

Food price volatility: political causes, effects on hunger and poverty, sustainable solutions¹

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Executive Summary

Policy decisions impacting on food prices have been a key element in food security research for a long time (Amartya Sen, 1982). Findings of price volatility causes often differ, at times without analytical or empirical in-depth studies. Our research project focused on minimising post-harvest losses as one of the most crucial aspects along the food value chain: (i) minimisation through improved on-farm storage techniques (ii) reductions of seasonal food price variations beyond farm-gates and, at the global level, (iii) the interaction of trade policy changes with world market prices for staple foods.

This Policy Brief has two purposes:

1. It informs regulators, negotiators, and national and global stakeholders engaged in policy processes around sustainable development, namely the implementation of Agenda 2030 adopted in September 2015, and of the Sustainable Development Goals #2 (ending hunger) and #12.3 (halving per capita global food waste). At the first UN Summit on the SDGs, heads of states and governments will examine progress in attaining these goals.²
2. It will also contribute to the work of the Committee on World Food Security (CFS) on the Voluntary Guidelines on Food Systems and Nutrition, particularly on the price volatility reduction achievable by improved storage for small farmers.

¹ This is a Policy Brief summarising the findings of our research funded by the *Swiss Network for International Studies* (SNIS). The project "Food price volatility: political causes, effects on hunger and poverty, sustainable solutions" produced three Working Papers already accepted for publication in scientific journals. The innovative and interdisciplinary approach entailed a combination of academic researchers and practitioners in Vietnam, as well as extensive experimental field work in Tanzania.

² 24 - 25 September 2019, New York

We thus place our findings on post-harvest loss reductions (i) in their wider context, with appropriate improvement technologies and management tools, and with a few considerations on how to lessen the negative impact of trade policy changes.

Based on our research we can show that post-harvest losses are a key cause for the vulnerability and for the food insecurity of small and often less than self-sufficient farmers in poor countries. All too often such losses result from a lack of support available even in poor countries, such as weather-resistant storage, or credit facilities also available to female households. We also found that the price impact of political decisions on big markets for the three commodities observed remains generally limited. Nonetheless, in a few cases a vicious circle originated from policy announcements, increasing price volatility in poor countries and farms unable to cope with appropriate means of defence. This issue may amount to a violation of the Right to Food. In any case, effective solutions (besides the already noted storage improvements) are not easy to find.

However, our research allows us to make a few additional suggestions:

- Better access to credits, risk management instruments, water, and other production inputs for smallholders and female households
- Transparent market data empowering poor but e-connected smallholders, and governments for a better use of available border measures such as safeguards
- Risk hedging (instead of expensive and inefficient public stockpiles) on a public-private partnership basis even for poor farmers
- Multilateral trade negotiations considering the impact of trade liberalisation on smallholders
- International and national food aid strictly limited to emergencies and to the poorest population segment
- Investment contracts with social and environmental performance requirements

Context

Poverty and hunger, with their complex and interconnected root causes, remain central to all global development efforts (Tadesse, Algieri, Kalkuhl & Braun, 2014). Post-harvest losses are perhaps the key cause for the vulnerability and for the food insecurity of small and often less than self-insufficient farmers in poor countries. This is not new. But this lack of resilience has now reached a global stage. According to OECD research, the global food crisis of the years 2007 – 2009 and then again in 2010 –

2011 was exacerbated by increased price volatility of agricultural commodities (Huchet-Bourdon, 2011). Of course, better distribution over time can reduce famine (Ravaillon, 1997). Yet, while developed country agriculture enjoys several financial, credit, insurance and other risk management buffer-tools, poor states cannot even provide the necessary instruments, research and development services to the weakest fragment of their society. As a result, the lack of adequate storage, including cold chain control for cash crops, can oblige smallholders to sell their products before, or soon after harvest, i.e. when prices are low. In addition, lack of transportation and road infrastructure makes it difficult for smallholders to reach markets for their cash crops or their temporary food crop surpluses (CFS Voluntary Guidelines). Moreover, whereas rural women are frequently the sole producers and income providers in their families, their access to credits and inputs may be especially difficult, because the few instruments and capital endowment schemes available to poor men fail to consider gender specificities.

