

# FOOD SECURITY AND REGIONAL FREE TRADE AGREEMENT IN TAIWAN

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## ABSTRACT

*The report focuses on the current state of food security in Taiwan, main indicators and key challenges facing the farmers such as price volatility, aging population, conflicts over resources, and climate change related risks. Several safety net measures were adopted including raising food self-sufficiency ratio to 40% in 2020, revitalizing 60,000 hectares of set-aside farmland, establishing a national food bank system to provide in-kind support for low-income families, and initiating a regional food emergency relief mechanism for post-disaster humanitarian aid. The second part presents the regional food security status and discusses the implications of emerging free trade agreements in Taiwan. While these regional free trade agreements provide a balancing mechanism for international agricultural markets, Taiwan must adapt to the changing economic landscape by building a harmonious and competitive agriculture in the 21<sup>st</sup> century. Policy suggestions on fostering agribusiness on food processing and services, launching major reforms on retirement system and long-term leasing of farmland, strengthening food security governance, and adopting innovative ICTs to raise productivity and global competitiveness are introduced as concluding remarks.*

**Keywords:** Food Security, Self-Sufficiency Ratio, Regional Free Trade Agreement

## THE CURRENT STATE OF FOOD SECURITY

In retrospect, global food security has been improving markedly over the past half a century due to increasing food availability per capita and declining real food prices. However, the recently erupted food crisis coupled with the financial crisis has brought back the debate on food security on the world agenda once again. Impact of these unusually high food prices coupled with fuel prices have severely affected the vulnerable sections of population to the extent that even the coping mechanisms have gone to the extent that people have been forced to draw down their assets to avoid large declines in consumption. Like many Asian countries, Taiwan is also affected by the negative consequences of the surge in food prices.

In Taiwan, the per capita food consumption is 2618 kilocalories per day in 2008. With a population of 23 million people, this is equivalent to 22 billion metric tons food supply per year (Chou, 2010). Given the warm and humid subtropical weather, many kinds of crops can be grown to produce a variety of farm products in Taiwan. Nevertheless, land scarcity and competition from non-agricultural uses seriously limited agricultural production.

The GDP share from agriculture accounts for less than 2.5% of total GDP in Taiwan in 2012. Comparing to the number of approximately 5 % in 2000, it is obvious that agriculture is in transition. Food supply is relying more on imports rather than domestic production and the domestic consumption met by import accounts for almost 70% on calorie basis in the recent decade.

The World Food Summit in 1996 offered a holistic definition of food security as: “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, accessibility, and utilization of food. In Taiwan, the official indicators adopted are food self-sufficiency rate and rice safety stock level as specified in the Food Administration Act.

#### 1. Rice Safety Stock

According to Article 3 of Food Administration Act, The term "food" shall include rice, wheat, flour and some coarse grains as well as processed rice products promulgated by the Council of Agriculture (COA). Moreover, Article 5-1 states that “The competent authority, for the purpose of security and stability of food supply, shall stockpile rice based on the preceding year’s average consumption and not below the safety stock level during a specific period. The level of safety stock shall be promulgated by the Executive Yuan.”

Food security and price stabilization are two major priorities in Taiwan’s rice policy administrations. Traditionally, the government has always maintained a stock level to meet the demand up to six months, which exceeds the two-month (or 17-18% of annual consumption) food security stock level suggested by the UN/FAO. However, the excessive amount of stock also incurs an extremely high storage costs and management burden.

According to the Food Administration Act, Article 5 stipulates that “the competent authority shall devise plans of food production and marketing every year in order to stabilize the supply and demand of food”. Therefore, a new amendment of Article 5.1 was issued in May 24 2006 which commends a minimum food security public stock level of 3 months’ consumption needs, which is about 310,000 metric ton (mt) of brown rice based on the current consumption level of 1.3 million mt. (Lin,

2006)

## 2. Food Self-Sufficiency Trend

Due to free trade policy and changing dietary intake of consumers, agricultural and food imports gradually took over domestic supply. As a result, food self-sufficiency ratio declined over time. **Figure 1** shows that the food self-sufficiency ratio weighted by energy dropped from 40% to 32% during the past two decades. Total agriculture imports and cereals have increased significantly due to the expansion of livestock and fishery industries and improve living standard.

However, the food price hike in 2007 and global warming related extreme weather events raised the public's concern on food security and brought back debates on food insecurity and policy actions to deal with the rising instability in the world market. The government responded with launching a series programs to revitalize the set-aside farmland and encourage local product consumption. The aim was to raise the self-sufficiency ratio. Yet, the effect of revitalization of farm land will be subject to limitation of ageing farm labor and environmental protection concern on exploiting the unproductive marginal land.

After the policy effort, the self-sufficiency ratio in 2011 was 33.5% in energy-weighted basis and 68.5% if weighted by prices, which was 2.2 and 0.6% higher than the levels in 2010, respectively. The reason why price-weighted ratio improved less significantly than the energy-weighted one is because there was a big drop in world price for cereal crops so that the price gaps between imports and domestic supply was enlarged. The other reason is due to the rising domestic supply on rice, corn, peanuts, and livestock which all contain higher calorie content. The future development will continuously depend upon these two factors as imports have become an indispensable component of the daily diet in Taiwan.

**Figure 2** shows that most food items have high self-sufficiency ratio except for wheat, maize and soybeans. The self-sufficiency ratio of fishery products exceeds 150 due to a large amount of export of marine fishery products. It has long been recognized that fish is a valuable food. Compared to meat, poultry and eggs, fish is low in saturated fatty acids and a good source of protein and selenium. However, the health recommendations to eat more fish in the developed economies add to existing pressures on the marine ecosystem while poor populations face the greatest threat from a collapse in capture fisheries (Brunner *et al.*, 2008).

