European Commission

Using food reserves

to improve food and nutrition security?

Information note

International Cooperation and Development

Published by Directorate General International Cooperation and Development

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European Commission
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Printed in Belgium, 2018

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Directorate-General for International Cooperation and Development (DG DEVCO)

European Commission

October 2018

Foreword

In adopting the 2030 Agenda for Sustainable Development, the international community committed itself to eradicating hunger and poverty, and inter alia to making agriculture sustainable and to securing healthy lives. Just 12 years from the deadline, over 10 per cent of the world's population are still suffering from chronic undernourishment. After two decades of decline, the global prevalence of hunger is on the rise again. The Global Report on Food Crises estimated that around 124 million food-insecure people in 51 countries were in need of urgent assistance across the world in 2017.

Today, the world produces enough food to feed everyone. But factors such as chronic poverty, price volatility, climate shocks and armed conflicts, impede access to sufficient nutritious food for many vulnerable households. The volatility of food prices raises serious problems in developing countries in particular. It hits consumers who tend to spend a large share of their expenditure on food, with negative effects on food security and nutrition, as well as political stability. Price instability also affects producers, making agricultural investment very risky and hampering the development of a more resilient agricultural sector.

One of the greatest challenges today is to end hunger and prevent malnutrition while making agriculture and food systems more sustainable. Food reserves offer great potential for meeting this challenge. They represent a valuable means to support chronically food-insecure households and to manage food crises. They can also be used to stimulate or orient food production. Importantly, food reserves can help increase the stability of national, regional and international food markets. However, this potential is currently under-exploited, notably in developing countries.

The use of food reserves is a hot topic on the international agenda and the source of intense debates. Poor governance remains a major source of reluctance for international actors to engage in this field, as many existing food reserves suffer from a lack of transparency and accountability. Another major point of discussion relates to the role to be given to food reserves in relation to other instruments, such as social transfers and social protection policies, in responding to food crises and enhancing resilience to food insecurity.

Building on a multi-country study commissioned through the CIRAD, this Information Note aims to raise awareness on the potential of food reserves among EU staff and Member States, as well as other donors and international actors. It provides pointers for working with food reserves to improve food and nutrition security in developing countries, and highlights the main rules for a good governance of food reserves. By shedding light on food reserves, this note intends to expand the range of policy options considered by decision-makers for more effective and integrated strategies towards the eradication of hunger.

"One of the greatest challenges today is to end hunger and prevent malnutrition while making agriculture and food systems more sustainable. Food reserves offer a great potential for meeting this challenge."

Leonard MIZZI
Head of Unit, Rural Development, Food Security, Nutrition
Directorate-General for International Cooperation and Development

Introduction

The purpose of this note is to guide staff in the European Commission and in European Union Delegations on the potential use of food reserves to improve food and nutrition security. The fight against hunger requires a combination of many instruments. This note discusses the circumstances in which food reserves may, or may not, be a useful component of such a multifaceted strategy, and provides guidelines to support decision-making.

Food reserves may improve food and nutrition security by activating four impact pathways

Food security "exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life." This definition highlights the four dimensions of food and nutrition security: (i) food availability, (ii) economic access to food, (iii) utilisation, and (iv) stability of the first three dimensions. There is an important distinction between chronic food and nutrition insecurity (when households have permanent or regular seasonal difficulty feeding themselves) and transitory food and nutrition insecurity (when they are in difficulty only at times of crisis).

Food reserves are stocks of food held by a public entity, comprising products with a content in calories or nutrients that makes them important for food and nutrition security. In practice, food reserves usually consist of grains or other staples (such as milled cassava) because, in developing countries, such products provide the major part of caloric intake but are subject to supply disruptions. The public entity that holds the food reserve is often national but can also be local (in Mali, each of the 700 municipalities has its own food reserves), regional (ASEAN+3[1], ECOWAS[2] and SAARC[3] have built food reserves) or, theoretically, global.

There are four different impact pathways through which food reserves can improve food and nutrition security (see Figure 1). First, the food stored can be used to supply **permanent transfers** to chronically food-insecure households. Second, food reserves can be used to manage food crises, by removing shortages or mitigating price surges through **sales** into the national market (possibly at a subsidised price – strategy 2a), or by supplying **emergency transfers** to households hit by the crisis (strategy 2b). These two strategies are not exclusive and are often combined. Third, whatever the way the food stored is used (permanently or in periods of crisis), food procurement by the food reserve agency offers the opportunity to send **incentives to farmers** to stimulate or orient their investment in food production, with potential effect on food and nutrition security in the medium run. Of course, this third impact pathway is strongly related to the first two ones: a country's ability to use food reserve procurement to orient food production strongly depends on the quantity to be procured and released, as well as the way it is used (permanently or only in periods of crisis). National governments can purposely activate these first three impact pathways to contribute to national food and nutrition security. In contrast, the fourth impact pathway operates at a cross-country level. It results from the fact that food reserves in a given country are likely to benefit other countries (especially importing countries) through a **stabilising** effect on regional or international markets. By avoiding or smoothing price surges on these markets, food reserves can contribute to improving food and nutrition security at the global level.

1. Association of Southeast Asian Nations (ASEAN) and the three East Asia nations of China, Japan and South Korea.
2. Economic Community of West African States.
3. South Asian Association for Regional Cooperation

Figure 1 – Impact pathways through which food reserves can improve food and nutrition security

This Information Note successively presents these four impact pathways. The conclusion highlights the decisive role of governance to efficiently activate these impact pathways.

How and when to use food reserves to address chronic food insecurity?

To reduce chronic food and nutrition insecurity, providing poor households with cash is usually more cost-effective than providing them with food. However, food transfers are sometimes more appropriate for specific populations or specific nutritional objectives

Food reserves can contribute to reduce chronic food insecurity by supplying permanent transfers to vulnerable households. The appropriateness of using food reserves for this purpose depends on two considerations:

- Whether it is more cost-effective to transfer food rather than cash or vouchers; and,
- Whether, in cases where food transfers are deemed to be better, it is more cost-effective to supply them through food reserves or through just-in-time purchases.

