Asia-Pacific Economic Cooperation

Food Security Policies in APEC

APEC Policy Support Unit

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Advancing Free Trade for Asia-Pacific Prosperity

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EXECUTIVE SUMMARY

The aim of this study is to complement APEC's ongoing work towards a comprehensive and unified Food System approach that promotes food security throughout the region. Because of the sharp rise in food prices in 2007-08 and again in 2011 as well as increased food price volatility, food security has become a major concern among many APEC economies. Rising food prices have resulted in intense discussions at both regional and domestic levels, and have resulted in new policy responses that have tried to address their negative impacts on vulnerable sectors of society. It is only by understanding what is taking place on the ground, and doing an analysis across economies that APEC can formulate a unified approach at a regional level that will address food security more effectively. APEC economies are among the world's largest food exporters and importers, reflecting a dynamic flow of traded food and agricultural commodities. While it recognizes the challenges of ensuring food security in the region and acknowledges the political and cultural sensitivity of food, APEC is therefore well positioned to help improve regional and global food security.

There are at least five reasons why APEC, a major forum for economic cooperation, has an important role to play in helping to improve regional and global food security. First, while APEC's member economies have reduced the region's undernourished by 24 per cent in the last two decades, there is still about one quarter of the world's hungry residing in the region. Second, APEC accounts for 53 per cent of global cereal production and almost 70 per cent of fish production. Third, APEC consists of major players in global agricultural trade. Together, APEC economies generated around 34 per cent and 36 per cent of global agricultural exports and imports, respectively, in 2009 and also accounted for a significant share in the trade of key agricultural commodities. Fourth, APEC economies are vulnerable to food security risks throughout the food chain as exemplified by a number of protests and riots that occurred during the food price crisis in 2007-08. Finally, the region is frequently exposed to natural disasters that temporarily disrupt food supply, damage the food production base, disrupt livelihoods, displace people and reduce access to food.

Given the complexity of factors affecting food security, a generalized concept of food security consisting simply of supply and demand is no longer adequate for planning anticipatory and response strategies. A more comprehensive approach is required, one that is broader in scope and one that takes into consideration all four basic dimensions of food security: availability, physical access, economic access and utilization. Thus, a multi-methods approach purposely built around these four dimensions was employed to achieve the project's objectives. It included the administration of a survey instrument to appropriate contacts in each economy, a literature review of secondary sources, and interviews with relevant stakeholders. Our analysis produced the findings presented below. For ease of understanding and for convenience, they are presented in an annotated form and grouped under four categories.

FINDINGS

Food security in APEC

- All APEC economies experience some form of food insecurity to some degree or another. While many are food secure at the macro level in terms of food availability, the picture is different at the household level.
- Agriculture and food security are now firmly back on the development and political agendas for most APEC economies, with some even identifying food security as of domestic strategic importance.
- Economies with common attributes *vis-à-vis* agriculture share common concerns across all four food security dimensions.
- In several APEC economies, food security is equated to rice self-sufficiency. Thus, many domestic policies are biased towards rice production or at least towards stabilizing domestic rice prices.

Policy responses

- APEC economies have responded to the various food security concerns by either reinforcing existing policy instruments or by introducing new ones. However, the policy focus has been biased towards increasing food availability and lowering food prices as well as cushioning the impact of higher prices on their populations.
- Common farmer-oriented policies have focused on reduced taxes, producer credit or financial support services, seed and fertilizer subsidies, producer price subsidies or building reserves, all aimed at increasing productivity and total production.
- Economies have also introduced trade policy measures to curtail price increases and ensure adequate supplies in domestic markets. Responses have depended to a great extent on whether the economies in question are net importers or exporters of food.
- Because of the devastating impact of extreme weather events on the agricultural sector in the last few years, a number of APEC economies have streamlined their frameworks for disaster assistance, climate change and green growth.
- Many APEC economies are increasing the size of their grain reserves, thus raising concerns about tighter international grain markets.
- Within the APEC region, a number of economies have increased their pro-biofuel policies resulting in an expansion of their biofuel industries. These are potentially in conflict with the region's food security objectives.
- Farmland expansion and acquisition are new food supply strategies in a number of economies.
- To address the 'economic access' dimension of food security and in particular rising food prices, economies have tried to cushion the impact of higher prices on more vulnerable sectors of society through a combination of food price controls, food price subsidies, imposition of safety nets, releasing stocks to stabilize prices, and food assistance and distribution.
- After decades of neglect, government expenditure in agriculture is now on the rise again in a number of APEC economies.
- Infrastructure leading to improved physical access to food is still in much need of investment, particularly in developing economies.
- Having been routinely neglected by governments and the donor community for many years, nutrition is now more explicitly recognized as being closely associated to food security and economies have begun to step up interventions in this area.

Governance of food security

- Potential conflict exists between food security objectives and those of other sectors.
- Multiple agencies or departments are involved in dealing with the diversity of issues related to food security and this often results in disconnected policy making and miscommunication.
- In addition to their commitments to food security initiatives within APEC, member economies are also taking part in other regional and global initiatives by bodies such as the G20, G8, ASEAN, the United Nation's High Level Task Force on Food Security, the Committee on World Food Security, the World Economic Forum, and the CGIAR. Thus, there is potential for overlap.

Issues requiring additional attention

- Noticeably overlooked in domestic policy discussions related to food security is the contribution of the fisheries and aquaculture sector.
- The role of reducing food losses is often underestimated in food security discussions**.**

Based on the above findings, 12 recommendations and key messages are presented below. They are not presented in order of importance.

RECOMMENDATIONS

1. Food security should continue to be on top of the political and development agendas of APEC economies as well as of the international community.
KEY MESSAGE: "Put food first."

2. While food (rice) self-sufficiency has powerful resonance throughout the region, economies should be cautioned against the potential repercussions of such an approach. Policies that distort production and trade in agricultural commodities could potentially impede the attainment of long-term food security.
KEY MESSAGE: "Think beyond borders."

3. Economies should not lose sight of the fact that short-term policies or "coping" strategies (vs. "curing" strategies), particularly to increase food availability run the risk of countering the goal of addressing the longer-term determinants of food insecurity.
KEY MESSAGE: "Get the balance right."

4. More inter-connected policy-making is needed to reduce policy conflicts between food and other sectors.
KEY MESSAGE: "Connect the dots."

5. APEC is encouraged to assess (both qualitatively and quantitatively) the robustness of each economy's capacity to address the present and future challenges of food security. This would help prioritize what urgent action needs to be taken at both the domestic and regional levels.
KEY MESSAGE: "Take stock before moving forward."

6. Economies should recognize health and nutrition as being closely associated to food security and should intensify efforts to build a more food and nutrition conscious community.
KEY MESSAGE: "More food does not necessarily ensure more food security."

7. Investment in all aspects of agriculture remains critical to sustainable long-term food security.
KEY MESSAGE: "Invest in the future now."

8. To protect the most vulnerable during emergency situations, the establishment and scaling-up of social protection programs, especially social safety nets should be accelerated.
KEY MESSAGE: "Protect the most vulnerable."

9. The contribution of reducing food losses should not be underestimated. Addressing losses across the entire food chain will be critical in any strategy to feed the region's growing and increasingly affluent and urban population.
KEY MESSAGE: "Deal with waste."

10. Given its importance socially and economically within the region, appropriate attention and investment should be given to the fisheries and aquaculture sector to meet present and future challenges.
KEY MESSAGE: "Ensure fish for all."

11. APEC should work collaboratively with existing food security initiatives.
KEY MESSAGE: "Coordinate and complement. Don't duplicate."

12. Economies and APEC as an organization should consider developing strategic communication strategies *vis-à-vis* food security issues that incorporate risk communication.
KEY MESSAGE: *"In uncertain times characterized by high risk issues, engage stakeholders in a dialogue-centered risk communication process. Communicate, communicate and communicate!"*

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INTRODUCTION

The sharp rise in international food prices in 2007-08 and in 2011 along with its devastating impact on the world's most vulnerable, have heightened awareness of global food insecurity and have forced governments to refocus their attention on agriculture and food security issues. While prices for many commodities have fallen in the last few months, increased food price volatility is likely to be with us for the foreseeable future, particularly due to more unpredictable weather patterns. At the time of writing, severe drought in the corn and soybean belt of the United States is expected to decrease overall production of these two important traded commodities by 12-13 per cent leading to severe food price increases. According to the United Nation's Food and Agriculture Organization (FAO), the world Food Price Index (FPI) jumped an alarming 6 per cent this past July (compared to June) following three months of decline while cereal prices jumped an average of 17 per cent. This 'new' reality has sparked a series of global and regional initiatives to address a world food system that currently leaves an estimated one billion people hungry, a further billion suffering from micronutrient deficiency and another billion that are overweight or obese.

As one of the key regional bodies, APEC is well positioned to contribute to regional and global food security with its members spanning a wide range of economies at different levels of economic development and with varying food and nutritional needs. APEC members[1] also account for half of the world's grain production and include major exporters and importers of agricultural products. Further, unlike other bodies, APEC has worked on trade facilitation, supply chain connectivity, and the promotion of a conducive business and investment environment which gives it a comparative advantage. Enhanced regional cooperation can only help ensure member economies respond to current and future challenges with appropriate policy strategies.

Since 1999, APEC members have been working towards a comprehensive and unified approach, an APEC Food System that promotes food security throughout the region. However, this only gained significant momentum after the food crisis in 2007-08.

STUDY OBJECTIVES

This study, commissioned by the APEC Policy Support Unit (PSU), aims to complement APEC's ongoing work in the area by mapping out and understanding the current food security needs and priorities of each member economy, and the policy environment to assure food security. It is only by knowing what is taking place on the ground, and doing an analysis across economies that APEC can formulate a unified approach at a regional level that will address food security issues more effectively.

This study will:

- Provide a landscape scan and analysis of the prevailing food security policies of each APEC member economy. The scope of the review will include the definition of food security used in each economy, a survey of the food security issues in each economy, and the policies in place in each economy to address these issues. Particular focus will be made on those policies relating to trade and investment.

[1] APEC members include: Australia; Brunei Darussalam; Canada; Chile; China; Hong Kong, China; Indonesia; Japan; Korea; Malaysia; Mexico; New Zealand; Papua New Guinea; Peru; Philippines; Russia; Singapore; Chinese Taipei; Thailand; United States; Viet Nam

- Identify any risks and/or opportunities in order to formulate more effective and targeted anticipatory and response strategies *vis-à-vis* food security across the APEC region.
- Suggest relevant policy measures and a way forward for APEC, with cross-reference to other APEC priorities and initiatives as well as other regional and global initiatives.

APPROACH

In order to gain a deeper understanding of the various issues associated with food security policies within the APEC region, **Asia BioBusiness Pte. Ltd., Singapore**, commissioned by the APEC Policy Support Unit (PSU), developed a survey instrument (see Annex 1) and administered it to appropriate contacts in each APEC economy to solicit information and data needed to allow analyses to be made. The survey was distributed via email to a contact list provided by the APEC PSU. This largely comprised of APEC Points of Contacts (POCs) in member economies, including members of the APEC Agricultural Technical Cooperation Working Group (ATCWG). Asia BioBusiness also distributed the survey to additional members of the APEC High Level Policy Dialogue on Agricultural Biotechnology (HLPDAB). This mailing was made in February and March 2012. Where no responses were received, direct emailings were conducted in the following weeks. Additional emails were sent requesting information from members of the Ocean and Fisheries Working Group (OFWG) in June 2012. The survey instrument was in the form of an editable PDF which, once completed individually or by groups, could be submitted online via the Adobe server or directly to Asia BioBusiness by email.

In addition to the survey, secondary sources (e.g. academic publications, databases and official documents from governments and inter-governmental institutions, and relevant publications from international organizations, non-governmental organizations and the private sector, etc.) were used to complete, complement and verify the data. This multi-methods approach was used to triangulate information.

CONCEPTUAL FRAMEWORK OF FOOD SECURITY

MULTI-DIMENSIONAL NATURE OF FOOD SECURITY

The Food and Agriculture Organization (FAO) of the United Nations defines food security as a condition when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO, 1996). The attainment of food security involves satisfying the following four basic dimensions simultaneously: 'availability', 'physical access', 'economic access' and 'utilization'. A fifth dimension, 'stability', is often added to emphasize the importance of the stability of the four dimensions over time. While each dimension is necessary for overall food security, they likely have different weightings in a rural setting as compared with an urban setting and also across economies with different incomes and net food trade balances.

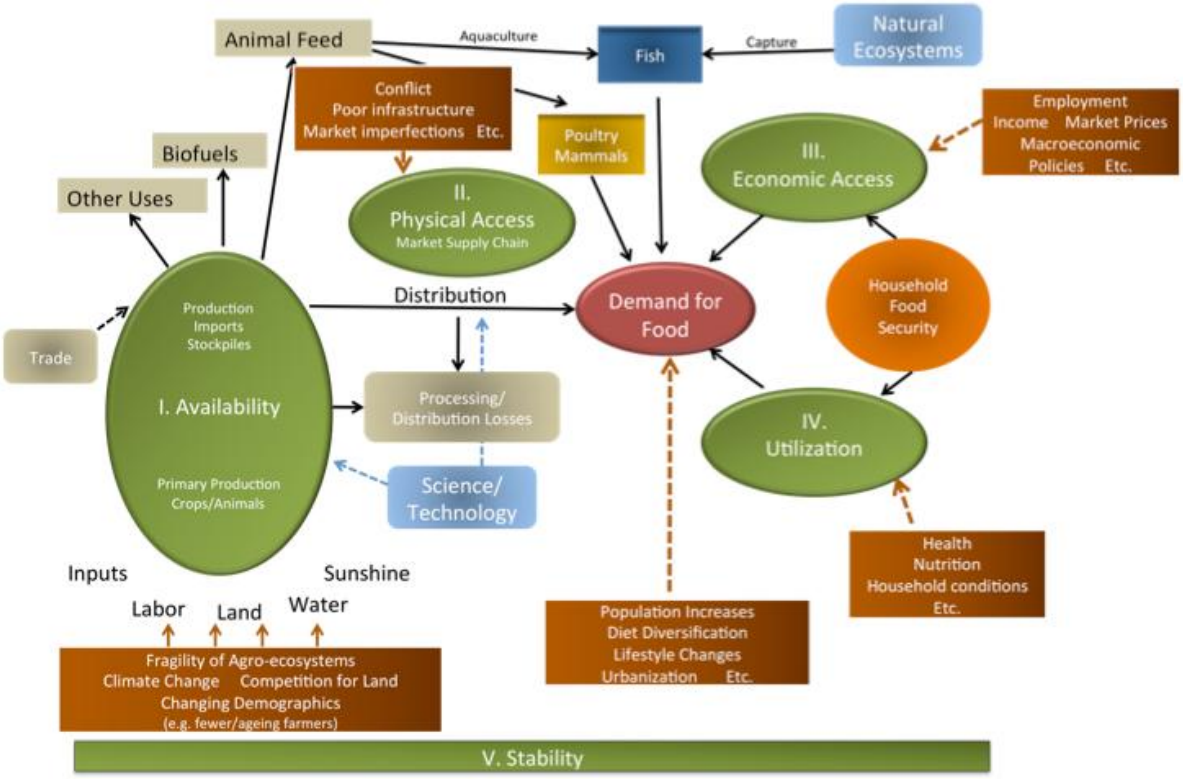
The first dimension of food security is the availability of food. This dimension addresses the 'supply side' of food security and is determined by the level of food production, stock levels and net trade. Here, raising farm productivity is the core issue. However, as the urban-rural disconnect widens and as more people live in cities, imports will be key to ensuring availability to consumers. When events precipitate sudden food insecurity, then governments commonly resort to stockpiles. As the model indicates (see Figure 1), food availability can be influenced by agro-climatic conditions and an entire range of socio-economic and cultural factors that determine where and how farmers perform in response to market conditions. 'Availability' can also refer to food supplies at the household level but is most commonly used to refer to food supplies on a more expansive (economy-wide/regional/global) level. Food availability is often the focus of much of the debate on food security but as the model illustrates, raising farm productivity, although necessary, is not sufficient to ensure household food security.

The second dimension is the physical access to food. This means an adequate amount of food must be within the physical reach of vulnerable households, whether through their own production or through the marketplace. Common threats to physical access to food are war, civil strife, poor infrastructure, inadequate logistics for food distribution and market imperfections. Such problems are more likely to exist in rural areas characterized by difficult terrain and remoteness. In an urban setting, however, raising the efficiency of market supply chains to deliver food to consumers is the primary concern. According to Reardon (2010), 50 to 70 per cent of consumers' cost of food is formed in post-farmgate segments of supply chains, e.g., wholesale, logistics, processing and retail. Supermarkets have now gone beyond catering to the initial middle- and upper-class clientele in many economies to reach the mass market.

The third dimension is the economic access to food or the ability of the household to purchase the food it requires. This is a challenge for both developed as well as less developed economies. A key element of this dimension is the purchasing power of consumers and the evolution of real incomes and food prices. Economic access deals with the capacity to gain access to available food, especially by vulnerable populations in societies with great disparities of wealth. Hardest hit by food price spikes are poor consumers in low income economies where food can account for a high percentage of household budgets. This can include many poor farmers with a net deficit in food production, that is, those who consume

more than they produce. Additional factors that will influence economic access include employment and income security, macro-economic policies and of course, the availability of food through its impact on supplies in the market, and therefore on market prices.

Figure 1: Conceptual model of food security



Source: Modified from Teng and Escaler, 2010b

The fourth dimension is food utilization. A household may have the capacity to purchase all the food it needs but it may not always have the ability to utilize that capacity to the fullest. Food utilization – which is typically reflected in the nutritional status of an individual – is determined by the quantity and quality of dietary intake, general child care and feeding practices, food preparation, food storage, along with health status and its determinants (Riely et al., 1999). It is not enough that an individual is getting what appears to be an adequate quantity of food if that person is unable to consume the food because he or she is always falling sick. Another aspect of food utilization is food safety, part of which results from the need to preserve 'freshness' in foods as it is transported from source to consumer. Technology and policies play key roles in ensuring that appropriate systems are in place to establish safety levels, as well as monitor compliance with safety standards.

Finally, food security also requires that people feel fairly secure about where their next meal is coming from. Uncertainty can lead to anxiety and can discourage individuals, households, and firms from embarking on other economic activities that could provide them with beneficial long-term effects (ADB, 2012). Food security requires that people feel secure about their future food supply, which implies the need for stability in the availability, access, and utilization of food.

Because each dimension has its own distinct set of influencing factors, different sets of public policies, services and interventions will be required to help economies solve their food security problems. Therefore, addressing food security is particularly challenging since food insecurity is the result of the interplay of a range of interconnected factors operating at different levels. Not only is a much broader perspective needed but the importance of interconnected policy-making is critical. According to the UK Foresight Report on Food and Farming Futures, published in January 2011, there is an *"urgent need to link food and agriculture policy to wider global governance agendas such as climate change mitigation, biodiversity and international development"* (Foresight, 2011). Without this connection, a decision in one area could compromise the objectives of another sector.

THE DURATION OF FOOD INSECURITY

Food security analysts have defined two general types of food insecurity: transitory food insecurity and chronic food security and a household is said to be food secure only if it is protected against both types (Osmani, 1998). The former may afflict any household regardless of whether the latter exists and occurs when there is a sudden drop in the ability to produce or access enough food to maintain a good nutritional status. It results from short-term shocks and fluctuations in food availability and food access, including year-to-year variations in domestic food production, food prices and household incomes. Transitory food insecurity is relatively unpredictable and can emerge suddenly. This makes planning and programming more difficult and requires different capacities and types of intervention, including early warning capacity and safety net programs. Teng and Escaler (2010a) identified some of the main drivers of both types of food insecurity. Examples of factors affecting transitory food insecurity include: weather disruptions and pest outbreaks, rising energy prices, competition from the energy sector, policy changes and the diversion from staple crops to cash crops.

Chronic food insecurity, on the other hand, occurs when a household is persistently unable to meet the food requirements of its members over an extended length of time, a period punctuated with good and bad episodes. This type of insecurity results from extended periods of poverty, lack of assets and inadequate access to productive or financial resources. This can normally be overcome with typical long term development measures also used to address poverty. Factors affecting chronic food insecurity include: demographic changes such as population growth, urbanization and food consumption changes; underinvestment in rural infrastructure and agricultural innovation; declining performance of agriculture; increasing fragility of agro-ecosystems as food production systems; climate change; rapid transformation of supply chains; declining number of farmers; and last but certainly not the least, poverty.

FOOD SECURITY AND THE ROLE OF TRADE

As regional population growth drives increased demand for food, and urbanization and income growth lead to diversification of diets (particularly a shift in demand from rice to flour, and an increase in meat consumption), intra- and inter-regional trade will play an increasingly important role in the region's food security. In general, international trade, and agricultural trade in particular, affects food security to the extent that it (1) increases economic growth, creates employment prospects and increases the income-earning capacity of the poor; (2) increases domestic food supplies to meet consumption needs; and (3) reduces overall food supply variability (Matthews, 2003).

With regard to trade and trade policies, an economy's food security policy can be defined in terms of its central objective: food self-sufficiency or food self-reliance (Konandreas, 2006). Food self-sufficiency implies meeting food needs, as far as possible, from domestic supplies and minimizing dependence on international trade. It also advocates diets that are simple and natural that can be produced domestically. Policies associated with this concept include the banning of food exports and imports and the development of small scale enterprises to boost local food production (Chandra and Lontoh, 2010).

Food self-reliance on the other hand, advocates reliance on the international market for the availability of food in the domestic market. It implies maintaining some level of domestic food production plus generating the capacity to import from the world market as needed. International trade is an essential component of a food security strategy based on self-reliance.

Both food self-sufficiency and food self-reliance, however, have their drawbacks. According to some critics, the former makes little economic sense given the world's greater capacity to produce rather than to consume food, the few restrictions imposed on food items in economies that possess excess capacity and the availability and efficiency of the international transport system (Pangariya, 2002). Economies should use their comparative advantage and focus instead on their ability to generate foreign exchange earnings to import whatever food they consume over and above what is efficient for them to produce (FAO, 2003). On the other hand, a dependence on international markets such as that espoused by a self-reliance strategy is equally disconcerting. Critics contend that the potential gains from trade liberalization cannot be guaranteed, and its ability to improve the food security of all groups within a society remains questionable (Chandra and Lontoh, 2010). Trade openness would most likely generate different outcomes among small scale and commercial farmers, rural non-farm producers and urban consumers, both within and across economies.

POLICY RESPONSES: GETTING THE BALANCE RIGHT

During times of economic crisis, including food crises, the challenge to economies within APEC and elsewhere is getting the balance right between immediate policy responses to protect the vulnerable, and medium- and long-term efforts to increase supply by making agricultural land and labor more productive (ADB, 2008). Attaining this balance is a challenge and will require a long-term vision that avoids sacrificing incentives for a farm-supply response and also avoids restricting domestic and international trade. This is because interventions geared towards preventing or cushioning the effects of food price increases may diminish the potential income of net food sellers and thus discourage increases in food production and consequently, food supply. On the other hand, measures that seek to restrict exports can generate protectionist reactions on the part of other economies, as well as disincentivising local production and contributing to the volatility of international markets (da Motta Veiga, 2010).

The 2007-08 global food crisis highlighted the problem of knee-jerk policy responses to cushion the adverse effects of price increases on vulnerable groups and the poor. Actual policy interventions by governments around the world emphasized a limited range of easy, fast-acting and cheap measures (especially trade policy measures) to secure food supplies for domestic markets and moderate prices for consumers. This short-term approach, while entirely understandable in light of the emergency situation, meant that in many cases

medium- and longer-term needs to raise agricultural production were neglected (da Motta Veiga, 2010).

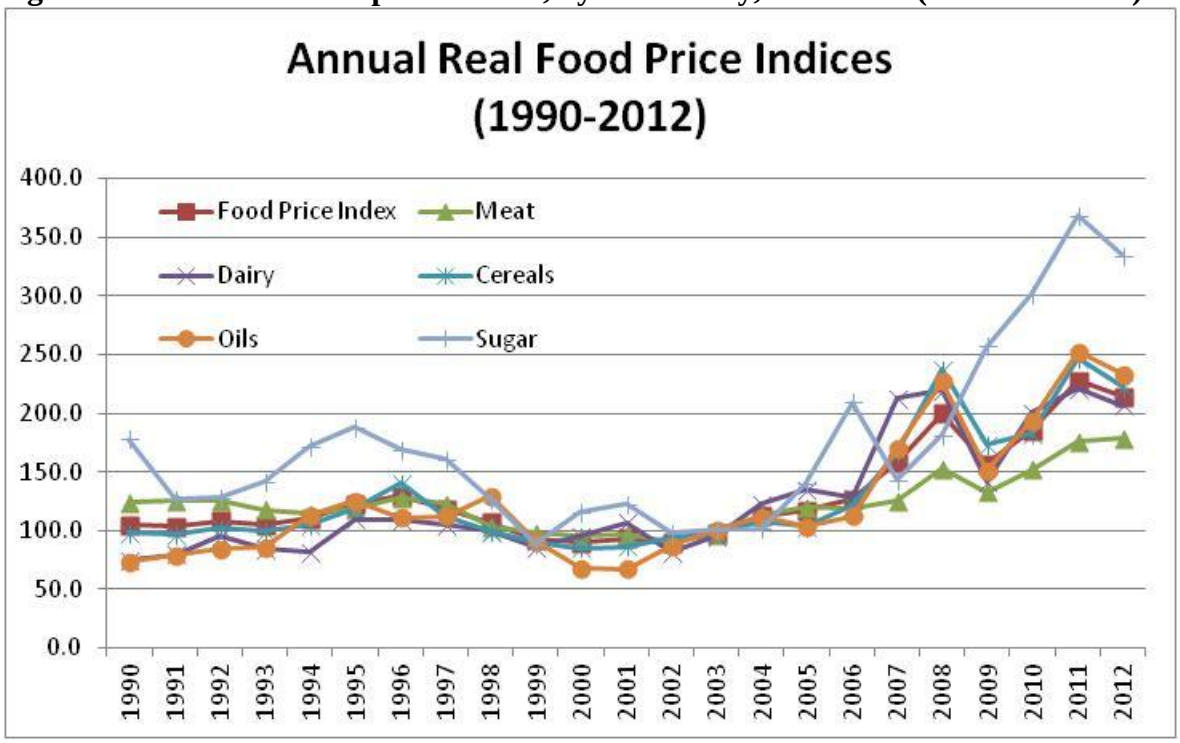
Thus, it is reasonable to assume that when the global economy is relatively stable, and when food prices do not fluctuate as much, policy makers can devote their political and financial resources on the process of long-term pro-poor economic growth (Timmer, 2010). By contrast, a world of increasing instability – in terms of the global economy, climate change and the world food situation – forces policy makers to concentrate their resources on short-term approaches to try to stabilize domestic prices and keep the poor from sliding deeper into the poverty trap. While obviously important, this clearly comes at the expense of significant progress towards long-term growth. From this perspective, instability is a serious impediment to achieving long-term food security.

RECENT TRENDS IN APEC FOOD MARKETS

GLOBAL FOOD PRICES AND FOOD SECURITY

In the last five years, international food prices have risen sharply on two occasions, in 2008 and in 2011, a situation not seen in international food markets since the 1990s (see Figure 2). These trends are fuelling new concerns about the food security of the world's most vulnerable. (Table 1 summarizes these price increases.) Between January 2007 and mid-2008, the FAO Food Price Index (FPI) more than doubled with nearly all food commodities experiencing significant price increases, ranging from 49 per cent for sugar and 192 per cent for oils. By the end of 2008, prices started to fall but remained higher than their pre-spike levels. In the second half of 2010, international food prices then started to rise sharply again, surpassing the peak levels of 2008. The FAO FPI increased by 41 per cent between June 2010 and February 2011, while the price of cereals jumped by 71 per cent during the same period.

Figure 2: Annual real food price indices, by commodity, 1990-2012 (2002-2004=100)



Source: FAO, 2012a

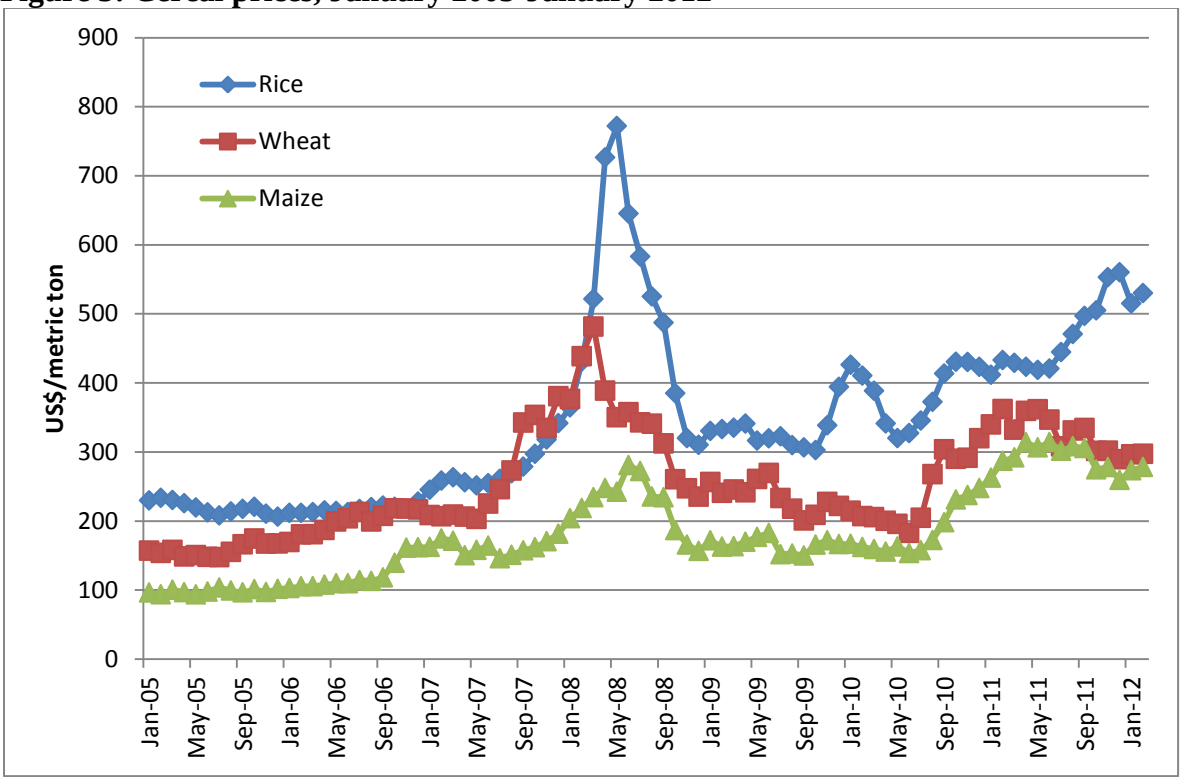
Table 1: Food price indices (2002-2004=100)

	1990-2006 Average	2008 Highest monthly value	2009 Annual average	2010 Annual average	2011 Highest monthly value	2012 January
Food	107.7	224.4 (June)	156.9	185.3	237.9 (Feb)	214.3
Meat	112.3	170.4 (Aug)	132.9	152.2	181.0 (Nov)	178.5
Dairy	99.5	255.7 (Jan)	141.6	200.4	234.4 (March)	206.8
Cereals	103.6	274.1 (April)	173.7	182.6	265.4 (April)	222.7
Oils	97.6	284.9 (June)	150.9	194.2	281.1 (Feb)	233.7
Sugar	139.5	207.3 (Aug)	257.3	302.0	420.2 (Jan)	334.3

Source: FAO, 2012a

Of particular significance to many economies in the APEC region has been the increase in the prices of the region's three key staple cereals (see Figure 3). Wheat prices increased by 86 per cent, maize by 73 per cent, and rice by 196 per cent from January 2007 until mid-2008. Between June 2010 and mid-2011, wheat prices increased by 98 per cent and maize by 105 per cent, while rice prices increased by 36 per cent.

