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Research Report

Consistency between Theory and Practice in Policy Recommendation by International Organizations for Extreme Price and Extreme Volatility Situations

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FONDATION POUR LES ÉTUDES ET RECHERCHES SUR LE DÉVELOPPEMENT INTERNATIONAL

Consistency between Theory and Practice in Policy Recommendation by International Organizations for Extreme Price and Extreme Volatility Situations*

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Introduction

Food prices have increased significantly in the past few years, with particularly sharp spikes seen during the 2007/08 season. There is some agreement on the causes of such price increases: (a) weather shocks that negatively affected agricultural production; (b) soaring energy and fertilizer costs; (c) rapidly growing income in developing countries, especially in China and India; (d) the devaluation of the dollar against most major currencies; (e) increasing demand for biofuels; and (f) changes in land use patterns. While there is no consensus on the relative importance of each of these culprits, it is widely agreed that most of these factors will further increase food prices in the medium and long run. Prices may become more volatile as well, as evidenced by the subsequent food crisis in 2010. Climate change will induce more weather variability, leading to erratic production patterns. Moreover, the volatile nature of the market is likely to induce possible speculation and exacerbating price spikes.

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• • • / • • • Additionally, in an effort to shield themselves from price fluctuations, different countries may implement isolating policies, further exacerbating volatility.

Looking at the volatility at global level is important because although the food price spikes of 2008 and 2011 did not reach the heights of the 1970s in real terms as shown in Figure 1, price volatility – the amplitude of price movements over a particular period of time – has been at its highest level in the past 50 years. This volatility has affected wheat and maize prices in particular. For soft wheat, for example, there were an average of 41 days of excessive price volatility a year between December 2001 and December 2006 (according to a measure of price volatility recently developed at IFPRI). From January 2007 to June 2011, the average number of days of excessive volatility was more than doubled to 88 a year. Despite this there has been no analysis of how global price volatility is affecting local relative prices (see Figure 2).

High and volatile food prices are two different phenomena with distinct implications for consumers and producers. High food prices may harm poorer consumers because they need to spend more money on their food purchases and therefore may have to cut back on the quantity or the quality of the food they buy or economize on other needed goods and services. For food producers, higher food prices could raise their incomes – but only if they are net sellers of food, if increased global prices feed through to their local markets, and if the price developments on global markets do not also increase their production costs. For many producers, particularly smallholders, some of these conditions were not met in the food price crisis of 2011.

Apart from these effects of high food prices, price volatility also has significant effects on food producers and consumers. Greater price volatility can lead to greater potential losses for producers because it implies price changes that are larger and faster than what producers can adjust to. Uncertainty about prices makes it more difficult for farmers to make sound decisions about how and what to produce. For example, which crops should they produce? Should they invest in