Comparative cost-effectiveness of food transfers versus cash or voucher transfers. Food transfers tend to be costlier to administer than cash and voucher transfers, and they are not always more effective in increasing the level or diversity of food consumption. As they give less choice than cash transfers, they are likely to give households less dignity and less opportunity to satisfy their preferences. Providing cash transfers is usually a more cost-effective way to fight against chronic food and nutrition insecurity, so, where markets allow, they should be considered as the default option. However, situations do occur where food transfers are more cost-effective for specific food and nutrition security objectives (e.g. increasing the consumption of calories or specific nutrients) or to help specific social groups. For instance, when cash transfers are managed by men and food transfers by women, food transfers may have a stronger impact on family food consumption. Cash may be provided in specific regions or to particular social groups and food to others. Or both cash and food can be distributed to the same households, in order to provide them with the right incentives for the different components of food consumption as, for example, on Ethiopia's Productive Safety Net Programme. In all cases, the choice should be based on empirical evidence: existing knowledge on food consumption habits and social practices should be used and, where necessary, validated through pilot projects.

Comparative cost-effectiveness of supplying food transfers through food reserves versus just-in-time purchases. When food transfers are implemented, it is often possible to supply them through just-

in-time purchases, which allows the duration of public storage (and therefore its cost) to be reduced. In some situations, however, purchasing in advance can be a more cost-effective option. This may be the case for food safety reasons, or when there is a risk of shortages or sharp price increases. It is also the case when the seasonality of producer prices is excessive compared with storage costs: procuring food during the post-harvest period may both reduce the cost of public purchases and mitigate the collapse in prices that occurs during this period of the year.

The decision process when considering the appropriateness of using food reserves to provide permanent transfers to food insecure households is the following:

Relying on food reserves to supply food transfers is relevant/ necessary when just-in-time purchases are costly or risky (risk of shortages or sharp price increases, excessive seasonality of producer prices).

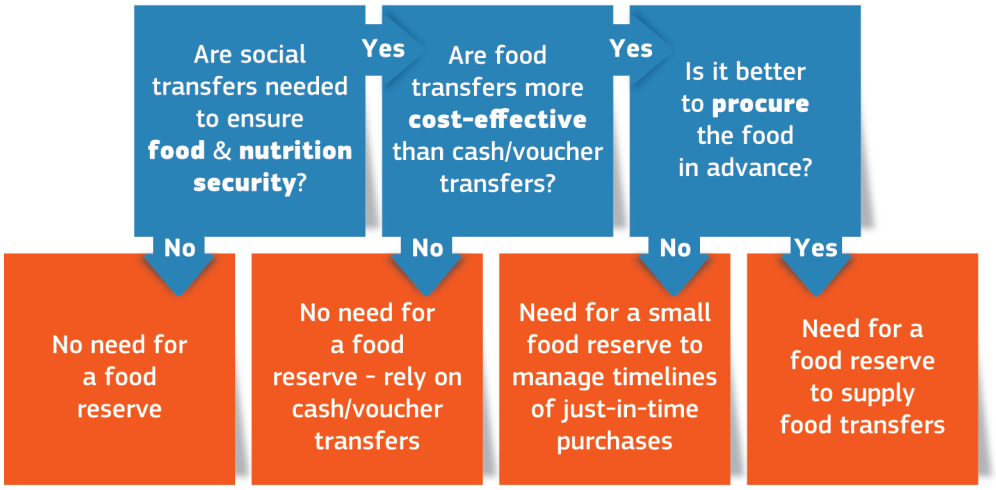

Figure 2 - Appropriateness of using food reserves to provide permanent transfers to food-insecure households

How and when to use food reserves to manage food crises

Because grains account for a high share of household expenditures in developing countries, surges in grain prices affect not only grain consumption (and thereby caloric intake) but also the consumption of other foods (potentially resulting in deficiencies in macro and micronutrients).

Food crises occur when the access to food of many households collapses at the same time. Depending on the household's situation, this may result in:

- reduced or less diversified food consumption, potentially resulting in caloric or nutrient deficiencies;
- reduced health expenditures, potentially affecting the ability of the body to absorb the consumed nutrients; or
- depleted savings and assets, resulting in reduced capital and lower resilience to future shocks.

Drivers of food crises and role for food reserves. Food crises may be provoked by (i) income collapses, (ii) disruption of food markets (such as shortages or sharp price increases), or (iii) a combination of both. When the crisis is provoked only by income collapses, an appropriate response is providing emergency cash or voucher transfers to the affected households. In this situation there is no role for food reserves. However, when the crisis is provoked by disruptions of food markets (as is most often the case), emergency cash transfers are likely to exacerbate the increase in food prices. By increasing recipients' purchasing power, they generate an additional demand for food products that exert an upward pressure on food prices. They may thereby undermine the access to food of non-recipient households. Therefore, when the crisis stems wholly or partly from disruptions to domestic food markets, it is preferable to provide food transfers or supply food markets. Food reserves thus may have a decisive role to play.

Disrupted grain markets are particularly damaging because they affect not only grain consumption (and thereby caloric intake) but also the consumption of other foods (potentially resulting in deficiencies in macro and micronutrients); in developing countries, grains account for a high share of household expenditures: when grain prices surge, vulnerable households have to reduce the diversity of their food consumption to maintain their grain consumption level.

Role of food reserves to reduce disruption of food markets. Three types of interventions can be implemented to

reduce disruption of food markets, all based on increasing the quantity available on the domestic market: (i) measures to restrict exports, (ii) measures to stimulate imports, and (iii) food reserve releases. The decision on the best policy mix (and therefore the role for food reserves) depends on whether the specific food product is exported or imported, or is not traded on international markets.