In most developed countries, agricultural policies tend to focus on farm security rather than on food security (Häberli, 2015). In poor and often structurally weak developing countries, policymakers with less deep pockets continue to rely on quickly disbursable food aid, and on price controls, especially for thinly traded commodities like rice (Rakotoarisoa, 2006). Alternative policy options directly striving to protect the most vulnerable groups would be more efficient in dealing with food price volatility; yet trade policy changes remain the dominant political intervention (Anderson & Nelgen, 2012).

After decades of neglect, developing country agriculture now obtains frequently important foreign and domestic investments for large-scale and often export-oriented projects, along the "Four Fs" of food, feed, fibre, and fuel commodities. While such investments could actually increase global food security and reduce world price volatility, and at the same time improve export earnings and debt-free rural infrastructure, the negative impact on resource-poor farmers is often neglected, not to mention land tenure rights of legally or illegally dispossessed smallholders (Häberli and Smith, 2014).

Under these circumstances, policy decisions under the banner of food security may turn out to be a socio-economic divider even among the poor. For instance, commodity exchanges, weather and price risk insurance, pre-harvest credits, and other modern risk management tools are but a remote prospect for the most food-insecure and least organised population segments. National and international food aid becomes a

symptom treatment, primarily directed at the poor but vocal urban population – and at the same time decreasing prices for poor domestic producers with modest surpluses.

International policy response has often exacerbated the farm-gate problem. Even during foreseeable price spikes, such as those resulting from prolonged droughts in Australia, fires in Russia and floods in Pakistan, international food aid volumes insidiously decreased. When in 2008 the world market price for rice quadrupled, the world's largest rice stockpile remained untouched. Even the WTO was unable to endorse the decisions of the G20 to prohibit export restrictions including for the purpose of providing international food aid. Although export taxes and restrictions were identified by OECD and the scholarship as severely impairing food security – sometimes even at home – the WTO never reinforced its far too lax rules applying to food export prohibitions and quantitative restrictions, laid down back in 1947 in GATT-Article XI:2.

Economically viable solutions to this conundrum, by rural development projects or better trade policies, are hard to come by. In our research, we show that even remote events, such as the announcement of policy decisions in a country with a big market and with export capacity, may affect world market prices. In turn, when such policy decisions entail massive trade distortions, for instance as an export restriction, they may influence the livelihoods of vulnerable populations and their farming prospects.

Our research focus on post-harvest loss management took the wider context of food action on big food markets into account. This relatively narrow approach allowed for several important and new findings. Some of them are also of importance for the UN SDG Summit, for the Agenda 2030, and for the finalisation of the CFS Voluntary Guidelines.

Findings

Price volatility has been interpreted as a market signal resulting from the interplay of numerous offer and demand factors as well as from related policy decisions. The problem lies in the difficulty of differentiating the underlying cyclical from the structural changes, and to limit policy changes to price developments with a long-term impact and the need for structural adjustments. It is not easy to recognise relative and absolute price spike increases when comparing and evaluating the magnitude of the price levels. However, it appears that politicians often suspect “speculation” and

“hoarding” in all unwanted price fluctuations and household stock increases.

This being, it would be wrong to look at national policy decisions as the sole price drivers on local and world markets. International food governance failures contribute their part to global food insecurity. For instance, hunger may actually increase when WTO rules cannot differentiate anti-poverty programmes from trade-distorting stock disposals. Price drivers such as export restrictions can then kick-start self-sufficiency programmes and “food sovereignty” policies in countries with less efficient farms, unhindered by the weak domestic subsidy disciplines in the same WTO.

