



REVIEW OF STOCKHOLDING POLICIES

Annelies Deuss
Agricultural Policy Analyst
Agro-food Trade and Markets Division
Trade and Agriculture Directorate, OECD

This paper has been prepared as a background document for the
OECD Global Forum on Agriculture:
Issues in Agricultural Trade Policy
2 December 2014, Paris

TABLE OF CONTENTS

REVIEW OF STOCKHOLDING POLICIES	3
Executive Summary	3
1. Introduction	5
2. Scope of the study	6
Terminology	6
Stockholding policies and domestic policies	7
3. Performance of recent public stockholding policies that influence prices	8
Defining the variables of interest	8
Some initial considerations on the potential of stocks to achieve their primary purposes	9
Review of country case studies	10
4. Other impacts of recent public stockholding policies.....	18
Distributional impacts	19
Fiscal impacts.....	19
Crowding out of the private sector.....	20
International spillovers.....	20
5. Conclusions	20

Tables

Table 1. Performance variables for the different stockholding programs	8
Table 2. Grain trading enterprises in Africa that deal with buffer stocks	11
Table 3. Agencies in Asia that manage buffer stocks	13

Figures

Figure 1. Indonesian and Thai wholesale rice price, January 2000 - September 2011	14
Figure 2. Stocks of wheat and rice in India: actual stock levels vis-à-vis mandated norms (million tonnes)	16
Figure 3. China wheat price support and market price, 2004-14	17
Figure 4. China soybean price support and market price, 2004-14.....	18

REVIEW OF STOCKHOLDING POLICIES¹

Executive Summary

The 2007-08 food price hike led to a renewed interest in stockholding policies as a way to deal with price volatility and food shortages. Public stocks grew significantly since 2007 and many developing countries plan to continue expanding their public stocks in the future. The increasing prevalence of public stockholding programs calls for a better understanding of the programs that are currently in place. It is particularly of interest to examine those programs that influence prices, directly or indirectly, as they can have significant impacts on the domestic economy and can have spill-over effects on neighbouring countries and international markets.

This paper reviews recent country experiences with public stockholding programs that influence prices. It distinguishes between three types of public stocks: buffer stocks, social safety net stocks and emergency stocks. The study focuses on the first two types as these are the ones that influence prices. Buffer stock programs influence prices directly as they aim to stabilise prices and/or affect the level of producer and consumer prices. Social safety net stock schemes also affect prices since they distribute food at subsidised prices in order to assist the impoverished and chronically food insecure. Emergency stocks have no impact on prices since they are only released to respond to humanitarian emergencies.

The different types of stockholding programs are not easily distinguishable in practice. Often one agency is in charge of different types of stocks, which each can have multiple purposes. The purpose of a stock can also change over time. For example, a stock that was acquired to serve as a buffer stock can be released through a regular distribution program. Finally, there are no uniformly used definitions to differentiate between the different types of stocks. As a result, it is not straightforward to associate certain effects to one particular type of stock.

Currently, buffer stocks are mostly held in countries in Africa and Asia. They are often operated by agencies that also manage social safety net stocks. This paper reviews the current literature on the performance of stockholding programs in five African countries (Kenya, Zambia, Malawi, Ethiopia and Tanzania) and six Asian countries (the Philippines, Indonesia, India, China, Thailand and Malaysia). The performance of buffer stocks is evaluated by analysing whether they were able to achieve their objective(s) of reducing overall volatility, increasing producer prices and/or stabilising consumer prices. The effectiveness of social safety net stocks is analysed by examining food security indicators such as consumer prices and domestic price volatility.

It is unrealistic to try to separate stockholding policies from other domestic policies. Any government program that involves buying or releasing cereals leads to the creation of public stocks. Furthermore, stockholding policies are almost always coupled with other policy instruments such as administered prices, trade policy instruments, and import and export monopolies. It is therefore not possible to disentangle the effects of public stocks and other policy instruments.

The connection between stockholding programs and trade instruments becomes apparent when analysing price volatility in countries that hold buffer stocks. Countries that reported lower overall price volatility often also implemented drastic changes in their trade policies. The fact that buffer stocks appear to stabilise prices in countries that have isolated their economy is not surprising. Buffer

1. The views expressed in this paper are those of the author and do not necessarily reflect those of the OECD or OECD member country governments.

stocks can only function in countries that are able to insulate their own economy from the world market; otherwise the stabilisation effects of the buffer stock dissipate into the international market. Even though buffer stocks seem to justify the presence of trade barriers, openness to international trade usually offers more price stability because it pools production risk and because international markets generally exhibit lower price volatility than domestic markets.

Inefficient targeting and conflicting objectives prevent stockholding programs to achieve their objectives. Inefficient targeting can increase inequality when higher producer prices or subsidised cereals are not received by the intended beneficiaries. Stockholding programs that pair producer price support objectives with the objective of providing lower prices to consumers often achieve only one goal at the expense of the other. Schemes that raise prices for producers frequently lead to higher consumer prices, which is in conflict with the food security objective of the scheme.

Stockholding programs carry large direct and opportunity costs. The direct costs for public stocks include storage costs, transport costs, management costs, acquisition costs and the costs associated with distribution. These costs escalate as the program increases the size of its stock and/or tries to achieve multiple objectives. The spending on public stocks also creates opportunity costs, as less funding is available for other public programs which might be more efficient at reducing food price volatility.

Public stock programs can crowd out private sector involvement in stockholding and trading activities. When the purchase or release of grain for public stocks is unpredictable, it becomes riskier and costlier for private agents to invest in trade and storage. Furthermore, when stockholding programs procure large amounts of grain, less grain is available for the open market. As the private sector gets crowded out, the government faces an even bigger role in stabilising prices, which adds additional pressures on the budget.

Even though public stockholding policies are designed as domestic policies, they can create unwanted international spill-over effects. When large amounts of grains are acquired to build or replenish public stocks, this can lead to a decrease of supply in the world market and hence potentially increase world market prices. Conversely, releasing large amounts of grains from public stocks may depress world market prices. In addition, the import tariffs and export restrictions that are implemented to improve the working of buffer stocks can have detrimental effects on the economies of neighbouring countries.

Given the domestic and international impacts of public stockholding programs, it is important to keep track of stock acquisition and release. A close monitoring of stockholding policies is necessary to understand and anticipate their potential impacts.

1. Introduction

1. The 2007-08 food price crisis led to a loss of confidence in the ability of international markets to guarantee a stable food supply. As a result, countries began to reconsider public stockholding policies as a way to address price volatility and food shortages. One of the policy responses during the crisis was to release stocks at subsidised prices² while many countries were actually stock-building mid-crisis. This renewed interest in keeping public stocks was furthered by the realization that price spikes tend to coincide with low stock-to-use ratios (Wright, 2012). Even though international crop prices have mostly fallen back since 2011 and most export restrictive measures that partly caused the crisis are no longer in use, many developing countries keep building public stocks.

2. Past experiences with public stocks, however, show that the creation of domestic stocks is often very costly and can negatively affect other countries. This was for example the case with the intervention stocks that were created under the Common Agricultural Policy in the European Union (EU) during the 1980s-1990s. In an attempt to support farmers' incomes, boost agricultural production and stabilise markets, farmers received a fixed minimum price for their products. When the internal price fell below the intervention price, the intervention agencies in the member states bought up any surplus, thereby increasing demand and stabilising prices. However, starting in the 1980s, this policy led to overproduction and the creation of huge surpluses, which had to be stored or exported. Since the intervention price was set well above the world market price, export subsidies were given to compensate exporters for the gap between the internal price and world market price. These subsidised exports depressed international prices and hurt other exporting and importing countries which could not compete with the lower prices of EU products. By the 1990s, this policy had incurred huge costs for storage and export subsidies provoking a reconsideration of the policies and a long reform process that began in 1992. By the late 1990s, the intervention stocks had been drawn down.

