



HLPE  
REPORT



1

# Price volatility and food security

A report by

The High Level Panel of Experts

on Food Security and Nutrition

July 2011



CFS  
Committee on  
World Food  
Security



HLPE  
High Level  
Panel of Experts





# Price volatility and food security

A report by

The High Level Panel of Experts

on Food Security and Nutrition

July 2011

## HLPE Steering Committee members (July 2011)

MS Swaminathan (Chair)  
Maryam Rahmanian (Vice-Chair)  
Catherine Bertini  
Tewolde Berhan Gebre Egziabher  
Lawrence Haddad  
Martin S. Kumar  
Sheryl Lee Hendriks  
Alain de Janvry  
Renato Maluf  
Mona Mehrez Aly  
Carlos Perez del Castillo  
Rudy Rabbinge  
Huajun Tang  
Igor Tikhonovich  
Niracha Wongchinda

## HLPE Project Team members

Benoit Daviron (Team Leader)  
Niama Nango Dembele  
Sophia Murphy  
Shahidur Rashid

*This report by the High Level Panel of Experts on Food Security and Nutrition (HLPE) has been approved by the HLPE Steering Committee. The views expressed do not necessarily reflect the official views of the Committee on World Food Security, of its members, participants, or of the Secretariat.*

*This report is made publicly available and its reproduction and dissemination is encouraged. Non-commercial uses will be authorized free of charge, upon request. Reproduction for resale or other commercial purposes, including educational purposes, may incur fees. Applications for permission to reproduce or disseminate this report should be addressed by e-mail to [copyright@fao.org](mailto:copyright@fao.org) with copy to [cfs-hlpe@fao.org](mailto:cfs-hlpe@fao.org)*

*Referencing this report:*

HLPE, 2011. Price volatility and food security. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security, Rome 2011.

## Table of Contents

FOREWORD .....	7
SUMMARY AND RECOMMENDATIONS FOR POLICYMAKERS .....	9
Introduction .....	17
1 Recent price behaviour in international food markets: Three explanations.....	19
1.1 Excessive price volatility .....	22
1.1.1 Food demand becomes less sensitive to price changes as income increases .....	23
1.1.2 Global food markets: more integrated but easily re-fragmented.....	24
1.1.3 Speculative funds in the futures market have dramatically increased, but so has the cost of hedging .....	25
1.2 Recurrent food crises .....	27
1.2.1 A decline of world stocks.....	27
1.2.2 A decline of agricultural investment .....	29
1.2.3 A decline of public spending on agriculture .....	29
1.3 Emerging scarcities .....	31
1.3.1 An unlimited demand for agricultural products.....	31
1.3.2 The Green Revolution finds its limits.....	33
2 International Policy options to address price volatility .....	37
2.1 Building a food security oriented trading system .....	37
2.2 Precautionary regulation of speculation.....	38
2.3 International coordination of storage policies.....	39
2.4 Food reserves and the World Food Programme.....	39
2.5 Curbing the growth of developed countries' demand for agricultural products.....	40
2.6 Refocusing public investment to achieve long term food security .....	41
3 Sources, transmission and consequences of food price volatility on food security.....	43
3.1 Price volatility that results from domestic sources is a permanent problem in many poor countries .....	43
3.2 International price volatility has been transmitted unevenly to developing country domestic markets.....	45
3.3 Actual consequences of price volatility on global food security are not well understood .....	48

4	National policy options to address price volatility .....	51
4.1	Policy instruments to deal with price volatility .....	51
4.2	Guiding principles for national options .....	55
4.3	Accounting for country specificities in managing food price volatility .....	56
5	Food price volatility and the Committee on Food Security (CFS) .....	59
	REFERENCES.....	61
	APPENDICES .....	65
	A1: Two examples illustrating the importance of national institutional capacity in the implementation of food security policy .....	65
	A2: National responses to the 2007–2008 price spike .....	67
	A3: Comparative table of recommendations made in recent Price volatility reports.....	71

