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Revisiting the Global Food Architecture. Lessons from the 2008 Food Crisis

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ABSTRACT

The 2008 episode of food price explosion, political turmoil and human suffering revealed important flaws in the current global food architecture. This paper argues that to safeguard the strengths of the current system, four failures in market functioning and policymaking need to be addressed. First, governments should reinvest in agriculture with a focus on public goods and subject to increased public accountability to re-ensure the global food supply. Second, the policy-induced link between food and fuel prices must be broken through a revision of EU and US agro-fuel policies. Third, better sharing of information on food stocks, stricter WTO regulation of export restrictions, and some form of globally managed buffer stock will be minimum requirements to prevent the resurgence of more inefficient national food self-sufficiency policies. Fourth, a market based food security system is only sustainable given well functioning national social safety nets.

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I. Introduction

The world saw food prices explode last year, causing havoc in developed and developing countries alike. Poor people were hit especially hard[2] and many more became poor.[3] Malnutrition among pre-schoolers rose, and children dropped out of school early, rendering the damage long-lasting. World food prices have come down since, and attention has shifted to staving off worldwide depression. Nonetheless, the 2008 bumper harvest and the subsequent decline in world food prices have only provided temporary relief. In effect, the world can consider itself fortunate in not having experienced even higher price peaks. Given record low cereal stock-to-use ratios last year (the second lowest in 30 years), prices could have gone

up much further if aggregate harvests had been even a few percent lower. And, domestic food prices have remained high in many developing countries (FAO, 2009).

This paper argues that the food crisis and the ensuing policy responses have revealed fundamental market and policy failures in the current market based food architecture. These must be urgently addressed. The shift towards more market based food systems started in the 1980s. Under high price protection and input subsidization food supply in the European Union and the US expanded rapidly, leading to record food stock-to-use ratios and the subsidization of exports, a model that was increasingly questioned because of its inefficiency and world market destabilizing effects. At the same time models of food self-sufficiency and food price stabilization through domestic buffer stocks became fiscally unsustainable in developing countries. Efficiency considerations and market based solutions began to permeate, and subsequently, dominate the food policy debates, as they did in most other spheres of society in the 1980s and 1990s.

The premise of more market based food systems found implicit support in the seminal micro-economic work on famine and hunger by Sen (1981). He highlighted that massive hunger often exists in the midst of plenty. A sufficient supply of food at the national level is merely a necessary, and not a sufficient condition for food security, the argument goes. There is only food security if everyone is assured of their access to food. This can either be achieved through own production, or through purchases on the market, which necessitates having sufficient income and well functioning market systems. These arguments resonated well within the midst of global food abundance. The food security debate shifted from ensuring national food self sufficiency to ensuring individual access to this food. The policy focus shifted to fighting income poverty and the establishment of proper food marketing systems, complemented with social safety nets to assist the chronically food insecure and those in need in times of crises.

At the national and international level, these insights translated in the promotion of a global market mediated food security model. In this view, market interventions are to be minimized to allow allocation of the factors of production to their most productive use in line with their true scarcity as revealed by the market forces and prices ("Getting Prices Right", Timmer (1986)). Countries engage in staple crop production according to their comparative advantage and secure sufficient supply of staples in the world market. National food buffer stocks to stabilize prices are to be kept to a minimum. They are very costly to maintain and often a major source of rent seeking. Countries rely instead on the much larger world markets to manage domestic price volatility. World food markets are less volatile because they are larger, and thus better able to weather supply shocks, which are often synchronized at the domestic level.[4]

The policy shift towards a more market based global food architecture has served the world relatively well with staple foods abundantly available and cheap throughout the 1990s and early 2000s. Real agricultural GDP in developing coun-

tries, largely driven by yield growth and better policies, grew by 2.6 percent per year between 1980 and 2004 (World Bank, 2007). Asia was particularly successful. Yet, agricultural performance in Sub-Saharan Africa remained dismal, despite improvements since the mid 1990s (Pratt and Yu, 2008). And the recent food crisis revealed further important flaws in the system.

First, the increasing reliance on market incentives went hand in hand with an erosion of public investment in agriculture. Yield growth slowed down and trend demand started to outweigh trend supply, rendering the system ill-prepared to face growing food supply uncertainty following looming land constraints, rising water scarcity, and last but not least, climate change. Second, as world food stocks were being depleted, structural demand shocks induced by EU and US agro-fuel policies and temporary supply shifts following weather shocks, led to sharp rises in world prices. Third, the escalation of export restrictions by key food exporters in the face of rising food prices reminded the world of the deeply political nature of food as a commodity. This had been vastly underappreciated in the promotion of the food trading edifice. Fourth, in the absence of social safety nets countries had little choice but to revert to costly universal food subsidies to assist the poor.