3. Other countries besides the EU that created public stocks experienced similar problems. In fact, many developed countries that implemented farm income support policies, accumulated stocks as a by-product of these policies. Maintaining these stocks put a financial strain on a country's budget and guaranteeing that prices remained stable required some degree of isolation from the market, often in the form of import tariffs to protect domestic producers from international competition. In cases where surpluses were generated, such as in the EU and United States, export subsidies were granted, which depressed international prices. As a result, these price support programs with their accompanying stock creation started out as domestic measures, but eventually spilled over to international markets through the creation of trade barriers and their impact on world prices.

4. In current stockholding programs stock accumulation is often no longer an outcome but an explicit purpose of the policy. The effects, however, can be similar to those of price support programs as both programs share the same objectives of stabilising prices and influencing the levels of prices. In the cases where stocks are created to improve the food security situation of the country, price levels can also be affected because of the distribution of food at subsidised prices.

5. The increasing prevalence of public stockholding policies calls for a better understanding of the programs that are currently in place. It is important to analyse whether these programs are able to

2. Countries that released stock at subsidised prices include: Algeria, Bangladesh, Benin, Bolivia, Brazil, Cambodia, Cameroon, China, Costa Rica, Dominican Republic, Egypt, Eritrea, Ethiopia, Guatemala, Guyana, Honduras, India, Iraq, Jordan, Kenya, Lebanon, Malawi, Malaysia, Mauritania, Nepal, Nigeria, Pakistan, Philippines, Republic of Korea, Senegal, Sierra Leone, Thailand, Togo, Viet Nam, Yemen (Wiggins and Keats, 2009).

reach their objectives and examine their impact. It is particularly of interest to evaluate those stockholding programs that influence prices, directly or indirectly, as they can potentially also affect neighbouring countries.

6. The purpose of this paper is to review the literature on the recent performance of stockholding policies that influence prices. The paper is organised as follows. The first section provides definitions of the different types of stocks according to their primary purpose. This paper will focus on buffer stocks and social safety net stocks, as these are the two types of stocks that influence prices. The next section identifies which variables will be used to examine the performance of these two types of stocks and addresses some of the general issues that are known to influence their performance. Then, the effectiveness of buffer stocks and social safety net stocks is reviewed using recent country case experiences. The next section describes the distributional and fiscal impacts of these types of stocks, as well as their effect on the private sector and international spillovers. The final section concludes.

2. Scope of the study

Terminology

7. Governments can decide to accumulate or release stocks for a variety of reasons. Public stocks can be acquired or sold to provide price incentives to farmers, stabilise prices in domestic markets, mitigate the effects of sudden price rises, or offer stable prices to consumers. Governments can also decide to build or distribute stocks in order to set up or replenish a strategic stockpile aimed at securing an adequate supply of food, distribute food to vulnerable household and people suffering from chronic food insecurity, respond to urgent food needs arising from emergency situations, or reduce the impacts of a fall in production.

8. The objective of this paper is to analyse the performance of national public stockholding policies³ that influence prices. In order to identify these policies, it is useful to classify stockholding programs according to their primary purpose. This study distinguishes between the following three types of stocks⁴: buffer stocks, social safety net stocks and emergency stocks (see Box 1). The two types of stocks that will be evaluated in this paper are buffer stocks and social safety net stocks as these influence prices, either directly or indirectly. While buffer stocks have an explicit market price objective, social safety nets focus on the provision of cereals or food at subsidised prices. Emergency stocks will not be considered as they are only released to provide emergency relief and are not intended to influence domestic market prices.

3. The study focuses on national public stocks which are composed of physical commodities (grains or food). This study does not consider stocks that are held by private actors, that are held at regional or international level or that are virtual in nature.

4. This classification is based on the classifications used in World Bank (2012b).

Box 1. Types of public food stocks

Buffer stocks are used to stabilise commodity prices. Buffer stocks aim to protect producers from price drops and/or consumers from price hikes.

Social safety net stocks function as working stocks for regular food distribution programs. These stocks aim to provide social safety nets for the impoverished and the chronically food insecure.

Emergency stocks are kept to provide assistance during transitory food shortages and crises, which are caused by sudden supply shocks, such as natural disasters.

9. Even though the above classification suggests a clear distinction between the different types of stocks, it is not straightforward to unequivocally identify those policies in practice. First of all, most stockholding programs have multiple purposes and often one agency is tasked with completing several objectives. Second, the goals for holding public stocks can change over time. That is, a stock that was acquired with the purpose of stabilising domestic prices can be used for food distribution programs. Finally, there are no unanimously used definitions in the literature to classify the different types of public stocks. OECD (2010) and Tangermann (2011), for example distinguish between two types of stocks based on their purpose (emergency reserves and strategic stocks), whereas the World Bank (2012b) defines three types of stocks (buffer stocks, food safety net stocks and emergency stocks). Furthermore, some call stocks that aim to stabilise prices buffer stocks, while others refer to them as strategic reserves, stabilisation stocks, regulation or regulatory stocks, or intervention stocks⁵. In addition, some buffer stock schemes seek to influence the fundamental level of prices while others do not.

Stockholding policies and domestic policies

10. Not only is it complicated to distinguish between the different stockholding policies, it is also practically impossible to separate stockholding policies from other domestic policies. Any government program that involves buying or releasing cereals leads to the creation of public stocks. As a result, it is not easy to distinguish between policies where stock creation was the purpose of the policy and those where stock creation was the outcome of a policy. This is particularly relevant when comparing buffer stock programs with price support programs.

11. To clarify how buffer stocks and price support programs are linked, it is important to understand how buffer stocks are designed. The working principle of a buffer stock is that the government buys stock when the market price of the commodity falls below a certain level and releases stock when the market price is above a specific level. The government implements buffer stock schemes by setting a floor price and a ceiling price. The floor price indicates the trigger price at which the government will buy stock, while the ceiling price specifies when the government will start selling its stock. By setting a floor price and a ceiling price, the government creates a “price band”, i.e. a range between which it wants to keep prices.

12. Even though buffer stocks schemes are defined as policies that stabilise prices by keeping prices between a price band, in practise, buffer stocks are mostly used to raise producer prices. In these situations, the distinction between price support programs and buffer stock schemes becomes blurred,

5. See also AFD (2014) for an overview of the different definitions that are used in the literature to classify stocks.

as both programs support producers by offering them higher prices. In the case of buffer stocks, these prices are often referred to as “procurement prices” while they are called “support prices” in the case of price support programs.

3. Performance of recent public stockholding policies that influence prices

Defining the variables of interest

13. To analyse the performance of buffer stock schemes and social safety net stocks, it is necessary to identify appropriate outcome variables. These outcome variables indicate how successful stockholding policies are at achieving their primary purposes (see Table 1).

14. In the case of buffer stocks, the variable of interest differs according to the specific purpose (and design) of the buffer stock: whether the buffer stock aims to stabilise overall prices, or whether it aims to raise producer prices or lower consumer prices. In cases where buffer stock schemes only impose a floor price, the government intends to support producers by offering them a minimum price. The performance of these types of buffer stocks can be assessed by analysing farm incomes or producer prices. Buffer stocks with ceiling prices are designed to protect consumers from price hikes and their effectiveness can be evaluated by examining if consumer prices reached lower and more stable levels. The performance of buffer stocks with a price-band can be assessed by measuring whether they reduced domestic market price volatility and/or successfully raised producer prices and/or reduced consumer prices.

15. The performance of social safety net stocks can be analysed by evaluating food security indicators. FAO (2014) identifies a set of indicators that capture various aspects of food insecurity, such as percentage of the population that is undernourished and prevalence of malnutrition. Consumer price levels and price stability are also indicators of food security. Note that these latter two outcome variables are also used to analyse the performance of buffer stocks. This is not surprising as consumer interests are addressed by both types of stockholding programs. In the case of buffer stock programs, there is an explicit objective to stabilise market prices, while social safety net stocks focus on the provision of cereals or food at subsidised prices.