## 3. Food Away from Home

The other development worth mentioning is the rising food-away-from-home (FAFH) trend and how it transformed the dietary habit as well as composition for consumers

of all generations. **Figure 3** illustrates the long-term changes of food expenditure share in total household expenditures and the share of FAFH in total food consumption. Currently the FAFH expenditure has reached US\$20 billion each year, which is roughly one-third of total food expenditures with 3.3 billion increases per six-year intervals. It implies the rising demand for high value and specialty food products, as well as fastfood and restaurant services. Two major changes have evolved due to the recent food price hike, the reverse of declining trend in food expenditure share and a drop in FAFH share.

Based on a recent market survey, about 80% of consumers are eating out regularly for breakfast and lunch. The major contributing factor is the changes in demographics and family structure, e.g., the rise in the number of double-salary families, high women's education and labor participation rate. This is particularly true in societies in which food preparation is performed by the female members of the family. Another contributing factor is the demand for greater variety by consumers. In both cases, the growth in demand for FAFH is driven by increases in household income. The immediate consequence of these changes is the rapid expansion of convenient stores, restaurants, hospitality and culinary business. The difference in nutritional content in food at home and food away from home may have important implications in the dietary and health status of population groups which deserve further studies.

### SAFETY NET MEASURES

As a policy response to the recent food price hike, the government convened a National Conference on Food Security on May 10-11, 2011. The discussions focused on three issues: current situation of food supply and demand and whether domestic food supply is secure, planning the maximization of future domestic food production and how to adjust production structure, and studying ways to expand overseas production bases to ensure food sources abroad. The conclusions included raising domestic food self-sufficiency rate to 40% in 10 years; planning overseas investments in agricultural production to stabilize sources of bulk commodities; establishing food security risk management system; strengthening the maintenance of good farmland; and effectively utilizing water for agricultural uses.

To accomplish these policy goals, there were 14 key strategies and 55 corresponding measures proposed. The main points on raising food self-sufficiency rate is either increasing domestic food production or encouraging domestic consumption on rice as substitutes for imported wheat. The government set the goal of food self-sufficiency rate at 40% in 2020 to ensure Taiwan's food security after taking into consideration international situations and trade regulations. Another policy goal is

to activate 140,000 hectares of fallow farmland giving priority to encourage the planting of feed corn by farmer groups in a large scale.

One of the major challenges for reaching the abovementioned goals is the lack of economies of scale, which results from small farm size (i.e., 1.1 hectares per farm) and therefore leads to the high production costs. Per capita farm income is only 70% of non-farm income. The emigrations in turn force farmers to suspend part of their farms, making the scale even smaller because they do not have enough manpower to take care of their farms.

The second challenge comes from the aging problem. As most people belonging to the young generation prefer non-farm urban jobs, the average age of farmers exceeds 61.1 according to the most recent census report. The absence of marketing expertise of the aging farmers also weakens their position to increase added values of agriculture. As a result, farmers cannot afford to invest in infrastructures to cope with the rapidly changing market competition and frequent natural disasters.

The third challenges are coming from the demand side. During the period of 1994 to 2006 as the economy was growing steadily, there was a slight rising trend of average propensity to consume. However, this rising trend has been reversed since 2007 due to the global crisis and lagged effect from stagnation in employment and payroll.

## 1. Supply Side Measures

Facing globalization and the food crisis, the government decided to secure 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). A program entitled “Turning Small Landlords into Large Tenants” was launched to make effective use of idle lands.

It is not until the recent price surge in the international market that the government decided to revitalize 60,000 ha of fallow land. Two-thirds of this will be converted to livestock feed crops like corn or silages. One-third of this will be reverted back to rice coverage and the 20,000 ha are expected to increase the national rice reserves from 2008's 300,000 tons to 400,000 tons in 2009. The Ministry of Economic Affairs will also formulate measures to stabilize wheat, corn, soybean and granulated sugar prices so as to ensure stable supply and demand.

The 2011 public rice stock has reached 480,000 MT of rice on February 2012, which was 60% higher than the 300,000 MT security level set by the Food and Agriculture Organization (FAO). Moreover, domestic manufacturers have kept enough stock of wheat, soybean and other grains for demand in 1-1.5 months, plus the grains shipping on the way and purchased. Overall speaking, Taiwan has taken control of grains enough to meet demand in 3-4 months.

The Environmental Protection Administration statistics show that about 2.75 million tons of food went to waste in 2010, which is equivalent to 20 years of consumption by 260,000 low-income households. Therefore, the government also advocates public awareness on the reduction of food losses and waste so that more food may be available for distribution to the poor and disadvantaged families.

## 2. Demand Side Measures

Despite increased social welfare spending during the past two decades, income inequality as measured by the Gini coefficient worsened slightly from 0.32 in 1994 to 0.34 in 2010. **Figure 4** shows that the average household income of the top 20 percentile was 5.38 times that of the bottom 20 percentile in 1994, but now it is 6.19 times in 2010. Although the overall widening of income gap is not very serious, there is very significant increase in the propensity to consume in the most disadvantage group of the bottom 20 percentile. This lowest income group has shown a persistent trend of lack of income to cover their daily needs. The ageing population and hollowing out of low and middle-wage job opportunities are two possible causes of this problem.

**Figure 5** illustrates that the average propensity to consume recorded a steady increase in all income quintile during the period 1994 to 2010. The highest income quintile increases from 60% to 65 % while the lowest income quintile increases from 91% to 107%. This also suggests that the gap between the highest and the lowest quintile is getting wider in recent decade.