Figure 3: Cereal prices, January 2005-January 2012



Source: FAO, 2012a

These numbers demonstrate how volatile prices continue to be (HLPE, 2011). Between January 2006 and December 2011, monthly cereal prices have increased more often than they have fallen, implying a general increase in average price levels. Regrettably, food prices have not returned to their pre-2007-08 levels and instead are now fluctuating at around double their average level during the period 1990-2006. These price increases and price volatility can have a devastating impact on household incomes and purchasing power and can transform vulnerable people into poor and hungry people.

This is of particular concern for most developing and transitional economies in APEC, where food accounts for one third or more of household expenditure with the ratio reaching around one half of total expenditure in economies such as Indonesia and Viet Nam. The equivalent share in industrialized APEC economies – the **United States**; **Japan**; **Canada**; **Australia**; and **New Zealand** – is less than 20 per cent of household expenditure (APEC PSU, 2009).

As well as undermining gains in poverty alleviation and food security, the spike in food prices led to macroeconomic instability in a number of APEC economies, including both net food importers and exporters. In the first months of 2008, food price inflation hit double digits in **China; Hong Kong, China; Indonesia**; and **Viet Nam** and rose significantly in **Malaysia; Philippines; Singapore**; and **Thailand** (ADB, 2008).

There is a large body of literature examining the causes for the increase in food prices in both 2007-08 and 2011 and the ongoing food price volatility. This report will not discuss them in great detail but will instead focus on the policy measures put in place in APEC economies to address these problems. In some cases, some of these measures even contributed directly and indirectly to the crises. However, it is important to mention some of the determinants of increases in food prices and of volatility. A selection of these is described below.

DETERMINANTS OF INCREASES IN FOOD PRICES AND OF VOLATILITY

First, population growth and urbanization in developing economies have added significantly to the demand for food and will continue to do so in the foreseeable future. Between now and 2050, the world's population is expected to increase by 2.4 billion, from the current 6.9 billion to 9.3 billion with Asia capturing the lion's share. At the same time, the population living in urban areas is projected to gain 2.9 billion, passing from 3.4 billion in 2009 to 6.3 billion in 2050 with most growth concentrated in the cities and towns of the less developed regions (United Nations, 2009). Asia, in particular, is projected to see its urban population increase by 1.7 billion with China and India alone accounting for about a third of the total increase. Underpinning this rapid urbanization in many parts of Asia is strong economic growth and this is not likely to change looking to the future. Thus, population growth is just one factor. Urbanization in combination with rising incomes will increase food demand and accelerate the diversification of diets. As incomes rise, diets will come to include more resource-intensive food products, such as meat, dairy, eggs, fruits and vegetables thus unleashing a rapid increase in demand for raw agricultural commodities.

Second, agricultural commodity prices are becoming increasingly correlated with oil prices. Oil prices have a direct impact on the price of nitrogen fertilizers of which natural gas is a key component. Further, higher oil prices also negatively impact the cost of transportation and shipping which can affect the ability of developing economies to import food. Unfortunately, because of continued strong demand from emerging economies and possible supply issues, the price of crude oil will continue to fluctuate in the coming decade.

Third, an increasingly worrying trend resulting from the close link between oil and food prices is the expansion of biofuel production and its competition with food crops for available land. Biofuel production based on agricultural commodities increased more than three-fold from 2000 to 2008. Various policy measures driving the rush to biofuels, as well as tax incentives and import restrictions in developed economies have been the main driver of this development.

Fourth, many of the world's agro-ecosystems being used as food production systems are already showing worrying signs of degradation. According to the Millennium Ecosystem

Assessment (2005), 60 per cent or 15 out of 24 ecosystem services examined are already being degraded or used unsustainably. The use of two of these systems, capture fisheries and fresh water, is now well beyond levels that can be sustained even at current demands, much less future ones. Climate change has added significant pressure on natural resources and food security through higher and more variable temperatures, changes in precipitation patterns, and increased occurrences of extreme weather events (Nelson et al., 2010).

Further, the world remains vulnerable to food price fluctuations because grain reserves are low and staple grains are exported by just a few economies. A major contributing factor to this is the declining performance of agriculture. Annual growth in agricultural productivity, measured in terms of average aggregate yield has been slowing over the years (Trostle, 2008). Global aggregate yield growth of grains and oilseeds averaged 2.0 per cent per year between 1970 and 1990, but declined to 1.1 per cent between 1990 and 2007. Yield growth is projected to continue declining over the next ten years to less than 1.0 per cent per year.

APEC: CONTRASTING AGRICULTURAL AGENDAS

The APEC region represents a wide spectrum of high, middle and low income economies with varying food and nutritional needs. Some economies continue to experience widespread hunger and poverty, with the rural poor still dependent on subsistence agriculture and the urban poor exposed to hunger due to rising food prices. Other economies are undergoing rapid transformation resulting in changes in food demand and diet diversification. At the other extreme, some economies with higher per capita incomes have consumers demanding healthier diets and more sustainable food-production systems. Further, APEC economies are a mix of food exporters and importers, have vastly different agrifood systems ranging from traditional to highly industrialized, as well as a broad range of natural resources, climatic conditions, and demographics that shape comparative advantage within food supply chains (APEC PSU, 2009). Another area of divergence is in the role that agriculture plays in APEC economies. In the more highly developed economies, agriculture accounts for only less than 5 per cent of GDP and the labor force while in others, it accounts for as high as 20 to 30 per cent of GDP and 38 to 54 per cent of the labor force. For **Papua New Guinea**, agricultural labor force accounts for as much as 85 per cent of the population. This diversity based on a range of basic and agricultural indicators is illustrated in Table 2.

As a result of such diversity, approaches to food security and policy priorities to improve food affordability and security vary significantly from one economy to another. This may even result in a mix of policies that conflict with that of other economies. For instance, changes in trade policies made by some economies contributed substantially to the increases in world prices of staple crops in the 2007-08 global food crisis. In 2008 alone, the change in protection on rice explains close to 40 per cent of the 90 per cent increase in rice prices observed for that year (Martin and Anderson, 2010).

Because of the 2007-08 global food crisis and more recent high and volatile food prices, food security has become a major concern among many APEC economies and is now firmly back on the agenda. Moreover, emerging trends occurring globally and regionally are changing the food security landscape of APEC economies and threatening the region's ability to feed itself. These trends include, but are not limited to the following: population growth and urbanization, the declining performance of agriculture, natural resource constraints, climate change, high and volatile food and oil prices, the increased production and use of

Table 2: Key indicators for APEC economies

	BASIC INDICATORS					AGRICULTURAL INDICATORS			FOOD SECURITY INDICATORS	
	GDP	**Share in world total**	**GDP/person**	**Pop'n**	**Urban Pop'n % total**	**Agric. Output % GDP**	**Agric. Workforce % Total**	**Arable Land (hectares/ person)**	**Food % Final Household Consumption Expenditure**	**Prevalence of under-nourishment % Pop'n**
	(US$bn, 2011)	**%**	**(US$, 2011)**	**(million, 2011)**	**2010**	**2011**	**2009**	**2009**	**2009**	**2008**
Australia	1,507.20	2	66,983	22.5	89.1	4	3.6	2.1	10.5	5
Brunei Darussalam	15.6	0	36,520	0.4	75.7	0.9	4.2	0	14	5
Canada	1,758.70	3	51,147	34.4	80.6	1.9	2	1.3	9.1	5
Chile	243	0	13,969	17.4	89	5.1	13.2	0.1	23.3	5
China	6,988.50	10	5,183	1,348.10	47	9.6	38.1	0.1	32.9	10
Hong Kong, China	246.9	0	34,393	7.2	100	0	n.a	0	12.2	n.a.
Indonesia	834.3	1	3,469	240.5	44.3	14.9	38.3	0.1	43	13
Japan	5,855.40	8	45,773	127.9	66.8	1.4	3.9	0	14.2	5
Korea	1,163.80	2	23,749	49	83	3	7	0	15.1	5
Malaysia	247.6	0	8,616	28.7	72.2	10.2	13	0.1	14	5
Mexico	1,185.20	2	10,802	109.7	77.8	3.9	13.7	0.2	24	5
New Zealand	168.8	0	38,227	4.4	86.2	4.7	7	0.1	12.1	5
Papua New Guinea	11.4	0	1,711	6.7	12.5	30.3	85	0	n.a.	n.a.
Peru	168.5	0	5,613	30	76.9	10	0.7	0.1	29	16
Philippines	216.1	0	2,255	95.8	48.9	12.3	33	0.1	36.7	13
Russia	1,884.90	3	13,236	142.4	73.2	4.2	9.8	0.9	28	5
Singapore	266.5	0	50,714	5.3	100	0	0.1	0	8	n.a.
Chinese Taipei	504.6	1	21,592	23.4	81	1.3	5.2	0	24	n.a.
Thailand	339.4	0	5,281	64.3	34	12.2	42.4	0.2	24.8	16
United States	15,064.80	22	48,147	312.9	82.3	1.2	0.7	0.5	6.9	5
Viet Nam	121.6	0	1,362	89.3	30.4	20	53.9	0.1	38.1	11

Sources: IMF, 2011; World Bank, 2011; FAOSTAT

biofuels, increased market speculation and the rapid transformation of supply chains (APEC PSU, 2009). All of these have resulted in intense discussions at both regional and domestic levels, and have forced economies to revisit their food security policies to try to protect the more vulnerable sectors of society.

While it recognizes the challenges of ensuring food security in the region and acknowledges the political and cultural sensitivity of food, enhanced regional cooperation within APEC can help ensure member economies respond to current and future concerns about food prices and food security with appropriate policy strategies.

APEC: ROLE IN FOOD SECURITY

There are at least five reasons why APEC, a major forum for economic cooperation, has an important role to play in helping to improve regional and global food security. First, while APEC's member economies have reduced the region's undernourished by 24 per cent in the last two decades, there is still about one quarter of the world's hungry residing in the region (APEC, 2010). Second, APEC accounts for 53 per cent of global cereal production and almost 70 per cent of fish production. Third, APEC consists of major players in global agricultural trade (see Table 3). Together, APEC economies generated around 34 per cent and 36 per cent of global agricultural exports and imports, respectively, in 2009 and also accounted for a significant share in the trade of key agricultural commodities. Fourth, APEC economies are vulnerable to food security risks throughout the food chain as exemplified by a number of protests and riots that occurred during the food price spike in 2007-08. Finally, the region is frequently exposed to natural disasters that temporarily disrupt food supply, damage the food production base, disrupt livelihoods, displace people and reduce access to food.

Table 3: APEC and global agricultural trade, 2009

Commodity Group	Share (%) of APEC in	
	World Exports	World Imports
Cereals	50	30
Fruits & Vegetables	35	34
Fish	43	43
Meat	29	36
TOTAL AGRICULTURE	34	36

Source: FAOSTAT

ROLE OF INTRA-REGIONAL TRADE

Trade within APEC is extremely important for its member economies, which absorb a significant portion of the region's total exports and imports. Total merchandise exported from APEC economies to other member economies was worth a total of USD 4.86 trillion in 2010 while intra-APEC imports totaled USD 4.93 trillion. As a result, the share of intra-APEC trade reached 67 per cent of all total exports and imports (see Figures 4.1 and 4.2). However, dependence on intra-regional trade varies widely across the 21 APEC economies. On the export side, **Brunei Darussalam; Mexico;** and **Canada** show a higher dependence on APEC, exporting close to 90 per cent of their total exports to other members, while **Russia** is the least dependent on the APEC region. APEC member economies generally rely heavily on the **United States; China;** and

Japan followed by **Korea** as export destinations (see Table 4). On the import side, **Papua New Guinea; Brunei Darussalam;** and **Hong Kong, China** lead the ranking, while the APEC-sourced share of imports is smaller in **Peru; Chile;** and **Russia**.

When it comes to the trade of food and agricultural products[2], the ranking of economies is slightly different (see Figures 5.1 and 5.2). On the export side, close to 90 per cent of all food and agricultural products exported by **Korea; Chinese Taipei; Japan; Hong Kong, China;** and **Mexico** is absorbed by other APEC economies. On the import side, close to 90 per cent of all food and agricultural products imported by **Papua New Guinea; Brunei Darussalam;** and **Mexico** originate from other member economies. As a region, 72 per cent of all of APEC's food and agricultural exports are absorbed by member economies while 72 per cent of its imports originate from other APEC economies.

With approximately 80 per cent of the value of fish imports (USD 36.5 billion) originating from APEC economies, intra-regional trade in fishery products is extremely important. **Japan** and the **United States** are the main importing economies in the region, obtaining about 81 per cent of their imports from other APEC economies which were valued in 2006 at USD 11.4 billion in **Japan** and USD 10.9 billion in the **United States** (APEC, 2009). **China** is by far the main fish exporter to other APEC economies: in 2006, 82 per cent of its total fish exports went to other APEC economies at a value of USD 7.5 billion. **Thailand** ranked second with 77 per cent of total fish exports traded intra-regionally (valued at USD 4 billion) followed by **Russia; Canada; United States; Chile; Viet Nam; Indonesia; Chinese Taipei; Peru;** and **Japan**.

[2] Food & agricultural products include (HS Classification): 01 Live animals; 02 Meat and edible meat offal; 03 Fish, crustaceans, molluscs, aquatic invertebrates nes; 04 Dairy products, eggs, honey, edible animal product nes; 05 Products of animal origin, nes; 06 Live trees, plants, bulbs, roots, cut flowers etc; 07 Edible vegetables and certain roots and tubers; 08 Edible fruit, nuts, peel of citrus fruit, melons; 09 Coffee, tea, mate and spices; 10 Cereals; 11 Milling products, malt, starches, inulin, wheat gluten; 12 Oil seed, oleagic fruits, grain, seed, fruit, etc, nes; 13 Lac, gums, resins, vegetable saps and extracts nes; 14 Vegetable plaiting materials, vegetable products nes; 15 Animal, vegetable fats and oils, cleavage products, etc; 16 Meat, fish and seafood food preparations nes; 17 Sugars and sugar confectionery; 18 Cocoa and cocoa preparations; 19 Cereal, flour, starch, milk preparations and products; 20 Vegetable, fruit, nut, etc food preparations; 21 Miscellaneous edible preparations.

Figure 4.1: Intensity of intra-APEC exports by member economies, 2010 (Share in total exports, percentages)

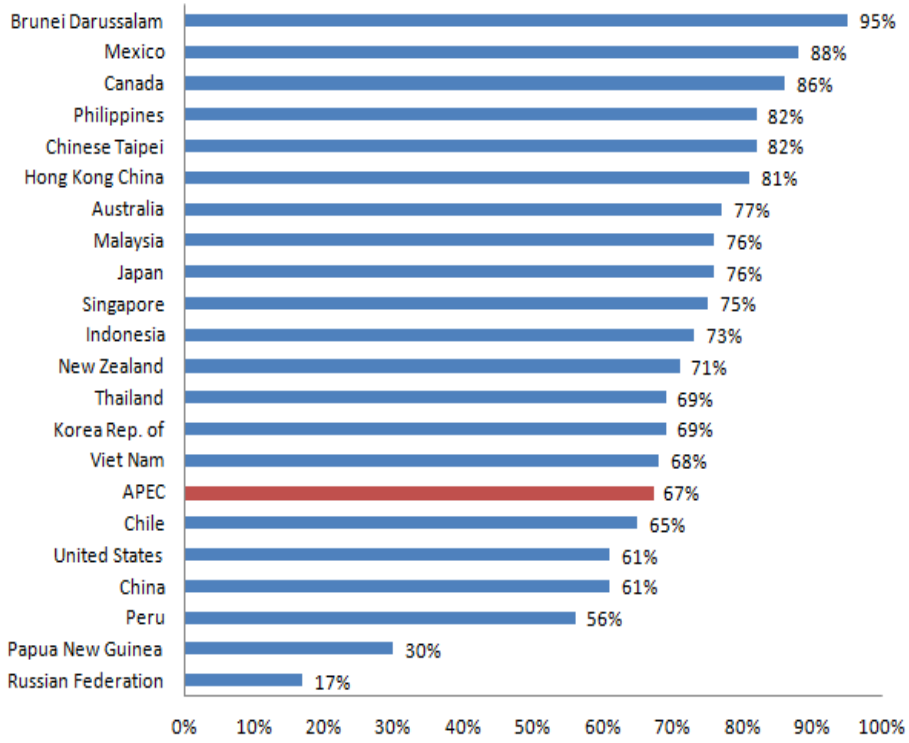
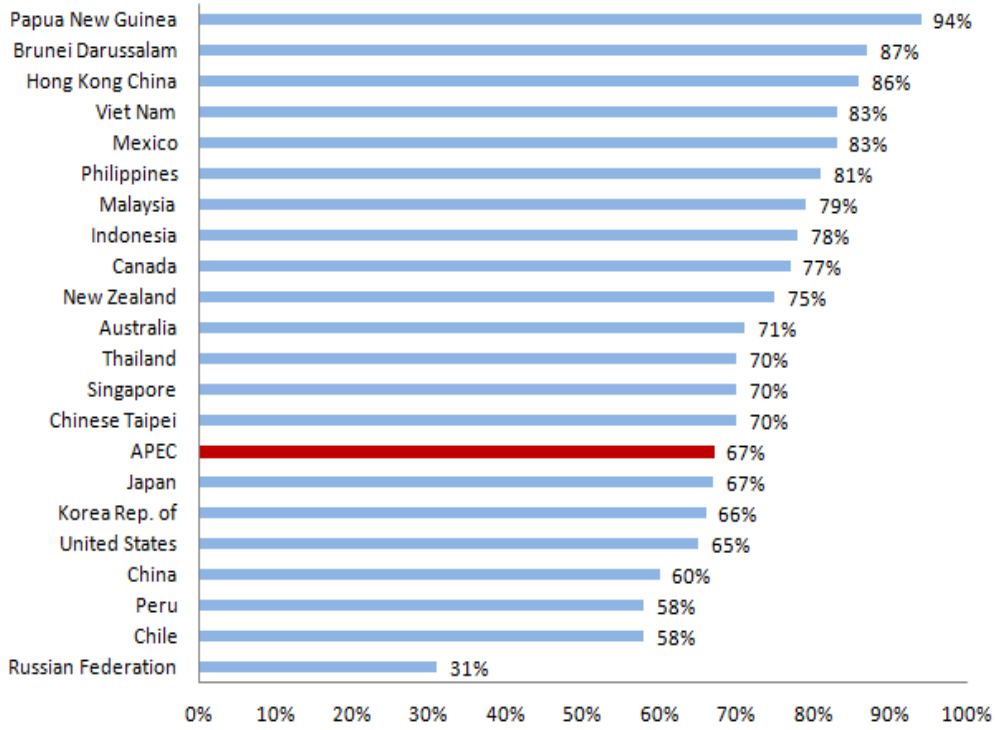


Figure 4.2: Intensity of intra-APEC imports by member economies, 2010 (Share in total imports, percentages)



Sources: WTO; FAOSTAT; UN Comtrade; Chinese Taipei's Bureau of Foreign Trade

Table 4: Intra-APEC export destinations, by member economy, 2010

Intra-APEC Exports (Percentages)	Australia	Brunei Darussalam	Canada	Chile	China	Hong Kong China	Indonesia	Japan	Malaysia	Mexico	New Zealand	Papua New Guinea	Peru	Philippines	Korea	Russia	Singapore	Chinese Taipei	Thailand	United States	Viet Nam	Total APEC	APEC share in total	Non-APEC	World (millions of dollars)
Australia		0	1	0	33	2	3	25	2	0	4	1	0	1	11	0	3	5	3	5	1	100	77	33	206,705
Brunei Darussalam	13		0	0	2	0	21	32	1	0	3	0	0	0	16	0	3	0	2	7	0	100	95	5	7,636
Canada	1	0		0	4	1	0	3	0	1	0	0	0	0	1	0	0	0	0	87	0	100	86	14	386,709
Chile	2	0	3		38	1	0	17	0	4	0	0	4	1	9	1	0	5	1	15	1	100	65	35	70,631
China	3	0	2	1		23	2	13	2	2	0	0	0	1	7	3	3	3	2	29	2	100	61	39	1,577,760
Hong Kong China	2	0	1	0	65		1	5	3	1	0	0	0	1	2	0	2	3	2	13	1	100	81	19	400,692
Indonesia	4	0	1	0	14	2		22	8	1	0	0	0	3	11	1	12	4	4	12	2	100	73	27	157,779
Japan	3	0	2	0	25	7	3		3	2	0	0	0	2	11	1	4	9	6	20	1	100	76	24	769,839
Malaysia	5	0	1	0	17	7	4	14		1	1	0	0	2	5	0	18	4	7	13	2	100	76	24	198,791
Mexico	0	0	4	1	2	0	0	1	0		0	0	0	0	0	0	0	0	0	91	0	100	88	12	298,305
New Zealand	32	0	2	0	16	3	3	11	3	1		1	0	2	5	1	3	3	2	12	1	100	71	29	30,932
Papua New Guinea	35	0	0	0	13	2	2	13	2	0	1		0	7	7	2	5	2	1	9	1	100	30	70	2,722
Peru	1	0	17	7	27	0	0	9	0	1	0	0		1	5	0	0	1	0	29	0	100	56	44	35,073
Philippines	1	0	1	0	14	10	1	19	3	1	0	0	0		5	0	17	4	4	18	1	100	82	18	51,497
Korea	2	0	1	1	36	8	3	9	2	3	0	0	0	2		2	5	5	2	16	3	100	69	31	467,730
Russia	0	0	2	0	30	1	1	19	1	0	0	0	0	1	16		3	3	2	19	2	100	17	83	400,100
Singapore	5	0	1	0	14	16	12	6	16	0	1	0	0	3	5	0		5	5	9	3	100	75	25	351,867
Chinese Taipei	1	0	1	0	34	17	2	8	3	1	0	0	0	3	5	0	5		2	14	3	100	82	18	274,596
Thailand	7	0	1	0	16	10	5	15	8	1	1	0	0	4	3	1	7	2		15	4	100	69	31	195,312
United States	3	0	32	1	12	3	1	8	2	21	0	0	1	1	5	1	4	3	1		0	100	61	39	1,277,110
Viet Nam	6	0	2	0	14	3	2	16	5	1	0	0	0	4	5	1	5	3	3	29		100	68	32	57,096
APEC	3	0	6	1	18	9	2	9	3	4	0	0	0	1	6	1	4	4	2	24	2	100	67	33	7,218,880

Greater than 5% but less 10% | Greater than 10% but less than 20% | Greater than 20%

Sources: WTO; FAOSTAT; UN Comtrade; Chinese Taipei's Bureau of Foreign Trade

Figure 5.1: Intensity of intra-APEC exports by member economies, food & agricultural goods, 2010 (Share in total exports, percentages)

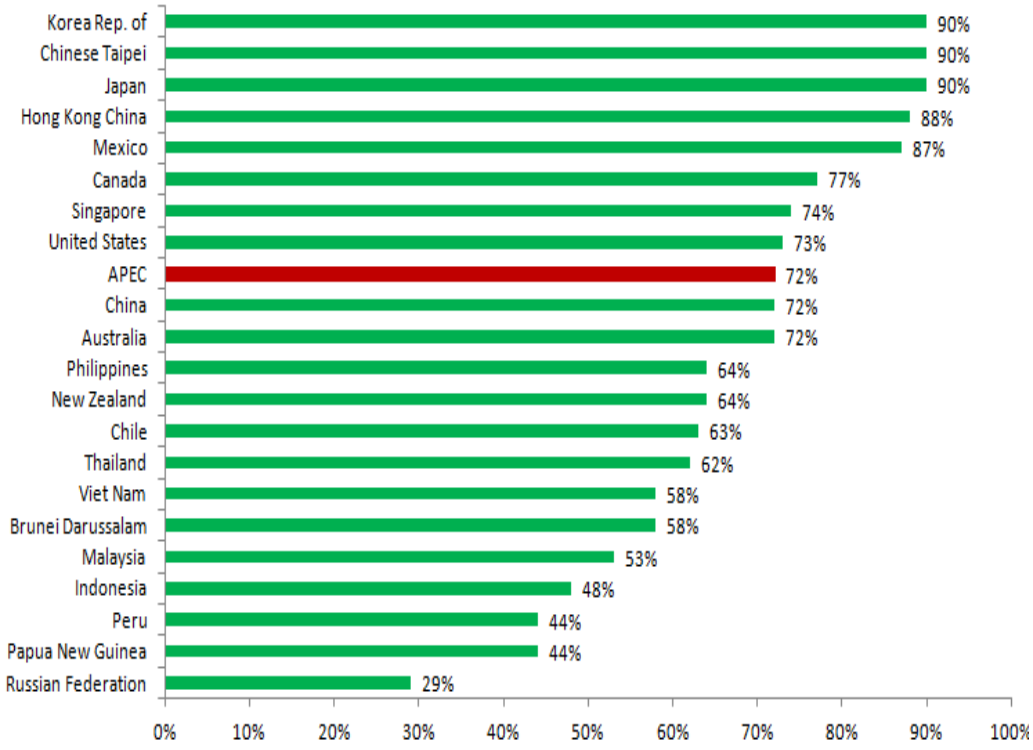
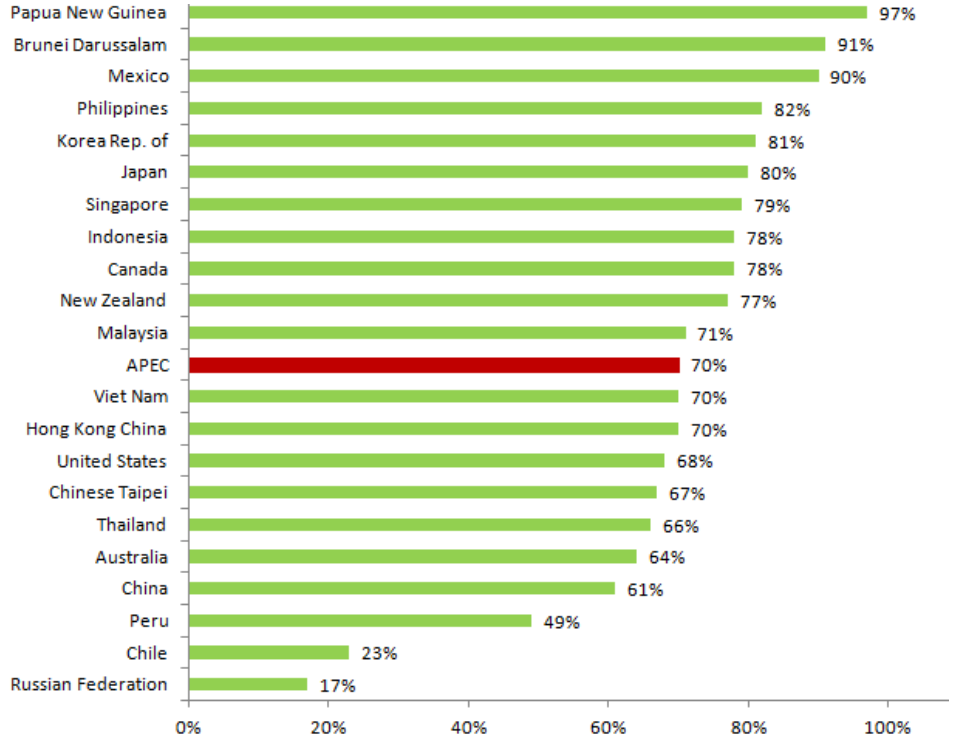


Figure 5.2: Intensity of intra-APEC imports by member economies, food & agricultural goods, 2010 (Share in total imports, percentages)



Sources: WTO; FAOSTAT; UN Comtrade; Chinese Taipei's Bureau of Foreign Trade

APEC INITIATIVES ON FOOD SECURITY

Food security has long been a priority for APEC since it first proposed an APEC Food System (AFS) policy in 1999 which aimed to address issues surrounding agriculture and food security across the region. APEC Ministers agreed that the overriding objective in building the AFS would be *"to efficiently link together food production, food processing and consumption to meet the food needs of our people as an essential part of achieving sustainable growth, equitable development and stability in the APEC region."* That same year, leaders adopted the APEC Business Advisory Council (ABAC) report on the APEC Food System and endorsed its key recommendations to: 1. Address rural infrastructure development; 2. Disseminate technological advances in food production and processing; and 3. Promote trade in food products.

However, for a variety of reasons, the APEC Food System failed to gain enough traction within member economies and no major framework or comprehensive APEC-wide approach was implemented (Johnson et al., 2010). This all changed when the global food crisis happened in 2007-08. The alarming increase in food prices pushed APEC to reassess its role in the region as a food security provider. In 2008, senior officials began developing the APEC "Work Plan on Food Security" and subsequent papers and proposals have been put forward under various working groups and committees culminating in the first ever APEC Ministerial Meeting on Food Security in Niigata, Japan in 2010 where ministers agreed that APEC economies would collectively pursue the shared goals of sustainable development of the agricultural sector and the facilitation of investment, trade and markets. They also endorsed the APEC Action Plan on Food Security which identified over 60 action points organized around the two principal shared goals.

A summary of all of APEC's initiatives on food security is provided in Annex 2. The main areas of focus have primarily been on the following: 1) promoting sustainable agricultural production and growth by expanding the food supply capacity of economies, enhancing disaster preparedness in agriculture, developing rural communities, and confronting challenges in climate change and natural resource management; 2) the facilitation of investment, trade and markets by promoting investment in agriculture, facilitating trade in food and agricultural products, exchanging best practices to develop better policies for fostering healthy agricultural sectors, developing a framework to strengthen cooperation in food safety activities across member economies, as well as to share information and build capacity in the region to harmonize food safety regulatory frameworks with existing international food standards; and 3) the development and adoption of new agricultural technologies through technology transfer and training (including exchange of best practices), creating an environment conducive to agricultural research and development, and fostering the development of agricultural biotechnology (including the development of regulatory frameworks and strengthening public confidence in the field).

While it is important to assess each one's effectiveness, it is equally important to evaluate how they fit in with other global and regional activities in this area in order to better align APEC's activities and explore areas of collaboration and partnership to maximize impact on the ground.

STUDY FINDINGS

Out of the 21 APEC member economies, only 12 completed the survey administered to solicit information on food security policies**: Australia; Hong Kong, China; Indonesia; Japan; Mexico; New Zealand; Papua New Guinea; Peru; Philippines; Russia; Singapore;** and **Viet Nam**. In addition, the **United States** provided some helpful information.

The findings below are based on the responses from those 12 economies as well as the literature review and interviews conducted of secondary sources. For ease of understanding and for convenience, the findings are presented in an annotated form and grouped under the following sections: food security in APEC; policy responses; governance of food security; and issues requiring additional attention.

The findings of our multi-methods approach helped to provide a general landscape of the prevailing food security policies of each APEC member economy as well as identify any gaps and opportunities in order to formulate more effective and targeted anticipatory and response strategies *vis-à-vis* food security. These findings, although not exhaustive, will provide an important foundation for APEC's newly established Policy Partnership on Food Security (PPFS) as it works towards a unified APEC Food System.

FOOD SECURITY IN APEC

1. All APEC economies experience some form of food insecurity to some degree or another. While many are food secure at the macro level in terms of food availability, the picture is different at the household level.

Because the APEC region represents a wide spectrum of high, middle and low income economies with varying food and nutritional needs, different agrifood systems ranging from traditional to highly industrialized, as well as a broad range of natural resources, climatic conditions, and demographics, the food security situations of economies are just as diverse (see Annex 3). However, the one thing in common across all economies is that all of them experience some form of food insecurity to some degree or another. While many member economies are food secure at the macro level in terms of food availability for human consumption (i.e. dietary energy supply), the picture is different at the household level.

The 12 survey responses and the literature review conducted revealed that developing economies (such as **China; Indonesia; Malaysia; Mexico; Papua New Guinea; Peru; Philippines; Thailand; Viet Nam**) continue to experience significant poverty and undernourishment (defined as the condition of people whose dietary energy consumption is continuously below a minimum dietary energy requirement for maintaining a healthy life and carrying out a light physical activity) with the rural poor still dependent on subsistence agriculture and the urban poor exposed to hunger due to rising food prices. Recent food security assessments in these economies have revealed that areas experiencing relatively high poverty ratios are the same ones that experience food insecurity. Further, households engaged in subsistence farming and agricultural wage labor were more vulnerable to food insecurity than other livelihood groups. At

the other extreme, this group of economies is also beginning to see increasing levels of obesity and overweight particularly in their urban populations. For example, **Chile** has the sixth highest level of child obesity among OECD economies with 35 per cent of children with the first eight years of education, overweight. In **China**, 9.2 per cent of children were overweight for their age in 2002. In **Mexico**, over 65 per cent of the adult population is overweight or obese. Obesity is also a growing public health concern in **Peru; Russia;** and **Thailand**.