Table 1. Performance variables for the different stockholding programs

Type of stock	Performance variables
Buffer stock programs	Reduced price volatility Increased producer prices Decreased consumer prices
Social safety net stocks	Improvement in food security indicators Reduced price volatility Decreased consumer prices

16. Besides their performance, it is also important to analyse the distributional impacts of public stockholding policies, their influence on the fiscal situation of a country, as well as how they affect the private sector and neighbouring countries. Some of these impacts will be mentioned alongside the

performance variables in the country case reviews. A more detailed evaluation will be presented in the next section, “Other impacts of recent public stockholding policies”.

Some initial considerations on the potential of stocks to achieve their primary purposes

17. The potential of buffer stocks and social safety net stocks to achieve their purposes is complicated by a set of factors that are intrinsically linked to their design. Before describing in detail recent country experiences with these types of stocks, it is useful to first address these general obstacles. Some of these factors relate to public stocks in general, while others are specific to buffer stock schemes and social safety net stocks.

18. When a government sets up a public stockholding policy, it first has to decide what it wants to achieve by implementing this program. As mentioned in the terminology section, it is not uncommon for a stockholding scheme to have multiple purposes and for one agency to be in charge of several types of stocks. However, the successfulness of a stockholding program decreases and its costs increase as the program has more objectives. This problem is particularly acute when the objectives are contradictory in nature, e.g. when the program intends to improve food security by offering lower consumer price while at the same time supporting producer prices. The multiplicity of objectives is identified as one of the main causes of failures of stockholding policies, and buffer stocks in particular (Dorosh, 2009; World Bank, 2012b).

19. The government also has to make several decisions related to the design and overall working of the scheme. Each of these decisions is crucial as they all influence the overall performance and functionality of the program. With regards to the design, the government has to decide upon the physical amount of stock to keep and how to finance the program. In the case of buffer stocks, the government has to choose the levels of the floor and/or ceiling prices while for social safety net stocks it has to select the level of subsidised prices. Additionally, there are also some practical issues that have to be handled, such as setting up the rules and trigger mechanisms for replenishment and release, the composition of the stock, the location of warehouses and release stations, and the management of the stocks. Tangermann (2011), the World Bank (2012b) and OECD (2010) explain in detail the complexity of each of these design-related and practical decisions and provide some suggestions on how to tackle them.

Buffer stocks and price stabilisation

20. Buffer stocks can only stabilise prices up to a certain extent. That is, the nature of buffer stocks is such that the government is limited in the amount it can sell or buy. If a country is faced with a few consecutive years of low availability and high prices, then it will exhaust its buffer stock. Once the buffer stock is depleted, it loses its capability to lower prices. Conversely, if a country keeps on buying stock to raise producer prices or sets floor prices too high with respect to the market price, then the government will eventually run out of funds and be left with huge stockpiles. This was for example the case with the “rice pledging scheme” that was installed in Thailand (see also later in this chapter).

21. Buffer stocks struggle with a mismatch of objectives when they intend to increase prices for producers while also reducing prices for consumers. Not only is it very costly to achieve both objectives, it is also challenging to achieve them simultaneously. Programs that raise prices for producers, usually also raise them for consumers, and vice versa for schemes that aim to lower prices.

22. Even when buffer stocks succeed at stabilizing prices, the question remains whether buffer stocks were more cost-effective than other policy options. In that sense, buffer stocks create opportunity costs as less funds are available for other programs that could also have reduced price

volatility, maybe even at a lower cost and more effectively. These other policy options include programs that support private storage, trade, commodity markets, insurance mechanisms and safety net programs.

23. Finally, past experiences with buffer stock schemes demonstrate that they have not been an effective instrument to stabilise prices. The collapse of the International Commodity Agreements was partly linked to their failure to stabilise price movements using buffer stocks. Developed countries have also found that they lead to unsustainable levels of price support and/or huge stockpiles that were dumped or sold at a loss.

Social safety net stocks and food security

24. The design of social safety net stocks focuses on the release of the stock. However, the acquisition of the stock can have an impact on food security. If the stock is acquired at above market prices and raises producer prices, then this usually also raises the price for consumers, which is in conflict with the stated food security objectives to keep consumer prices reasonable or low. Even if the stock is acquired at market prices, it is still possible that market prices rise as a result of the stockholding policy if the government decides to acquire a large amount of stock and/or keeps the stock in storage for a relatively long period.

25. Similarly as with buffer stocks, there is a limit to the potential of social safety net stocks to improve food security. Once a stock is depleted, it loses its capability to provide cereals or food for distribution programs.

Review of country case studies

26. This section reviews country case studies of national public buffer stocks and social safety net stocks that were implemented in the last 15 years. The review focuses on those countries for which recent studies are available that evaluate the performance of these types of stocks using the outcome variables that were described above. Besides examining the performance of stocks, the review will also address potential distributional impacts of stockholding programs. A more detailed evaluation of the distributional impacts, fiscal impacts, impacts on the private sector and international spillovers will be presented in the next section.

27. As mentioned above, price support programs and buffer stock schemes can be easily confounded. Since it is not the purpose of the paper to cover price support programs, this review only considers those studies that clearly indicate that stock procurement or release was an explicit purpose of the policy.

28. Social safety net stocks often operate through various distribution channels, which each might have different working principles (e.g. distribution of food at subsidised prices versus food for work programmes) and targeting practises. It is beyond the scope of this paper to evaluate each of these distribution channels. Instead, the review will mainly focus on those stockholding programs that have a clear buffer stock component and then analyse any associated social safety net stocks.

29. At this point, a few remarks have to be made regarding the reviewed literature. First, none of the studies on buffer stocks control for any other factors that could have contributed to price volatility. In particular, the role of trade policies, actions of private traders, private stocks, the macroeconomic environment, and production levels in (de)stabilising prices are ignored in most of the studies and certainly are not accounted for in any empirical analysis. At best, a study will mention the confounding factors. This is not a criticism as it is indeed an extremely complex, if not impossible,

task to disentangle the impact of trade policies, macroeconomic factors and domestic policies on price volatility.

30. Second, most studies on buffer stocks examine producer price increases rather than consumer price decreases. This is not surprising as buffer stocks are by nature more adapt at preventing price drops (guaranteeing a floor price) than curtailing price spikes (maintaining a ceiling price). This relates back to the point mentioned above regarding the natural limit of stocks: once stocks are depleted, the buffer stock can no longer prevent price rises. Buffer stock intervention is therefore more effective at limiting price falls than curtailing the incidence and magnitude of price spikes (Wright, 2012). Also, in practice, it is rare to encounter buffer stock programs that operate using a price band; most buffer stock schemes only have a floor price.

31. Finally, buffer stocks are rarely used as a price stabilisation mechanism in Latin America and the Caribbean, South Africa, Europe and Central Asia. Accordingly, the review of buffer stock case studies will focus on experiences in African and Asian countries.

Experiences in Africa

32. Buffer stocks in eastern and southern Africa are generally run by grain trading enterprises (GTE). Often, these GTEs are also in charge of social safety net stocks. GTEs lost importance in the late 1980s and 1990s following economic reforms. However, they re-emerged in the early 2000s and are now again dominant players in African grain markets (Jayne, 2012).

33. Certain operational features of GTEs raise concerns about their potential to reach their objectives. First, these enterprises not only operate with the purpose of stabilising prices, but also have other objectives such as providing grains in cases of emergencies, distributing food aid, providing food assistance and managing international trade (FAO, 1997). As mentioned above, one of the main reasons why public stock systems often fail is because they aim to achieve too many objectives with one instrument. Second, GTEs generally do not follow established intervention rules for purchasing and releasing stocks and rarely commit to floor and ceiling prices (Poulton et al, 2006). This lack of transparency and predictability is detrimental to the well-functioning of the scheme as it diminishes the confidence of consumers and private traders in buffer stocks (Jayne 2012).