Since 2003, the COA launched a domestic staple food relief program which releases around 1,600 metric tons white rice from public stock to help low-income families and disadvantage people in Taiwan. Each person can apply for up to 3 -month consumption of 36 kg of rice. According to the official statistics, a total of 15,000 MT of white rice have been released under this program. Humanitarian groups can also apply for domestic or international humanitarian relief usage.

There are about 260,000 low-income families (approximately over 600,000 people) under the welfare programs by the government or private charity organizations who cannot afford to buy food. Each person is eligible to receive 400 gm of milled rice per day from the government's public rice reserve to meet their basic nutritional needs. Beside rice, a national "Food Bank" system has been initiated on other types of food. Under the new food bank system, donated food would be acquired from farmers, manufacturers, distributors and consumers, and be made available to those in need, through non-profit organization or agencies as after-school programs that provide food to the hungry.

In 2008, in response to the rising food prices, the government augmented a

relief mission to all low-income families. Each person was given 10 to 20 kg of white rice per year. These relief programs are mostly short-term basis. For long-term purpose, direct income transfer and public provisions on education and healthcare are more effective ways to lift the bottom-layer households out of the poverty traps and ultimately affirm their food security.

The safety net measures in the farming sector are mainly targeted for the rice and elderly farmers. Price support on public stock procurement has been provided to the rice farmers for food security purposes for many decades. Table 1 indicates that the net farm income per hectare for rice farms has fluctuated over the past decade, largely due to climate related natural disasters like typhoons or floods. The average net income before and after the WTO accession were almost the same.

As for the elderly farmers, the government has implemented the “Provision Act of Living Allowance for Elderly Farmers” to take care of the lives and benefits of the senior farmers. The farmers are assisted through the offering of the allowance. After three times adjustments in the amount of the allowance, the monthly payment amount has been increased to US\$200 per month per person since July 2007.

## REGIONAL FREE TRADE AND FOOD SECURITY

### 1. Food Security in Asia

Adhering to the principle of national production for domestic consumption, Asian economies have been striving for grain self-sufficiency for the concerns of agrarian stability, foreign currency conservation, and independence from political influences of their importing foreign counterparts (Corke and Cai, 2004). The region’s food security mainly relies on domestic production, while imports only account for less than 10% of grain supply (Rosen *et al.*, 2012).

Although food imports doubled over the last decade, Asia appears to be the least dependent among all regions on food imports. In Asia, a 4% increase in the food-insecure population from 2007 to 2008 is mainly due to population growth, followed by a minor factor of deepening food insecurity. With the 2008 Asian food-insecure population accounting for an estimated 46% among 70 countries studied in Shapouri *et al.* (2009), while its total population is nearly two-thirds of that of these 70 countries. Less than 20% of the Asian population was estimated to consume below the nutritional target in 2008. Asia’s food-security status was good relative to the other concerned countries (Shapouri *et al.*, 2009).

**Table 2** 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. Comparing the composition and consumption level of the

nutrients, the percentage of carbohydrates in Northeast Asia is slightly lower than in other regions and world average. Proteins and fats account for 12% and 27%, respectively, which are higher than that of other regions.

Recently, the Economist Intelligence Unit published a Global Food Security Index (GFSI) across 105 countries using the definition of the 1996 World Food Summit (Economist Intelligence Unit, 2013). This index is constructed from 25 unique indicators that measure the drivers of food security through the categories of affordability, availability, quality and safety. The scores can be used to identify which countries are more vulnerable to food insecurity than others.

The index reveals a number of interesting findings and where interventions/improvements are most needed. For example, the most food secure economies score less well owing to limited availability of vegetables and iron in food supplies. Landlocked countries are no worse than coastline economies despite their lack of access to port facilities. Economic opportunities for women show a very high and positive correlation (0.93) with food security, and thus become critical to expand agricultural output in the developing world.

Within the 25 indicators, “extreme weather” is viewed as a major threat from nature through measuring the volatility of agricultural production. In spite of rising economic losses and populations affected by natural disasters, global food aid has declined over the past decade. The global financial crisis in 2008 was another blow to the food-insecure and vulnerable people.

**Table 3** illustrates the scores and rankings of nine East Asian economies, indicating a wide gap across the region. In addition, we also conducted the GFSI calculation for Taiwan using the Taiwanese statistics. Among the East Asian economies, the net food importing Japan, South Korea, and Taiwan fare quite well in their food security based on the EIU’s criterion.

Next, the food security situation for primary regions in East Asia is stated according to FAO reports (FAO, 2009a). In recent years, the food self-sufficiency rate is taken as an important indicator to show the extent to which a country relies on its own production resources. According to the FAO report, the food self-sufficiency rate (SSR) means the magnitude of production in relation to domestic utilizations.

Based on FAO (2009b), cyclones, floods, and droughts, in addition to the continuing conflicts and civil strife, affected the food security in most regions of East Asia. The food aid situation of East Asia is listed in **Figure 6**. Between 2000 to 2006, based on FAOSTAT statistics, only Cambodia, Indonesia, North Korea, Laos, Mongolia, the Philippines, and Timor-Leste constantly received food aid. Thailand received food aid only in 2000 and 2002. North Korea and Cambodia had a sharp decline on its volume of assistance. However, Cambodia’s food aid rebounded from



2007 onwards, although with a reduced magnitude. Most of the listed East Asian countries continued to receive food aid, but to a lesser degree.

