food preferences, price volatilities and the effects of climate change are all affecting Asia’s food systems in major ways.
- The experiences of the European Union have relevance for the integration of regional food systems in Asia.
- Rural farmers face the challenge to first survive, then increase productivity and finally become involved in the marketplace. Their success or failure to progress through these stages is vital for the future of Asian food security.

The Scope of Food Security in Asia

- Addressing the primary vulnerabilities of Asian food systems requires stronger understandings of the linkages between urban and rural areas.
- There is an urgent need to rethink food security, and promote sustainable agriculture on a far greater scale. Such promotion should not come at the expense of continuing yield growth and efficiency improvements, but rather pursued as part of such agricultural advances.

- Advances in fishery production will be vital for meeting the nutritional needs of many people throughout Asia, and cases already exist that demonstrate how such advances might proceed.
- The private sector plays, and must continue to play, key roles in facilitating the spread of agricultural technologies to small-scale farmers.

Availability – Promoting Sustainable Agricultural Production

- There is a need for a ‘doubly Green Revolution’ that will lead to increasing food production while reducing land degradation and the unsustainable overuse of fertilisers, pesticides and water.
- Fish is often neglected in food security discussions dominated by crops and livestock, but is the key provider of protein for a large percentage of the population in Asia. This should be recognised and represented in future food security strategies.
- There is significant untapped potential in urban and peri-urban agriculture throughout many parts of Asia. This likewise should be recognised and represented in future food security strategies.
- Genetic modifications and changes in crop traits can be vital tools for improving yields and reducing losses. Asian stakeholders need to consider these opportunities more closely.

Access – Understanding Markets and Supply Chains

- The maturing of agricultural markets has created challenges and opportunities for small-holders and it is essential that they become more thoroughly integrated into market systems in order to move out of subsistence modes of living.
- There are many opportunities in Asia for agribusiness, as regional population growth drives increased demand for food, and as income growth leads to diversification in food preferences.

- Asia is experiencing a modernisation of food supply chains and a supermarket revolution at a pace never before experienced by any other region. This dynamic has effects that are rippling through food systems, from the farm to the consumer.
- From a macroeconomic perspective, the financialisation of food commodities is not the main culprit behind recent food price crises; and therefore limiting investment by commodity index funds and access to derivative trading is unlikely to prevent the next crisis.

Utilisation – Ensuring Health and Nutrition

- The largest proportion of the globe’s undernourished reside in Asia and the Pacific – an estimated 578 million. It is essential to identify the food insecure and create strategies to rapidly respond to spikes in undernutrition.
- Biofortification is a vital tool for achieving better dietary conditions for, and improving the nutritional status of, Asia’s most vulnerable populations.
- Food safety contributes to the improved nutrition and health status of a population; reduces public health costs; reduces food losses; increases availability, stability and utilisation of food along the food chain; and increases national and international market access. Efforts to promote food safety are thus mightily important and should be redoubled.
- Experiences from parts of Asia demonstrate that protracted and consistent nutrition security policies can significantly improve the health and well-being of a population.

Appropriate Investments to Match Urban Food Security Needs with Areas of Surplus

- Trade plays an important role in enhancing Asian food security, as even the region's most self-reliant food producing countries still rely upon food imports to meet their domestic demands. For these reasons, Asian countries should position themselves to take advantage of any opportunities provided by the Doha round of international trade negotiations.
- Land acquisition in Asia has accelerated in part as a result of the food price fluctuations of 2007–2008; countries with land and water deficits invest and often take control of land for food production. This situation creates challenges and opportunities, and recipient states in Asia should pursue mutually beneficial relationships with investors and protect the rights of their domestic populations.
- Brazil's agricultural successes can provide developing Asian countries with several important lessons on production gains, the protection of small-scale farmers and engagement with international food markets.
- Rather than a second Green Revolution, Asia needs an 'evolution' of existing food strategies that builds on past experiences and creates more stable regional food systems. Paramount to any such strategy will be the capacity to be both profitable and sustainable.

ICAFS 2011 Statement on Feeding Asia in the 21st Century***Statement Highlights***

- Regain investment momentum in the agriculture and food sectors, and redouble R&D efforts.
- Judiciously pursue enhanced science and policy innovation.
- Address the plight of the region's chronic poor.
- Enhance capacities to sustain increases in farm production and to diversify livelihood activities to increase incomes.
- Promote greater small-holder participation in the transformation of local retail markets, supply and distribution chains, and expanding international trade systems.
- Take pragmatic and concrete efforts to link policies in the food and health sectors.
- Pursue risk-based approaches to food safety that are predicated upon leading scientific knowledge and extend throughout entire food chains.
- Extend existing foundations to create positive symbiotic relationships between producing and consuming actors.
- Recognise the importance of agriculture for rural employment and development, and implement policies that help rural actors face the challenges that exist in changing Asian food systems.
- Utilise resources available in urban contexts to promote sustainable agricultural advancement in rural settings.

The full text of this Statement can be found on page 34

High-level Forum – ‘Think Global, Act Asia’

Why ASEAN Needs to Be Concerned about Food Security

Southeast Asia is currently facing escalating food challenges. Significant food price fluctuations in 2007–2008 and again in 2010–2011 have served as the most recent reminders of the potential volatility of regional food systems, and these highly publicised events have underscored the stakes involved in the food security sector.

With regard to food security, Southeast Asia is a region of contrasts. The region is home to the world’s largest rice exporters, as well as to the largest importer and consumer of rice per capita globally. Southeast Asia continues to enjoy the benefits of vibrant regional economic growth and poverty reduction, yet over 15 per cent of the Asia-Pacific’s undernourished can be found in the region. The region is deeply endowed with natural resources that are valuable for agriculture, yet environmental stresses continue to threaten many key environmental systems and, by extension, future food production. Southeast Asia has a rich agrarian history upon which to draw, yet urbanisation trends are changing traditional connections between the region’s land and its people.

These defining contrasts reflect a region battling to attain food security for all of its citizenry. As it is, pervasive insecurities continue to exist throughout the region, manifested through hunger, undernutrition and health problems among the region’s most vulnerable populations; reduced agricultural productivity at times of lean food access; the perpetuation of poverty; shifting trends in migration, demography and urbanisation; and the potential destabilisation of governments and other social systems at community, state and regional levels.

In response to these challenges, ASEAN member states have implemented several measures to soften the impact of food-related risks, particularly on the most vulnerable segments of their populations. These include export restrictions, price controls, price subsidies and import facilitation. Such approaches are understandable and at times seemingly the only option available to governments. However, there are both costs and benefits from these types of state intervention in food markets, as these strategies potentially involve competing objectives, that of protecting consumers, against that of assisting agricultural producers to benefit from rising prices.

While far from perfect, ASEAN efforts to coordinate regional food policies, create a forum for the discussion of food-related issues, and act as a centre for information and monitoring which have helped to reduce hunger and facilitate the availability of affordable, nutritious food. However, as regional food challenges become more acute, more action is needed. There is an urgent need to develop policy frameworks that strategically pursue measures and actions on behalf of all member states that can contribute to the long-term food security of the ASEAN region.

ASEAN must continue to be proactive in facilitating partnerships throughout the region between public and private enterprises that seek to contribute to regional food security. ASEAN must also serve as a conduit for regional dialogue, as this can help to ensure that zero sum approaches do not find traction within the regional food security sector. Finally, ASEAN will continue to promote and help drive food security policies that align with the principles of social justice and environmental sustainability. The people-centred approaches that define much of the character of the organisation must be applied to the food security sector in order for progress along lines that benefit all sectors of society to be achieved.

Asian Food Security in a Global Food Context

The number of hungry people in Asia has been on the rise since the mid-1990s, and a large majority (62 per cent) of the world's undernourished continue to live in Asia. Strong economic growth has propelled a number of Asian countries towards middle-income status. However, these same countries are home to an overwhelming share (86 per cent) of the region's undernourished, with India accounting for 43 per cent and China 24 per cent.

Several emerging trends further threaten Asian and global food security. First, the population of the region's developing countries is projected to increase from 3.6 to 4.5 billion between 2010 and 2050. Most of the growth is in cities, with the urban population set to surpass the rural population in 2028. As a result of the growing and changing population, demand for more and higher quality food will continue to rise. Second, increased constraints on natural resources in Asia, such as land degradation and water scarcity, put severe pressure on agricultural sustainability and food security in the region. Moreover, these environmental challenges are set to become more pronounced as food demands continue to rise. Third, international prices of major food commodities have risen sharply in 2010–2011, only a couple of years removed from the last food-price spike. Since June 2010, for example, international maize prices have more than doubled, while wheat prices have almost doubled. Domestic food prices in many countries in Asia have also increased rapidly. Lastly, climate change will put additional pressure on natural resources and food security through fomenting higher and more variable temperatures, changes in precipitation patterns, and increased occurrences of extreme weather events. According to recent projections by the International Food Policy Research Institute (IFPRI), Asia's production of irrigated wheat and rice will be respectively 14 and 11 per cent lower in 2050 than in 2000 due to climate change.

In addition to the above, the role played by agriculture in supporting Asia's food security has been undergoing a transformation. Agriculture's contribution to the economy in relation to other sectors has been on the decline over the last several decades, with agriculture's share of gross domestic product (GDP) falling from 43 to 18 per cent between 1961 and 2009. The proportion of developing Asia's economically active population employed in agriculture has also steadily fallen from 70 to 55 per cent between 1980 and 2010, and is projected to further fall to 49 per cent in 2020. However, it is important to emphasise that agriculture still employs a significant share of the workforce and will continue to do so into the foreseeable future. In terms of farm size, small-holder agriculture not only continues to dominate the Asian farming system – 87 per cent of the world's 500 million small-holder farms are in Asia – but land holdings in the region are getting smaller as a result of population growth and inheritance-based fragmentation. There is also a rapid transformation of supply chains with 40 per cent of agricultural produce going to retail in supermarkets.

In response to these trends and in order to achieve sustainable food security in the region, a comprehensive policy and investment agenda needs to achieve the following:

- Improve small-holder productivity.
- Protect vulnerable people.
- Support transparent, fair and open trade.
- Establish regional strategic grain reserves.
- Exercise extreme caution on biofuel expansion.
- Create regional frameworks for knowledge sharing and better coordination.

Nothing short of such multipronged approaches will be able to meet Asia's contemporary and future food security challenges.

Effects of the European Union’s Food and Agricultural Trade Policies on Food Security for Developing and/or Net Importing Countries

The European Union (EU) has been accused of dumping practices in relation to its agricultural exports to developing and net importing countries and been blamed for destroying small-scale farms in Africa through distortive trade policies. Are these accusations justified? The reality is that the EU has made great strides in liberalising its trade regime and fostering increased competitiveness with other agricultural exporters, but still greater strides to this end remain possible.

The aim of the EU’s food and agricultural trade policies is a progressive liberalisation of agricultural trade that is consistent with the statutes of the World Trade Organization (WTO). Over the last two decades, the EU has made progress towards this goal in the following areas:

- Progressively phasing out export subsidies.
- Increasing market access.
- Converting domestic support into ‘green box’-compatible measures

The effects of these efforts have been largely positive for international trade. There has been a cumulative reduction in EU price support and significant changes in the net production surplus of key agricultural products from 1990/1994 to 2005/2009. With the exception of maize, the net production surplus of cereals has fallen over the years. For example, wheat net production surplus fell from 35 per cent in 1990/1994 to about 7 per cent in 2005/2009. Drastic changes in the production of beef and sugar have also seen the net production surplus of these products fall dramatically during this period.

Europe is a vital supplier of food to the world. It is one of the world’s top exporters together with the US, Brazil and China and is a leading exporter of final products such as wine, wheat and food preparations. European exports are mainly targeted at developed countries such as the US and Japan along with large emergent markets such as China and Russia.

On the other hand, the EU is also the world’s top importer of agricultural products. The agricultural trade balance of the last 10 years shows that Europe has become the world’s largest net importer of agricultural goods from developing countries. EU imports are much larger than those by the US, China, Japan and Russia, and its imports are more diverse in product and in origin.

The abovementioned reforms and those that are currently under discussion in the EU are central to the region’s strategies for promoting global food, environmental and social security. Paramount among its objectives are the promotion of broad-based rural economic growth, better access to land for the rural poor, support for agricultural research, enhancement of education and training, and institution building. For the period 2007–2013, EU spending for development cooperation with African, Caribbean and Pacific (ACP) countries is over 3 billion euros per year mainly via national or regional programmes.

Despite this progress, more action is needed to improve agricultural trade and help address global food security. Export subsidies must be abolished. There must be better market access through further duty reduction, special and differential treatment of developing countries and the abolition of tariff escalation. The recent policy path in domestic support must be continued. Food crops must not be used for biofuels. The 0.7 per cent GDP target for overseas development assistance by rich countries must be fulfilled. Investments in agricultural R&D, extension and networking must increase. Finally, food aid for emergency cases must be ensured.

Food Security, Livelihoods and the Rural Poor

For the millions of small-holder farmers in Asia, dreams of credit facilities, land ownership and resources, profitable livestock, education, increased market opportunities and better infrastructure have yet to be realised. As a result of such deficiencies, they remain a highly vulnerable sector of society. Regrettably, contemporary trends such as environmental degradation, climate disasters, urbanisation, commercial agriculture, the emergence of food-based biofuels, mining and extractive industries, and deforestation further threaten their livelihoods and their very existence. Numerous international institutions, such as the World Bank, the Food and Agriculture Organization of the United Nations (FAO) and International Fund for Agricultural Development (IFAD), have acknowledged and recognised the importance of the small-holder farmer in global food security and have called for increased investments in rural development.

Three stages characterise the development of poor rural farmers. The first is the *survival* stage where farmers' access to basic services and productive resources is critical. Here, agrarian reform and land tenure improvement are key issues. Second, there is a *productivity* stage during which increasing agricultural productivity, employing sustainable agricultural practices and practising crop diversification are the main components. Finally, the *growth* stage finds farmers learning to be entrepreneurial, and participating in markets and industry-oriented enterprises. There must be a paradigm shift among small-holder farmers, from a site-focused or individual approach to a more industry or community/national approach. They need to be able to go beyond subsistence farming, and engage in more sustainable livelihoods that can enhance their capabilities, lead to equitable use of their resources and ensure environmental sustainability.