Figure 1. Real price evolution. Index=100 in 1960

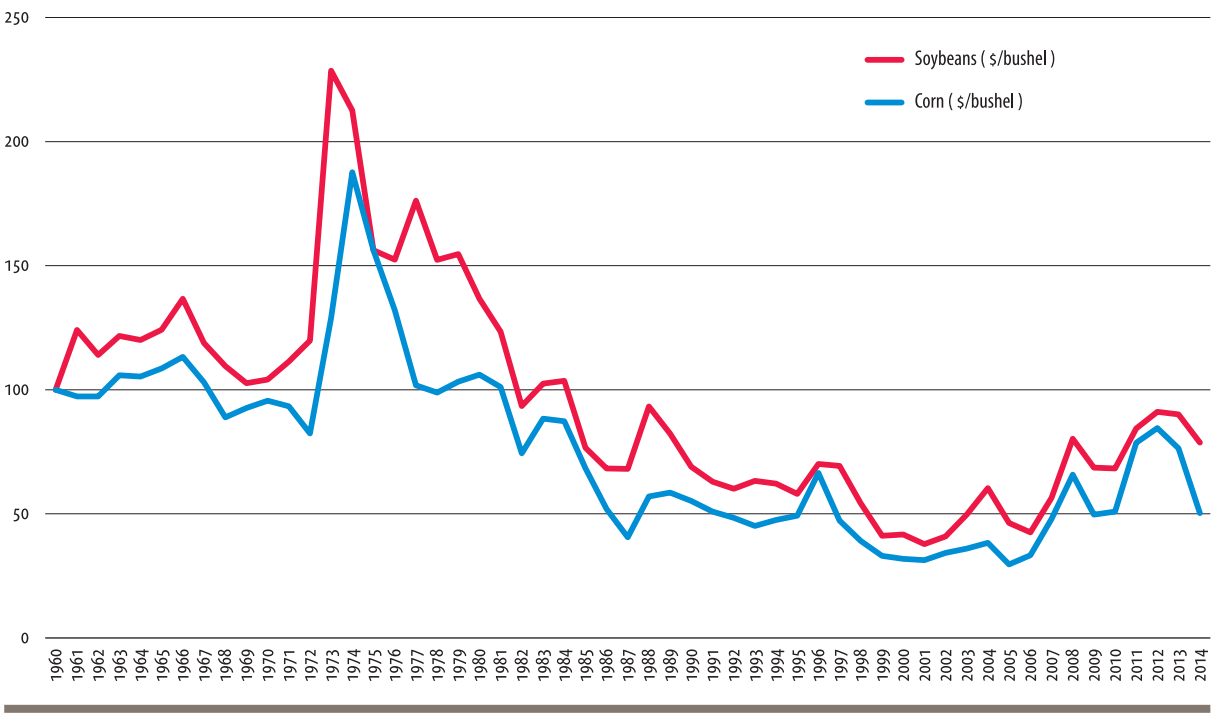
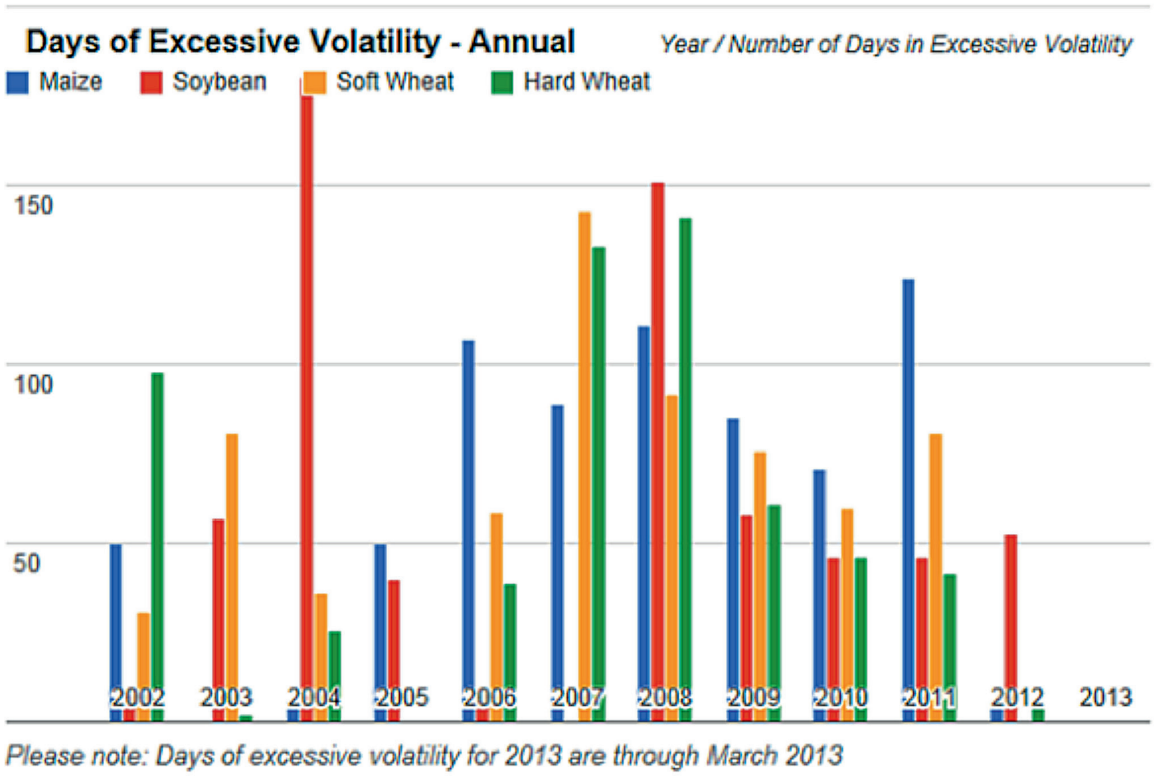