Addressing these four shortcomings-public underinvestment in agriculture, integration of food and fuel markets through agro-fuel policies, loss of confidence in market mediated food security, and the absence of functioning social safety nets-will be critical to safeguard the strengths of the current system. The paper reviews guiding principles in addressing these market and policy failures, emphasizing the need for both political astuteness and enhanced public accountability to maximize the impact of the necessary increase in public spending. It proceeds in section 2 by giving a more detailed account of the key factors behind last year's food crisis, the governments' responses, and the implications for the global food architecture. Key principles for making reinvestment in agriculture effective and environmentally sustainable are discussed in section 3. Section four revisits the desirability and sustainability of agro-fuel expansion. Section five explores how trust in world food markets can be restored to avoid full reversal to national food self-sufficiency policies. Section six reviews modalities for building effective social safety nets. Section seven concludes.

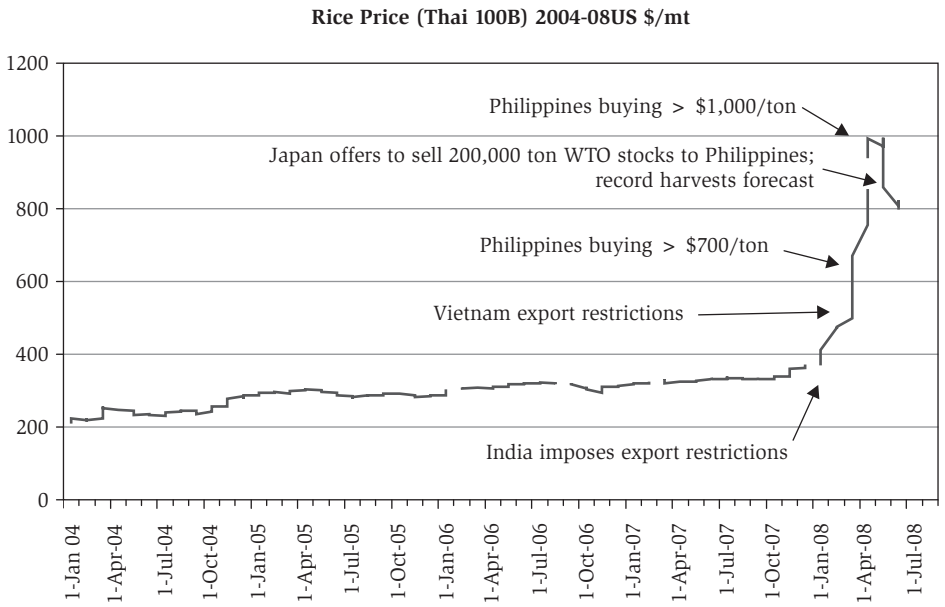
II. Fundamental Flaws in Global Food Architecture

For several decades, real food prices had been trending downward and the world had become accustomed to a world of plenty and continuously cheaper food.[5] However, from early 2000 on, standard food models started to predict a slight upward trend in prices.[6] This trend reversal did not follow from the oft purported acceleration in per capita grain or meat demand among rapidly growing countries.[7] It

rather reflected looming supply constraints from rising land and water scarcity and slowing technological progress,[8] following a systematic reduction in public investment in public goods such as rural roads, irrigation, and agricultural research and extension services, an important market failure.[9] The emerging gap between trend demand and trend supply was further compounded by substantial rice destocking in India and China in the early 2000s. World stocks-to-use ratios of grains and vegetable oils reached their lowest levels in 2004 since the early 1980s. These "slow and steady" shifters of supply and demand help explain the gradual increase in world grain prices observed in the first half of 2000, the first factor in understanding last year's food crisis.

To understand the subsequent acceleration, one cannot go around the critical role of EU and US agro-fuel policies. Between 2000 and 2007, the harvested grain area grew at 0.4 percent and grain yields grew at 1.3 percent per year. In normal circumstances, this should have sufficed to cover growth in demand for food (and feed) consumption purposes (Mitchell, 2008; Lustig, 2008). After legislation on mandates, tariffs, and subsidies was passed in the EU in 2001 and the US in 2005, the demand for corn for the production of ethanol and vegetable oils for the production of biodiesel exploded.[10] Corn and oilseed prices rose together with this accelerating demand for agro-fuels. The upward price pressures in the corn and oilseed markets worked their way through to the wheat and (to a lesser extent also the) rice markets through the substitution of corn for wheat (especially as feed), the substitution of wheat for rice (in certain parts of Asia), and the reallocation of land from wheat to oilseed production (Mitchell, 2008). Estimates of the exact contribution of agro-fuels to the food price hike vary.[11] Nonetheless, there is consensus that the policy induced structural demand surge for corn and oilseeds (further aided by rising oil prices) added significant pressures to already tight cereal markets as reflected in the low stock-to use ratios. Temporary supply shocks in key exporting countries (such as the back to back droughts in 2006 and 2007 in Australia) added only more fuel.

By 2007 global corn and wheat stock-to-use ratios were run down to their lowest levels since the 1970s. To protect their consumers from soaring world prices, several key cereal exporting countries imposed export restrictions. This behaviour was especially pronounced among rice exporters, resulting in a "Run on Rice" (Brahmbhatt and Christiaensen, 2008; Slayton, 2009). World rice prices tripled between October 2007 and April 2008. The process started when India (Figure 1), the second largest rice exporter in 2006 (6.3 mmt), introduced an export restriction on non-basmati varieties of rice in October 2007. It did so because importing the necessary amounts of wheat at the prevailing high world prices to compensate for its wheat harvest failure would have been too expensive (both economically and politically). It was decided to retain more rice for domestic consumption instead. Instantly, 3-4 million tons were taken off the thinly traded world market of 28-30 million tons a year and world rice prices rose within a matter of weeks.