Table 2. Grain trading enterprises in Africa that deal with buffer stocks

Country	Name of grain trading enterprise
Kenya	National Cereals and Produce Board (NCPB)
Zambia	Food Reserve Agency (FRA)
Malawi	Agricultural Development and Marketing Corporation (ADMARC)
Ethiopia	Ethiopian Grain Trade Enterprise (EGTE)
Tanzania	National Food Reserve Agency (NFRA)

34. **Kenya's** National Cereals and Produce Board (NCPB) and **Zambia's** Food Reserve Agency (FRA) both aim to stabilise prices by procuring and selling cereals at administered prices. In

addition, they also hold stock for food security and famine relief. Case studies suggest that their stockholding programs were able to reduce aggregate price volatility over time. Jayne et al. (2008) estimate that Kenya's NCPB stabilised maize market prices between 1989 and 2004. Mason and Myers (2013) show that Zambia's FRA stabilised maize market prices between 1996 and 2008. However, maize price volatility in Kenya and Zambia between 2005 and 2011 was higher than in South Africa, which is the international reference price for Eastern and Southern Africa and does not have buffer stocks. In particular, the World Bank (2012b) estimates that price volatility⁶ between January 2005 and May 2011 reached 12% in Kenya and 14% in Zambia, while it was only 9% in South Africa.

35. The buffer stock policies in Kenya and Zambia are reported to have led to higher producer prices. In Kenya, average price levels increased around 20% between 1995 and 2004 (Jayne et al., 2008), while mean maize producer prices in Zambia rose by 17% between 1996 and 2008 (Mason and Myers, 2013). However, the food security impacts of the stocks are not unanimously positive. While consumers in Kenya benefited from relatively lower prices during times that market prices could have been high, consumer prices in Zambia rose even more than producer prices, namely 19% during 1996-2008. As a result, the price support policy of FRA negatively affected net buyers of maize in Zambia and is unlikely to have any positive welfare effects on poor households. Moreover, the benefits of higher prices in both programs tend to be captured by the more affluent and food secure farmers. In Kenya, surveys indicate that the price support policy of NCPB led to a transfer of income from poor rural households and urban consumers to large maize-selling farms.

36. **Malawi's** Agricultural Development and Marketing Corporation (ADMARC) is responsible for the marketing of all agricultural products and management of food security reserves, besides stabilising prices through buffer stocks. During the 2001-03 food crises and the 2007-08 price spikes, Malawi's buffer stock schemes were not effective at reducing maize price volatility. The main reasons for this were lack of clear guidelines, mismanagement and exclusion of the private sector (Jayne and Tschirley, 2009; Minot and Rashid, 2013).

37. Buffer stocks in **Ethiopia** are operated by the Ethiopian Grain Trade Enterprise (EGTE). EGTE was established in 1992 with mandates to stabilise producer and consumer prices, earn foreign exchange through exporting grains to the world market, and maintain a strategic food reserve for disaster response and emergency food security operations. EGTE proved unsuccessful at stabilising prices and withdrew from its price stabilisation activities by the early 2000s, except for two ad hoc interventions during 2003 when cereal prices collapsed and during the price spike of 2007-08. Rashid and Negassa (2011) examine cereal price variability during the past three decades and show that price volatility was lower during the 1990s, when EGTE operated its buffer stock, compared to the 2000s, when EGTE had withdrawn from cereal price stabilisation. The authors argue that the higher price volatility in the 2000s cannot be attributed to the absence of EGTE. The same authors indicate that the high price variability was caused by production shocks in 2002-03 and by unpredictable market behaviour during 2006-08, when domestic prices were higher than import parity prices.

38. Starting in 2007, EGTE's market intervention increased through subsidised sales of wheat. Dorosh and Ahmed (2009) demonstrate that government imports and sales in 2008-09 effectively lowered market wheat prices. However, the authors also note that market prices were still high relative to import parity prices and that similar results could have been obtained through trade if the government had not inhibited private sector imports. Furthermore, domestic grain prices remained high well into 2009, even though international grain prices had already dropped by that time (Minot

6. Price volatility in World Bank (2012b) is defined as the standard deviation of the logarithm of the first price differences.

and Rashid, 2013). Finally, AFD (2014) points out that as a result of the sale of government stock less wheat was available for emergency and food security interventions as these stocks are not separated from buffer stocks in Ethiopia.

39. **Tanzania's** Strategic Grain Reserve (SGR) was established in 1991 with the objectives to stabilise staple grain prices, advise the government on food security policy, and supply food for emergency assistance. Since the volumes of purchases and sales accounted for only 4% of market surplus, the SGR did not have any significant impact on grain prices (Minot, 2010). Following the 2007-08 food price crisis, SGR was merged with other departments to form the National Food Reserve Agency (NFRA), which now covers an even larger set of objectives. The new agency most probably will not have much effect on grain prices since it holds 5% as a core strategic grain reserve.

Experiences in Asia

40. Similar to the grain trading enterprises in Africa, most of the agencies in Asia that manage stocks have multiple mandates, which complicates the functioning of these agencies. The buffer stock schemes in Asia are considered to be relatively more successful at stabilising prices than those in Africa for two reasons. First, most buffer stocks in Asia consist of rice. Since rice production in Asia is irrigated, it is less variable than maize production in Africa. Second, the gap between import and export parity prices in Asia is smaller than in Africa (World Bank, 2012b).

Table 3. Agencies in Asia that manage buffer stocks

Country	Name of agency managing buffer stocks
Philippines	National Food Authority (NFA)
Indonesia	Badan Urusan Logistik (BULOG)
India	Food Corporation of India (FCI)
China	China Grain Reserve Corporation (SINOGRAIN)
Thailand	Rice pledging scheme
Malaysia	PadiBeras National Berhad (BERNAS)

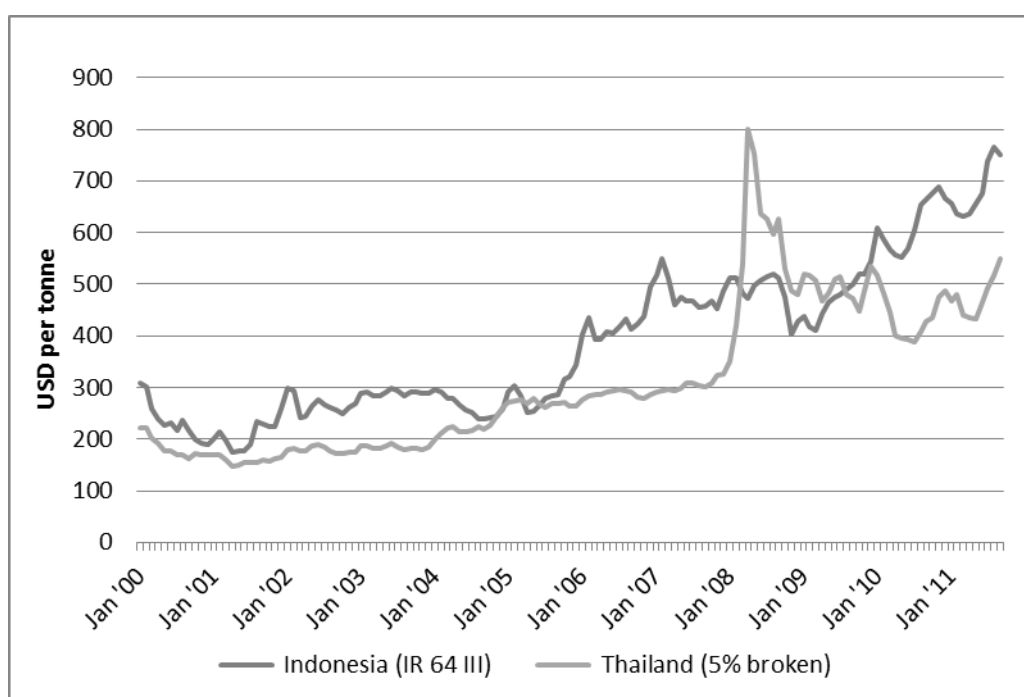
41. The **Philippines** National Food Authority (NFA) is tasked to stabilise rice prices by keeping farm prices high and retail prices reasonable for consumers. In addition, the NFA also has the mandate to guarantee stable rice supply during emergencies and calamities by releasing rice from its stocks. Intal et al. (2012) show that the NFA was ineffective at influencing producer prices because it only procured a relative small share of regional output. On the other hand, the NFA was able to stabilise domestic prices of rice compared to the international markets in the 1990s and 2000s. However, the reason for NFA's success in ensuring price stability is not a result of its buffer stocks scheme but is attributed to its dominant role in importing rice in the country. The NFA imports 35% of the import allocation of rice at duty-free rates while 65% is imported by the private sector (Tobias et al., 2012).