Other economies (such as **Chinese Taipei; Japan; Korea**) which are undergoing rapid transformation and urbanization are seeing dramatic changes in food consumption patterns and diet diversification and are forced to keep up with demand by increasing food imports at the expense of self-sufficiency. Food security discussions in these economies are more often associated with this concept. As already mentioned earlier, **Chinese Taipei; Japan;** and **Korea** have relatively low food self-sufficiency ratios particularly in grains (with the exception of rice) and depend to a large extent on food imports. The increase in demand for grains is driven primarily by the expansion of the livestock industry as more and more of the population consume meat products.

Economies with higher per capita incomes (such as **Australia; Canada; New Zealand**; **United States**), while also reporting disrupted eating patterns and reduced food intake for a small proportion of their population, are also facing reduced quality, variety or desirability of diet which has resulted in increasing levels of obesity and other diet-related chronic diseases. For example, in 2009-2010, more than 35 per cent of **US** men and women (37 million men and 41 million women) and almost 17 per cent of youth (5.5 million girls and 7 million boys) were obese. In **Australia**, the prevalence of obesity has more than doubled in the past 20 years. Results from a recent survey revealed that in 2007-08, 61.4 per cent of the Australian population are either overweight or obese, with 42.1 per cent of adult males and 30.9 per cent of adult females classified as overweight and 25.6 per cent of males and 24 per cent of females classified as obese. In **Canada**, approximately one in four adults is obese, according to measured height and weight data from 2007-09. Of children and youth aged six to 17, 8.6 per cent are obese. There has been a rise in obesity in **New Zealand** adults in recent decades – from 9 per cent (males) and 11 per cent (females) in 1977 to 27.7 per cent and 27.8 per cent, respectively, in 2008-09. A recent survey revealed that one in three adults was overweight (37.0 per cent) and one in four was obese (27.8 per cent); one in five children aged 2 to 14 years was overweight (20.9 per cent) and one in twelve was obese (8.3 per cent).

2. Agriculture and food security are now firmly back on the development and political agendas for most APEC economies, with some even identifying food security as of domestic strategic importance.

Out of the 12 economies that responded to our survey, 7 economies (**Indonesia; Mexico; Papua New Guinea; Peru; Philippines; Russia**; and **Viet Nam**) identified food security as of domestic strategic importance. Further research also revealed that **China** (Huang et al., 2003) and **Chinese Taipei** (*Taipei Times*, 2010) have similar viewpoints. A partial attribution is the 2007-08 food crisis and ongoing food price volatility, from which food security has re-emerged as one of the central issues on the global development and political agendas. After decades of neglect, the crisis has refocused attention of governments and international organizations on investments in agriculture, food, and nutritional security.

While the 1996 FAO definition of food security is widely accepted among all APEC economies – i.e. food security is achieved when *'all people, at all times, have physical and economic access to sufficient, safe and nourishing food to meet their dietary needs and food preferences for an active and healthy life'* – economies differ in their philosophies and approaches to food security and these are often reflected in their policies. In our survey, respondents were asked to rank in order of priority the following concepts their economy supports for attaining food security: first, the concept of food self-sufficiency which generally seeks to minimize an economy's dependence on buying food from other economies while emphasizing one's own production of food products for domestic consumption; second, the concept of food self-reliance which advocates reliance on the international market for the availability of food in the domestic market; third, the concept of food sovereignty which is defined as 'the right of the people, communities and countries to define their own agricultural, fisheries, land and food policies which must be ecologically, social, economic and culturally appropriate to their particular conditions' (FAO, 1996); and fourth, the concept of the 'right to food' which is the recognition that every person has the right to have access to a decent standard of living, including access to adequate food. Out of the 12 economies that responded to the survey, only 7 performed the ranking. The results were as follows: **Mexico; Peru; Philippines;** and **Viet Nam** ranked the concept of 'right to food' as the highest while **Papua New Guinea** and **Russia** supported most the concept of 'self-sufficiency.' It is interesting that a majority of the economies surveyed, with the exception of **Singapore** and **Papua New Guinea**, ranked the concept of 'self-reliance' last.

Table 5: Ranking of food security concepts

	Self-sufficiency	Self-reliance	Food sovereignty	Right to food
Mexico	3	4	2	1
Papua New Guinea	1	2	3	4
Peru	3	4	2	1
Philippines	2	4	3	1
Russia	1	4	3	2
Singapore	2	1	4	3
Viet Nam	3	4	2	1

The concept of self-sufficiency has grown in popularity among APEC economies because of growing mistrust in many developing and net food importing economies about the reliability of international markets as suppliers of affordable food. Food import bills in APEC economies have risen markedly over the last decade, driven mainly by a combination of higher international prices and greater trade (see Table 6). Eleven economies have seen their import bills grow by more than 10 per cent per annum during 2000-2010 with **Viet Nam** and **Russia** having the highest growth rates of 23.8 per cent and 16.8 per cent, respectively. This has raised concern in more vulnerable economies on the over-reliance on international trade. Thus, several economies, notably **Brunei Darussalam; China; Indonesia; Japan; Korea; Malaysia; Mexico; Papua New Guinea; Philippines; Russia; Chinese Taipei; and Viet Nam** have called for increased self-sufficiency and food independence versus continued reliance on the international market for the availability of food in the domestic market. Some economies have set targets for increased self production of selected food items, for example **Singapore'**s target to meet 15 per cent of its requirements for fish through local production. A summary of self-sufficiency positions and future targets of selected APEC economies is presented in Table 7.

For relatively advanced Asian economies (such as **Japan**; **Korea**; and **Chinese Taipei**), self-sufficiency ratios vary among different categories of food. The ratios of fish and seafood, vegetables and fruits are pretty high while the ratios of cereals are quite low except of rice which is heavily protected in these economies. The self-sufficiency ratio of wheat in particular is quite low in **Japan** (11 per cent) and **Korea** (0.8 per cent). In **Chinese Taipei,** the remarkable increase in agricultural imports, from USD 66.5 million in 1952 to USD 12.1 billion in 2008, is mainly due to two reasons: the increased imports of dairy products and beef in response to rapidly improved living standards and the rapid increase in imports of cereals and fishmeal due to the expansion of the livestock and fishery industries. The above reflects the changing patterns of food consumption that usually accompanies rising affluence and urbanization.

Table 6: Food import bills of selected APEC economies, 2000 and 2010 (USD million)

Economy	Food Import Bills		
	Total		
	Million US$	Million US$	% p.a.
	2000	2010	growth 2000-2010
Australia	2 579.9	8 291.5	12.4
Brunei Darussalam	172.7	450.2	10.1
Canada	10 782.7	24 104.6	8.4
Chile	1 181.8	4 424.2	14.1
China	20 742.6	83 746.0	15
Japan	43 689.2	57 564.0	2.8
Korea	7 192.3	21 599.9	11.6
Malaysia	3 340.6	12 052.5	13.7
Mexico	8 245.7	18 610.9	8.5
New Zealand	914.4	2 815.1	11.9
Peru	830.4	2 997.5	13.7
Philippines	2 405.6	5 885.2	9.4
Russia	8 302.8	39 149.6	16.8
Singapore	3 223.1	8 044.0	9.6
Thailand	2 450.2	8 227.5	12.9
United States	41 489.3	79 872.5	6.8
Viet Nam	711.5	6 007.8	23.8

Source: FAO, 2012b

Table 7: Self-sufficiency plans and developments in selected APEC economies

Economy	Self-sufficiency plans and developments
Brunei Darussalam	Rice self-sufficiency rate was 3.12 per cent in 2007; Aims to increase rate to 60 per cent by 2015
China	Goal is to maintain a >95 per cent grain self-sufficiency rate
Indonesia	Self-sufficient in rice in the mid-1980s but agricultural productivity declined over the years; Over recent years, Indonesia has been a major rice importer – on average requiring over 1.1 million tons of imports per year; Current aim is to reach rice self-sufficiency by 2014
Japan	40 per cent self-sufficiency rate in terms of calories; 100 per cent in rice, 11 per cent in wheat, 8 per cent in beans, 83 per cent in vegetables, 41 per cent in fruits, 58 per cent in meat and 62 per cent in seafood; Aims to raise self-sufficiency rate in terms of calories to 45 per cent by 2015
Korea	Self-sufficient in rice, but on average has a 26.7 per cent grain self-sufficiency rate; Aims to raise grain self-sufficiency rate to 30 per cent by 2015

Malaysia	Aims for self-sufficiency in rice production at about 65-70 per cent of local consumption
Mexico	42 per cent of food consumed is imported; The dependency on imports is dramatic: 80 per cent in rice, 95 per cent in soybeans, 33 per cent in beans, and 56 per cent in wheat; World's number one importer of powdered milk; Self-sufficient up until 1988
Philippines	Aims to attain self-sufficiency in rice by 2013; Reduced import target for 2012 to around 500,000 tons from around 2.45 million tons of rice imports in 2010
Russia	Established the following minimum self-sufficiency targets through to 2020: 95 per cent in grain and potatoes, 90 per cent in milk and dairy products, 85 per cent in meat and meat products and edible salt, 80 per cent in sugar, vegetable oil, and fish products
Singapore	With local farming accounting for 23 per cent of eggs, 4 per cent of fish and 7 per cent of leafy vegetables consumed, the aim is to increase self-sufficiency levels to 30 per cent of eggs, 15 per cent of fish and 10 per cent of leafy vegetables in the next five years
Chinese Taipei	Food self-sufficiency ratio is 30.6 per cent in terms of calories; government launched a new program in 2008 to encourage farmers to grow corn for feed on fallow land
Viet Nam	Proposed to maintain a 2.5 per cent rice yield increase per year until 2020

In addition to such self-sufficiency pronouncements, some economies have also brought forward legislation to address food security concerns. Earlier this year, a draft Grain Law was released in **China** which aims to ensure grain supply and security by stabilizing grain output and intensifying supervision over the market. In 2011, **Mexico** approved the constitutional reform that establishes the right to food in that economy. With it, the government has an obligation to guarantee the right and to assure sufficient supply of basic foods through integrated and sustainable rural development. In early 2010, **Russia**'s then President Medvedev signed Russia's Food Security Doctrine which outlines that economy's agricultural production and policy goals, emphasizing its food independence and self-sufficiency in certain products. The Doctrine was the first step towards the development and adoption of the Federal Law on National Food Security.

3. Economies with common attributes *vis-à-vis* agriculture share common concerns across all four food security dimensions.

To examine the food security issues confronting the APEC region, economies have been grouped according to common attributes such as their levels and types of agricultural production (APEC PSU, 2009). **Group 1** includes economies that have a large number of small farms, low levels of capital investment but generally high levels of agricultural chemical inputs, and a large percentage of the total labor force engaged in primary production. **Group 2** includes those economies with large scale, capital intensive farms and fisheries, with a small proportion of the labor force engaged in primary production. **Group 3** includes economies with small scale farms that are relatively labor intensive. Agricultural industries in these economies are protected to maintain 'sufficiency' and cultural values. Lastly, **Group 4** includes those economies which have large populations relative to their primary production base and depend to a large extent on food imports.

Group 1: Economies with extensive agriculture: **Chile; China; Indonesia; Malaysia; Mexico; Papua New Guinea; Peru; Philippines; Russia; Thailand; Viet Nam**

Group 2: Economies with large-scale farming: **Australia; Canada; New Zealand; United States**

Group 3: Economies with small-scale farming: **Japan; Korea, Chinese Taipei**

Group 4: Economies with limited primary production: **Brunei Darussalam; Hong Kong, China; Singapore**

(Source: APEC PSU, 2009)

The survey responses from the 12 APEC economies along with the literature review revealed that the economies in each group share common concerns across all four food security dimensions. A summary of these concerns is presented in Table 8. It is evident from the table that compared to the other groups, Group 1 economies are confronted by much more complex and multi-faceted issues in each of the four dimensions, suggesting that a more encompassing approach is needed to address food insecurity.

Despite the diversity of concerns across the different groups, there are a few issues that stand out which are shared across all of them. These include, but are not limited to the following: for the 'availability' dimension, natural resource constraints, climate change and natural disasters; for the 'physical access' dimension, natural disasters; for the 'economic access' dimension, the rising cost of (nutritious) food; and for the 'utilization' dimension, the lack of nutrition education and food safety.

<u>Natural resource constraints and climate change</u>

Many of the world's agro-ecosystems being used as food production systems are already showing worrying signs of degradation. According to the Millennium Ecosystem Assessment, 60

Table 8: Main issues of concern *vis-à-vis* each food security dimension per group of economies

Economy	Availability	Physical Access	Economic Access	Utilisation
GROUP 1: Economies with extensive agriculture				
Chile; China; **Indonesia**; Malaysia; **Mexico**; **Papua New Guinea; Peru; Philippines; Russia**; Thailand; **Viet Nam**	High cost of production inputs, poor infrastructure, wastage, competition for land, poor credit, limited investments in R&D and extension services, natural disasters, climate change, natural resource constraints, poor access to credit	Inefficient supply chain and logistics systems, road connectivity of remote areas, inadequate transport, natural disasters, lack of retail outlets	Poverty, rising cost of food, lack of diversity in sources of income, insufficient social safety nets for vulnerable sectors of society, lack of stable employment	Lack of nutrition education, suboptimal infant/maternal feeding programs, high cost of nutritious foods, poor implementation of laws on mandatory food fortification, lack of access to essential infrastructure and services, poor sanitation, food safety
GROUP 2: Economies with large scale farming				
Australia; Canada; **New Zealand**; United States	Natural resource constraints, climate change, open trading system, natural disasters	Natural disasters, lack of retail outlets providing appropriate and nutritious foods in remote areas	Rising cost of nutritious food	Poor food choices leading to lifestyle-related chronic diseases, lack of nutrition education, food safety
GROUP 3: Economies with small scale farming				
Japan; Korea; Chinese Taipei	Declining performance of agriculture, fewer and aging farmers, decreasing farmland, tight global supply and demand, dependence on foreign imports, natural disasters, climate change	Natural disasters, lack of connectivity of vulnerable populations (e.g. elderly) to retail outlets	Rising cost of nutritious food	Lack of nutrition education, poor food choices, food safety
GROUP 4: Economies with limited primary production				
Brunei Darussalam; **Hong Kong, China**; **Singapore**	Diversification of sources, heavy dependence on imports, shortages/ disruptions in global market (e.g. export restrictions, disease outbreaks, weather disruptions, incidents of unsafe food, etc.), competition for land	Natural disasters	Rising cost of nutritious food	Food safety, lack of nutrition education

Note: APEC economies that responded to the survey are in **bold**.

per cent or 15 out of 24 ecosystem services examined are already being degraded or used unsustainably. The use of two of these systems, capture fisheries and fresh water, is now well beyond levels that can be sustained even at current demands, much less future ones.

Climate change will put additional pressure on natural resources and food security through higher and more variable temperatures, changes in precipitation patterns, and increased occurrences of extreme weather events (Nelson et al., 2010). Because food production is critically dependent on local temperature and precipitation conditions, any changes require farmers to adapt their practices, and this adaptation requires resources that could be used for other purposes. Farmers everywhere will need to adapt to climate change. According to recent projections by the International Food Policy Research Institute (Fan, 2011), Asia's production of irrigated wheat and rice will be 14 and 11 per cent lower, respectively, in 2050 than in 2000 due to climate change. In East Asia and the Pacific, yields in 2050 for crops will decline from their levels in 2000 by up to 20 percent for rice, 13 percent for soybeans, 16 percent for wheat, and 4 percent for maize because of climate change. Latin America and the Caribbean will face average yield declines of up to 6.4 per cent for rice, 3 per cent for maize, 3 per cent for soybeans, and up to 6 per cent for wheat in 2050.

Natural disasters

It is noteworthy that natural disasters have surfaced as a major food security concern for all APEC economies. The region is frequently exposed to natural disasters such as earthquakes, tsunamis, typhoons, floods and droughts that temporarily disrupt food supply, damage the food production base, disrupt livelihoods, displace people and reduce access to food. In the last few years, the region has had its fair share of natural disasters with the ongoing drought in the **United States** as a stark reminder of how vulnerable economies can be. Corn production is forecast at 10.8 billion bushels, down 13 per cent from 2011 and the lowest production since 2006 while s**oybean** production is forecast at 2.69 billion bushels, down 12 per cent from last year (USDA, 2012b).

The floods in **Australia** in 2010-11 reduced agricultural production by at least USD 459-600 million, with significant impacts on production of fruit and vegetables, cotton, grain sorghum and some winter crops. The largest estimated losses were in cotton (about USD 138 million) and fruits and vegetables (about USD 206 million).

Agricultural output fell by 12 per cent following a severe drought in **Russia** in 2010. Total grain output was reduced by 31 per cent compared to the previous five-year average. Barley, the principal feed crop, had a 52 per cent fall in output compared to the average of the previous five years. The drought in 2010 affected all crop sectors severely; the 2010 potato harvest was almost one quarter below the average of the three preceding years.

In **Canada**, excessive rains in June 2010 led to severe flooding in the prairies where the majority of Canadian wheat is grown; Central and Northeast Saskatchewan were the hardest hit regions, although southern parts of Alberta and Manitoba were also affected. Roughly 20 per cent of total acreage in the prairies was estimated not to have been seeded, approximately 5 million hectares.

The 2010 earthquake in **Chile** inflicted an estimated USD 1 billion of damage on the economy's agricultural and rural infrastructure.

The massive earthquakes that hit the eastern part of **Japan** in March 2011 caused extensive tsunami damage in the coastal area. Approximately 23,600 hectares of farmland (roughly 1 per cent of total farmland) were flooded and related production facilities (e.g. irrigation) were severely damaged.

The 2009-2011 drought in northern **China** was the worst drought to afflict that economy in 60 years. The drought affected 7.7 million hectares of winter wheat, and by the end of the episode in June, some 35 million people had been affected. It caused an estimated USD 3.5 million dollars in immediate damage, both to agriculture and to the hydroelectric sector. During the same period, floods also occurred affecting 13.5 million hectares of crops with at least 2 million completely destroyed. The drought and flooding in 2010 cost **China** about USD 75 billion. The Chinese government spent nearly USD 15 billion in direct relief and subsidies to farmers. So far, China has spent an average of USD 35 billion a year since 2004 counteracting the effects of extreme weather, and the numbers are increasing each year.

The year 2011 also saw severe flooding taking place in Southeast Asia destroying thousands of hectares of paddy. Tropical storm Nalgae in early October 2011 caused severe flash flooding in the northeast, east and central regions of **Thailand**. Flood waters inundated more than two-thirds of that economy causing loss of life, the submergence of rice fields, loss of crop and livestock, closure of hundreds of factories and severe damage to buildings and infrastructure. Official estimates indicate that the floods affected over 2.4 million people and damaged at least 1.6 million hectares of standing crops. The affected area covered 12.5 percent of the total domestic cropped land. **Viet Nam** was also hit by the same typhoon in October 2011 and a total of 28,813 hectares of standing paddy crop had been damaged (0.4 per cent of the total paddy area).

The **Philippines** was hit by several strong typhoons in 2009 and then again in 2011. Typhoons Ondoy and Pepeng that hit in September-October 2009 caused significant damage to the agricultural sector. It is estimated that the agricultural sector sustained damage of USD 80.1 million and losses of USD 769.2 million. The storms came at a time when the current crops were about to be harvested, so most of the production was lost. Furthermore, irrigation systems were partially destroyed. Two years later, the **Philippines** was hit again by typhoons, Nesat on 27 September 2011 affecting 35 provinces in northern and central Luzon and later by typhoon Nalgae on 1 October. Both the typhoons and subsequent localized floods had a severe impact on the paddy production of the main 2011 season, which accounted for approximately 55 per cent of the national rice output. Official reports indicated that about 4 million people had been affected and at least 485,000 hectares of standing crops, including rice, maize and high value commercial crops had been damaged or lost to the floods. The affected cropped area covered 6 per cent of the total domestic cropped area. Additionally, nearly 3.3 million livestock and poultry were also affected.

Rising cost of food

The rising cost of food is an important barrier to economic access to food and is a concern across all APEC economies. Inflation erodes the purchasing power of households, especially those with low incomes, and could undermine the gains in poverty reduction and human development that have been achieved (ADB, 2012). At the domestic level, higher food prices hurt economies that provide substantial food subsidies. High levels of food subsidies may displace public investments in other areas, such as health, education and infrastructure. At the household level, the impact of higher prices falls heaviest on the poor, particularly female-headed households, small-scale farmers and the landless, which may spend as much as three-quarters of their income on food. Moreover, more volatile food prices often push small-scale farmers and poor consumers into long-term poverty traps as vulnerable households often cope with higher food prices by selling assets, reducing spending on health, or removing children from school in order to maintain food intake. These short-term coping mechanisms have long-term negative, sometimes permanent effects on the family's ability to escape from poverty. Volatile food prices can also result in large income fluctuations for farmers, who have little or no recourse to savings and insurance. Thus, risk-averse farmers may opt for inefficient technologies with low returns rather than risk investing scarce resources in better technology (ADB, 2012; FAO, 2012b).

Lack of nutrition education

As already mentioned earlier, simply having enough food or being able to access it will not always guarantee food security. To be food secure, people's bodies should be able to use the food effectively so that it contributes to their health and nutrition (ADB, 2012). Other factors that affect nutrition include sanitation – such as access to safe drinking water – and disease. Education, particularly women's education, is one of most important instruments for combating child malnutrition and infant mortality. Nutrition is crucial to improving productivity and economic growth and for combating poverty. According to the World Bank (2009) children undernourished during the first two years of their lives are expected to have 10-17 per cent lower income than well-nourished children. Available studies have shown that low birth weight, protein energy malnutrition in childhood, childhood iron-deficiency anaemia and iodine deficiency are all linked to cognitive deficiencies and the effects are more or less irreversible by the time the child is ready to go to school.

At the extreme end of the malnutrition spectrum is the problem of over-nourishment which leads to overweight and obesity. While an already well-established phenomenon in developed economies, obesity is also increasing in the developing world, especially among urban dwellers. Many developing economies are now facing a "double burden" of disease. While they continue to deal with the problems of infectious disease and under-nutrition, they are experiencing a rapid upsurge in non-communicable disease risk factors such as obesity and overweight. As the data presented in Table 10 reveals, it is not uncommon to find under-nutrition and obesity existing side-by-side within the same economy and even household. Children in these economies are more vulnerable to inadequate pre-natal, infant and young child nutrition. At the same time, they are exposed to high-fat, high-sugar, high-salt, energy-dense, micronutrient-poor foods, which tend to be lower in cost. These dietary patterns in conjunction with low levels of physical activity have resulted in sharp increases in childhood obesity while under-nutrition issues have remained

unsolved (WHO, 2012). Worldwide obesity has more than doubled since 1980. In 2008, more than 1.4 billion adults, aged 20 and older, were overweight. Of these over 200 million men and nearly 300 million women were obese.

Food safety

Food safety also has a profound contribution to food security. First, it contributes to improved health and nutrition of the population thereby increasing productivity and livelihoods. Second, it reduces public health costs through a decrease in food-borne illnesses among vulnerable populations and related social and economic implications. Third, it reduces food losses resulting in increased availability, stability and utilization. Finally, with more and more food being traded across borders, compliance with food safety issues is becoming an increasingly important determinant in market access.

Food safety represents another important challenge for all APEC economies, both developing and developed alike. High profile food safety incidents in the region including the 2008 incident of melamine-contaminated infant milk powder in **China**, the 2011 incident of DEHP plasticizer used to replace palm oil in food and drinks in **Chinese Taipei**, salmonella-contaminated peanut butter in the **United States** in 2007, and radiation-contaminated food following the earthquake in **Japan** in 2011 have helped stress the need for improvements in the food safety systems of member economies.

4. In several APEC economies, food security is equated to rice self-sufficiency. Thus, many domestic policies are biased towards rice production or at least towards stabilizing domestic rice prices.

It is inevitable that food security discussions in the APEC region should feature rice prominently given its importance politically, economically and culturally for many member economies. The region is home to most of the world's top producing, consuming, exporting and importing economies (see Table 9). Despite its gradual decline in terms of economic and cultural importance in many member economies, with the exception of the **Philippines**, most discussions about food security in the region still focus on rice.

Table 9: Leading rice-producing, -consuming, -exporting and –importing economies in APEC, 2011 (ranking)

Producing	Consuming	Exporting	Importing
China (1) Indonesia (3) Viet Nam (5) Thailand (6) Philippines (7) Japan (10) United States (11) Korea (13)	China (1) Indonesia (3) Viet Nam (5) Philippines (6) Thailand (7) Japan (9) Korea (11) United States (13)	Thailand (1) Viet Nam (2) United States (4) China (11) Australia (13)	Indonesia (1) Philippines (6) Malaysia (8) Mexico (13) Japan (14) United States (15)

Source: USDA, 2011

Rice production

At the global level, the share of rice in total cereal production has not changed a lot between 1961 and 2007, starting at 24.6 per cent and rising gradually to 28.1 per cent (Timmer, 2010). However, the regional patterns of change are quite dramatic. It is obvious that Asia relies more heavily on rice than the rest of the world. The share of rice in overall cereal production in East Asia (which includes **China; Hong Kong, China; Japan; Korea;** and **Chinese Taipei**) fell steadily from 56.2 per cent in 1961 to 43 per cent in 2007. Southeast Asia (which includes **Brunei Darussalam; Indonesia; Malaysia; Philippines; Thailand;** and **Viet Nam**) is very heavily dependent on rice; it accounted for 90.6 per cent of cereal production in 1961 and still accounted for 85.9 per cent of cereal production in 2007.

In terms of the role of rice in overall agricultural production, rice has been about 5 to 6 per cent of global agricultural production since 1961, but once again the share varies enormously by region (Timmer, 2010). In East Asia, rice's share has dropped from 18.9 per cent to 8.34 per cent in 2007 while in Southeast Asia, rice contributed 40.2 per cent of agricultural output in 1961, dropping steadily but slowly since then. In 2007, rice still contributed 32 per cent of agricultural output in Southeast Asia. In terms of rice's contribution to the economy, the share of rice in Asian economies (as a share of GDP) has declined very rapidly due to the structural transformation and the declining role of agriculture in some emerging economies in the region, and the agricultural transformation taking place, where farmers are opting out of low-valued rice

production. Even in 1961, rice accounted for just 6.8 per cent of GDP in East Asia and 14.5 per cent in Southeast Asia. In 2007, it was just 1.0 per cent in East Asia and 3.8 per cent in Southeast Asia. These data suggest that even in Asia, rice is less important economically than other sectors such as livestock, construction, transportation and even banking (Timmer, 2010).

Rice consumption

Further, Timmer (2010) reports that significant changes are also under way in rice consumption in Asia. First, the overall importance of rice to Asian consumers as a source of calories is gradually declining. Rice as a share of calories for all of Asia fell from 36.3 per cent in 1961 to 29.3 per cent in 2007. What is striking about this decline is its acceleration. The share fell by 0.25 per cent per year between 1961 and 1990, but by 1.00 per cent per year from 1990 to 2007. There is also great variance among economies in the changing role of rice in food consumption. With the exception of the **Philippines**, the share of rice in terms of calorie contribution has been falling over the last few decades in **China; Indonesia; Japan; Korea; Chinese Taipei;** and **Viet Nam**. The fall has been especially rapid in Korea – from 49.8 per cent in 1980 to 6.8 per cent in 2007 – and in China, from 38.7 per cent in 1970 to 26.8 per cent in 2007.

However, despite the declining role of rice in overall production and consumption, the total size of rice demand remains important because rice is still the largest single source of calories for a significant majority of Asian consumers and a considerable percentage of the region's population is still involved in rice cultivation. It is perhaps for these two reasons along with the cultural importance of rice that rice availability has for many years been considered the key indicator of food security in the region.

Rice policies

Because of its political and cultural importance, governments of exporting and importing economies alike have long taken a heavy-handed approach towards the rice economy (Trethewie, 2012). More often than not, food security in these economies is equated to rice self-sufficiency in domestic production. The survey responses from **Indonesia**; **Philippines**; **Japan**; and **Viet Nam** as well our literature review of other economies where rice features prominently revealed that many domestic policies are biased towards rice production or at least towards stabilizing domestic rice prices. Some rice-specific policies that have become prominent since the 2007-08 food crisis are described below.

Since the 2007-08 crisis, **Indonesia** and the **Philippines** have pursued substantial rice production initiatives and pledged to be self-sufficient by 2014 and 2013, respectively, with the aim of becoming net exporters soon after (Trethewie, 2012). **Indonesia** has begun to advocate a decrease in household consumption of rice, encouraging consumption of alternatives such as cassava. It has also undertaken strategies to increase rice production, including the allocation of new farmlands and the improvement of irrigation infrastructure in order to become self-sufficient by 2014 and an exporter of rice by 2015. These are not entirely new objectives given that Indonesia has been aiming for self-sufficiency for some years, but the strategy has gained new momentum following the food crisis.

In the **Philippines**, the government support price (SP) for palay (paddy rice) was increased to P17/kg from P12/kg plus an incentive of P0.70/kg in February 2009. The National Food Authority implemented several marketing assistance programs for rice farmers. In-quota tariff for rice was lowered to 40 per cent from 50 per cent before the crisis. Lowering the in-quota tariff of rice encouraged the private sector to participate in the economy's rice importation activities which was predominantly handled by the National Food Authority.

In March 2008, **Viet Nam** suspended the signing of new rice-export contracts between Vietnamese export companies and their partners amidst escalating food prices worldwide. In April 2008, the Prime Minister also signed Directive 391/2008/Q-TTg to facilitate the implementation of the agricultural land use plan and allocate land for rice production. Also, a domestic land use plan was issued for the period up to 2020 and partly towards 2030 that prescribes that least 3.8 million hectares of land be maintained for the purpose of producing paddy. Meanwhile, the land area under paddy production has in fact declined from 4.2 million hectares in 2000 to 4 million hectares in 2009 due to competing claims on land use (IIAS, 2011). Moreover, some policies supporting rice production such as research and applying new rice varieties, technological trainings, exemption of irrigation fees and encouraging rice farmers doing contract farming have also been recently applied. More recently in May 2012, the Prime Minister signed Government Decree No 42/2012 ND-CP which calls on relevant authorities to encourage rice cultivation rather than other crops, and to urge people to reclaim fallow land for wet rice cultivation. The decree articulates that the government will subsidize 70 per cent of the cost of fertilizer and pesticides when losses top 70 per cent; or 50 percent when farmers lose from 30-70 per cent of their crops. In addition, the government will also pay for 70 per cent of the cost of reclaiming fallow land, or rehabilitating land for wet rice cultivation. According to the decree, the government will provide rice seed free of charge to farmers in the first year in areas which have been reclaimed, while supporting 70 per cent of the seed price for the first rice crops on rehabilitated land.

In **Thailand**, the government of the Puea Thai party Prime Minister Yingluck Shinawatra took office in August 2011 after pledging during the election campaign to reinstate a previous rice Paddy Pledging Program with intervention prices 30-50 per cent higher than rice market prices. It replaced a Price Insurance Program that had operated for two years. Thailand holds more than half of the world’s share of exports in broken rice, which is the main type of rice consumed in most developing economies. In the case of broken rice, the top five producers account for roughly 80 per cent of world exports. This high level of concentration implies that world prices for broken rice will immediately react to any reduction in exports by Thailand—and it is feared that the government’s proposed fixed-price scheme will severely limit Thai rice exporters’ ability to compete in the global market. This in turn will result in significantly higher prices and price volatility, with detrimental effects on the world’s poor (Torero, 2011).

Following the unprecedented food crisis of 2007-08, **Malaysia** responded by releasing its rice stocks (public or imported at subsidized price) and by imposing price controls at the retail level. Malaysia imposed ceiling prices on rice sold to consumers and raised the guaranteed minimum price for rice growers. There were more efforts initiated by the Malaysian government, of course, to handle the issue in short- and long-term policy measures. Amongst these was the National Food Security Policy which is directed at increasing rice production towards meeting the revised

self-sufficiency target, especially in Sabah and Sarawak. This policy includes a Miller Subsidy Programme, increased Paddy Price Subsidy, farm mechanization, increase in agricultural subsidies, etc. Under **Malaysia**'s new National Agricultural Policy (2011-2020), it has been noted that an acceptable level of self-sufficiency of not less than 70 per cent for rice has to be maintained.