Source: Brahmbhatt and Christiaensen, 2008.

Figure 1. Export restrictions induce a run on rice driving world rice prices to unseen highs.

Other rice exporting countries (China, Vietnam, and Egypt) quickly followed suit and introduced export restrictions of their own. In an attempt to ensure domestic supply the Philippines, a major importer, issued large tenders at increasingly high prices further stirring up the rice price fire. And hoarding happened also in domestic markets.[12] While at no point was there a shortage of rice in the world, panicked hoarding caused world rice prices to peak beyond 1000 US$/ton. Prices eased back by the end of June, following forecasts of record harvests, announcement by Japan to release 200,000 tons of rice stocks it holds under World Trade Organization (WTO) agreements, and Vietnam's decision to lift export restrictions. Nonetheless, trust in international markets as a source of food security was already substantially damaged. The uncoordinated response by the major exporters each driven by internal political dynamics and national self interests underscores the continuing political nature of food as a commodity and the need for a global governance mechanism to better coordinate a global response in times of emerging tensions in the world food balance.

Other macro economic factors that contributed to the food price increase include the depreciation of the dollar which Mitchell (2008) estimated to explain about 20 percent of the increase in commodity prices January 2000 and June 2008. Low interest rates in the US, the resulting expansionary monetary policy and inflow of capital in commodity index funds, likely also accelerated the food price increase

(Frankel, 2006; Lustig 2008). Its relative importance remains disputed, especially in the case of rice where the direct opportunities for speculation in futures and options by outside investors are limited (Timmer, 2009).

To stave off the most severe consequences agricultural trade and tax policies were especially popular. FAO (2008a) reports that 50 out of 99 surveyed countries reduced grain import tariffs and that more than 20 countries imposed export controls of some kind – either in the form of taxes or outright quantitative controls (such as export quotas and bans). Social protection responses were tilted heavily toward food tax reductions and food subsidies rather than targeted safety nets. According to the International Monetary Fund (2008) 84 out of its 146 surveyed countries had reduced food taxes and 29 had increased food subsidies, while only 39 countries had expanded their safety nets. Producer support measures to instigate a short run supply response were predominantly geared towards input subsidies to help farmers cope with the even more rapidly rising fertilizer and seed prices.

High visibility and ease of implementation characterize these responses, making them politically expedient, even though often economically inefficient. Export restrictions reduce earnings and incentives for domestic farmers and undermine trust in the world market as a source of food security. Universal food subsidies are costly, regressive, and once installed, typically hard to remove, jeopardizing future fiscal stability. Similar economic arguments hold against the use of universal input subsidies. Yet, the importance of their political expedience should not be belittled, as demonstrated by their popularity. The review of last year's food crisis and the ensuing policy response reveals the need for 1) public reinvestment in agriculture; 2) a revision of agro-fuel policies; 3) restoration of trust in world markets; and 4) the establishment of social safety nets.

III. Sow Responsibly Today to Reap Sustainably Tomorrow

Higher food prices provide important incentives for increasing production. However, structural and institutional constraints in input and food markets and poor agronomic practices usually yield low supply elasticities, especially in Africa (Kherallah et al., 2002). That most of last year's bumper supply response has been concentrated in high and middle income countries is no surprise. Public investment in agriculture and rural development, especially in developing countries, must be increased to enable smallholder farmers overcome their supply constraints. In addition, how the increase in public investment is spent is as important in increasing agricultural output and farmers' incomes as the increase in spending itself.[13] To maximize their impact, investments should be focused on 1) providing public goods; 2) closing the production frontier; and 3) making agriculture environmentally sustainable.

They should be subjected to better planning, rigorous evaluation and increased public scrutiny.

An important distinction is between spending on public goods[14] such as rural infrastructure (roads, electricity, ICT), plant and animal protection, soil conservation, agricultural research, development and extension, and spending on private goods such as farm inputs (fertilizers, seeds) or commodity specific marketing and promotion programs. Lopez and Galinato (2007) for example estimate that, keeping total expenditure constant, a reallocation of 10 percent of subsidy expenditures to supplying public goods would increase agricultural per capita income in Latin America by 5 percent. An increase in public spending on agriculture by 10 percent the other hand, keeping the spending composition constant, would increase per capita agricultural income only by 2 percent.

Nonetheless, farm input subsidies are once again riding high on Africa's agricultural agenda. The governments of Malawi and Zambia are currently spending more than 60 percent of their agricultural budgets on input and crop marketing subsidies, leaving little room for investments that pay off for a long time such as rural roads, irrigation, agricultural research, development and extension. Whether Malawi's input vouchers turn out to be smart (i.e. inducing sustainable use of fertilizer among needy non-adopters) and fiscally sustainable remains to be seen.[15] Given the opportunity costs and their political popularity, and thus likely entrenchment, caution is warranted and rigorous impact evaluations are called for. Clearly, input subsidies are not a quick fix justifying more than half of a country's agricultural budget. A much better understanding of the relative role of other demand (risk, credit constraints, knowledge, profitability) and supply (input supply constraints) factors in determining technology adoption is needed. The evidence so far supports especially investment in public goods.