## List of Figures

Figure 1: Food Price Index, monthly, January 1990–May 2011 .....	20
Figure 2: Agricultural commodity prices index, monthly, 1990 January-2011 May .....	20
Figure 3: Food Price Index, current and constant US dollar, annually, 1960–2011 .....	21
Figure 4: Price elasticity distribution at world level, 1996 .....	24
Figure 5: World stocks (corn, wheat, rice and vegetable oils), share of production 1960–2010 .....	28
Figure 6: Overseas Development Aid to agriculture, DAC countries and multilateral agencies, 1971–2008 .....	30
Figure 7: Indices of world agricultural production, nitrogen fertilizer use and world agricultural area ...	34
Figure 8: Niger, consumer prices for imported rice, local corn and local millet and producer price for millet.....	43
Figure 9: Local food prices by region, January 2007–November 2010 or latest available.....	47
Figure 10: Challenges of productive safety nets programs in Ethiopia .....	66

## List of Tables

Table 1: Food Price Index (2000 = 100) .....	19
Table 2: Principal characteristics of commodity booms.....	27
Table 3: Average annual rates of growth in agriculture capital stock .....	29
Table 4: Government expenditures in agriculture (44 developing countries) .....	30
Table 5: Growth rates in public agricultural research expenditures, 1981–2000.....	30
Table 6: World consumption growth rate for cereals, vegetable oils and oilseed meals, 1980–2009..	31
Table 7: Biofuel production (millions of litres) .....	32
Table 8: Growth rate of cereals consumption .....	32
Table 9: Vegetable oil: growth rate of world consumption and share of industrial use in world consumption .....	33
Table 10: Cumulative percentage changes in real rice prices, Quarter 4 2003 to Quarter 4 2007 .....	45
Table 11: Cereal prices in Africa: Comparison of price volatility.....	46
Table 12: Policy interventions adopted by countries to address the 2007/08 food crisis .....	47
Table 13: Illustrative suggestions for national policy and programme interventions to reduce, manage, and cope with price volatility .....	53





## FOREWORD

The UN Committee on World Food Security (CFS) underwent a reform in 2009 in order to make the international governance of food security and nutrition more effective through improved coordination, policy coherence, and support and advice to countries and regions. The reformed CFS set up a High Level Panel of Experts on Food Security and Nutrition (HLPE), for getting credible scientific and knowledge-based advice to underpin policy formulation, thereby creating an interface between knowledge and public policy. The HLPE is directed by a Steering Committee, appointed in July 2010, which I have the privilege to Chair. The work of the HLPE supports the policy agenda of CFS: this makes its reports demand driven. It serves also to raise awareness on emerging issues.

Food price spikes and volatility are of increasing political, professional and public concern for food security worldwide. They have been the focus of many studies. Price volatility is high on the agenda of many governments and a priority of the G20 in 2011. It is a primary policy issue for the CFS. It is in this background that the CFS requested the HLPE in October 2010, to report on food price volatility and *“all of its causes and consequences, including market distorting practices and links to financial markets, and appropriate and coherent policies, actions, tools and institutions to manage the risks linked to excessive price volatility in agriculture. This should include prevention and mitigation for vulnerable producers, and consumers, particularly the poor, women and children that are appropriate to different levels (local, national, regional and international) and are based on a review of existing studies. The study should consider how vulnerable nations and populations can ensure access to food when volatility causes market disruptions.”*

This report contains the analysis and recommendations of the High Level Panel of Experts as approved by its Steering Committee at its meeting held in Amsterdam on 12-13 July 2011 and is now being presented to the CFS.

The HLPE operates with very specific rules, agreed by the CFS, which ensure the scientific legitimacy and credibility of the process, as well as its transparency and openness to all forms of knowledge. The Steering Committee of the HLPE attached great importance to sound methodology and followed a rigorous procedure. This report has been produced by a Project Team appointed by the Steering Committee, and under its oversight. The process is also open and transparent, and gives opportunities for a diversity of views, suggestions and criticism: the terms of reference as well as the first draft (V0) prepared by the Project Team have been submitted to open electronic consultations. Final versions of the report have been reviewed by three independent eminent experts, on the basis of which it has been finalized by the Project Team for being submitted to the Steering Committee for approval before being forwarded to the CFS.

I wish to pay my whole hearted tribute to the members of the Steering Committee, especially those having spared their time freely to work with Sheryl Hendriks for the oversight of this report, to the Project Team Leader Benoit Daviron, to members of the Project Team, to the external anonymous reviewers, as well as to the hardworking and dedicated Secretariat of the HLPE headed by Vincent Gitz for their untiring efforts. They can be proud to have

managed to be so responsive and to bring such a high quality report within a short span of time. This has involved heavy strain and hard work on the part of all concerned. I also admire the enormous trouble taken by numerous experts in participating constructively in our electronic consultations. I wish to thank them all. This Report thus owes its quality and relevance to the inputs received from a broad coalition of those concerned with the eradication of hunger on our Planet.