42. Even though consumer prices were more stable in the Philippines, they did not lead to lower volatility of producer prices. Indeed, the World Bank (2012b) demonstrates that the volatility of retail

and wholesale rice prices was 3% between 1990 and 2011, while the volatility of farm (paddy) prices was 11.6%. Moreover, these lower consumer prices are only enjoyed by a small portion of the population. World Bank (2007) shows that only 10 to 12 per cent of the poorest population bought rice at subsidised prices in 2007/08, with the remainder of rice bought at prices above world market level.

43. Buffer stocks in **Indonesia** are managed by Badan Urusan Logistik (BULOG). BULOG was created in 1967 with a rice price stabilisation policy that was implemented using a price-band. Starting from 2005, the focus shifted from a price-band policy to setting a floor or procurement price while selling subsidised rice to the poor via the Raskin program. Evaluating the performance of buffer stocks on price stabilisation in Indonesia in the past decade is complicated by Indonesia's trade policy. Until the early 2000s, Indonesia was one of the world's largest rice importers. To boost domestic production, it implemented an import ban in 2004, which resulted in a surge of domestic prices. By isolating itself from the international market, Indonesia's rice prices were shielded from the global food price hikes in 2007-08 (Figure 1).

Figure 1. Indonesian and Thai wholesale rice price, January 2000 - September 2011



Source: OECD (2012) and FAO-GIEWS (2014).

44. Indonesia's rice price moved to a higher level since 2005, but it is unclear how much can be attributed to the buffer stock program (high procurement prices) and how much to its trade policy (import ban). As was the case in Kenya and Zambia, most of the gains of the higher procurement prices were captured by the more affluent farmers (McCulloch and Timmer, 2008).

45. Social safety net stock activities in Indonesia are coordinated through Raskin. Raskin is reported to have good coverage, which is likely due to the fact that it distributes subsidised rice to almost twice the number of beneficiaries as planned. However, as a result of this wide targeting, 70% of the subsidised rice reaches beneficiaries who are not poor and it is estimated that one in six of the 20% richest households receive Raskin rice. This inefficient targeting comes at the expense of poor

households, which receive considerably less rice than their intended monthly quota (World Bank, 2012a).

46. The Government of **India** implements its price stabilisation and food security policies through the Food Corporation of India (FCI). In particular, the FCI's objectives are: i) to provide farmers remunerative prices, ii) to make food grains available at reasonable prices, particularly to vulnerable section of the society, iii) to maintain buffer stocks as measure of Food Security, and iv) to intervene in market for price stabilisation (FCI website⁷). McCreary (2012) examines the performance of the FCI with regards to the objectives that relate to price stabilisation, namely i), ii) and iv). His conclusions seem to indicate a success-story. The author reports that the FCI has been successful at providing remunerative prices for wheat and rice and that the FCI reduced price volatility of wheat and rice during the period 2006-12. The author also shows that consumer prices were more stable with than without the FCI reserve policy.

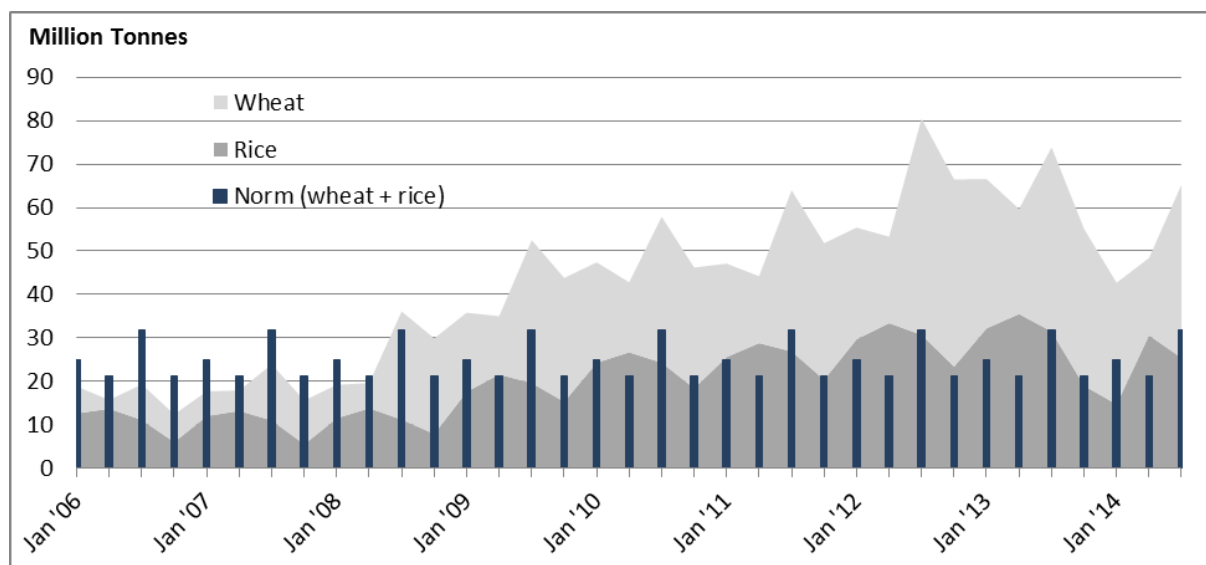
47. There are, however, some factors that urge us to be cautious about these results. First, the study ignores the impact of trade policies on prices. Between 2007 and 2011, India imposed export bans on rice and wheat. These bans not only protected India from the spikes in international prices in 2007-08 but also contributed to price hikes in India's trading partners and are considered to have increased world price volatility. Second, FCI's storage policy does not seem to follow the standard rules. That is, FCI did not release stocks when prices were high, instead it kept accumulating stock and its releases did not keep up with accumulation (Gouel, 2013).

48. In addition, there are doubts regarding the program's contribution to food security as it can decrease net availability of food grains and can even lead to an increase in market prices. Saini and Kozicka (2014) show that between 2000 and 2012, production of wheat and rice rose by 29%. However, net availability of food grains over that same period decreased by almost one per cent. This gap between production and net availability is directly linked to the rising levels of government stocks rather than to India's exports. Indeed, during the years in which India imposed its export bans, this gap even increased by 64%.

49. The program's influence on market prices is related to the sharp rise in the quantity of grains that are procured and that are kept in stock. The level of stocks more than tripled between July 2006 and July 2014 (Figure 2). In July 2014, the level of public stocks was 65.3 million tonnes, which was more than double the norm established by the government. Since 2008, stocks have been consistently above the mandated norms. If the FCI continues to procure large amounts of food grains but does not release grain when needed, less grain will be available in the open market, which will in turn put upward pressure on market prices. As a result, the stockholding program could in fact increase food insecurity.

7. <http://fciweb.nic.in/>

Figure 2. Stocks of wheat and rice in India: actual stock levels vis-à-vis mandated norms (million tonnes)



Source: FCI.

50. In 2013, the National Food Security Act (NFSA) was passed, which aims to provide food security to 67% of the population by distributing a fixed amount of subsidised grain each month. The large coverage of this act will inevitably intensify the requirements for food grain procurement, storage and distribution. Consequently, the act will amplify the impacts of India's buffer stock program on the welfare of its population, the fiscal budget, and the private sector. Given the size of India's stocks compared to the world's total utilization, there will also be considerable potential impacts on the world market. In July 2012, for example, India's stocks of rice and wheat accounted for more than 6 and 7% of the world's total rice and wheat utilization (Saini and Kozicka, 2014). Releasing even part of these stocks on the world market could significantly influence world prices.