According to Harvey *et al.* (2010)'s review on the changes in international food aid and food assistance policies, the 2006-08 global food price spikes, financial crisis and the associated economic recession have forced a re-examination of the future of the Food Aid Convention (FAC). However, no consensus has yet been made and food aid remains the majority of humanitarian appeals and an important tool in responding to crisis and natural disasters. They also pointed out a major shift of the key donors from providing in-kind food aid to in-cash transfers and local/regional procurement. This has led to a highly challenging environment for policy and practices in the future.

On the other hand, Young and Abbot (2008) and Kuhlitz *et al.* (2010) address the question of whether international food aid responds effectively to the needs of recipients. Their empirical findings indicate that although some food aid programs have not been well-targeted toward the most vulnerable people, they do respond effectively to the violent conflicts and severe production shortfalls after sudden natural disasters such as hurricanes, tsunamis, and earthquakes. They also find strong evidence of donor coordination in food aid allocation, including the Consolidated Appeals Process (CAP) of the United Nations in co-financing, and the World Food Program and international non-profit organizations in channeling aid resources from multiple donors to the needy recipients.

## 2. Emerging Regional FTAs

Three emerging mega regional free trade negotiations, Trans-Pacific Partnership (TPP), Regional Comprehensive Economic Partnership (RCEP), and Transatlantic Trade and Investment Partnership (TTIP), are expected to change Taiwan's global competitiveness. In comparison to the conventional free trade negotiations, these mega negotiators are "working on a 21st century agreement, addressing issues such as new technologies, services, standards, trade facilitation, and capacity building in less developed countries" (Petri, 2010).

Although they differ in ambition, they try to "create a new template for the conduct of international trade and investment" (Petri, 2012). Together, such a comprehensive movement in "competitiveness liberalization" is creating the greatest challenge for our agricultural sector. Nevertheless, the agriculture and food industry as a whole remains important in Taiwan's domestic economies because of its interrelationships with other industries as well as its capacity to offer (Lin and Chang, 2004).

However, the agriculture sector of Taiwan is facing many challenges in both

domestic and global markets.

**a. Low level of food self-sufficiency**

Among the food supply, the net import of food amounted to 12,142,000 metric tons while domestic production was 10,930,000 tons. Taiwan's food self-sufficiency ratio is only 30.6% weighted by energy (72.5% weighted by prices) in 2007, which is almost the lowest among East Asia countries (Huang *et al*, 2000). In 2007 and 2008, the prices of imported foods and feed grains in Taiwan had risen sharply as those found in international markets. Given that food self-sufficiency ratios have constantly dropped, this has become a severe problem and solutions must be found.

**b. Aging population**

Population growth rate and age distribution are key important factors affecting the demand function of food and agricultural products. Population growth of Taiwan has been decreasing, particularly with the fertility rates kept dwindling ever since the 1980s. Such observation has made demographic policies top of the agenda for Taiwan's sustainable economic development. A medium variant of the official population projections—conducted by the Council of Economic Planning and Development (CEPD), which are regarded as key references for long-term planning of fiscal and social welfare policies—envisage a highly possible transition of Taiwan into an aged society by 2018 and super-aged by 2025 (CEPD 2012).

**c. Aging farmers**

The average age of the farmers is 58 years old in Taiwan's rice farming sector. Aged farmers tend to be less efficient, and more likely to depend on subsidies from the government. Moreover, as a commitment to being a WTO member, Taiwan opens a tariff-rate quota of 144,720 metric tons of brown rice for rice importation each year. In order to keep a balance between the supply and demand of rice, some 220,000 hectares of farmland in Taiwan is currently lying fallow. Therefore, full-time farm households decreased from 40% in 1955 to 21% in 2007. Agricultural employment decreased from 1,667,000 persons to 740,000 persons during the same period, and even decreased to 535,000 in 2008.

**d. The size of farming**

Moreover, the small scale of these farms was a major bottleneck to the enhancement of productivity in Taiwan's agriculture. The average farm size per farm household in Taiwan is 1.1 hectares compared to the farm sizes in Japan, EU and US of around 1.6, 20, and 190 hectares, respectively.

**e. Soaring prices of fertilizers and other inputs**

Prices of fertilizer and other inputs are inflamed by a high oil price, which may remain constantly high in the foreseeable future. The rising contract labor cost may be another potential problem if the aging farmer problem persists into the future.

f. **Natural disasters accelerated by climate change**

Natural disasters have contributed to the shortfall in production in recent years. Unstable production resulted from changes in production patterns and frequent floods and droughts.

g. **Rapid changes in world food economy**

Under the rapid increases in demand in Brazil, Russia, India and China (BRICs) for high quality foods, Taiwan tends to lose in buying competition. Soaring grain prices due to rapid increases in demand for bio-fuel is damaging dairy and livestock farmers.

In the face of high food prices, some governments introduced various distortionary trade and domestic policy measures to complement domestic social safety nets and investment actions. However, measures such as direct price controls, export restrictions, generalized subsidies or across-the-board wage increases can further distort markets, be ineffective in the medium- to long-term or be fiscally unsustainable. A particular concern is the imposition of price controls that may stabilize food price expectations in the short run, but act as a disincentive to food producers and retailers. Price controls can be difficult to enforce, and may actually lead to food shortages.

## CONCLUSION

Taiwan used to be one prominent example of the Asian miracles. However, past performance is no guarantee for future success. The rapid development brought dramatic structural changes and many side effects to our society such as environmental degradation and income inequality. New challenges facing policymakers arise and rapid development of supply chain, internet commerce, emergent markets (China, India, etc) has changed agricultural trade pattern and competitiveness of our domestic agriculture. So now, the question remains “Where to go and how to get there?”