When a product is exported, shortages in the country are, by definition, very unlikely, but the price of the product may nonetheless be high and increasing, depending on the level and dynamics of the international price. A country can stabilise or reduce its domestic prices by restricting exports (for instance, when the international price is 100, implementing an export tax equal to 20 will result in the domestic price being equal to 80). Export restriction measures, which are fully allowed by the World Trade Organisation (WTO), usually mitigate increases in domestic prices effectively, almost immediately, and at a no cost to the government. However, they may contribute to destabilising international markets, as happened with rice in 2008 (see Box 3). Indeed, restricting exports is the only way an exporting country has to stabilise or reduce its domestic prices. It can choose to do so or to accept higher food prices, but **food reserves serve no purpose,** since any releases would simply result in increased exports.

When a product is imported, the problems on the domestic market may stem from (i) too high an international price or (ii) insufficient imports. In the first case, there is no disruption in the supply chain and no need for food reserves: the solution is to reduce import taxes or even to subsidise imports as long as the international price remains at too high a level. In the second case, the fact that the domestic price is higher than the import price suggests that there are problems of supply. Such disruption might stem from quantitative restrictions on imports, which should therefore be removed. But it might also be the result of long or uncertain import timelines, for example in the case of:

- *large importers* (i.e. countries whose staple imports account for a significant share of the quantity traded on international markets), which, when facing a bad harvest, may find it difficult to import the quantity they need – their above-normal demand is also likely to push up international prices (see Section 4);
- *landlocked countries,* which are vulnerable to import delays; and
- *all importing countries* when there is scarcity on international markets, as occurred in 2008 (see Box 3).

In all these situations, private stocks may not be sufficient to cover import timelines, and prices are likely to escalate. Even if private stocks are only believed to be insufficient, prices may surge because of panic purchases and stock hoarding behaviours. So, **when there is a risk that private stocks may not be sufficient, a relevant option is using food reserves to manage import timelines**. This does not imply that the food reserve needs to cover all needs during import timelines: private stocks are usually not nil, and food reserve interventions are likely to have a leverage effect on private supply by discouraging stock hoarding.

Food reserves can be very useful to reduce disruptions of food markets. This is especially the case of products not traded on international markets or imported with long or uncertain import timelines (large importers, landlocked countries).

When a product is not traded on international markets, such as in the case of many grains or other staples consumed (especially by the poor) in developing countries (e.g. millet, sorghum, cassava or specific varieties of maize), there may be some scope to increase their availability by stimulating imports, since they are usually traded on regional markets. However, the stabilising effect of imports from the regional market is often limited because the quantities available for import may not be sufficient, especially since neighbouring countries are likely to be hit at the same time by the same natural hazards (see Case study

1). It is of course possible to import other grains from international markets, but these grains are inadequate substitutes for local staples (often because they are much more expensive). So, for food products not traded on international markets, the probability of shortages is much higher than for imported food products, and their prices are likely to increase much more. Hence **the role of a food reserve is broadly similar to its use for imported products except that the period where releases are welcome is likely to be much longer:** the entire crisis period instead of just the duration of import timelines. The decision process when deciding on the appropriateness of building food reserves to manage price crises is as follows:

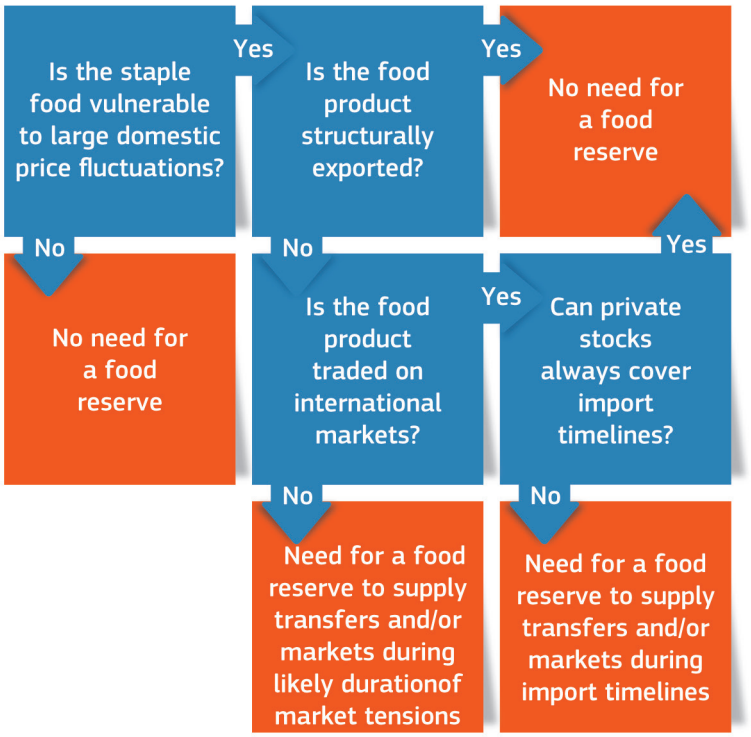

Figure 3 – Appropriateness of building food reserves to manage food price crises

Ways of using food reserves to manage crises. When food reserves are required, they can be used either to deliver emergency food transfers or to supply markets. In the first case, they are distributed for free to targeted recipients (see Case Study 1); in the second, they are sold on markets with the aim of removing shortages or mitigating food price increases (see Case Study 2). The choice between these two options (which can be used in combination) depends on:

- *the existence of shortages:* when markets are not supplied, food reserves should be used to supply them.
- *the proportion of food-insecure households within the total population:* when food insecure households account for a small share of the population, emergency transfers are likely to be more appropriate because market interventions would generate a high level of what can be considered as 'leakages' from the point of view of food and nutrition security (because they act on food prices, market interventions are not targeted and de facto benefit both food-secure and food-insecure households).
- *the cost-effectiveness of emergency transfers,* which depends on several parameters, especially the cost and effectiveness of targeting, the risk of political patronage, and possible social resistance to targeting, due to its potentially damaging effects on local communities.
- *the length of the period during which food reserve releases are necessary:* since mitigating food price increases requires higher quantities of food than emergency transfers, it is obviously more feasible when the period is limited to import timelines (as in the case of imported food products) than when it covers the entire crisis period (as in the case of food products non-traded on international markets).

