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Food Security
- Global Trends and Region Perspective with Reference to East Asia

by

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Food Security

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ABSTRACT

The sharp increase in global food prices during 2007-2008 has triggered the awareness of food insecurity problems and their impacts on the low income, food-deficit countries many of which are located in the East Asian countries. The food-security situation was good in relative terms given that the percentage of carbohydrates consumed is slightly lower than the world average while proteins and fats consumption are higher than that of other regions. The food security in East Asia is largely driven by domestic production performance, and despite the doubling of import volume during the last decade, Asia remains the least dependent of all regions on food imports. Nevertheless, the rising energy costs and grain prices induced by the increasing demand of grains for bio-fuel exacerbate the undernourishment of the poor households in the region. While most of the government interventions focus on short-term measures such as reducing domestic food prices through trade or price control, the risk of facing a long-term food insecurity still exists which may render national action inadequate and require multilateral cooperation.

Evidence has shown that agricultural production is rather vulnerable to climate change, in particular, temperature and precipitation changes. As Matthews et al. (1995) indicates, the impact of climate change on rice production in Asia is of particular policy interest considering that rice is the most important component in millions of Asians' diet. Seventeen south, south-east, and east Asian countries produce 92% of the world total rice supply, among which 90% is consumed in these regions as well (Matthews et al., 1995). Rice-growing countries in Asia locate in different latitudes and the terrain conditions of the rice-growing areas vary as well. As such, climate-change impact on rice production of the Asian countries is quite diversified and warrants a detailed assessment at regional level.

Here, we present a summary report from a recent study by Lee and Chang (2010) regarding the impact of climate change on Asia's rice sector. Our study employs a multi-region, multi-sector computable general equilibrium (CGE) model—which also considers crop suitability and agro-ecological characteristics—to analyze the climate-change impact on global rice market (supply-side shock through crop yield change), with the consideration of changes in food demand due to population and

economic growth. In contrast to Mathews et al. (1995), our study places more emphasis on the economic side of food security issue regarding rice such as the effect on prices of rice and other competing food crops that is brought about by varied changes in rice yield across countries.

We take into account changes in both the supply and demand sides to examine the impact of climate change by 2020 on the global rice market and food security for Asian countries should the world is developing as plotted in the IPCC SRES scenario A2. Among all these concerns, food price is the key. Thus, in addition to the physical impact of climate change, price-induced adjustments in food production, which would affect significantly the reallocation of agricultural land among uses, are also taken into account. By identifying crop suitability and agro-ecological features of land, the economic model we used here can model more realistically the production responses of rice-growing countries to climate change, especially when diversity are found for the rice-growing countries in their vulnerability to climate change. Food security of countries located in tropical and sub-tropical zones may be adversely affected by climate change and the fluctuations in global food prices thus induced.

The results suggest that among Asian countries, India gets the hardest hit of climate change in its rice production, and a huge increase in the unit cost of rice production. Thus India has to rely heavily on imports from the world market to meet its domestic rice demand. To fill the gap being caused by climate change, China also has to increase rice imports, with a relatively bigger magnitude than the other Asian countries. India and China have been the world's top rice-growing countries, and most of their rice production is consumed domestically. Should negative effects of rice yield occur in these two major rice-consuming countries, their raised demand for rice imports may push up global price of rice, and in turn affect regions that are very much reliant on foreign supply.

Our major finding is that as agricultural trade intensifies, impact of climate change, be it positive or negative, occurring in one region will spill over into other regions, through the channels of trade. As such, policy measures aimed to effectively alleviate food security problem should also take into account the geographically diverse impact of climate change on crop yield along with the agricultural trade development related policies.

Food Security

- Global Trends and Region Perspective with Reference to East Asia

I. Introduction

The sharp increase in global food prices during 2007-2008 has triggered the awareness of food insecurity problem and its impact on the living standards of many, particularly the poor. In my presentation today, I would like to focus first on the prospects of food security for the global and East Asian countries. A snapshot of the factors that led to East Asia's problems will be provided followed by the policy responses. A quantitative assessment on the impact of climate change on rice sector in the Asian region are given before conclusions are drawn.

Let me begin with the definition of food security which has evolved over time. Initially in the 1974 World Food Summit introduced the concept of food security as “availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices.” Basically, the essence was to respond transitory food insecurity such as milk supply-demand gaps during the lean season, and temporary food insecurity such as production shortfall due to natural disasters (Kuntjoro and Jamil, 2008).

Besides the demand and supply side, more concerns gave rise to the distribution of food and access to food. Therefore, the World Food Summit in 1996 offered a holistic perspective of food security: “The food security exists when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life.” This definition implies that the food security should include four dimensions: availability, stability, access, and utilization of food. In recent years, the rising energy costs, the falling dollar, and increasing demand of grains for bio-fuel not only induce a sharp increase in grain prices (Mitchell, 2008) but also exacerbate the deficiency in food and undernourishment of the poorer households with a larger share of food in their total expenditures (Brahmbhatt and Christiaensen, 2008).