First, we need to know where we are heading. Two possible directions worth considering, one is a realization of the APEC free trade block (FTAAP) using TPP as a pathway to FTAAP. The other is consolidation of TPP and RCEP which requires tremendous efforts in harmonization among the two given that they differ substantially in ambition.

Trade opening can lead to more effective resource conservation, improve global welfare and reduce inequality, poverty, malnutrition and hunger (Anderson, 2010). Regions with a comparative advantage in growing food can produce it relatively more cost effectively and exchange it for other goods with other regions, whose comparative advantage may lie elsewhere. Overall, unrestricted trade flows are potentially important adjustment mechanism; restrictions on global trade could

jeopardize prospects for regional food security.

Furthermore, as emphasized by Nelson *et al.* (2010), restrictions on trade worsen the effects of adverse shocks such as climate change impacts by hindering the ability of producers and consumers to adjust and adapt. The exposure of agriculture sector to international free trade means that any climate-change-related shocks in international markets for farm products will be easily transmitted to the region through trade channels and create short-term crisis for the low-income households and social unrest (Zhai and Zhuang 2009).

In a similar manner, export restrictions can increase price volatility, reduce food availability in international markets and dissuade farmers from productivity-enhancing investments. During the food price crisis of 2007–2008 more than 40 countries imposed export controls on food commodities. The interest of individual countries to take potentially damaging policy actions can be mitigated by stronger multilateral trade regimes. Better-integrated domestic and regional markets offer opportunities for more diverse and increased agricultural production. In food crises, regional integration increases the potential for local sourcing of food to respond to communities in need.

If these mega regional free trade agreements provide a balancing mechanism for international agricultural markets, then our vision for agriculture should be “Harmonious and Creative”. Taiwan must adjust to the changing economic landscape by building a harmonious and competitive agriculture of the 21<sup>th</sup> century. Some suggestions are as follows:

### 1. Fostering Agribusiness Service Industry

We need new policies to release farmland into the hands of young and professional farmers who are not afraid of embracing free trade policies. New comers, including private investors and companies, should be allowed to buy farmland for the purpose of turning farming into a more profitable and competitive business. The subsidies for individual farming households are regarded as being counterproductive, since they support small farms and discourage farm consolidation.

Facing globalization and the food crisis, we should follow the lead of European nations that have introduced large-scale farming while maintaining the population in the agriculture sector by having more people work in food-related industries. Firstly, we need to turn small landlords into large tenants to effectively use idle lands. Secondly, we need to foster professional farmers and agribusiness industry. The capacity of smallholder farmers to grow more food is constrained because many of them cannot afford improved seeds or inputs such as fertilizer and veterinary services. Their production systems are likely to be affected by climate variability and change

because they have little margins for adapting soil and water management practices and often lack the necessary information about how to do.

Despite the movement by many consumers and governments to “buy local”, the food supply chain has become more globalized around the world. Developing food processing industry can create job opportunities for farmers as well as facilitate local economies. Because the local produce can be used for food processing, the economy can benefit from value-added products. But even if imported ingredients are used, the industry can provide jobs and income to sustain the local economy. Furthermore, new research suggests that the container industry plays a crucial role in international supply chains. It has been more of a driver of globalization than all trade agreements over the past 50 years taken together. Thus, rather than building an entire domestic supply chain, importing cheaper and safer ingredients and developing a modernized food processing industry would have positive effect on Taiwan’s GDP.

In addition, including processed foods in one’s trade calculations is a reliable and less expensive way of ensuring food security. If we import primary agricultural products and process them into food preparations for export, then we would actually import more of those products than is needed for domestic consumption. Therefore, a drop in imports will not jeopardize our food security, provided that the decrease is within a predetermined margin. However, for the development of food processing industry, liberalization of agricultural imports is a prerequisite which can be achieved by joining the TPP and lowering tariffs.

## **2. Launching Agricultural Policy Reform**

### **a. Retirement system and lease payment scheme**

A program to encourage small landlords into large tenants can ease land transfers, boost the utilization of farmland and encourage the long-term leasing of farmland by old farmers not keen on farming. This program should be coupled with a retirement pension system for old farmers and an easy lease payment scheme for both landlords and tenant-farmers. It should also provide long-term low-interest loans to facilitate agribusiness development by tenant-farmers. The program will enable tenant-farmers to lower production costs, enlarge their farming scale, and boost production efficiency and competitiveness.

### **b. Institutional governance:**

Good governance for food security is fundamentally about national governments prioritizing policies and funding to address food insecurity in the most vulnerable populations. The reform should take into account the rapid demographical transition in our society, e.g., ageing, urbanization, low fertility, single-parent family, etc. Humanitarian or development assistance should be effectively targeted at the most vulnerable people when they are affected by substantial external shocks. This calls for

new strategies and programs that give due priority to meeting both long-term demands and short term emergency requests for food and nutrition security.