Brunei Darussalam has set a 60 per cent rice self-sufficiency level by 2015 from 3.12 per cent in 2007 and elaborated in 2008 an action plan to achieve its target. This plan includes the use of high-yielding varieties, the adoption of new technologies, the opening of new areas for rice production, the upgrading of existing farm infrastructure and the development of local capacity.

High trade barriers and protectionist policies for rice have allowed **Japan** to achieve an almost 100 per cent self-sufficiency rate for rice but the supply of other foods depends heavily on imports. Japan's new Basic Plan on Food, Agriculture and Rural Areas elaborated in 2010 envisions a more ambitious self-sufficiency rate target of 50 per cent in calorie supply by 2020 relative to 41 per cent in 2008 (OECD, 2011). Based on the new Basic Plan, new *farm income support payments* were introduced for rice farmers in 2010. The payments are designed to bridge the gap between producer price and production cost. Approximately 1.2 million rice farms participated in this program in 2010. The *rice production adjustment program*, which limits supply by allocating production targets to rice farms and keeps prices above market equilibrium levels, was maintained in 2010. Japan's Ministry of Agriculture, Forestry and Fisheries (MAFF) announced the new operational rule of *rice stockpiling* from fiscal year 2011 onward. The target level of domestic rice stockholding is unchanged at one million tonnes. Under the existing rule, the stockpile is revolved discretionally to maintain the target level of stock. The new rule requires MAFF to withdraw 0.2 million tonnes of rice every year before harvesting time from the domestic market and sell it for animal feed or processing after five years of stockholding, while the stockpile was sold to the staple rice market under the previous operational rule. The release to the domestic rice market will be limited to emergency shortage situations. A *rice traceability system* was elaborated in 2009, following the incidence that government rice sold for non-human consumption had been illegally marketed for food processors and breweries. The new law on rice traceability requires producers, wholesalers and retailers of rice and rice processed products to record certain information of all transactions (e.g. date, place of origin and transaction parties) and keep it for three years. Retailers and restaurants are also required to communicate the place of origin of rice and rice processed products either directly (e.g. labeling) or indirectly (e.g. printing the designated contact number).

Like Japan, **Korea** has achieved a near perfect self-sufficiency rate in rice due to protective measures and heavy government intervention. Direct payment schemes have been in place, while maintaining a public stockholding scheme for rice, which is a purchase and release mechanism based on current market price (OECD, 2011). In 2009, five kinds of direct payment programs were implemented with different objectives including direct payment for rice income compensation. The Rice Income Compensation Act which was revised in March 2005 establishes two kinds of payment to rice farmers. The first pays about USD 600 per hectare each year for farmers growing rice, as compensation for benefits to the public that come from maintaining rice paddies. The second payment is related to the price of rice that farmers receive. If the price falls below a target that is fixed in advance, the government pays farmers 85 per cent

of the difference between the target and market price for the quantity of rice that farmers sell. Another measure to deal with surplus rice production is the direct payment for adjustment of rice production. Currently, the payment is USD 3,000 per hectare for fields that are not used for any commercial production for 3 years.

Between 2008 and 2010, **China** increased each year the minimum prices for rice and wheat, independent of changes on international markets. Thus, rice prices remained much below those on international markets while those for wheat were artificially boosted pushing them above international levels in 2009 and 2010. Direct payments started to be implemented in 2004 to support grain production and to increase grain producers' incomes. Payments are based on current area sown to rice, wheat or corn and are financed from the National Grain Risk Fund. Central government funding for direct payments was increasing each year up to 2007, but then stabilized at CNY 15.1 billion (USD 2.2 billion) per year in 2007-10. Subsidies on agricultural inputs (e.g. improved seeds) have also increased, particularly for late *Indica* rice.

POLICY RESPONSES

5. APEC economies have responded to the various food security concerns by either reinforcing existing policy instruments or by introducing new ones. However, the policy focus has been biased towards increasing food availability and lowering food prices as well as cushioning the impact of higher prices on their populations.

6. Common farmer-oriented policies have focused on reduced taxes, producer credit or financial support services, seed and fertilizer subsidies, producer price subsidies or building reserves, all aimed at increasing productivity and total production.

In response to the food crisis of 2007-08 and ongoing challenges of increased food price volatility and extreme weather shocks, APEC members have made policy changes and/or introduced new policy measures *vis-à-vis* the food and agricultural sectors. Policy responses have varied according to the economies' level of development, the impact on their populations, their ability to supply their own needs, their financial resources and on whether the economies in question are net exporters or net importers of food.

To increase the availability of food, economies have used a combination of various farmer-oriented (i.e. production-oriented) and trade-oriented policies. Table 10 summarizes the data gathered from the 12 economies that responded to our survey as well as from the literature review conducted.

Farmer-oriented policies

A majority of APEC economies have increased their support to agricultural producers by way of direct payments, higher credit and financial support services, higher subsidies, minimum purchase prices, reduced producer taxes, etc.

In **Australia**, agricultural support is mainly provided by budget-financed programs as well as through regulatory arrangements and tax concessions. Budget-financed programs are mainly used for structural adjustment and for natural resources and environmental management. A major new initiative, *Australia's Farming Future*, was launched in 2009 to protect Australia's natural environment. It is Australia's climate change initiative for primary industries and provides funding over a period of four years (July 2008 to June 2012) to help primary producers adapt and respond to climate change.

In **Canada**, the *Growing Forward* framework replaced the five-year *Agricultural Policy Framework* (APF) in July 2008, and full implementation of the five-year agreement began in 2009. Major support policies are delivered through the business risk management heading of which there are four programs: *AgriInvest*, which subsidizes farm savings; *AgriStability*, which provides some support for income declines; *AgriInsurance* provides insurance against natural perils; and *AgriRecovery* for *ad hoc* disaster assistance.

The last few years have seen **China** significantly increasing its support to farmers. Market price support provided through tariffs, tariff rate quotas (TRQ) and state trading, combined with

minimum guaranteed prices for rice and wheat and *ad hoc* interventions on a growing number of agricultural commodity markets, is the main channel for providing support to Chinese farmers (OECD, 2011). Further, budgetary transfers for producers have been constantly growing since the end of the 1990s and are provided through input subsidies for agricultural chemicals, in particular fertilizers, improved seeds and agricultural machinery and, to an increasing extent, through direct payments at flat rate per unit of land. In 2007, the government launched subsidized pilot agricultural insurance schemes for both livestock and crop producers. Overall support for agricultural infrastructure has also amplified in recent years from USD 5.6 billion in 2007 to USD 15.9 billion in 2010. In 2011, China's most important policy document – the Number 1 Document – laid out plans to invest about USD 630 billion in water conservation in the next 10 years to combat increasing water scarcity. These plans include implementing institutional and policy reforms to improve water-use efficiency. China also released the 2012 Number 1 Document specifically focused on innovation in agricultural science and technology and boosting agricultural productivity. The annual growth rate of public spending on agricultural research and development in real terms increased from an average of 16 per cent from 2000-09 to more than 20 per cent in 2010-11 and is expected to grow in the coming years.

In March 2010, **Japan** announced a new Basic Plan for Food, Agriculture and Rural Area which envisions a more ambitious self-sufficiency rate target of 50 per cent in calorie supply by 2020 relative to 41 per cent in 2008 (OECD, 2011). The new Basic Plan lays out new directions of agricultural policies in the mid-term: 1) introduction of a new income support direct payment to farmers; 2) conversion to a production system that is more responsive to consumer demands for quality and safety; and 3) promotion of farmers' initiatives to expand their businesses into food manufacturing and retailing sectors to bring more income opportunities to rural areas. Based on the new Basic Plan, new *farm income support payments* were introduced for rice farmers in 2010 as a single year pilot program. However, the program was continued through 2011 and extended to include upland crops such as wheat, barley and soybean. Moreover, new direct payments for breeding and feeding cattle farmers and hog farmers were introduced in 2010.

Under its fourth National Agricultural Policy (NAP4 – 2011-2020), **Malaysia** has continued with the incentives for farmers under the domestic food security policy to ensure sufficient food supply at all times. Most of the efforts are carried out via a comprehensive set of market interventions in the form of input and output subsidies, production programs, guaranteed minimum price for paddy, paddy price support and other production-based incentives.

Mexico extended its *PROCAMPO* program which provides direct income support to farmers beyond its original deadline of 2008 until 2012 and initiated three main changes in April 2009. First, the rate of payments was made more progressive from 2009, providing higher payment rates for smaller farmers; second, the maximum payment limit was reduced under the program regardless of total area under production; and third, a revision of the register of land for *PROCAMPO* was decided to improve the quality of the program data. Further, in 2011 the Sustainable Modernization of Traditional Agriculture (*MasAgro*) project was launched in collaboration with the International Maize and Wheat Improvement Centre (CIMMYT). The project which brings together domestic and international organizations in partnership with innovative Mexican farmers aims to help increase farmers' income through a combination of improved cropping practices (including conservation and precision agriculture) and

conventionally-bred, high-yielding maize and wheat varieties to ensure that increased productivity does not have negative impacts that may contribute to climate change.

Support to agriculture in **New Zealand** is provided mainly through expenditures on general services such as agricultural research and biosecurity controls for pests and diseases (OECD, 2011).

During the second quarter of 2010, **Peru** launched two new programs, *AgroEmprende* and the Compensation for Competitiveness Program (PCC), with the aim to improve the competitiveness of small agricultural producers. *AgroEmprende* with a budget of USD 10.5 million and PCC with a budget of USD 53 million offer non-reimbursable funds to build or improve irrigation systems, production and processing equipment, and contract technical assistance. Encouraging producers' associability and integration to the market are also objectives of these programs (USDA, 2010).

The **Philippines** saw the Government Support Price for paddy rice increase in February 2009 as well as higher subsidies for agricultural inputs and new marketing assistance programs for rice farmers. The current administration has increased its support to farmers by way of providing them with improved seeds and set up post-harvest facilities such as dryers.

As already mentioned earlier, the most significant policy development in **Thailand** came in late 2011 in the form of a rice-pledging scheme which was reintroduced by the newly elected Thai government. To boost farmer incomes, the scheme sets intervention prices 30-50 per cent higher than rice market prices.

The **United States** elaborated a new agricultural policy framework in 2008 called the Food, Conservation and Energy Act of 2008 (2008 Farm Act), which governs farm policy for the period 2008-2012. This continues to emphasize direct payments, counter-cyclical payments and marketing assistance loan programs for the 2008-2012 crop years, with adjustments to target prices and loan rates for certain commodities (OECD, 2011). The 2008 Farm Act also introduced a new revenue support program known as the Average Crop Revenue Election program.

As mentioned earlier, the recently signed Government Decree No 42/2012 ND-CP in **Viet Nam** has called for the government to subsidize 70 per cent of the cost of fertilizer and pesticides when losses top 70 per cent; or 50 per cent when farmers lose from 30-70 per cent of their crops. In addition, the government will also pay for 70 per cent of the cost of reclaiming fallow land, or rehabilitating land for wet rice cultivation. According to the decree, the government will provide rice seed free of charge to farmers in the first year in areas which have been reclaimed, while supporting 70 per cent of the seed price for the first rice crops on rehabilitated land.

7. Economies have also introduced trade policy measures to curtail price increases and ensure adequate supplies in domestic markets. Responses have depended to a great extent on whether the economies in question are net importers or exporters of food.

Trade-oriented policies

In addition to farmer- and production-oriented policies, Table 10 also shows that many economies have also introduced trade policy measures to curtail price increases and ensure adequate supplies in domestic markets. Responses have depended to a great extent on whether the economies in question are net importers or exporters of food. The former involves reducing import restrictions and tariffs, while the latter involves adopting increased taxes and restrictions on exports. Some examples of such measures seen in the last five years are provided below.

Reducing or eliminating import tariffs on food products has been the most widespread policy response for stabilizing domestic food prices in the APEC region. While many of these measures were put in place during the 2007-08 period, some of them remained in place up until 2010-2011. In February 2010, **China** reduced import tariffs on wheat by 50 per cent and on sesame seed and butter by 25 per cent. Maize flour was also exempted of tariff. In December 2010, **Indonesia** suspended the import tariff for rice by the State Logistics Agency (Bulog) and in January 2011 temporarily suspended the imposed 5 per cent import duty on wheat, soybean, flour and feed products following protests from the industry. In February 2011, **Korea** removed import tariffs on maize, soy meal and 32 other items to ensure supply and control inflation. Duty-free import of wheat was extended for another six months in September 2010 by the **Philippines**. In 2008, **Mexico** removed import tariffs on wheat, rice, maize, sorghum and fertilizers, reduced the import tax on powdered milk by half and an import quota of 100,000 tonnes of beans was allowed duty free. In 2011, **Peru** removed import tariffs on some food products including maize and rice. Also that same year, **Chinese Taipei** decreased the import duties on seven food staples by up to 50 per cent as a strategic measure to stabilize domestic prices. The tariff on durum wheat and other wheat was halved from 6.5 per cent to 3.25 per cent, wheat flour duties were reduced from 17.5 per cent to 8.75 per cent and wheat groat and meal from 20 per cent to 10 per cent. The tariff on skimmed and full-cream milk powder was cut from 10 per cent to 7.5 per cent, while the tariff on cassava starch was halved from 7 per cent to 3.5 per cent. Despite being large exporters of rice, **Thailand** and **Viet Nam** also liberalized rice imports to ensure a steady supply of rice.

At the other end of the spectrum, net exporting economies have adopted increased taxes and restrictions on exports. In March 2008, the government of **Viet Nam** suspended the signing of new rice-export contracts between Vietnamese export companies and their partners amidst escalating food prices worldwide. The deputy minister of industry and trade at the time reportedly said that the move was aimed at increasing 'the value and export revenues, while ensuring food security and serving the state's interests' (Viet Nam maintains, 2008). In August 2010, **Russia** introduced a ban on grain exports following a drought-reduced grain harvest and a spate of wildfires that devastated crops. This was eventually lifted in July 2011. In order to counteract a domestic food price surge, the government of **China** cancelled all the previous food export stimulus policies. The year 2007 saw the government cancel export tax rebates on exported wheat and its starch products. In 2008, the government abolished export tax rebates on

some of the exported vegetable oils. Such polices helped to stabilize domestic supply and the food price to an extent. In February 2008, **Indonesia** also increased the export tax on palm oil to control the domestic price of cooking oil.

Table 10: Policy responses to increase availability

Economy	Farmer-oriented								Trade-oriented			
	Reduced producer taxes	Producer credit/ financial support services	Production input subsidies (e.g. fertilizer, seeds etc.)	Producer price subsidy	Marketing of product/ product purchase	Increased investment in RDE	Increased investment in infrastructure (e.g. irrigation)	Build reserves/ stockpiles	Increase imports/ relax restrictions	Increase/ decrease export taxes	Export bans/ controls	Import diversifi-cation
Australia	✓	✓	✓		✓	✓	✓					
Brunei Darussalam							✓	✓				✓
Canada		✓	✓		✓	✓						
Chile	✓	✓	✓		✓	✓						
China	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	
Hong Kong, China		✓			✓	✓	✓					
Indonesia		✓	✓	✓		✓	✓	✓	✓	✓		
Japan	✓	✓	✓	✓		✓	✓	✓				✓
Korea		✓						✓	✓			
Malaysia		✓	✓	✓				✓				
Mexico		✓	✓	✓	✓	✓	✓	✓	✓	✓		
New Zealand						✓	✓					
Papua New Guinea*									✓			
Peru	✓	✓	✓		✓				✓			
Philippines			✓	✓	✓		✓	✓	✓			
Russia	✓	✓	✓					✓	✓	✓	✓	
Singapore						✓		✓				✓
Chinese Taipei				✓		✓			✓			
Thailand		✓	✓	✓		✓	✓	✓	✓			
United States	✓	✓	✓	✓	✓	✓	✓					
Viet Nam	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	

Note: APEC economies that responded to the survey are in **bold**. * data not available

8. Because of the devastating impact of extreme weather events on the agricultural sector in the last few years, a number of APEC economies have streamlined their frameworks for disaster assistance, climate change and green growth.

Our survey and literature review showed that a number of APEC economies have made adjustments to their capacities (or initiated new programs) to deal with food insecurity destabilizing factors in recent years.

Australia conducted a comprehensive *National Review of Drought Policy* and is now implementing pilot projects to test measures that aim to prepare farmers, their families and rural communities for future challenges, rather than waiting until they are in crisis to offer assistance – to move from a crisis assistance approach to risk management (OECD, 2011). In 2009 the government began implementing *Caring for our Country*, a suite of programs which funds environmental management of Australia's natural resources. It supports communities, farmers and other land managers to protect Australia's natural environment, and sustainably produce food and fiber. Australia also launched in 2009 a major new climate change initiative for primary industries known as *Australia's Farming Future*. It provides funding over a period of four years (July 2008 to June 2012) to help primary producers adapt and respond to climate change. The initiative consists of a number of elements: the *Climate Change Research Program* which provides funding for research projects and on-farm demonstration activities; *FarmReady* which helps industry and primary producers develop skills and strategies to help them deal with the impacts of climate change; the *Climate Change Adjustment Program* which assists farmers in financial difficulty to manage the impacts of climate change; and *transitional income support* which is linked to the climate change adjustment program and provides short-term income support and advice and training opportunities to farmers in serious financial difficulty, while they adapt their farm to changing circumstances, including climate change.

As already mentioned earlier, **Canada**'s latest agricultural framework, Growing Forward, includes the *AgriRecovery* program for *ad hoc* disaster assistance. The *AgriRecovery* framework is a new process to assess disaster situations and provide further assistance as needed to help impacted farmers recover. Examples of initiatives under the *AgriRecovery* program include the *Prairie Excess Moisture Initiative* which provided assistance to producers affected by excess moisture and flooding in 2010; the *Manitoba Interlake Unseeded Land Restoration Program* which assisted producers to help with the cost of restoring the land after two years of flooding and excess moisture in 2008 and 2009; and the *Pasture Recovery Initiative* which provided USD 51 per head for breeding cattle and other breeding livestock in order to help producers buy feed in 2010 while damaged pastures recovered from drought in 2008 and 2009.

Korea reinforced programs for protecting farm household income from natural disasters (OECD, 2011). An insurance scheme for crops and fruits was initiated already in 2001, starting with apple and pears. In 2009, the eligible products increased to twenty varieties, adding rice, sweet potato, maize, garlic, and plum since 2008. The government plans to extend the product coverage of the insurance to 30 commodities in 2011. Korea's direct payment for environmentally-friendly agriculture has resulted in the rapid increase of areas that are certified as adopting environmentally-friendly farming practice. The area of land adopting environment-friendly farming practice increased from 0.2 per cent of the total area of farmland in 2001 to 12.2 per cent in 2009. In addition, in 2009, direct payment for environmentally-friendly livestock farming was introduced. Further, Korea has launched the

Presidential Committee on Green Growth and set the five-year Green Growth National Strategy in 2009. In addition, in April 2010, the government established the Framework Act on Low Carbon and Green Growth including the agricultural sector, as a part of policy for low carbon and green growth.

Mexico published in 2009 the *Mexican Climate Change Strategy 2009-12* which sets challenging objectives for agriculture. Several mitigation objectives have been fixed and quantified, including quantification of their impact on the CO2 equivalent emissions; a change in the use of marginal agricultural land (548,000 hectares into tree crops and diversified crops, forest and protected natural land); cropping sugar cane when it is green (188,000 hectares); production of bio-fertilizers and a reduction of 15 per cent in the use of fertilizers; and planting bushes and trees in grass land. There are also specific adaptation objectives for agriculture: reduce agricultural vulnerability (insuring 9 million hectares against natural disasters, saving 3 billion cubic meters of water currently used in agriculture, increase the productivity of water in irrigation by 2.8 per cent annually); modernize irrigation infrastructure in 1.7 million hectares; research on vulnerability of agriculture to climate change in different geographical areas; and reduce livestock vulnerability (insuring 5 million animals against natural disasters, achieve 91 per cent livestock land free of diseases).

Recent policy initiatives in **New Zealand** relate to research and innovation, sustainable development, reducing greenhouse gas emissions, dairy reform, water management, and biosecurity controls. The *Primary Growth Partnership* (PGP), launched in 2009, initiated a public-private partnership to invest in research and innovation for the growth and sustainability of the primary sectors. The PGP fund will provide USD 7 million per year for the new Agricultural Greenhouse Gas Research Centre, which will focus on developing technologies that reduce emissions and improve on-farm efficiency and productivity.

Russia spent large amounts on exceptional assistance in 2009-10 following the combined impact of the financial crisis and droughts in 2009 and 2010. Financial assistance to the downstream industry was chiefly provided through subsidized credit. Disaster relief also included credit restructuring, crop loss compensation and additional input subsidies. The main part of the exceptional assistance was financed by the federal budget as many regions were confronted with considerable budget constraints and had difficulties in meeting the co-financing obligations. This recent experience has prompted a re-design of disaster assistance in Russia, and a draft federal law on subsidized catastrophic insurance underwent its first reading in Parliament in 2010. This is an effort to shift away from *ad hoc* disaster assistance by making all support payments conditional on producers being covered by catastrophic insurance.

In 2010, the **United States** saw some new developments in the area of disaster assistance and conservation (OECD, 2011). For the former, examples of initiatives include the *ad hoc Crop Assistance Program (CAP)* which made provisions for up to USD 550 million in assistance to producers, in eligible counties, of rice, upland cotton, soybeans and sweet potatoes for losses due to excessive moisture or related conditions in 2009; and the *Tree Assistance Program* (TAP) which provided assistance to producers of orchard and nursery trees to replant or rehabilitate trees, bushes and vines damaged or destroyed by natural disasters. For conservation, the United States launched a few initiatives including the *Conservation Loans* (CL) program, authorized under the 2008 Farm Act, which was launched to make loan funds available through the Farm Service Agency (FSA) to farmers and ranchers seeking to apply conservation practices on their land; and the new *Conservation Stewardship Program* (CSP)

which is expected to encourage producers to engage in more conservation activities and thereby generate greater environmental benefits.

9. Many APEC economies are increasing the size of their grain reserves thus raising concerns about tighter international grain markets.

The 2007-08 food price crisis and ongoing volatility of international markets have prompted a number of APEC economies to review their food reserve policies and to build up their grain reserves either by sourcing locally or by importing grain from the international market. Similar policy decisions have also been observed in other parts of the world such as the Middle East, Sub-Saharan Africa, and South Asia thus raising concerns about thinner grain markets leading to increased volatility.

Food reserves are stocks of grain that are managed at the community, national, regional or even international level. They can serve a number of purposes: to protect against emergency food shortages (strategic or emergency grain reserves), to help stabilize food prices (buffer stocks), or to restore confidence in markets by guaranteeing adequate food availability.

Based on the responses of economies surveyed in this study, a number of them hold some type of food reserves. **Hong Kong, China** holds about 13,900 tonnes of rice, which is adequate for about 15 days of consumption, to cater for emergencies; **Indonesia** holds a rice reserve of about 1 million metric tonnes which includes the Government Reserve Stock (CBP), which is essentially a buffer stock of about 500,000 tonnes of rice; **Japan** holds approximately 1 million metric tonnes of rice, approximately 0.97 million tonnes of wheat, and roughly 0.2 million tonnes of feed grains (2011); **Mexico** holds 2 million tonnes of white corn, 1.8 million tonnes of yellow corn, 1.3 million tons of wheat, and 500,000 tonnes of barley grain; the **Philippines**, through its local governments, holds a Standard Rice Reserve equivalent to at least 15 days of rice consumption and a buffer stock equivalent to at least 30 days of rice consumption; **Russia** holds 1.8 million tonnes of wheat grain and 1.3 million tonnes of barley grain; **Singapore** holds a rice reserve 2 times the total monthly import quantity; and at the beginning of 2012, **Viet Nam** held 1.1 million tonnes of rice in reserve.

Further research also revealed the following: **China**'s grain reserves are estimated to be more than double the 17 per cent safety level recommended by the FAO; **Thailand** normally keeps a rice reserve of about 10 percent of output although the Thai rice mortgage scheme has absorbed about 14 million tons of paddy rice; **Malaysia** announced in June 2010 that it planned to build up its rice stockpile by maintaining 45 days of consumption; and **Korea**'s rice reserve exceeded 1.5 million tonnes in the 2010 food grain year, the highest level since 1994 and represented a gain of 52 per cent, or 516,000 tonnes, from the year before and is due to a surge in local production and more rice brought into the country under the minimum market access arrangement (MMA). The total is also twice as large as a reserve of 720,000 tons that policy makers said is adequate for dealing with emergency situations. The year 2011 also saw Korea include wheat, soybeans and maize in domestic reserves to secure a stable supply of those commodities.

While there is renewed emphasis on building food reserves at the domestic level, a more encouraging development is the establishment of regional grain reserves such as the ASEAN Plus Three Emergency Rice Reserve (APTERR). The Agreement is a testimony to ASEAN's efforts with **China**, **Japan**, and **Korea** in ensuring the long-term food security and livelihoods of the people in the region. **Korea**, **Japan** and **China** have pledged to contribute 150,000; 250,000 and 300,000 tonnes, respectively, and the remaining 87,000 tonnes will come from the rest of the ASEAN member economies combined. The largest contributors

are: **Thailand;** Myanmar; **Viet Nam; Indonesia;** and the **Philippines** which has stated its intention to increase its contribution once it reaches rice self-sufficiency.

10. Within the APEC region, a number of economies have increased their pro-biofuel policies resulting in an expansion of their biofuel industries. These are potentially in conflict with the region's food security objectives.

Although **Peru** was the only economy surveyed that identified energy policies, especially those promoting biofuels, as potentially conflicting with its food security objectives, further research revealed that a number of economies have increased their pro-biofuel polices resulting in an expansion of their biofuel industries. These have the potential to generate competition with food crops for available land and resources.

Global biofuel production has been increasing rapidly in recent years driven by factors such as increasing oil prices, the need for increased energy security, and concern over greenhouse gas emissions from fossil fuels (ADB, 2012). Between 2000 and 2009, global output of bioethanol quadrupled and production of biodiesel increased tenfold. Biofuels overall now account for a significant part of global use of a number of crops. On average, in the 2007-09 period that share was 20 per cent in the case of sugar cane, 9 per cent for both oilseeds and coarse grains (although biofuel production from these crops generates by-products that are used as animal feed), and 4 per cent for sugar beet. Various policy measures such as mandates and subsidies, as well as tax incentives and import restrictions in both developed and developing economies have been the main driver of this development.

Within the APEC region, a number of economies have increased their pro-biofuel policies resulting in an expansion of their biofuel industries. Fuel ethanol production within the region in 2007 was estimated at approximately 27.6 billion liters, mainly produced in the **United States; China; Canada; Australia;** and **Thailand**. Biodiesel production in 2007 was approximately 4.4 billion liters with the majority of the production coming from the **United States; Indonesia; Malaysia; China; Australia;** and **Canada** (APEC, 2008).

There are various levels of government involvement and support for biofuels development in the APEC region. While governments in some economies such as **Indonesia; Mexico; Russia;** and **Viet Nam** have expressed interest and support for the biofuels industry, there are either no policies in place at present or policy implementation has been slow. On the other hand, **Australia; Canada; China; Thailand**; and the **United States** have adopted a range of policy instruments that affect the production and consumption of biofuels. The most common policy supporting biofuels in the APEC region is the mandate for compulsory blending with fossil fuels to a certain percentage (see Table 11). Other policy instruments applied in the region include fuel tax exemptions, loan guarantees, reduced enterprise taxes and subsidies (direct and indirect) for biofuels production, and research and development (R&D) investments.

In August 2012, the US Department of Agriculture reported that corn and soybean production in the US, one of the major suppliers to the world of both these commodities, will decline by 12-13 per cent due to the drought that has hit such crop-growing regions in the US. International organizations such as the FAO and IFPRI have therefore called for the US to evaluate its biofuel targets which use corn to produce ethanol.

Table 11: Biofuel mandates and targets in APEC economies

Economy	Ethanol Mandates and Targets	Biodiesel Mandates and Targets
Australia	E5 in place in Queensland, E4 in New South Wales	B2 in place in New South Wales
	A biofuels target of at least 350 million litres by 2010	
Brunei Darussalam	X	X
Canada	E5 since 2010	B2 by 2012
Chile	Plans to introduce voluntary E5 in 2008	Plans to introduce voluntary B5 in 2008
China	Increase production to 3 million tonnes/year by 2010 and to 10 million tonnes/year by 2020;	Increase production to 300,000 tonnes/year in 2010 and 2 million tonnes/year in 2020
	Seeks to move to a 10 per cent biofuels mandate by 2020, and currently has a 15 per cent overall target for 2020.	
Hong Kong, China	X	X
Indonesia	2 per cent biofuels in the energy mix by 2010; 3 per cent by 2015; 5 per cent by 2025	
	E3	B2.5
Japan	500 million liters by 2010	X
Korea	X	B0.5; B3 by 2012
Malaysia	X	B5 was planned to be mandated in 2008. Government suspended implementation due to the palm oil supply and price considerations
Mexico	E2 in Guadalajara, and will expand the blending mandate in 2012 to Mexico City and Monterrey	X
New Zealand	Biofuels to account for 0.53 per cent of total fuels sold in New Zealand in 2008 and increase to 3.4 per cent by 2012	
Papua New Guinea	X	X
Peru	E7.8 in 2010	B2 in 2009; B5 in 2011
The Philippines	E5 since 2009; E10 since 2011	B1 since May 2007; possibly B2 in 2009
Russia	X	X
Singapore	X	X
Chinese Taipei	E3 in 2011	B1 since 2008; B2 since 2010
Thailand	X	B2 since February 2008; B5 in 2011; B10 in 2012
United States	7.5 billion gallons (=28 billion litres) of biofuel by 2012; 36 billion gallon (=140 billion litres) biofuels target by 2022	
Viet Nam	500 million liters by 2020	50 million liters by 2020

Sources: APEC, 2008; Biofuels Digest, 2011

Note: Ethanol blends are blends of ethanol mixed with gasoline. For example, E5 is 5 per cent ethanol mixed with 95 per cent gasoline. Biodiesel blends are blends of biodiesel mixed with petroleum-based diesel. For example, B2 is 2 per cent biodiesel mixed with 98 per cent petroleum-based diesel.

11. Farmland expansion and acquisition are new food supply strategies in a number of economies.

Another policy response that a few economies in the region have taken since the food crisis has been the expansion or acquisition of farmland, either within or outside one's economy, to ensure food supplies. As already mentioned earlier, **Indonesia** has one of the most ambitious programs in Southeast Asia as it aims to become one of the world's net food producers in years to come. The plan, which was announced in 2010, entails the fast-track development of vast agricultural estates in remote areas such as Papua and Kalimantan. The first such estate, the USD 6 billion Merauke Integrated Food and Energy Estate (MIFEE) was launched in August 2010 (Hangzo and Kuntjoro, 2011). The MIFEE will initially cover 1.6 million hectares but will be expanded further to 2.5 million hectares.

With its aim to be rice sufficient by 2013, the **Philippines** aims to pursue large-scale development of an estimated 1.9 million hectares of unused land. Similarly, **Malaysia** aims to increase its rice sufficiency through increased production in two major rice growing areas – the Muda Agricultural Development Authority (MADA) and the Kemubu Agricultural Development Authority (KADA). Plans are also underway to turn the state of Sarawak into a major rice producer through large-scale farming.

The widening gap between its food export and import bills has prompted **China** to explore alternative strategies to ensure its food supplies in the form of acquisition of foreign farmlands. China's official policy to acquire farmlands overseas has its origin in 2007 when the Ministry of Agriculture was charged with the establishment of an overseas farming land. Since then, China has made investments in Cambodia and the Philippines.