The contemporary relevance of this report will be clear from the fact that in spite of all the efforts of international organizations and national governments, the targets of the UN Millennium Development Goal 1, namely reducing hunger and poverty by half by 2015, is still proving to be a difficult one to achieve. It is our hope that the food security strategy program outlined in this report involving the state, the market and the civil society, including farmers' groups, will help to achieve price stabilization, greater ability to manage price volatility and enhance the coping capacity of national governments and local populations to price fluctuations.

It is our hope that this report will help to nourish policy debate at the next meeting of the CFS in October 2011. I wish to record my sincere appreciation to the Chairman and Members of CFS and to the CFS Bureau and CFS Advisory Group for their encouragement during this first year of operations of the HLPE.

MS Swaminathan, Chair, Steering Committee of the HLPE - July 2011

# SUMMARY AND RECOMMENDATIONS FOR POLICYMAKERS

Food price volatility over the last four years has hurt millions of people, undermining nutritional status and food security. The level of price volatility in commodity markets has also undermined the prospects of developing countries for economic growth and poverty reduction. After staying at historic lows for decades, food prices have become significantly higher and more volatile since 2007. A first price spike occurred across almost all commodities in 2007/2008. After a drop in 2009/10, prices are now climbing again and volatility remains high. Periods of high or low prices are not new. In fact, price variability is at the core of the very existence of markets. Since 2007, however, the degree of price volatility and the number of countries affected have been very high. This is why food price volatility in the context of higher food prices has generated considerable anxiety and caused real problems in many countries.

Global and national responses to this unprecedented food price trend have been remarkable. There have been numerous governmental and intergovernmental initiatives to protect vulnerable populations from the negative consequences of higher food prices. In October 2010, the recently reformed Committee on World Food Security (CFS) asked the High Level Panel of Experts on Food Security and Nutrition (HLPE) to prepare a report on price volatility that covers *“all of its causes and consequences, including market distorting practices and links to financial markets, and appropriate and coherent policies, actions, tools and institutions to manage the risks linked to excessive price volatility in agriculture. This should include prevention and mitigation for vulnerable producers and consumers, particularly the poor, women, and children, that are appropriate to different levels (local, national, regional and international) and are based on a review of existing studies. The study should consider how vulnerable nations and populations can ensure access to food when volatility causes market disruptions”*.

## **Principal observations**

1. Price volatility has a strong impact on food security because it affects household incomes and purchasing power. Simply put, it can transform vulnerable people into poor and hungry people. Price volatility also interacts with price levels to affect welfare and food security. The higher the price, the stronger the welfare consequences of volatility for consumers, while the opposite is true for producers. This interaction implies that focusing only on price spikes will not address overall welfare consequences. Thus, this report addresses both dimensions of price behaviour.
2. To better understand the underlying causes of recent food price behaviour, three interlinked explanations – relating to short, medium, and long-term factors – are discussed. The first explanation defines food price increases as a problem of ‘agricultural price volatility’ (implicitly suggesting that high prices will not last) and as a quasi-natural and constant problem in agricultural markets. To understand if this explanation is consistent with recent trends, one needs to assess if the price volatility seen since 2007 has been out of the ordinary. There appears to be a consensus that price volatility in the last five years has been higher than in the previous two decades, but lower than it was in the 1970s. Because of the liberalization of markets over the past 20 years, however, domestic prices in many countries are more connected to international prices than they were in the 1970s. For some developing countries, liberalization has also meant a significant increase in the level of imports in the total food supply, making international food price volatility even more a concern than it would have been in the 1970s.
  - a. Based on the view that volatility is the normal state of agricultural markets, three possible causes of international food price volatility are discussed in the report: demand elasticity, trade policies and speculation. Of these three, the role of

speculation in the futures market is clearly the most controversial. Nobody contests the dramatic increase in the volume of non-commercial transactions on the futures market. However, conclusions diverge widely as to whether increased non-commercial transactions led to the formation of price bubbles. By contrast, the effects of both the demand from the biofuel industry and the use of restrictive trade measures (mostly export bans) on prices are far less controversial. But both issues are very sensitive politically. Biofuel support policies in the United States and the European Union have created a demand shock that is widely considered to be one of the major causes of the international food price rise of 2007/08. Similarly, the restrictive trade measures adopted by many countries to protect consumers during that time are widely seen as having accelerated price increases. Both biofuel support policies and export restraints have led many governments to question whether they can rely on international markets as part of their food security strategies.