When a country chooses to use food reserves to mitigate price surges, the goal should be to manage price crises, not to maintain prices permanently at a low level, which would be costly and would discourage production (this is the 'urban bias' experienced by many African countries during the 1960s and 1970s). A simple rule is that domestic prices should follow the mid-term trend of international prices, or regional prices for products not traded on international markets.

When a crisis occurs, food reserves can be distributed for free to targeted recipients or sold on markets with the aim of removing shortages or mitigating food price increases. The choice between these options (which can be used in combination) depends on the context.

Case study 1

USING FOOD RESERVES TO SUPPLY EMERGENCY TRANSFERS IN THE SAHEL

In Sahel countries, coarse grains (millet, sorghum and maize) are the main staples consumed by the poor: because their price is usually much lower than the price of rice, they provide the cheapest source of calories. However, their price is highly unstable, provoking frequent food crises: in Mali the millet price increased by +150% in 2005 and by +100% in 2012. The increase in the price of coarse grains cannot be effectively mitigated through imports from international markets: millet and sorghum are not traded on these markets, imported maize is only used to feed animals, and rice is much more expensive than coarse grains making it ineffectual in keeping the prices of millet and sorghum at reasonable levels. Imports of coarse grain from the regional market may help but they have a limited effect: droughts often affect millet and sorghum production in all Sahel countries at the same time (as happened in 2005 and 2012); and maize imports from coastal countries are likely to mitigate only the rise in the maize price, without being able to stabilise the price of millet or sorghum (as was observed during the 2012 crisis).

In this context, emergency transfers are needed to protect food-insecure households. These transfers can either be provided as food (supplied from a food reserve), or as cash or vouchers, in which case they can be backed by releases from a food reserve to control their inflationary effect

Case study 2

USING FOOD RESERVES TO MITIGATE SHARP PRICE INCREASES (AND COLLAPSES) IN INDONESIA

Indonesia's food logistics agency (BULOG) was established at the end of the 1960s to control rice prices, with a head who reported directly to the president, and with a line of credit at subsidised interest rates from the Central Bank. BULOG implemented a publicly announced floor and ceiling price for rice, with the margin between the two kept wide enough for the private sector to carry out most rice marketing activities. A rice buffer stock absorbed purchases at the floor price and provided rice to inject into urban markets to defend the ceiling price, with rice imports providing an important balance in the process.

The world food crisis in 1972/73 caught the Indonesian government, and BULOG, unprepared. After several years of price stability, rice prices spiralled out of control and the government quickly tried to arrange emergency imports from a world rice market that had completely disappeared for nearly a year. However, BULOG was quite successful in stabilising rice prices from late in 1973, when it regained control of domestic prices after a good rice harvest, up until the Asian Financial Crisis in late 1997: the price of rice on the domestic market followed the trend of the international price, while considerably smoothing its surges and collapses.

Since 1998, however, the objective of the Indonesian government appears to have shifted from stabilising the domestic price of rice to maintaining it permanently at a high level: it has restricted imports, resulting in sharp increases in the price of rice on the domestic market. Meanwhile, the food transfer programme (Raskin) is not sufficient to compensate for the effects of high rice prices on poor consumers – all the more so because Raskin's targeting is notoriously poor. High prices do not really benefit poor farmers, so the lesson is that maintaining high domestic prices (i.e. significantly above the level of international prices) while trying to mitigate the consequences through transfers targeted to poor consumers is unlikely to be an effective policy against food and nutrition insecurity. The transfers are not able to protect poor consumers, while high prices benefit mainly the biggest farmers. And the cost to the Government is substantial.

How and when to use food reserves to stimulate or orient food production

When food reserves are used to provide permanent transfers or to manage food crises, food should be procured on the domestic market or abroad. This offers the opportunity to use food reserve procurement to send incentives to domestic food producers, thereby improving food and nutrition security by (i) stimulating investment in food production or (ii) orienting farmers' decisions towards specific production and marketing models (for instance, organic agriculture, collective marketing through producer organisations, warehouse receipt systems).

Using food reserves procurement to stimulate investment in food production. The mechanism is simple: an attractive procurement price is fixed in advance and announced to farmers before they make their production decisions. If the quantities procured are significant, this procurement price may play the role of a floor for the domestic market price. Such a floor price would boost investment by making farmers more willing to invest, and banks or microfinance institutions more willing to lend them money. The expected benefits are: increased and less variable food production; lower production costs; increased availability of land and agricultural labour for other foods (thanks to productivity gains); and higher farmer incomes (resulting in reduced food and nutrition insecurity in rural areas).

Stimulating farmer investment in food production does not require a high floor price: what matters is preventing price collapses. The floor should therefore be fixed at, or even slightly below, the mid-term average level of international prices: a high price floor generates a high consumption price that is damaging for food and nutrition security, even if subsidies are implemented to support poorer consumers (as illustrated by the current experiences of the Philippines, Zambia and, since 1998, Indonesia – see Case Study 2).

By offering remunerative prices, food reserve procurement may boost farmer investment, potentially resulting in higher and more stable production, lower production costs, and less rural poverty. However, specific conditions are required to get these results.

However, using food reserves to guarantee a floor price is not always appropriate:

- It may simply not be possible to guarantee a floor price through food reserve procurement: for this, the quantity to be procured would need to account for a significant share of the quantity traded on the domestic market.
- Other tools may be better suited to guarantee minimum prices to farmers: taxes and subsidies may be more efficient, for example the use of import taxes.
- Floor prices may not be necessary to boost investment in food production: just providing an enabling environment (e.g. availability of improved seeds, good quality roads) is sometimes enough.
- Guaranteeing floor prices may generate negative effects. First, it may create environmental degradation if it promotes production models that generate scarcities in some of the resources used (e.g. water for irrigation) or unacceptable levels of pollution of soil, water and plants, generating food safety concerns. Second, if there is a lack of available land or agricultural labour, incentives to increase the production of specific crops may result in reducing the production of other foods, thereby restricting the diversity of food consumption. Third, floor price policies may sometimes have a negative effect on rural poverty and food and nutrition security as they may mainly benefit big farmers and harm deficit farmers (who comprise, for example, 73% of farmers in Ethiopia and 63% in Kenya).