There is a lot of scope for increasing food production in the short run through better use of existing agronomic practices, not only in Africa, but also in Asia. Closing the existing 1-2 ton/ha rice yield gap (including through improved nitrogen and potassium management) and reducing post harvest loss (estimated at about 25 percent of the *value* of the rice crop in Southeast Asia) are thus the first two points in the recently adopted 2008 Rice Action Plan of the International Rice Research Institute (IRRI). The enormous potential from closing the productivity gap also holds in Africa, where maize yields on farmers' fields are routinely 2 to 4 ton/ha below those achieved on farm demonstrations plots (World Bank, 2007). Doing so does not require the introduction of genetically modified organisms (GMOs) and the debates surrounding the potential and introduction of GMOs with pro poor traits (World Bank, 2007; Collier, 2008) should not distract from what can already be achieved today given more efficient agricultural services and better functioning markets. In effect, both will be equally necessary for GMOs to be successful.

Given the vast underutilization of modern inputs, there remains tremendous scope for environmentally sustainable expansion of the Green Revolution in Sub-Sa-

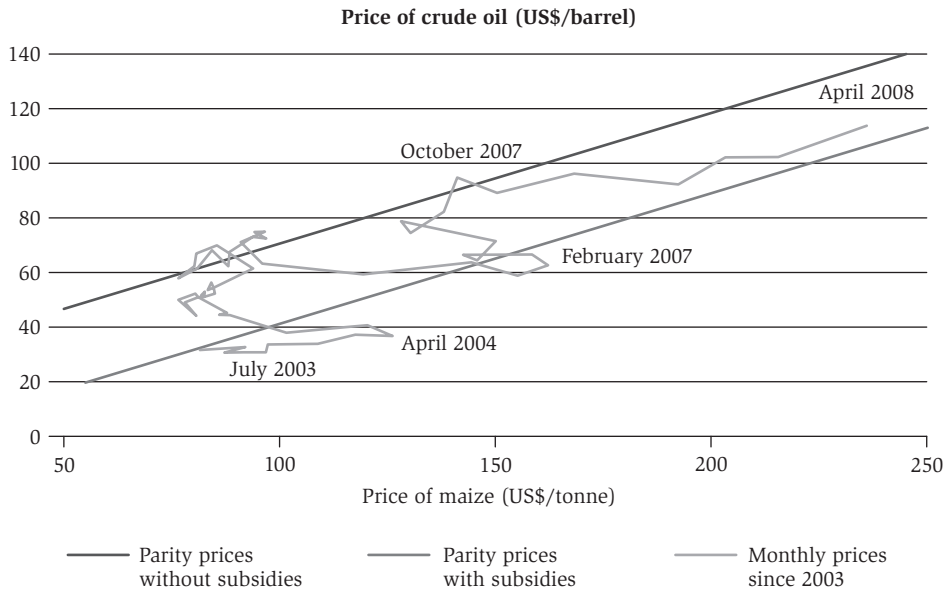
haran Africa. Where possible, this should be done in combination with organic farming practices. Complementary fertilization of maize fields through intercropping of maize with Faidherbia allbida (ex-Acacia), a leguminous tree which loses its leaves during the growing season of maize, provides one promising example. Yet, organic practices are often labor and knowledge intensive, and in need of upfront investment, such as trees in the example above, which has often hindered their breakthrough on the ground. In Asia, the primary challenge is greening the Green Revolution, especially to overcome rising water scarcity. This can be done through better water management, proper incentives, and regulation. Just addressing poor land layout, for example, through adequate levelling and higher embankments to retain wet-season water, has been shown to increase yields in Cambodia by 27 percent. And, a shift from area-based to volume-based charges in China's Tarim Basin resulted in a 17 percent decrease in water use. How climate change will affect the agro-ecological conditions for agriculture will need to be taken into account in future agricultural investments across the world.

To maximize the impact of public spending on agriculture and politically sustain its increase, demand driven, evidence based policymaking and public accountability should be fostered. On the supply side this requires agricultural ministries to shift from being primarily providers of agricultural services (such as extension services) to becoming facilitators, coordinators and regulators. In this view, extension services could for example be provided through mixed public-private systems, involving public agencies contracting out extension services, as in Uganda. Through the issue of extension vouchers, competition among extension providers and direct accountability of the service provider to the farmer, the relevance and quality of extension services can substantially increase. On the demand side, more detailed disaggregation of agricultural public spending and the establishment of public spending tracking systems could increase transparency and foster public accountability. Citizen report cards can help feed information about the performance and relevance of government agricultural services back into the policy making process.