The Asian NGO Coalition for Agrarian Reform and Rural Development (ANGOC) has been involved in two community initiatives in this area. The first is the Sustainable Agriculture for Poverty Reduction initiative which aims to contribute to the goal of poverty reduction by enhancing capacities of non-governmental organisations (NGOs) and Asian rural communities to increase agricultural productivity through sustainable agriculture. Projects include the production of vegetables, rice and wheat in India; the production of organic rice, cassava, and zallaca fruit in Indonesia; and the production of organic rice and sugarcane in the Philippines.

A preliminary impact assessment showed that the net income from employing sustainable agricultural practices is greater than that from conventional agriculture, thus demonstrating that sustainable agriculture presents a viable option for reducing poverty. However, sustainable agriculture is knowledge-intensive and requires broad-based training among farmers, retraining of agricultural technicians, the incorporation of new techniques into agriculture curriculums and a range of support services.

ANGOC's second initiative, called Promoting Rural Industries and Market Enhancement (PRIME), aims to link farmers to markets through a value-chain approach. PRIME works with 42 microenterprises and organisations engaged in the production, distribution and marketing of organic rice, muscovado sugar and seaweed throughout the Philippines.

The success of the projects described above has demonstrated that a more people- or community-centred approach can be employed to address food security effectively. Community-based social enterprises that simultaneously focus on access to resources, sustainable agriculture practices, microenterprise development and industry have the ability to improve the lives of the millions of rural poor in Asia.

Discussion

The discussion during this session centred around four topics: the use of genetically modified organisms (GMOs) in the EU; the over-consumption of meat; food prices and volatility; and the priorities for regional food security strategies.

The import of genetically modified (GM) products for feed use is necessary if the EU wishes to continue to produce its own pork and pork products. Although the majority of EU consumers are against GM food, hundreds of thousands of farmers will be negatively impacted should the EU turn away from GM products and import pork from Latin America. Thus, current EU authorisations for zero tolerance for GM products need to be changed.

As for the production of GM food in the EU, there has been some slight progress in new member countries; they tend to be more open to the technology. It was arguably a step backwards for regional integration when the President of the European Commission allowed member states to make their own rules concerning the adoption of GMOs. A rethinking of these policies would be wise, but it is unlikely that there will be much movement on GMO issues in the short to medium term. To convince consumers, there needs to be a significant price difference between GM and non-GM products – which currently does not exist.

Changing dietary patterns and the over-consumption of meat are issues complicated by the fact that they touch on peoples' own cultural sensitivities, levels of awareness and economics. It would be difficult to legislate lifestyle changes due to the notion that people should have the right to choose their food. However, changes can come about with better information and knowledge about the nutritional, social and environmental costs of the over-consumption of meat. From an economic perspective, the

externalities of producing meat, such as water, land and resources, need to be reflected in the prices of products. National programmes also need to seek alternative ways of producing meat and other sources of protein, including taking lessons from indigenous agriculture and looking at neglected food crops.

Discussions about food price hikes must strike a delicate balance between the need to address consumer concerns over high prices, and continuing to provide incentives for small-holder farmers. This means that discussions must not be solely focused on preventing price hikes from occurring but rather on stabilising food price volatility (which should be done not through invasive government interventions but through market mechanisms). To reap the benefits of higher prices, small-holder farmers must have access to credit, technology, inputs and other resources.

In order to address the twin aims of poverty reduction and food security in Asia, governments need to prioritise agriculture and make pro-poor investments, particularly if they wish to maintain stability and peace within their borders. With 80 per cent of Asia's poor still residing in rural areas, significant investments in agriculture R&D, extension services, small-farm technologies, post-harvest loss and waste management, and farmers' insurance are urgently needed. Unlike in other parts of the world, the small-scale agriculture found in the region requires less capital intensive investments.

No single-measure approach will solve the problems of hunger and poverty in Asia, and no individual country can tackle them alone. Regional organisations such as ASEAN and the Asian Development Bank (ADB) must work to extend regional frameworks for knowledge sharing, seek consensus, and coordinate common actions and positions to address food security challenges.

Session 1: The Scope of Food Security in Asia

The Interdependence between Urban and Rural Food Security in Asia

Population increases, urbanisation and high economic growth are trends affecting food security in Asia in significant ways. The world's population will increase from the current 6.7 billion to roughly 9.1 billion in 2050, requiring food production to rise by 70 per cent. This production growth must be realised in the face of changing consumption patterns, the impacts of climate change and the growing scarcity of water and land.

Rapid urbanisation has also thrown up new challenges to urban food security. Land-use changes in particular are a major challenge to urban food security because as cities expand, prime agricultural lands are being converted into residential and industrial areas. Most cities in developing countries have great difficulty coping with the fast pace of development. As cities struggle to absorb ever increasing numbers of people, more slums can be seen; and these urban poor are exceedingly vulnerable as they spend a major part of their income on food.

Sustained economic growth in countries such as China and India has also led to changing consumption patterns and created another set of challenges. With higher disposable incomes, people move away from diets based on staple grains, vegetables and fruits, and limited foods of animal origin towards more varied diets that include more pre-processed food and more foods of animal origin. The diversion of grains to feed livestock has therefore impacted on the availability of cereals.

The trends discussed above highlight the need to better understand the dynamics and growing importance of urban food security. Unlike those living in rural areas, most urban dwellers are net food buyers and spend a large part of their disposable income on food. This makes them highly vulnerable to fluctuations in food prices and disruptions in the global food supply chain. Addressing these vulnerabilities requires an understanding of the linkages between urban and rural areas.

Urban agriculture will of course not be able to completely meet the growing demands for food in cities, but urban food production can play a role in supplementing rural agriculture. Urban and peri-urban agriculture (UPA), which encompasses the growing of plants and the raising of animals within and around cities, offers a way to improve urban food security. The practice of UPA can take many forms: agro-parks, vertical farming, rooftop farming, aquaponics, aeroponics and the like. The areas surrounding urban centres or extended metropolitan regions in particular play an important part in the provision of food to urban consumers, and the proximity of these areas to urban markets lowers food transport and storage costs.

In addition, even as cities develop their capacity to produce food, renewed efforts must be undertaken to improve agriculture in rural areas. Decades of faltering public commitment to investing in agriculture have hindered the ability of farmers to pull themselves out of poverty, or cope with price volatility, and climatic and economic shocks. To have the greatest impact on food productivity and ultimately on poverty reduction, public investments in agriculture must be complemented by investments in non-farm rural development, soft and hard infrastructure development, better education and effective healthcare.

Making More Food Available: Promoting Sustainable Agricultural Production

Over the last half century, remarkable changes in agricultural practices have resulted in increased food production across the world. Since the genesis of the Green Revolution in the early 1960s, gross world food production (cereals, coarse grains, roots and tubers, pulses and oil crops) has grown from 1.84 billion tonnes in 1961 to 4.38 billion tonnes in 2007. This increase is due to changes to crop varieties (day-length insensitive, partitioning of carbohydrates to grain rather than straw, disease resistance), changes to agricultural practices (fertilisers, water management, pesticides), and broader social, economic and political change.

Although these changes have had many positive effects, there have also been significant costs. Increases in yield have been achieved without great expansion in land use, but this high-energy crop production has involved sharp increases in fertiliser, pesticide and water use, which has in turn led to increased emissions of nitrates and pesticides into the environment and the depletion of ground-water aquifers. The increasing mechanisation of farming led to manual labour being replaced, which led to the worsening of poverty in some rural areas. More recently, climate change is posing challenges to food security. Agriculture-based livelihood systems that are already vulnerable to food insecurity face immediate risk of increased crop failure, new patterns of pests and diseases, lack of appropriate seeds and planting material, and loss of livestock.

There is an urgent need to rethink food security, and promote sustainable agriculture on a far greater scale. Sustainability rests on the principle that we must meet the needs of the present without compromising the ability of future generations to meet their own needs. Not only does sustainable agriculture address many environmental and social concerns, it also offers innovative and economically viable opportunities for growers, labourers, consumers, policymakers and many others in the entire food system.

One way of achieving sustainable agriculture is by transitioning to a 'bioeconomy'. A bioeconomy can be thought of as a world in which biotechnology contributes to a significant share of economic output. The use of biotechnology in agriculture is an evolving success story. By 2015, approximately half the global production of the major food and industrial feedstock crops could come from plant varieties developed using one or more types of biotechnology. These biotechnologies include not only GM but also intragenics, gene shuffling, and marker-assisted selection. Research into agronomic traits to improve yields and resistance to stresses such as drought, salinity and high temperatures has increased rapidly since the early 1990s, as shown by the increase in the number of GM field trials of agronomic traits by small and large firms and by public research institutions. Biotechnologies other than GM can also be widely used to improve the quality and health of livestock for dairy and meat products.

There has also been an increasing emphasis on biomass as an energy source because the continued reliance on traditional energy sources such as petroleum is not sustainable. Biomass is obtained primarily from plants, animals and their by-products. The most important feature of biomass is that it is a renewable source of energy, unlike hydrocarbon-based resources. Agricultural products such as switchgrass, soybean, corn, sugarcane, sugar beet, wheat, cassava, sorghum, miscanthus, palm oil and jatropha are now specially grown for the production of a wide range of biofuels such as biodiesel, bioalcohols, ethanol, biogas and syngas. If these fuels can become more efficient, avoid displacing important agricultural activities and not lead to serious food price distortions, they could become a greater part of future food and energy security calculations.

Fisheries Resources in Cambodia: Implications for Food Security, Human Nutrition and Conservation

The contribution of freshwater capture fisheries to national food security and the economy in Cambodia is higher than in any other country. Cambodians traditionally consume fish daily in one form or another: fresh fish, salted dried fish, salted fish, smoked fish, fermented fish, fish sauce, and most importantly, *prohoc* fish paste. Of the 1,200 known fish species in the Mekong River, 500 species are found in the section of the river that flows through Cambodia. Cambodia's freshwater capture fisheries, with an annual production of between 300,000 and 400,000 tonnes, rank as the fourth most productive worldwide after China, India and Bangladesh. The total value of fisheries is estimated at USD1.2–1.6 billion or 9–12 per cent of Cambodia's total GDP. In all, an estimated 6 million Cambodians or 45 per cent of the population are involved in fishing.

Most freshwater fish production is concentrated on and around the Tonle Sap lake and river system (including the branches and floodplains). The lake, which hosts 296 fish species account for 16 per cent of the total fish catch in the Mekong River Basin and 60 per cent of Cambodia's fish production. Fish is an important source of protein in Cambodia, constituting more than 80 per cent of the population's total animal protein intake. The average annual fish consumption in the country is estimated at 52.4 kg per person. The fisheries sector also attracts both

local and international tourists. The floating villages of Chong Khneas and Kompong Phluk in Siem Reap, the Mekong dolphins in Kratie, and the mangrove forests and coral reefs in Koh Kong and Kampong Som are but some of the major attractions.

However, fisheries production per person in Cambodia has experienced a gradual decline over the past decades, with average per capita fish catch declining from 347 kg in 1940 to 116 kg in 2010. Among the reasons are industrial development; upstream damming; disruptive fishing methods, such as explosives, mosquito nets, electric fishing, and poisoning; and the use of highly hazardous chemicals imported from neighbouring countries and used indiscriminately, for instance, to harvest fish or to preserve dry fish.

The trends of declining fish catch can, however, be reversed through foresighted actions. First, the strategic development plan for the fisheries sector (Strategic Planning Framework 2010–2019) which calls for the management, conservation and development of sustainable fisheries resources, needs to be strengthened. Second, research on the nutritional value of fish needs to progress and assessments of food and nutrition security vulnerability to hydropower dam development and climate change need further exploration. Finally, Cambodia must reduce post-harvest losses and increase the use of bycatch and fish products for human consumption. If it can achieve these goals, Cambodia may come to exemplify the ability of a developing country to attain food security against a formidable range of challenges.

The Role of Agribusiness and Opportunities for Investment in Food Security

The need to address food security has never been greater and this realisation sees the sector moving up national agendas around the world. Contemporary challenges to food production and overall food systems will be felt most directly in rural economies in developing countries, where agriculture has traditionally been dominated by small-holder farmers. Small-holder farmers currently contribute roughly 25 per cent of the overall global food

production. However, they also constitute about half of the 1 billion people living in chronic hunger.

To improve the productivity of small-holder farmers, the right technologies need to be delivered to them. Improved technologies could help unlock the potential of plants, and help farmers grow more using less water and land. Insecticides, fungicides and herbicides, for instance, protect crops from insects, diseases and competition from weeds. Better seeds could help improve crop growth and quality, and decrease produce losses. Modern science can identify key natural traits of a plant in order to breed improved varieties with the highest possible yield. In other instances, GM can be used to achieve desirable traits, such as disease resistance or herbicide tolerance.

In addition to a concerted mobilisation of farming resources, reducing global hunger also requires that issues of gender inequality be more thoroughly addressed. Women constitute the bulk of unpaid or poorly paid farm labour (more than 70 per cent) in most developing countries and they produce 60–80 per cent of food. However, women own only 1 per cent of the land. General policies to improve income-earning abilities and opportunities for women include reforming property rights systems to be more equitable toward women; eliminating barriers to women's labour-market participation; removing constraints to participation in credit and other markets; and developing technologies that increase the returns to female labour, whether through increased demand or increased labour productivity.

Private agribusiness firms have an important role to play in helping small-holder farmers improve their productivity. In Bangladesh, for example, there is an initiative which involves hiring female market developers or 'farmer's sisters' to keep in direct contact with the farmer's wives. The role of each 'sister' is to conduct daily family meetings, visit farmers' wives and meet with retailers to recommend crop solution packages. Similar strategies have been successful for setting up information and service hubs for growers in India that enable them to obtain pest and disease information on their mobile phones, and for providing small-holder farmers in Kenya

with crop protection products for staple and high-value export crops. These approaches all exemplify ways that the private sector can contribute to food security through engagement with small-holder farmers, and such efforts will be of paramount importance for the future of farming and food markets.