Figure 2. Periods of Excessive Volatility



Note: This figure shows the results of a model of the dynamic evolution of daily returns based on historical data going back to 1954 (known as the Nonparametric Extreme Quantile (NEXQ) Model). This model is then combined with extreme value theory to estimate higher-order quantiles of the return series, allowing for classification of any particular realized return (that is, effective return in the futures market) as extremely high or not. A period of time characterized by extreme price variation (volatility) is a period of time in which we observe a large number of extreme positive returns. An extreme positive return is defined to be a return that exceeds a certain pre-established threshold. This threshold is taken to be a high order (95%) conditional quantile, (i.e. a value of return that is exceeded with low probability: 5 %). One or two such returns do not necessarily indicate a period of excessive volatility. Periods of excessive volatility are identified based a statistical test applied to the number of times the extreme value occurs in a window of consecutive 60 days. // Source: Martins-Filho, Torero, and Yao 2014.

expensive fertilizers and pesticides? Should they pay for high-quality seeds? Without a good idea of how much they will earn from their products, farmers may become more pessimistic in their long-term planning and dampen their investments in areas that could improve their productivity. The positive relationship between price volatility and producers 'expected losses can be modeled in a simple profit maximization model assuming producers are price takers. Still, it is important to mention that there is no uniform empirical evidence of the behavioral response of producers to volatility. By reducing supply, such a response could lead to higher prices, which in turn would hurt consumers.

It is important to remember that in rural areas the line between food consumers and producers is blurry. Many households both consume and produce agricultural commodities. Therefore, if prices become more volatile and these households reduce their spending on seeds, fertilizer, and other inputs, this may affect the amount of food available for their own consumption. And even if the households are net sellers of food, producing less and having less to sell will reduce their household income and thus still affect their consumption decisions.

Finally, increased price volatility over time can also generate larger profits for investors, drawing new players into the market for agri-

cultural commodities. Increased price volatility may thus lead to increased—and potentially speculative—trading that in turn can exacerbate price swings further.

Despite the conceptual importance of the effects of price volatility, consumer welfare is notoriously difficult to measure due to income effects associated with price changes. In addition, the fact that in many low income countries economic agents are concomitantly consumers and producers of food creates added concerns.

Besides the inherent difficulties in adequately measuring consumer welfare, most empirical models for the dynamic evolution of returns for major agricultural commodities lack flexibility in modeling the conditional volatility (conditional standard deviation) of returns. Restrictive modeling of volatility can produce inconsistent return forecasts and inaccurate assessments and policy recommendations regarding the link between volatility and consumer welfare.

This situation imposes several challenges. In the short run, the global food supply is relatively inelastic, leading to shortages and amplifying the impact of any shock. The poorest populations are the ones hardest hit[1]. As a large share of their income is already being devoted to food, the poor will likely be forced to reduce their (already low) consumption. Infants and children may suffer lifelong consequences if they experience serious nutritional deficits during their early years. Thus, the short-term priority should be to provide temporary relief for vulnerable groups.

In the long run, the goal should be to achieve food security[2]. The drivers that have increased food demand in the last few years are likely to persist (and even expand). Thus, there will be escalating pressure to meet these demand requirements. Unfortunately, increases in agricultural productivity have been relatively meager in recent years. In this line, "the average annual rate of growth of cereal yields in developing countries fell steadily from 3 percent in the late 1970s to less than 1 percent currently, a rate less than that of population growth and much less than the rise of the use of cereals for other things besides direct use of food" (Delgado et al, 2010, p 2).