- b. Increasing volatility may also be related to a decrease in price elasticity of demand as a result of increased income. The richer a consumer is, the less likely it is that s/he would reduce food consumption because of a price increase. This is because the share of staple food in the total expenditure of relatively rich people is smaller relative to their income. As a result, an increase in prices does not necessarily lead to a decrease in demand. Given the overall growth in world incomes, food demand is now less price sensitive, which, as price theory shows, can lead to more volatility. This observation raises an international equity issue. In the international markets, consumers with very different income levels compete for access to food. Consumers in poor countries are much more sensitive to price changes than consumers in rich countries. This is true of richer and poorer consumers within countries as well. It also means that, when supplies are short, the poorest consumers must absorb the largest part of the quantitative adjustment necessary to restore equilibrium to the market. While a spike in food prices forces the poorest consumers to reduce their consumption, richer consumers can maintain more or less the same level of consumption, increasing inequity in the overall distribution of food. Biofuel support policies tend to reinforce this uneven division of the quantitative adjustment because they make the biofuel industry less sensitive to higher commodity input prices.
3. The second explanation of the current behaviour of international food prices points to the fact that there have been periodic food crises (1950s, 1970s, and present) that can be explained by the dynamics of agricultural investment. High prices trigger a rush of investment and technological development that succeeds in raising production and lowering prices. In contrast, persistence of low prices leads to a reduction of public interest and waning investment. This situation persists until supply is so low that prices begin to spike, which again triggers a new round of investment. From the end of the 1970s to the mid-1990s, the growth of world Agricultural Capital Stocks (ACS) slowed, ultimately stabilizing at a low growth level. Several developed regions even experienced a process of decapitalization in agriculture. In developing regions, the growth of ACS stayed positive, but slowed and is still slowing in Latin America, sub-Saharan Africa, and south Asian countries. The slowing of agricultural investment growth occurred during a period of restricted public support for agriculture in developing countries. Calculated as a percentage of agricultural Gross Domestic Product (GDP), public spending decreased from 11 percent in 1980 to 8 percent in 1990 before returning to 10 percent in 2002. This is much lower than in developed countries, where the share of public support to agriculture is often more than 20 percent of agricultural GDP. This general slowing of government expenditure adversely affected agricultural research. Nor did financial aid to developing countries from OECD countries and multilateral agencies counter this trend. Indeed, ODA certainly contributed to the trend away from public investment in agriculture in the poorest countries.
4. The third explanation sees the current price increases as an early signal of a long-lasting scarcity in agricultural markets. According to this explanation, the world could be facing the end of a long period of structural overproduction in international agricultural markets, made possible by the extensive use of cheap natural resources (e.g. oil, water, biodiversity, phosphate, land) backed by farm subsidies in OECD countries. In other words, we might be at

the end of a period of historically unprecedented growth in agricultural production that relied on a strategy akin to mining. At the same time, new demands for biomass are emerging. Biofuels are just the most visible part of increasing demand for biomass to provide not only food but also building materials, heat, and transportation. This explanation of rising food prices in terms of scarcity is not new; it was much discussed in the 1970s. But our understanding of the environment has deepened. Today, we see more clearly the costs of industrial agriculture, including the associated pollution, depletion of freshwater aquifers and loss of biological diversity. We also see the costs of long-term under-investment in agriculture and agricultural research. We are asking new questions about what to expect from climate change and how the introduction of potentially unlimited demand on agricultural resources from the energy sector will play out. We can be optimistic that human ingenuity will find solutions, but only if we are prepared to learn from our past mistakes. The long-term challenges confronting agriculture today on both the supply and the demand side are very real.