IV. **Revisit Agro-Fuel Policies**

When food and fuel markets are integrated, energy prices will drive food prices, because demand for the former is infinitely large compared to demand for the latter. The strengthened integration of food and fuel markets has so far been largely policy induced. This is nicely illustrated for maize in Figure 2, which plots monthly crude oil and maize prices pairs from June 2003 through April 2008 relative to a break even line with and without subsidies. Left of the parity line, maize ethanol is profitable. Right of it, it is not. By looking at different price pairs, the dynamic feedback effects of higher fuel prices on feedstock prices are also taken into account. Almost

all pairs lie to the right of the parity price-without-subsidy-line; without subsidies, maize ethanol was virtually never competitive over the past 5 years. With subsidies (and tariff protection), maize was competitive most of the time (pairs lying to the left of the parity price with subsidy). FAO (2008b) concludes that with the important exception of ethanol produced from sugar cane in Brazil, first generation agro-fuels produced in OECD countries with current technology are not generally competitive with fossil fuels without subsidies, even at high crude oil prices.



Source: FAO, 2008b (adapted from Tyner and Taheripour, 2007).

Figure 2. US maize based ethanol not profitable without subsidies.

FAO (2008b) simulations further indicate that removal of agro-fuel subsidies (tax concessions, tax credits and direct support for the production of agro-fuels) and trade restrictions in OECD and non-OECD countries, even when retaining agro-fuel use targets,[16] would reduce global ethanol and biodiesel consumption by 10-15 percent and 15-20 percent respectively and reduce vegetable oil and maize prices by 5 percent. It would also increase OECD imports from Brazil and other developing country suppliers (Thailand, African countries) substantially. Given policy and regulatory frameworks that permit long term investments, properly arrange land acquisitions, uphold decent labor standards, and promote adequate production structures (including outgrower schemes), this could further reduce oil dependence in developing countries and help reduce poverty among farmers.

While the collapse in fuel prices since the second half of the2008 has attenuated the upward pressure on food prices (and poverty) from agro-fuels and despite substantial sunk investments by the OECD agro-fuel industry, removal of EU and US subsidies and import tariffs is clearly a very minimal first step to reduce distortions in the food market and allow agro-fuel production to concentrate in economically and environmentally more suitable locations. Not only does current maize based ethanol in the US and oilseed based biodiesel in the EU come at a high cost to tax payers and consumers, it contributes only marginally to reducing greenhouse gas emissions and increasing energy security. Especially production methods and crops that exploit marginal lands and do not compete with land for food production or forests, that minimize environmental impacts (including on water and soil resources and biodiversity), and maximize reduction in GHG should be promoted. Secondary generation agro-fuels that use lignocellulosic feedstock such as wood, tall grasses, and forestry and crop residues hold most promise in this regard and their commercial development should be accelerated.

V. Restore Trust in the World Food Market

Reversal to grain self-sufficiency combined with larger national buffer stocks to stabilize domestic markets presents a costly alternative to many net importers that have no comparative advantage in grain production. It also leads to thinner and more volatile grain world markets, which countries may in effect have to rely upon more frequently as climate changes increases the occurrence of natural disasters and domestic supply shocks are more likely to exceed their buffer stocks. Alternatively, food importing countries could circumvent world markets by outsourcing their staple crop production directly to land abundant countries (The Economist, 2009).

Especially richer Arab countries and China that suffer from water scarcity are following this route. Such deals can help revive agricultural production in many developing countries through infrastructure building and knowledge spill-over and reduce poverty through employment generation and the provision of social services. Much will depend on how land acquisitions and production are organized. In the absence of proper regulatory frameworks and land tenure security, land resources risk being contracted cheaply to the larger benefit of few, and marginal populations (especially) risk losing their livelihoods without compensation. As production is set to take place on mechanized, large scale farms, employment generation may be limited. International codes of conduct to govern these government-to-government deals are being developed. They should include respecting customary land rights, sharing the benefits with the locals, and increased transparency.

Irrespectively, these developments do not reduce the need for the restoration of trust in world markets. This requires at a minimum 1) a global food intelligence unit to generate and share reliable grain stock information; 2) revision of WTO regulation on export restrictions; and likely also 3) the establishment of an internationally coordinated strategic reserve system. Part of last year's price run up was related to uncertainty about existing stocks, especially in the rice markets. As the introduction of India's rice export restrictions created a perception of shortage, countries, farmers and consumers alike raised their price expectations, inducing a surge in the demand for rice for hoarding. This transformed the gradual increase in rice prices since the turn of the century into an explosion. More reliable information[17] about the state of supplies could mitigate inaccurate perceptions of shortage. Given the politically sensitive nature of food stocks, this would require an independent global intelligence unit. Useful lessons could be learned in this regard from the International Energy Agency which receives and reports on public and private petroleum stocks (Wright, 2008).

Secondly, WTO leadership could go a long way in preventing an escalation of export restrictions as observed last year. WTO regulations are largely geared towards the challenges faced by exporters and thus focused on import restrictions, such as high border protection, domestic support and export subsidies. The use of quantitative restrictions and embargoes on agricultural exports is permitted to relieve shortages of "basic foodstuffs or other materials of importance to the exporting country". And, the requirement in the WTO Agreement on Agriculture that such restrictions must be notified has been notably ineffective (Mitra and Josling, 2009). There are no bounds on export taxes. While the focus on import restrictions might have been appropriate when low world prices dominated the agenda, it fundamentally ignores the plight of importers who argue that export restrictions reduce the reliability of their supplies. By better disciplining export restrictions the balance of benefits from the trade system between exporters that want assured market access, and importers that want assured supplies, could be restored. This is an important topic for the Doha Round, though one which has not been very high on the agenda so far.