There is a wide array of options to achieve these short- and long-run objectives, and there are no one-size-fits-all policies. Most policies come with significant trade-offs and each government must carefully weigh the benefits and costs they would face. For example, governments might try to make food more readily available by reducing food prices through price interventions. While this policy might achieve its short-term goal, it can potentially entail fiscal deficits and discourage domestic farmers' production. Other policies not only have domestic consequences but can entail side effects for other countries. In their efforts to insulate themselves from international price fluctuations, some countries might impose trade restrictions; if a country is a large food exporter, the government might impose export taxes, quantitative restrictions, or even export bans. Albeit increasing domestic supply and lowering national prices, these policies would reduce the exported excess supply, induce even higher international prices, and hurt other nations. In addition, the "right" policies depend on the particular institutional development of a country. Middle-income countries might already have

1. There is a general concern that increasing food prices have especially adverse effects on the poor. However, until recently, there was no rigorous evidence of this. On the one hand, there would most probably be negative effects on poor urban consumers who spend a considerable portion of their budget on food. But on the other, there are gains to farmers who benefit from increased prices for their output. In general, this impact depends on whether the gains to net agricultural producers are larger than the losses to consumers. Directly dealing with this issue, Ivanic and Martin (2008) and Ivanic, Martin and Zarman (2011) find that the food crisis has led to significant increases in poverty rates of developing countries.

2. Food security is a situation in which "all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs, and food preferences for an active and healthy life" (World Food Summit, 1996). Even when increases in food production are not a sufficient condition for food security, they are indeed a necessary condition (von Braun et al 1992).

safety networks for vulnerable populations which can trigger prompt aid to those most in need in times of crisis. However, countries with lower incomes do not have such mechanisms readily available. Finally, the effectiveness of different policies will vary depending on the market characteristics of the commodity in which the government is intervening (i.e. the market structure for wheat is very different from that of rice, which is different from that of soybeans, etc.).

In this regard, this paper describes some of the most important policies International Organizations like the World Bank, IFAD, AFD, IADB, has prescribed to different countries during the food crisis of 2007/08. The understanding of such policies is important for at least three reasons. First, food crises are very sensitive episodes that affect the basic needs of entire populations, especially those of the world's poorest. As such, they require timely and sensible measures. Second, increasing food prices and price volatility are likely to remain an important challenge in the medium and long run. Third, food policies are usually complex; they need to be assessed to consider their domestic impact, the trade-offs that they entail with respect to other objectives, their consequences for other countries, and their feasibility in particular contexts.

Consistency of key policies proposed and implemented

The question that this paper tries to answer is how consistent or inconsistent the operational policy recommendations have been with respect to: (a) Proposals of International Organizations and the G8's document prepared for the Ministers of Finance Meeting in 2008 and (b) the different policy recommendations proposed by key researchers and analyzed in detail in the previous two sections. The review focuses on the short-term, medium, and long-term policies proposed. In terms of short-term policies, two mechanisms are emphasized: support for the poor and price stabilization (with an emphasis on trade restrictions and food reserves). In terms of medium- and long-term policies, we focus on the recommendations linked to increasing agricultural productivity through productivity gains and elimination of post-harvest losses.

With this objective in mind, we analyze as an experiment the portfolio of loans of the Global Food Crisis Response Program (GFRP) operations detailed in Table 1, covering operations in 13 developing countries.

Table 1: Documents Analyzed for GFRP Operations

Country	Project ID	PAD	ICR
Mozambique	107313	✓	✓
Djibouti	112017	✓	✓
Honduras	112023	✓	N/A
Haiti	112133	✓	N/A
Bangladesh	112761	✓	✓
Sierra Leone	113219	✓	✓
Madagascar	113224	✓	✓
Rwanda	113232	✓	N/A
Burundi	113438	✓	✓
Philippines	113492	✓	✓
Guinea	113625	✓	✓
Mali	114269	✓	N/A
Cambodia	117203	✓	✓

Note: PAD is the Project Appraisal Document and ICR is the Implementation and Completion and Results Report

In support of the poor, Targeted Cash Transfers (TCT) and Conditional Cash Transfer (CCT) programs already in place clearly constitute first-best responses for several reasons: (a) they prioritize assistance for targeted groups, (b) they do not entail additional costs of food storage and transportation, (c) they do not distort food markets, and (d) in the case of CCTs, they explic-

itly prevent human capital deterioration. When TCTs and CCTs are not available, governments may also implement other types of assistance programs, although this could bring some inefficiency. Therefore, in poor countries where TCTs and CCTs are not yet in place (such as most Sub-Saharan Africa), it is essential that during non-crisis years, countries invest in strengthening existing programs - and piloting new ones - to address chronic poverty, achieve food security and human development goals, and be ready to respond to shocks. Across the different Global Food Crisis Response Programs (GFRPs), we see these policies implemented by the World Bank, specifically in Philippines, Djibouti, Haiti, Cambodia, Guinea, Burundi, and Madagascar.