Similarly, because of over dependence on food imports, both **Singapore** and **Korea** have also looked outside their borders to increase their food security. **Singapore**'s Agricultural and Veterinary Authority (AVA) has implemented several initiatives to facilitate source diversification. This includes the signing of an agreement with Jilin City in May 2010 to establish and maintain a Sino-Singapore Jilin Food Zone in China. The Food Zone, which has a core zone of 57 square kilometers, will be home to the production of agricultural foodstuff, grown and processed under stringent health and quality standards. The AVA is also collaborating with a local supermarket retailer, NTUC FairPrice, in their ongoing efforts to expand their contract farming initiative. NTUC FairPrice recently established a new contract farm in Medan, Indonesia to supply leafy vegetables to Singapore. In **Korea**, a 2011 report by the Samsung Economic Research Institute entitled "New Food Security Strategies in the Age of Global Food Crises" argued for the acquisition of foreign bases for food production through overseas agricultural development (Part et al., 2011). As many as 60 local companies are now involved in farming in 16 economies, including Cambodia, Indonesia and the Philippines.

12. To address the 'economic access' dimension of food security and in particular rising food prices, economies have tried to cushion the impact of higher prices on more vulnerable sectors of society through a combination of food price controls, food price subsidies, imposition of safety nets, releasing stocks to stabilize prices, and food assistance and distribution.

Table 12 suggests that many economies have intervened to safeguard poor consumers' access to food through a variety of emergency and 'safety net' measures. The most common policy responses have been the distribution of basic food staples to the most vulnerable groups and the imposition of safety nets, followed by the release of public stocks to stabilize prices and food price controls and subsidies. Below are some examples of key policy developments in this area in a number of APEC economies.

In the face of rising food prices, **China** increased support to existing social protection programs and established emergent measures in July 2007. These have provided contingency aid and subsidies to counteract price jumps of staple goods in cities, and raise the subsidies of families receiving minimum social welfare support particularly in urban areas. In addition to this, the government also established new social protection programs. Before 2007, the social security system in China only covered urban dwellers and rural households enjoying the five guarantees (childless and infirm old persons who are guaranteed food, clothing, medical care, housing and burial expenses by the local government), excluding other rural inhabitants. However, in July 2007, the government proclaimed that a system for rural families to receive minimum social welfare support was to be in place across China. Progress has been faster, however, for the urban residents, and important gaps subsist between them and the rural populations. Another more recent policy development in China was the doubling of the poverty standard, measured as annual per capita income in rural areas, to about USD 365. This was essential to bring 13.4 per cent of the rural population (or 128 million people) under the poverty alleviation program.

Hong Kong, China's Comprehensive Social Security Assistance (CSSA) provides a safety net for those who cannot support themselves financially. The CSSA payments cover basic needs, including expenditure on food.

Indonesia scaled up its already existing social safety net program to cushion the impact of the 2007-08 crisis on the poor and vulnerable. By 2008, the social safety net program covered around 19.1 million poor households budgeted with some Rp 60 trillion (USD 6.36 billion) and consisted of: (i) distribution of subsidized rice (at 70 per cent price subsidy, 15 kg/month/household), (ii) cash transfer (Rp 100,000/month/household), (iii) free health care and (iv) subsidized education costs especially for primary and secondary schools. Further, in view of helping poor families to empower them to earn income, a National Program on Community Empowerment was also undertaken in 2008 involving 40 million people in 36 thousand villages. The program basically helps poor households to develop economic activities, create job opportunities, and increase productivity.

Table 12: Policy responses to address economic access

Economy	Reduced taxes/customs	Food assistance/ distribution	Food price subsidies	Imposition of safety nets	Conditional Cash transfers	Price controls	Release stocks
Australia	✓	✓		✓			
Brunei Darussalam		✓	✓	✓			✓
Canada		✓		✓			
Chile*					✓		
China	✓	✓	✓	✓		✓	✓
Hong Kong, China		✓		✓			
Indonesia	✓	✓	✓	✓	✓	✓	✓
Japan		✓		✓		✓	✓
Korea		✓	✓	✓		✓	✓
Malaysia	✓		✓			✓	✓
Mexico	✓	✓	✓		✓	✓	
New Zealand*							
Papua New Guinea*							
Peru	✓	✓			✓		
Philippines		✓	✓		✓	✓	✓
Russia						✓	✓
Singapore				✓	✓		
Chinese Taipei*							
Thailand		✓	✓			✓	✓
United States	✓	✓		✓			
Viet Nam*			✓	✓	✓		✓

Note: Economies that responded to the survey are in **bold**. * data not available

Mexico's conditional cash transfer program, '*Oportunidades*' has been shown to contribute to improving the health and nutritional status of children and adults, along with school enrolment rates. In the context of rising food prices, it enabled the government to rapidly respond to the crisis. In 2008, the government increased the budget dedicated to the program which had already existed for the last ten years, from 39 billion pesos in 2007 to 42 billion pesos in 2008; payments to the poorest households also increased by 24.3 per cent. Although the amount of transfers did not entirely compensate for the increase in food prices, it had a mitigating effect on the crisis (Demeke et al., 2009). In addition to imposing safety nets, the President of Mexico, with industry representatives and members of the Confederation of Industrial Chambers (Concamin), agreed to freeze prices of more than 150 consumer staples, such as coffee, sardines, tuna, oil, soup and tea, among others, until the end of December 2008.

In **Peru**, the National Strategy *CRECER* was created through an Executive Decree in July 2007 as a coordinated poverty reduction strategy to improve the effectiveness of the 26 existing social programs in the fight against poverty and child malnutrition, by refining target populations, reducing administrative costs, and instituting results-oriented management. Moreover, Peru's conditional cash transfer program, *JUNTOS*, also saw significant increases in their budget allocations.

The *Pantawid Pamilyang Pilipino Program (4Ps)* in the **Philippines**, a conditional cash transfer program was scaled up to cover 2.3 million beneficiary households in 2011 from the original 1 million households. The program provides a stipend (maximum of Php 1,400/month) to households provided they meet certain health and education conditions such as prenatal care services, health care services for young children, and regular school attendance.

Russia responded to rising food prices by temporarily freezing the prices of bread, milk, kefir, vegetable oil, and eggs in October 2007.

Singapore has in place a comprehensive social safety system. It emphasizes upstream and longer-term protection and investment in their people, and also ensures that the needy have sufficient access to food. Through ComCare – a key component of the social safety net, those requiring urgent and temporary assistance can access cash, vouchers or food rations, up to a maximum of 3 months. Those who require mid to longer term social assistance can – subject to their type of circumstances – get financial assistance to help cover basic living expenses, including food expenses, whilst they seek means to achieve self-reliance. In addition to government assistance, community partners such as Self-Help Groups and Voluntary Welfare Organizations, also play an active role. Many local initiatives exist that complements government schemes by providing cash, vouchers or food rations to the needy.

Viet Nam has a social assistance program under *Decree 67* which includes cash transfers to orphans, children and adolescents deprived of parental care, elderly living alone, people above the age of 85 without a pension, severely disabled and unable to work, mentally disabled and poor single parents. The recent widening of eligibility criteria has led to a considerable increase in the number of beneficiaries from 416,000 in 2005 to about 1 million in 2008, accounting for around 1.2 per cent of the population.

13. After decades of neglect, government expenditure in agriculture is now on the rise again in a number of APEC economies.

To assume its role as an engine of growth, development and poverty reduction, agriculture itself needs to grow. If developing economies are to follow a similar path to development as today's developed economies, they should create conditions for a gradual increase of investments in primary agriculture, up- and downstream sectors and rural infrastructure. Research has shown that economies that performed best in terms of reducing poverty and hunger are also those that achieved higher net investment rates per agricultural worker (FAO, 2012b). According to the World Bank, China's rapid growth in agriculture was initially responsible for the rapid decline in rural poverty from 53 per cent in 1981 to 8 per cent in 2001 and has contributed significantly to improved domestic food security (World Bank, 2008). However, there has been a global slowdown in the rate of capital formation (e.g. transportation, storage, machinery, market infrastructure, research and irrigation, etc.) in primary agriculture. While the rate grew annually at 1.7 per cent during 1990-99, the rate of capital formation was only 0.5 per cent during 2000-07 (FAO, 2012b).

Within the APEC region, a similar slowdown in the growth rate of agricultural investments has been observed in the last few decades for a number of economies including **Brunei Darussalam; Chile; China; Korea; Mexico; Papua New Guinea; Peru**; and **Viet Nam** (see Table 13). Even more dismaying is the fact that public expenditure in agriculture as a share of GDP has been extremely low in some developing economies (IFPRI SPEED). In 2007, the agricultural share of public expenditure as a percentage of GDP in **China** was 1.3 per cent; **Indonesia** 0.5 per cent; **Mexico** 0.5 per cent; **Papua New Guinea** 0.4 per cent; **Philippines** 0.9 per cent; and **Thailand** 1.3 per cent.

However, the food crisis of 2007-08 shook many economies and pushed them to revisit their investment policies in the sector. All 12 economies that responded to our survey have increased their investments in various areas of the agricultural sector.

Australia, while food secure at the domestic level**,** has long recognized the importance of research, science and innovation for increasing productivity to achieve long term economic growth and to enable Australia to engage effectively with current and future domestic and global challenges. Total government support for research and innovation in 2011-12 is estimated at AUD 9.4 billion. As part of the Water for the Future initiative, the government has committed AUD 5.8 billion to increase water use efficiency in rural Australia. This includes investment to improve water delivery infrastructure and assist water system operators to undertake modernization planning. Australia's Irrigation Management Grants provided AUD 204.75 million to 11,414 irrigators during 2007-09. Irrigators were able to implement on-farm activities that addressed reduced water allocations and maximized the productive use of available water.

Based on the indicators used by the OECD to measure expenditures in agriculture, a number of member economies have increased their expenditures on general services (GSSE), which includes R&D, agricultural schools, inspection services, infrastructure, marketing and promotion, public stockholding, etc (OECD, 2011). **Australia**'s share of expenditures on GSSE to total support (TSE) increased from 6.5 per cent of TSE in 1986-88 to 43.2 per cent in 2008-10. Further, total government support for research and innovation in 2011-12 is estimated at AUD 9.4 billion. For **Canada,** GSSE increased from one-eighth of the TSE in 1986-88 to more than one quarter in 2010. About half of total agricultural support in **Chile** in

2010 was allocated to general services, a share that is among the highest in the OECD. It increased from 16.1 per cent in 1986-88 to 47 per cent in 2008-10. **Korea** saw its GSSE share increase from 12.8 per cent in 1995-97 to 13.7 in 2008-10. In 2009, the Empowerment Support Project, the Local Industry Promotion Project, and the Specialized Product Promotion Project were merged into the Rural Vitalization Promotion Project. Through the convergence of primary, secondary and tertiary industries, the government is seeking to support job creation and re-vitalize the rural economies. The amount of support provided for this project was KRW 329.1 billion (USD 284 million) in 2009 covering 142 prefectures. Support to agriculture in **New Zealand** is provided mainly through expenditures on general services such as agricultural research and biosecurity controls for pests and diseases. The *Primary Growth Partnership (PGP)* was launched in 2009 as a government-industry initiative to invest in significant programs of research and innovation in the agricultural sector. To date, a total investment of over NZD 380 million has been made. It aims to boost the economic growth and sustainability of New Zealand's primary, forestry and food sectors. Lastly, the **United States** also saw its share for general services provided to agriculture increase from 23 per cent in 1986-88 to 37 per cent in 2008-10.

Even before the crisis, **China** had already started to intensify its investments in the agricultural sector. During 1999-2002, the central government allocated approximately RMB 167 billion to build rural infrastructure and improve rural agricultural production and the living conditions of those living in the countryside. Since 2004, the central government has continued to allocate budget to address the needs of agriculture, the countryside and farmers. In 2006 and 2007, investments totaled RMB 339.97 billion and RMB 391.7 billion, respectively. In terms of R&D, China's public agricultural R&D spending totaled USD 4.3 billion, which is close to twice its 2000 total of USD 2.3 billion. Then more recently, China released the 2012 Number 1 Document in 2011 which specifically focused on innovation in agricultural science and technology and boosting agricultural productivity. The annual growth rate of public spending on agricultural R&D in real terms increased from an average of 16 per cent from 2000-09 to more than 20 per cent in 2010-11 and is expected to grow even further in the coming years.

Papua New Guinea's National Agricultural Development Plan (NADP) 2007-2016 has focused on eight priorities, one of which is Agriculture Research, Extension, Information and Training. The government has allocated USD 30 million per year for the funding of NADP during its ten year duration.

Peru is undertaking several programs aimed at addressing some of the challenges facing its irrigation sector. In 2006, it approved the Technical Irrigation Program which aims to repair, develop and improve irrigation systems throughout Peru.

Singapore has doubled its support for local farms to SGD 10 million, under the Agri-Food and Veterinary Authority's (AVA) Food Fund which was originally launched in December 2009. The aim is to strengthen strategies of food diversification and local farming to ensure a resilient supply of food for Singapore.

Table 13: Capital and investment in agriculture

Economy	Agricultural Capital Stock					
					Growth	
	Constant 2005 US million $ 1980	Constant 2005 US million $ 1990	Constant 2005 US million $ 2000	Constant 2005 US million $ 2007	% p.a. 1990-99	% p.a. 2000-07
Australia	112 505	111 469	115 218	111 963	0.0	-0.4
Brunei Darussalam	19	16	37	55	8.0	5.8
Canada	88 391	91 793	91 089	94 170	0.0	0.5
Chile	17 883	18 619	21 986	21 946	1.9	0.0
China	244 926	296 964	350 665	366 322	1.5	0.6
Hong Kong, China						
Indonesia	83 923	98 265	112 546	128 256	1.5	1.9
Japan	236 526	307 544	274 751	265 379	-0.8	-0.5
Korea	4 892	7 973	12 936	15 043	5.5	2.2
Malaysia	3 320	4 489	5 029	5 475	1.2	1.2
Mexico	98 776	110 154	116 094	117 184	0.5	0.1
New Zealand	59 933	56 500	54 124	56 245	-0.4	0.6
Papua New Guinea	609	661	907	1 043	3.6	2.0
Peru	19 148	19 548	22 070	23 349	1.2	0.8
Philippines	10 338	10 879	12 784	14 941	1.7	2.3
Russia			185 688	161 586		-2.0
Singapore						
Chinese Taipei						
Thailand	25 254	27 415	26 173	28 224	-0.1	1.1
United States	582 672	557 953	569 261	579 069	0.2	0.2
Viet Nam	23 788	34 322	49 400	54 915	3.9	1.5

Source: FAO, 2012b

Given the limitation of government funds particularly in developing economies, foreign direct investment (FDI) in the agricultural sector could make a significant contribution to bridging the investment gap. It is for this reason that many developing economies in the region are working hard to attract and facilitate foreign investment into their agricultural sectors. UNCTAD (2010) has reported an increase in the total amount of FDI going into the APEC region. For agriculture, forestry and fishing, total inward FDI flows amounted to USD 2.8 billion during 2006-08 per year on average compared to USD 164 million in 1990-92. For some APEC economies these flows into agricultural production accounted for a notable share of their total inward FDI flows, for example in **Papua New Guinea**, where it reached 14-15 per cent of total FDI flows; and **Malaysia** where it reached 10 per cent, and to a lesser extent in **Peru; Indonesia; Viet Nam; Chile;** and **Russia**. For the food and beverage sector, total inward FDI flows into the region was even larger during the same period, USD 32.9 billion in 2006-08 compared to USD 2.2 billion in 1990-92.

In 2010, **Viet Nam** enacted Decree 61/2010/ND-CP on incentive policies for businesses to invest in agriculture and rural areas. Further, earlier this year the Ministry of Agriculture and Rural Development was set to finalize and submit a plan to create hi-tech agricultural zones for government approval later in the year. The plan is expected to help increase the application of modern technologies in agricultural production.

14. Infrastructure leading to improved physical access to food is still in much need of investment, particularly in developing economies.

Good infrastructure supports efficient market operations and allows physical access to food and other inputs and therefore is essential for food security. Proactive government support for transportation, primary processing and marketing infrastructure to shorten the supply chain between farmers, retail outlets and consumers would lower the cost of food and enhance access. Shorter transportation times also help in preserving product quality and in reducing losses. Given that 50 to 70 per cent of consumers' cost of food is formed in post-farmgate segments of supply chains, e.g. wholesale, logistics, processing and retail (Reardon 2010), this dimension of food security demands as much attention as the others. Many food-insecure households in the region remain isolated from key infrastructure such as roads and transportation and electricity. Salim (2010) noted that the lack of infrastructure in **Indonesia**, particularly in the area of transportation, is one of the key factors that undermine Indonesia's effort to become a net food producer. In its survey response, the **Philippines** revealed that inefficiencies along the agricultural supply chain have resulted in higher transaction and distribution costs (Philippine Development Plan 2011-2016). The Philippine logistics system has been characterized as being cost-inefficient, unresponsive to customers and market requirements, and unreliable. Compared to developed economies, distribution and processing costs in the Philippines are 20-30 per cent higher with logistics costs accounting for almost 30-40 per cent of total marketing costs (NEDA-UNDP, 2005). For rice and corn, about 14.75 per cent and 7.2 per cent of the total production are lost during postharvest operations, respectively. Losses are even higher in horticultural crops: losses in fruits range from 5-48 per cent, while losses in vegetables range from 16-40 per cent. These postharvest losses, when translated into monetary values, considerably reduce the income of farmers and their households.

Table 14 presents data on the quality of infrastructure, lead time to export/import, percentage of paved roads and access to electricity of APEC member economies. It is noteworthy that **Chile; Indonesia; Mexico; Papua New Guinea; Peru; Philippines; Russia;** and **Viet Nam** had lower quality of infrastructure scores in 2010 than the APEC average. The **Philippines** and **Indonesia** had the slowest lead time to import at 5 and 5.3 days, respectively. In terms of the percentage of paved roads, **Papua New Guinea** had only 3.5 per cent of all its roads paved in 2009; the **Philippines** 9.9 per cent; **Peru** 13.9 per cent; **Mexico** 35.3 per cent; and **Viet Nam** 47.6 per cent (FAO, 2012b). While a high proportion of the region's population has access to electricity, there are still a significant number of people without access to electricity particularly in **Indonesia; Papua New Guinea; Philippines;** and **China**.

Having scored the lowest across all the indicators, it is timely that **Papua New Guinea's** Medium Term Development Plan (MTDP) 2011-2015 will lay the foundation for expanding the roads network that will link all of PNG. Properly planned and prioritized rehabilitation and maintenance of existing and new road transport infrastructure will underpin economic and social development. Improved road transport infrastructure will improve access to markets and improve the flow of essential goods and services (including basic services such as health, education and law and order) to both rural and urban communities. Further, the MTDP 2010-2030 also sets out goals for establishing a reliable water and sea transport system. The strategies are as follows: rehabilitation and upgrade of all ports and port facilities to cater for increased traffic and cargo; relocation of Port Moresby and Madang ports to minimize congestion; improve inland/coastal water transport for marginalized communities; and safety compliance of maritime vessels and facilities.

Mexico and the **Philippines** have allocated and prioritized funds to upgrade and open new feeder roads from farm to market to allow the distribution and selling of products in rural areas.

At the other end of the spectrum, a high income economy such as **Australia** is still prioritizing infrastructure development. Record investment in transport infrastructure has been taking place, including a doubling in road spending and a tenfold increase in rail. These investments will assist all sectors of the economy, including the food sector. Changes in infrastructure policy have primarily reflected a response to the global financial crisis and the wish to boost productivity throughout the economy through infrastructure investment. Road and rail spending is targeted across the economy under the Nation Building Program, with the program costing more than AUD 36 billion over the 6 years to 2014. In addition, both the Australian and some state and territory governments have invested in infrastructure for community retail stores to ensure remote indigenous communities have access to constant and affordable food supplies including fresh fruit, vegetables and nutritious food.

Table 14: Infrastructure, roads and electricity in APEC economies

Economy	Quality of infrastructure	Lead time to trade		Roads Paved	Access to electricity	
	Score	Export	Import		Electrification rate	Pop'n w/o electricity
	(1=lowest to 5=highest)	Days	Days	% of all roads	%	millions
	2010	2009	2009	2009	2009	2009
Australia	3.8	2.6	2.8	38.7	100	0
Brunei Darussalam				77.2	99.7	
Canada	4	2.8	3.7	39.9	100	0
Chile	2.9	3.5	3	20.2	98.5	0.3
China	3.5	2.8	2.6	53.5	99.4	8.1
Hong Kong, China						
Indonesia	2.5	2.1	5.3	59.1	64.5	81.6
Japan	4.2	1	1	79.6	100	0
Korea	3.6	1.6	2	78.5	100	0
Malaysia	3.5	2.6	2.8	82.8	99.4	0.2
Mexico	3	2.1	2.5	35.3	97	3.3
New Zealand	3.5	1.3	1.6	65.9	100	0
Papua New Guinea	1.9			3.5	45.0	3.8
Peru	2.7	2	3.8	13.9	85.7	4.2
Philippines	2.6	1.8	5	9.9	89.7	9.5
Russian Federation	2.4	4	2.9	80.1		
Singapore	4.2	2.2	1.8	100	100	0
Chinese Taipei					99	0.2
Thailand	3.2	1.6	2.6	98.5	99.3	0.5
United States	4.2	2.8	4	67.4	100	0
Vietnam	2.6	1.4	1.7	47.6	97.6	2.1

Source: FAO, 2012b

Note: The **quality of infrastructure score** reflects perceptions of an economy's logistics based on efficiency and quality of logistics services, quality of trade- and transport-related infrastructure, and frequency with which shipments reach the consignee within the scheduled time. The **lead time to export/import** is the median time (the value for 50 per cent of shipments) from shipment point to port of loading for exports and from port of discharge to arrival at the consignee for imports. **Paved roads** are those surfaced with crushed stone and hydrocarbon binder or bituminized agents, with concrete, or with cobblestones, as a percentage of all the economy's roads, measured in length. **Electrification rate** is the proportion of population with access to electricity.

15. Having been routinely neglected by governments and the donor community for many years, nutrition is now more explicitly recognized as being closely associated to food security and economies have begun to step up interventions in the area.

Just as increases in food prices are pushing more people towards starvation, hidden hunger, too, worsens as families switch from costly, nutrient-rich fruit, vegetables and meat to cheaper, nutrient-poor staples. The food utilization dimension of food security, which is typically reflected in the nutritional status of an individual, has long been routinely neglected in food security discussions. Unlike the hunger that comes from a lack of food and which has grabbed significant global media attention of late, the hidden hunger of micronutrient deficiencies harms even more people and inflicts lasting damage on them and their societies. These deficiencies are a consequence of inadequate dietary diversity or a poor physical condition affecting the individual's capacity to properly 'utilize' food. Thus, food utilization is determined by diet quality, education (particularly women's education), general childcare and feeding practices, food preparation, food preservation, safe water, sanitation and general health status and its determinants.

Table 15 shows how APEC economies fare *vis-à-vis* different indicators of food utilization such as female literacy rates, the ratio of girls-to-boys in and out of school, public expenditure on education and health, and access to sanitation facilities and safe water. Compared to the rest of the region, developing economies such as **Papua New Guinea; Peru; Indonesia;** and **China** fare poorly across all indicators. In addition, the **Philippines** spends very little on education and health based on the share of its GDP allocated to these two sectors.

With the current attention now focused on food and nutrition security, governments have begun to step up interventions in the area. For example, the priorities for the **Philippine** Plan of Action for Nutrition 2011-2016 include improving infant and young child feeding, appropriate management of acute malnutrition, improved micronutrient supplementation, strengthened implementation of food fortification, and prevention of increase in obesity. New labor laws require the provision of crèches in large companies and a law adopted in 2010 mandates the provision of lactation rooms and lactation breaks in the workplace. In addition, an updated policy on micronutrient supplementation was adopted in 2010. It reiterates the importance of vitamin A and iron supplementation for infants, young children (less than 5 years old), pregnant women, and those with deficiency conditions. It also includes zinc supplementation for diarrhoea management and introduces multiple micronutrient powder for young children. In the area of education, the **Philippines** has also increased the number of years of basic education with the inclusion of kindergarten, an additional level in elementary education, and an additional level in secondary education. There are also ongoing efforts to rationalize technical and vocational education and tertiary education to match local and global job markets. In 2009, the government also adopted an integrated maternal, newborn, child health and nutrition (MNCHN) strategy that among others, promotes a package of services for women, mothers and children.

Table 15: Education, health and sanitation in APEC economies

Economy	Literacy rate, female	Ratio of girls-to-boys		Public exp. on education	Health expenditure		Access to improved		
		out of primary school	in prim. and sec. education	share of GDP	current per capita	share of GDP	sanitation facilities	water source	
	%	ratio	%	%	USD	%	%	rur. %	urb. %
	2009	2009	2009	2009	2009	2009	2008	2008	2008
Australia		1.4	97.3	4.5	3870	8.5	100	100	100
Brunei Darussalam	93.7	1.8	101	3.7	791	3			
Canada		2.3	98.7	4.9	4380	10.9	100	99	100
Chile	98.7	0.9	98.5	4	787	8.2	96	75	99
China	90.9	1.2	105	1.9	177	4.6	55	82	98
Hong Kong, China	95.4			4.7		5.2			
Indonesia	89.1	0.4	97.7	2.8	55.4	2.4	52	71	89
Japan		1.1	100	3.5	3320	8.3	100	100	100
Korea		0	97.2	4.2	1110	6.5	100	88	100
Malaysia	90.3	1	103	4.1	336	4.8	96	99	100
Mexico	92.1	1.7	102	4.8	515	6.5	85	87	96
New Zealand		3.1	103	6.1	2630	9.7	100	100	100
Papua New Guinea	56.5	0.8	83.5	6.5	36.7	3.1	45	33	87
Peru	84.6	1.2	99.4	2.7	201	4.6	68	61	90
Philippines	95.8	1.4	102	2.8	66.9	3.8	76	87	93
Russia	99.4	1.2	98	3.9	475	5.4	87	89	98
Singapore	92			3	1500	3.9	100		100
Chinese Taipei	96			4.3		6.1			
Thailand	91.5	0.9	103	4.1	168	4.3	96	98	99
United States		1.4	100	5.5	7410	16.2	100	94	100
Viet Nam	90.5	0.4	93.2	5.3	79.7	7.2	75	92	99

Source: FAO, 2012b

In April 2012, **Viet Nam** launched its 2011-2020 National Nutrition Strategy which focuses on stunting reduction. The most recent Nutrition Survey 2009-2010 report revealed that one in three children under age five in Viet Nam do not currently meet their full height potential—which is linked with serious consequences on cognitive, social and economic outcomes. The package of interventions will be implemented through integration within existing health services and communication with the communities. It will build upon Viet Nam's strong health system that is able to deliver quality interventions with high coverage. Some interventions will require outreach services and home visits and will utilize the existing systems of village health workers and the Women's Union.

Scaling up of existing school feeding programs (SFPs) has also been a common response to improve child nutrition. It is increasingly viewed as a way to encourage students from poor families to keep going to school and to discourage parents from taking their children out of school to have them look for food. High food prices have resulted in dropping out and reduced enrollments in the **Philippines** and the government there launched the Enhanced Food for School Feeding Program in July 2008 to provide public elementary students from pre-determined areas with porridge every day they attend classes. Other economies that have reinforced their SFPs in light of the food crises include **China; Indonesia;** and **Mexico**. In 2010, Mexico launched an anti-obesity campaign which sets out a five-step program: physical activation, weight and waist measurement, control and food intake, promote the consumption of plain water, fruits and vegetables, and socialization of new health practices. Under the new guidelines only water, unsweetened but flavored water, or pure fruit juices will be sold in schools. Soft drinks and sugary fruit drinks are no longer allowed.

Many of the programs in developing economies are done in collaboration with local and international NGOs and/or the private sector. In **Indonesia**, the World Food Programme (WFP) collaborates closely with the National School Health Coordinating Board under the Ministry of Education for all strategic and administrative issues as well as with numerous cooperating partners. WFP is expanding the school feeding program to other food insecure areas of Indonesia, most notably in the eastern parts where the most vulnerable populations are found (West Timor, Lombok, Madura). WFP is also actively implementing joint programs with UNICEF, FAO and WHO as part of the Focusing Resources on Effective School Health (FRESH) initiatives. Additionally, WFP has partnered with the private sector to improve the quality of education and the health and nutritional levels of school age children on the island of Lombok, as well as in Bogor (West Java) and Madura (East Java).

In **China**, WFP has cooperated with China's Internet giant Tencent to run an online donation platform to feed hungry children and is approaching deals with more companies in the economy's booming Internet industry for similar projects. Over 100,000 netizens have donated 1.87 million yuan (USD 296,000) via Tencent's donation platform since it was launched in September 2011 to help fund a "school feeding" program that provides meals for school children in poor regions of western China and in Cambodia. Tencent donated another 1 million yuan to the program. In 2005, the Chinese Students Nutrition Promoting Association in conjunction with the National Institute of Child and Adolescent Health, with a group of multidisciplinary health and education professionals concerned with childhood obesity, developed a nutrition education and physical activity curriculum for primary and secondary students.

In more developed economies where school feeding is available in most schools, there has been a renewed effort to increase the availability of healthier food and beverage choices and to improve nutrition education among children. In the **United States**, the Healthy, Hunger-Free Kids Act of 2010 (HHFKA) allows the USDA, for the first time in over 30 years, an opportunity to make real reforms to the school lunch and breakfast programs by improving the critical nutrition and hunger safety net for millions of children. The legislation authorizes funding and sets policy for USDA's core child nutrition programs: the National School Lunch Program, the School Breakfast Program, the Special Supplemental Nutrition Program for Women, Infants and Children (WIC), the Summer Food Service Program, and the Child and Adult Care Food Program. **Japan**'s School Lunch Act was revised in 2008 to change its aim from "improvement of dietary habits" to "promotion of *Shokuiku*" (Food and Nutrition Education). In order to enhance *Shokuiku* in schools, the Ministry of Education, Culture, Sports, Science and Technology established the Diet and Nutrition Teacher System in 2007 which aims to promote the placement of diet and nutrition teachers in public elementary schools and junior high schools in accordance with the needs of local communities. **Singapore** is currently revising its 2003 food-based dietary guidelines for children, adults and older adults.

Food safety is another aspect of food utilization. Technology and policies play key roles in ensuring that appropriate systems are in place to establish safety levels, as well monitor compliance with safety standards. In light of recent food contamination incidents, several economies have strengthened their food safety controls. In **China**, a series of important measures to strengthen food safety supervision has been taken and a Food Safety Law was adopted in March 2009 replacing the Food Hygiene Act of 1995. **Japan** also established the Consumer Affairs Agency to strengthen management of growing, harvesting and handling food to ensure the safety of their people. It covers a broader range of jurisdictions related to

consumer problems, such as trade, labeling and safety. In 2011, the Food Safety Modernization Act was signed into law in the **United States**. It aims to ensure the US food supply is safe by shifting the focus from responding to contamination to preventing it. In the wake of the food safety scandal in **Chinese Taipei** in 2011, the government ruled safety certificates would be mandatory for the export of five types of food products: sports drinks, juices, teas, syrups and jams, and tablets and powders – which could be potentially tainted with industrial plasticizers. **Korea** enacted its Food Safety Basic Law in 2008 which emphasizes enhanced coordination and cooperation of different authorities dealing with various food safety issues more effectively and efficiently. The most recent revision of Korea's Food Sanitation Law reinforced the government's responsibility for emergency preparedness and prompt response, food-borne disease surveillance, inspection, certification of official laboratories, immediate recalls and prohibition of sale of contaminated food, extensive monitoring for risk assessment, establishment of the food safety information centre, and enhanced consumer participation to promote consumer assurance on various food safety issues. Food hygiene laws are also currently being updated in **New Zealand.** In **Hong Kong, China**, education and publicity programs on food safety are conducted to provide relevant and accurate food safety information to the public and trade in a timely manner. In the **Philippines**, an act strengthening and rationalizing the regulatory capacity of the Bureau of Food and Drugs by establishing adequate testing laboratories and field offices, upgrading its equipment, augmenting its human resources complement, giving authority to retain its income, and renaming it the Food and Drug Administration (FDA), was signed by the President in August 2009.

GOVERNANCE OF FOOD SECURITY

16. Potential conflict exists between food security objectives and those of other sectors.

As discussed earlier, energy policies that promote the expansion of the biofuels industry have the potential to conflict with an economy's food security objectives. In addition to this, our survey also identified other policies that may do the same. They include policies on conservation, land use and management, water utilization, climate change, and population.