Discussion

Cambodia exemplifies countries that face a range of development challenges. More specifically, the country has to deal with food-related shortcomings in combination with energy demand issues. It has a very limited range of alternative energy sources for meeting its power demand, and is therefore heavily dependent on imported fossil fuels. While national priorities such as energy security, economic development and the environment are critical and pressing, the implications of the resultant hydropower dams on the fishing sector and food security are profound. There are two kinds of dams currently under construction on the Mekong River: those that are built on the mainstream river and those that are built on the tributaries. Mainstream dams have greater potential to adversely impact fisheries than those built on the tributaries. In all, there are about 12 mainstream dams that are either under construction or are on the verge of being constructed in the Lower Mekong Basin (LMB). In light of this, LMB countries need to conduct participatory planning in decision-making, both before and after dam construction, so that local fishers, farmers and consumers that depend on the Mekong River are not marginalised.

Cambodia's case lends itself readily to wider questions about how to stimulate a bioeconomy. Forging a bioeconomy will require the leadership of not only governments but also private firms to establish goals for the application of biotechnology in agriculture. To achieve success in these endeavours, conducive structural conditions must be put in place, including the formation of regional and international agreements and mechanisms to ensure that policies can flexibly adapt to new opportunities. Importantly, many cases call for negligible government interventions in order to stimulate

bioeconomies. As it stands now, governments are involved in areas such as the provision of subsidy through exemptions from or reductions in fuel excise taxes, direct payments to producers, capital grants or cheap loans for infrastructure and the like. However, these subsidies can have unintended effects that undermine the fiscal and environmental goals they are purported to support. Governments should commission economic analyses of the long-term economic viability and competitiveness of the biofuels industry in the absence of assistance and trade protection and create an environment for more private-sector participation.

Another point relating to food production is that price volatilities will continue to affect both rural and urban stakeholders, but there are notable differences in the response capacities of these two groups. Generally speaking, the response capacity of urban areas is lower than that of rural areas. This is because urban dwellers are dependent on a monetised economy and spend a large share of their household budgets on food. The rural poor on the other hand may have greater access to food through family relationships or the capacity to produce their own food. One of the ways to improve the response capacity of urban areas to food price shocks is to grow food, especially perishable high-value vegetables, in and around cities.

Organic inputs could potentially have a role in helping farmers cultivate food in a cost-effective manner. However, insecticides and pesticides that have a low environmental impact can also help farmers produce food in a sustainable way. Given the limited arable lands available to increase food production, there are strong arguments to suggest that meeting growing food demands requires scaling up productivity on existing arable lands through the use of better crop protection products and GM plants. Doing so would require a thorough assessment of the benefits and risks of innovative solutions. This is where the interests of private companies, regulators and the public have to be congruent, because without innovation there will be no solution to critical food security issues.

Session 2: Availability – Promoting Sustainable Agricultural Production

The Need for a ‘Doubly Green Revolution’ to Increase Food Availability

Over the last 50 years, the world has seen some dramatic changes in the realm of food security. Global population increased by 111 per cent from 3 billion to over 6 billion. Crop production increased by 162 per cent from 1.8 billion tons to 4.8 billion tons, land used for crops grew from 960 million ha to 1,209 million ha, and yield per ha rose from 1.84 tons to 3.96 tons. The first Green Revolution was based almost exclusively on improved productivity through better seeds, a greater degree of mechanisation and more inputs such as pesticides and fertilisers. It was a success in many ways: it spared wild lands, and decreased hunger and malnutrition. However, the Green Revolution has been criticised for not paying enough attention to the longer term sustainability and resilience of agriculture. It contributed to increased levels of water use, chemical run-off, soil erosion and greenhouse gas emissions. Poverty and hunger also remain widespread.

Some of the projected changes to the food ecosystem are challenging and result primarily from today's unsustainable overuse of resources such as land and water. By 2050, pesticide use is expected to increase from today's 3.75 million tons to 10.1 million tons, nitrogen fertiliser use from 87 million tons to 236 million tons, and arable land from 1.54 million ha to 1.89 million ha. How can future food demands be met without compromising the environment? A ‘doubly Green Revolution’ will have to include reduction in land degradation and unsustainable overuse of fertilisers, pesticides and water. This emphasis on environmental protection while feeding the future billions presents stiff challenges for both policy and science. The doubly Green Revolution will need significant policy and social changes, new regulatory regimes circumscribing food production, and major scientific and technological advances to achieve and control potential impacts.

Technological innovation is one way of producing more from less. In most cereal crops, there is a large yield gap between potential and actual yield. For corn, however,

the yield gap is closing, because of the development of hybrids in the 1960s, but also because of the expansion of irrigated areas, increased nitrogen fertiliser rates, integrated pest management practices, and recently, the introduction of GM corn.

Numerous peer-reviewed studies on the yield and economic impact of GM crops have shown overwhelmingly positive results, particularly in developing countries. However, as with all technologies, GM crops have their risks. Herbicide-tolerant crops risk producing herbicide-tolerant weeds and *Bacillus thuringiensis* (Bt) crops may result in insect resistance to Bt crops. Appropriate management practices are therefore required to protect useful technologies and the ecosystem.

The next 50 years is likely to be the final period of rapid expansion in food production. Crop yield increases are falling below projected demand and therefore, yields per unit of land must increase or the area under cultivation must expand. Food and ecological security are intractably linked together and stakeholders throughout Asia have no alternative but to prioritise both sectors. GM crops can be part of the strategic solutions to address this but it is still not clear how much it will contribute in the regional context. These crops can increase yields (and thus incomes) and reduce inputs (thereby protecting water and soils). However, they also require new regulatory regimes, political and social changes, and much greater investment in agricultural R&D, specifically in conventional breeding and agronomy.

Meeting the Needs for More Fish through Aquaculture

Fish is often neglected in food security discussions (which tend to be dominated by crops and livestock) despite being considered ‘rich food for poor people’. It has played an important role in addressing nutritional and livelihood security in many developing countries. It provides 20 per cent of the animal protein intake of some 2.6 billion people globally and at least 50 per cent of the animal protein intake of over 400 million in Asia and Africa. Fish provides roughly 13 per cent of the animal protein intake in developed countries; in developing Asia, the intake is much higher, averaging at 30 per cent, with

some countries being notably reliant on fish, such as Bangladesh (51 per cent), Indonesia (58 per cent) and Cambodia (75 per cent).

In terms of its contribution to livelihood security, 540 million, or 8 per cent, of the global population is involved in fisheries and aquaculture. Eighty to a hundred per cent of rural aquaculture products are sold, generating cash income for low-income rural families. From an economic perspective, fish is the most internationally traded commodity. About 40 per cent of global production enters the international market compared to only 10 per cent for terrestrial based meat production. Nearly 50 per cent of aquatic product exports come from developing countries.

It has been estimated that an additional 20 to 30 million tons would be needed by 2020 to maintain the present level of consumption. Because of increasing wealth and urbanisation in Asia, per capita consumption of fish is expected to grow significantly. By 2030, two-thirds of the world's middle class will be in the Asia-Pacific, with China and India driving this growth. Hence, much of the estimated additional demand for fish is expected to be from Asian countries where fish is an important component of daily diets and animal protein intake.

Of the 115 million tons of fish produced in 2009, 52 per cent came from capture (wild) fisheries and the rest from aquaculture. Global fish production from capture fisheries has stagnated in the last decade and it is probable that no major increase can be expected, as most of the stocks have either been over-exploited or reached their maximum sustainable yields. The growing demand for fish must therefore be met from aquaculture, which saw its share in global fish production increase to 55 million tons in 2009 from less than 1 million tons in 1950. Eighty per cent of this production comes from some 20 million small-holder farms, of which 18 million farms are in Asia, allowing the region to contribute 91 per cent of global aquaculture production.

With land and water becoming scarce, it would not be economically viable to sustain Asia's low-output, extensive aquaculture systems. Since nearly 80 per cent of aquaculture production comes from small-holder operated farms and it is a source of livelihood for the

rural poor, issues that concern these small-scale farmers – such as access to resources (both natural and financial), a lack of skills, vulnerability, and aversion to risks – need to be addressed, and opportunities for enterprise development provided.

Overall, in order to exploit the contribution of aquaculture to food security, urgent action is needed in the following areas: R&D to improve fish stocks, including fish health management; the integration of small-scale aquaculture into the globalised market economy; appropriate institutional and regulatory frameworks and integration in development planning; compliance of small-holder farmers to food safety and product quality standards; and improvements in policy and governance.

Enhancing Food Security through Urban and Peri-urban Agriculture in China: Best Practices and Upscaling

Farming is embedded in the Chinese culture. China currently feeds more than 20 per cent of the world's population by utilising less than 12 per cent of the world's farmland. Historically, food was considered heaven and was the basis of the economy of many dynasties. However, China's recent rapid transformation from a rural to an urban population is challenging its ability to be self-reliant. Nearly half of its population now reside in cities. With this massive shift in migration and the increasing affluence of its people, China is currently facing a 'soft food crisis'. A new concept of food security has thus emerged, one that not only covers the sufficient availability of food but also the quality and safety of food, its convenient accessibility and its steady affordability. Cases of poor food quality and unsafe foods have plagued China's food system of late and food prices have soared; doubling within months for some specific products. Middle-class households are feeling the pressure.

Urban and peri-urban agriculture (UPA) is an effective response as it is closely aligned with urban development and could potentially become an organic part of the urban system. UPA stands out with its multi-functional characteristics reflected in high value-added production, social inclusion through helping vulnerable groups and its ecological contribution. It is also a good anchor for strengthening urban-rural linkages.

China recognised the important role of UPA in improving food security and has made it a priority. UPA in China has focused on areas such as the development of seeds, agricultural exports, technology, food processing, agro-tourism, logistics, recycling and agro-parks. Although the objectives behind the promotion of UPA in cities in China are largely the same, each city has its own innovative approaches and practices. Examples include the following:

Beijing 2-2-1 Action Programme on Urban Agriculture: This comprehensive programme was initiated by the Beijing municipal government in April 2004 with the objective of creating a multi-functional recreational agriculture area in the peri-urban zones of Beijing. Specifically, the programme aims to maximise resource and market utilisation, mobilise the supportive inputs of capital and technology, and facilitate information platforms for sharing agro-technologies and experiences.

Shanghai Sunqiao Modern Agricultural Development Zone: Built in 1994, the Shanghai Sunqiao Modern Agricultural Development Zone aims to speed up the integration of the city with villages through agricultural industrialisation.

Chengdu Agro-tourism: This initiative promotes rural agro-tourism, which is also called leisure agriculture and sightseeing agriculture. Chengdu is one of the pioneering cities in China in the development of agro-tourism. Tourists from urban areas in Chengdu go to a farmer's house and stay over the weekend, eating country food and enjoying the rural setting. It has also significantly increased local rural households' annual income, thereby improving the overall quality of Chengdu's rural environment.

While UPA plays many roles, its core function remains increasing food production through the effective use of resources and the application of innovative technologies. As demonstrated in many large cities in China, UPA can help improve food security in urban areas. For example, UPA provides more than 40 per cent of vegetables to Beijing and 60 per cent to Shanghai. Although certain features of China's farming system may be unique to the country, UPA holds great potential for many developing countries, particularly in Asia.

Crop Traits to Increase Productivity by Increasing Yield and Decreasing Losses

Asia is food insecure today. The effects of the Green Revolution are winding down. Rice and wheat yield gains are in decline. Only corn yield gains are holding steady due to more recent technological innovations. Public sector investment in R&D is down. Many of the food security policies in Asia focus mainly on producing more rice, and while this goal is laudable it is also insufficient. Although rice demand will increase by 28 per cent, other cereals will play a greater role in the Asian diet. Wheat demand will increase by 40 per cent, soybean by 125 per cent and corn by 86 per cent between now and the mid-21st century.

How will the world satisfy Asia's increasing appetite? The answer lies in increasing productivity and reducing post-harvest losses. While both are key to improving food availability, the focus of this presentation is on the former. Currently, technologies to increase productivity do indeed exist. They include improvements in breeding, better agronomic practices such as irrigation and pest protection as well as biotechnologies.

The first generation of GM traits looked at the three platforms of insect protection, herbicide tolerance and virus resistance. These early GM crops, which are now almost 15 years old, have led to reduced losses from biotic stresses, and higher farm productivity. For example, the introduction of GM soybean and GM corn has led to an increase in production of 9.7 million tons and 29.4 million tons respectively. This increase in production not only provided farmers with higher incomes but has also spared additional land from being used to plant these crops. It is estimated that without these yield gains, growing an adequate amount of soybean and corn would have required an additional 3.8 million ha and 5.6 million ha of land respectively.

While the first generation of GM crops was relatively straightforward to develop, those that are currently under development address more complex problems such as moisture, fertility, salinity and temperature, and as such require more sophisticated technologies. Significant research is currently underway, in the private as well

as public sector, to address these new challenges. For example, Monsanto has developed drought-tolerant maize by introducing a gene that confers tolerance to environments with highly variable moisture content. Another Monsanto product is a nutritionally enhanced soybean with high levels of omega-3 fatty acids (which can improve heart health). These soybeans contain 20 per cent more omega-3 fatty acids than traditional crops, and could thus be an alternative to fish as a source of omega-3 fatty acids.

Despite the existence of such technologies and the convincing evidence of their benefits, the adoption of GM crops in Asian countries remains low due to several reasons. First, public funding for agricultural R&D in the region has declined over the last three decades, allowing the private sector to dominate agricultural investments in R&D. Second, there is a lack of science-based regulations to oversee the use of these crops. Only one country in ASEAN has an operational regulatory system for the cultivation of GM crops. Thus, farmers across the region are unable to legally access these high-yielding seeds. Third, there is the lack of intellectual property (IP) protection and enforcement which are necessary for investments and innovation. Fourth, there is insufficient investment in rural infrastructure including market access and extension services. Lastly, the lack of a science-led public discussion about these new technologies has also significantly impacted their widespread adoption in the region.