Food reserve procurement can provide targeted incentives in order to orient farmers' decisions toward specific production or marketing models (such as organic agriculture, collective marketing through farmer organisations, or use of warehouse receipt systems).

Using food reserve procurements to orient farmers' decisions toward specific models, such as production by small-scale or organic farmers, or marketing models based on collective marketing through producer organisations, warehouse receipt systems (see Box 1) or commodity exchanges. There are several ways to provide such targeted incentives: a quantity quota can be reserved for specific categories of suppliers, who may then also benefit from higher prices or more flexible conditions regarding quality, place of delivery, timing, minimum quantity requirements or payment.

The potential benefits are multiple:

- Reduced rural poverty and rural food and nutrition security;
- Increased food safety;
- Improved sustainability of food production (reduction of pollution, less intensive use of natural resources);
- Strengthened production organisations resulting in increased bargain power for small farmers;
- Improved transparency on food markets; and
- Higher farm storage, contributing to improved food and nutrition security during the lean period.

BOX 1

Supporting warehouse receipt systems to improve farmers' marketing

Warehouse receipt systems (WRS) are based on outsourcing the storage activity. Farmers and traders entrust their stocks to an accredited warehouse and receive warehouse receipts. These receipts can be used as collateral to obtain credit from a bank or a microfinance institution. In some countries, warehouse receipts can be sold, meaning that several transactions (transfer of property rights) may occur without moving the product. By getting a better access to credit, farmers who use WRS are often able to defer their sales, thereby getting a better price (prices usually collapse during the post-harvest period). Another consequence is increasing their level of grain stocks during the lean period, thereby contributing to improve their food and nutrition security. Apart from their expected effect on the farmers who use them, WRS may also generate benefits on a broader scale: they may contribute to improve market efficiency by increasing the transparency on stocks, reducing transaction costs and smoothing the seasonality of prices.

Other tools can be used to generate such benefits: an enabling environment (e.g. a legal framework for warehouse receipts) or subsidies. However, lessons from experience show that public procurement can have a much stronger impact through generating learning-by-doing and capacity building. On the other hand, providing targeted incentives through food reserve procurement can be challenging because many implementation issues have to be overcome, in particular the risk that policy-makers or bureaucrats may be tempted to use food reserve procurement for political patronage.

Case study 3

AN INTEGRATED FOOD RESERVE TO ENCOURAGE SMALL-SCALE FARMERS IN BRAZIL

Brazil developed an ambitious policy framework to improve food and nutrition security: the "Zero Hunger" strategy. It is based on a multidimensional and multi-sectorial approach: it encompasses many programmes and activities including conditional cash transfers (Bolsa Família), school feeding programme, food assistance for vulnerable groups, vitamin A and iron supplementation, food and nutrition education, subsidized credit for family farmers, programme for family care, inclusive microcredit and many others.

Food reserves and public support to stocks held by farmer organizations play an important role within this framework. The government holds food reserves for maize (1 900 000 tons), rice (755 000 tons), wheat (400 000 tons) and beans (47 000 tons). In addition, it purchases a huge diversity of food products to supply school canteens and food transfers to vulnerable households. Some of these purchases are targeted to family farmers.

Public purchases from family farmers are currently based on two programmes: the Food Acquisition Programme (PAA) and the National School Feeding Plan (PNAE). Both programmes aim to increase the income of family farmers (among whom the poverty rate is extremely high: 21.8% compared with 13.2% for the general population). They also aim to improve the quality of food used for school feeding and other social programs (i.e. more fresh food, more organic food, more local food, and more food attuned to local culture, habits and preferences).

The PAA was created in 2003, with the following objectives:

- incentivise family farm production;
- incentivise the consumption of family farm production;
- promote access (in quantity, quality and regularity) to food for populations in situations of food and nutrition insecurity;
- build food reserves;
- support the creation of food stocks by farmer organisations; and
- strengthen local and regional networks for food marketing.

The PAA is mainly focused on organising public purchases from family farmers. It is based on simplified procurement procedures which bypass the bidding legislation that, for different reasons, makes it almost impossible for small-scale family farmers to compete with larger producers and companies. The procurement prices applied by the PAA are generally not much higher than the prices prevailing on regional markets: its theory of change is that guaranteed demand may be enough to boost and improve the production of small-scale farmers. However, since 2011, the procurement price has been 30% higher for organically certified or agro-ecologically produced products. Since the launching of the PAA in 2003, its resources have increased and stabilised since 2013. In 2015, they were around R$500 million (equivalent to €115 million at December 2015 exchange rate).

The PNAE is also the product of a long history. The first government school feeding programmes were launched in 1945, with a focus on food and nutrition, and little attention paid to the cultural adequacy of the food provided. Since 1994, decentralisation has been a decisive step in increasing family farmers' access to PNAE's public purchases, with the Federal government transferring resources to states and municipalities for school meals (since 1998, management of the programme has fallen under the National Fund for the Development of Education or FNDE). A 2001 decree stipulated that 70% of the FNDE's resources for school feeding should be used to purchase foods that meet the regional/local eating habits and the availability of local crops. This vision was strengthened in 2003 with the launch of the Zero Hunger strategy, with its highlighting of the concepts of 'food culture' and 'local solutions'. Then, in 2009, a new law specified that at least 30% of purchases for school meals with Federal resources should be from smallholder farmers or their organisations, with the criteria of eligibility and priority to supply copied from PAA (including the priority given to organic food and food produced via agro-ecological practices). The PNAE budget has increased regularly over the years, both because its coverage has expanded (for instance, secondary school students were included from 2009) and because the amount per meal has also risen. In 2015, the PNAE budget reached R$3750 million, of which R$858 million was dedicated to purchases from family farmers (equivalent to €197 million at December 2015 exchange rate), more than the budget of the PAA.