The **Philippines** identified several policies currently being implemented as potentially conflicting with its food security objectives. Its Comprehensive Agrarian Reform Program (CARP) was extended in August 2009 with the aim to continue the redistribution of some 1.2 million hectares of mostly private agricultural lands to identified beneficiaries. However, obstacles and bottlenecks remain that prevent the complete implementation of the agrarian reform program. Barriers to implementation include strong resistance by landowners, fiscal problems, inherent program weaknesses, conflicting policies, ineptness of the bureaucracy and increasing land conversions and exemptions from CARP coverage. In addition, the National Water Crisis Act of 1995 adopted urgent and effective measures to address the water crisis but these may have the potential to conflict with food security objectives. Being the largest user of water, irrigation is the first sector to lose out as water scarcity increases. Also, an unclear population policy will most likely result in continued population growth and relatively large household size, especially among the poor, which coupled with limited capacity to earn further adds to the burden of feeding the family.

Papua New Guinea identified its National Climate Change Policy as potentially conflicting with its National Food Security Policy. The former has identified agriculture as a major culprit in greenhouse gas emissions and has requested the sector to reduce agricultural activity to cut emissions. This will have implications on food production, income generation and will have a major impact on poverty reduction and food security in rural areas.

China's conservation set-aside program, popularly known as Grain for Green, is one of the world's largest conservation projects. The program entails farmers setting aside all or parts of certain types of cropland and planting seedlings to grow trees. It was designed to increase forest cover and curtail soil erosion in China's major river basins. However, scholars and policy makers are divided about whether the project threatens the economy's food security. Major set-aside programs in developed economies typically have the main objective of either supply control or environmental conservation or (in most cases) a combination of both. Short-term set-asides of up to five years are mainly aimed at supply control, whereas long-term set-asides of 10 years or more are chiefly aimed at providing environmental services. Examples of short-term set-aside programs include the **United States'** Acreage Reduction Program while long-term set-aside programs include the US Conservation Reserve Program (CRP) and **Canada**'s Permanent Cover Program. **Japan**'s rice paddy field diversion programs include both short-term and permanent conversion schemes. In **Chinese Taipei**, some 220,000 hectares of farmland is currently lying fallow.

17. Multiple agencies or departments are involved in dealing with the diversity of issues related to food security and this often results in disconnected policy making and miscommunication.

In all 12 economies that responded to our survey, a number of separate government agencies deal with the various aspects food security. Issues related to the availability dimension of food security are normally dealt with by the departments of agriculture, foreign affairs and trade, environment, energy, public works, science and innovation, and finance; those related to the physical access dimension, by the departments of infrastructure, transport, communication, and commerce; those related to the economic access dimension, by the departments of social or community welfare, community services, indigenous affairs, education, and labor and employment; and finally, those related to the food utilization dimension, by the departments of health, public works, and education. Only a few economies in the APEC region have coordinating bodies that are tasked to deal with food security. However, many of these so-called centralized agencies often still have a narrow view on the subject.

The **Philippines**' National Food Authority (NFA), under the Department of Agriculture, is responsible for ensuring the food security of the Philippines and the stability of supply and price of rice, the staple grain. **Indonesia** has two principal bodies that play a key role in food security, the National Food Security Agency (Badan Ketahanan Pangan, or BKP) and the state-owned enterprise National Food Logistics Agency (Perum BULOG) which maintains the domestic rice security stock. While these institutions in both economies play important roles in ensuring food security, the fact that they fall under the Department of Agriculture pose challenges since the Department of Agriculture more naturally responds to its farmer constituency than to food consumers' interests. **Russia**'s National Security Council is charged to oversee the implementation of the food security doctrine which sets food self-sufficiency targets and the main measures to reach them.

In 2010, an Expert Working Group commissioned by the Prime Minister's Science, Engineering and Innovation Council recommended that **Australia** establish a National Food Security Agency to coordinate the development and implementation of policies and programs targeted to improving Australia's food security (PMSEIC, 2010). The Agency would report to an appropriate minister and liaise with states and territories.

In **Singapore**, the National Security Coordination Secretariat (NSCS) at the Prime Minister's Office has recently taken up food security as one of its focus areas and has invited representatives from different agencies to form a coordinating council on the matter. The Agri-Food and Veterinary Authority (AVA) which is the domestic authority on food safety dedicated to ensuring a resilient supply of safe food will be but one of the representatives to sit in this council.

The involvement of multiple, often geographically and even philosophically, disparate agencies in responding to food insecurity may present a barrier to developing effective action. The absence of any coherent internal communication plan was highlighted in discussions with a number of economies. No mention was made of any communication strategy in the survey responses.

Similarly, there was no mention of any communication strategy with external stakeholders. Given the confusion surrounding the 2007-08 food crisis with regard to information on real

commodity stock levels, crop failures and the precise reasons for the crisis, it is important that this be addressed. More timely, complete and accurate information and improved capacity to identify and analyze early warning signals might have calmed the markets, reassured populations and resulted in better readiness (FAO et al., 2011).

18. In addition to their commitments within APEC, member economies are also taking part in other regional and global food security initiatives by bodies such as the G20, G8, ASEAN, the UN's High Level Task Force on Food Security, the Committee on World Food Security, the World Economic Forum, the CGIAR, etc. Thus, there is potential for overlap.

The food crisis in 2007-08 heightened awareness of food insecurity and sparked a series of regional and global initiatives to address food security. A summary of these key initiatives is in Annex 4. Because many APEC economies are also members of other regional and global initiatives on food security, there is potential for overlapping activities.

The proposed establishment of an APEC Food Emergency Response Mechanism (AFERM) run parallel to the already established ASEAN Plus Three Emergency Rice Reserve Mechanism (APTERR), of which **Brunei Darussalam; Indonesia; Malaysia; Philippines; Singapore; Thailand;** and **Viet Nam** are also members. Similarly, many member economies such as **Australia; Canada; Japan; New Zealand; Russia; United States** and others already have existing commitments to the World Food Programme.

APEC's Asia-Pacific Food Security Information Platform (APIP) which is a system for sharing information on food security has some similarities with the recently established G20 initiative, Agricultural Market Information System (AMIS), and the ASEAN Food Security Information System (AFSIS), both of which involve economies from the region. Economies that are members of both G20 and APEC include **Australia; Canada; China; Indonesia; Japan; Korea; Mexico; Russia;**, and the **United States** while **Brunei Darussalam; Indonesia; Malaysia; Philippines; Singapore; Thailand;** and **Viet Nam** are also members of ASEAN.

The framework for the global Scaling Up Nutrition (SUN), which was released in 2010, is now being pursued by an increasing number of economies and a broad movement of civil society organizations, businesses, scientific bodies and development partners. **Indonesia** and **Peru** are the only two APEC economies that are part of the UN-led SUN Movement.

The collaboration between APEC's Food Safety Cooperation Forum (FSCF) and its Partnership Training Institute Network (PTIN) and the recently established World Bank Global Food Safety Partnership and Fund seeks to improve food safety competencies, laboratory proficiency, and risk-based management systems in APEC economies and then, globally.

Various multilateral and bilateral agreements between donors and member economies to increase agricultural productivity also run parallel to the ongoing work of APEC's Agricultural Technical Cooperation Working Group (ATCWG) and Industrial Science and Technology Working Group (ISTWG) in carrying out the 2010 Niigata Action Plan on Food Security.

ISSUES REQUIRING ADDITIONAL ATTENTION

19. Noticeably underestimated and overlooked in domestic policy discussions related to food security is the contribution of the fisheries sector.

The importance of the fisheries and aquaculture sector to APEC economies cannot be overestimated. In 2010, total world capture fisheries and aquaculture production reached about 148 million tonnes with APEC economies accounting for 102 million tonnes of this total, roughly 69 per cent (see Table 16). APEC members account for approximately 62 per cent of the world's capture fisheries and 79 per cent of global aquaculture production with **China** capturing the lion's share (over 61 per cent) of total aquaculture production. **Viet Nam; Indonesia; Thailand;** and the **Philippines** are also among the top ten aquaculture producers in the world. This is significant given the fact that global demand for fish and seafood products will be increasingly met by aquaculture. Aquaculture production now accounts for around half of world supplies of fish and fishery products destined for human consumption.

Table 16: World fisheries production, by capture and aquaculture

	Capture	Aquaculture	Total
Australia	171,410	69,581	240,991
Brunei Darussalam	2,272	500	2,772
Canada	927,622	160,924	1,088,546
Chile	2,679,736	701,062	3,380,798
China	15,418,967	36,734,215	52,153,182
Hong Kong, China	168,010	4,338	172,348
Indonesia	5,380,266	2,304,828	7,685,094
Japan	4,044,185	718,284	4,762,469
Korea	1,732,928	475,561	2,208,489
Malaysia	1,433,427	373,151	1,806,578
Mexico	1,523,889	126,240	1,650,129
New Zealand	436,232	110,592	546,824
Papua New Guinea	224,507	1,588	226,095
Peru	4,261,091	89,021	4,350,112
Philippines	2,611,720	744,696	3,356,415
Russia	4,069,624	120,384	4,190,008
Singapore	1,732	3,499	5,231
Chinese Taipei	851,384	310,338	1,161,722
Thailand	1,827,199	1,286,122	3,113,321
United States	4,369,540	495,499	4,865,039
Viet Nam	2,420,800	2,671,800	5,092,600
APEC	54,556,541	47,502,222	102,058,763
WORLD	88,603,826	59,872,600	148,476,426

Source: FAO, 2010

In addition to being a major producer of fishery products, APEC is also a major consumer with consumption in the region over 60 per cent higher than the world average of 18.5 kg/capita/year (FAOSTAT). Moreover, the fisheries sector generates a significant source of

revenue to economies across the region. APEC economies account for approximately half of the world's fish exports in terms of value. In 2009, this amounted to USD 50.4 billion. Five of the top ten fish exporting economies are from the APEC region.

The fisheries sector also provides significant employment for millions of people – roughly 26.2 million fish harvesters and fish farmers are employed in this sector with 90 per cent of them employed in small-scale activities (APEC, 2009). This comprises 60 per cent of the world's total fisheries workforce. Lastly, the sector also contributes significantly – at almost one fifth – to the creation of agricultural GDP in some APEC economies. This share is significantly higher in **Chile** at 64 per cent and **Peru** at 25 per cent. While the average share of fish versus agricultural exports is 15 per cent, this figure is 67.5 per cent in **Brunei Darussalam** and more than 40 per cent in **Chile; Japan; Peru;** and **Viet Nam**.

To continue to meet local, regional and global demand for fishery products, APEC economies must be able to overcome the challenges currently facing the fisheries sector. They include, but are not limited to the following.

Climate change and increased frequency of weather shocks

Though the future impacts of climate change on fisheries and aquaculture are still poorly understood, climate change is already affecting the seasonality of particularly biological processes, altering marine and freshwater food webs, with unpredictable consequences for fish production (FAO, 2008). It is also modifying the distribution of marine and freshwater species. Differential warming between land and oceans and between polar and tropical regions will affect the intensity, frequency and seasonality of climate patterns and extreme weather events and hence, the stability of marine and freshwater resources. Extreme weather events, such as storms, are likely to increase in frequency and affect fishing operations, and coastal and wetland flooding is likely to become more frequent (FAO, 2012c).

Overexploitation of marine stocks leading to depleted fisheries

According to the FAO, the proportion of marine stocks estimated to be underexploited or moderately exploited declined from 40 per cent in the mid-1970s to 15 per cent in 2008 (FAO, 2012b). In contrast, the proportion of overexploited, depleted or recovering stocks increased from 10 per cent in 1974 to 32 per cent in 2008. The share of fully exploited stocks has remained relatively stable at about 50 per cent since the 1970s. Based on this data, the scope for further increase in capture production is unlikely, unless effective management plans are put in place to rebuild overfished stocks.

Safety of fishing vessels and fishers

According to the International Labour Organization (ILO), 24,000 fatalities occur worldwide per year in capture fisheries (FAO, 2008). The design, construction and equipment of fishing vessels determine their safety and that of fishermen. However, inappropriate human behavior compounded by error, negligence or ignorance also result in accidents and loss of life. Many fishers are pressured by the need for economic survival and thus exercise poor judgment during fishing operations. In addition, fishers, fish farms and their communities tend to be particularly vulnerable to natural disasters because of their location, the characteristics of their livelihood activities, and their overall high levels of exposure to natural hazards and climate change impacts. Women in particular are more vulnerable as it is also more common

to find in coastal artisanal fishing communities women managing the smaller boats and canoes that go out fishing (FAO, 2012c).

Sustainable fishing practices

Most fishing techniques in use today have their origin in a time when resources were abundant, energy costs were lower and less attention was paid to the negative environmental impacts of fishing. Current high energy prices and greater awareness of environmental impacts are now realities and present major challenges to the sustainability of fisheries, particularly in developing economies where access to and promotion of energy-efficient technologies have been limited (FAO, 2012c).

Private vs. public standards and certification schemes

Intra-regional trade and exports of fishery products are extremely important for APEC economies. **Japan** and the **United States** obtain about 81 per cent of their imports from other member economies, and about half of the European Union's imports come from the region. Thus, these three markets dominate fish trade in terms of both prices and market access requirements. Retailers, supermarket chains and consumers in these top export destinations are increasingly demanding documentation, particularly from private certification bodies, that certifies not only health and sanitary requirements but also environmental, traceability, sustainability and fish farming standards. To continue to access these markets, APEC's fisheries sector, of which 90 per cent is made up of small-scale activities, will need to meet these regulations and other emerging standards and of course, their associated compliance costs. Producers and exporting economies in particular question whether these private standards and certification schemes duplicate or complement the work of government authorities (FAO, 2008).

20. The role of reducing food losses is often underestimated in food security discussions.

Out of the 12 economies that responded to the survey, only two (**Philippines** and **Russia**) identified food losses as a concern. There was also no mention of any policies related to this area in any of the survey responses. Interestingly, the literature review revealed that this is an area that has been neglected over the years and is only starting to gain traction now. APEC's most recent Ministerial Meeting on Food Security in Kazan, Russia identified reducing food losses along the entire food supply chain (FSC) as a priority area.

The results of a recent study conducted by the Swedish Institute for Food and Biotechnology (SIK) on request from the FAO (Gustavsson et al., 2011) suggest that roughly one-third of food produced for human consumption is lost or wasted globally, which amounts to about 1.3 billion tonnes per year. Inevitably, this also means that huge amounts of the resources used in food production (e.g. water, land, inputs, labor, etc.) are wasted, and that the greenhouse gas emissions caused by food production that gets lost or wasted are also emissions in vain.

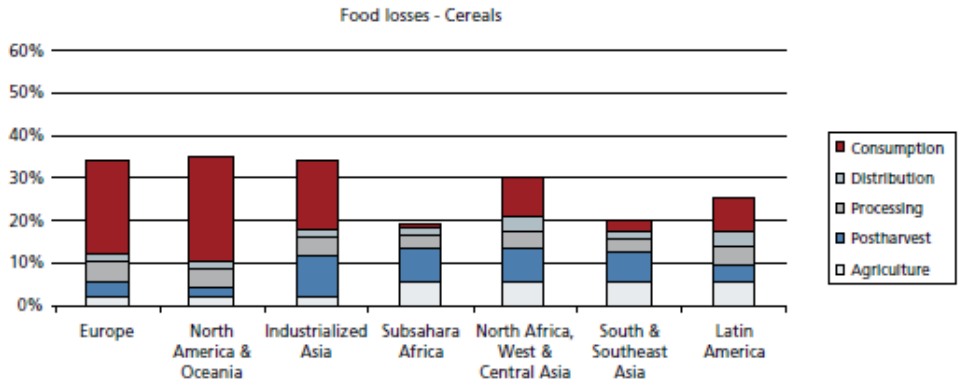
Food is lost at all stages of the food supply chain, from production on the farm or pond, to the food being served on a plate. The exact causes of food losses vary throughout the world and are very much dependent on the specific conditions and local situation in a given economy. Food losses take place at production, postharvest and processing stages in the food supply chain (Parfitt et al., 2010). Food losses at the end of the food chain (retail and final consumption) are rather called "food waste", which relates to retailers' and consumers' behavior.

While there has not been a comprehensive study done on the state of food losses and waste in the APEC region, the FAO commissioned study above provides a glimpse of the extent of food losses and waste by region (see Annex 5 for grouping of world regions). According to its findings, in medium- and high-income economies, food is to a great extent wasted, i.e., it is thrown away even if it is still suitable for human consumption. Significant food losses, however, also occur early in the food supply chain. In low-income economies, food is mainly lost during the early and middle stages of the food supply chain with much less food being wasted at the consumer level. The per capita food loss in North America and Oceania (which includes **Australia; Canada; New Zealand**; and the **United States**) is almost 300 kg/year while in South/Southeast Asia (which includes **Indonesia; Malaysia; Philippines; Thailand**; and **Viet Nam**) it is 120 kg/year.

The study further looked at the percentage of food losses and waste of seven commodity groups: cereals, roots and tubers, oil crops and pulses, fruits and vegetables, fish and seafood, meat, and dairy products in the different regions.

In the case of *cereals*, wheat is the dominant crop in medium- and high-income economies, and the consumer phase is the stage with largest losses, between 40-50 per cent of total cereal food waste (see Figure 6). In low-income regions, rice is the dominant crop, especially in South and Southeast Asia. For these regions, the largest losses occur during agricultural production and postharvest handling and storage, as opposed to the distribution and consumption stages.

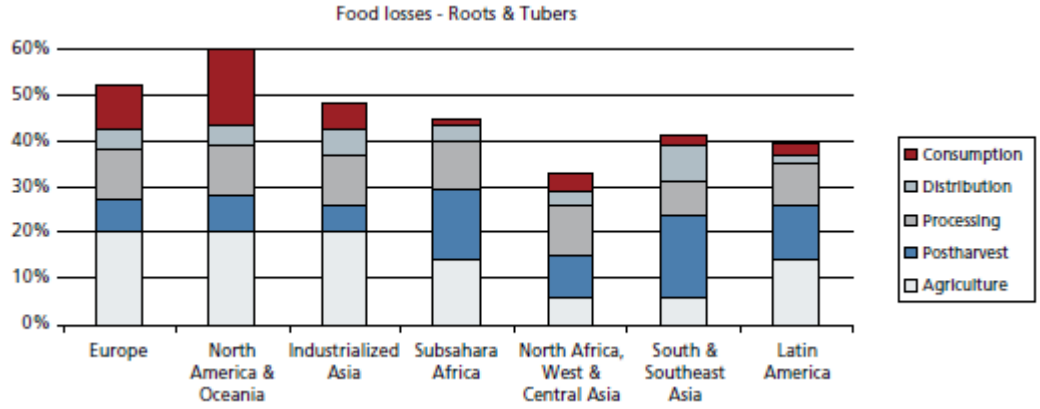
Figure 6: Part of the initial production lost or wasted, at different FSC stages, for cereals in different regions



Source: Gustavsson et al., 2011

For *roots and tubers*, potato (sweet potato in China) is the dominant crop in medium- and high-income economies and the largest losses occur during agricultural production (see Figure 7). This mainly depends on postharvest crop grading, due to quality standards set by retailers. Food waste at the consumer level is also high. For low-income economies, agricultural production, postharvest handling and storage are the stages with relatively high food losses, as opposed to those of distribution and consumption.

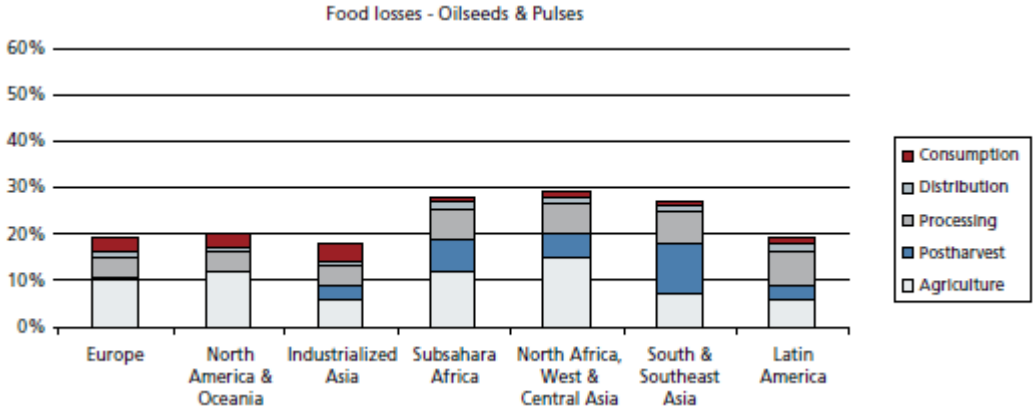
Figure 7: Percentage of food losses at different stages of the FSC for root and tuber crops in different regions



Source: Gustavsson et al., 2011

In the *oil crops and pulses*, soybeans are the dominant crop in North America and Oceania and Industrialized Asia. Losses in medium- and high-income regions occur most during agricultural production, contributing waste percentages between 6-12 per cent during harvest (see Figure 8). Soybeans and coconut are dominant in South and Southeast Asia and soybeans in Latin America. Losses in these regions are largest in agricultural production and during postharvest handling and storage.

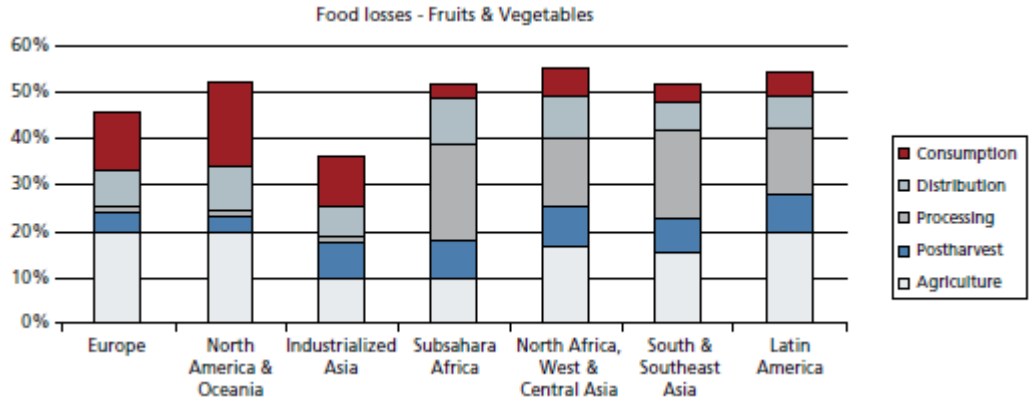
Figure 8: Percentage of food losses at different stages in the FSC for oilseeds and pulses in different regions



Source: Gustavsson et al., 2011

For *fruits and vegetables*, losses in agricultural production dominate for all three industrialized regions, mostly due to postharvest fruit and vegetable grading caused by quality standards set by retailers (see Figure 9). Waste at the end of the FSC is also substantial in all three regions, with 15-30 per cent of purchases by mass discarded by consumers. In developing regions losses in agricultural production dominate total losses throughout the FSC. Losses during postharvest and distribution stages are also severe and are partly due to the deterioration of perishable crops in the warm and humid climate of many developing economies.

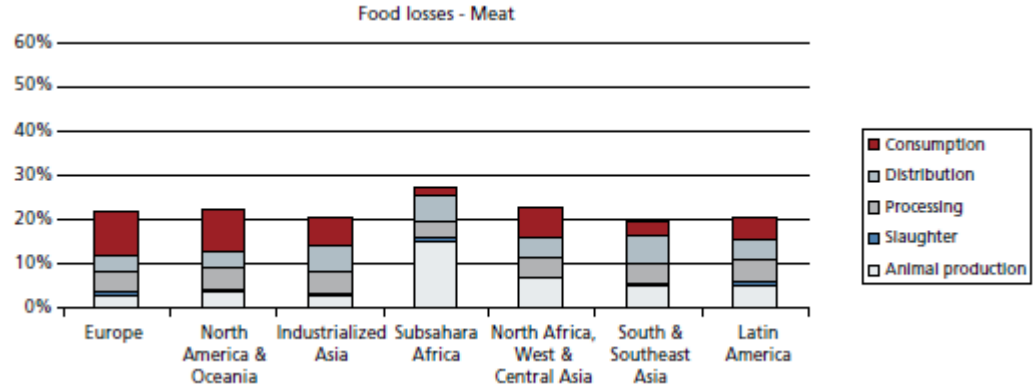
Figure 9: Percentage of food losses at different stages in the FSC for fruits and vegetables in different regions



Source: Gustavsson et al., 2011

In the case of *meat and meat products*, losses and waste in industrialized regions are most severe at the end of the FSC, explained by a high per capita meat consumption combined with large waste proportions by retailers and consumers, especially in Europe and the US (see Figure 10). Waste at the consumption level makes up approximately half of total meat losses and waste. Losses in all developing regions are distributed quite equally throughout the FSC, but Sub-Saharan Africa experiences relatively high losses during agricultural production. This is explained by high animal mortality, caused by frequent diseases in livestock breeding.

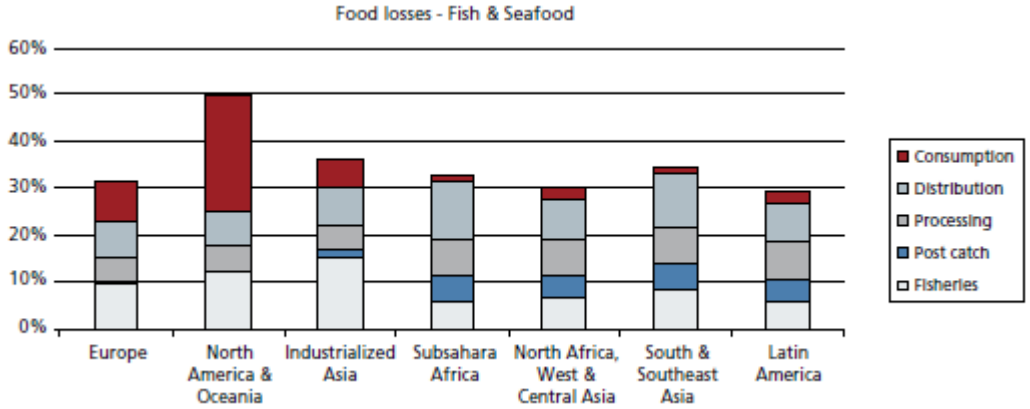
Figure 10: Percentage of food losses at different stages in the FSC for meat and meat products in different regions



Source: Gustavsson et al., 2011

For *fish and seafood*, losses in primary production are significant in all three industrialized regions due to discard rates of between 9-15 per cent of marine catches (see Figure 11). A large proportion of purchased fish and seafood is also wasted by consumer households. In developing economies, losses in primary production mostly depend on discard rates between 6-8 per cent of marine catches. High losses at the distribution level can be explained by high levels of deterioration occurring during fresh fish and seafood distribution.

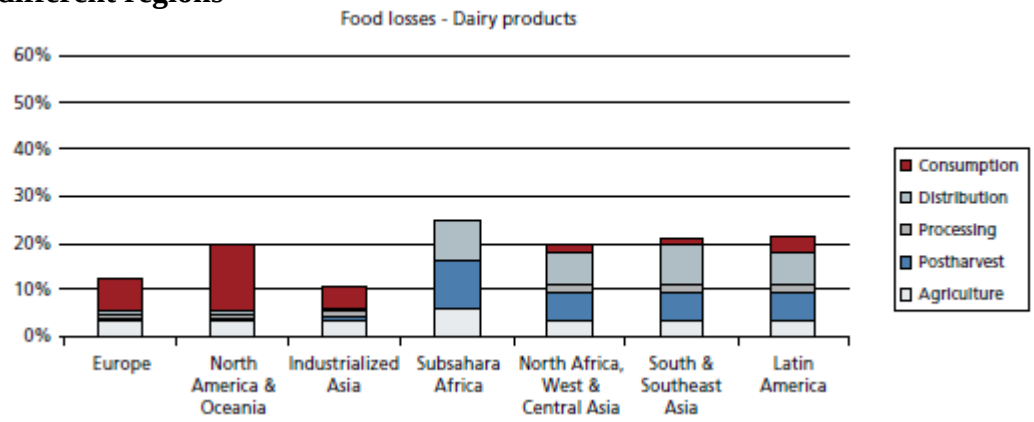
Figure 11: Percentage of food losses at different stages in the FSC for fish and seafood in different regions



Source: Gustavsson et al., 2011

For *milk*, waste at the consumption level makes up approximately 40-65 per cent of total food waste in all three industrialized regions (see Figure 12). Losses in agricultural production are significant since dairy cow illness causes an approximate 3-4 per cent decrease in milk yield. For all developing regions, milk wastage during postharvest handling and storage, as well as at the distribution level, is relatively high.

Figure 12: Percentage of food losses at different stages in the FSC for dairy products in different regions



Source: Gustavsson et al., 2011

A word of caution is needed, however in interpreting the above data. By admission of the authors of the report, due to lack of sufficient data, many assumptions on food waste levels at foremost the distribution and consumption levels had to be made. Their study along with others (Kitinoja et al., 2011; Parfitt et al., 2010) reveal that there are major data gaps in available knowledge of global food waste, especially with regard to the quantification of food losses by individual cause, and the cost of food loss prevention. Much of the data on losses have not been collected systematically and updated; some of the data are from 30 years ago. In addition, there has not been much research on the impact of food waste in transitional economies such as Russia and China, where food consumption patterns are changing dramatically. Therefore, there is an urgent need for more quantitative research on loss estimates for the food supply chains of developing economies and the rapidly evolving transitional economies. Parfitt et al. (2010) argue that without such evidence, discussions on the potential for reducing global food waste as a contribution to feeding 9 billion by 2050 will remain largely rhetorical and measuring progress against any global reduction target almost impossible.

Despite the above, however, if the current global estimate of 30 per cent waste is assumed, halving the total amount of waste by 2050, which is considered to be a realistic target, could reduce the food required by 2050 by an amount approximately equal to 25 per cent of today's production (Foresight, 2011). This would lessen the pressure on the resources required for food production. It would also have positive environmental effects, including lower greenhouse gas emissions, reduced water stress and decreased levels of soil degradation. With such important direct and indirect benefits, reducing food losses should be given priority and urgent attention by governments, the donor community, the private sector and non-governmental organizations (NGOs).

CONCLUDING REMARKS AND RECOMMENDATIONS

The sharp rise in food prices in 2007-08 and again in 2011 along with increased food price volatility have led many economies in the region to refocus their attention on food security and agricultural issues. While commendable and timely, our analysis has shown that policy makers need to take a much broader perspective and approach in relation to food security. Policy responses that have been put in place have demonstrated a bias towards increasing food availability and lowering food prices as well as cushioning the impact of higher prices on more vulnerable populations. Particularly with respect to the 2007-08 crisis, policy responses by governments emphasized a limited range of easy, fast-acting and cheap measures that were mainly *ad hoc* in nature (especially trade policy measures). While entirely understandable in light of the emergency situation, this short-term approach may have come at the expense of medium- and long-term objectives of increased agricultural productivity and sustained economic growth.

As this study has repeatedly underscored, food security is multi-dimensional and complex consisting of many social, economic, environmental, physical and political factors. It is simply not enough to produce more food, or change diets, or reduce waste. It is essential that policy makers address all four dimensions of food security (availability, physical access, economic access and utilization of food) at the same time. Moreover, economies need to acknowledge that food security at the aggregate level does not necessarily ensure security at the household or individual level and therefore, governments need to have the latter as their overarching long-term objective.

It is difficult for a broadly scoped study such as this to consider the entire range of food security issues and related policy responses within each APEC economy in the same detail as the more focused work of academics and institutions. Further, our analysis has been limited to those economies (12) that responded to the survey instrument, albeit to varying degrees, and to a literature review of secondary sources and thus, may not be as exhaustive and comprehensive as was initially intended. Rather, its insights should be seen as complementary to ongoing work within APEC towards a unified Food System that promotes food security throughout the region. This study aims to provide a fresh look and to challenge existing thinking about food security within the region, as well as highlight important issues and promising initiatives by individual economies.

