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ASEAN Food Reserve and Trade: Review and Prospect

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Abstract

Public food reserves come back into the policy agenda as a result of huge doubts on the reliability of international trade in the current new era of price instability. In addition to national food reserve, ASEAN countries are among the pioneer in establishing food reserve cooperation at the regional level. This study reviews ASEAN food reserve and trade in the cost and benefit framework. Although food reserve has contributed to the economic successes in the region, the operational cost for such policy is high. We show that regional cooperation through risk sharing can significantly reduce the fiscal costs of holding stocks. Moreover, ASEAN countries and their partners can consider to enlarge the cooperation by involving more countries.

Keywords: Price stabilization, Storage, Regional cooperation, ASEAN, APTERR

JEL codes: F13, F15, Q17, Q18

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1. Introduction

High uncertainty and volatility of food prices in the recent years have renewed the interests of many countries to consider food reserve as an important instrument in managing food price instability. These reserves come back into the policy agenda as a result of huge doubts on the reliability of international trade to guarantee the food supply. The 2008 crisis, in particular, highlights the low level of food stocks that makes countries vulnerable to excessive price volatility even with only low levels of supply or demand shocks (Wright, 2009).

Countries in Southeast Asia have been using storage-based price stabilization for decades (Rashid et. al., 2006). Grain price stabilization in the Philippines has started in 1960s, carried out by Rice and Corn Administration (RCA) and Rice and Corn Board (RICOB). In Indonesia, price stabilization was managed by *Badan Urusan Logistik* (BULOG), a national food reserve agency created in 1967. At the regional level, the cooperation on food reserves has started since late 1970s when the original members of the Association of Southeast Asian Nations (ASEAN) established the Agreement on Food Security Reserve (AFSR). The ASEAN Emergency Rice Reserve (AERR) was created in 1979 with the Initial earmarks of 50,000 tons of rice to serve as the subset of national stocks in addressing food emergencies in the region. However, due to small size of the stocks and complex release mechanism, the AERR has never really put into practice during the entire period when it was in force for more than a quarter of a century (Dano, 2006).

The recent food price crisis affecting almost all countries in the world led to a new phase of regional reserve cooperation in Southeast Asia. The ten members of ASEAN countries partnering with China, Japan and Korea agreed on ASEAN plus Three Emergency Rice Reserve (APTERR) which entered into force since July 2012. APTERR is a permanent reserve scheme replacing a pilot project of East Asia Emergency Rice Reserve (EAERR) which was presented as a metamorphosis of AERR. The initial earmark of APTERR is 787,000 tons of rice, roughly twice the size of von Braun and Torero's (2009) proposal for a modest emergency reserve of 300,000 – 500,000 metric tons of grains for the whole world. However, APTERR has hardly been tested in practice. Since its entry into force, only 200 tons of rice was released in the end of

2012 for poverty alleviation and malnutrition eradication program in Indonesia and 800 tons of rice early 2014 for typhoon Haiyan victims in the Philippines. Several other small releases have been made during its pilot project from 2004 – 2010¹.

This study aims to review the storage-based price stabilization policy in Southeast Asia, both at the national and regional level, and to discuss its prospect in the current new era of price instability. The remainder of the article is organized as follows: Section two provides information on ASEAN market structure which will discuss food trade and the development of trade cooperation in the region. Section three and four describe food reserves at the national and regional level in ASEAN including a discussion on their cost and benefit. The discussion on the national level will take examples of several countries in ASEAN, while on the regional level the ASEAN+3² cooperation will be mainly discussed. Section five analyzes the WTO rules on public stockholding and the last section provides concluding remarks.

2. ASEAN Food Market Structure

The recent waves of the global food price crisis affect almost all countries in the world. ASEAN countries are among those that are hit by the price crisis. Since 2007, the increase of food prices in the region are relatively higher compared to price increases of other commodities (figure 1).

ASEAN countries accounted for 29 percent of total world's rice output in 2013, while maize production in this region accounted only for 4 percent of total world's output. Countries in this region are not traditional producers of wheat and other cereals. Supply for these commodities heavily comes from imports. Most of Southeast Asians eat rice as their main staple food. More than half of cereals' calorie intake of the people in this region comes from rice. In Thailand and Vietnam, it accounted even for more than two third of their cereals' calorie intake³.

¹ www.apterr.org accessed on 17 September 2014.

² Association of Southeast Asian Nations (ASEAN) members are: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam; Plus Three Countries (+3) are China, Japan, Rep. Korea.

³ Own calculation based on FAOSTAT. The shares are among cereals, in 2012.

[Figure 1 here]

ASEAN provides a mix of cases. It is home to some of the world's biggest producers, consumers, exporters and importers of rice at the same time. Thailand and Vietnam are among the biggest rice exporters whereas Indonesia, Malaysia and the Philippines are among the biggest rice importers in the world. However, Indonesia and the Philippines, with their self-sufficiency goals, view trade as the last source of supply, making them as on and off rice importers depending on their production level. Other countries such as Singapore and Brunei are considered as traditional purchasers of rice.

[Figure 2 here]

The international market of rice has been historically thin and unstable (Dawe and Timmer, 2012). Geographic concentration of rice production and its thinness in international trade with high transactions costs are among the factors contributing to its instability. Only about 5 percent of world's total production enters the international market which is mostly concentrated in Asia. Southeast Asia as a region is a net rice exporter (figure 3) but the bulk of the countries are rice importers (table 1).

[Figure 3 here]

[Table 1 here]

ASEAN countries' imports are mainly sourced from within the region. The countries in this region absorb roughly one third of total regional exports and send the excess rice supply to the rest of the world.