Evidence shows that the income gap between family farmers and the rest of the working population has been reduced between 2001/2002 and 2009/2011. Over the same period, the extreme poverty rate decreased by 60% for family farmers compared with 39% for the rest of the population. The PAA and the PNAE are believed to have contributed to this result, in conjunction with other social programmes. The PAA and PNAE's role on food and nutrition security can only be understood within the Zero Hunger framework: for instance, a significant part of the PAA suppliers are beneficiaries of Bolsa Familia.

To sum up, when food reserves are used to provide permanent transfers or to manage food crises, the required public purchases can be used to provide incentives to stimulate or orient food production. These incentives often take the form of price incentives but other kinds of incentives can also be provided (such as attractive conditions of payments and delivery, specific quality requirements, or quotas for specific categories of suppliers). Sometimes the existence of a regular structured demand is enough to generate the expected benefits (as illustrated by Brazil's experience, see Case Study 3). However, food reserve procurement is not the only way to provide incentives to farmers: they can benefit from subsidized credit or input subsidies, and the domestic market price can be supported through trade policies. Also, at times, providing an enabling environment (ensuring, for instance, the availability of improved seeds, good quality roads, or organic certification) can be sufficient. The question is thus whether it is more efficient to provide incentives through food reserve procurement instead of (or in complement to) other types of incentives. Experience shows that the comparative advantage (if any) of providing incentives through public procurement is often related to generating learning-by-doing and capacity building. The decision process when deciding on the appropriateness of using food reserve procurement to send price incentives in order to stimulate or orient food production and marketing is as follows:

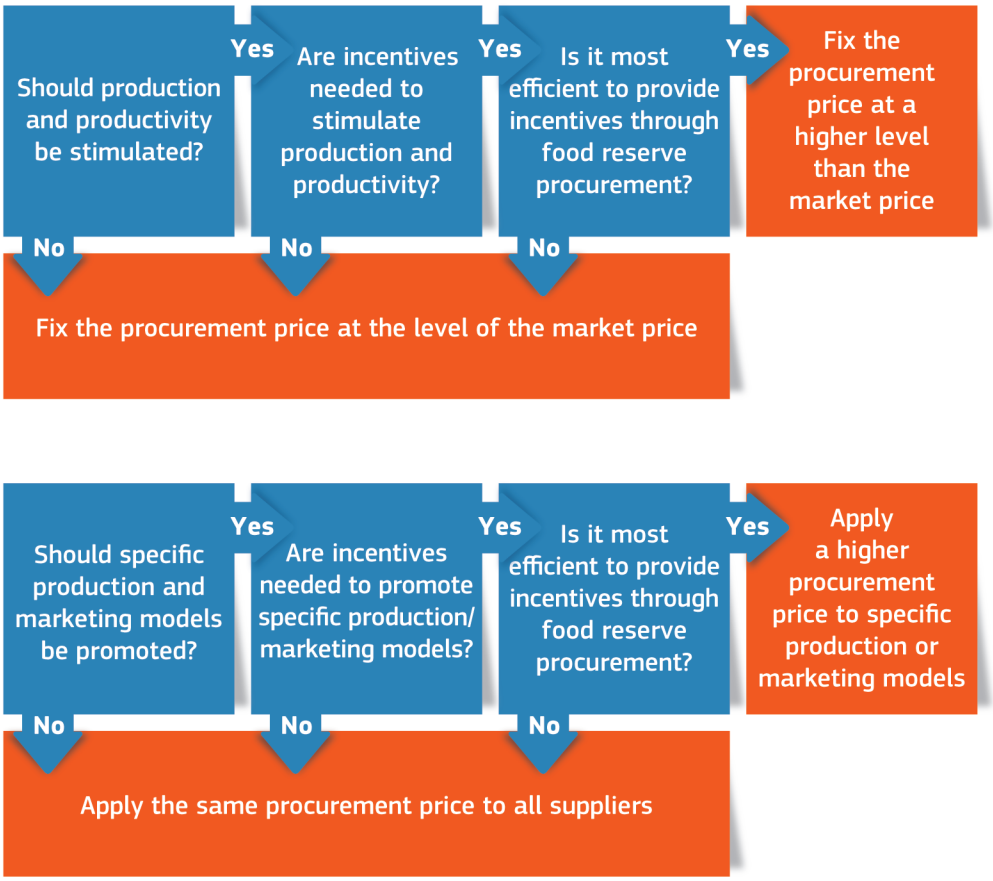

Figure 4 – Appropriateness of using food reserve procurement to send price incentives in order to stimulate or orient food production and marketing

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How and where to support food reserves to increase the stability of regional and international markets?

The role of food reserves in mitigating the risk of global grain stocks being insufficient and contributing in avoiding price spikes on international markets. When the level of stocks is too low (compared with annual uses), any significant supply or demand shock may generate sharp price increases. For grains, the consequences can be highly damaging for world food and nutritional security. A major issue is that the stock-to-use ratio (STUR) is likely to be too low, most of the time. Private storage contributes to more stable prices because traders usually purchase when the price is low (thereby supporting it) and sell when it is high (thereby pushing it down). Thus, storage generates a positive externality: it benefits not only those who hold the stocks but all people impacted by prices. This is precisely why private storage, which is only driven by profit maximisation, is likely to be insufficient compared with the level of stock that would be optimal for food and nutrition security. **Food reserves can contribute to fill this gap** by complementing private storage (see Box 2). In so doing, they have beneficial effects on national markets, but also a stabilising effect on international or regional markets.

BOX 2

Harmonising food reserves and private storage

Private stocks can play an important role in ensuring food and nutrition security. Policies should recognise this and create an enabling environment for private storage. Food reserves can contribute, for instance by procuring grains with warehouse receipt systems (which encourage storage). Clear and transparent rules to trigger food reserve releases help to prevent the food reserve from discouraging private storage. Finally, in periods of crisis, timely releases from food reserves can play a decisive role in avoiding stock hoarding and panics.

However, because national food reserves are driven by national food security objectives, they are likely to be lower than would be optimum from the point of view of global food and nutrition security. **This means that the risk of global stocks (in both private stocks and food reserves) being insufficient is high,** that is, periods during which stocks are too low (compared to uses) are likely to occur, making markets particularly vulnerable to shocks.