II. The global trends of food security

Recently, the food price change has reflected precarious food insecurity for many low income countries¹. By March 2008, the basic food gain prices were more than two and a half times higher than in early 2002. Almost three quarters of this increase occurred since the start of 2007, and about half since the beginning of 2008.

¹ *Food Security Assessment, 2008-09 / GFA-20*, Economic Research Service/USDA.

According to the forecasts of major international organizations e.g., FAO, UNDP, and OECD, the prediction of high food grain prices in the medium term is expected to continue as policies aiming at achieving energy security and carbon dioxide emission reductions present a strong trade-offs with food security goals (Brahmbhatt and Christiaensen, 2008).

Figure 1 shows that the food prices continued their rise in the early part of 2008, which became a concern for policy makers, but then fell in the later part of the year. Particularly, from July to December 2008, international prices for food and fuel declined sharply. Oil prices were cut by nearly 70% and food prices by 33%. However, as of February 2010, prices of food and fuel still remain much higher than they were for much of this decade. The increase in food prices would be a negative development for low income, food-deficit countries, many of which are becoming more dependent on imported foods and food ingredients.

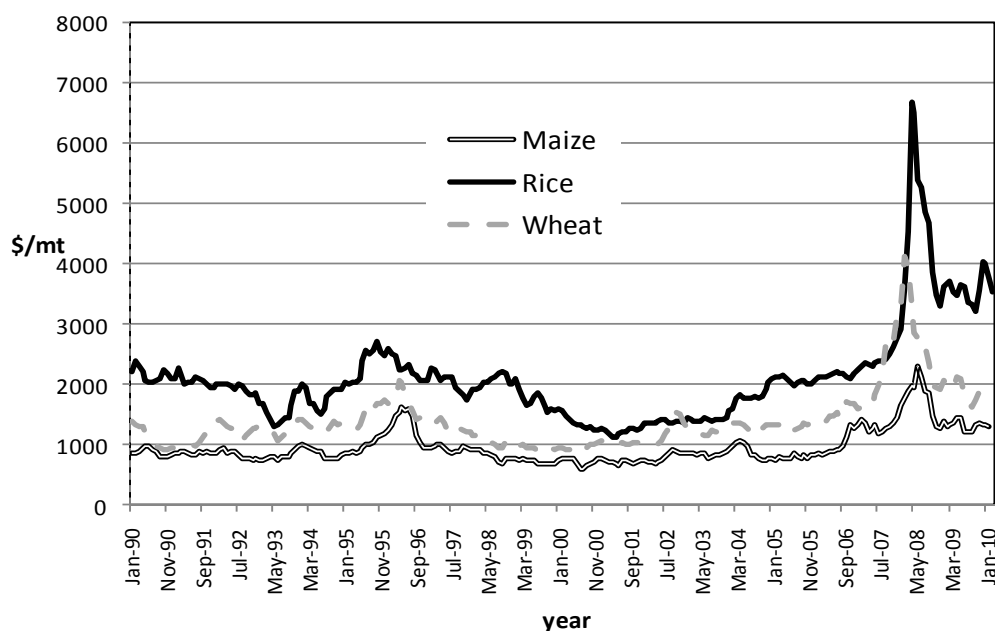


Figure 1. Grain prices from January 1990 to March 2010

(Source: Global Economic Monitor (GEM), World Bank,

<http://databank.worldbank.org/ddp/home.do?Step=1&id=4.>)

Figure 2 exhibits most net exporters are located in North America and Australia. However, the critical problem of inadequate food occurs in Asia. For most African countries, the stability of food supply system is also impeded. Referring to the prevalence of undernourishment² population in Figure 3, most net exporters

² According to FAO, the undernourishment exists when caloric intake is below the minimum dietary energy requirement (MDER). The MDER is the amount of energy needed for light activity and a minimum acceptable weight for attained height, and it varies by country and from year to year depending on the gender and age structure of the population.

relatively have less undernourished population. Actually, FAO reports³ that even before the consecutive food and economic crises, the number of undernourished people in the world had been increasing slowly but steadily for a decade.