[Figure 4 here]

Rice tariff rate of ASEAN countries is relatively high on average compare to other commodities. In 2012, the tariff for rice was 15.94 percent on average among ASEAN countries, which was much higher than the total average tariff rates for all commodities (Table 2).

[Table 2 here]

Southeast Asian countries liberalize their market through regional and multilateral trade agreements. The cooperation through Association of Southeast Asian Nation (ASEAN) has started since 1967 and All ASEAN members are currently members of the World Trade Organization (WTO). Through the ASEAN Trade in Goods Agreement (ATIGA) that supersedes the Common Effective Preferential Tariff (CEPT) scheme which has been implemented since 1992, international trade within the region is almost without tariffs except for certain sensitive commodities. Moreover, in addition to bilateral cooperation of ASEAN members with many other countries, the members also build cooperation with neighboring countries while maintaining ASEAN centrality (figure 5). There are AK-FTA (Agreement with Rep. Korea), AC-FTA (Agreement with China), AANZFTA (Agreement with Australia and New Zealand) and AI-FTA (Agreement with India). Although the agreement of ASEAN and Japan has not yet entered into force, many ASEAN members have already established bilateral agreement with Japan. Furthermore, greater cooperation through Regional Comprehensive Economic Partnership (RCEP) which will combine ASEAN cooperation with their six partners is currently under negotiation⁴. ASEAN itself is entering a new phase of a stronger cooperation through ASEAN Economic Community (AEC) in 2015.

[Figure 5 here]

However, despite that ASEAN (and plus countries) trade agreements have significantly reduced their tariffs on many commodities, cereals tariffs are still in place at a considerable number (table 3). Cereal product especially rice is considered as highly sensitive commodity in ASEAN, thus the countries still put exceptions of tariff reduction for the commodity.

[Table 3 here]

⁴ RCEP participating countries are ASEAN countries (Brunei, Burma, Cambodia, Indonesia, Laos, Malaysia, Singapore, Thailand, Philippines, Vietnam) plus their six partners (Australia, China, India, Japan, New Zealand and South Korea), launched in November 2012.

3. National Food Reserves in Southeast Asia

The fact that the international rice market has been historically thin and unstable, forced countries in this region to prevent the transmission of world prices' fluctuations to domestic markets (Dawe and Timmer, 2012; Rashid et. al, 2006). Storage-based public intervention policies to control food availability in the market have been part of their development agenda for many years.

Food price stabilization in the Philippines is managed by National Food Authority (NFA), a regulator as well as a corporation engaged in grain trading. The history of NFA started in the 1960s when the Rice and Corn Board (RICOB) and the Rice and Corn Administration (RCA) were still active. In 1972, the National Grains Authority (NGA) replaced these two agencies to promote the integrated growth and development of the grain industry in the country. In 1981, NGA was transformed to NFA with two primary mandates: to ensure food security and to stabilize the supply and price of rice, highlighting the importance of rice in the society. The NFA aims to achieve its mandates through procurement and distribution, importation and buffers stocking activities. For the buffer stocking activities, the NFA is required to maintain rice stocks in its warehouses equivalent to 15 days of consumption for the entire country (Aquino, et al., 2013).

In Indonesia, price stabilization was managed by *Badan Urusan Logistik* (BULOG), a national food reserve agency created in 1967 with special objective to protect domestic markets from sharp fluctuations of prices on world markets. BULOG buys excess rice supplies from farmers' production that are not absorbed by the market during harvest seasons, keeps it in the warehouses throughout the country, and distributes it in low prices during planting seasons, drought or other similar condition that make sharp increase of rice prices in the market. A ceiling price policy is maintained to ensure the affordability of rice prices for low-income consumers especially in urban areas. As well as NFA in the Philippines, BULOG also monopolizes rice imports in Indonesia.

As rice importers, Indonesia and the Philippines mainly control rice imports. Other countries such as Vietnam which is an exporter country also use public reserve policies to control rice

exports. VINAFOOD in Vietnam is responsible to manage rice availability and prices in the market.

3.1. Benefits and Costs of National Reserves

Although it is difficult to separate the contributions of policies, we provide some review and discussion on the benefit and cost of national food reserve in qualitative approaches. Rashid et al. (2006) argue that the storage-based price stabilization policies benefit countries through price stability and better agricultural performance. Southeast Asian countries were among those that successfully managed their domestic food prices for years. Under “New Order”⁵, Indonesia was one of the success stories of food price stabilization, especially for rice. From 1969 to 1997, domestic rice prices were substantially less volatile compared to the “reform”⁶ period after 1998 when BULOG has less power to intervene the market⁷ (see figure 6). In Vietnam, agricultural policies since early phase of the unification of North and South Vietnam have transformed the country from major disappointment of agricultural production to one of the biggest rice exporters in the world.

[Figure 6 here]

Price stability benefits consumers and producers at the same time (Timmer, 1989). Poor consumers in Southeast Asia, like many others in developing countries, spend more than half of their income on food (von Braun and Tadesse, 2012). Excessive price volatility and spikes can cause food and nutrition insecurity for those consumers who cannot maintain consumption stability. Reducing food and nutrition intake, even if only for temporary, can have short and long term effects (Block et al., 2004). Price stabilization policy serves as a preventive program instead of a response program of emergency cases. This kind of policy can help consumers to better manage their expectations on food prices and thus better manage their food and nutritional

⁵ “New Order” refers to the government lead by President Soeharto, in power from 1967 to 1998

⁶ “Reform” refers to democratization era in Indonesia after the lost power of Soeharto regime in 1998.