This risk is particularly problematic for grains. **Low global grain stocks (expressed in months of world annual uses) often result in surges in international grain prices.** The relationship between grain stocks and prices is so strong that the 2008 crisis had been predicted as early as 2005 by observing the decreasing trend of global grain stocks. Significantly, after the 2008 crisis, FAO commissioned a study to build an early warning indicator of price spikes based on the level of global stocks. The 2008 crisis on international rice and wheat markets showed what may occur when the level of global stocks is too low (see Box 3). Importing countries that do not hold enough stocks (compared with their needs) may panic if the food products they need become scarce on international markets: they may then increase their level of imports, thereby further exacerbating the increase in international prices. In parallel, exporting countries may be tempted to ban exports in order to avoid the surge in international prices pulling up domestic prices, especially when the main exporting countries are developing countries in which grain price spikes may generate food insecurity issues (as in the case of rice).

BOX 3

Lessons from the 2008 global rice price crisis

Whatever its direct triggers (which are still debated), it is clear that the underlying cause of the 2008 rice price crisis was the low level of global stocks, chiefly as a result of policy changes among the three main traditional holders of grain: China, the European Union and the United States.

In late 2007 and early 2008, several big countries dramatically restricted their exports (for instance, India's export ban on non-basmati rice resulted in its rice exports falling from 6.45 to 2.48 million tons), while some big importing countries panicked and increased their imports (for instance, the Philippines' rice imports jumped from 1.8 in 2007 to 2.43 million tons in 2008). The international rice market is thin (around 30 million tons compared to 100 for maize and 120 for wheat), so the 2008 decrease in India's exports accounted for more than 13% of the quantity traded on the international rice market and the increase in the Philippines' imports for around 5%. Moreover, export restriction policies and panic imports in some countries exacerbated the worries about scarcity, thereby leading other countries to implement the same policies. This snowballing effect resulted in dramatic price increases: during the first six months of 2008, the price of a ton of rice on the world market trebled.

Significantly, food reserves played an important role in ending the crisis. The bubble of export bans and panic imports was only reversed when the United States exceptionally allowed Japan to export its "minimum access rice reserve" (stockpiled in Japan because of a WTO ruling). Immediately after the announcement, mere anticipation of this move lowered prices by 14% in a single week. Ironically, although the rice from Japan was never actually sold or shipped, confidence returned to the markets and the world rice price continued to fall every month throughout 2008.

Food reserves can be very useful as a grain custodian, especially when the grains most consumed by the poor are not traded on international markets (as is often the case in sub-Saharan Africa, for instance).

Which solutions? To bridge the gap between the drivers of national food reserves (national food and nutrition security objectives) and the needed extent of their collective effect (stability of regional or international markets and thereby improvement of global food and nutrition security), external incentives or supranational arrangements are a valuable option. Such incentives can be provided by International or regional organisations, as well as donors, in the form of technical and financial support to the building of food reserves in vulnerable countries, and supranational arrangements can take the form of the establishment of regional food reserves.

External support to food reserves as a way to reduce the probability and magnitude of price surges on international or regional markets. Because food reserves in a given country may contribute to improved food security in other countries (thanks to their stabilising effect on regional or international markets), it makes sense for donors or international or regional organizations to support them, particularly in developing countries that may face import challenges, countries where the grains most consumed by the poor are not traded on international markets (such as many African countries), landlocked countries, or countries whose imports account for a significant share of the quantity traded on international markets. In all these situations, food reserves can help avoid panic imports and the resultant destabilising effects on regional or international markets (it was estimated that, in 2008, half of the price surge on the rice market was due to panic imports).

Regional food reserves as a way to promote regional solidarity in managing food crises. Regional food reserves are mutualised reserves built collectively by a group of countries from the same region (see Case Study 4). Their goals are: (i) to be a grain custodian, usable by Member countries if hit by natural disasters or food crises; and (ii) to promote regional solidarity, with the cost of the grains provided to a crisis-hit country being covered by the other countries.

Case study 4

REGIONAL RESERVES – ACHIEVEMENTS AND CHALLENGES

Three regional grain reserves are currently functioning. Two of them are based in Asia: the SAARC Food Bank (SFB) and the ASEAN Plus Three Rice Reserve (APTERR). The target stock levels are 787,000 tons of rice for APTERR and 486,000 tons for SFB (comprising 60% rice and 40% wheat). Together these two reserves only account for about 3% of the annual international rice trade, 1% of world rice stocks and 0.25% of annual world rice consumption. They have never, however, been used as a grain custodian in the case of an emergency, probably because they are not really competitive with international markets: commercial imports can often be arranged more quickly and at a similar or even lower cost (preferential prices have been discussed for the two reserves but are still not agreed upon). The only aspect that seems to be successful is the one based on regional solidarity (Tier 3 of APTERR). But the quantities involved are very small: for instance, in 2016, 240 tons of rice were distributed in the Philippines and 210 tons in Cambodia, while in 2017, 267 tons were distributed in Myanmar.

Food reserves can help avoid panic imports. In 2008, half of the price surge on the rice market was due to panic imports.

The third regional reserve (ECOWAS Regional Food Security Reserve) seems to be more apposite. It is focused on grains that are scarcely traded on international markets (millet, sorghum and specific varieties of maize) and whose local production is highly unstable, which renders a grain custodian extremely useful. It also benefits from a favourable context as grains can be easily stored in the Sahel region: millet and sorghum can be kept for two or three years without any quality deterioration. Finally, it is mainly based on regional solidarity: when a Member Country is hit by a crisis, it can receive for free a specific quantity of grains from the reserve. When surplus grains are available, Member Countries or non-governmental organisations can buy grains from the reserve. The ECOWAS Regional Reserve took time to establish, but now the infrastructure is almost completely in place (food reserve agency, rules and procedures, contracts with national food reserves for storage services, etc.). About 27,000 tons have been purchased. 1,130 tons were provided to Nigeria and distributed in the Northeast of the country during the 2017 famine. And, in August 2018, 6,500 tons of grains have been lent to Niger and 4,300 tons to Burkina Faso. Additional benefits have been an improvement in information systems on food crises (based on the Cadre Harmonisé Bonifié, a local version of the international Integrated Phase Classification) and the provision of technical support to national and local food reserves. However, the Reserve is still facing many challenges. Up to now, all procurement has relied on EU funding, and the stock is still a long way from its target level of 140,000 tons. The financial reserve is still zero, whereas its target level is equivalent to 260,000 tons of grain. To date, no financial contribution from ECOWAS has been provided and no sustainable source of funding has been created (a 0.5% “zero-hunger tax” on ECOWAS non-food imports has been discussed but never implemented).