Thirdly, given the highly political nature of staple foods (in particular rice), the establishment of an internationally coordinated strategic reserve system may further be needed. Von Braun, Lin and Torero (2009) have recently made a proposal in this direction, including the introduction of a virtual reserve. The introduction of internationally coordinated emergency, physical and virtual grain stocks all have merit, but deserve careful analysis before implementation. Past experience has not been promising and the challenge of multilateral coordination and determination of optimal operation procedures should not be underestimated. Wright (2008) refers to the U.S. Strategic Petroleum Reserve that emphasizes the interplay between public and private stockholdings for further lessons on how such a system could be designed. Given the much thinner nature of the world rice markets, examination of

the contours of an optimal international reserve system within ASEAN +3 could provide an excellent starting point.

VI. Build Effective Social Safety Nets

Reliable social safety net that assist the most needy, are an essential ingredient of a global food architecture anchored in markets. In the absence of such systems, governments see themselves obliged to revert to politically expedient but economically inefficient universal tax reductions and subsidies. A hopeful lesson from worldwide experience with social safety nets is that they can be successfully designed and implemented in all country settings (Grosh et al., 2008). In low income settings this entails adapting the design in accordance with the administrative capacity.

Effective safety nets consist of several programs that complement each other as well as other public and social policies, including the food policies described above. These programs provide full coverage and meaningful benefits to various groups in need of assistance in a fair and equitable way, i.e. the same benefits to beneficiaries equal in other respects (horizontal equity) and more generous benefits to those more in need (vertical equity). They should be cost effective-target most of the resources to the intended beneficiaries-and incentive compatible-minimize disincentives. Individual programs should be financially and politically sustainable to avoid stop/start cycles. They should evolve over time in line with the countries' level of development.

There consists a whole range of safety net programs including cash transfers of various sorts, food transfers, public works, conditional cash transfers, general price subsidies, and fee waivers for access to social services. Cash and near cash transfer programs are in many respects the most preferred way to mitigate poverty, promote equity, manage shocks and facilitate reforms. They have lower administrative costs and do not distort prices. The transfers can directly meet critical household needs and be adapted according to need. They can be easily scaled up and down in response to shocks. As they are more information intensive they require some time to set up, an important task governments should embark upon now.

Cash transfer programs also assume that essential commodities (such as food) are available. If this is not the case, in-kind food transfer programs, which are much more costly to administer, may be inevitable. Cash transfers may also be used for unintended purposes. Conditional cash transfers, whereby transfers are conditional on behavioural change such as school attendance or use of preventive health care can help mitigate such concerns. They are more effective when health and education systems function properly. They also only reach households with children. In addition to distributing transfers, typically through self-targeting, public work programs avoid labor disincentives and create much needed infrastructure,

provided they are complemented with proper technical assistance. They are well suited when unemployment is high and can be scaled up and down, including to address seasonal unemployment. Yet, they can only cover able bodied and are administratively demanding.[18]

VII. Concluding Remarks

The review of last year's food crisis revealed four areas of market and policy failure that deserve immediate attention to safeguard the strengths of the current global food architecture. First, the erosion of public investment in agriculture and global destocking has left the global food system ill prepared to cope with the longer running challenge of global food supply uncertainty. Governments, especially in developing countries, will need to reinvest in agriculture focused on the provision of public goods supporting environmentally sustainable production of food. To increase effectiveness and sustain the current shift in financial and political commitment to agriculture, enhanced public accountability through more demand driven and evidence based agricultural policymaking with agricultural ministries focused on coordination, regulation, and facilitation should be pursued.

Second, the world cannot afford to have its food prices being determined in the infinitely larger fuel market, and the current policy induced link between food and fuel markets must be broken. This requires removal of US and EU subsidies and import tariffs supporting first generation agro-fuels and a revision of EU and US usage targets to allow production of agro-fuels in economically and environmentally more suitable locations. Second generation agro-fuels hold more promise and their commercial development deserves to be accelerated.

Third, the introduction of export restrictions by food exporters to protect their domestic markets from rising food prices has eroded confidence in the world grain markets. Yet, a global food architecture based on national food self sufficiency and larger domestic food stocks will result in higher domestic food prices, a larger total global reserve, and very thin, and thus highly volatile, international grain markets. Outsourcing of food production to third countries could provide a partial solution, if well executed. Especially globally coordinated action will be necessary to restore trust in the world grain markets through a combination of improved information exchange on grain harvests and stocks, strengthened WTO regulations on export restrictions, and potentially some sort of global reserve.