⁷ Empirical test using standard deviations of log of prices in difference (SSD) shows 0.05 for the periods before 1998 and 0.1 for the periods after 1998

intake. For producers, price stability also helps them to maintain consumption stability, as most farmers in Southeast Asia are also categorized as poor citizen living in the rural area.

Furthermore, price stability serves farmers to better manage price expectations on food crops which can enhance efficiency in the farm sectors by better managing the planting system. Moreover, price stability contributes to social and political stability. Arezki and Brückner (2014) show that price movement can induce political instability by the incidence of political riots and civil conflicts. This social and political instability can in turn cause difficulties for the government to promote growth and development.

Food price stability is in fact associated with rapid economic growth during the early development phase in Southeast Asia (Dawe and Timmer, 2012, Cummings et al., 2006). The downside of stabilization policies are, however, fiscal costs of public reserves that are often high while the benefits may not be as expected. In the Philippines for instance, the government spending on NFA surpassed spending on agrarian reform, research and development, and extension services during the period of 2003 – 2008 (Aquino et al., 2013). In Indonesia, a financial audit report by Arthur Anderson covering the period of April 1993 to March 1998 suggested that total inefficiency of BULOG was about 400 million USD per year (Arifin, 2008). Likewise, the economic costs of distorting market and crowding out private storage and trade can also be very high.

Over decades, there have been several shifts of price stabilization policies in Southeast Asia. In the 1980s and 1990s, public reserves fell into disfavor particularly with changing interest of many countries to improve market efficiency. Fiscal difficulties caused by the Asian crisis in late 1990s triggered countries in the region to use less intervention in the market. Indonesia loosened its monopoly structure and created competition within the domestic market. BULOG lost its domestic power to monopolize sugar and rice trade because Indonesia was required to comply with the International Monetary Foundation (IMF) Letter of Intent to liberalize its market.

4. Regional Food Reserve Cooperation

Following the global food price crisis in 2008, ASEAN countries agreed on ASEAN Integrated Food Security (AIFS) framework aiming to address four major components in food security challenges which include food security arrangements and emergency short-term relief, sustainable food trade development, integrated food security information system and agricultural innovation. The AIFS framework provides the foundation for the establishment of APTERR, an ASEAN regional reserve cooperation together with their three partners⁸ which finally agreed in October 2011 and entered into force in July 2012.

The history of APTERR dates back to 1979 when the original members of ASEAN⁹ agreed on the ASEAN Emergency Rice Reserve (AERR). The objective was to build up physical rice reserves that serve the needs of member countries when the demand in any member country cannot be fulfilled from own production or through purchases in international market. The main reason for the cooperation was that ASEAN countries identify the food instability as the consequences of high vulnerability of the region's production of food as common threats. AERR was created with the initial earmarks of 50,000 tons to serve as the subset of national stocks. The releases from AERR were to be arranged by bilateral negotiation between a country in a state of emergency and a country offering its earmarked reserve. The system, however, was never used and the small size of rice earmarked was too undersized to cope with an actual emergency situation.

The efforts of building up stocks in the region continued. In 2001, ASEAN countries partnering with China, Japan and Korea initiated a consultation and cooperation process in establishing the emergency rice reserve at the regional level. A pilot project of the East Asia Emergency Rice Reserve (EAERR) was created at the end of 2003 with the political support of the ASEAN plus three countries. The purpose of the EAERR is twofold: maintaining food security in case of emergency and contributing toward price stability in the region (APTERR, 2014). The food price crisis in 2008 led ASEAN plus three governments to strengthen the financial and stockpiling

⁸ China, Japan and Rep. Korea

⁹ Five original members are: Indonesia, Malaysia, Philippines, Singapore and Thailand; current ASEAN members are also include Brunei, Cambodia, Laos and Vietnam.

abilities of the EAERR and move beyond the pilot phase of the system. APTERR was finally agreed as a permanent scheme in October 2011 and entered into force in July 2012.

The initial earmarked stock of APTERR is 787,000 tons of rice which come from the voluntary contributions of the member countries (table 4). The stocks remain owned and controlled by the respective earmarking governments for the purpose of meeting the emergency situation of any member countries. The respective governments are also responsible for the management cost of the earmarked stocks to ensure the stocks remain in good quality. Another type of APTERR stock is a stockpiled emergency rice reserve which could be in form of cash or rice but is owned collectively by APTERR member countries and managed by the APTERR secretariat under the supervision of the APTERR council¹⁰.

[Table 4 here]

APTERR is designed to mainly address emergency situation anywhere in the region. Emergency is defined as “*the state or condition having suffered extreme and unexpected natural or man-induced calamity, which is unable to cope with such state or condition through its national reserve and is unable to procure the need through normal trade*”¹¹. In principle, given the definition of emergency, extreme price volatility will not be a reason of rice releases of APTERR.

APTERR presents as a subset of national reserves. Rice release from APTERR is only possible when the national reserve is unable to cope with extreme shocks. The release of APTERR stock is based on the request of the member country encounters an emergency situation of rice shortage. The requesting country is also responsible for the transportation and operational cost during the implementation program.

APTERR heavily relies on the commitment and political will of every member countries without any sanction mechanism. Nevertheless, APTERR member countries appoint a Management Team to ensure rice releases take place in case of emergency.

¹⁰ APTERR council is composed of one representative from each APTERR member country.

¹¹ ASEAN Integrated Food Security Framework.

4.1. Benefit and Cost of Regional Reserves

There have been extensive debates on storage-based price stabilization policies (Galtier, 2013). While on one hand countries with public reserve policies can benefit through price stability and better agriculture performances which are associated with economic success, on the other hand, the policies are often criticized for their high fiscal and economic costs.