5. Although rising international food prices represent a serious threat to vulnerable people in developing countries, it is *domestic* food price inflation and volatility that determine the poverty and food security impacts of international food crises. In most developing countries, the 2007/08 international food price rise was transmitted to domestic prices, although not evenly and in some cases with significant delays. Moreover, the subsequent drop in international prices was only partially transmitted – average consumer prices in developing countries remained up to 50 percent higher than they were before 2007/08. The international price rise that started in 2010 and continues today was transmitted to domestic markets even more quickly than the 2007/08 price spike. However, the uneven transmission of international price spikes to domestic prices across countries, commodities, and time periods means that each case will require careful characterization of the transmission in order to appropriately formulate price stabilization and food security policies.
6. In many poor countries, price volatility on domestic markets for locally grown products is the result of both the transmission of international price volatility and of purely domestic (sometimes called endogenous) sources. Even when international prices are stable (as they were between 2000 and 2007) many poor countries exhibited very high price volatility across space and time. Again, there is a large heterogeneity with respect to the mix of imported and domestic sources of volatility. Each country should therefore accurately identify the sources of its own price volatility. Appropriate policies to stabilize, manage, and cope with domestic price volatility can be quite different depending on the sources of price volatility.
7. The Food and Agriculture Organization (FAO) has estimated that the 2007/08 price spike increased the number of undernourished people from about 850 million in 2007 to about 1023 million in 2009. These estimates are contested on several grounds however, including the failure to account for the specific conditions of countries with protected domestic markets, such as India and China, where there was little transmission of higher global prices and have had strong income growth. Furthermore, FAO estimates do not account for the gains from the higher prices commodities (non-cereal) on which millions of people in developing countries rely for their livelihood. To date, there is no institutional mechanism that systematically collects and analyzes data with a view to informing a global and dynamic vision of the actual impact of food price crises on vulnerable populations.
8. There is considerable heterogeneity across countries in terms of how increased price volatility could affect a given country. Key sources of heterogeneity include: agro-ecological conditions and connectivity (e.g. landlocked countries may be affected differently from those with coastal access), preferences of staple food (e.g. diversified versus single staple focus), institutional capacity to implement policies, and macroeconomic health. There is consequently no 'one policy response fits all' approach. This finding has the following implications:
  - a. The feasibility and effectiveness of some of the most commonly recommended policy prescriptions for poor countries – such as scaling up social safety nets and introducing weather insurance programmes for risk management – will vary from country to country. Therefore, information regarding cross-country heterogeneities needs to be assessed in order to make these policies work.

- b. It will be necessary to work with a typology of countries that helps to identify country-specific contexts with respect to impacts and policy responses. One category of particular focus in the typology should be poor, highly food-insecure countries. For each country within this category, it will be important to develop a typology of households to characterize differential channels of the impact of price volatility on welfare. This will involve assessing the net seller–net buyer position of the household in term of staple food markets.
- c. Every country will need to design its own comprehensive food security strategy. This will involve objective assessment of the existing food security policies and programmes, identification of gaps, and working towards building the internal institutional capacity to address them.

## **Recommendations**

1. **Trade rules:** Building a rules-based multilateral trading system able to guarantee food access for every country is now a major challenge for the international community. Since the Uruguay Round, negotiations regarding agriculture have been conceived and conducted in the context of a structural overproduction. This means that the focus has been on how to limit trade conflicts amongst exporting countries and how to open up protected economies to more imports. The objective of the rules was to guarantee fairness of competition between suppliers and to protect market access for exporters. Access to world markets was *not* negotiated for importers and export restrictions were hardly disciplined. The increase in international food prices and the breakdown of the Doha negotiations opens the possibility of a new project in which confidence in international markets would not be based on unrestricted free trade. The food price crisis showed that sovereign states are not prepared to serve international markets at the expense of domestic priorities. This political ‘reality check’ suggests that trade policies, and the multilateral rules that frame them, need to be reconsidered. Multilateral rules are more essential than ever.
  - a. ***Governments should continue to focus on building a transparent, accountable and rules-based multilateral trading system. However, these rules need to give a larger place to public policy concerns regarding food security, better account for the heterogeneity of World Trade Organization (WTO) member states and taking into account special needs of poor and vulnerable countries or social groups.***
  - b. ***Measures to consider include disciplines on export restrictions, safeguarding measures to protect against import surges, measures to better ensure that commercial actors respect contractual obligations, and exemptions for genuine responses to food emergencies (food aid practices continue to require further reforms as well).***
  - c. ***Distinct rules for low-income food-deficit countries (LIFDCs) should be explored.***
2. **Stocks:** The relationship between stock levels and price volatility is well established: low stocks are strongly associated with price spikes and volatility. It is likely that some international coordination of stocks would also make an important contribution to restoring confidence in international markets.. Empirically, a minimum level of world stocks seems to be a sufficient condition to avoid price spikes. Experience also shows that, in a crisis, access to financing mechanisms may not secure stocks during supply shortages. Past experience shows that managing world stocks for price stability is difficult as this requires inter-government cooperation and information. This needs international agreement regarding complex issues - among other issues - when to stock, governance of the systems, location, coordination and ensuring that the stocks reach those who need it most.
  - a. ***The current context is different from the past, therefore, it is recommended that the CFS continues to explore forms of international cooperation regarding world food stocks and food security including the establishment of guidelines for the efficient management of such stocks.***