In terms of short-term price stabilization policies through trade policies and management of food reserves, we identify important inconsistencies in what was recommended in the official position by the World Bank, through the GFRP framework document and in the G8's document prepared to the Ministers of Finance Meeting in 2008, and in post-2008 recommendations. Clearly, the official recommendations in 2008 were more flexible, especially in regards to trade policies and physical reserves, and in some cases allowed short-term interventions that could end in pervasive market distortions. As a result, most of the operations under the GFRPs were consistent with the official policy recommendations with the exception of Cambodia, Guinea, Sierra Leone, and Rwanda.

On the other hand, if we look at the post-2008 recommendations, all of them will avoid any potentially pervasive market distortions. Even more, regarding trade policies, most of the work of the World Bank will advise against any trade restrictions (on both the import and the export side). In that sense, if we assess ex post the GFRP operations, we find that in many of countries, the policies implemented as a result of the GFRP created additional trade restrictions other than export bans, which was the only bad policies identified in the GFRP framework document. This was the case for Bangladesh, Philippines, Mali, Guinea, Burundi, and Sierra Leone.

Nevertheless, and as explained, it is important to mention that what the GFRP framework recommended in 2008 relative to what was recommended post-2008 is in a certain way justifiable as a short-term measure given that all in all, trade policies may be an effective instrument for short-term price stabilization purposes in some nations: those facing considerable political unrest, lacking adequate food distribution networks, with no safety nets available, etc. However, they may have important beggar-thy-neighbor consequences and may fuel price increases of important commodities. The 2007/08 food crisis – especially in the case of rice – is quite illustrative in this respect. Insulating trade policies imposed by importers and exporters (as well as high-income and developing countries) were indeed responsible for a considerable share of price spikes. However, even when the aggregate effect of the actions of these broad groups is quite large, most of the turmoil was likely caused by large exporters and importers. In this sense, if the argument is that such policies create further imbalances for others, policy recommendations should distinguish between larger and smaller countries; from all the countries where we see these inconsistencies, the Philippines is the only one falling into the category of a significant importer of rice where the World Bank should be clearly against import tenders and quantitative restrictions, given they clearly helped to exacerbate international prices in the rice market.

With respect to food reserves, the discussion seems to highlight the need for food reserves to ease the effect of shocks during periods of commodity price spikes and volatility. There seems to be some consensus around this idea. The disagreement stems from the specific mechanisms to implement food reserves. As in the case of trade interventions, the most appropriate choices are likely to depend on the characteristics of the specific market under in-

tervention, the country's capacity to cope with crises, and the possibility of establishing international coordination mechanisms. While it likely does not make sense to establish national buffer stocks in most grain markets, it may be more valid in a few cases, such as in the rice market. Again, however, regional reserves with strong governance and clear triggers are preferred. However, it is important to mention that the GFRP framework is not extremely clear on this in difference to what was recommended post-2008. It is in that sense that when analyzing the operational plans of the GFRPs, proposals can be identified that promote country level reserves as buffer stocks, as in the case of Bangladesh where the stocks were increased from 1 to 1.5 million MT of rice, the NFAs in Philippines, and Guinea. It could also be argued that these reserves were consistent with the official position of the World Bank through the GFRP framework, although clearly these type of policies are problematic in countries where the necessary conditions for these reserves to work don't exist. Additionally, buffer stocks usually entail high costs and market distortions and are prone to corruption. Thus, most countries – especially those with weak institutions and scarce resources – should probably refrain from using buffer stocks.

Finally, with respect to the medium- and long-run policies, we see significant investment in the GFRPs (for example, the provision of infrastructure and public goods in Mozambique, increasing seed availability in Mali, and the rice intensification program in Madagascar). In addition, and as recommended in the GFRP framework document, we also see the important presence of input subsidies similar to those that have failed in Malawi with a fiscal cost of around 3% of the GDP. These plans envisage the implementation of a market smart approach to input subsidies. Such a strategy is characterized by: (a) targeting poor farmers; (b) not displacing existing commercial sales; (c) utilizing vouchers, matching grants, or other instruments to strengthen private distribution systems; and (d) being introduced for a limited period of time only. Albeit outlining a sensible rationale, it is unclear how these principles would be implemented in practice in poor countries like in the GFRPs in Haiti, Cambodia, Mali, Sierra Leone, and Rwanda. Poorer countries– which likely have the least developed input markets– may find it difficult to target only those farmers in need. Additionally, subsidy programs that would strengthen, rather than displace, the private sector are likely to require complex mechanisms. Institutional weaknesses of poor countries may render them unfeasible, aside from the fiscal costs.