National public food reserves in Southeast Asia are largely managed as buffer stocks to address price instability. This kind of reserve is usually held with a large size of stocks and high rotation to keep a good quality of the stocks. The consequences of the system are high fiscal costs of storing food/grains as well as high potential of market distortions as a result of high degree of intervention. On the other hand, a public reserve that is held as emergency reserve usually holds low stocks but intends only to address humanitarian goals without price stabilization purposes.

In the competitive storage model, the central idea behind storing food today for tomorrow's consumption is based on the assumption that an equilibrium price can be reached when today's price (p_t) equals the expected price tomorrow (p_{t+1}) plus the costs of storage. Stockholding occurs as anticipation in making profit, which implies that the marginal gain of holding stocks should exceed the marginal cost. However, under this condition, the optimal stock level is not necessarily optimal in social perspective.

Using this assumption, public involvement in stockholding is needed to address economy wide consequences of demand or supply shocks. Difficulties arise when determining the optimal stock level (Gardner, 1979) as it depends on the criterion of desirability. For instance, public rice stocks maintained by the NFA in the Philippines are equivalent to 15 days of consumption for the entire country (Aquino, et al., 2013). This stock level is based on the assumption on the need of national stock level (public and private) to be equivalent with 90 days of consumption, which covers the lean season when usually no harvests from domestic production prevails.

Notwithstanding the difficulties to determine the optimal stock level, we provide an illustration on how regional cooperation can significantly reduce the required stocks¹². Following Kornher

¹² Further discussion on optimal stock level can be found in Kornher and Kalkuhl (2014)

and Kalkuhl (2014), we estimate the required stocks as the difference between largest historic supply shortfall and percentage of threshold:

$$S = \max \left[\left(1 - \frac{x}{100} \right) E(Q_t) - Q_t \right]$$

where x is the level of allowed supply shortfall. For instance, if we want to maintain 97 percent consumption stability, then the allowed supply shortfall is 3 percent. $E(Q_t)$ is the expected supply level at time t . Since supply for consumption increases following the population growth, we measure shortfall around a trend.

Supply shortfalls of countries individually are compared to supply shortfalls of the entire region using the coefficient of variation of supply which can be written as:

$$CV^2\left(\sum_1^n Q_i\right) = \sum_1^n s_i^2 CV(Q_i) + 2 \sum_1^n \sum_{i+1}^n s_i s_{i+1} + 1 r_{i,i+1} CV(Q_i) CV(Q_{i+1})$$

where $CV^2(\sum_1^n Q_i)$ is the coefficient of variation of regional supply and Q_i is supply for each country. s_i and $r_{i,i+1}$ are country shares and coefficient of correlation respectively. This condition assumes free flow of food among countries within the region. Production shortfall can be compensated by imports, which means that supply shortfall in one country can be compensated by supply surplus in other countries.

Considering that not all of ASEAN countries are rice producers, supply data (production + imports) is used instead of production only. Rice supply in Singapore for instance heavily comes from imports. Using the actual data of rice supply of ASEAN+3 countries from USDA PSD for the period of 1980 – 2014, we estimate the required stocks for two months consumption stability at 97 percent (allowed supply shortfall of 3%). Countries' stocks are determined from the regional stocks using their consumption shares. The results of the estimations are presented in table 5.

[Table 5 here]

Simulations show that regional cooperation can significantly reduce the required stock by roughly 44 percent from 1,403,717 tons of rice without cooperation to 787,535 tons of rice with cooperation. This implies that fiscal costs associated with holding stocks can be reduced by cooperation through risks sharing. The simulations also show that all countries can reduce the required contributions of stocks through risk sharing in the region.

In APTERR system, the stocks remain owned and controlled by the respective earmarking governments for the purpose of meeting the emergency situation of any APTERR member countries. The consequences, however, there will be transportation cost occurring to transfer rice from donor country to country in need. This transportation cost should also be taken into consideration when calculating cost reduction as a result of cooperation. Since transportation cost will occur only when there is shortfall in any country within the region, we calculate transportation cost from the expected trade volume¹³ in times of shortfall and estimated to be equal with the required stocks for two months consumption. The results are available in table 6.

[Table 6 here]

The total cost that can be reduced by food reserve cooperation is estimated to be about 14.3 to 19.9 million USD to store the food for two months consumption. The saving cost is roughly 40 percent of the estimated cost without cooperation.

The current APTERR stock is roughly equal to the total stocks needed by the region to maintain consumption stability at 97 percent for two months consumption. However, the voluntary contribution of each member countries of APTERR is not the same with the required stock for each country with cooperation through risks sharing. For instance, Japan and Korea contribute more than what they need but Cambodia and Lao PDR contribute less than the required stocks. Richer countries of APTERR are more likely to provide food assistance to their poorer neighboring countries. This can be seen also from the voluntary contributions of APTERR member countries where each of the “plus three” countries contribute more than the total of all ASEAN countries’ contribution. There is a strong indication that the large contribution of the “plus three” countries has brought APTERR into practice. Its predecessor, AERR, which

¹³ The expected trade volume in times of shortfall is based on the mean value of the historical regional shortfalls

consists only ASEAN members with small size of stock, has never released its stock during the entire period it was in force.