To avoid such vicious cycles there is a need for better policy responses at the national level, and stricter rules and disciplines at the international level. This raises questions such as the definition of “excessive” price volatility as a threshold for safeguard actions. Another question is which kind of food stockpile management really reduces price volatility and “speculation”? (Haase and Tobler, 2015, and Wright, 2011) It has also become clear that regional or „virtual” food stockpiles can be more efficient than national schemes, but that such stockpiles require mutual trust and the possibility of concerted and swift action. Absent pre-agreed and “automatic” trigger mechanisms, public stockpiles will remain ineffective in counteracting price spikes, extremely costly, and prone to corruption; moreover, such schemes can crowd out private risk management, storage, and non-subsidised insurance. (Gilbert, 2011)

It is such problems, and non-robust production and trade data, which have failed, in the eyes of critical stakeholders, to give operators the risk management tools entailing more food security at the respective production, processing and trading levels.

In contrast, our research project chose a different, innovative path to address one of the most crucial elements in the food value chain. We looked at the post-harvest losses faced especially by smallholders and women producing three different grains, namely maize, wheat, and rice. Our three papers analysed, and found improvement possibilities for three different types of policy or production shortcomings leading to increased food insecurity:

- i. Post-harvest loss improvements with on-farm storage technology
- ii. Decrease of seasonal food insecurity as a source of social stress and poverty

- iii. Adequate on-farm stock finance, lessening the negative impact of trade policy changes even for other poor population segments.

In all three cases, our empirical studies allowed for the identification of food insecurity causes, resulting from the collateral impact of inadequate rural development and trade policies. The correlation between such shortcomings and on-farm income reductions, especially for the above-mentioned three grains, and for smallholders and women producers, is a hitherto little noted consequence of inadequate food security policies. We found that a simple and inexpensive technology could contribute substantially to reducing seasonal food insecurity and improving smallholder farmers' year-round access to food. Moreover, improved credit systems directly improved on-farm storage benefits. While an immediate negative impact on farm income of political food policy decisions was not generally demonstrable, we did find such an impact for decisions taken on a big market or for the primary benefit of urban consumers.

Improved on-farm storage reduces seasonal food insecurity of smallholder farmer's households – Evidence from a Randomized Control Trial in Tanzania

The seasonality of harvests can exacerbate food insecurity, particularly in the lean season, i.e. before the new harvest is brought in. We posit that addressing seasonal food insecurity requires not only increased food production, as is commonly argued, but also consideration of post-harvest losses during storage. Here we present the results of a randomized control trial on the effects of improved on-farm storage on seasonal food insecurity. Our intervention provided farming households in two districts in Tanzania with hermetic storage bags that can help reduce storage losses. The results show that the intervention reduced the proportion of severely food insecure households by 40% on average in the lean season, and by 21% in the full seasonal cycle. Households with primarily female members benefitted most from the intervention.

Incidentally, export restrictions applied by Tanzania after low harvests, in order to ensure enough food supplies for urban consumers, not only discouraged subsequent cash crop production at home, but even in neighbouring developing countries (Diao et al, 2017). A similar result in terms of global food insecurity was observed for stockholding policies with excess disposal on third markets (Debnath et al, 2017).

Does improved on-farm storage reduce seasonal food price gaps? Experimental evidence from Tanzanian markets

Where income from agricultural production and expenditure for food both have considerable shares in household budgets, poverty and food security are closely linked to food prices and their seasonal changes. Seasonal food price variations during a harvest cycle may thus have important welfare consequences. The extent of seasonal price gaps in Sub-Saharan Africa suggests that intertemporal arbitrage is constrained. We argue that high post-harvest losses during storage limit farmer's intertemporal arbitrage, and thereby exacerbate seasonal price gaps. The argument is tested by randomly allocating hermetic storage bags as an improved on-farm storage technology to smallholder farmer groups in two districts of Tanzania. These bags can minimize storage losses even under extended periods of storage. Local market prices were tracked on a weekly frequency. The results document significant effects of improved on-farm storage on local market prices. Improved on-farm storage reduced the seasonal price gap by 16% on average in the observed harvest cycle. In contrast to the prevailing argument in the literature, we can show that suitable storage technologies contribute to smallholder farmers' ability to make use of intertemporal arbitrage opportunities. The results thus highlight the need to consider improved on-farm storage as a policy and development option, in order to counter seasonal food price gaps and their adverse effects on poverty and food security.