Discussion

Many outstanding issues remain that relate to food availability. Important among these is the relation of GM crop adoption to environmental and social risks, the declining interest of new generations in agriculture, the actual practicality of urban farming and how net food importing countries such as Singapore can address food security.

On the topic of risks associated with GM crops, the potential breakdown of resistance linked to using single Bt gene technology represents a significant area of concern. To address this, Monsanto has worked with universities and government agencies to improve the

technology. Subsequent technologies such as RNA interference (RNAi) technology in addition to dual Bt proteins will provide more long-term durability. Insect-resistance management plans must also be part of any deployment strategy.

Additional concerns exist over the relevance of GM crops to small-holder farmers and whether the private sector consistently considers their interests. The socioeconomic impacts of the adoption of Bt corn by small-holder farmers in the Philippines have been well-documented; the most important benefit has been to increase farmers' incomes which has in turn resulted in increased investments at the village level.

There is growing concern over the fact that Asia's youth are largely less interested in agriculture and are migrating to cities in search of alternative sources of livelihood. It is thus imperative for governments to communicate to the youth what is at stake and how agriculture, including the aquaculture sector, can be an attractive and profitable venture. A 'new agriculture' which brings together multiple disciplines such as economics, agronomy, land use efficiency, and energy must be responsible for attracting the next generation of agricultural thinkers.

What China has shown with some of its urban farming projects is that most crops, even rice, can be grown within cities with the use of simple and smart technologies. Nevertheless, urban farming has tended to focus on high-value vegetables as these have proven to be profitable. China has demonstrated that UPA can play multiple roles in addressing the food security problems of cities.

Finally, net food importing countries such as Singapore can play a significant role in addressing regional food security. First, wealthier countries need to acknowledge that they are paying too little for their food. Second, they need to support R&D in other food producing countries and increase their investments. They need to be part of the solution and not only reap the benefits of other countries' investments in agricultural productivity. Third, importing countries such as Singapore can be an experimental hub and testing ground for many types of farming innovations and technologies.

Session 3: Access – Understanding Markets and Supply Chains

Economic and Agricultural Policies and Their Impact on Access to Food by Vulnerable Sectors of Society

The transition period in which developing countries move from lower- to middle-income status and simultaneously achieve growth in agricultural markets is marked by several factors that impact access to food. There is a shift in the demographics of the poor; small-holder farmers and rural populations face adaptation challenges; and development dynamics change as donors withdraw, with micro-lending rates hardening, and the private sector becoming more active.

Vietnam is a case in point, with the transition seeing a growing number of its people moving in and out of poverty (the transient poor, as differentiated from the chronic poor). The economic conditions that determine the position of the transient poor fluctuate at high speeds and exacerbate their vulnerability. Thus, policies aimed at poverty reduction and rural development have to address the specific, and different, needs of the transient poor as well as the chronic poor.

An emerging challenge for development and investment partners is to help move the transient group permanently out of subsistence agriculture and into the marketplace. The emphasis must go beyond augmenting incomes, to fostering risk mitigation and coping strategies, and governments must gradually shift from subsidies and safety nets to market development strategies. In formulating policies to assist the chronic poor, governments must take into consideration the over-representation of indigenous and ethnic minorities in this group.

The development of agricultural markets has created challenges and opportunities for small-holders. Farm households are adapting with two main strategies, and these must be understood by policy- and development-oriented actors. First, male members are increasingly migrating to work in urban growth poles while females continue to work on the farm. Second, farmers are increasingly implementing market-oriented diversification of production. Development partners have also adapted to changing conditions by implementing revised poverty reduction strategies such as market linkages and group formation for small-holder farmers.

Economic and agricultural policymakers must take into consideration the effects of their policies on the marginalised segments of the population, particularly rural populations. They also need to pay attention to the need for small-holder access to financial and technological resources. In order to be effective, policies need to focus on sustaining productivity growth (this would include increasing R&D), supporting market-oriented diversification (while addressing the associated risks to farmers), linking small-holders to markets, promoting the private sector (tapping new markets, strengthening value chains, encouraging investment in social and human capital, and providing incentives to lower the entry barrier), linking non-farm activities to the rural economy, and addressing risk and vulnerability.

In order for food security objectives to be reached, there needs to be a paradigm shift whereby governments create an environment that enables and fosters economic growth to the benefit of large- and small-scale farmers alike. This requires political will, adequate financial resources, a focus on effective policy priorities, as well as effective coordination among governments, development partners, investors and other stakeholders.

Asian Food Security, the Global Grain Trade and the Role of Agribusiness Firms in Managing the Supply Chains

Opportunities for the agricultural sector in Asia are flourishing as regional population growth drives increased demand for food, and income growth leads to diversification in food preferences (particularly a shift in demand from rice to flour, and an increase in meat consumption). As the supply chain transforms and modernises, however, there is great risk of small-holder farmers being excluded. Addressing such possible exclusion is a key challenge for policymakers. Further factors that must be taken into account by policymakers in addressing the region's urban and rural food security are supply and demand dynamics, trends in trade flows, the competency of agribusinesses and the strength of supply chains.

Regional trade trends indicate that Asia faces widening deficits in the supply of wheat, corn and soybean, not only for human consumption but for animal feed. In

particular, import dependency is high for soybean in East Asia. Demand is very high for wheat, soybean and soybean meal in Southeast Asia, and remains high for soybean meal in South Asia. Asia's import dependency on North and South America is high on multiple counts. More than half of US grain and oilseed exports are destined for Asia. The region is also highly dependent on Australia for wheat.

Trade between the Americas and the Pacific has grown on par or even faster relative to global trade, and will only increase as populations and the environment demand it. Unfettered trade is key to regional food security, and is particularly important for urban areas and net importing countries. Export curbs in staples such as rice and wheat must not be condoned as they exacerbate shortages.

Strategically, the responsibility for creating efficient linkages from farms to markets lies with private enterprises. In particular, the agribusiness sector must manage risks at all stages of the supply chain – from farming, origination, primary processing and logistics; to secondary processing, marketing, distribution and customer delivery. Agribusiness needs to invest in sophisticated logistics, ensure food safety and traceability, fund R&D and share information. It can be observed that the sector is playing an increasingly important role in these areas.

At the regional level, reliable supply chains need to be developed in order to deliver trusted, quality products at lower costs. Supply chains must also be secured, which would mean improving ports and storage in Asian destination locations, making the agriculture sector in rural areas more resilient to climate change, ensuring the safety of sea lanes, prioritising the bio-security of food supplies, fostering a liberal investment climate, eliminating non-tariff barriers to trade, and establishing emergency food reserves.

The price spikes in 2008 and 2010–2011 offer lessons for urban and rural food security, including the need for an early warning system for production and outcomes, sufficient inventories, the prevention of export curbs (on which the WTO must act with resolve), and transparency and cooperation among ASEAN members.

Food Industry Transformation and Food Security in Asia

The biggest competition in Asia's food economy over the next 10 to 20 years will come from within. Internal food trade will lead to integrated markets and regional multinational wholesalers. The rapid transformation of the food industry in Asia is marked by multiple sectors evolving and growing as a cluster. In order to adequately address food security concerns in this evolutionary environment, discourses must reflect the realities of the Asian food economy. For example, discussions about food should not focus narrowly on grain and rice, given that these staples comprise only 25 per cent of all food consumed. Additionally, given that the vast majority of the Asian food economy is domestic, debate on food security should not be skewed towards trade. Furthermore, talk on food security should go beyond the current tendency to focus on rural food security. It should be recognised that between 50 and 70 per cent of the Asian food market is urban.

Policies and food security strategies also need to more proportionally address off-farm sections of the food sector, including processing, wholesale, logistics and retail, given that 50 to 70 per cent of food prices are formed post-farm gate. Governments need to be proactive in engaging the private sector, through reducing barriers to investment, improving food safety laws, introducing effective zoning, promoting wholesale segments of the market, encouraging agribusiness investments and enabling small-holder farmers (who would be extremely vulnerable to the effects of the transformation of the food industry).

Asia is undergoing a modernisation of food supply chains and a supermarket revolution more rapid than ever before experienced by any region. Supermarkets are penetrating food markets utilised by the poor and are reaching towns and villages across the region, and the decline of traditional markets in Asia is happening faster than in any location throughout history. In order to gain market share, supermarkets have reduced their dealings with small- to medium-sized enterprises – and thus small-holder farmers – with the aim of passing on savings to consumers in the form of lower prices.

Rapid transformations are occurring all along the supply chain. In the midstream section, rapid technological developments are increasing the efficiency of the processing sector. In wholesale, there have been major transformations in the last 20 years, with wholesalers becoming agricultural providers, operating a cluster of agricultural services. As traditional supply chains shorten, there is evidence that the village trader or broker role is diminishing as larger companies increase their direct involvement with farmers. In logistics, traders are increasingly investing in facilities and trucks, although this is occurring at vastly different rates across the region. As specialised wholesale actors dedicated to supermarkets rise in scope in some areas of Asia, investment in private logistics is increasing. Moreover, the industry is witnessing the multinationalisation and regional integration of logistics.

The upstream components of the supply chain – sourcing and procurement – face reorganisation, standardisation, disintermediation and reintermediation. For example, it is predicted that in the coming decades almost all rice will be sourced directly from large mills, not the spot market. The transformation of the supply chain is naturally causing greater challenges for both farmers and small- to medium-sized suppliers, while consumers are clearly benefiting from the supermarket revolution in terms of improved economic and physical access to food.

These dynamic changes in Asian food systems are creating both challenges and opportunities. Asian countries must recognise the shifting environment – which at present sees the private sector moving too fast for many governments to keep up – and create policies that can maximise advantages and minimise the marginalisation of vulnerable groups.

The Financialisation of Food Commodities – Not the Cause, Not the Cure

There is some speculation that financialisation of food commodities was a primary cause of the 2007–2008 food price crisis. However, a macroeconomic analysis of other factors, including food price inflation, correlations between various indices, the impact of currency on food price volatility, and lessons learned from financial crises, suggests a more nuanced explanation.

Co-movement between the CRB food index, the Brent oil price and the S&P 500 index has increased in recent years, particularly since the global financial crisis and food price crisis in 2008. However, it must be understood that this is a correlation and does not immediately suggest a causal relationship. There is evidence that food commodities are increasingly behaving like financial assets and respond to similar drivers in similar ways. This increased financialisation could well be explained by a burgeoning increase in index funds investing in food commodities. It has been noted that food popular to indices (for example, wheat, corn and soy) are more financialised than ‘illiquid’ food such as rough rice and pork belly.

In 2007–2008, however, even though the financialisation of food commodities had become significant, the food price crisis was caused by the least financialised products. A process of panic, hoarding and contagion similar to a financial crisis was witnessed.

There is a perception that inflation caused by food prices is a phenomenon caused by temporary supply shock, but it should be considered that macroeconomic factors such as demand, inflation expectation and monetary policy responses have a strong ‘second round’ impact.

One popular explanation for food price volatility is the strength and weakness of the US dollar, but given that the dollar is trade-weighted, a weakening dollar cannot fully account for this volatility. Economic policy actions, such as the second round of quantitative easing by the US government in 2010 (QE2), appear to have a more direct impact on the S&P 500.

From a macroeconomic perspective, then, the financialisation of food commodities is not the main culprit of food price crises. Therefore, limiting investment by commodity index funds and access to derivative trading is unlikely to prevent the next crisis.

The experience of numerous financial crises over the past 20 years has led to the development of mechanisms designed to avoid such crises. There is a need to respond to the recent food price crises in the same way, to learn from

them and develop appropriate mechanisms. A regional risk-sharing mechanism to prevent panic hoarding and price spirals should be considered. This mechanism would have to involve exporting and importing countries. It should start small, reflect political realities, aim to prevent panic-led crises (rather than stabilise regular volatility), be easily accessible in order to address emergencies, have clear modalities, minimise moral hazard and be subject to regular peer review and monitoring.

Discussion

The gains from increased competition and efficiency in the food industry are resulting in improved physical and economic access to food for many in Asia. The transformation and consolidation of the Asian food industry is, however, leading to daunting challenges for small-holder farmers. This issue must be addressed by focusing on the inclusion of small-holder farmers in the transformation of Asia's food economy, but questions abound as to how this may best be accomplished. The need to build the capacity of farmers while achieving economies of scale was discussed. The financing of the midstream segment of the supply chain and the flow-on effects to small-holders was also a concern, as was effective governance. The impact of possible future economic recessions on food prices must also be considered.

Projects that link small-holders with markets and build their capacity to do so are a priority for development stakeholders. Issues of economies of scale must be taken into account when taking such actions, however, as clusters, rural development programmes and organised cooperatives are prone to failure. The achievement of economies of scale at the level of agricultural services (such as harvesting and rice transplanting) in the face of fragmentation at the farm level and the increased use of cold stores are two examples of successful models for capacity building.

Small- to medium-sized enterprises midstream in the supply chain are having difficulty sourcing funding

from the private sector. On the other hand, government subsidies are often directed towards farmers. There is therefore a missed opportunity to provide financing to midstream enterprises to enable them to leverage on opportunities, the benefits of which will then flow to small-holder farmers. In a policy similar to one previously implemented by Brazil, China is addressing this issue with the issuance of subsidies to wholesalers and logistics enterprises on the condition that they link to small-holder farmers.

Proactive governments that work with, and build upon, existing market flows are the most effective at prolonging small-holder engagement as food economies develop. China has developed several effective approaches. This includes the implementation of food safety laws moderated for maximum participation. It has also supported the shift from wet markets to supermarkets through out-zoning, fostering developments in the wholesale sector and promoting agribusiness investments. Some other governments in Asia have less effective approaches characterised by a denial of market realities, lack of investment in infrastructure, and bureaucratic restrictions which do not encourage private sector engagement nor allow for effective private-public partnerships.

In terms of a possible economic recession in the near future and its impact on food prices, it is likely that a lowering of demand will be a factor in driving food prices down. However, even if global demand remains depressed, it is possible that futures may increase and that food prices will remain elevated. Prices will also be impacted should a third period of quantitative easing (QE3) take place in the US.