We also attempt to simulate the required stock for ensuring consumption stability of 97 percent in different cooperation regimes to analyze whether countries can benefit from larger cooperation (table 7). From ASEAN, ASEAN+3 and ASEAN+3 plus India, we found that the benefit from cooperation is decreasing by more countries joining the cooperation. This is possible because correlation of shortfall risks increases when the member countries also increase. However, although the benefit from cooperation is decreasing, the required stock is still significantly reduced. For instance, if India is also joining the ASEAN+3 cooperation, the required stock is reduced by 31 percent. Moreover, larger cooperation means larger coordination between countries which can potentially prevent collective action failures.

[Table 7 here]

5. WTO rules on public reserve

The central issue in a WTO compatible framework for developing countries including in Southeast Asia is whether these countries are able to stockpile their staple food i.e. rice to ensure stable incomes for their farmers while at the same time to ensure their low income citizens accessing the basic food at affordable price. This issue however affects, or has potential effects on other countries. The potential spillovers of public reserves are high in different member countries due to different conditions of countries in ensuring food security for the citizens. The increasing demand of food for stockholding purposes increases prices and potentially reduces supply for immediate consumption in other countries. When food stocks are finally released for consumption, international trade can be distorted, affecting market competition.

The present WTO rules allow member countries to maintain or introduce domestic support measures without any limit or reduction commitments. To qualify for this, domestic support to food reserves must meet “the fundamental requirement that they have no, or at most minimal,

trade distorting effect or effects on production”¹⁴. Countries however may argue to define the minimal trade distorting effects on this matter.

A public reserve is not only economically complex but also politically encumbered. The Bali Package, which is mentioned as the first ever agreement reached in the history of the WTO, still places exception on public stockholding. In the 9th ministerial meeting held in Bali Indonesia at the end of 2001, the WTO member countries adopted an interim solution and agreed to negotiate a permanent solution that specifically addresses public reserve by the 11th ministerial conference in 2005. Furthermore, in the Post-Bali work, countries also agreed to continue the interim solution when the permanent solution cannot be agreed by 2017. Yet, this means that no agreement has been reached for public reserve. Nevertheless, the agreed interim solution that should prevent countries to challenge through dispute settlement mechanism until the permanent solution is found, can be a starting point for a new institutional arrangement to prevent collective action failures of uncoordinated national public reserves that can further destabilize prices at the international level.

6. Conclusion and Policy Implication

Public food reserve policies have been used by many countries for decades. Although in the 1980s and 1990s public reserves fell into disfavor particularly with changing interest of many countries to improve market efficiency, the policy has always been part of the development agenda in many countries. Storage-based stabilization policy through public food reserve receives much more attention today in the era of increasing food price volatility. Food security concerns in the recent years have led many countries to reconsider public food reserve as the main policy to deal with such uncertainty and price instability.

ASEAN countries provide an interesting case with their long experience in storage-price based stabilization policies. Albeit difficulties to measure the impact of different policies, price stabilization in fact has been an integral part of their development agenda for decades and contributes to price stability which is associated with economic successes in this region.

¹⁴ WTO Agreement on Agriculture

ASEAN also shows that cooperation at the regional level is possible. APTERR presents as regional effort to face common challenges in ensuring food security.

One of the main concerns of public reserve is that the fiscal cost needed to store the food is relatively high. The cost, however, can be reduced with cooperation. Simulations show that regional cooperation significantly reduces the required stocks which will definitely reduce the costs of holding them. When transportation cost is also added due to the decentralized storage in the different countries, the total cost for food reserve with cooperation is still lower than food reserve without cooperation. This definitely will be beneficial for all participating countries. Admittedly, determining optimal stock level is difficult. It always depends on the criterion of desirability. The current earmarked stock of APTERR is designed mainly to address emergency situation rather than for price stability purposes. However, its effect may calm the market and thereby prevent the rapid increase of food prices.

ASEAN and their partner countries can also consider expanding the cooperation that may include other neighboring countries. Simulation with India as the “fourth” country shows that the cooperation still significantly reduces the required stocks that will be beneficial for all member countries involved. India is emphasized in the simulation for its important role in the region. The fact that the country is home to around 200 million undernourished people¹⁵, has brought serious concerns to the policy makers in the country. With the world’s largest food programs covering public procurement, storage and distribution of wheat and rice, India has been successfully stabilized its food prices for many years. However, the policies run at the very high fiscal cost. In 2013, the cost is estimated around 1.2 percent of GDP (Kozicka, et. al., 2015).

Yet, India is not part of ASEAN plus three countries food reserve cooperation. However, ASEAN and India has already an FTA which entered into force since January 2010. The countries involved can also consider bringing food reserve as part of their cooperation which will likely bring benefits to all participant countries. In addition to reduce the fiscal costs, larger cooperation and coordination also means that collective actions failures are diminished.

Withdraw from ASEAN case, public food reserve is an ancient idea that meets its relevance today. The way forward is to build institutional arrangements that accommodate coordination

¹⁵ Estimated from 17 percent of population as stated in the Global Hunger Index, IFPRI et. al., 2014.

and cooperation among countries, including through the multilateral trading system of the WTO. Each of ASEAN trade agreements with six countries¹⁶ which might go further under Regional Comprehensive Economic Partnership (RCEP) framework that combines all ASEAN “plus” agreements can be a starting point for a stronger and larger cooperation including in public reserves.

¹⁶ The six countries are Australia, China, India, Japan, Korea and New Zealand.