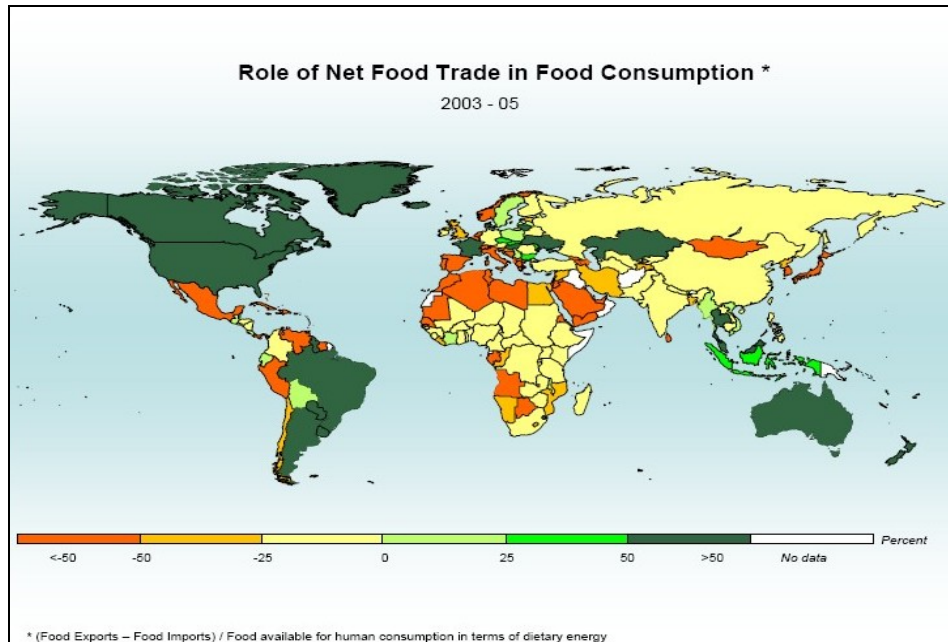


Figure 2 Global Net trade Position in food
(Source: FAOSTAT, <http://faostat.fao.org/site/291/default.aspx>)

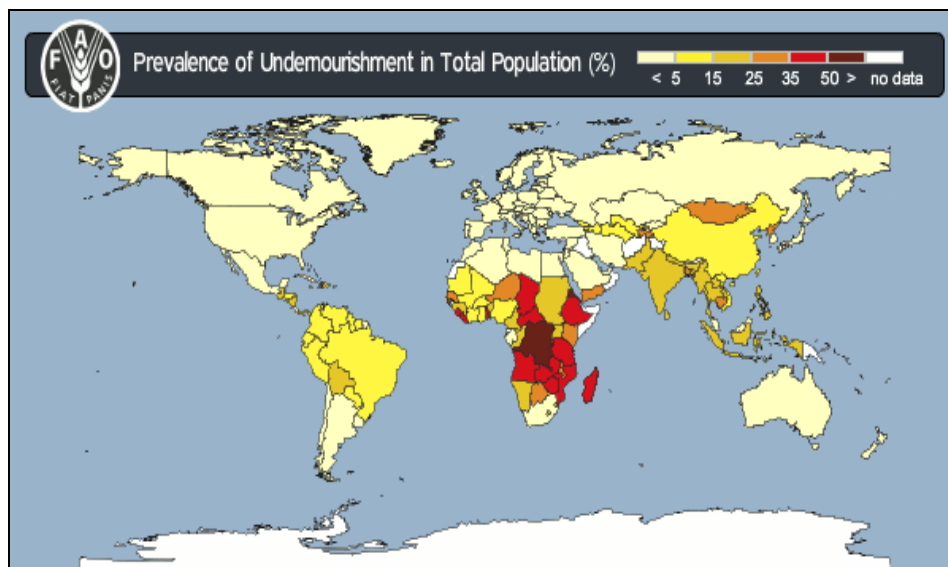


Figure 3 Prevalence of undernourishment in total population (%)
(Source: FAO Hunger Map, <http://faostat.fao.org/site/291/default.aspx>)

³ Food and Agriculture Organization, The State of Food Insecurity in the World- 2009. Rome, 2009.

Figure 4 shows that the number of undernourished people increased between 1995-97 and 2004-06 in all regions except America. In late 2008, as global food and oil prices continued to fall, the global financial crisis was another blow to the food-insecure and vulnerable people. Particularly for developing countries, FAO states that the current economic turmoil is different in three important aspects. First, the crisis is affecting large parts of the world simultaneously, and thus traditional coping mechanisms used to focus on several countries in particular regions are likely to be less effective than they were in the past .