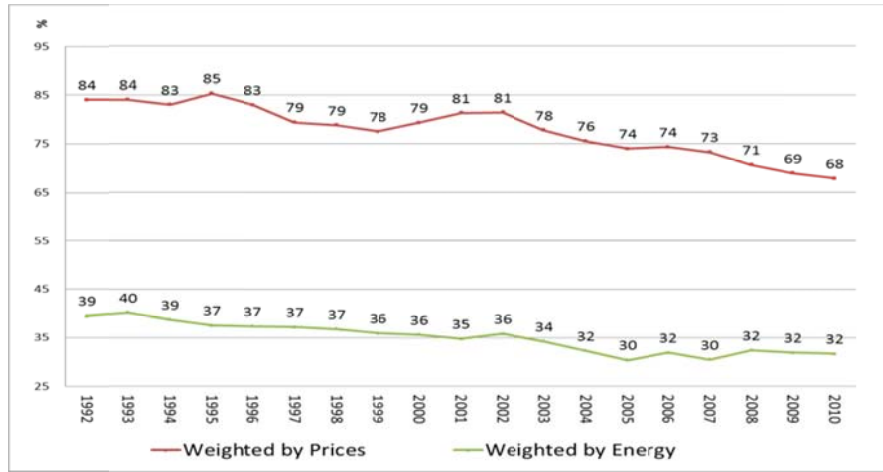
Successful pursuit of these objectives requires across-government support and long-term coordinated actions. Interventions have to be properly financed and benefit from adequate capacities both to implement them and monitor their impact. The value of strengthening food security governance has now been recognized and is receiving attention at global, regional and country levels (UN 2010).

**c. Linking ICT innovations with agribusiness and agricultural productivity**

A key to develop food and agriculture sector would be a set of supply chain innovations on linking farmers to modern markets. These innovations bring business opportunities, but also a wide range of risks, rules, regulations. Taiwan has an advantage in applying ICT innovations into agribusiness and in helping farmers boost their international competitiveness. That is, development of information technologies on traceability, accountability, and risk management will be able to help agribusiness and food processing become globally competitive. In turn, this will bring beneficial ripple effect to the farmers for ensuring their market and to the consumers for ensuring quality and safety.

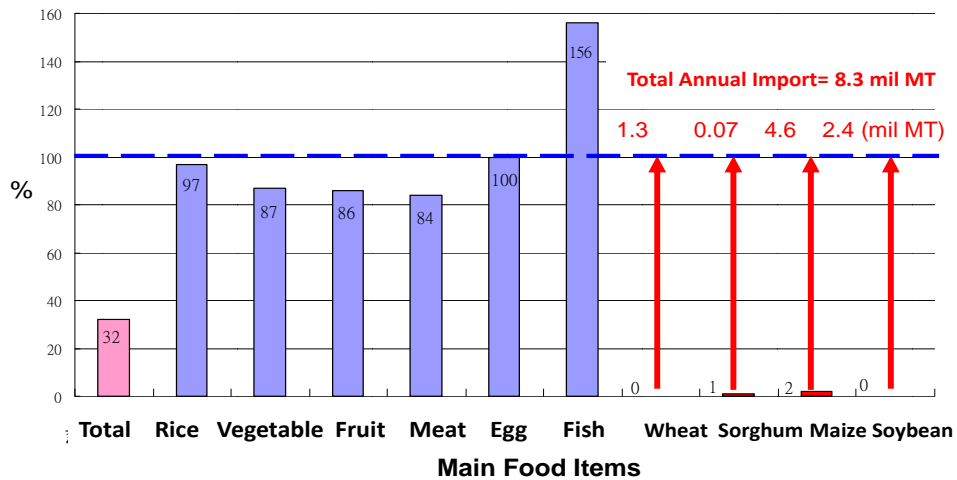
**d. Foreign investment and international cooperation in emergency response**

For the sake of long-term consideration, the establishment of an inter-ministerial coordination platform for overseas agricultural investment and cooperation were proposed. These measures have been adopted by many other food net importing countries like Japan and Korea. The COA also simulated the emergency situation in which Taiwan cannot get food supply from international markets and formulated countermeasures. In 2011, a joint initiative of an APEC regional food emergency reserve mechanism (AFERM) was proposed at the APEC Ministerial Meeting in Kazan in 2012 to provide mutual support for emergency food shortage resulting from natural catastrophes so as to safeguard food security within the APEC region.



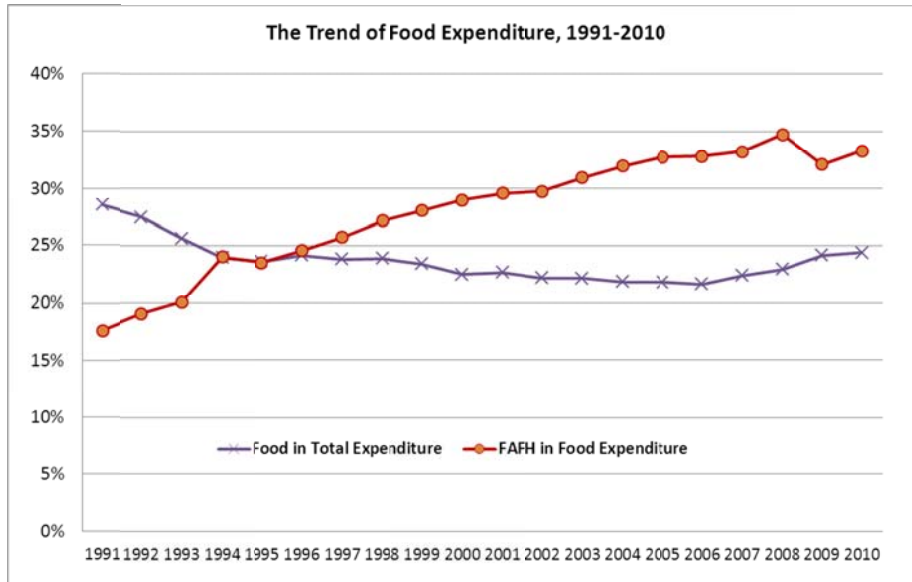
**Figure 1. Changes of Food Self-sufficiency Ratios, 1992~2010**  
 Source: Council of Agriculture, Food Supply and Utilization, 2001- 2010.