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Table 1. ASEAN rice trade balance 2011 (million USD)

Country	Import	Export	Net Import
Brunei	39.6	2.0	37.6
Myanmar	1.6	98.5	-96.9
Indonesia	1513.2	0.8	1512.3
Cambodia	4.9	107.9	-103.1
Lao PDR	9.8	NA	NA
Malaysia	606.1	0.4	605.7
Philippines	383.2	1.7	381.5
Singapore	284.3	52.6	231.6
Thailand	8.9	6507.5	-6498.6
Vietnam	1.3	3656.8	-3655.5

Source: FAOSTAT

Table 2. Average tariff rates of ASEAN countries' in 2012 (%)

Sector	Tariff rates
All commodities	5.42
Food commodities	7.01
Rice	15.94

Note: Average tariff rates not weighted, classification based on standard product in SITC

Source: TRAINS database accessed via WITS

Table 3. Tariff of selected agricultural product of different trade agreement regimes 2012 (%)

Commodity	MFN applied	ATIGA	AK FTA	AC FTA	AANZ FTA	AI FTA
Animals & product	4.6	0.0	0.1	0.0	0.8	2.2
Dairy products	5.4	0.0	0.0	0.0	0.8	2.2
Fruit, vegetables & plants	5.3	0.0	0.1	0.0	1.2	3.8
Coffee & Tea	6.4	0.0	0.0	0.0	0.4	4.3
Cereals	11.8	7.1	7.3	7.3	7.7	10.1
Oil seeds, fats & oils	4.3	0.0	0.0	0.0	0.1	2.3
Sugar	12.8	8.1	8.1	8.1	8.1	10.4
Cotton	4.0	0.0	0.0	0.0	0.0	1.6
Other agriculture products	4.1	0.0	0.0	0.0	0.1	2.4

Source: WTO

Note: MFN-Most Favoured Nations, ATIGA – ASEAN Trade in Goods Agreement, AK FTA – ASEAN Korea FTA, AC FTA – ASEAN China FTA, AANZFTA – ASEAN Australia New Zealand FTA, AI FTA – ASEAN India FTA.

Table 4. Earmarked Stock of APTERR

Country	Earmarked stocks (tons)
ASEAN Countries	
Brunei Darussalam	3,000
Cambodia	3,000
Indonesia	12,000
Lao PDR	3,000
Malaysia	6,000
Myanmar	14,000
Philippines	12,000
Singapore	5,000
Thailand	15,000
Vietnam	14,000
Plus Three Countries	
China	300,000
Japan	250,000
Korea	150,000
TOTAL	787,000

Source: APTERR

Table 5. Stocks required for allowed supply shortfall of 3% (tons)

	w/o cooperation		with cooperation		Actual APTERR stock	
	required stock	stock-to-use ratio	required stock	Stock-to-use ratio	earmarked stock	stock-to-use ratio
ASEAN						
Brunei	1227	23.22	688	13.02	3000	56.76
Cambodia	47768	12.95	26799	7.27	3000	0.81
Indonesia	57413	1.05	32210	0.59	12000	0.22
Lao PDR	18912	10.73	10610	6.02	3000	1.7
Malaysia	17947	5.59	10069	3.14	6000	1.87
Myanmar	34552	2.37	19385	1.33	14000	0.96
Philippines	78355	5.41	43960	3.04	12000	0.83
Singapore	10420	23.28	5846	13.06	5000	11.17
Thailand	130132	8.60	73008	4.82	15000	0.99
Vietnam	136657	5.42	76669	3.04	14000	0.55
Plus Three						
China	678268	3.2	380533	1.8	300000	1.42
Japan	132280	8.7	74214	4.88	250000	16.45
Korea	59788	6.93	33543	3.90	150000	17.40
Total	1403717	3.81	787535	2.14	787000	2.14

Source: Own elaboration based on USDA PSD

Note: required stocks w/o cooperation and with cooperation are calculated for two months consumption

Table 6. Storage and transportation cost (million USD)

	storage cost		transportation cost		total cost	
	low	high	low	high	low	high
w/o cooperation	35	49	-	-	35	49
with cooperation	20	28	0.7	1.1	20.7	29.1
cost savings					14.3	19.9

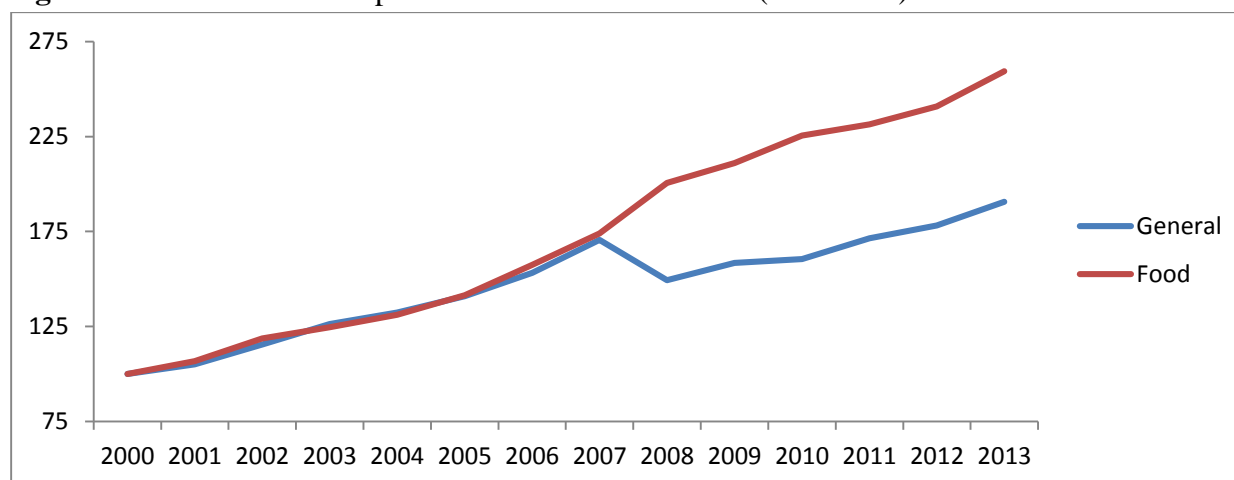
Note: Storage cost is estimated in the range of USD 25 (low) to USD 35 (high) per ton. Transportation cost within ASEAN+3 countries is estimated in the range of USD 10 (low) to 15 (high) per ton.