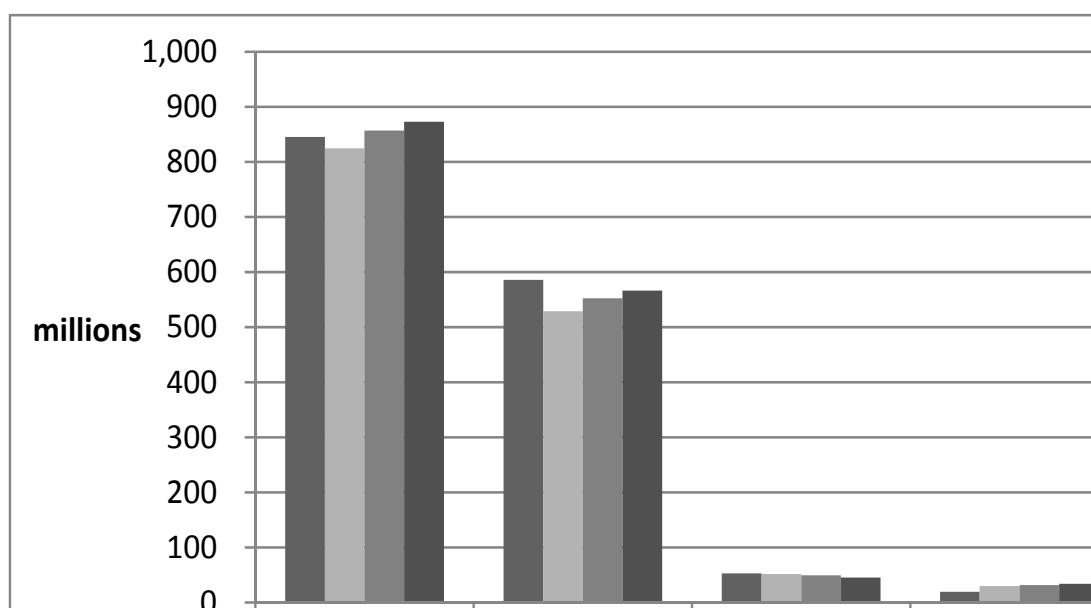


Figure 4 Undernourishment on the rise: number of undernourished in selected regions from 1990-92 to 2004-06.

(source: FAO, The State of Food Insecurity in the World- 2009. Rome, 2009.)

Second, the current economic crisis emerged immediately following the food and fuel crisis of 2006 to 2008. While food commodity prices in the world market declined, they remained high by recent historical standards. Also, food prices in domestic markets came down more slowly, partly because the weakened US dollars, in which most imports are priced. At the end of 2008, domestic prices for staple foods remained an average of 17% higher in real terms than two years earlier.

Finally, developing countries have become more integrated, both financially and commercially, into the world economy than they were 20 years ago. As a consequence, they are more exposed to changes in international markets. The rising income and urbanization are also changing the nature of their diet. It is very important to be cognizant of all the components of food security so that progress towards reducing malnutrition and improving living standards can be maintained.

III. The Food Security with Respect to East Asia

3.1. Difference between East Asia and global situation

In Asia, the increase in the number of food-insecure people of 4 percent from 2007 to 2008 was more a reflection of population growth than deepening food insecurity⁴. The region's food security is largely driven by domestic production performance, and despite the doubling of import volume during the last decade, Asia remains the least dependent of all regions on food imports. While Asia accounted for an estimated 46 percent of the food-insecure people of the 70 countries in 2008, the region accounted for nearly two-thirds of the total population of these 70 countries. In other words, its food-security situation was good in relative terms. Less than 20 percent of the region's population was estimated to consume below the nutritional target in 2008.

Table 1 shows the share in dietary energy consumption and the average nutrient including carbohydrates, proteins, and fats. The carbohydrates are measured as kcal per person per day. Compare the composition and consumption level of the nutrients, the percentage of carbohydrates in East Asia is slightly lower than other regions and world average. Proteins and fats account for 12% and 27%, respectively, which are higher than that of other regions.

Table 2 listed the food balance sheet of Southeast and Northeast Asia. Because of China, the population of Northeast Asia is much higher than that of Southeast Asia. Northeast Asia export more rice while the domestic supply is less than the Southeast Asia. Basically, the demand of rice and protein are higher for people in Northeast Asia.

3.2 Regional Reviews

Based on FAO report⁵, recent cyclones, floods and droughts in addition to the continuing conflicts and civil strife affected most regions in East Asia. The food aid situation of East Asia is listed in Table 3. From 2000 to 2006, based on FOA statistics, only Cambodia, Indonesia, North Korea, Laos, and Philippines received continuous food aid. Thailand received the food aid only in 2002. North Korea and Cambodia had a sharp decline on its volume of assistance.

⁴ *Food Security Assessment, 2008-09 / GFA-20*, Economic Research Service/USDA.

⁵ Food and Agricultural Organization (FAO), November 2009, *Crop Prospects and Food situation*, No.4.