**Self-Sufficiency by Items, 2009**



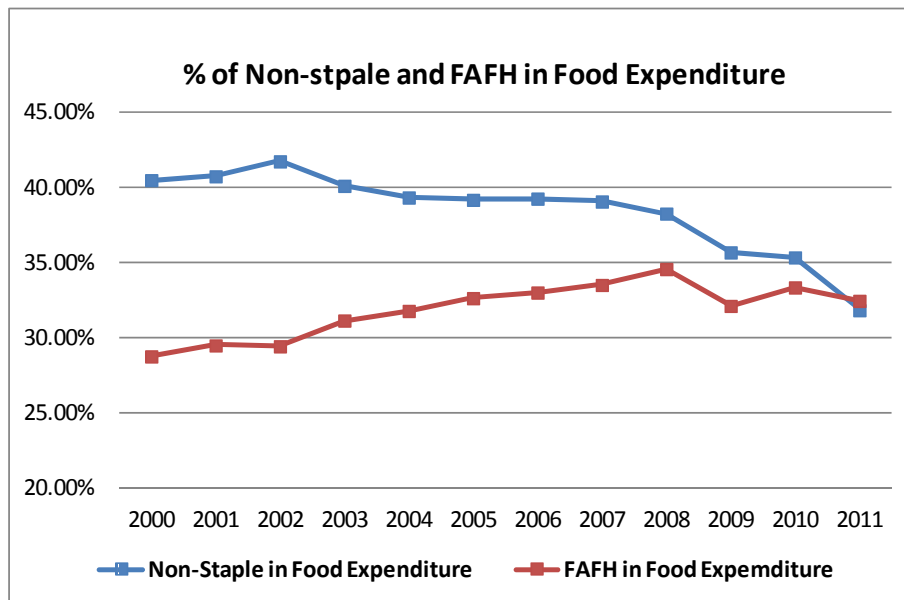
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**Figure 2. Self-Sufficiency Ratio by Items, 2009**  
 Source: Council of Agriculture, Food Supply and Utilization, 2009



**Figure 3. Percentage of Food and FAFH in Household Expenditures, 1991-2010**

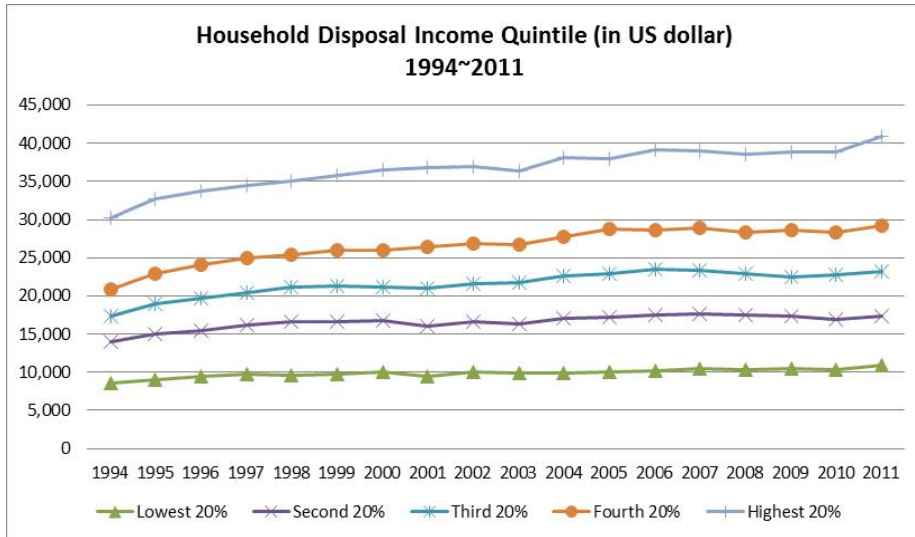
Source: Directorate-General of Budget, Accounting and Statistics, Report on the Survey of Family Income and Expenditure



**Figure 3a. Percentage of Non-staple and FAFH in Total Household Expenditure on Food, 1991-2011**

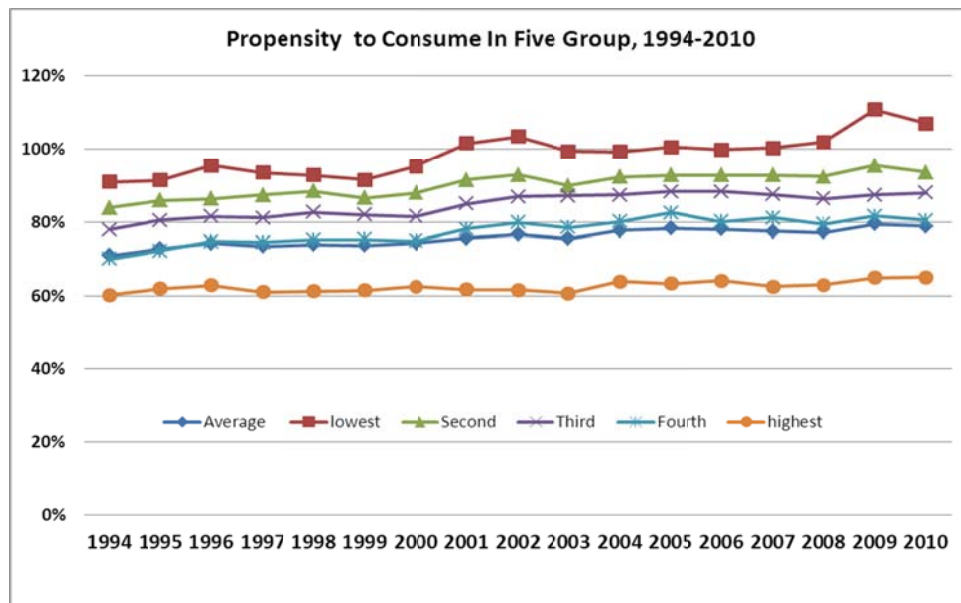
Source: Directorate-General of Budget, Accounting and Statistics, Report on the Survey of Family Income and Expenditure