Finally, to more efficiently assist the poorest in accessing food in times of crises and make a market based national food policy politically sustainable countries need to establish effective social safety net systems. Clearly, addressing the shortcomings in the current global food architecture poses a daunting task. The ongoing cutback in academic departments and training programs of agricultural economists

across the world, including at the Catholic University of Leuven, would thus seem premature at best. People like Professor Tollens, to whom this article is dedicated and who uniquely straddles the fields of economics and agronomics, are becoming an extinct species indeed, one the world will need dearly.

ACKNOWLEDGMENTS

This paper is dedicated to Professor Eric Tollens in honour of his retirement at the Catholic University of Leuven, Belgium. His compassionate enthusiasm, penetrating empiricism, and unyielding support have not only introduced this author (and many others with him) to the powers of economic thinking, the intricacies of African development, and the world's challenge of ensuring access to food for all, they also instigated the author to follow in his footsteps in addressing these challenges, most recently as Senior Research Fellow at UNU-WIDER.

NOTES

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2. More than 90 percent of the estimated increase in urban poverty depth derived from already poor households becoming poorer and less than 10 percent from (non-poor) households falling into poverty (Dessus, Herrera and de Hoyos, 2008).
3. Ivanic and Martin (2008), Wodon et al. (2008), and Dessus, Herrera and de Hoyos (2008) predicted $1-day poverty to increase by 3 to 5 percentage points in developing countries.
4. Dawe (2008) provides an excellent exposition of these arguments in "Can Indonesia trust the world rice market?".
5. Real prices of grains in world markets declined by about 1.8 percent per year between 1980 and 2004 (World Bank, 2007).
6. Rosengrant et al. (2006), for example, predicted an increase in food prices, by 0.26 percent per year from 2000 until 2030 and by 0.82 percent from 2030 to 2050.
7. Rather the contrary, the model rests on a predicted decline in annual cereal consumption growth from 1.9 percent between 1969 to 1999 to 1.3 per cent from 2000 to 2030; growth in meat consumption was expected to slow from 2.9 per cent to 1.7 per cent per year.
8. Annual cereal yield growth declined, especially in developing countries, from more than 3 percent around 1980 to about 1.5 percent per year now.
9. Public spending on agriculture declined from 6.9, 14.3 and 8.1 percent of total public spending in agriculture based, transforming and urbanized countries in 1980 respectively, to 4, 7, and 2.7 percent in 2004 (World Bank, 2007). As individual investors can't fully appropriate the benefits from investments in these goods and services, it is up to the public sector to fill in the gap, especially when it comes to staple crops.

10. Seventy percent of the increase in global corn production between 2004 and 2007 was used for ethanol production, while biodiesel accounted for one third of the increase of consumption of oilseeds during the same period.
11. Using computable general equilibrium models (Rosegrant et al., 2008) estimated the impact of accelerated ethanol use on weighted cereal prices from 2000 to 2007 to 30 percent in real terms. Collins (2008) attributes 60 percent of the increase in maize prices from 2006 to 2008 to the increased use of maize for ethanol based on partial equilibrium models. Using a residual accounting framework, Mitchell (2008) argues that almost three quarters of the increase in food commodity prices could be ascribed to agro-fuels, and the related consequences of reduced grain stocks, large land use shifts, and speculative activity and export bans.
12. In May 2008 for example, there was reportedly at times no rice to be found in Ho Chi Minh, the largest city in Vietnam, the second largest rice exporting country in the world.
13. Most recently, public investment in agriculture and rural development has been increasing from its historical lows in the early 2000s, and even though actual spending is still far below commitments (International Food Policy Research Institute, 2008), the pace of increase has accelerated since last year's food spike.
14. Goods are considered public if they generate positive externalities (soil conservation, sanitary protection), palliate the effects of market failures (research and development), and when participation can't be excluded and participation does not directly reduce the benefits of others (infrastructure of unrestricted use, ICT).
15. Ricker-Gilbert and Jayne (2008) find evidence of substantial out crowding of commercial fertilizer use in Malawi's fertilizer program-for every kg of subsidized fertilizer use they estimate a reduction of 0.61 kg in commercial fertilizer use. The yield impact of fertilizer subsidies is maximized when they induce non-users to adopt.
16. The EU target is currently to replace 10 percent of transport fuels with agro-fuels by 2020, while the US is aiming for around 15 percent.
17. This is especially difficult in the rice market where rice is stored all along the marketing chain (farmers, small scale and wholesale traders, and governments) and where even government stocks are not well known as attested by the wide divergence in FAO and USDA estimates of China's rice supply stock-to-use ratios.
18. See Grosh et al. (2008) for a comprehensive and operationally oriented discussion of the design and implementation of effective safety nets.

REFERENCES

Braun, J. Von, J., Lin, and M., Torero, 2009, Note for Discussion: Eliminating Drastic Food Price Spikes-A Three Pronged Approach for Reserves, http://www.ifpri.org/pubs/reservenote20090302.asp.

Brahmbhatt, M. and L., Christiaensen, 2008, The Run on Rice, *World Policy Journal*, 25-2, 29-37.

Collier, P., 2008, The Politics of Hunger, *Foreign Affairs*, November/December.

Collins, K., 2008, The Role of Biofuels and Other Factors in Increasing Farm and Food Prices: A Review of Recent Development with a Focus on Feed Grain Markets and Market Prospects, mimeographed.