In conclusion, it is evident that transformations in the food industry are likely to lead to greater economic and physical access to food for consumers in the form of lower prices and increased availability, but that small-holder farmers will be made vulnerable by these same transformations. Opportunities for small-holder farmers to adapt and overcome these challenges exist, but investments and policies must be directed adequately and properly.

Session 4: Utilisation – Ensuring Health and Nutrition

Identifying Food Insecure Populations and Response Action to Ensure Food Security

The number of undernourished people in the world underwent a major spike between 2008 and 2009, rising to over 1 billion before dipping to 925 million in 2010. The largest proportion of the globe's undernourished – an estimated 578 million – reside in Asia and the Pacific. According to the *World Hunger Map 2010* produced by the FAO, the intensity of undernourishment in the Asia-Pacific is not as pronounced as that of sub-Saharan Africa, but incidences of undernourishment are more widespread across the region.

The World Food Programme (WFP) is tasked with identifying populations vulnerable to food insecurity at a global level. However, a major challenge to identifying these populations is the difficulty in establishing a baseline for measurement of food insecurity.

To overcome this, the WFP collates and analyses a range of different data gleaned from national statistics organisations and other agencies. From this information, the WFP produces a food security atlas offering country analyses with indicators relevant to not only food security but also development, poverty and other vulnerabilities. This multifaceted approach allows for more effective mapping of where specific problems exist and their intensity, and can lead to the allocation of more targeted, appropriate interventions.

Through this exercise, the WFP discovered numerous fundamental differences among countries. The regional distribution and intensity of problems such as poverty, undernourishment, underweight children, and populations lacking access to clean water provide indicators to the WFP of the possible food security challenges in each area and how to best address them. In some countries, the atlas exercise was performed not only at the national level but also for specialised areas of interest, such as urban centres. WFP intervention methods are, therefore, dependent on the specific problem experienced by the region in question. Essential considerations include whether interventions need to be long- or short-term,

whether monitoring and surveillance are needed, and whether food insecurity is acute or chronic.

The WFP conducts different types of field assessments, including emergency food security assessments, comprehensive food security and vulnerability analyses, and crop and food-supply assessment missions to help gauge the specific needs of each beneficiary region. Among the indicators used are the Food Consumption Score, the Coping Strategy Index, calculations of household expenditure on food, and a household or community asset score. The WFP also monitors world food price changes and their impact on the food-basket costs in individual countries on a quarterly basis.

WFP food distribution programmes are essentially short-term interventions, and usually take place following a catastrophe. After assessing the needs and coping capabilities of the population being served, the WFP may cease distribution and implement vulnerable-group feeding, which is targeted towards the elderly, the disabled, and those living with HIV/AIDS.

The WFP also carries out food assistance programmes. These include food for work or assets, cash transfers, food for education, school feeding programmes and supplementary nutritional feeding for vulnerable women and children. It also supports food technology development and capacity building, and provides opportunities for low-income farmers to supply food to WFP operations regionally and locally.

The Role of Biofortification in Improving Nutrition Security

There are four intervention methods to meet food security challenges faced by vulnerable populations worldwide: supplementation, food fortification, diet diversification, and biofortification. Biofortification is arguably complementary to the others, but all are essential in achieving better dietary quality and nutritional status for the vulnerable.

Globally, micronutrient deficiency is currently estimated to affect 3 billion people. Iron, vitamin A and zinc deficiencies are prevalent, and are predominant among those without access to a diverse diet. Many are likely to suffer from deficiency in multiple micronutrients.

Supplementation is a short-term strategy used to combat micronutrient deficiency, but this type of intervention has limitations. Micronutrient supplements need to be administered frequently and regularly. While the cost of each dose is small, it is expensive to implement a supplementation programme across a large population. Also, short-term supplementation does not improve deficiencies in the long term. Once supplementation ends, the deficiencies recur – because the population had not made fundamental changes in their dietary habits. In this context, it is essential to take a long-term food-based approach to nutrition security with biofortification incorporated into the framework. Existing examples of biofortification of food items include the addition of iodine to salt.

Arguably, the effectiveness of such interventions is assured if the fortified products reach the people. However, there remains a gap between those who are served by such interventions and those who often are not; including sustenance farmers or those who source their food locally. Among such groups, dietary preferences tend to be more rigid, and limited by factors including access and purchasing power.

It is argued that biofortification could play a more significant role in overcoming these obstacles because it aims to breed crops with higher nutritional content without sacrificing yield or entailing behavioural changes on the part of the consumer, thereby simultaneously improving food and nutrition security. There has been significant progress in breeding biofortified crops. There is limited need for GM in order to produce them as genetic variation is sufficient for conventional breeding purposes. There appears to be no trade-off between yield and the nutrient content of the crop seed. Also, low-cost and highly precise methods of screening promising new lines for breeding and cultivation have been discovered in recent years.

There has also been progress on the nutrition side of biofortification. Nutrient retention rates from the consumption of biofortified crops are high, and high per capita intake levels of such crops have also been recorded. The bioavailability, or proportion of the added nutrients capable of being absorbed and available for use or storage, of crops also appears promising. Iron's bioavailability ranges from 5 to 10 per cent, zinc's is assumed to be 25 per cent, and the bioavailability of provitamin A is two to three times higher than anticipated.

Bioefficacy trials and studies are underway to test whether long-term consistent consumption of a biofortified crop leads to a change in the nutritional status of the beneficiary population, moving them from deficiency to sufficiency. Effectiveness studies have also been undertaken to assess long-term improvements in micronutrient levels across receiving communities, and the ability of farmers, markets and consumers to access biofortified seeds, crops and products.

In order to encourage the long-term sustainability of a biofortified crop, it is essential to establish stronger links between the food retail sector and food producers, while promoting the health characteristics of the crop. It was also suggested that a nutritionally improved crop could be popularised to consumers by diversifying food preparation and products. Companies may be able to ensure access by integrating familiar products into existing markets and consumer preferences. This requires no change in the dietary habits of the consumer, but will have a profound impact on their nutritional status.

There remain challenges to biofortification. Target groups for biofortified crops and its resultant products are almost always poor and lacking in physical and economic access to such foods. There remains an urgent need to develop programmes to deliver such products to these groups. The international food security agenda also appears preoccupied with increasing crop yield. Arguably, a shift towards a focus on both yields and nutritional value is needed in order to sustainably and holistically overcome the current food security challenges.

Ensuring Food Safety for Food Security

Food safety contributes to the improved nutrition and health status of a population; reduces public health costs; reduces food losses; increases availability, stability and utilisation of food along the food chain; and increases national and international market access. Today's major food safety concerns include residues, contaminants, pathogens, zoonotic diseases, GM issues, organic pollutants, allergens and labelling issues.

At the international level, the WTO agreements on Sanitary and Phytosanitary Measures (SPS) and Technical Barriers to Trade (TBT) exist to address the public health, safety and environmental concerns that arise from food safety at the global market level. These agreements set out the basic rights and obligations of countries with regard to food safety standards. They also coordinate the harmonisation of the Codex Alimentarius Commission, the World Organisation for Animal Health (OIE) and the International Plant Protection Convention (IPPC), and outline safety equivalence standards and requirements.

In order to further ensure food safety, it was suggested that a food chain approach to meeting safety requirements should be encouraged. This would entail a shift from end-product inspection and testing, to building safety and quality throughout the food chain, taking a preventative rather than reactive approach to risks, and placing responsibility for food safety in the hands of all actors along the chain (farmer, processor, handler, government actor and consumer). Such strategies would also entail better regulation of good manufacturing practices (GMP), good hygiene practices (GHP), hazard analysis and critical control point (HACCP), and import-export inspection and certification. However, three major concerns with meeting such requirements remain: implementation limitations in developing countries or those susceptible to food insecurity, diversity of food safety standards, and the use of such requirements as trade barriers.

The major challenges to meeting food safety at the international level were identified. They include variable climatic conditions and global financial crises. The rise in food insecurity, the upholding of food safety as an integral part of the food security agenda, and changing dietary patterns were cited. Scientific progress would also be vital.

Meanwhile, a multitude of complex national-level challenges are becoming more pressing. Examples include the difficulty of keeping pace with changes in international and importing countries' regulations, and questions of clarity and coordination between different organisations with overlapping roles. There is a need to focus on issues such as promoting increased participation in international standard-setting, establishing disease surveillance for food-borne hazards, and encouraging HACCP and dealing with the increased reliance on the certification of the exporting country.

The Links between Food Security Research, Policy and Programmes, and Nutrition Security: The Thai Experience

Nutrition security is an integral branch of food security. It is focused on the individual and takes into consideration his food consumption behaviours and access. Nutritional status is measured with specific indicators including body mass index (BMI), weight-for-age, height-for-age and weight-to-height ratios.

Thailand provides a strong example as to how indicators along these different measurement criteria can improve as a result of new policy measures. Importantly, Thailand's nutrition security improvements were not solely contingent upon conventional nutritional intervention programmes which consist of education, surveillance and supplementation efforts, but occurred as a result of multiple inputs and interventions that were strongly influenced by research and policy developments.

Thailand has employed 10 plans across a period of 48 years, spanning different targeted interventions and complementary research efforts to address the specific nutrition security challenges of each time period.

Thailand began fortifying salt with iodine in the 1960s to 1970s following concerns of nutrient deficiencies. The positive results spurred the government to invest in national-level research on nutritional epidemiology and how to better integrate nutritional improvement into rural community development throughout the 1970s. National-level research on key nutritional deficiencies was then paired with rural development programmes alongside a policy focus on reducing the rate of underweight children, as well as the rate of stunting and wasting between 1982 and 1991. The combination of nutritional intervention programmes, nationwide school feeding programmes and cooperation with the UN Children's Fund (UNICEF) on iodine deficiency issues successfully reduced the national rate of underweight children from 50.8 per cent in 1982 to 17.1 per cent in 1991.

Thailand's two nutrition security programmes over the last decade have been focused on examining the implications of the national food safety policy for food industry standards, harnessing local technologies for safe food production, and dealing with persistent issues of simultaneously occurring over- and undernutrition issues. Parallel to these programmes, the plans also run research on the promotion of agriculture based on economic sufficiency principles and studies on how the global and national market influence the public's food consumption behaviours and food choices.

The initial obstacles to implementing these plans included convincing policymakers of the importance of nutrition security. That involved going beyond definitions of food security that place importance almost exclusively on staple food crop production. Presently, various challenges, constraints and threats to the future of such nutritionally focused plans remain. These include evolving political

priorities, development issues, Thailand's changing demographic landscape, in particular the mass migration of working-age people to urban centres, a growing ageing population and an increase in the number of elderly people working, acute food demand in certain regions post-natural disaster, the growing double burden of under- and overnutrition, and a rise in incidences of chronic disease.

The future of food security programmes, policies and research in Thailand would likely be focused on cultivating economic sufficiency, equity and social resilience through encouraging agricultural development as a main source of income and food security. Technology- and knowledge-based growth, a community based approach to development, and food safety would also be priorities for the coming years.

Discussion

On the role of international organisations in food and nutrition security, it was observed that the WFP Food Consumption Score is accepted as a primary indicator for assessing food insecurity at the household level while taking into consideration country-specific thresholds, local adaptations, levels of development and access, and dietary differences between and within countries. It was noted that efforts are still underway to calibrate the score to each nation's specific dietary patterns and consumption habits so as to generate a more comprehensive picture of dietary diversity.

In the context of food and nutrition security after the end of the short-term WFP food assistance, it was asked if there were studies that surveyed the impact of such interventions on the consumption habits of populations. There was also a question on the effect of the interventions on regional food security when a population becomes dependent on a supplementary crop, leaving local markets unable to meet the demand.

In response, it was clarified that the WFP does not attempt to alter a population's dietary habits. If there are ways in which local populations can meet their own dietary requirements, the WFP tries not to alter this by introducing a new aid crop. In an emergency, however, the WFP will have to choose a crop based on market circumstances and available funding. Household access to sufficient food after food assistance, meanwhile, was highlighted as an area that will be subject to assessment by the WFP and individual governments. The WFP would either continue assistance or help a government transition into its own programmes.

Responding to questions on the relationship between the 'most favoured nation' (MFN) status and food safety at the international level, it was explained that MFN is a status accorded by one state to another in international trade. A country that has been accorded MFN status may not be treated less advantageously than any other country with MFN status by the promising country. In practical terms, this means that a country cannot apply differing standards in food safety to the same product imported from different source countries. This concept is only malleable within the context of regional harmonisation of food safety standards.

It was also noted that FAO-World Health Organization (WHO) joint food safety programmes must be acknowledged for their role in providing for transparency in risk- and science-based approaches. It was further highlighted that progress in transparency has been positive, with the FAO publishing various tools alongside the implementation of several projects including capacity building and the establishment of good agricultural practices. Additionally, more comprehensive tools are being developed based on the outcomes of these projects.

On biofortification, the WFP respects governments' wishes as to crop types used in food assistance. However, the WFP's main criterion for crop choice, whether biofortified through GM or conventionally, prioritises the use of donor funds in the most efficient and appropriate manner so as to optimise the kilocalories and nutritional value provided to beneficiary populations. It was also noted that in order to ensure consumer uptake of biofortified products in the market, there needed to be proactive engagement with multiple actors – with farmers so as to ensure crop productivity, with consumers so as to promote the health benefits of consumption, and with policymakers and governments so as to convince them of the importance of nutrition security, not only food security and yield.

On food and nutrition policy, standards and research, it was affirmed that research findings from non-nationally funded sources such as the private sector and academia play important functions in shaping government policies. Many research results and data are applicable cross-sectorally, and in order to optimise their potential, findings needed to be fed into the appropriate coordinating and implementing bodies so as to impact policymaking processes. It was agreed that research findings needed to be publicly available so as to maintain public engagement and awareness on food and nutrition issues.

The bureaucratisation of international food regulations and the best methods to adjust food and nutrition standards and policies according to accurate assessments of risk were raised. In response, it was explained that international regulations and standards are often aligned with international agencies and are aimed at protecting consumers. It was, however, acknowledged that it was important to note the variations in the regulations of different countries and regions. It was suggested that to bridge these gaps, avenues for working within the system must be capitalised upon. A final recommendation was to push for progress towards harmonising public and private sector standards at the WTO level.