Theoretically, more ambitious supranational reserves are possible, like bigger regional reserves focused on stabilising prices, or international grain reserves. However, these kinds of reserve would be very costly and would probably face substantial governance issues.

Conclusion: the decisive role of governance

This note shows that food reserves can, in some occasions, be a very useful tool that, combined with other instruments, may significantly contribute to improving food and nutrition security. Yet, the four impact pathways reviewed in the previous sections are not automatic: they can only be achieved through well-designed and well-governed food reserves. What matters is the good governance of food reserves themselves but also the international coordination of the building and use of food reserves.

Good governance of food reserves as a key condition of success. The main rules for a good governance of food reserves are the following:

- The objectives of a food reserve should be relevant, realistic and clearly specified. For instance, if a food reserve aims to act on food prices, its objective should be limited to prevent price surges or collapses but domestic food prices should still follow the mid-term trend of international prices (permanently high prices are highly damaging for food security whereas permanently low prices discourage production).

- The composition, size and location for the food reserve should be chosen carefully in order to meet the specific objectives of the food reserve and the specificities of the context.

- The physical management of the stock (treatments, rotation, etc.) should avoid losses, quality deterioration and diversions.

- Food reserve interventions should be rules-based and predictable. Discretionary and unpredictable interventions would crowd out private storage and private trade: traders would store less because they would fear public interventions may curb prices down. On the contrary, interventions triggered by clearly defined and publicly known rules do not disturb the market. This also implies that Information on the triggering indicators should be available to all market players.

- The procedures used for food reserve agency purchases, sales and distribution should guarantee fairness among market players or potential recipients. For instance, when the food reserve agency purchases or sells on the domestic market, tenders can be organised to guarantee a fair competition between market players, which does not preclude defining specific conditions for specific categories of market players (such as farmer organisations), providing that these conditions are the same for all market players within a category.

- The food reserve agency should have the means to react quickly when it appears that an intervention is useful or necessary (in terms of staff, infrastructure, equipment and budget).

- Data on food reserve interventions, their cost and their effects should be regularly produced and disseminated in order to guarantee the transparency on interventions and to allow for regular improvement in the management of interventions.

Why an international institutional environment would be very useful to coordinate the building and use of food reserves. Establishing an international institutional environment for food reserves could be very useful in two respects:

- To optimise the use of existing stocks (especially in periods of crisis). Three main lines of action have been proposed: the creation of an international agricultural market information system (AMIS) to improve the transparency on stocks (this AMIS has actually been created and is hosted at FAO); developing WTO disciplines on export restrictions (such disciplines have been debated, and rejected, in 2011 – see Box 4); and building an international agreement for the coordinated use of food reserves in periods of crisis (such an agreement was proposed in 2008 by Justin Lin, then chief economist of the World Bank, but has never been developed).
- To maintain a minimum level of stocks at the global level. Two main lines of action have been proposed: the modification of WTO rules on food reserves to make them less restrictive (negotiations on this topic have been on-going since 2013 – see Box 4); and building an international agreement by which countries commit themselves to hold a minimum level of grain stock (an agreement of this kind, to share the burden of storage between countries – inspired by the Kyoto protocol – was proposed in 2011, but has never been developed).

BOX 4

Possible WTO reforms

WTO rules play an important role in determining the level and use of food stocks. However, they do not necessarily provide the right incentives: they place restrictions on food reserves that might be expected to have a stabilising effect on international prices, whereas they allow trade policies that may have a very destabilising effect, such as export restriction measures. There is therefore an argument to modify WTO rules.

One option would be based on restricting the use of export restriction measures. However, this approach raises an issue about feasibility (such a proposal was discussed – and rejected – during the 2011 WTO Ministerial Conference). Furthermore, its effectiveness in improving global food and nutrition security is uncertain: whilst it would be expected to help reduce the instability of international prices, it would also impede exporting countries from protecting themselves from any remaining instability on those markets.[x]

So it is worth considering whether the solution might rather be found in modifying the WTO rules that relate directly to food reserves. Three possible options for this exist:

- To adjust the rules that specify how the support provided by food reserves is calculated: for grains, current rules generally strongly overestimate the real level of support provided;[xi]
- To increase the ceilings for the maximum allowed level of domestic support (at least for some categories of countries and products); and
- To allow countries to exceed their maximum allowed support in specific circumstances (through safeguard clauses).

These three options have been debated at the WTO since 2012. The Bali conference (in December 2013) failed to produce an agreement on this issue: Members simply agreed on a peace clause exempting the already existing public stockholding programmes from legal challenges until a "permanent solution" is found. [xii] [xiii] The need to find a permanent solution to the issue of public stockholding for food and nutrition security purposes was reaffirmed in December 2015 during the Nairobi Ministerial Conference. The topic was debated again during the Buenos Aires Ministerial Conference [xiv] in December 2017, in a context marked by the US-China grains dispute. [xv] [xvi] But no agreement has been reached yet.

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Published by European Commission, Directorate-General for International Cooperation and Development,
DEVCO Unit C1 (Rural Development, Food Security, nutrition)

Rue de la Loi 41, B-1049 Brussels, March 2018.

For further information:
http://ec.europa.eu/europeaid/

Catalogue number: MN-05-18-004-EN-N
ISBN: 978-92-79-96739-9
DOI: 10.2841/594233