Finally, international market price volatility can have important welfare implications even on remote markets, albeit not necessarily flaring up in so-called "food riots". Where an international price shock hit the key imported staple food (rice, in Côte d'Ivoire), Dimova and Gbakou (2012) observed an interesting income reallocation from richer to poorer households. They found that the middle-income population was hit hardest, while the poorest returned to subsistence farming.

Do national trade policy changes increase global food price volatility?

Price volatility in global agricultural markets has gained increasing attention since the food price crises of the years 2007-08 and 2010-11. This paper presents the first analysis on the effects of the announcement of national trade policy changes on global food price volatility. We develop an original dataset covering the main global staple crops, namely wheat, maize, and rice, from 2005 to 2017. While public and media awareness focused on rising food price levels, the political response concentrated on

food price variations. A dedicated target on food price volatility in the 2030 Agenda for Sustainable Development reflects this political priority.

National governments have frequently resorted to agricultural trade policy interventions with a claim to stabilising domestic food prices and averting adverse effects on poor consumers and agricultural producers. However, there is a widespread concern that when many countries act in the same way, even more volatile global market prices may result. Yet, the empirical evidence behind this concern is thin. If indeed national trade policy interventions increase global price volatility, their effects most likely appear on the day when trade policy changes are announced. Our results show that the announcement of national trade policy changes, specifically restrictive export and liberal import policies, can result in increases of global food price volatility on their announcement day and a few days thereafter; yet the persistence of these trade-policy related volatility effects is short. Moreover, the results show that adequate stock levels can minimize the observed short-term effects. Our results hence provide little empirical support to the concern that national agricultural trade policies exacerbate global food price volatility.

Markets for the three main cereals do not always follow the same patterns. Rezitis et al (2015) observed that while wheat prices follow a cyclical pattern, rice price volatility was mainly governed by irregular components. The lead-time of the 2008 price spike for rice was due, according to these authors, to the reduction of the Chinese grain stockpiles after 2002. We can now show that not only country specific but also commodity specific policy measures are clearly more appropriate.

The main challenge in this field is to insulate political statements and decisions, and their price impact, from other price shaping factors. In respect of the core question on the influence of policy on short-, medium- and long-term effects, Diaz-Bonilla (2016) suggests to separate trends, cycles, and shorter-term events, including spikes and busts, in order to find out whether they are indeed short-term events, or rather indicate a trend requiring policy adjustments based on long-term fundamentals.

Perhaps in view of the short-term sensitivity of food security, many governments tend to choose unilateral trade policy interventions instead of alternative domestic policy options, such as targeted subsidies or social-safety nets, even though social policies allow the government to take a direct role in securing food supplies for the population.

Conclusions

Our survey reveals several new features in an apparently typical boom and bust cycle. Through the lens of post-harvest losses, we could show that policy decisions in big markets can have limited but nevertheless meaningful negative consequences for the most food-insecure producers, notably women without access to investment and production credits. We also showed that simple, affordable techniques such as polypropylene bags can reduce post-harvest losses, and that such on-farm loss reductions can reduce cyclical price volatility. This, in turn, “calms” markets and reduces indebtedness of poor producers and consumers due to financial needs such as school fees.

What does this imply for

1. The **SDGs #3** (ending hunger) and **#12.3** (halving per capita global food waste)?
2. The **CFS Voluntary Guidelines on Food Systems and Nutrition?** (Paragraph 44 of the Zero Draft of these guidelines includes improved storage in the context of post-harvest loss reduction for small farmers.)³

Firstly, we consider that post-harvest on-farm losses are not just a “weather-given” cause of food insecurity. Some prevention measures are easily available, including for the poorest and most food-insecure population segments. Secondly, related to the ongoing work of the CFS in respect of “excessive” price volatility, we showed that a substantial reduction is directly achievable by improved storage facilities for small farmers. As for the indirect effect of policy decisions on both small farmer incomes and – through export restrictions – on poor third country markets, we see in the ongoing WTO negotiations on domestic support an opportunity to improve the rules framework applying to national policy decisions especially on big developed and developing markets.