Session 5: Appropriate Investments to Match Urban Food Security Needs with Areas of Surplus

The Doha Round Negotiations on Agriculture Trade Rules and Their Potential Impact on Food Security

Trade plays an important role in enhancing Asian food security, as even the region's most self-reliant food producing countries still depend on food imports to meet their domestic demands. For countries facing land and/or resource constraints, the international food trade constitutes a fundamental element in ensuring food access for their citizenries. As such, trade policies that inhibit the free flow of goods should be reassessed, minimised, and in some cases, heavily curtailed. Such ideas provide the impetus for international trade deliberations generally, and for the ongoing negotiations on the General Agreement on Tariffs and Trade (GATT) specifically. While the direction of international trade negotiations remains uncertain, it is clear that future trade regimes will have significant implications for Asia's regional food systems.

The 8th round of GATT negotiations (the Uruguay Round) was held from 1986 to 1994, and the agreements were implemented from 1995 to 2004. These were the first GATT negotiations to include agriculture, which was previously excluded because of its contentiousness. They also led to the creation of the successor to the GATT, the WTO.

The Doha Development Agenda (the Doha Round) succeeded the Uruguay negotiations in late 2002 and has highlighted development agendas to a greater extent than any previous major international trade meetings. Agricultural issues loom large in the still-to-be-concluded Doha Round, and have significantly contributed to the negotiators' inability to reach consensus. Agricultural points of contention fit readily into the larger Doha discourses on development, protectionism and the liberalisation of markets. These issues can be usefully categorised within the two main pillars of the Doha Round, namely, market access and domestic support measures.

The market access discussions rest upon the management of tariffs. The Uruguay Round left the legacy of a range of tariffs. Doha seeks to 'harmonise' international tariffs to make them more uniform and ultimately reduce their role in the food sector and elsewhere. This goal has led to a 'tiered reduction formula' that calls for higher tariffs to be cut more severely than lower ones, to the end that future trade rounds can reduce tariffs from a more uniform starting point. While unresolved issues remain, such as those relating to tariff ceilings and tariffs for so-called 'sensitive products', the objective of lessening the gaps in tariff levels will continue to loom large in the Doha Round.

Domestic support measures represent a second pathway by which countries often pursue economic strategies that can limit the free trade of food. Doha classifies domestic support measures into three strata, which it labels amber, blue and green. Amber measures are seen to be trade distorting, and notably include agricultural subsidies that encourage over-supply. These measures are targeted for reduction under the Doha Round negotiations. Blue subsidies are similar to amber, with the exception that farmers cannot expand subsidised crops onto new lands in order to receive additional subsidies. Blue subsidies are thus seen as being less trade distorting than amber ones. The most benign subsidies, from a liberal trade perspective, are labelled green and include non-trade distorting practices such as infrastructure investment. Categorising green subsidies often proves difficult.

Food security issues at the centre of the Doha negotiations are technically complex and politically contentious, and prospects for consensus at the November 2011 meetings are slim. Despite continuing impasse, however, trade liberalisation continues at the bilateral and regional levels, including in ASEAN where tariffs are relatively low.





Participants of ICAFS 2011

Seated (from left to right): Fr Francis Lucas, Dr Franz Fischler, Assoc. Prof. Mely Caballero-Anthony, Dr Fan Shenggen, Amb. Barry Desker, Dr Mohamad Maliki bin Osman, Prof. Paul Teng, Dr Gil Saguguit, Jr, Col (NS) Loh Kean Wah, Assoc. Prof. Ralf Emmers.

Back row (from left to right): Dr Margarita Escaler, Dr Annie S. Wesley, Dr Lourdes S. Adriano, Ms Atsuko Toda, Asst Prof. Jintana Young-aree, Dr Vijay Gupta Modadugu, Dr Keith Dawson, Dr Rolando Dy, Mr Geoffry Smith, Dr Mercedes Sombilla, Prof. Cai Jianming, Ms Shashi Sareen, Dr T.J. Higgins, Dr Tan Siang Hee, Prof. Rudy Rabbinge, Mr Michael Sheinkman, Dr Kashyap Choksi, Dr Jose Geraldo Eugenio de Franca, Dr Santitarn Sathirathai, Mr Lee Kwong Weng, Dr Randy Hautea, Dr So Nam.

The task at hand for Asian countries is to re-evaluate their own regulative and at times protectionist trade regimes so that they will be well-placed to take advantage of the more liberalised trade system that will likely emerge from Doha in the future. In the potentially volatile food security context, such preparations may prove profoundly important for the region's future.

'Land Grabbing' as a Food Security Phenomenon: A Critical Review

'Land grabbing' is a very emotive and contentious issue. It is a pejorative term used to describe the process by which external actors, both public and private, gain control of lands in a given location at the expense of the lands' traditional or otherwise rightful owners. This term, while effective in drawing attention to those who have become marginalised through property acquisition agendas, is no longer sufficient or appropriate for describing land control transfers in Asia. 'Farmland acquisition' is a more balanced term that can justifiably underwrite a critical account of land transitions in Asia.

Farmland acquisition has been usefully defined by Cotula and colleagues as 'the purchase of both the ownership and use rights [of land] through leases or concessions whether short or long term.' Farmland acquisition, despite existing controversy, represents a key element of the food security strategies of countries lacking in land and/or natural resources. Exploring the modalities of farmland acquisition processes is therefore an important endeavour, and necessitates analysing the drivers of the phenomenon, the policies of both investing and recipient countries, and the potential for 'win-win' situations.

Land acquisition has accelerated partly as a result of the food price fluctuations of 2007–2008. This period of price volatility served warning to countries of their own relative food security vulnerabilities. At the height of the crisis, 29 countries curbed food exports, 11 countries banned rice exports and 15 countries banned the export of wheat.

This was a disastrous situation for food importing states, and amplified their desire to bypass conventional food markets and gain security through controlling land.

The IFPRI estimates that from 2006 to 2009, between 15 and 20 million ha have been acquired around the world, much of it in developing Asian countries. Countries that face land and water deficits but have access to capital seek farmland in countries with strong agricultural potential and the need for capital investments. Specifically, capital-rich countries in the Middle East have acquired significant lands in Southeast Asia, with Cambodia and Indonesia being the primary recipient states. Saudi Arabia, a primary food producer in the Middle East, has seen its agricultural outputs dwindle through water shortages and has looked further afield to meet its domestic needs. East Asian countries such as the Republic of Korea, which currently relies on imports for up to 90 per cent of its food consumption, and China, which while not land-poor faces daunting food demands and environmental stresses, have also actively pursued lands outside of their own borders.

The interplay between acquiring and recipient actors defines much of the farmland acquisition discourse. Some take the view that it represents injustice and is economically untenable in the longer term. Against this, there are those who insist that farmland acquisition is a natural extension of the food trade that can benefit all parties involved. Transcending both of these positions, however, is the reality that farmland acquisition is an increasingly entrenched process that will continue to affect the physical, socioeconomic and political landscape of Asia for the foreseeable future. What is important within this context is to seek symbiotic relationships that respect the needs of acquiring actors as well as ensure social justice in and the economic futures of recipient states and communities. This will require a strengthening of laws and institutional capacities in recipient states and an emphasis on uniform regulations and standards globally.

Some steps have been taken to this end, including the creation of farmland acquisition frameworks by the IFPRI and the World Bank. More regional engagement is needed from groups such as ASEAN and the South Asian Association for Regional Cooperation (SAARC) in order to address the specific conditions experienced in Asia. Through such engagement and responsible practices, it is possible that farmland acquisition will emerge as a key food security strategy for acquiring and recipient countries alike.

The Brazilian Cerrado Experience and Its Implications for Investment to Produce Surplus Food

Over the past four decades, Brazil has invested heavily in agriculture for food and energy; and the results have led it to become an internationally relevant agricultural producer. Brazil's experience, while tied to its own unique national circumstances, does provide some insights into how developing Asian countries can address their own respective food security challenges.

Production improvements in the cerrado regions of Brazil are essential for understanding the country's larger success. The cerrado is similar to the savannahs in Africa, and comprises one-fourth of Brazilian land. The cerrado is home to light (with some dense) vegetation, along with areas of grassland, and has soil with high aluminium content. The region is also important for water security, housing some of Brazil's primary watersheds. Soil and water management, the development of new agricultural methods and inputs, and the maintenance of social systems that are conducive to agriculture have made the cerrado a key to Brazil's food and biofuel production strategy.

The agricultural sector is a pillar of the Brazilian economy. Brazil's 2008 agricultural output was valued at USD1.57 trillion, making up over 26 per cent of the country's GDP and over one-third of its exports. Current trends suggest that agriculture will continue to play a significant role in the Brazilian economy for at least

the next two to three decades. The cerrado is the single most important location for maintaining this output and it currently supplies significant amounts of beans, corn, sugarcane and other staple products. Moreover, roughly 60 million out of the 207 million ha of cerrado land is still available for agriculture, making it the linchpin of future agricultural strategies.

These future strategies will only be tenable if they are pursued in a sustainable manner. There are reasons for optimism on this front, as Brazil has steadily reduced the environmental impact of its agricultural activities. For example, soybeans cultivated in the cerrado are now being grown largely without nitrogen, and new bacterial inputs allow Brazil to undertake a progressive strategy to ensure biological nitrogen fixation. The country is also extending areas of untilled land and pursuing agro-climatic zoning in search of ideal conditions and maximum yields. The success of these actions, moreover, has taken pressure off of the Amazonian forests, which continue to face threats (albeit often overblown) from agricultural expansion.

Brazil has also been more successful than most in pursuing an ambitious approach to biofuel production. Biomass, largely from sugarcane, currently makes up a very significant part of Brazil's energy mix, including fuel for half of its 30 million car fleet. Advances in sugarcane yields and a fledgling second-generation ethanol agenda suggest that these figures could still increase more. It is important to note, however, that the transferability of the Brazil's biofuel strategy may be limited, and the experiences elsewhere provide valuable cautionary tales for many Asian contexts.

Nonetheless, in the realm of food production, Brazil can provide developing Asian countries with several important lessons. Like much of Asia, Brazil has neither the luxury nor the inclination to reduce or eliminate small-scale farming in favour of a sector dominated by estate-level operations. The millions of small-

scale farmers are important to the country's economy. However, they are also the ones who in leaner times often suffer from food insecurities. Brazil has responded with a mix of social programmes that provide financial assistance when needed as well as regular programmes aimed at improving the agricultural capacities of farmers and the market opportunities available to them. These programmes can be replicated with enough political will and Brazil is willing to continue to share its experiences with its Asian counterparts, and collaborate towards a more secure food future.

Food Security: Opportunities for Increasing Agricultural Production in Emerging Markets

Rather than a second Green Revolution, Asia needs an 'evolution' of existing food strategies that builds on past experiences and creates more stable regional food systems. Paramount to any such strategy will be their capacity to be both profitable and sustainable. This is a particularly daunting challenge in the context of growing populations, increasing affluence, shifting food choices and a potentially emergent biofuel industry. There is, however, no alternative – the social, political and economic stability of parts of Asia and beyond require that agricultural production meet future needs while protecting environmental endowments.

Advances in food production are not new – the Incas of contemporary South America provide an example of agricultural diversification in the face of food challenges – and such progress can be replicated, particularly with information sharing being widespread today. Likewise, technological progress resulting from teamwork, innovation and resource allocation appears poised to continue indefinitely. Both of these points lend themselves directly to issues of land-use in food production. Land is the key input for agriculture and must be used judiciously and effectively. The second related primary input for food production is water, and water requirements vary significantly in different environments and for different crops. In combination, growing food demand and the

inputs required by such expansion make the efficient use of land and water the ultimate objectives of the food production sphere.

Despite challenges, agricultural production has realised substantial yield increases, particularly with barley, maize, rice and wheat. These increases, however, have been predicated to a large extent on investment in research and the technical progress that it has wrought. This investment has been in steady decline, and in consequence, output increases have also seen a downward trend. Somewhat paradoxically, the economic downturn has had some corollary effects that could partially reverse this trend. The instability of global markets for stocks, bonds and other financial products has led to capital movement into tangible sectors such as land and crops. These investments manifest in a number of ways – private and government-owned initiatives as well as public-private partnerships – and create opportunities for a rejuvenation of the agricultural production sector.

Such emergent opportunities are influenced by a variety of factors. Crop production requires significant initial capital investment, and investors can play a role by initiating projects that would otherwise not have been possible. These capital investments will be predicated on an assessment of the risks involved in a given project, whether they are political, environmental, or related to infrastructure, project execution and marketability. An overall assessment of these risks in a given location suggests its investment potential. Notably, areas that currently suffer from wide yield gaps can be particularly attractive to investors.

Three case studies in Europe, Cuba and North Africa have all demonstrated the potential of public-private partnerships, showing that investment in agricultural inputs and capacity building can have a marked effect on food production. Such strategies are essential for meeting Asia's future food needs and, for success from a food security perspective, they must be pursued in conjunction with the strengthening of land rights, the rule

of law, and the principles of social justice. If undertaken appropriately, such projects can appeal to the mutual interests of all stakeholders in the production process, in that they all desire high yields, marketable quality, low costs of production, and environmentally and socially sustainable practices. Through these relationships, it has been shown that it is possible to increase productivity, improve value-chain development and increase resilience. These are the three primary tasks of the Asian food production sector.

Discussion

The push towards self-sufficiency is not without its problems and the notion that it could erode the principles of free trade and lead to greater protectionism is potentially problematic for the future of the international food trade. However, it should not be assumed that supporting domestic agricultural sectors will necessarily erode trade, detract from the necessity of trade or lead to the breaking of the rules of trade. The fact that international trade negotiations allow some level of subsidy in developing states' agricultural sectors, much of which is not currently being utilised, demonstrates that there is a middle ground between strict market liberalisation and myopic emphases upon domestic food sectors.