As mentioned earlier, APEC is well positioned to contribute to regional and global food security and therefore should act decisively in this area. APEC should continue to do what it does best and that is to coordinate the exchange of best practices and information in the different areas of food security and continue to build capacity among various stakeholders in member economies. However, given the complexity of issues, APEC should raise awareness of the broader dimensions of food security within member economies and existing fora, and working groups in agriculture should be reminded of the broader context in which they work and coordinate with other like-minded bodies where possible.

Existing fora and working groups focusing on policy should ensure policies that are developed or currently exist do not conflict with the goal of a food secure economy. Technical working groups should continue to seek technology and cooperative mechanisms to address production and supply chain challenges. These include losses in yield during the

growth phase of the crops and post production wastage. APEC could also consider the development of a program specifically on post production food wastage. The recent APEC Policy Partnership on Food Security (PPFS) Meeting and the most recent Ministerial Meeting on Food Security in Kazan, Russia in May both identified food losses as a target for mount action. An APEC Conference on Food Wastage could raise awareness of this key issue and serve as a launch for specific programs. APEC could also establish an initiative that addresses the nutritional security challenges that some of the less developed economies face. This initiative could partner with existing NGO initiatives.

Moreover, APEC should maximize its Asia-Pacific Food Security Information Platform (APIP) and ensure that the information contained within is relevant, comprehensive, inclusive and up-to-date so that it can assume its role as a dynamic information platform that can help truly address food security challenges in the region.

Finally, monitoring and evaluation of progress and impact of its initiatives remain critical in order for APEC to continue to be a relevant player in food security of the region.

Based on the above, 12 recommendations and key messages are presented below. These have been drawn from the analysis done throughout the study. They are not presented in order of importance.

RECOMMENDATIONS AND KEY MESSAGES

1. Food security should continue to be on top of the political and development agendas of APEC economies as well as of the international community.

High and volatile food prices are likely to continue in the foreseeable future and may potentially be the 'new reality'. With a larger, more urbanized and affluent population continuing to increase, demand for more food but also a more varied, high-quality diet will grow which will require additional resources to grow. On the production side, the stronger linkages between agricultural commodity prices and oil prices will also have an impact on food price volatility and the further expansion of biofuels will place additional pressure on the system and compete with food crops for increasingly scarce resources. The effects of climate change which include higher and more variable temperatures, changes in precipitation patterns, and increased frequency of weather shocks will become increasingly apparent. Further, the world remains vulnerable to food price fluctuations because of low grain reserves and the fact that staple grains are exported by just a few economies.

KEY MESSAGE: "Put food first."

2. While food (rice) self-sufficiency has powerful resonance throughout the region, economies should be cautioned against the potential repercussions of such an approach. Policies that distort production and trade in agricultural commodities could potentially impede the attainment of long-term food security.

The food system is more globalised and interconnected than ever before which itself has both advantages and disadvantages. For example, economic disruptions in one part of the world can quickly be transmitted to others, but on the other hand supply shocks in one economy can be compensated for by producers elsewhere. Trade is an excellent buffer for localized fluctuations originating domestically and therefore must be an essential component of any

food security strategy. Not all economies can or should aspire to supplying all their own food needs. Doing so can be excessively costly (both financially and environmentally) and may reduce choice and quality, without providing the assurance of achieving food security. A general openness to trade, which APEC aspires to, will contribute to the robustness of each economy's capacity to address the challenges of food security.

Policy responses of some APEC economies during the 2007-08 crisis demonstrated that the actions of some economies at the domestic level, while entirely understandable in light of the emergency situation, can compromise the food security objectives of other economies and contribute to the increased volatility of global food prices. In addition, the way in which some economies (particularly in the ASEAN region) responded not only undermined the promotion of regional solidarity but also the food security situation in the region.

KEY MESSAGE: "Think beyond borders."

3. Economies should not lose sight of the fact that short-term policies or "coping" strategies (vs. "curing" strategies), particularly to increase food availability run the risk of countering the goal of addressing the longer-term determinants of food insecurity.

During times of economic crisis, including food crises, the challenge to economies within APEC and elsewhere is getting the balance right between immediate policy responses to protect the most vulnerable, and medium- and long-term efforts to increase productivity in agriculture and sustain economic growth. Many of these short-term responses include agricultural supply-side policies that distort production and trade (e.g. production and input subsides, food price controls, export restrictions, etc.) and therefore, have the potential to hamper efforts to achieve long-term food security. They lead to misallocation of resources domestically, they stimulate or conserve production in areas where it would not otherwise occur, and they can distort the transmission of price signals to producers elsewhere.

KEY MESSAGE: "Get the balance right."

4. More interconnected policy making is needed to reduce policy conflicts between food and other sectors.

The diversity of issues related to food security is currently dealt with by separate government agencies and departments. An integrated approach to food policy is therefore needed to address food security more effectively. Policies in other sectors outside the food system need to be developed in much closer conjunction with those for food. These areas include energy, water, land use, environment, labor, health, science and technology, infrastructure and transport, etc. An example of such conflict highlighted in this study is that between food and biofuels. Conversely, policies in all areas of the food system should consider the implications for sustainability, climate change and hunger.

To encourage more interconnected policy making, governments should establish an inter-agency coordinating body to address the diversity of issues related to food security. Australia is working to establish a National Food Security Agency that consists of all the major players relevant to food security. This body will coordinate the development and implementation of policies and programs targeted to improving Australia's food security.

KEY MESSAGE: "Connect the dots."

5. APEC is encouraged to assess (both qualitatively and quantitatively) the robustness of each economy's capacity to address the present and future challenges of food security. This would help prioritize what urgent action needs to be taken at both the domestic and regional levels.

Given every economy in APEC experiences some form of food insecurity to some degree or another, it would be worthwhile for each economy to take stock of its food security system in relation to the four basic dimensions and measure how robust it actually is to withstand future challenges. There are existing indices that provide a quantitative estimation of how food secure an economy is from the perspective of supply and demand but there are few, if any, tools available to identify the factors that enable an economy to be food secure over time. An example of such a quantitative tool is Syngenta's Rice Bowl Index (Syngenta, 2012). The Index does not describe an economy's actual state of food security but is intended to provide a means of assessing how robust its capacity is by considering the host of factors which will influence its state of food security. These factors are quantified on the basis of publicly available data and grouped into four rubrics: farm-level factors, environmental factors, policy and trade, and demand and price. Similarly, the Economist Intelligence Unit's newly launched Global Food Security Index (EIU, 2012), which is sponsored by Dupont, considers the core issues of affordability, availability, and quality across a set of 105 countries. The index is a dynamic quantitative and qualitative scoring model, constructed from 25 unique indicators, that measures the drivers of food security across both developing and developed economies.

KEY MESSAGE: "Take stock before moving forward."

6. Economies should recognize health and nutrition as being closely associated to food security and should intensify efforts to build a more food and nutrition conscious community.

It is not enough to have more food available. Adequate nutrition is essential. Individuals must consume sufficient amounts of not only calories, but also protein, fats, vitamins and minerals to support growth and development throughout their life. While significant progress has been made to increase food availability, some economies within the region continue to suffer from under nutrition and micro-nutrient deficiencies. This is a consequence of inadequate dietary diversity or a poor physical condition affecting an individual's capacity to properly 'utilize' food. Thus, food utilization is determined by diet quality, education (particularly women's education), general childcare and feeding practices, food preparation and preservation, safe water, sanitation and access to general healthcare.

On the other hand, the problem of over-nourishment is increasingly becoming apparent in many developed and emerging APEC economies and thus warrants more attention and focus.

KEY MESSAGE: "More food does not necessarily ensure more food security."

7. Investment in all aspects of agriculture remains critical to sustainable long-term food security

After decades of neglect, government expenditure in agriculture is now back on the rise. To assume its role as an engine of growth, development and poverty reduction, agriculture itself needs to grow. If developing economies are to follow a similar path to development as

today's developed economies, they should create conditions for a gradual increase of investments in primary agriculture, up- and downstream sectors, research and innovation and rural infrastructure including roads and transportation. Research has shown that economies that performed best in terms of reducing poverty and hunger are also those that achieved higher net investment rates per agricultural worker. China stands out from other developing economies for assigning top priority to agriculture and in particular to innovation in agricultural science and technology in domestic economic development. China's annual growth rate of public spending on agricultural research and development in real terms increased from an average of 16 per cent from 2000-09 to more than 20 per cent in 2010-11 and is expected to grow in the coming years (IFPRI, 2012).

Forward planning and anticipatory action, particularly given future challenges of climate change and more frequent weather shocks, is required if food price volatility is not to be the new normal. This has to be supported by increased public and private sector investments in all four dimensions of food security.

KEY MESSAGE: "Invest in the future now."

8. To protect the most vulnerable during emergency situations, the establishment and scaling-up of social protection programs, especially social safety nets should be accelerated.

In economies lacking established safety net programs, governments should begin program development immediately, focusing on geographic areas that are extremely vulnerable to food price surges, and should draw on best practices from other economies. Where they are already in place, governments should ensure that scaling-up existing safety net programs is a viable option during times of emergencies by either adding new beneficiaries and/or by increasing transfers made to beneficiaries. The effectiveness of these programs will depend on the availability of government resources and administrative capacities, as well as proper targeting, design and implementation (Fan et al., 2011). More research is needed to determine the effectiveness of different forms of assistance, whether it be cash, food vouchers, or food. Each has its benefits and drawbacks.

KEY MESSAGE: "Protect the most vulnerable."

9. The contribution of reducing food losses should not be underestimated. Addressing losses across the entire food chain will be critical in any strategy to feed the region's growing and increasingly affluent and urban population.

An oft-neglected strategy to improve food availability is the simple act of reducing waste. Inefficiencies across the entire food supply chain – from 'farm to fork' – result in significant food losses in both developing and developed economies. As much as 30 per cent of all food grown worldwide may be lost or wasted before and after it reaches the consumer. Reducing such waste could help moderate the amount of increase in food production that is needed to meet growing food demand, which would alleviate the pressure on resources and help lower greenhouse gas emissions.

Regrettably, there are major data gaps in available knowledge of global food waste, especially with regard to the quantification of food losses by individual cause, and the cost of food loss prevention. Much of the data on losses have not been collected systematically and

updated. In addition, there has not been much research on the impact of food waste in transitional economies such as Russia and China and other emerging APEC economies, where food consumption patterns are changing dramatically. Therefore, there is an urgent need for more quantitative research on loss estimates for the food supply chains of developing economies and the rapidly evolving transitional economies

KEY MESSAGE: "Deal with waste."

10. Given its importance socially and economically within the region, appropriate attention and investment should be given to the fisheries and aquaculture sector to meet present and future challenges.

To continue to meet local, regional and global demand for fishery products, APEC economies must be able to overcome the challenges currently facing the sector with the same commitment and determination they have for the crops and livestock sectors. Urgent action and investment are needed in the following areas: R&D to improve wild fish stocks; R&D for sustainable aquaculture technology including fish health management; integrating 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.

KEY MESSAGE: "Ensure fish for all."

11. APEC should work collaboratively with existing food security initiatives.

Since the food crisis of 2007-08, a number of food security initiatives have been set up by regional and international bodies, many of which consist of APEC member economies. Thus, it is critical for APEC, given limited resources, to take stock of its own initiatives in the area to ensure synergies are built and that duplication does not occur. APEC should also be able to identify priority areas where it has comparative advantage over other international bodies.

KEY MESSAGE: "Coordinate and complement. Don't duplicate."

12. Economies and APEC as an organization should consider developing strategic communication strategies *vis-à-vis* food security issues that incorporate risk communication.

It is vital for all economies that up to date and precise information on food security issues be provided to both internal and external stakeholders in real time and through all channels of communication, including social media. A prerequisite for these communication initiatives is information that is timely and accurate, promotes dialogue and addresses inherent risks. It is suggested that economies establish, within their food security agency, information gathering systems that closely monitor key information sources identified in this study. Relevant information should then be delivered in accordance with risk perception theory (Slovic, 1987). There are three paradigms of risk communication that should be applied in communications depending upon the risk/hazard profile (Covello and Sandman, 2001).

1. Precautionary advocacy (Low concern/High hazard scenarios)
This seeks to raise awareness of the challenges that economies face in food security. Essentially, these programs should be similar to those used in public health – raising

awareness (promoting behavioral change) without causing excessive fear that will inhibit action. Multiple/consistent messages are delivered by multiple organizations and individuals to stimulate dialogue and change.

2. Crisis Communication (High concern/High hazard scenarios)
Should identify one or two key individuals that will deliver proactively developed messages (limited number) designed purely to prompt direct action, not stimulate dialogue. The aim is to prompt action to overcome denial and despair, in the spirit of, "we're in this together." At least one of these individuals should be a senior government official but they could be supported by a well known / highly respected scientist or public figure.

3. Outrage management (High concern/Low (real) hazard scenarios)
A risk acceptance dialogue anticipated and delivered to reduce the high levels of concern that may develop as a result of the perception of psychological risk. The aim is to engage stressed or concerned stakeholders in order to address psychological risk perception factors that raise concerns over risks that are, in reality, measurably small. Programs with senior figures in APEC economies' food security initiatives can be developed to provide best practices in the communication areas.

KEY MESSAGE: "In uncertain times characterized by high risk issues, engage stakeholders in a dialogue-centered risk communication process. Communicate, communicate and communicate!"

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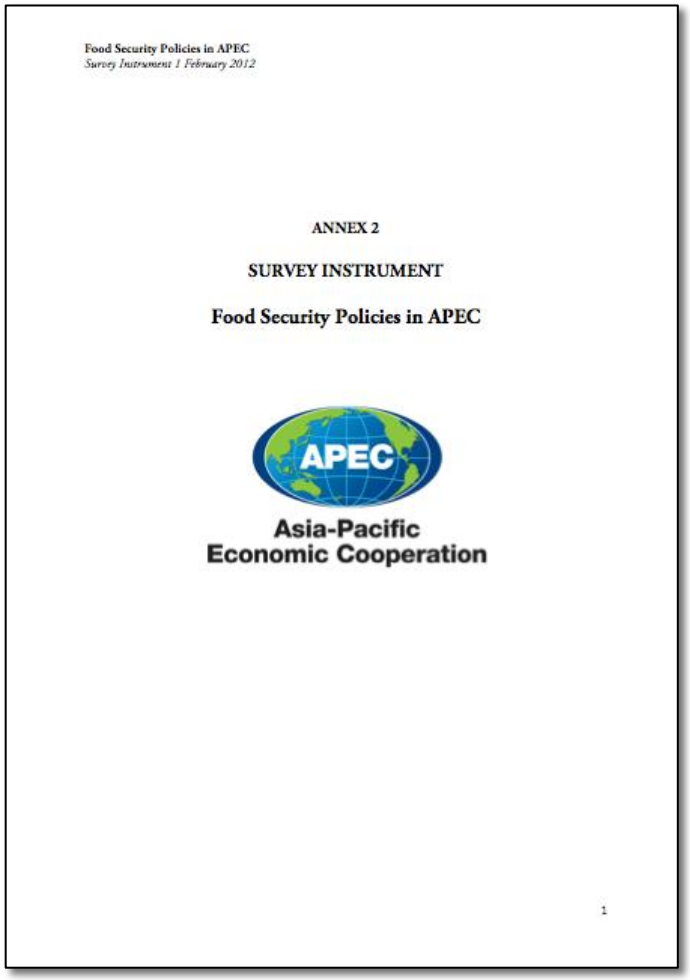
ANNEX 1. SURVEY INSTRUMENT



Click on the above image to download the survey instrument from this address: https://acrobat.com/?i=XAJLKp0DAIMF0trNAw1Mzw

ANNEX 2. APEC FOOD SECURITY INITIATIVES

Initiative/Program	APEC Forum	Date Established and Related Meetings	Brief Description
APEC Food System (AFS)	APEC Business Advisory Council (ABAC), Leaders and Ministerial Meetings	September 1998 in Chinese Taipei September 1999 in Auckland, New Zealand November 2000 in Brunei Darussalam October 2001 in Shanghai, China	Proposed by ABAC in 1998 to develop a so-called APEC Food System that better links farmers, food processors and consumers so as to boost the food sector's contribution to the prosperity of the APEC economies. In 1999 APEC Leaders endorsed ABAC recommendations on rural infrastructure development, dissemination of technological advances in food production and processing, and promotion of trade in food products. ABAC recommended that the work program should involve close public-private collaboration and parallel cooperative action in the three areas. In November 2000 and October 2001, Leaders and Ministers confirmed their commitment. Agreed objective is to "efficiently link together food production, food processing, and consumption to meet food needs of our people as an essential part of achieving sustainable growth, equitable development and stability in the APEC region".
APEC Food Safety Cooperation Forum (FSCF)	Sub-Committee on Standards and Conformance (SCSC): A subgroup of the Committee on Trade and Investment (CTI)	April 2007 in Hunter Valley, Australia July 2009 in Singapore May 2011 in Montana, USA	Some 60 regulators from 16 economies participated in the first meeting in Australia and a strategy for capacity building in the region was developed at the Forum and endorsed by the SCSC. The Forum will be led by China and Australia and will coordinate capacity building activities which aim to: improve food safety cooperation outcomes; accelerate progress towards harmonization of food standards with international standards; improve the transparency of food standards and regulations of APEC member economies; and facilitate trade in food products. Since 2007, the FSCF has undertaken significant capacity building throughout the APEC region in areas of risk analysis; development of food laws, standards and enforcement systems; microbiological risk assessment; management of food safety incidents and food recalls. At the May 2011 forum in USA, the APEC FSCF and the World Bank signed an MOU to explore opportunities for deepening the working relationship with the World Bank on carrying out capacity building activities to promote and support food safety in the Asia-Pacific region. The Food Safety Cooperation Forum's Partnership Training Institute Network (FSCF PTIN) was created specifically to address the need to engage the food industry and academic food safety experts with the regulators, to strengthen capacity building in food safety. An APEC Food Safety Incident Management Workshop was also held with the key recommendation to establish an APEC FSCF Food Safety Incident Network that would have as its primary objectives (1) improved information-sharing and communication,

			including on risk assessment, risk management and risk communication, among member economies to provide accurate and timely information on emerging food safety issues or in the event of a food safety incident; (2) development and implementation of FSCF-agreed approaches to improved food safety incident preparedness, response and recovery mechanisms within APEC; and (3) strengthened participation of member economies in the World Health Organization's International Food Safety Authorities Network (INFOSAN) and other international networks to increase the ability to respond to food safety emergencies of global significance.
Strategic Framework for Food Security in APEC	ABAC	2009	ABAC released a "Strategic Framework for Food Security in APEC" that was designed to achieve food security in the region through effective implementation of the AFS. The objectives are to ensure availability of and reliable access to food; strengthen food safety and dietary health; and preserve environmental security. The paper recommends that APEC should refocus on a comprehensive AFS approach that tackles in a holistic way access to food, availability of food, supply reliability, trade liberalization, food safety, dietary health, environmental security, climate change and sustainability. The Strategic Framework for Food Security in APEC calls for economies to commit to: undertake a Food System Approach, establish a High-Level Food Dialogue, end export restrictions, an APEC Leaders pledge to provide purchasing power assistance for the poor, and advance Doha agricultural negotiations through the APEC caucus.
APEC Food Security Forum	APEC Food System Group Agricultural Technical Cooperation Working Group (ATCWG)	August 2010 in Chinese Taipei August 2011 in Chinese Taipei	The Forum brought together food security related senior government officials from 17 participating economies, experts from both public and private sectors, and scientists from member economies to discuss issues related to food security including investment, environmental issues and trade facilitation. Chinese Taipei announced that it would organize a team to flesh out the implementation of an APEC Food Emergency Response Mechanism (AFERM), the objective of which is to build a regional, multiple food crops network for the provision of a short-term, timely, and fully granted form of humanitarian food relief during emergencies caused by natural disasters. Chinese Taipei initiated a project to delineate the costs and benefits of the AFERM and to enumerate its potential social-economic impacts; to define innovative approaches, timeframe, management protocol, resource requirement and expected deliverables of the AFERM; and to build consensus among APEC member economies on the AFERM and to refine the existing proposal on the AFERM so as to move forward as an APEC pathfinder initiative in 2012.

ATCWG Medium Term Work Plan (2010-2015)	Agricultural Technical Cooperation Working Group (ATCWG)	September 2010 in Japan	In the period from 2010-2015, ATCWG will serve as a forum for member economies to enhance the capacity of agriculture and its related industries to contribute to economic growth, food security and social well-being in the region. The Medium-Term goals of ATCWG are as follows: 1. Improving agricultural production and distribution through increased innovation, nutritional value, and food safety; 2. Improving human and institutional resource capacities in agriculture through education and training; 3. Improving aspects of environmental and natural resource management, infrastructure development related to food security; 4. Improving agricultural information systems and analysis; 5. Improving the preparations for natural disasters and cross border threats.
Paracas Declaration and Action Agenda	Third APEC Oceans-Related Ministerial Meeting	October 2010 in Paracas, Peru	Agreed to focus their efforts on the following four sub-themes: 1. Sustainable Development and Protection of the Marine Environment by focusing their attention on: Understanding of the Marine Environment, Sustainable Management of the Marine Environment, Pollution; 2. Impact of Climate Change on the Oceans; 3. Promote Free and Open Trade and Investment; 4. the Role of Oceans in Food Security. In 2012, the Ocean and Fisheries Working Group (OFWG) continues to focus on implementing the Paracas Declaration.
APEC Niigata Declaration on Food Security	First APEC Ministerial Meeting on Food Security	October 2010 in Niigata, Japan	Agreed that APEC economies would collectively pursue the shared goals of (i) sustainable development of the agricultural sector, by expanding food supply capacity, enhancing disaster preparedness in agriculture, developing rural communities, and confronting challenges in climate change and natural resource management; (ii) facilitation of investment, trade and markets by promoting investment in agriculture, facilitating trade in food and agricultural products, strengthening confidence in agricultural markets, improving agribusiness environment, and improving food safety practices. Also endorsed an APEC Action Plan on Food Security (see below), which identifies specific activities to be implemented by APEC economies to strengthen regional food security. Invited relevant APEC sub-fora to help carry out these activities in cooperation with responsible economies and ABAC.
APEC Action Plan on Food Security	First APEC Ministerial Meeting on Food Security	October 2010 in Niigata, Japan	62 action points organized around the 2 principal shared goals (see above); Responsibility shared among 14 APEC economies and ABAC; Implementation period 2011-2015. Essentially a list of activities nominated by member economies rather than a coherent strategy with some questions over implementation. Activities consist mainly of workshops, symposiums, conferences, dialogues, training modules, studies, information sharing, network facilitation, some research and analysis.

APEC Policy Partnership on Food Security (PPFS)	APEC Senior Officials Meeting; ABAC	November 2011 in Hawaii, USA PPFS Management Council Meeting in February 2012 in Moscow, Russia May 2012 in Kazan, Russia	Primary mechanism APEC will use to address food security concerns and should drive forward all issues related to, and affecting, food security. These would include (but are not limited to): trade; productivity; rural development; technology dissemination; fisheries; post-harvest loss; balanced use of land and water resources for human, animal and energy use; transparency of markets; and the impact of financial instruments on food prices. The PPFS will primarily examine policy issues as they relate to food security, but will remain cognizant of the capacity building work occurring in APEC working groups such as the Agricultural Technical Cooperation Working Group and the Ocean and Fisheries Working Group, as well as the work undertaken by the Sub-Committee on Standards and Conformance and the Food Safety Cooperation Forum so that efforts are complementary and not duplicative.
Kazan Declaration on Food Security	Second Ministerial Meeting on Food Security	May 2012 in Kazan, Russia	Unanimously endorsed by APEC's 21 member economies and takes into consideration input from the private sector and key international institutions, provides a comprehensive assessment of food security issues and developments and an updated framework for APEC and external stakeholders to cooperatively address them. The Kazan Declaration states that at the present stage it is necessary to focus on: 1. Increasing agricultural production and productivity; 2. Facilitating trade and developing food markets; 3. Enhancing food safety and quality; 4. Improving access to food for socially vulnerable groups of population; 5. Ensuring sustainable ecosystems based management and combating illegal, unreported and unregulated fishing and associated trade.

Source: APEC

ANNEX 3. SNAPSHOT OF THE FOOD SECURITY SITUATION OF EACH APEC ECONOMY

Economy	Food Security Situation	Source
Australia	98 per cent of fresh food consumed is grown and supplied domestically. Able to export more than half of its food production. Some communities and individuals experience food insecurity at a higher rate than the general population (indigenous people, unemployed, single parent households, low-income earners, rental households and young people). Growing number of Australians consuming poor diet resulting in increasing levels of obesity and other diet-related chronic diseases. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=3220*	Survey; FAOSTAT
Brunei Darussalam	Less than 5 per cent of the total population was undernourished during 2006-2008, one of the lowest rates in Southeast Asia. Food security is largely translated in terms of increasing self-sufficiency in rice; in 2007, rice self-sufficiency rate was 3.12 per cent; aims to increase rate to 60 per cent by 2015. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=2980*	FAOSTAT; Ministry of Industry and Primary Resources, 2008
Canada	An estimated 2.7 million Canadians, or 8.8 per cent of the population, lived in food insecure households in 2004. Food insecurity more prevalent in households with low incomes, those relying on social compensation, off-reserve Aboriginal households, rental households, single female parent households. Approximately one in four adults is obese and of children and youth aged six to 17, 8.6 per cent are obese. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=3530*	FAOSTAT; Health Canada, 2007
Chile	Significant achievements in reducing hunger and poverty in recent years, most notably in the area of child malnutrition which stands at 0.4 per cent for children under 6 years in 2007. However, obesity is becoming a serious public health concern among children with 35 per cent of those with the first 8 years of education overweight; has the 6th highest level of child obesity among OECD members. *Food supply for human consumption - dietary energy supply (kcal/person/day) *=2960*	FAOSTAT; ENS Chile 2009-10
China	Has realized food security at the overall domestic level (>95 per cent grain self-sufficiency rate in recent years) but there are still some areas and populations vulnerable to food insecurity and it varies from region to region and between urban and rural areas. Grain reserves are estimated to be more than double the 17 per cent safety level recommended by the FAO. Over 70 per cent of the counties with vulnerable grain supplies	FAOSTAT; Fengying et al. 2010; United

	were also classified as poverty counties; they are concentrated in the western region which has poor natural conditions and fragile ecologies. At the same time, obesity is appearing: in 2002, 9.2 per cent of Chinese children were overweight for their age, a figure only slightly under the percentage of Chinese underweight (11 per cent). Estimated that in 2005, only 25 per cent of public health resources were devoted to rural residents, although they make up close to 60 per cent of the total population. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=2990*	Nations, 2012
Hong Kong, China	Very little food is grown in Hong Kong, China with the vast majority of food imported. Thus, it ranks as one of the more highly vulnerable economies to rising food prices. 18.1 per cent of the population lives under the poverty line and one in three people over age 65 live in poverty. More than 300,000 children do not receive 3 meals a day. At the same time more than 2,300 tons of food is sent to landfills each day. Landfills in Hong Kong, China are expected to reach capacity by 2015, and food waste currently accounts for one-third of all solid waste.	Survey; The Global Food Banking Network 2011; Oxfam, 2011; Nomura Food Vulnerability Index 2010
Indonesia	Majority of the economy is food self-sufficient in cereal production and food availability at the overall domestic level is adequate. However, districts in Papua province and some districts in Riau province, Kepulauan Riau, Jambi, Kalimantan Tengah, parts of Maluku and Maluku Utara provinces are cereal deficient. Recent food security assessments in vulnerable areas revealed that the households engaged in subsistence farming and agricultural wage labor were more vulnerable to food insecurity than other livelihood groups. Limited access to food for the poor due to poverty, lack of stable employment, low and irregular cash incomes and limited purchasing power. Overall domestic rate of undernourished was 18 per cent. In 2007, more than 12 per cent of Indonesian villages did not have access to roads, 10 per cent of households had no access to electricity, 21 per cent of households had no access to improved drinking water; *Food supply for human consumption - dietary energy supply (kcal/person/day)*=2550*	Survey; FAOSTAT; WFP, 2009
Japan	A large net importer of food. Between 1960 and 2005, the share of agricultural output in GDP dropped from 9 per cent to 1 per cent, the food self-sufficiency ratio from 79 per cent to 40 per cent on a calorie basis, and agricultural land, indispensable for food security, from 6.09 million hectares to 4.63 million hectares. Rapid aging and declining rural population are fundamentally shifting Japan's approach to food. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=2800*	Survey; FAOSTAT; Tetsuji and Nobuhiro, 2008; Yamashita, 2010
Korea	Has a grain self-sufficiency ratio of 26.7 per cent. Average farmer is >50 yrs old. Self-sufficient in rice due	FAOSTAT;

	to protective measures but imports significant grains. Rising income and awareness of food has shifted focus from quantity to quality by prioritizing health and environmental preservation. Food import structure shows high dependence on a few economies or a few companies (i.e. the grain majors). Pursuing food production overseas. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=3040*	APIP
Malaysia	Less than 5 per cent of population undernourished. Food security is largely translated in terms of achieving self-sufficiency in rice production at about 65-70 per cent of the local consumption. Domestic paddy production meets only about 60 per cent of the domestic requirement. Practically all wheat and maize requirements are imported. Increasing amount of land devoted to industrial crops vs. food crops. Average age of farmer is above 60 yrs. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=2890*	FAOSTAT; Tey, 2010
Mexico	In 2008, 18.2 per cent of population was in food poverty; states with the highest percentages of food poverty were Chiapas, Guerrero and Oaxaca with 47, 42 and 38 per cent of their total population, respectively. Though acute malnutrition has dropped significantly, the overall domestic prevalence of chronic malnutrition in children under five is almost 13 per cent, with southern Mexico suffering the most at over 18 per cent. Moreover, chronic malnutrition is significantly higher in rural areas than urban ones. In addition, one in four children is overweight or obese, and that number increases to one in three for teenagers. Over 65 per cent of the adult population is overweight or obese, with the problem being more prevalent in urban populations. Indigenous population is significantly worse off than other groups. Lower income households spent an average of 52 per cent of their expenditures to purchase food, unlike those in the highest income decile, who spent only 23 per cent. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=3260*	Survey; FAOSTAT; USDA, 2010
New Zealand	A net exporter of clean, safe and competitively priced food to the rest of the world. Although adequate levels of nutrition generally prevail, there are small pockets of relative poverty and hunger due to issues of access rather than availability, which the government attempts to alleviate through various social welfare programs complemented by the activities of voluntary organizations such as food banks. There has been a rise in obesity in New Zealand adults in recent decades. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=3150*	Survey; FAOSTAT
Papua New Guinea	During 2004-09, 18 per cent of children under 5 years were underweight. A net food importer, depends on food imports such as rice, wheat, vegetables, beef and sheep meat. Rice is a major staple food now and there is concern that the economy should pursue rice self-sufficiency for fear that if there is a supply problem, it could result in major starvation leading to domestic security problems. *Food supply for human*	Survey; FAOSTAT; IFPRI, 2011

	consumption- dietary energy supply (kcal/person/day)=2622*	
Peru	16 per cent of the population is undernourished – equivalent to 4.5 million people. One out of five children does not consume the minimum necessary to satisfy basic needs for growing (chronic malnutrition). In rural areas the figure is one out of three children. When it comes to families with caloric deficiencies, the number is 31 per cent of the total, and worse again in rural areas than urban areas. 37.2 per cent of the total supply of food is imported. Obesity is a growing problem in urban areas. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=2410*	Survey; FAOSTAT; Guevara, 2010
Philippines	13 per cent of the population is undernourished – equivalent to 11.8 million people. In 2008, 20 per cent of children aged under-five was underweight-for-age while 32 per cent were stunted. About 7 out of 10 (72.7 per cent) households worried about the sufficiency of food in the household but did not have the money to buy more food. Among the household members, children were the least food-insecure. The regions of Cagayan Valley, Central Luzon, Bicol, Western Visayas, Central Mindanao and Autonomous Region of Muslim Mindanao were found to have the highest percentage of food insecure households. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=2580*	Survey; FAOSTAT; Molano et al, 2003
Russia	Main food security problem is inadequate access to food by certain socioeconomic groups. The most food insecure groups are those with the following traits: low income, large households, and no access to a garden plot on which they can grow food. Overweight and obesity, which affect half the adult population, have become a more serious health problem than underweight or malnutrition. Russia imports around 35 per cent of its agriculture and food. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=3320*	FAOSTAT; Liefert, 2004
Singapore	Because Singapore imports over 90 per cent of its food requirements for its 5 million inhabitants, food security concerns focus on a sudden stoppage of critical food supplies, increased competition with major global buyers and sudden price hikes. One of the main concerns for Singapore is that key products are imported from just a few source economies. Singaporean households spend, on average, 21.6 per cent of their monthly income on food, of which a significant proportion (63 per cent) is spent on meals in restaurants, food courts, hawker centers, etc. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=3114 (1990 figure)*	FAOSTAT; Teng and Escaler, 2010; Singapore Dept of Statistics, 2009
Chinese Taipei	Food self-sufficiency ratio is 30 per cent on a calorie basis weighted by dietary energy supply in 2007. Among the food supply, the net import of food amounted to 12.14 million metric tons while domestic production was 10.93 million metric tons. The agricultural sector is facing many challenges including large	FAOSTAT; Huang et al, 2009

	acreage of set-aside farmlands, small scale farming, soaring price of fertilizers, natural disasters accelerated by climate change, and rapid changes in the world food economy. Average age of farmers is 58 yrs old. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=2821 (2007 figure)*	
Thailand	A food surplus economy at the macro level and a major supplier in the world food trade. However, in terms of food accessibility, especially at the household level, it remains a problem, particularly in rural remote areas. 16 per cent of the population is undernourished – equivalent to 10.7 million people. Stunting rate in children aged under 5 was reported to be 16 per cent. Food poverty highly concentrated in the rural north and northeast regions. Most of the debates on food security tend to be focused on nutrition and safety issues rather than availability. Further, overweight and obesity have emerged as concerns. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=2540*	FAOSTAT; Prachason, 2009; Isvilanonda and Bunyasiri, 2009
United States	In 2010, 17.2 million households, 14.5 per cent of households (approximately one in seven), were food insecure, the highest number ever recorded in the US. About 5.4 per cent of these households had very low food security—meaning that the food intake of one or more household members was reduced and their eating patterns were disrupted at times during the year because the household lacked money and other resources for food. In 2009-2010, more than 35 per cent of US men and women (37 million men and 41 million women) and almost 17 per cent of youth (5.5 million girls and 7 million boys) were obese. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=3750*	FAOSTAT; USDA; Ogden et al., 2012
Viet Nam	A net food exporter, Viet Nam has firmly obtained its food security at the overall domestic level consuming only about 54 per cent of total rice production. However, 11 per cent of the population remains undernourished – equivalent to 9.6 million people. Rice deficit areas include the North West and Central Highlands which have relatively high poverty ratios. Among the Asian economies, Viet Nam experienced one of the fastest increases in food prices in early 2008; the retail price of rice increased by 65 per cent in Hanoi in the first half of 2008. As a result, Viet Nam has been classified as one of the hunger hot spots in Asia and the Pacific based on the Global Hunger Index classification. *Food supply for human consumption - dietary energy supply (kcal/person/day)*=2780*	FAOSTAT; FAO, 2004; IFPRI; Ngai, 2010

***Food supply for human consumption or dietary energy supply per person** refers to the amount of food, expressed in kilocalories (kcal) per day, available for each individual in the total population during 2006-2008. These figures represent only the average supply available for the population as a whole and do not necessarily indicate what is actually consumed by individuals. The actual food consumption may be lower than the quantity shown as food availability depending on the magnitude of wastage and losses of food in the household.