Table 1 Share in total dietary energy consumption and average nutrients

Country groups	Macronutrients	g/person/day*	percent
WORLD TOTAL	Carbohydrates	2700	64
	Proteins	74	11
	Fats	71	25
Asia and the Pacific	Carbohydrates	2560	67
	Proteins	67	11
	Fats	56	23
Northeast Asia	Carbohydrates	2830	61
	Proteins	81	12
	Fats	71	27
Southeast Asia	Carbohydrates	2410	72
	Proteins	56	10
	Fats	45	18
South Asia	Carbohydrates	2330	71
	Proteins	56	10
	Fats	45	20
Central Asia	Carbohydrates	2750	64
	Proteins	83	12
	Fats	70	24
Western Asia	Carbohydrates	2180	69
	Proteins	65	12
	Fats	40	19
Americas	Carbohydrates	2750	62
	Proteins	74	11
	Fats	78	27
Near East and North Africa	Carbohydrates	2980	68
	Proteins	81	11
	Fats	70	21
Sub-Saharan Africa	Carbohydrates	2080	72
	Proteins	50	10
	Fats	41	19

Source: Food Security Statistics, FAO,
<http://www.fao.org/economic/ess/food-security-statistics/en/>.

Table 2 Food balance sheet of Southeast and Northeast Asia

item	Total Population (1000)	Production (1000 tons)	Import Quantity (1000 tons)	Stock Variation (1000 tons)	Export Quantity (1000 tons)	Domestic supply quantity (1000 tons)	Feed (1000 tons)	Seed (1000 tons)	Food (1000 tons)	Food supply quantity (kg/capita/yr)	Food supply (kcal/capita/day)	Protein supply quantity (g/capita/day)	Fat supply quantity (g/capita/day)
Southeast Asia													
Population	1,538,250												
Wheat		110,520	11,543	-1,202	4,199	116,662	8,046	4,155	98,993	64.4	563	18	3
Rice		137,534	2,698	9	1,333	138,908	10,366	4,500	115,363	75	782	14.4	2.9
Barley		3,893	3,351	-211	598	6,436	1,311	119	433	0.3	2	0.1	0
Maize		154,090	30,078	-5,201	5,698	173,269	118,913	1,325	12,206	7.9	61	1.2	0.2
Millet		1,571	48	0	25	1,594	832	30	661	0.4	3	0.1	0
Sorghum		2,468	1,307	99	238	3,636	2,648	21	844	0.5	4	0.1	0
Cereals, Other		567	155	100	182	641	206	104	304	0.2	1	0	0
Northeast Asia													
Population	564,025												
Wheat		159	13,091	-300	698	12,252	959	6	10,873	19.3	140	3.8	0.4
Rice		123,237	4,633	-8,440	14,317	105,113	8,832	2,550	73,863	131	1270	24.3	3.9
Barley		18	1,129	-78	26	1,043	2	0	35	0.1	0	0	0
Maize		30,401	4,516	-1,230	778	32,909	18,409	276	9,162	16.2	116	2.9	1.1
Millet		168	18	1	6	181	22	5	144	0.3	2	0.1	0
Sorghum		57	19	0	3	73	70	0	0	0	0	0	
Cereals, Other		140	234	100	219	254	23	4	304	0.5	3	0.1	0

Source: FAOSTAT, 2007, <http://faostat.fao.org/>.

Table 3 Food aid shipments of East Asia regions for cereal (tons)

	2000	2001	2002	2003	2004	2005	2006
Cambodia	18,917	55,302	24,932	33,670	13,622	12,568	6,326
China	40,300	80,680	106,847	8,808	66,787	-	-
Indonesia	241,949	219,966	205,657	177,013	76,147	37,247	21,338
North Korea	1542,440	1,069,860	973,064	843,965	995,907	878,968	133,783
Laos	16,331	22,648	21,037	19,379	14,340	11,032	13,384
Mongolia	64,866	59,539	-	48,691	34,194	29,730	34,271
Myanmar	-	-	-	-	-	249	10,111
Philippines	108,808	244,928	68,150	106,100	48,200	70,969	82,957
Thailand	-	-	1,223	-	-	-	-
Timor-Leste	2,030	800	-	-	-	-	-
Viet Nam	108,255	27,000	60,000	24,027	31,600	-	-

Source: FAOSTAT, <http://faostat.fao.org/>.

Also, the FAO report classified several East Asia regions which are requiring external assistance and is exhibited in Table 4. Different from other regions, the reason of requiring food support for North Korea is because its economic constraints and political problems. Next, the food security situation for primary regions in East Asia is stated according to FAO reports.

Table 4 Countries in crisis requiring external assistance

Nature of Food Insecurity	Main Reasons	Changes from last report (July 2009)
<i>Widespread lack of access</i>		
North Korea	Economic constraints	—
<i>Severe localized food insecurity</i>		
Myanmar	Past cyclone	↑
Philippines	Tropical storm	+
Timor-Leste	IDPs	—

Note: “—”=No change; “↑”= Improving; “↓”= Deteriorating; “+”=New entry.