The most intractable food production quandaries facing Asia stem from the interplay between large- and small-scale farming and the land rights issues that accompany shifts in the regional production calculus. Many question the desires and intentions of the private companies involved in the food sector, some of which are likely concerned almost exclusively with profit to the detriment of environmental sustainability and social justice. The degree to which these problems can be avoided depends largely on the effectiveness of the partnerships and collaborative endeavours between private and governing entities. These partnerships, when used effectively, can be very useful tools for symbiotic efforts that promote food security at local, state and regional levels.

Similar issues underlie concerns related to foreign direct investment in the agricultural sectors of other countries, which is typically undertaken in the name of improving efficiencies and outputs. While this may not be problematic in its own right, there are well-founded fears that these investments may fail to provide capital, jobs and other benefits for local populations, and will thus ultimately fail to appropriately address food security concerns. More explicit emphasis needs to be paid to supporting not just shareholders, but also communities receiving the investments.

Land acquisition likewise necessitates balancing the interests of foreign investment and local development. There is a risk that governments of destination countries are not accountable to, nor do they consult, their people. This could result in partnerships that produce capital, but at the expense of local interests. This is exacerbated by the reality that many land rights systems in Asia are fragile and based on tradition. In Cambodia, for example, land acquisition has led to forcible evictions of people with only traditional land rights, and has resulted in violence. Issues also arise from the promotion of food security for wealthy countries at the expense of marginal populations in destination locations. Is it appropriate that these processes are viewed as inevitable? And should we take the situation for granted and deal with it only on its current terms? Moreover, different conditions pertain in various locations, precluding a one-size-fits-all approach, making such questions even more pressing. One relatively non-contentious point in this ongoing debate is that checks and balances and frameworks for evaluation, such as the certification processes put forward by the WWF, can mitigate some of the land rights issues that would otherwise exist.

Session 6: Statement of the International Conference on Asian Food Security (ICAFS) 2011

An inclusive dialogue was held to discuss the draft of the ICAFS 2011 Statement on Feeding Asia in the 21st Century. The deliberations yielded a range of alterations, additions, re-emphases and reorientations. The Statement was much improved through this process, and the following text represents the culminating contribution of ICAFS 2011.

ICAFS 2011 Statement on Feeding Asia in the 21st Century

ICAFS 2011 was convened in the shadow of profound and systemic food challenges throughout Asia. The convenors recognised the clear and voluminous evidence that impediments to food security are among the most formidable obstacles to advancing the progress and quality of life for all of Asia's citizenries. In response, the concluding plenary session discussed positions and recommendations relating to the pillars of food availability, access, utilisation and rural-urban relationships. While recognising that there is no single solution to Asia's food challenges, the plenary discussion suggests the following as guides for future food sector policies and strategies in Asia.

Food Availability

Regain investment momentum in the agriculture and food sector, and redouble efforts in the R&D sectors.

Evidence has demonstrated that agriculture is fully capable of generating high economic returns on investments. Food sector investments allowed food production to

meet many of the demands that have accompanied factors such as economic growth, population expansion, demographic changes, and shifts in food preferences. These investments have waned significantly over the past decade and contributed to the slowdown in food production growth. Investments in R&D in particular have drastically reduced over time in most developing Asian countries, affecting yields of agricultural commodities including fish and other marine products.

Food demands, however, continue and will continue to expand especially in Asia where the population is expected to rise from 3.8 billion in 2010 to about 5.2 billion in 2050. Along with this expansion will be more demographic changes and marked urbanisation trends. More and better quality food will be needed.

Food production must increase but this time through more sustainable increases in yields. Investment momentum in the agriculture sector must be rejuvenated to support yield-enhancing infrastructure and activities, including R&D, agricultural extension, insurance and credit, and assistance to enable small-, medium- and large-scale farmers to overcome the emerging threats posed by climate change, fuel and food price volatility, and other uncertainties of the globalised food system.

Such investments should be the responsibility of both the public and private sectors, including companies, farming and non-governmental organisations, philanthropic bodies, and government actors. It should also be the responsibility of developed countries, especially net importers of food in the region such as Singapore and Brunei, to support R&D in the food producing countries.

Judiciously pursue enhanced science and policy innovation.

Higher yields are developed from the intersection of multiple technologies that include conventional technologies such as germplasm breeding; agronomic practices such as irrigation, fertilisation management and pest protection; as well as scientific advancements like those offered by biotechnology. R&D has to be pursued to increase yields, improve the quality of produce and promote more sustainable agricultural production.

However, future R&D efforts should shift such that the most appropriate combination of sciences and techniques should be used with due consideration to the circumstances of small-holder farmers, in terms of their ability to access new technologies, the applicability of new technologies in their production environment, and the capacity of stakeholders to adopt and use the new technologies that are deployed.

Focus should increasingly shift towards the development of technologies that will improve the production of commodities that are projected to undergo rapid demand increases because of the evolving economic and demographic circumstances. Technologies should also be pursued to lower the environmental impacts of farming and encourage the development of urban and peri-urban agriculture. Singapore and other urban areas can act as pioneers for innovative farming techniques such as agro-parks, aquazones, vertical farming, rooftop aquaponics, and aeroponics.

All of these technological ambitions should be accompanied by the formation and implementation of adequate and appropriate policies and regulations, particularly those pertaining to intellectual property (IP), that would allow their use by small- and large-scale farmers across a range of regional locations.

Food Access**Address the plight of the region's chronic poor.**

The chronic poor, of whom indigenous people make up a large proportion, are isolated from mainstream economic growth. These populations often lack market access and opportunities, have comparatively low skills and capabilities, and encounter language difficulties. They thus require policies targeted at supporting their specific conditions. Such support can come in the form of social safety nets or cash transfers, employment generation, universal healthcare, and skills training and capacity development. Such actions are important for bringing the region's poor to a level of sufficient productivity and food security. The most beneficial of these safety nets are those that would help the chronic poor eventually develop to take advantage of market expansion and overall economic growth.

Enhance capacities to sustain increases in farm production and to diversify livelihood activities to increase incomes.

Agriculture remains the economic backbone of most Asian countries but despite the impressive performance of the sector in the past, value added per unit of production input has not improved to the extent necessary to effect broad-based progress in living conditions, especially for small-holder farmers. Incomes in the agriculture sector have to improve through diversification, not only to high value crops but also to value-adding activities that would facilitate the transformation of the agricultural sector into more commercial scales.

Farmers' capacities have to be strengthened in the following areas: (1) access and use of appropriate technologies to improve yields; (2) ability to engage in agribusiness activities; (3) participation in the food

supply chain; and (4) the organisation of effective farmers' groups and cooperatives. To make this happen, investment support will be needed to provide public goods such as infrastructure, post-harvest facilities and market information systems; correct market failures and deliver credit; eliminate institutional gaps in sectors such as training and skills development; and remove distorting economic policies and impediments to the progress of small-holder farmers. Investing in the agricultural sector, and particularly in women who are small-holder farmers, is essential for feeding much of the region's most vulnerable.

Greater participation in the transformation of local markets and the expanding international trade.

A significant transformation is taking place in the food supply chain; consumers now obtain 40 per cent of agricultural produce from supermarkets and corporate retail outlets. Private sector investments are critical in the modernisation of this supply chain particularly in the off-farm segments that involve wholesalers, processors and supermarkets to improve efficiency, ensure delivery of trusted quality products, and reduce transaction costs, resulting in lower food prices. Governments should lower entry barriers for private businesses and put in place more stringent food safety measures. Small-holder farmers should be well integrated into the whole modernisation process. Governments should encourage investments in physical and human capital to lessen the exceptional start-up costs of small-holder farmer collaboration on agricultural projects.

While much of the food consumed in Asia is produced domestically, the role of international trade is accelerating in importance especially with the rapid expansion of urban

populations that are partly dependent on imports for their food requirements. In this regard, unfettered trade should be promoted and trade partners expanded. Additionally, export curbs and other distorting trade policies should be discouraged to avert food shortages and episodes of price volatility. The establishment of effective food supply and demand monitoring and early warning systems can help prepare for market disturbances. Likewise, the establishment of emergency food reserves can prevent countries from becoming more food insecure. Measures such as robust and deep grain futures markets that have never been applied to agricultural commodities should be studied in terms of their effectiveness in promoting transparency of price formation, supply stability and market confidence. Singapore's role as a leading global and regional financial hub can also serve as a base for these commodity futures markets.

Food Utilisation

Take pragmatic and concrete efforts to link policies in the food and health sectors.

Policies should encourage both yield growth and higher nutritional values for agricultural commodities. They should help popularise nutritionally improved food products, advocating their benefits to consumers and enhancing their marketability through developing techniques for their diversified preparation. At the same time, strong national food control and regulatory systems that are reinforced by international guidelines, particularly those addressed in the Codex Alimentarius, should be put in place and built along all phases of the food chain.

Pursue risk-based approaches to food safety that are predicated upon leading scientific knowledge and extend throughout entire food chains.

Quality and safety must be holistically pursued throughout all phases of the food chain, with end-product inspections serving as a supplementary rather than primary strategy. Preventative on- and off-farm strategies must replace reactive approaches to risk, and strong national food control and regulatory systems should strive to increase public confidence in the safety of the modernising agricultural sector. These food safety measures must be pursued in ways that neither exaggerate nor discount food utilisation risks, and be actuated in ways that do not compromise the sustainability of local livelihoods.

Additionally, food safety standards must be harmonised at the regional and even international level by investing in more sensitive detection methods for pathogens and contaminants, strengthening food testing laboratories and improving food safety accreditation systems. Efforts should also be focused on the development of mechanisms not only to share but also to promote collaborative use of knowledge and expertise.

Rural-Urban Relationships

Extend existing foundations to create positive symbiotic relationships between producing and consuming actors.

It is clear that food importing countries can impact conditions in producing states and regions in fundamental ways. These relationships need to be managed in order to add resilience and reduce vulnerabilities for importing states while providing economic opportunities for producing countries. While potentially symbiotic, such relationships between producer and consumer states are

often difficult to manage, and require policy interventions that cooperatively address the different circumstances and interests of urban food consumers and rural food producers.

Recognise the importance of agriculture for rural employment and development, and implement policies that help rural actors face the challenges that exist in changing Asian food systems.

Millions of rural stakeholders in Asia look to the food sector for their sustenance and livelihood, and ensuring that needs are met in both areas is paramount for food security in both rural and urban settings. The plague of poverty and hunger should thus be reprioritised throughout Asia, and the key role played by small-holder farmers, many of them women, should be reflected in future policy directions. Specifically, improvements in land tenure legislation and regulation, supply-chain and storage infrastructure, access to modern agricultural inputs, sharing of best practices, and food price management are all readily possible and vital for the future of rural Asia.

Utilise resources available in urban contexts to promote sustainable agricultural advancement in rural settings.

Investments in agricultural production are needed from urban economic, political and social centres, and investors and recipients should pursue policies that protect local communities and contribute to national strategies that recognise that environmentally and socially sustainable policies are essential for future growth and prosperity. Combining the financial, economic, logistical and research capacities of urban areas with the land and natural resource endowments of Asia's hinterlands is essential for the region to effectively respond to the formidable food security challenges of the 21st Century.

Programme

International Conference on Asian Food Security 2011
10–12 August 2011
Grand Copthorne Waterfront Hotel,
Singapore

Day 1 10 August 2011 (Wednesday)

08:00	Registration	
08:55	Arrival of Guest of Honour Dr Mohamad Maliki bin Osman Senior Parliamentary Secretary, Ministry of National Development and Ministry of Defence, Singapore	
09:00	Welcome Remarks Ambassador Barry Desker Dean, S. Rajaratnam School of International Studies (RSIS), Nanyang Technological University, Singapore	
09:10	Welcome Remarks Dr Gil Saguiguit, Jr Executive Director, Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) / Southeast Asian Ministers of Education Organization (SEAMEO), Philippines	
09:20	Introduction to ICAFS 2011 Professor Paul Teng Senior Fellow and Advisor to the Food Security Programme, Centre for Non-Traditional Security (NTS) Studies, S. Rajaratnam School of International Studies (RSIS), Nanyang Technological University; and Dean, Graduate Programmes and Research, National Institute of Education, Singapore	12.45
09:35	Keynote Speech by Guest of Honour Dr Mohamad Maliki bin Osman Senior Parliamentary Secretary, Ministry of National Development and Ministry of Defence, Singapore	14:00
10:30	HIGH-LEVEL FORUM ON FOOD SECURITY Sub-theme: 'Think Global, Act Asia' <i>Moderator</i> Dr Gil Saguiguit, Jr Executive Director, Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) / Southeast Asian Ministers of Education Organization (SEAMEO), Philippines	

Why ASEAN Needs to Be Concerned about Food Security

Associate Professor Mely Caballero-Anthony
Director of External Relations,
Political Security Community Department,
ASEAN Secretariat, Jakarta,
Indonesia

presenting on behalf of
Dr Surin Pitsuwan
Secretary General, ASEAN Secretariat, Jakarta,
Indonesia

Asian Food Security in Relation to Global Food Security

Dr Fan Shenggen
Director General, International Food Policy
Research Institute (IFPRI), Washington, DC,
US

Effects of the European Union's Food and Agriculture Trade Policies on Food Security for Developing and/or Net Food Importing Countries

Dr Franz Fischler
Former European Union (EU) Commissioner for
Agriculture, Rural Development and Fisheries

Food Security, Livelihoods and the Rural Poor

Fr Francis Lucas
Chairperson, Asian NGO Coalition for Agrarian
Reform and Rural Development (ANGOC),
Philippines

Q&A Session and Media Questions

Lunch
*Sponsored by CropLife International and
CropLife Asia*

SESSION 1: The Scope of Food Security in Asia

Moderator

Associate Professor Mely Caballero-Anthony
Director of External Relations,
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ASEAN Secretariat, Jakarta,
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The Interdependence between Urban and Rural Food Security in Asia

Professor Paul Teng
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and

Associate Professor Mely Caballero-Anthony
Director of External Relations, Political Security Community Department, ASEAN Secretariat, Jakarta, Indonesia

Making More Food Available: Promoting Sustainable Agricultural Production

Professor Rudy Rabbinge
University Professor in Sustainable Development and Food Security, Wageningen University, Netherlands; and Immediate Past Chair, Science Council of the Consultative Group on International Agricultural Research (CGIAR)

Fisheries Resources in Cambodia: Implications for Food Security, Human Nutrition and Conservation

Dr So Nam
Director, Inland Fisheries Research and Development Institute (IFReDI), Cambodia

The Role of Agribusiness and Opportunities for Investment in Food Security

Ms Kavita Prakash-Mani
Head, Food Security Agenda, Syngenta International AG, Switzerland

Q&A Session

MARKETPLACE A

Sponsored by Monsanto Company Pte Ltd
Posters displaying projects, technologies, or R&D outcomes that contribute to food security; meeting place to exchange ideas.