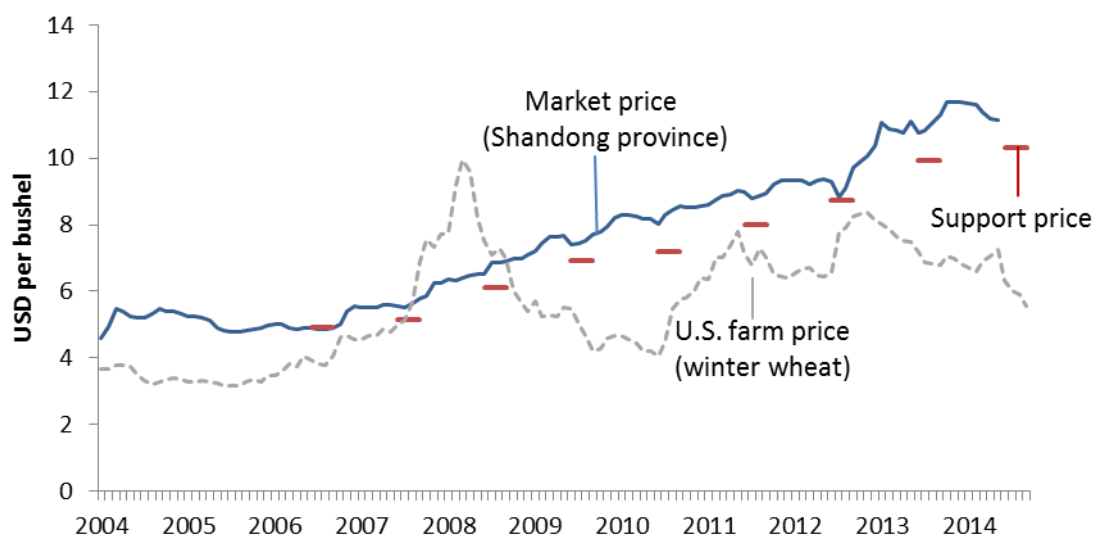
51. **China's** buffer stock policy is implemented by the China Grain Reserve Corporation (SINOGRain), which was established in 2000. Besides managing grain and oilseed reserve stocks, SINOGRain is also responsible for the procurement of grains and oilseeds, stock maintenance, interprovincial shipments and international trade of grain. The government stocks consist mainly of rice, wheat, and maize (OECD, 2009). The exact size of government state reserves is a state secret, which complicates any analysis of the impact of stockholding policies on prices and volatility.

52. Even though the mandate of SINOGRain is to purchase commodities when prices are low and release them when prices are high, it seems that SINOGRain is not releasing grain and oilseed reserves adequately or with a timing that is consistent with this objective, even when consumer prices are high. Carter et al. (2012) note that SINOGRain might function more as a price support scheme than a true buffer stock scheme. The current price support schemes are implemented in two forms: a "minimum purchasing price" program and a "temporary stocking purchase" program. Under the "minimum purchasing price" program, a guaranteed minimum price has been applied to rice (since 2004) and to wheat (since 2006) in some targeted regions. The "temporary stocking purchase" program was implemented in 2008 and offers price supports for maize, soybean, rapeseed and cotton in designated regions. Both programs offer fixed prices that are based on the market situation.

53. The support prices are raised every year, leading to a steady growth in prices for all commodities covered in the price support programs. Farmers do not seem to fully benefit from these higher prices, though, while traders and marketing agencies are indirectly taking advantage of these programs. Xu, Xi and Zhang (2010) report that farmers overwhelmingly prefer to sell grain below the minimum price to traders instead of selling it at the minimum price to SINOGRain. The reason farmers sell to traders is that they want to avoid the cost and inconvenience of transporting and marketing their grains. The traders then sell the corn to state-owned depots at the minimum price. Under the “temporary stocking purchase” program, quantities procured are sometimes announced after farmers have sold their crops, which implies that only marketing agencies can benefit from the program (Carter et al., 2012).

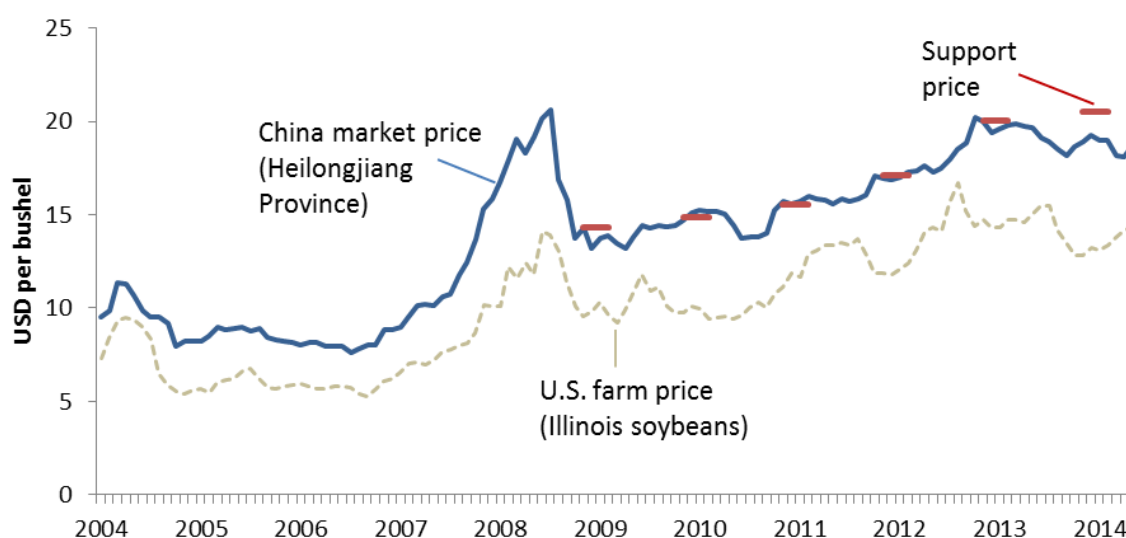
54. China’s buffer stock policy is cited as one of the reasons why China experienced stable domestic food prices during the 2007-08 food price crisis. Trade insulation, however, most probably played an even bigger role in shielding China from international price volatility. This becomes apparent when analysing price volatility of wheat, rice and soybean during the food price hike (Figure 3 and Figure 4). China holds buffer stocks for all three crops, but almost does not trade rice and wheat, while it imports most of its soybeans for domestic consumption. Rice and wheat prices displayed much less volatility in Chinese markets compared to the international market during the last decade, and certainly during the 2007-08 price hike. The prices of soybean however, followed the US soybean price surge (Gale, 2013).

Figure 3. China wheat price support and market price, 2004-14



Source: USDA, Economic Research Service analysis of data from China National Grain and Oils Information Center, China National Development and Reform Commission, and USDA, National Agricultural Statistics Service.

Figure 4. China soybean price support and market price, 2004-14



Source: USDA, Economic Research Service analysis of data from China National Grain and Oils Information Center, China National Development and Reform Commission, and USDA, National Agricultural Statistics Service.

55. In 2011, **Thailand** reinstated a rice pledging program in which it bought rice from domestic producers at a premium to the world market price and stored any surplus. The purpose of the program was to help boost the incomes of the rice farmers. The intervention price Thailand paid was rather high, namely 15 000 baht (around USD 460) per tonne, 40-50% higher than the market prices. The government counted on financing the program by selling rice on the global markets at an even higher price. Since Thailand was the world's largest exporter at the time and several countries had imposed export bans in response to the price crisis, the government expected that by stockpiling rice, it would decrease the global supply of market and consequently cause a rise in world prices.

56. The government's expectations were crushed when India lifted its export ban on rice shortly after the program was implemented and as a result, world price did not increase as much as Thailand had expected. The program eventually led to huge stockpiles of rice as the government kept speculating for higher prices. The program ultimately was abolished in February 2014. Most rice farmers, who were intended to profit from the program, were left worse off since no funds were available to pay them.