Source: Food and Agricultural Organization (FAO), November 2009, *Crop Prospects and Food situation*, No.4.

In **China**, the harvest of the 2009 secondary spring wheat crop was completed in August and output is estimated at record 6 million tons. The 2009 aggregate wheat output is now estimated at a record 114.9 million tons, some 2.2% above the

previous high set last year reflecting Government support and favourable weather. Harvesting of the 2009 maize crop is just completed and the annual output is estimated at 158 million tons, lower than the record level of last year but above the five-year average. Harvesting of the 2009 early rice crop, a small crop accounting for less than 20 percent of total annual paddy output, was completed in July. The output is estimated at some 38 million tons, about 3.3 percent above the good crop of last year, reflecting increased area and yields.

In **Japan**, agriculture is in a freefall decline. In the years between 1960 and 2005, the share of agricultural output in GDP dropped from 9% to 1%, the food self-sufficiency ratio from 79% to 41%, and agricultural land, indispensable for food security, from 6.09 million hectares to 4.63 million hectares. Meanwhile, the ratio of part-time farm households, which derive more than half their income from non-farm employment, increased from 32.1% to 61.7%. The percentage of farmers over 65 years old also jumped from 10% to 60%. Gross agricultural output in 2006 was 8.5 trillion yen, less than the sales volume of Panasonic, which stood at 9.1 trillion yen in the same year.

In **Myanmar**, the Government and partners recently appealed for USD 103 million to help meet critical recovery needs for last year's cyclone Nargis affected areas. Furthermore, the food supply and market access exist difficulties. In Myanmar, agricultural and food assistance continues to be needed for the summer season and the current monsoon season to help small farmers recover their production and livelihoods in the areas affected by cyclone in 2008.

In **North Korea**, the food security remains precarious because of political problems⁶. Because of a series of natural disasters and the dissolution of the Soviet bloc, the number of food insecure people more than doubled between 1995-96 and 2007-08. North Korea is facing persistent food shortages⁷. In 2008, according to the UN World Food Programme, 40% of the country's population people were in need of emergency food aid. From 2000-2006, within the recipient countries in East Asia, North Korea receives most types of food. The main assisted food can be seen in table4. As the table shows, the sharp decline of foreign assistance is due to the decline of rice and coarse grains.

⁶ *Food Security Assessment, 2008-09 / GFA-20*, Economic Research Service/USDA.

⁷ Food and Agricultural Organization (FAO), November 2009, *Crop Prospects and Food situation*, No.3.

Table 5 North Korea- Food aid shipments (tones)

	2000	2001	2002	2003	2004	2005	2006
Rice	575,959	296,084	626,572	493,003	490,400	431,414	102,811
Coarse Grains	725,850	420,667	52,425	163,218	278,320	88,593	5,424
Other	31,322	8,400	6,452	3,831	6,326	2,796	2,500
Non-Cereals							
Wheat	239,384	325,990	277,121	180,923	224,722	358,960	25,548

Source: FAOSTAT, <http://faostat.fao.org/>

In the **Philippines**, nearly 2 million people were affected by the tropical storm which hit the northern island of Luzon in September 2009 and caused heavy flooding in this main rice producing area. The Government declared "a state of calamity" for 25 provinces of the island and appealed for international assistance. A joint Government/UN appeal has been launched for 25,800 tons of food for 1 million most affected people.

In **Taiwan**, the food self-sufficiency ratio is only 30.6% weighted by energy in 2007. Total agriculture imports and cereals have increased significantly due to the expansion of livestock and fishery industries and improve living standard. The agriculture sector of Taiwan is facing many challenges, such as: low level of food self-sufficiency, aging farmers, large 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. To cope with these challenges, the present agricultural policy is based on three guidelines: "Healthfulness, Efficiency, and Sustainability." A program entitled "Turning Small Landlords into Large Tenants" was launched to make effective use of idle lands. Facing globalization and the food crisis, Taiwan will secure stable food supply through revitalization of its set-aside farmlands and international markets, and provide technical assistance to developing countries, in particular for staple food crops (Huang et al., 2009).

In **Thailand**, the world's largest rice exporter, 2009 paddy production is preliminarily forecast at 31.8 million tons, higher than 2008 and the average of the last five years but slightly below the record harvest in 2007. Rice exportable surplus for 2010 is estimated at about 8.6 million tons, similar to that of 2009 but down from the near record level of about 10 million tons in 2008.