It is important to note that in many countries, input markets are not well developed, as they are hampered by various policy, institutional, and infrastructure constraints that can only be overcome over time, while improvement in access to inputs would provide substantial benefits in the short run, given the crisis circumstances. Is in that sense that the "smart subsidies" proposed under the GFRP framework could be conceptually justifiable although as a short term measure given it could also create fiscal problems as previously mentioned based on the Malawi experience. Moreover it is of central importance that any "smart subsidy" policy include the five key characteristics mentioned in the previous paragraph. Furthermore, a long-time horizon is required to apply the "first-best" policies, namely, the alleviation of constraints (such as infrastructure, missing credit markets, etc.) which inhibit the development of efficient input markets.

Therefore, although this "second best measure" in the face of existing constraints as stated in the GFRP framework document could be justifiable in the short term the key is to assure all other needed elements are in place for its success and specially that investment to alleviate the key constraints of the input market are also started at the same time. All of these arguments are conceptually valid, although their applicability in any given country cannot be taken for

granted; in most cases, applicability was not actually and explicitly verified in the assistance programs funded under GFRP and the key four characteristics of the proposed "smart subsidies" strategies were not validated in advance.

In summary, when assessing the consistency of the specific loans and policies prescribed officially by the World Bank (WB) for selected countries during the 2007/08 food crisis, we identify that given the significant flexibility of the World Bank official recommendations, most of the loans comply with what was in the GFRP framework. However, when analyzing the consistency of those recommendations to the research results published by the World Bank post-2008, we found significant inconsistencies, especially in short-term policies. As a result, is extremely important for the World Bank to carefully assess the risks and costs of the implementation of the official, more flexible recommendations, of the GFRP against what is currently being advocated at the Bank and to carefully assess how to avoid these inconsistencies in the future.

Table 2. Summary of Operations

	Official position of WB during 2007/08		Policies recommended by the WB after 2008	
	Consistent	Not Consistent	Consistent	Not Consistent
Mozambique	X		X	
Bangladesh	X			X
Philippines	X		X	X
Djibouti	X		X	X
Honduras	X			X
Haiti	X		X	X
Cambodia	X	X (export ban)	X	X
Mali	X	X	X	X
Guinea	X	X (export ban)	X	X
Burundi	X		X	X
Madagascar	X		X	X
Sierra Leone	X	X	X	X
Rwanda		X		X

Conclusions

The world faces a new food economy that likely involves both higher and more volatile food prices, and evidence of both conditions was clear in 2007/08 and 2011. After the food price crisis of 2007–08, food prices started rising again in June 2010, with international prices of maize and wheat roughly doubling by May 2011. This situation imposes several challenges. In the short run, the global food supply is relatively inelastic, leading to shortages and amplifying the impact of any shock. The poor are the hardest hit. In the long run, the goal should be to achieve food security. The drivers that have increased food demand in the last few years are likely to persist (and even expand). Thus, there is a significant role for international organizations like the World Bank, IFAD, AFD, IADB to play in increasing the countries' capacity to cope with this new world scenario and in promoting appropriate policies that will help to minimize the adverse effects of the increase in prices and price volatility, as well as to avoid exacerbating the crisis.

In this regard, this paper describes some of the most important official policies that international organizations prescribed to different countries during the food crisis of 2007/08. In addition, it compares those policies to what the scientific evidence on their potential costs and benefits. The review focuses on the short-term, medium-, and long-term policies. In terms of short-term policies, two mechanisms are emphasized: support for the poor and price stabilization (with an emphasis on trade restrictions and food reserves). In terms of medium- and long-term policies, we focus on the recommendations linked to increasing agricultural productivity through productivity gains and elimination of post-harvest losses.

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