***b. Better and transparent information systems are essential for policy decisions and management of stocks. The [AMIS] system proposed by the Inter-agency Report for the G20 is welcomed.***

3. **Speculation on the futures market:** Even though the evidence on the impacts of increased speculative activities on prices is inconclusive, the risks of the formation of price bubbles and the exclusion of commercial actors, because of higher costs of participation in a deregulated commodity futures market, are well documented. This implies that tighter regulation is warranted, at least as a precautionary measure. Increasing transparency, by requiring exchange trading and clearing of most agricultural commodity contracts, and setting lower limits for non-commercial actors could be the first set of measures taken by the countries that house major commodity exchanges.

***a. Action regarding transparency in futures markets and tighter regulation of speculation is necessary.***

4. **Demand for food products:** It appears increasingly clear that the unlimited demand of rich consumers for food products generates negative pecuniary externalities for the poorest consumers. Demand tends to be presented as an exogenous variable (like the weather) that cannot be negotiated. This is not true. Indeed, we know that the consumption levels of the world's richest countries cannot be extended to everyone in a world that looks set to grow to include nine billion people. Demand is significantly affected by public policy choices and can be reduced. . The significant expansion in the production of animal products also raises questions as a number of associated costs are not internalized in prices, and because industrial meat production places significant demands on cereal stocks and freshwater reserves. Moreover, the livestock industry makes a significant contribution to greenhouse gas emissions. By generating a new demand for food commodities that can outbid poor countries and food-insecure populations, industrial biofuels highlight the tension between a potentially unlimited demand (in this case for energy) and the constraints of a world with finite resources. Several proposals linked to changes in existing mandates could reduce the likelihood of biofuel production contributing to price spikes..

***a. Given the major roles played by biofuels in diverting food to energy use, the CFS should demand of governments the abolition of targets on biofuels and the removal of subsidies and tariffs on biofuel production and processing.***

***b. Governments should explore incentives for the reduction of waste in the food system including addressing post harvest losses.***

5. **Investing in agriculture:** Investing in agriculture with a long-term view is necessary to prevent a repetition of the food crisis. It is also necessary to guarantee a transition from food and agricultural systems that deplete natural resources to sustainable food and agricultural systems that reduce the use of fossil energy and pollution. New public and private investments are necessary in both research and development. Preservation of agro-biodiversity and the creation of new varieties should be promoted by international and national agronomic research centres, as should research aimed at maximizing biomass on diversified agricultural production systems. Agro-ecology offers an important and complementary base of experience and perspectives for such a transition that is particularly suited for producers with limited access to chemical inputs. Collaboration between international agronomic research centres and agro-ecology supporting organizations should be encouraged. Public support is also necessary to help farmers to engage in more ecologically sustainable systems. With these investments, national governments should reinforce local capacity and resilience of food production systems. Investment at all levels should respect the plurality of knowledge systems, including women's knowledge and the knowledge of indigenous peoples.

***a. Stable and sustainable long-term investment in agriculture is a necessary condition for addressing the challenges in food security.***

**b. A significant global expansion in funding for agricultural research and development is recommended. Strengthening the current reform process of the CGIAR and support for national research systems will contribute to long-term solutions to food insecurity, especially in the context of land degradation, water scarcity and climate change.**

6. **Incorporating externalities in the cost of food production:** High food prices are an opportunity to promote internalisation of externalities to create incentives for improving the efficiencies of production systems. In addition to new public investments, institutional devices aimed at increasing the cost of using non-renewable natural resources are essential to effect a transition to more sustainable production models. Such incentives should be selected on the basis of a comparative evaluation of their implementation, monitoring and information costs. Better cost accounting for industrial agriculture will go a long way in ensuring that agribusiness pays its share of the cost for agriculture, while allowing the economic and ecological efficiencies of small-scale producers to ensure a fairer return.