IV. Climate Chang and Rice in Asia- A Quantitative Assessment

Evidence has shown that agricultural production is rather vulnerable to climate change, in particular, temperature and precipitation changes. As Matthews et al. (1995) indicates, the impact of climate change on rice production in Asia is of particular policy interest considering that rice is the most important component in millions of Asians' diet. Seventeen south, south-east, and east Asian countries produce 92% of the world total rice supply, among which 90% is consumed in these regions as well (Matthews et al., 1995). Rice-growing countries in Asia locate in different latitudes and the terrain conditions of the rice-growing areas vary as well. As such, climate-change impact on rice production of the Asian countries is quite diversified and warrants a detailed assessment at regional level.

Here, I present a summary report from a recent study by Lee and Chang (2010) regarding the impact of climate change on Asia's rice sector. Our study employs a multi-region, multi-sector computable general equilibrium (CGE) model—which also considers crop suitability and agro-ecological characteristics—to analyze the climate-change impact on global rice market (supply-side shock through crop yield change), with the consideration of changes in food demand due to population and economic growth. In contrast to Mathews et al. (1995), our study places more emphasis on the economic side of food security issue regarding rice such as the effect on prices of rice and other competing food crops that is brought about by varied changes in rice yield across countries.

We take into account changes in both the supply and demand sides to examine the impact of climate change by 2020 on the global rice market and food security for Asian countries should the world is developing as plotted in the IPCC SRES scenario A2. Among all these concerns, food price is the key. Thus, in addition to the physical impact of climate change, price-induced adjustments in food production, which would affect significantly the reallocation of agricultural land among uses, are also taken into account. By identifying crop suitability and agro-ecological features of land, the economic model we used here can model more realistically the production responses of rice-growing countries to climate change, especially when diversity are found for the rice-growing countries in their vulnerability to climate change. Food security of countries located in tropical and sub-tropical zones may be adversely affected by climate change and the fluctuations in global food prices thus induced.

On the demand side, this study considers the fact of fast growing Asian economies, such as China and India, in population and per capita income, which are

the key drivers for food demand increase. On the trade front, our study also simulates for the production and demand shocks being received by all food exporting and importing countries. Importing countries are more concerned about food security, while exporting countries are concerned about the change in farm income.

The simulation design follows that of Lee (2009) and is illustrated in Fig. 4. In the first step of the simulation, we produce line A¹B, which graphs the growth path of some variable, e.g, supply of a crop, in the GTAP land use model from 2001 to 2020 under the SRES scenario A2. In producing this baseline A¹B, we brought in region-specific GDP and population growth forecasts by IIASA (2007a) and IIASA (2007b) to the GTAP land use model and gradually updated the benchmark database of 2001⁸ to 2020, i.e., point B. Population and GDP growth forecasts of 19 world regions/countries used in this study draw on those as compiled by Lee, Cheng, and Chang (2010).

In the 2nd step, the updated database then serves as the benchmark equilibrium for the simulation—that is, to bring in climate-induced crop yield changes (the supply-side shocks). The climate-induced yield changes of three staple crops—i.e., rice, wheat, and coarse grains—by 2020 as estimated by Rosenzweig and Iglesias (2001) are used based on the climate forecasts as projected by the HadCM3 model (Gordon et al. 2000; Pope et al. 2000) under the IPCC emissions scenario IS92a⁹. Japan, Centralized Planning Economies in Asia, Indonesia, and other regions in the Pacific Asia¹⁰ gain 6%, 3%, 1%, and 1.58%, respectively, in rice yield. On the other hand, China, India, other South Asian countries receives negative impact of 1%, 8%, and 0.74% on their rice yield.

The results suggest that among Asian countries, India gets the hardest hit of climate change in its rice production, and a huge increase in the unit cost of rice production. Thus India has to rely heavily on imports from the world market to meet its domestic rice demand. To fill the gap being caused by climate change, China also has to increase rice imports, with a relatively bigger magnitude than the other Asian countries. India and China have been the world's top rice-growing countries, and most of their rice production is consumed domestically. Should negative effects of rice yield occur in these two major rice-consuming countries, their raised demand for rice imports may push up global price of rice, and in turn affect regions that are very

⁸ Lee et al. (2009) for AEZ land use; Dimaranan, (2004) for other economic variables and parameters.

⁹ In order to simulate for more Asian countries, we tried to use the yield change estimates of as disaggregated regions as possible. Rosenzweig & Iglesias (2001) has, so far, the most disaggregated regions of estimates that fit with the need of our study purposes.

¹⁰ Viet Nam is included in CPA; Thailand and the Philippines are in PAS.

much reliant on foreign supply.

Our major finding is that as agricultural trade intensifies, impact of climate change, be it positive or negative, occurring in one region will spill over into other regions, through the channels of trade. As such, policy measures aimed to effectively alleviate food security problem should also take into account the geographically diverse impact of climate change on crop yield along with the agricultural trade development related policies.