ANNEX 4. GLOBAL INITIATIVES ON FOOD SECURITY

Name (Year Established)	Leaders/Supporters/ Funding	Priority Actions	Key Objectives	Progress 2010-2012
UN Millennium Development Goal 1 (Eradicate Extreme Poverty & Hunger) (2000)	UN Millennium Project's Task Force on Hunger; Supported by the UN and 198 countries around the world	• Make the MDGs the centerpiece of national poverty reduction strategies supported by international processes. • Provide recommendations for action at international, national and community levels.	• Halve, between 1990 and 2015, the proportion of people who suffer from hunger. • Move from political commitment to action. • Reform policies and create an enabling environment. • Increase agricultural productivity of food insecure farmers. • Improve nutrition for the chronically hungry and vulnerable. • Reduce vulnerability for the acutely hungry through productive safety nets. • Increase incomes and make markets work for the poor. • Restore and conserve the natural resources essential for food security.	MDG 2011 progress report: Despite significant setbacks after the 2008-2009 economic downturn, exacerbated by the food and energy crisis, the world is still on track to reach the poverty-reduction target. By 2015, it is now expected that the global poverty rate will fall below 15 per cent, well under the 23 per cent target. This global trend, however, mainly reflects rapid growth in Eastern Asia, especially China. The proportion of people in the developing world who went hungry in 2005-2007 remained stable at 16 per cent, despite significant reductions in extreme poverty. Based on this trend, and in light of the economic crisis and rising food prices, it will be difficult to meet the hunger-reduction target in many regions of the developing world.
Comprehensive Africa Agriculture Development Program	African Union's New Partnership for Africa's Development (NEPAD), representing African leaders.	• Raise annual agricultural productivity by at least 6 per cent by 2015 and increase public investment in	4 pillars: • Extend the area under sustainable land and water management. • Improve rural infrastructure	So far, 25 countries have signed their CAADP compact and 8 have met their target of devoting 10 per cent of their budgets to agriculture: Ghana, Ethiopia, Niger, Mali, Malawi, Burkina Faso, Senegal and Guinea; and most have made

(CAADP) (2003)		agriculture by a minimum of 10 per cent of African governments' annual national budgets. • Help countries adapt to CAADP principles through improved coordination and sharing knowledge.	and trade related capacities for market access. • Raise smallholder productivity and respond to food emergencies more efficiently. • Improve agricultural research to disseminate new technologies.	significant progress towards it. Ten countries have met the 6 per cent target and another 19 have achieved productivity growth of between 3 per cent and 6 per cent.
U.N. Secretary-General's High-Level Task Force on the Global Food Security Crisis (HLTF) (2008)	Formed by the UN's Chief Executive Board; Leadership by the UN Secretary-General and FAO Director General and supported by 22 members including UN specialized agencies, IFAD, ILO, IMF, WTO, OECD, WFP, WHO, and the World Bank.	• A mechanism for coordinating the work of the UN system, donors and other stakeholders. • Provide a Comprehensive Framework for Action (CFA) with recommended short- and long-term actions for governments and organizations to take to improve food and nutrition security.	• Provide coordinated support for in-country action. • Support institutions that provide social protection and emergency food assistance. • Advance efforts to engage a broad range of public sector, business and civil society partners. • Track progress and communicate results at national, regional and global levels.	Released Updated CFA (UCFA) in September 2010. The UCFA covers a wider range of issues on food and nutrition security and prioritizes environmental sustainability, gender equity and the prerequisites for improved nutrition. It also acknowledges a multiplicity of actors that have a vital contribution to make. Recent emphasis on the way the UN system works in protracted crises and how to encourage more private sector involvement in food security. Finally, another area of attention is the work on the intersection between water, food, energy, environment, land and climate.
EUR 1 billion European Union Food Facility (EUFF) (2008)	Funding is channeled through FAO, UNRWA, UNICEF, IFAD, UNDP, the World Bank and other country-specific UN agencies; EUR 1 billion by the European Union.	• Bridge the gap between emergency aid and medium- to long-term development aid. • Increase food supply and food production capacity, and deal with the effects of volatile food prices on local populations.	• Improve access to agricultural inputs and services with special attention to local facilities and availability. • Provide safety-net measures to maintain agricultural production capacity and meet the basic food needs of vulnerable populations.	In 2009, the facility carried out 56 projects in partnership with international organizations in 41 developing countries. Through these first projects the facility estimates to reach directly as well as indirectly over 33 million people. Projects were to end mid-2011 after which results will be published. FAO is working to integrate EUFF project interventions into existing national policies and projects to ensure continuity.

		• Provide assistance to programs in 50 high-priority countries.	• Support small-scale production-boosting measures based on countries' individual needs and vocational training and support.	
Hunger-Free Latin America and the Caribbean (HFLAC) 2025 Initiative / Iniciativa America Latina y Caribe Sin Hambre 2025 (ALCSH) First launched in 2005 and endorsed by all in 2008	Secretariat based at FAO. Supported by all countries in the region; Funded by AECID (Spanish Agency for International Development Cooperation).	• Construct adequate institutional framework to help government bodies work together. • Develop social awareness to problems and objectives. • Create an agreement for monitoring malnutrition. • Promote the Parliamentary Front Against Hunger and their Action Plan.	• Develop a series of alliances and advocacy activities to place hunger in political agenda and stimulate awareness. • Training program to improve understanding of officials and journalists. • Technical assistance for specific projects. • Support implementation of regional and national "hunger observatories".	Six countries have approved food security laws, with support from HFLAC and nine more are in the process of doing so. The six countries are Brazil, Ecuador, Venezuela, Guatemala, Honduras and Nicaragua.
Global Food Crisis Response Program (GFRP) (2008)	World Bank in coordination with the United Nations' High-Level Task Force (HLTF) on the Global Food Security Crisis USD 1.2 billion rapid financing facility (increased to USD 2 billion in April 2009)	•Support safety net programs such as food for work, conditional cash transfers, and school feeding programs for the most vulnerable. • Provide support for food production by supplying seeds and fertilizer, improving irrigation for small-scale farmers, and	• Reduce the negative impact of high and volatile food prices on the lives of the poor in a timely manner. • Support governments in the design of sustainable policies that mitigate the adverse impacts of high and volatile food prices on poverty. • Support broad-based growth in productivity and market participation in agriculture to ensure an	As of September 2011, GFRP has approved USD 1,502.5 million and disbursed USD 1,185.7 million (79 per cent of approved funds). The GFRP has helped nearly 40 million vulnerable people in 44 countries.

		providing budget support to offset tariff reductions for food and other unexpected costs. • Establishment of a Multi-Donor Trust Fund to facilitate policy and operational coordination among donors, and leverage financial support for the rapid delivery of seeds and fertilizer to small farmers for the upcoming planting season.	adequate supply response as part of a sustained improvement in food supply.	
Challenge Program on Climate Change, Agriculture and Food Security (CCAFS) (2009)	CGIAR Alliance Centers (Lead: CIAT) and the Earth System Science Partnership (ESSP); Budget proposal USD 63.2 million in 2011 (USD 41.4 million from CGIAR Fund). Partnerships include government, civil society and private sector such as FAO, FARA and WFP. Funded by CGIAR Fund, CIDA, DANIDA, the EU and IFAD.	• 10-year research program to help vulnerable communities overcome the threats of climate change. • Collaboration between world's best researchers in agricultural science and climate science to develop more adaptable, resilient agriculture and food systems.	• Identify and test pro-poor adaptation and mitigation practices, technologies and policies. • Provide diagnosis and analysis that will ensure cost-effective investments, the inclusion of agriculture in climate policies and vice versa. • Four themes: Adaptation to Progressive Climate Change, Adaptation through Managing Climate Risk, Pro-poor Climate Change Mitigation and Integration for Decision Making. • Support agriculture's role	A Commission on Sustainable Agriculture and Climate Change launched involving senior natural and social scientists to produce policy recommendations to UNFCCC, Rio+20 and G20. Published "Achieving Food Security in the Face of Climate Change: Summary for policy makers from the Commission on Sustainable Agriculture and Climate Change" in November 2011. First round of CCAFS sites initial regions: East Africa, West Africa, and Indo-Gangetic Plains. Researchers outline food security-climate change road map.

			in the post-2012 international climate change regime.	
L'Aquila Food Security Initiative (AFSI) (2009)	G8; USD 22 billion pledged over three years; Endorsed by leaders of 26 countries and 15 organizations including the HLTF, the CFS, FAO, WFP, World Bank, and CGIAR.	• A comprehensive approach to food security, effective coordination, support for country-owned processes and plans and use of multilateral institutions whenever appropriate. • Harmonization of donor practices in line with the Rome Principles, as established in the L'Aquila statement.	• Increase agriculture productivity. • Stimulus to pre- and post-harvest interventions. • Emphasis on private sector growth, smallholders, women and families and preservation of the natural resource base. • Support for good governance and policy reform. • "Management for Development Results": tracking implementation of budget commitments to improve effectiveness and efficiency.	Of the USD 22 billion, 22 per cent has been disbursed while an additional 26 per cent is on track to be disbursed. 2012 objectives: 1) collective results-oriented reporting on its members' and partner countries achievement and 2) promoting principles of results-based management and aid effectiveness. US (Chair of AFSI 2012) primary goal is to ensure not only that donor countries are living up to our own financial pledges, but also that these contributions are being allocated strategically and making a real difference in the fight against global hunger.
Committee on World Food Security (CFS) 1974 World Food Conference but reformed in October 2009	Advisory group includes FAO, WFP, IFAD, Gates Foundation, HLTF, HLPE and other private, research, philanthropic, and financial institutions. 1 Chair: Nigeria + 12 member countries: Angola, Australia, Brazil, China, Egypt, France, Guatemala, Indonesia, Jordan, Switzerland, USA, Zimbabwe.	• Reformed committee includes a wider group of stakeholders to increase its ability to ensure food security and nutrition for all. • Focus on the global coordination of efforts to ensure food security. • Aims to be the foremost inclusive international and intergovernmental platform dealing with food security and	• Coordinate a global approach to food security. • Develop a global strategic framework. • Promote policy convergence through development of international strategies and guidelines based on best practices. • Support and advise countries and regions. • Coordinate at national and regional levels. • Promote accountability and share best practices.	Current areas of work: price volatility, land tenure and responsible agricultural investment. Consultation and proposals for the Global Strategic Framework for Policy Coherence underway (final version expected by October 2012). At the 37th session (October 2011), a set of recommendations aimed at reducing food price volatility and enhancing vulnerable populations' resilience to price shocks was agreed. One important meeting outcome aims to reduce food price volatility at the world market level by enhancing transparency and information-sharing and strengthening the coordination of responses. The Committee urged major food producing and consuming countries

		nutrition.	• Facilitate civil society participation in CFS discussions through the Civil Social Mechanism.	to participate in the new Agricultural Market Information System (AMIS) established by the G20 and collaborate towards providing the international community with high-quality and timely market information products.
Food Security Through Rural Development (2009)	AusAID (Australia). Partnerships with Australian agricultural research organizations, governments and civil society. Funding also to CGIAR; AUD 464 million.	• Lifting agricultural productivity, improving rural livelihoods and building community resilience in developing countries.	• Increase investments in international agricultural research. • Promote increased trade and better functioning markets that directly benefit the poor. • Strengthen and expand social protection programs so poor people can purchase or access food.	Funding allocations: Asia (AUD 182 million), Pacific (AUD 66 million) and Africa (AUD 100 million). Australia-Africa Food Security Initiative: includes research partnership with ACIAR and CSIRO to boost farm production and partnership with COMESA on improving rural markets.
ASEAN Integrated Food Security Framework (AIFS) and Strategic Plan of Action for Food Security (SPA-FS) (2009-2013)	ASEAN Secretariat and ASEAN Ministers on Agriculture and Forestry (AMAF); Potential donor support from FAO, World Bank, IRRI, IFAD and ADB. Support also provided by ASEAN Development Fund and ASEAN Foundation.	• Provide scope and joint pragmatic approaches for cooperation among ASEAN member states. • Develop a long-term agricultural plan focusing on sustainable food production and trade. • Compatible and consistent approach with the Comprehensive Framework for Action (CFA) by the UN HLTF.	Four components to the AIFS Framework: • Food security and emergency/shortage relief. • Sustainable food trade development. • Integrated food security information systems. • Agricultural innovation.	In October 2011, ASEAN plus Three (Japan, China and Korea) signed a food security commitment – the ASEAN plus Three Emergency Rice Resources (APTERR) to create a stock of 878,000 tonnes of rice for emergencies and for price stability. Work underway to discuss standard operating procedures. November 2011 launched a new USD 10 million cooperative program aimed at boosting ASEAN capacity to meet its food security objectives. The MARKET program will directly support the ASEAN Integrated Food Security (AIFS) framework and associated Strategic Plan of Action for Food Security (SPA-FS), emphasizing enhanced trade facilitation as well as improved farmer and policy maker access to information and technology, in partnership with the private sector.
Cereal Systems	IRRI (Project Base),	• Accelerate	• Widespread delivery and	Has delivered technologies to 60,000 farm

Initiative for South Asia (CSISA) (2009)	IFPRI, ILRI and CIMMYT, and public and private sector organizations in Bangladesh, India, Nepal and Pakistan; Funded by USD 20 million from the Gates Foundation and USD 10 million from USAID.	development and deployment of new cereal varieties, encourage sustainable cropping systems management practices and support agricultural policies. • Help farmers increase their yield, nitrogen and water use efficiency and annual household income.	adaptation of technologies to increase production. • Promote sustainable crop and resource management practices. • Provide high-yielding, stress-tolerant and disease- and insect-resistant rice varieties. • Support improved policies for inclusive agricultural growth. • Train scientists and agronomists for cereal systems research.	families and 70,000 hectares of land over three years in Bangladesh, India, Nepal and Pakistan. Has helped to increase farm household income by 350 US dollars per year per hectare within the three-year term.
The King Abdullah Initiative for Saudi Agricultural Investment Abroad (2009)	Saudi private sector, with possible partnerships with specialized multinational and local companies; 3 billion Saudi Riyals (about USD 800 million) by private sector Saudi companies.	• Build integrative partnerships with countries around the world that have high agricultural potential to develop and manage agricultural investments in several strategic crops. • Establish a strategic reserve for basic commodities such as rice, maize, wheat, barley, sugar and livestock.	• Identify countries with agricultural investment capabilities. • Choose cultivated crops and sign treaties with host countries to guarantee food reserve. • Invest in necessary infrastructure for transporting the crops to market.	Has identified 12 countries for potential agricultural investment including Turkey, Ukraine, Egypt, Ethiopia, Sudan, Kazakhstan, Viet Nam, Poland, Brazil and the Philippines.
Operational Plan for Sustainable Food Security in Asia and the Pacific	Asian Development Bank (ADB) Maintain the level of ADB's sustainable food	• Emphasis on the integration of agricultural productivity, market connectivity, and	• Help developing member countries to strengthen inclusive food and agricultural value chains that enable integration of	

(2009)	security engagement at about USD 2 billion annually from 2010 to 2012.	resilience against shocks and climate change impacts as the three pillars to achieve sustainable food security. • 5 medium-term measures to be implemented: (1) adopt a multi-sector approach to access the key constraints to sustainable food security; (2) expand and deepen ADB partnership on sustainable food security with other donors and specialized agencies; (3) continue to align ADB operations in agriculture and rural development on a selective basis and with greater focus; (4) increase support for agriculture and natural resources research; (5) invest in collaborative learning and knowledge development for sustainable food security.	production, processing, markets, and distribution networks while improving farm and nonfarm employment opportunities, increased incomes, and better living standards of the poor, women, and other vulnerable groups. • Address the three binding constraints to sustainable food security: stagnating food productivity and production; lack of access to rural finance, infrastructure, technology, markets, and nonfarm income opportunities; and the threat of climate change and volatility of food prices.	
Global Agriculture and	First proposed by G8; Supervised by the World	• Invest in existing national and regional	• Provide better access to seeds and technologies to	Two new donor countries: Ireland and Australia. As of December 2011, USD 1,105 million in

Food Security Programme (GAFSP) First proposed in 2009; finally approved in 2010 (to assist in the implementation of pledges made under the L'Aquila Food Security Initiative)	Bank and resource allocation managed by an external Steering Committee; USA, Canada, Spain, Korea, and the Gates Foundation have so far pledged USD 925 million over three years.	strategic plans for agriculture in the world's poorest countries. • Provide a more harmonized investment process in order that funds are readily available and aid flow is more predictable.	increase productivity. • Improve farmers' links to markets. • Reduce risk and vulnerability by providing protection measures for farmers. • Support nonfarm rural livelihoods. • Build infrastructure and institutions and provide training. • Enhance environmental services.	contributions (pledged and committed) for both private and public sector windows; US announced that USD 135 million will be available for GAFSP in early 2012. In November 2011, the Dutch Government made a pledge of EUR 100 million to the Private Sector Window. Since 2010, has approved grants worth USD 481 million for 12 countries.
A New Vision for Agriculture (2010)	Led by a Project Board selected from the World Economic Forum's Consumer Industries' Community; Advisory support from WEF's Global Agenda Council on Food Security, as well as high-level leaders of industry, government, institutions and civil society	• Develop a shared agenda for action, tapping into both public and private sector insights and capacities, to meet food security, economic development and environmental sustainability goals through agriculture. • Support existing initiatives that show potential for collaboration.	• Form and coordinate public-private partnerships to leverage investment for agricultural growth. • Boost good stewardship practices of natural resources. • Develop agricultural markets through improved infrastructure and policies. • Driving economic growth through agriculture, including opportunities for small-scale farmers.	"Realising a New Vision for Agriculture: A roadmap for stakeholders" launched in 2011, outlining role of business in meeting food and nutrition needs. • At the country level, the initiative has catalyzed public-private partnerships in Tanzania, Viet Nam, Indonesia and Mexico – each one engaging between 15-35 companies – as well as a regional task force in Africa. • New report published in 2012 "Putting the New Vision for Agriculture into Action: A Transformation Is Happening" - an action agenda.
Scaling Up Nutrition Movement (SUN) (2010)	Leadership by the UN Secretary General and supported by over 100 government, civil society, academic and business organizations; coordinated	• Stimulate leaders to focus on nutrition and commit to effective national policies. • Increase the effectiveness of existing	• Commit to working together to create conditions in which household members – especially women – are enabled to improve their own and their children's nutrition.	Released a Framework for Action to Scale-Up Nutrition in September 2010/April 2011 and a Road Map. The SUN Framework calls for two complementary approaches to reducing under-nutrition, one is direct nutrition-specific interventions (NSIs) focusing on pregnant

	by an international team and six task forces. The Transition Team is presently chaired by the UN Secretary General's Representative on Food Security and Nutrition	programs by encouraging their alignment to these policies. • It supports the participation of a wide range of stakeholders in supporting policy implementation that leads to broad ownership and a shared responsibility for results.	• By implementing a set of specific nutrition interventions, expanding the pool of resources for this effort, and integrating nutrition into health, agriculture, education, employment, social welfare and development programs, participants in the Movement can together contribute to significant and sustained reductions.	women and children aged less than two years and the second is a broader multi-sectoral nutrition-sensitive approach to development that acts to counter the determinants of under-nutrition – specifically by promoting agriculture and food insecurity to improve the availability, access to and consumption of nutritious foods.
EU Joint Programming Initiative on Agriculture, Food Security and Climate Change (FACCE JPI) (2010)	Involves 20 European countries overall and is coordinated by France through the INRA and the UK through BBSRC; Scientific Advisory Board consisting of 12 scientists. Given a Recommendation by the European Commission who will also contribute about EUR 2 billion.	• Bring together researchers, improve the effectiveness of national funding totaling over EUR 1 billion annually, share existing research results and coordinate future work to avoid duplication and maximize value for money. • Develop a common research agenda establishing medium- and long-term research needs and objectives for food security.	Five core research themes: • Sustainable food security under climate change, based on an integrated food systems perspective. • Environmentally sustainable growth and intensification of agricultural systems. • Assessing and reducing trade-offs between food production, biodiversity and ecosystems services. • Adaptation to climate change through the whole food chain. • Greenhouse gas mitigation.	Two new participants: Belgium and Switzerland. Scientific Research Agenda of JPI, adopted in December 2010, outlines 5 core research themes. A broad public stakeholder consultation was conducted with the aim to reinforce the Scientific Advisory Board analysis of the key issues to be addressed as well as to gather views on their importance: goals, core research themes and priority actions, and implementation. Due to be published in 2012.
CGIAR Fund (2010)	Members of the CGIAR: numerous international organizations and foundations; USD 358 million for 2011.	• Finance research guided by the CGIAR Strategy and Results Framework. • Implement the	• Reduce rural poverty, strengthen food security, improve human nutrition and health and enhance natural resources management.	As of December 2011, the Fund has approved programs on water, forests, maize, dryland cereals and systems, rice productivity, wheat, roots and tubers, meat, milk, fish, grain legumes, climate change (CCAFS) and market access. 25

	Administered by the World Bank and governed by the Fund Council.	strategy through the CGIAR and its partners through a portfolio of CGIAR research programs.		donors have started or completed Contribution Agreements/ Arrangements (CAs). Disbursed ~USD 150 million on CGIAR research programs.
Feed the Future (2010)	USAID/ US government; USD 3.5 billion pledge from US government at L'Aquila, 2009. Fund to be enhanced by private sector and other partner investments.	• Focus Areas: inclusive agricultural sector growth, improved nutrition, private sector engagement, research & capacity building, gender integration, environment-sensitive development. • Support country-owned processes through which countries develop and implement food security investment plans that reflect their own needs, priorities and development strategies. • 2011-2016 goals: Increase the purchasing power of 18 million people, generate USD 2.8 billion through R&D, reach 7 million children to improve nutrition and health, leverage at least USD 70 million in private investment.	• Invest in country-owned plans that support results based programs. • Strengthen strategic coordination to mobilize and align the strengths of stakeholders. • Ensure a comprehensive approach that emphasizes agriculture-led growth. • Leverage the benefits of multilateral institutions to fill financial and technical gaps. • Make sustained and accountable commitments.	In the US FY2012 budget, bilateral aid for Feed the Future received about USD 813 million and multilateral aid received USD 100 million. President Obama's FY2013 budget reaffirms importance of foreign assistance reform and calls for continued support of reform-oriented Presidential initiatives (i.e. Feed the Future, Global Health Initiative). Twenty focus countries selected based on five criteria: level of need, opportunity for partnership, potential for agricultural growth, opportunity for regional synergy, resource availability. High priority on food security and to help reduce vulnerability to drought in Africa. United States says it will contribute over USD 12 million to agriculture policy research in Zambia over the next five years; a similar amount was earmarked for Rwanda.
Food Security	FAO and WFP, and a	• To coordinate food	• Tools and guidance on	Global Emergency Food Security Cluster

Cluster (2011)	Global Cluster Coordinator, also NGOs, the International Red Cross and Red Crescent Movement; Funding provided by Humanitarian Aid department of the European Commission (ECHO), DfID and Ministry for Foreign Affairs of Finland.	security responses in countries affected by large-scale natural disasters, conflicts and crises. • Support country-level food security initiatives.	coordinating responses more effectively. • Filling human resources gaps in emergency situations. • Capacity building and training. • Improved information and knowledge management. • Strengthened and better coordinated advocacy work.	Inception Meeting held in May 2011. First FSC Coordinator and Information Manager training session held in September 2011 and capacity building programs developed. First global Food Security Cluster (gFSC) meeting of partners held in October 2011 to identify priority areas for 2012. Draft Terms of Reference (TORs) of the gFSC were presented. They centered around the agreed five strategic pillars: surge support; capacity development; tools and guidance; information management; and advocacy.
G20 Action Plan on Food Price Volatility & Agriculture (2011)	G20 Leaders, FAO, OECD, The World Bank group, IFAD, UNCTAD, WFP, WTO, IMF, IFPRI and the UN HLTF, Gates Foundation and the private sector	• Increase agricultural production and productivity on a sustainable basis. • Tackle the issue of food price volatility.	• Improve agricultural production and productivity both in the short and long term in order to respond to a growing demand for agricultural commodities. • Increase market information and transparency in order to better anchor expectations from governments and economic operators. • Strengthen international policy coordination in order to enhance confidence in international markets and to prevent and respond to food market crises more efficiently. • Improve and develop risk management tools for governments, firms and farmers in order to build capacity to manage and	With the private sector, committed to increase world agricultural production sustainably. The G20 also decided to move up a gear in terms of coordination of international agricultural research, starting with the development of new wheat varieties. The G20 also decided to make the agricultural products markets transparent, by creating an Agricultural Markets Information System (AMIS), whose first meeting was held on 15 September, to coordinate the collection and analysis of the main data on production, consumption and stocks, and to help developing countries to build their market analysis capacities. In addition, the Global Agricultural Geo-Monitoring Initiative (GEO-GLAM) was launched in June 2011 to strengthen global agricultural monitoring by improving the use of remote sensing tools for crop production projections and weather forecasting. At the international level, the G20 launched a Rapid Response Forum to prevent and manage market crises in a coordinated manner. The G20 also decided to exempt World Food Programme humanitarian aid from all export restrictions. For

			mitigate the risks associated with food price volatility, in particular in the poorest countries. • Improve the functioning of agricultural commodities' derivatives markets.	the most vulnerable, the G20 initiated the implementation of a system of prepositioned emergency humanitarian food reserves in the Economic Community of West African States (ECOWAS) and decided, with the World Bank, to develop innovative insurance and risk management instruments for the poorest to protect them from rising prices or events affecting harvests. Like for all other financial markets, the G20 set out rules against market abuses and price manipulation on the agricultural commodity derivative markets.
New Alliance for Food Security and Nutrition (2012)	G8 and African leaders with the support of The World Bank, African Development Bank, United Nation's World Food Program, International Fund for Agricultural Development, and Food and Agriculture Organization	Initial investment of USD 3 billion dollars by 45 companies, two-thirds of which are based outside of Africa, including Cargill, DuPont and Monsanto	• Increase responsible domestic and foreign private investments in African agriculture. • Take innovations that can enhance agricultural productivity to scale. • Reduce the risk borne by vulnerable economies and communities.	Agreed to promptly fulfill outstanding financial pledges made at L'Aquila Summit, and seek to maintain strong support to address current and future global food security challenges, including through bilateral and multilateral assistance. A major new component of the New Alliance will also include significantly increased participation by the private sector.

Source: Modified from Farming First, 2011

ANNEX 5. GROUPING OF WORLD REGIONS

Economies included in world regions 1-3—Medium/High-income economies

Region 1: Europe		
Albania	France	Netherlands
Armenia	Georgia	Norway
Austria	Germany	Poland
Azerbaijan	Greece	Portugal
Belarus	Hungary	Romania
Belgium	Iceland	Russian Federation
Bosnia & Herzegovina	Ireland	Serbia
Bulgaria	Italy	Slovakia
Croatia	Latvia	Slovenia
Cyprus	Lithuania	Spain
Czech Republic	Luxemburg	Sweden
Denmark	Macedonia	Switzerland
Estonia	Moldova	Ukraine
Finland	Montenegro	United Kingdom

Region 2: USA, Canada, Oceania	**Region 3: Industrialized Asia**
Australia	Japan
Canada	China
New Zealand	Republic of Korea
United States of America	

Economies included in world regions 4-7—Low-income economies

Region 4: Sub-Saharan Africa		**Region 5: North Africa, West and Central Asia**	**Region 6: South and Southeast Asia**	**Region 7: Latin America**
Angola	Liberia	Algeria	Afghanistan	Argentina
Benin	Malawi	Egypt	Bangladesh	Belize
Botswana	Mali	Iraq	Bhutan	Bolivia
Burkina Faso	Mauritania	Israel	Cambodia	Brazil
Burundi	Mozambique	Jordan	India	Chile
Cameroon	Namibia	Kazakhstan	Indonesia	Colombia
Central African Rep	Niger	Kuwait	Iran	Costa Rica
Chad	Nigeria	Kyrgyzstan	Laos	Cuba
Congo-Brazzaville	Rwanda	Lebanon	Malaysia	Dominican Rep
Congo-Kinshasa	Senegal	Libya	Myanmar	Ecuador
Cote d'Yvoire	Sierra Leone	Mongolia	Nepal	El Salvador
Equatorial Guinea	Somalia	Morocco	Pakistan	Guatemala
Eritrea	South Africa	Oman	Philippines	Guyana
Ethiopia	Sudan	Saudi Arabia	Sri Lanka	Haiti
Gabon	Swaziland	Syria	Thailand	Honduras
Gambia	Tanzania	Tajikistan	Viet Nam	Jamaica
Guinea	Togo	Tunisia		Mexico
Guinea-Bissau	Uganda	Turkey		Nicaragua
Kenya	Zambia	Turkmenistan		Panama
Lesotho	Zimbabwe	Utd Arab Emirates		Paraguay
		Uzbekistan		Peru
		Yemen		Suriname
				Uruguay
				Venezuela

Source: Gustavsson et al., 2011