Before addressing the need for further research, we offer two context comments also based on our research project.

1. After decades of relative stagnation, agricultural trade and investment started to grow strongly in the middle of the nineties, for many commodities and in many developing countries. Different structural causes contributed to this growth, regrettably including

³ Policy-relevant areas: Support to smallholders. “Information technology, training and capacity building can play a key role in increasing farmers’ opportunities to deliver a diversity of fresh, safe and nutritious foods to market.”

illegal acquisition of land titles ("land grab"). Incidentally, all this took place despite an only half-full glass of trade and investment liberalisation. As a result, global food security and domestic cash crop investment have increased, and the total number of hungry people has been halved (MDG 1). However, smallholders and women farmers in poor developing countries, with no or little disposable production surpluses remained resource-poor and without access to production credits. Their relative food insecurity has increased.

2. The price impact of another fundamentally new factor remains unaddressed in this article: climate change. While the increasing short-term consequences for food security are perhaps due to more frequent extreme weather events, it seems fair to say, at a very general level, that agriculture (and fisheries) are very likely to be among the most affected sectors in the medium and long term. This would mean that in the absence of more coherence, international food security governance failure is likely to exacerbate the food price impact of global warming.

In conclusion, we see several policy options for **national governments**. More national food security implies the development of sound and coherent agricultural and food policies, including secure market access for competitive product exports, efficient and temporary safeguards against food dumping of all kinds, and structural adjustment support for fundamentally weak sectors. Resource-poor and hence vulnerable farmers require special attention with clearly focused support instruments aiming at increasing their resilience.

Options for the **multilateral rules framework (WTO)**: it is too easy to posit that an appropriate continuation of the reform process, mandated in Article 20 of the WTO Agreement on Agriculture, would automatically improve multilateral food security governance. Besides, regional trade agreements rarely deal with food security issues and rules – and LDCs are hardly ever associated as full trading partners in such agreements. Yet, governments do need a better policy framework (Zunckel, June 2010). Even poor governments could then better avoid inappropriate food policies such as price-increasing and competition-reducing tariffs, counter-productive price controls, export taxes and restrictions, and non-targeted and costly producer or consumer subsidies.

On the other hand, given that agricultural trade growth is increasingly taking place between developing countries, even a concerted effort to limit trade-distorting domestic support will not be effective unless the better-off

developing countries also accept some „do no harm” principles. The WTO’s export bias increasingly appears as a violation of the **Right to Food** enshrined in public international law. Hence, a new market access improvement package requires considering the impact of trade liberalisation on smallholders.

A less uneven playing field

A lot could be done by poor developing countries even on the present, uneven playing field. Reviewing and challenging producer subsidies „wrongly” notified as Green Box measures would increase the chances of less-subsidised producers. Better market data could empower poor but e-connected smallholders. Moreover, governments could make better use of available border measures such as safeguards. Risk hedging on a public-private partnership basis could be made available even to poor farmers. Food aid limited to emergencies and to the poorest population segment, whether in kind or in cash, would still allow local producers to compete with non-subsidised food imports. Investment contracts could include monitored social and environmental performance requirements in exchange for fiscal benefits.

Recommendations for further research

Notwithstanding the many impact studies presently available, there still is a clear gap in current research in terms of (i) a detailed understanding of the causal effects of political interventions on price volatility at the global level, and (ii) investigations based on more direct and higher-frequency measurements of trade policy interventions. Also lacking are studies on the need for and the long-term effectiveness of price spike mitigation measures, as opposed to risk hedging and organised food storing by the private sector. As for public stockpiles, more comparative research on efficient schemes, including with the participation of the private sector, would help demystify the attraction of stockpiles as an instrument of both producer and consumer price stabilisation, and of farm income. Regional or „virtual” stockpiles also require further research before they can be recommended to responsible governments.