V. Response of East Asia Regions and Concluding Remark

It is a big challenge for East Asian countries to deal with rising food prices. There may be some speculative procurements in the food sectors around the region. According to Brahmhatt and Christiaensen (2008), it is emergent for setting greater international engagement and collaboration to address the competing demands of energy and food security. Demeke et al. (2009) suggest that the policies include releasing food stock to the market, reducing tariffs, price control, and export restriction. In recent years, the bio-fuel mandates, trade tariffs and subsidies in the advanced countries have distorted world food markets and have played an important role in rising world food prices. More analysis and international dialogue is needed to decide whether the benefits from the current mix of policies really justifies the costs, or whether a new global deal can be struck covering both clean energy and food.

For example, China eliminated export taxes on some grains, including wheat (3%), rice (3%), and soybeans (5%). The Thailand government set the farmers guaranteed price for second-crop paddy at THB 11,800 (USD 332) per ton under a new intervention scheme starting on March 16 and running through July. Japan cut the price at which it sells imported wheat to domestic flour millers by an average 23% to 49,820 yen (USD 549) per ton. Indonesia is planning to release 2,250 tons of rice through a market operation to avoid price spikes before the harvest of the second season. In the Philippines, the National Food Authority announced that it will allow private-sector traders to import up to 563,000 tons of rice annually. The measure aims at enhancing market participation ahead of liberalization of the sector, including the removal of quantitative restrictions on imports. The Viet Nam Food Association (VFA) confirmed the purchase of 400,000 tons of husked rice for state reserves under the first phase of the procurement plan announced by the Government in mid-June. Under the plan, the VFA is instructed to buy two million

tons of summer-autumn rice to prevent a fall in domestic prices at the peak of the harvest, when export demand is low.

Table 6 illustrate the major policy measures taken by the East Asian countries. It is quite obvious that most of the government interventions focus on short-term measures such as reducing domestic food prices through changes in trade policies or changes in domestic taxes or subsidies. Price control is also implemented in some cases. Despite these efforts, the severity of the food insecurity renders national action inadequate and requires multilateral cooperation. The establishment of a regional food reserve (e.g., ASEAN Emergency Rice Reserve or East Asia Emergency Rice Reserve) as a long-term measure would serve to stabilize extreme price fluctuations in the international market.

Table 6 Policy measures taken by governments to moderate food insecurity

	Consumer oriented						Producer oriented		Trade oriented			
	Tax	Social			Market			Production support	Market management	Import	Export	
	Taxes / customs	Food assistance	Food subsidies	Safety net & other	Price controls	Release stocks	Food procurement & other	Producer credit & other	Minimum producer prices & other	Import tariffs & other	Quantitative export controls	Export price control & tax measures
Cambodia						✓						
China	✓							✓	✓	✓	✓	
Indonesia			✓		✓			✓		✓	✓	✓
Japan					✓					✓		
Malaysia					✓	✓		✓	✓			
Mongolia	✓											
Philippines			✓					✓	✓			✓
Republic of Korea										✓		
Thailand						✓						
Viet Nam											✓	

Source: Food and Agricultural Organisation (FAO), July 2008, Crop Prospects and Food Situation, No. 3

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Appendix Countries in each region

Region	Country
Asia and the Pacific	East Asia, Oceania, Southeast Asia, South Asia, Central Asia, Western Asia.
Northeast Asia	China, Korea Dem People's Rep., Republic of Korea, Mongolia.
Oceania	Papua New Guinea.
Southeast Asia	Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Thailand, Viet Nam.
South Asia	Bangladesh, India, Nepal, Pakistan, Sri Lanka.
Central Asia	Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan.
Western Asia.	Armenia, Azerbaijan, Georgia
Latin America and the Caribbean	North and Central America, The Caribbean, South America.
North and Central America	Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama
The Caribbean	Cuba, Dominican Republic, Haiti, Jamaica, Trinidad and Tobago
South America	Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela.
Near East and North Africa	Near East, North Africa.
Near East	Afghanistan, Islamic Rep. of Iran, Iraq, Jordan, Kuwait, Lebanon, Saudi Arabia, Syrian Arab Republic, Turkey, United Arab Emirates, Yemen
North Africa	Algeria, Egypt, Libyan Arab Jamahiriya, Morocco, Tunisia.
SUB-SAHARAN AFRICA	Central Africa, East Africa, Southern Africa, West Africa.
Central Africa	Cameroon, Central African Republic, Chad, Dem. Republic of Congo, Republic of Congo, Gabon.
East Africa	Burundi, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, Sudan, Tanzania, Uganda.
Southern Africa	Angola, Botswana, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Swaziland, Zambia, Zimbabwe.
West Africa	Benin, Burkina Faso, Côte d'Ivoire, Gambia, Ghana, Guinea, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo.

Source: FAO, Food Security Statistics, <http://www.fao.org/economic/ess/food-security-statistics/en/>.