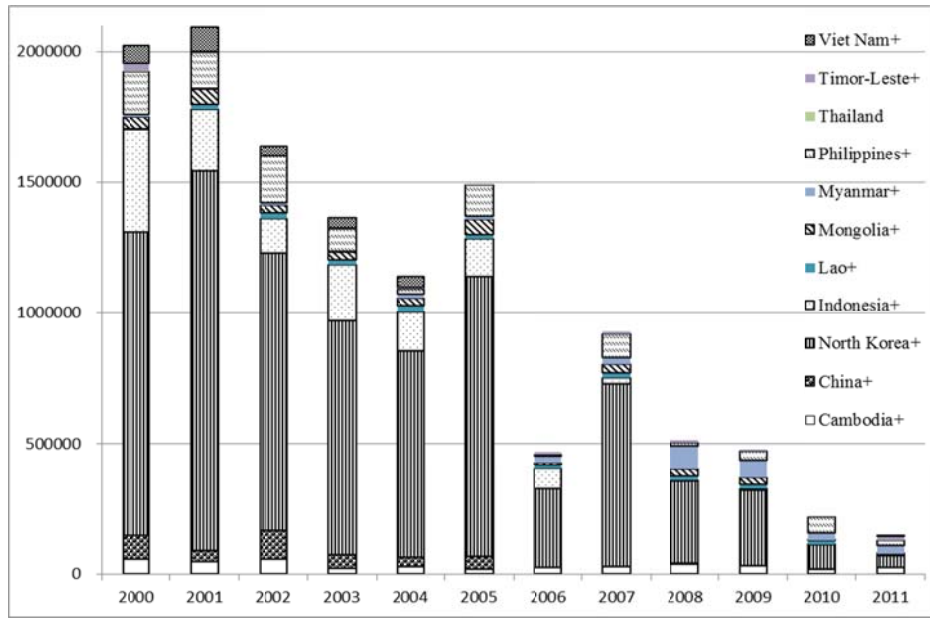
**Figure 4. Changes in Household Disposal Income Quintile, 1994-2011**

Source: Directorate-General of Budget, Accounting and Statistics, Report on the Survey of Family Income and Expenditure



**Figure 5. Changes in Propensity to Consume by Disposable Income Quintile, 1994-2010**

Source: Directorate-General of Budget, Accounting and Statistics, Report on the Survey of Family Income and Expenditure



**Figure 6. Food (cereals) Aid Deliveries to East Asia Regions (in metric tons)**

**Table 1. Rice Farm nominal Income Per Hectare before and after Joining the WTO, 1997-2010**

Unit: NT\$/HA

Before	1997	1998	1999	2000	2001	1997-2001 Average		
1 <sup>st</sup> crop	51,906	50,806	58,289	52,934	49,536	52,694		
2 <sup>nd</sup> crop	45,383	42,540	39,744	39,111	38,947	41,145		
Total	97,289	93,346	98,033	92,045	88,483	93,839		
After	2004	2005	2006	2007	2008	2009	2010	2004-2010 Average
1st crop	64,643	54,213	50,743	51,436	69,092	74,985	66,938	61,721
2nd crop	51,291	33,485	47,476	17,492	26,382	41,035	28,383	35,078
Total	115,934	87,698	98,219	68,928	95,474	116,020	95,321	96,799

Source: Council of Agriculture, Agricultural Yearbook, various issues.

Note: Net farm income is the total receipt minus the expenditure including the imputed own farm labor cost.

**Table 2. Share in Total Dietary Energy Consumption and Average Nutrients**

Region groups	Macronutrients	Per person/day* (g)	Percent (%)
<b>WORLD TOTAL</b>	<b>Carbohydrates</b>	<b>2700</b>	<b>64</b>
	<b>Proteins</b>	<b>74</b>	<b>11</b>
	<b>Fats</b>	<b>71</b>	<b>25</b>
Asia and the Pacific	Carbohydrates	2560	67
	Proteins	67	11
	Fats	56	23
<b>Northeast Asia</b>	<b>Carbohydrates</b>	<b>2830</b>	<b>61</b>
	<b>Proteins</b>	<b>81</b>	<b>12</b>
	<b>Fats</b>	<b>71</b>	<b>27</b>
<b>Southeast Asia</b>	<b>Carbohydrates</b>	<b>2410</b>	<b>72</b>
	<b>Proteins</b>	<b>56</b>	<b>10</b>
	<b>Fats</b>	<b>45</b>	<b>18</b>
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: FAO (2012d).

**Table 3. The Overall Global Food Security Scores and Rankings in East Asia, 2013**

	Overall Scores	Ranking in 105+1 world economies	Ranking of 17+1 East Asian economies
Japan	81.3	13	1
South Korea	77.7	21	2
Taiwan*	75.75	In-between 22 and 23	3
Malaysia	64.2	32	4
China	62.8	37	5
Thailand	58.1	43	6
Viet Nam	50.1	56	7
Philippines	47.1	63	8
Indonesia	46.5	64	9

Note:

1. The overall scores are the weighted averages of all category scores where 100=most favorable.
2. The index is not available for 4 APEC economies (Brunei, Hong Kong, Singapore, and Chinese Taipei).

Source: The Economist Intelligence Unit (2013)

\* Own calculation.

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