Dawe, D., 2008, Can Indonesia Trust the World Rice Market?, *Bulletin of Indonesian Economic Studies*, 44-1, 115-132.

Dessus, S., Herrera, S., and Hoyos, R., 2008, *The Impact of Food Inflation in Urban Poverty and Its Monetary Cost*, World Bank Policy Research Working Paper 4666, (World Bank, Washington D.C.).

The Economist, 2009, *Outsourcing's Third Wave, Buying Farmland Abroad*, May 22-29: 60-62.

FAO, 2008a, *Policy measures taken by governments to reduce the impact of soaring prices*, http://www.fao.org/giews/english/policy/index.asp.

FAO, 2008b, The State of Food and Agriculture – Biofuels: Prospects, Risks and Opportunities (Food and Agriculture Organization, Rome).

FAO, 2009, Crop Prospects and Food Situation, April 2009, Food and Agriculture Organization: Rome.

Frankel, J., 2006, The Effects of Monetary Policy on Real Commodity Prices, NBER working Paper N. 12713, (National Bureau of Economic Research, Cambridge, M.A).

Grosh, M., C., del Ninno, E., Tesliuc and A., Ouerghi, 2008, For Protection and Promotion: The Design and Implementation of Effective Safety Nets (World Bank: Washington D.C.).

International Food Policy Research Institute, 2008, *IFPRI Forum*, October 2008.

International Monetary Fund, 2008, *Food and Fuel Prices: Recent Developments, Macroeconomic Impact, and Policy Response*, Fiscal Affairs, Policy Department and Review, and Research Departments (International Monetary Fund, Washington D.C).

Ivanic, M. and W., Martin, 2008, Implications of Higher Global Food Prices for Poverty in Low Income Countries, *World Bank Policy Research Working Paper 4594,* (World Bank, Washington D.C.).

Kherallah, M., C., Delgado, E. Gabre-Madhin, N., Minot and M., Johnson, 2002, *Reforming Agricultural Markets in Africa, (*International Food Policy Research Institute, Washington D.C. and John Hopkins University Press, Baltimore, MD.)

Lopez, R. and G., Galinato, 2007, Should Governments Stop Subsidies to Private Goods? Evidence from Latin America, Journal of Public Economics, 91-5,6, 1071-1094.

Lustig, N., 2008, Thought for Food: The Challenges of Coping with Soaring Food Prices *Center for Global Development Working Paper No. 155,* (Center for Global Development, Washington D.C.).

Mitchell, D., 2008, *A Note on Rising Food Prices*, World Bank Policy Research Working Paper 4682, (World Bank World Bank: Washington D.C.).

Mitra, S. and T., Josling, 2009, *Agricultural Export Restrictions: Welfare Implications and Trade Disciplines*, International Food and Agricultural Trade Policy Council Position Paper, Agricultural and Rural Development Policy Series.

Pratt, A. and B., Yu, 2008, An Updated Look at the Recovery of Agricultural Productivity in Sub-Saharan Africa, *International Food Policy Research Institute Discussion Paper 787,* (International Food Policy Research Institute, Washington D.C.).

Ricker-Gilbert, J. and T.S., Jayne, 2008, *The Impact of Fertilizer Subsidies on National Fertilizer Use: An Example from Malawi*, selected paper for presentation at the American Agricultural Economics Association Annual Meeting, Orlando.

Rosengrant, M., S., Msangui, T., Sulser and C., Ringler, 2006, Future Scenarios for Agriculture: Plausible Futures to 2030 and Key Trends in Agricultural Growth, Background Paper for World Development Report 2008.

Sen, A., 1981, Poverty and Famines – An Essay on Entitlement and Deprivation, (Clarendon Press, Oxford).

Slayton, T., 2009, Rice Crisis Forensics: How Asian Governments Carelessly Set the World Rice Market on Fire, *Center for Global Development Working Paper 163,* (Center for Global Development, Washington D.C.).

Timmer, C.P., 1986, *Getting Prices Right – The Scope and Limits of Agricultural Price Policy*, (Cornell University Press, Ithaca, NY.).

Timmer, C.P., 2009, *Did Speculation Affect World Prices?* Paper presented at FAO conference on "Rice Policies in Asia" Chiang Mai, Thailand, February 9-12.

Tyner, W. and F., Taheripour, 2007, Biofuels, Energy Security, and Global Warming Policy Interactions. Paper presented at the National Agricultural Biotechnology Council Conference, 22-24 May, 2007, South Dakota State University, Brookings, SD, USA.

Wodon, Q., C. Tsimpo, P. Backiny-Yetna, G. Joseph, F. Adoho and H. Coulombe, 2008, Potential Impact of Higher Food Prices on Poverty: Summary Estimates for a Dozen West and Central African Countries, mimeo, World Bank, Washington, DC.

World Bank, 2007, World Development Report 2008: Agriculture for Development (World Bank, Washington D.C.).

Wright, B., 2008, *Speculators, Storage, and the Price of Rice*, Giannini Foundation of Agricultural Economists: University of California.