Source: own elaboration

Table 7. Stocks required for allowed supply shortfall of 3% in different (tons)

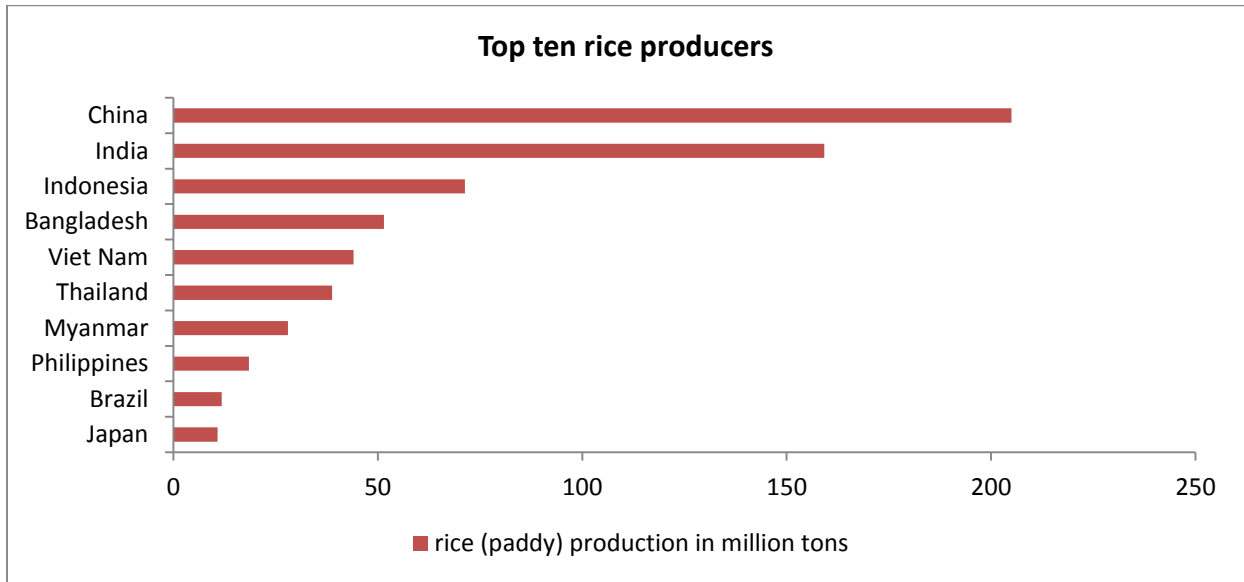
Regional cooperation (simulation)	Required stocks without cooperation	Required stocks with cooperation	Reduced by
ASEAN	533382	178885	66%
ASEAN+3	1403717	787535	44%
ASEAN+3+India	2362418	1637777	31%

Source: Own elaboration based on USDA PSD

Figure 1. General and Food price index in Southeast Asia (2000=100)