57. Public rice stocks in **Malaysia** are managed by PadiBeras National Berhad (BERNAS), a private company traded on the Kuala Lumpur Stock Exchange. BERNAS purchases paddy from farmers at a guaranteed minimum price, manages farm input subsidies, runs milling operations, maintains the nation's rice stockpile, and acts as the sole importer of rice. This privileged position was extended in 2011 for another 10 years. So far, no studies were found that examine the effectiveness of the buffer stock in achieving price stability.

4. Other impacts of recent public stockholding policies

58. The country examples show that buffer stocks and social safety net stocks have varying degrees of success in achieving their objectives. However, besides their performance, it is also

important to examine whether these stockholding policies have other impacts on society. In certain cases, these negative impacts can even offset any benefit that was created by the stockholding program. The most significant impacts of stockholding policies relate to their effects on distributional outcomes, the government's budget, the displacement of the private sector and spill-overs to neighbouring countries.

Distributional impacts

59. The distributional impacts of buffer stocks and social safety net stocks validate the importance of effective targeting and setting simple objectives. Several country case studies (e.g., Kenya, Zambia, Indonesia, and Ethiopia) that reported on the success of buffer stocks at raising producer prices pointed out that these higher prices were mostly captured by the wealthier and large-scale farmers. In the case of social safety net stocks, targeting is also crucial to ensure that those who are most food insecure are the beneficiaries of the food distribution programs. However, targeting still remains one of the main weaknesses of these programs. There are not only exclusion errors, where people who should be targeted do not receive the benefits, but also inclusion errors, where people who are not in need of assistance enjoy undue benefits. Nearly 70% of the beneficiaries of Indonesia's Raskin, for example, are not poor. As a result, there is less subsidised rice available for the people who need it the most (World Bank, 2012a).

60. In cases where producer price support objectives are paired with the objective of providing lower prices to the consumers, poor and food-insecure consumers risk being hurt multiple times. First, consumers are paying indirectly for the higher prices for producers through taxes that fund the program. Second, higher producer prices often translate to higher consumer prices, which are difficult to counterbalance by food distribution programs. In the Philippines, for example, the share of rice that was bought at subsidised prices by the poorest households in 2007/08 was only around 10%. The remaining rice was sold at prices above world market level (World Bank, 2007). Finally, due to inefficient targeting, poor consumers risk not being reached by food distribution programs.

Fiscal impacts

61. The fiscal impact of stockholding programs is often cited as one of its main downsides. The direct costs for public stocks include storage costs, transport costs, management costs, acquisition costs and the costs associated with distribution. These costs escalate as the program increases the size of its stock and/or tries to achieve multiple objectives. The volume of India's public wheat and rice stocks, for example, more than tripled between 2005 and 2013. This led to an increase of almost 200% in nominal terms of the food grain carrying costs⁸ for FCI over that period (Saini and Kozicka, 2014). Public spending on stocks can amount to as much as two per cent of GDP and is often larger than public spending on Agriculture and Research (World Bank, 2012b).

62. The spending on public stocks also creates opportunity costs, as less funding is available for other public programs which might be more efficient at reducing price risk. In many Eastern and Southern African countries, volatility is a result of poor infrastructure and low resilience against shocks. These problems would be best addressed by investing in infrastructure and agricultural research and development. The scale of costs of buffer stocks thus leads to major opportunity costs because not enough investments are made in those programs that are best suited to tackle volatility. World Bank (2012b) notes that as a result, buffer stocks in Kenya, Malawi and Zambia are even

8. Carrying costs are the costs incurred to maintain stocks and include the costs of warehousing, stock maintenance, etc.

thought to increase price volatility because they were not able to address the causes of volatility and took away resources from programs that could.

Crowding out of the private sector

63. Public stock programs can disincentivise the private sector to participate in stockholding and trading activities. In particular, when the purchase and release of grain for public stocks is unpredictable, it becomes riskier and costlier for the private sector to invest in trade and storage (Jayne and Tschirley, 2009). Faced with greater insecurity, the private sector will withdraw from storage and trade, and with less actors in the market to stabilise prices, this will eventually exacerbate the instability of food prices.

64. The private sector can also be discouraged to partake in domestic market activities when the size of the public stockholding program is large. In India, for example, 75% of marketable surplus is procured by the government, which leaves very little grain available for the open market (Saini and Kozicka, 2014). When the private sector is crowded out, the government will face an even bigger role in stabilising prices, which adds additional pressures on the budget.

International spillovers

65. Stockholding policies are designed as domestic policies, but their impacts can transcend national borders. When big players on the world market acquire or release large amounts of stock, this can create international spill-overs. The acquisition, whether from domestic production or through imports, can lead to a decrease of supply in the world market and hence a potential increase in the world market price. On the other hand, releasing large amounts of stocks may depress world market prices. These effects are not limited to large countries, as the same effect can be caused by a group of relatively smaller countries acting in the same way. However, when large countries implement large stockholding programs, this inevitably generates nervousness on the international markets as it is often uncertain how much stock will be acquired or released, when and at which price.

66. Buffer stocks can also impact neighbouring countries through the trade barriers that are often created to defend the price band. In particular, countries need to have control over their imports and exports to effectively implement a floor price and ceiling price. Import tariffs or tariff quotas help countries maintain their floor price, while export restrictions are used to apply their ceiling price. The implementation of these trade barriers can have significant impacts on prices in other countries and hence on their food security and poverty situation.

5. Conclusions

67. This paper reviews the recent literature on the performance of buffer stocks and social safety net stocks. The effectiveness of buffer stock programs is evaluated by analysing whether the programs were able to achieve their objective(s) of reducing overall volatility, increasing producer prices and/or stabilising consumer prices. The performance of social safety nets is analysed by examining food security indicators such as consumer prices and domestic price volatility. The review focuses on country case experiences in the last 15 years.

68. As stockholding policies are almost always associated with other policy instruments such as administered prices, trade policy instruments, import and export monopolies, it is not possible to disentangle the effects from these other instruments. This explains why none of the case studies

controlled for any other factors that might have influenced the performance or impact of stockholding policies.

69. In terms of volatility, some country case studies showed that these stockholding programs were associated with lower overall price volatility. Interestingly, the countries that reported a reduction in overall price volatility had implemented a drastic change in their trade policies or had linked their stockholding programs to trade policies. This observation raises two important issues. First, in those countries where the change in trade policy was rather radical (e.g. an export ban), trade most probably had a more significant impact on volatility than stocks. The reports do not explicitly provide proof for this statement as none of the studies control for any of the confounding factors that might have influenced price volatility. What is clear though is that countries that isolate their domestic markets from the international markets using trade measures such as bans are able to shield themselves from international price volatility. However, when international prices are stable countries with strong trade barriers are potentially exposing themselves to more instability, because domestic market shocks are typically more severe and frequent than international ones. Second, buffer stocks can only work efficiently in countries that can control their trade flows. In particular, a country implementing a buffer stock scheme needs to be able to insulate its own economy from the world market, otherwise the stabilisation effects of the buffer stock dissipate into the international market.

70. Even though buffer stocks necessarily lead to the creation of trade barriers, openness to international trade would, usually, offer more price stability because it pools production risk and because international markets exhibit lower price volatility than domestic markets. While a buffer stock might succeed at lowering price volatility for some period of time, the risk remains that this program collapses. Once a stabilisation program breaks down, the resulting surge in price volatility will offset any price stabilising effects of the original program.

71. Buffer stocks that explicitly aimed to raise producer prices seemed to have been relatively successful at reaching their objective. However, there are some caveats. First of all, these policies do not always reach their targeted audience. Instead of reaching poor farmers, the benefits of the schemes can be accrued by well-off farmers, traders or marketers. Additionally, these programs are often a huge drain on the budget. Even though the strategy is to buy low and sell high, this is a tactic that often does not work and as a result the country can be left with massive stockpiles and/or a fiscal deficit. Finally, buffer stocks that guarantee producers an artificially high price can cause several indirect economic costs. They can lead to higher consumer prices, tend to lower wage competitiveness, and can reduce agricultural diversification (World Bank, 2012b). The fact that consumer prices often rise as a result of buffer stock schemes is in direct conflict with any food security objectives of the program.