End of Day 1

**Day 2
11 August 2011 (Thursday)**

08:30

CONCURRENT SESSIONS 2 & 3

SESSION 2: Increasing Food Availability: Promoting Sustainable Agricultural Production in Asia

Moderator

Dr Tan Siang Hee
Executive Director, CropLife Asia, Singapore

The Need for a 'Doubly Green Revolution' to Increase Food Availability

Dr T.J. Higgins
Honorary Research Fellow, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia

Meeting the Needs for More Fish through Aquaculture

Dr Vijay Gupta Modadugu
World Food Prize Laureate 2005, India

Enhancing Food Security by Urban and Peri-urban Agriculture in China: Best Practices and Upscaling

Professor Cai Jianming
Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences; and China Regional Coordinator of the Resource Centres on Urban Agriculture and Food Security (RUAF) Foundation, China

Crop Traits to Increase Productivity by Increasing Yield and Decreasing Losses

Dr Harvey Glick
Senior Director – Asia, Regulatory Policy and Scientific Affairs, Monsanto Company, Singapore

Q&A Session

SESSION 3: Improving and Ensuring Access to Food

Moderator

Dr Mercedita Sombilla
Manager, Research and Development Department, Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), Philippines

17:00

08:30

	Economic and Agricultural Policies and Their Impact on Access to Food by Vulnerable Sectors of Society Ms Atsuko Toda Country Programme Manager, Asia and Pacific Division, International Fund for Agricultural Development (IFAD), Vietnam Asian Food Security, Global Grain Trade and the Role of Agribusiness Firms in Managing the Supply Chains Dr Rolando Dy Executive Director, Center for Food and Agribusiness, University of Asia and the Pacific (UAP), Philippines Supermarkets, Modern Supply Chain, Food Security and the Small Farmer Professor Thomas Reardon Department of Agricultural, Food, and Resource Economics, Michigan State University, US Financialisation of Food Commodities – Not the Cause, Not the Cure Dr Santitarn Sathirathai Economist, Emerging Markets Economics Research group, Credit Suisse, Singapore and Mr Kun Lung Wu Economist, Credit Suisse, Singapore Q&A Session	
12:30	Lunch	
	CONCURRENT SESSIONS 4 & 5	
13:30	SESSION 4: Food Utilisation Dimensions of Food Security – Ensuring Health and Nutrition <i>Moderator</i> Dr Annie S. Wesley Senior Programme Specialist, Agriculture and Environment, International Development Research Centre (IDRC), Canada Identifying Food Insecure Populations and Response Action to Ensure Food Security Mr Michael Sheinkman Senior Regional Programme Advisor – Vulnerability, Analysis and Mapping (VAM), World Food Programme, Regional Bureau for Asia, Thailand	and Mr John Aylieff Director for Southeast Asia, World Food Programme, Thailand Biofortification and Emerging Creative Approaches of the Food Production Sector to Improve Nutrition Dr Gerard Barry HarvestPlus Rice Crop Team Leader; and Golden Rice Network Coordinator, International Rice Research Institute (IRRI), Philippines Ensuring Food Safety for Food Security Ms Shashi Sareen Senior Food Safety and Nutrition Officer, Food and Agriculture Organization of the United Nations (FAO), Regional Office for Asia and the Pacific, Bangkok, Thailand Effects of Food Security Research, Policy and Programmes on Nutrition Security Assistant Professor Jintana Yhoung-aree Institute of Nutrition, Mahidol University, Thailand Q&A Session SESSION 5: Appropriate Investments to Match Urban Food Security Needs with Areas of Surplus <i>Moderator</i> Dr Lourdes S. Adriano Lead Agriculture Sector Specialist, Agriculture, Rural Development and Food Security Unit, Asian Development Bank (ADB), Philippines The Doha Round Negotiations on Agricultural Trade Rules and Their Potential Impact on Food Security Mr Raul Montemayor National Manager, Federation of Free Farmers Cooperatives, Inc. (FFFCI), Philippines ‘Land Grabbing’ as a Food Security Phenomenon: A Critical Review Mr Pau Khan Khup Hangzo Associate Research Fellow, Centre for Non-Traditional Security (NTS) Studies, S. Rajaratnam School of International Studies (RSIS), Nanyang Technological University, Singapore and

	Ms Irene A. Kuntjoro Research Analyst, Control Risks, Singapore	11:00	ICAFS Statement on Feeding Asia in the 21st Century
	The Brazilian Cerrado Experience and Its Implications for Investment to Produce Surplus Food		Dr Gil Saguiguit, Jr Executive Director, Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) / Southeast Asian Ministers of Education Organization (SEAMEO), Philippines
	Dr Jose Geraldo Eugenio de Franca Executive Director, Brazilian Agricultural Research Corporation (EMBRAPA), Brazil		and
	Food Security: Opportunities for Increasing Agricultural Production in Emerging Markets		Professor Paul Teng Senior Fellow and Advisor to the Food Security Programme, Centre for Non-Traditional Security (NTS) Studies, S. Rajaratnam School of International Studies (RSIS), Nanyang Technological University; and Dean, Graduate Programmes and Research, National Institute of Education, Singapore
	Dr Keith Dawson Technical Director, Continental Farmers Group Ltd; and Vice President, Scottish Society of Crop Research, UK		
	Q&A session	11:50	Closing Remarks
17:00	MARKETPLACE B <i>Sponsored by Monsanto Company Pte Ltd</i>		Associate Professor Ralf Emmers Acting Head, Centre for Non-Traditional Security (NTS) Studies, S. Rajaratnam School of International Studies (RSIS), Nanyang Technological University, Singapore
	End of Day 2		
Day 3 12 August 2011 (Friday)			
09:00	SESSION 6: Capstone Plenary Session Capping it off: Panel of Experts and Open Discussion	12:00	Lunch
	<i>Moderators</i>	13:30	SATELLITE WORKSHOPS
	Professor Paul Teng Senior Fellow and Advisor to the Food Security Programme, Centre for Non-Traditional Security (NTS) Studies, S. Rajaratnam School of International Studies (RSIS), Nanyang Technological University; and Dean, Graduate Programmes and Research, National Institute of Education, Singapore		Workshop A: Forming a Global Consortium on Food Security Initiatives <i>By invitation only</i> <i>Convenors:</i> Hohenheim University; Centre for Non-Traditional Security (NTS) Studies, S. Rajaratnam School of International Studies (RSIS); Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA)
	and		Workshop B: EU Policies on Food Security <i>Open to ICAFS participants</i> <i>Convenor:</i> EU Centre
	Dr Gil Saguiguit, Jr Executive Director, Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) / Southeast Asian Ministers of Education Organization (SEAMEO), Philippines		Workshop C: Challenges to the Acceptance and Adoption of Crop Biotechnology <i>Open to ICAFS participants</i> <i>Convenor:</i> International Service for the Acquisition of Agri-Biotech Applications (ISAAA)
	The five panellists (i.e., the moderators for the earlier five sessions) will give their recommendations on each of the following questions based on the presentations and discussions in each of the sessions:		Workshop D: Workshop on Nutrition Security <i>By invitation only</i> <i>Convenor:</i> International Development Research Centre (IDRC)
	- What immediate policy, technical or other interventions are needed to improve food security in Asia? - How can net food importing countries contribute to stabilisation of food availability, access and utilisation for Asia and globally?		- End of Conference -

List of Speakers and Moderators

in alphabetical order according to last names

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About the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA)

The **Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA)** was established in 1966 by the Southeast Asian Ministers of Education Organization (SEAMEO) primarily to 'provide high-quality graduate education and training in agriculture to member countries; promote, undertake, and coordinate research programs related to the needs and problems in agriculture in the region; and disseminate the findings of agricultural research and experimentation'.

At present, SEARCA focuses its plans and efforts on the ultimate goal of bringing about sustainable agricultural and rural development to reduce rural poverty and ensure food security.

Our Vision

A leading enabler in the science and practice of agriculture and rural development in Southeast Asia

Our Mission

We are committed to building the capacities of Southeast Asian institutions, working toward agricultural and rural development through graduate scholarship, R&D, and knowledge management.

Our Current Priority Themes

- 1) Natural Resource Management
 - Management of land and water resources
 - Biodiversity management for food security
 - Risk assessment and the impacts of climate change on agro-biodiversity
- 2) Agricultural Competitiveness
 - Resource access and rural economic growth
 - Agricultural policies and trade regimes
 - Agricultural support services

Our Core Programs

1) Graduate Scholarship

SEARCA's Graduate Scholarship Program continues to develop a strong cadre of agriculture professionals in the region through more graduate scholarships and grants for student and faculty exchanges, thesis research and professorial chairs. SEARCA is also the secretariat of the Southeast Asian University Consortium for Graduate Education in Agriculture and Natural Resources.

2) Research and Development

SEARCA spearheads research initiatives to recommend policy directions that would lead to a highly viable agriculture sector while addressing pressing and emergent environmental concerns. It also conducts policy roundtables, conferences and workshops to address contemporary concerns.

3) Knowledge Management

The Center promotes a learning culture in the region that applies science-based analyses which in turn lead to the creation of new knowledge. It does this through learning forums, training, seminars, virtual knowledge centers, a semi-annual journal, and other publications as well as materials made available online.

Cross-cutting Activities

SEARCA also implements support activities that cuts across its core programs. These include:

- Seed Fund for Research and Training
- Travel Grants
- Dioscoro L. Umali Achievement Award in Agricultural Development
- Project Development and Management
- Fellowship Programs (Adjunct Fellows, Visiting Research Fellows, Senior Fellows)

More information on SEARCA's programs and activities are available at www.searca.org.

About the RSIS Centre for Non-Traditional Security (NTS) Studies

The **RSIS Centre for Non-Traditional Security (NTS) Studies** conducts research and produces policy-relevant analyses aimed at furthering awareness and building capacity to address NTS issues and challenges in the Asia-Pacific region and beyond.

To fulfil this mission, the Centre aims to:

- Advance the understanding of NTS issues and challenges in the Asia-Pacific by highlighting gaps in knowledge and policy, and identifying best practices among state and non-state actors in responding to these challenges.
- 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.
- Engage policymakers on the importance of NTS in guiding political responses to NTS emergencies and develop strategies to mitigate the risks to state and human security.
- Contribute to building the institutional capacity of governments, and regional and international organisations to respond to NTS challenges.

Our Research

The key programmes at the RSIS Centre for NTS Studies include:

- 1) Internal and Cross-Border Conflict Programme
 - Dynamics of Internal Conflicts
 - Multi-level and Multilateral Approaches to Internal Conflict
 - Responsibility to Protect (RtoP) in Asia
 - Peacebuilding
- 2) Climate Change, Environmental Security and Natural Disasters Programme
 - Mitigation and Adaptation Policy Studies
 - The Politics and Diplomacy of Climate Change
- 3) Energy and Human Security Programme
 - Security and Safety of Energy Infrastructure
 - Stability of Energy Markets
 - Energy Sustainability
 - Nuclear Energy and Security
- 4) Food Security Programme
 - Regional Cooperation
 - Food Security Indicators
 - Food Production and Human Security

5) Health and Human Security Programme

- Health and Human Security
- Global Health Governance
- Pandemic Preparedness and Global Response Networks

The first three programmes received a boost from the John D. and Catherine T. MacArthur Foundation when the RSIS Centre for NTS Studies was selected as one of three core institutions to lead the MacArthur Asia Security Initiative in 2009.*

Our Output

Policy Relevant Publications

The **RSIS Centre for NTS Studies** produces a range of output such as research reports, books, monographs, policy briefs and conference proceedings.

Training

Based in RSIS, which has an excellent record of post-graduate teaching, an international faculty, and an extensive network of policy institutes worldwide, the Centre is well-placed to develop robust research capabilities, conduct training courses and facilitate advanced education on NTS. These are aimed at, but not limited to, academics, analysts, policymakers and non-governmental organisations (NGOs).

Networking and Outreach

The Centre serves as a networking hub for researchers, policy analysts, policymakers, NGOs and media from across Asia and farther afield interested in NTS issues and challenges.

The **RSIS Centre for NTS Studies** is also the Secretariat of the Consortium of Non-Traditional Security Studies in Asia (NTS-Asia), which brings together 20 research institutes and think tanks from across Asia, and strives to develop the process of networking, consolidate existing research on NTS-related issues, and mainstream NTS studies in Asia.

More information on our Centre is available at www.rsis.edu.sg/nts

** The Asia Security Initiative was launched by the John D. and Catherine T. MacArthur Foundation in January 2009, through which approximately US\$68 million in grants will be made to policy research institutions over seven years to help raise the effectiveness of international cooperation in preventing conflict and promoting peace and security in Asia.*

About the S. Rajaratnam School of International Studies (RSIS), Nanyang Technological University

The S. Rajaratnam School of International Studies (RSIS) was inaugurated on 1 January 2007 as an autonomous School within the Nanyang Technological University (NTU), upgraded from its previous incarnation as the Institute of Defence and Strategic Studies (IDSS), which was established in 1996.

The School exists to develop a community of scholars and policy analysts at the forefront of Asia-Pacific security studies and international affairs. Its three core functions are research, graduate teaching and networking activities in the Asia-Pacific

region. It produces cutting-edge security related research in Asia-Pacific Security, Conflict and Non-Traditional Security, International Political Economy, and Country and Area Studies. The School's activities are aimed at assisting policymakers to develop comprehensive approaches to strategic thinking on issues related to security and stability in the Asia-Pacific and their implications for Singapore.

For more information about RSIS, please visit www.rsis.edu.sg



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