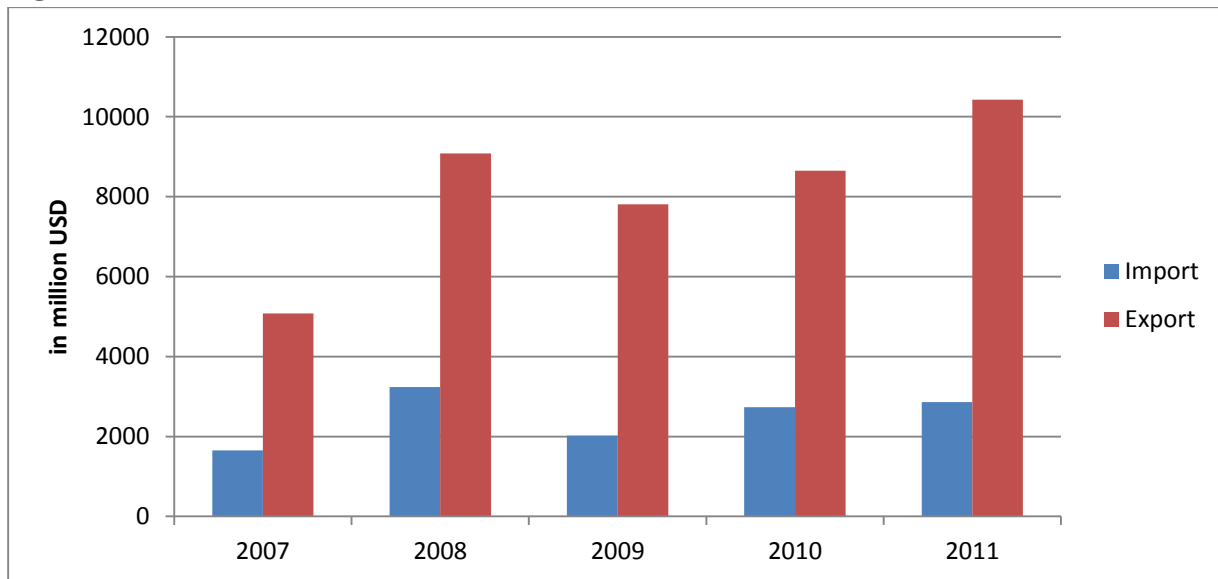
Source: FAOSTAT

Figure 2. World's rice production in 2013



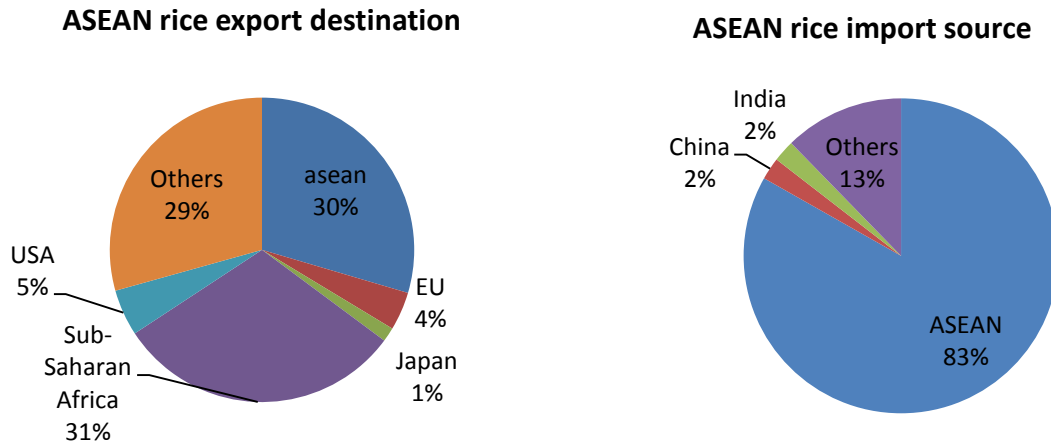
Source: FAOSTAT

Figure 3. ASEAN rice trade 2007 – 2011



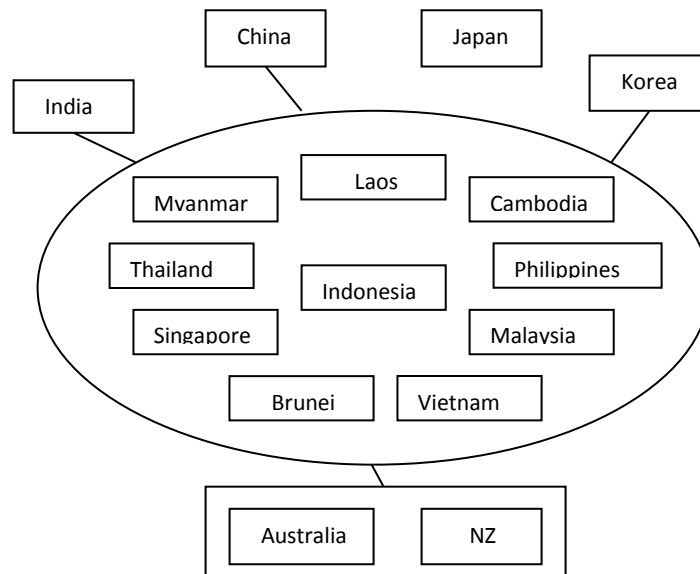
Source: FAOSTAT

Figure 4. ASEAN rice trade flow 2011



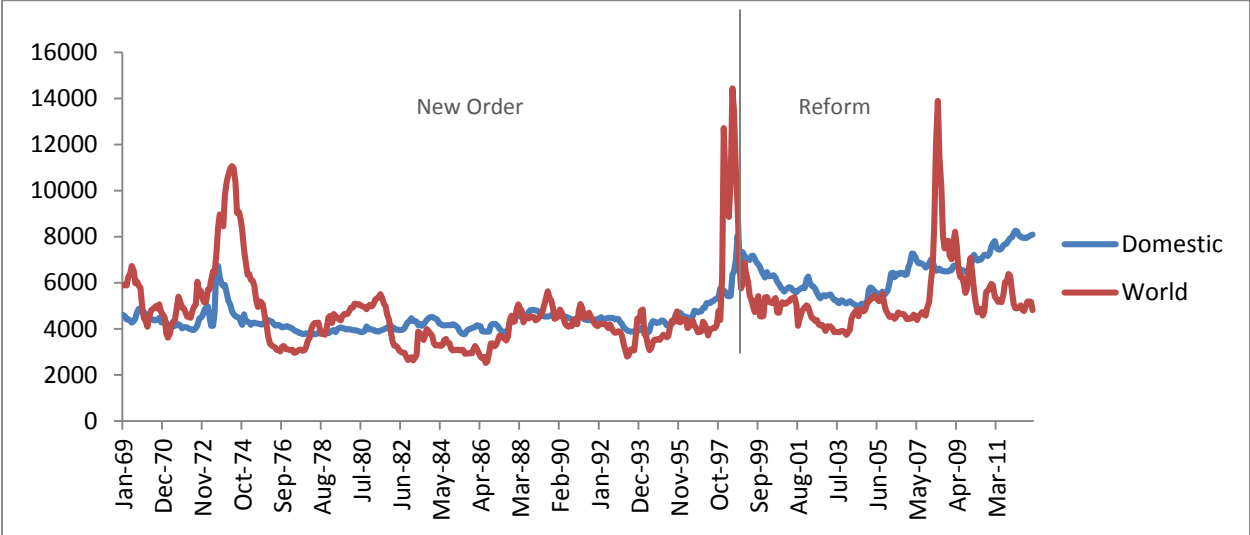
Source: UN COMTRADE

Figure 5. ASEAN Free Trade Agreement



Source: WTO

Figure 6. Rice prices in Indonesia during “New Order” and Reform”



Source: Dawe (2008) and GIEWS