72. There is little evidence of buffer stocks stabilising consumer prices. This is mainly due to the fact that buffer stocks are more adept by nature at preventing price drops than curbing price hikes and are more often used to raise prices. Also, stocks that were bought with the purpose of stabilising prices are not necessarily released with the same purpose and could end up in regular distribution programs. The fact that it is hard to trace these stocks complicates the analysis.

73. The literature provides a very detailed explanation on why buffer stocks have typically failed. The most common causes are the unsustainable fiscal costs, conflicting objectives of the programs, crowding out of the private sector and other agricultural investments, poor management and non-transparent working of the programs. The reasons why buffer stocks failed in the past are in general also the reasons why they appear to be currently failing. The overwhelmingly negative experiences with buffer stocks clearly suggest that countries would be better off without these policies. However, they are politically attractive and it is important to keep track of them as they will

undoubtedly influence domestic prices and have very large fiscal impacts while in some cases they will also have international spill-overs that influence the food security of other countries.

74. The success of social safety net stocks depends largely on having well-defined objectives and effective targeting. In cases where targeting is poorly executed the distributional impacts can be very significant. Social safety net stocks are usually less controversial than buffer stocks, mostly because they do not influence prices directly and have a food security objective. However, when large players on the world market decide to build stocks, the objective for the creation of these stocks is not relevant to its trading partners. Whether the stock is created for the purpose of price stabilisation or to improve food security, the fact remains that when the stock is built, a large amount of cereals might not reach the world market. Moreover, there is also the risk that these large stockpiles might get dumped on the world market at any time. It is therefore necessary to also monitor social safety net stocks.

REFERENCES

- Abbott, P. (2011). Stabilisation policies in developing countries after the 2007-2008 crisis. OECD Working Paper TAD/CA/APM/WP(2010)44, Paris, France.
- AFD (2014). Food Reserves and Regulating Market Volatility in Africa. A Savoir n.23.
- Carter, C. a., Zhong, F., & Zhu, J. (2012). Advances in Chinese Agriculture and its Global Implications. *Applied Economic Perspectives and Policy*, 34(1), 1–36. doi:10.1093/aep/047
- Dorosh, P. (2009). Price stabilisation, international trade and national cereal stocks: world price shocks and policy response in South Asia. *Food Sec.*, 1:137-149.
- Dorosh, P. and H. Ahmed (2009). Foreign Exchange Rationing, Wheat Markets and Food Security in Ethiopia. Ethiopia Strategy Support Program 2 (ESSP2) Discussion Paper No. ESSP2 004. International Food Policy Research Institute, Washington, DC.
- FAO (1997). Strategic grain reserves - Guidelines for their establishment, management and operation. FAO Agricultural Services Bulletin. Rome.
<http://www.fao.org/docrep/w4979e/w4979e00.htm#Contents>.
- FAO, FIDA, IFPRI, FMI, OCDE, CNUCED, WFP, WORLD BANK AND WTO (2011). Price Volatility in Food and Agricultural Market: Policy Responses. Background Policy Report for the G20 Summit in Paris in November 2011, Rome.
- FAO (2014). The state of food insecurity in the world, 2014. FAO, Rome.
- FAO-GIEWS (2014). Food Price Data and Analysis Tool. <http://www.fao.org/giews/pricetool/>
- Gale, F. (2013). Growth and Evolution in China's Agricultural Support Policies, ERR-153. U.S. Department of Agriculture, Economic Research Service, Washington, DC.
- Gouel, C. (2013). Food price volatility and domestic stabilisation policies in developing countries. In: Chavas J.-P., Hummels D. and Wright B. (ed.) *The Economics of Food Price Volatility*. Chicago: University of Chicago Press.
- Intal, P. S., Cu, L. F., & Illescas, J. A. (2012). Rice Prices and the National Food Authority. Discussion paper series No. 2012-27. Philippine Institute for Development Studies, Makati City, Philippines.
- Jayne, T. S. (2012). Managing food price instability in East and Southern Africa. *Global Food Security*, 1(2): 143–149. doi:10.1016/j.gfs.2012.10.002
- Jayne, T., R. Myers, and J. Nyoro. 2008. "The Effects of NCPB Marketing Policies on Maize Market Prices in Kenya." *Agricultural Economics* 38: 313–25.

- Jayne, T.S. and Tschirley, D. (2009) Food price spikes and strategic interactions between the public and private sectors: markets failures or governance failures?. In: FAO Commodity Market Review 2009-2010.
- Mason, N. M., & Myers, R. J. (2013). The effects of the Food Reserve Agency on maize market prices in Zambia. *Agricultural Economics*, 44(2): 203–216. doi:10.1111/agec.12004
- McCreary, I. (2012). Food Reserves in India. Canadian Foodgrains Bank Occasional Paper. Canadian Foodgrains Bank, Winnipeg, MB.
- McCulloch, N. & C. P. Timmer (2008). Rice Policy In Indonesia: A Special Issue. *Bulletin of Indonesian Economic Studies*, 44(1): 33-44.
- Minot, N. (2010). Food price stabilisation: Lessons from eastern and southern Africa. Paper prepared for the Fourth African Agricultural Markets Program (AAMP) policy symposium, Agricultural Risks Management in Africa: Taking Stock of What Has and Hasn't Worked, organized by the Alliance for Commodity Trade in Eastern and Southern Africa (ACTESA) and the Common Market for Eastern and Southern Africa (COMESA). Lilongwe, Malawi, September 6-10, 2010.
- Minot, N. and S. Rashid (2013). Technical inputs to proposed Minimum Support Price (MSP) for wheat in Ethiopia. Policy Note. International Food Policy Research Institute, Washington DC.
- OECD (2009). Agricultural Policies in Emerging Economies: Monitoring and Evaluation 2009. OECD, Paris.
- OECD (2012). Review of Agricultural Policies: Indonesia 2012. OECD, Paris.
- Poulton, C., J. Kydd, S. Wiggins, and A. Dorward (2006). State intervention for food price stabilisation in Africa: Can it work?. *Food Policy* 31, no. 4: 14.
- Rashid, S., & A. Negassa (2011). Policies and Performance of Ethiopian Cereal Markets. Ethiopia Strategy Support Program 2 ((ESSP 2) Working Paper No. 21. International Food Policy Research Institute, Washington, DC.
- Saini, S. & M. Kozicka (2014) Evolution and Critique of Buffer Stocking Policy of India. ICRIER Working Paper No. 283, Indian Council for Research on International Economic Relations, New Delhi, India.
- Tangermann, S. (2011). Policy Solutions to Agricultural Market Volatility: A Synthesis; ICTSD Programme on Agricultural Trade and Sustainable Development; Issue Paper No. 33; ICTSD International Centre for Trade and Sustainable Development, Geneva, Switzerland. www.ictsd.org
- Tobias A, Molina I, Valera H G, Mottaleb K A, and Mohanty S, (2012). Handbook on rice policy in Asia. International Rice Research Institute (IRRI), Philippines
- Wiggins, S. and S. Keats. (2009). Volatile World Food Prices and Their Implications: Grain Stocks and Price Spikes. Overseas Development Institute, London.
- World Bank (2007) Philippines: Agriculture Public Expenditure Review. Technical working paper, Manila and Washington, DC.

- World Bank (2012a) Targeting Poor and Vulnerable Households in Indonesia. Working Paper 67218, World Bank, Washington DC.
- World Bank (2012b) Using Public Food Grain Stocks to Enhance Food Security. Report Number 71280-GLB, World Bank, Washington DC.
- Wright, B. D. (2012). International Grain Reserves And Other Instruments to Address Volatility in Grain Markets. *The World Bank Research Observer*, 27(2): 222–260. doi:10.1093/wbro/lkr016
- Xu, Z., Y. Xi, and S. Zhang (2010). Analysis on the Implementation, Mechanisms and Effects of 2008 /2009 National Corn Provisional Purchase Policy. *Issues in Agricultural Economy*, 3: 16-23.