**a. It is recommended that this issue should be considered in food security debates. Further research is needed to identify and test such incentives.**

7. **Promoting food security strategy programmes:** Food security is a complex and multidimensional issue and a national responsibility. Therefore countries need an national comprehensive food security strategy in line with the specificities and special characteristics of each country. Such strategies should include policies to reduce, manage and cope with price volatility. These strategies should be developed and managed in an inclusive manner with civil society, Farmers' Organisations and in partnership with the private sector. The elaboration of a food security strategy should be based on robust data collection and analysis. Regular policy review is necessary. Policies should be coherent. Governments need information systems to be able to assess hunger and malnutrition, provide early warnings and target appropriate assistance effectively. Elaboration of food security strategies is consistent with the Rome Principles

Two categories of policies and programmes can be contemplated at the national level to solve the volatility problem in relation to food security. The first aims at stabilizing prices. The second aims at reducing the impact of price volatility on incomes and purchasing power. This can be divided into two further categories: steps taken in anticipation of price shocks (*ex ante*) to reduce their impact, and steps taken after the shocks occur (*ex post*) to help people and businesses cope with price volatility. The policy and programme instruments can be divided into three groups corresponding to the roles of the market, state, and civil society in development: market-based instruments, direct state interventions in markets, and interventions through civil society organizations. Combining the three policy objectives (stabilization, management, and coping) with the three categories of instruments (market, state, and civil society) gives nine classes of instruments. The proposed typology constitutes a convenient way of organizing the multitude of policy instruments used by developing countries and advocated by different analysts during the recent world food price swings.

**a. The CFS should encourage and support the establishment or review of existing national food security strategies in each member country. This should include human and institutional capacity to develop, implement and monitor food security.**

**b. There should be an inter-sectoral national coordination structure, including civil society representatives and farmers' organisations representatives, to coordinate implementation of the national strategies.**

**c. The vast array of instruments (such as those identified in this paper including social protection) should be combined to achieve the maximum impact and to fit the food security strategy of each particular country.**

- d. It is recommended that a typology of countries and vulnerable groups may help policy makers in selecting the most appropriate policy instruments. This should include consideration for the various stages of the human life-cycle.*
8. **The role of the CFS:** The recent food crisis shows that there is a need and an opportunity to reduce the occurrence and severity of food crises by better management of information, learning, and coordination of policy interventions at a world level. The CFS could play a major role in these three domains.
- a. The CFS should ensure that the information on food security is appropriately managed as well as the coordination of policy interventions at the global level.*
  - b. The CFS could play a role in the establishment of the Agriculture Market Information System (AMIS) and the Rapid Response Forum (RRF) proposed by the G20. It is recommended that the AMIS market information be extended to include food crops other than the usual global cereals, including livestock and fish. AMIS should also include reliable, disaggregated and accurate information on hunger to support the achievement of food security. The AMIS could play a role in early warning.*
  - c. The CFS should coordinate short and long term policy measures taken in relation to price spikes (considering trade barriers, food aid, input subsidies, stocks, etc...).*
  - d. The CFS should also serve as a body where donors and governments make long term commitments to public investments in food security and a body where those commitments are monitored and enforced.*
  - e. The CFS should contribute to better inter-governmental coordination, including emergency policy measures taken in relation to price volatility.*
  - f. The CFS, as the highest governance body on world food security should stimulate and facilitate debate and learning on food security issues, including as a forum for more open debate on how agricultural trade rules could support food security.*
  - g. The CFS should establish codes of conduct on food security issues for better international cooperation.*
  - h. More studies are required on global governance on agriculture and food security, to inform the Global Strategic Framework on Food Security and Nutrition.*



# INTRODUCTION

Something important happened with the 2007/08 food crisis. Indeed, as the World Bank's 2008 World Development Report showed, the change was perhaps already taking place when the crisis hit. Whatever the case, the public policy debate on food security has changed permanently in the light of that crisis and its aftermath. The crisis triggered a swift and important response at the national, regional and multilateral levels from governments, intergovernmental agencies and Non-Governmental Organizations (NGOs). Dozens of reports were published and the debate continues still. This report benefits enormously from work that has been done before, and is intended as a contribution to what is sure to be a continuing debate.

Three years after the 2007/08 crisis peaked in June 2008, it was clear that the higher prices and higher levels of food price volatility in international markets are not short-lived. While some traditional sources of price volatility are exerting an influence, other factors are now operating. International trade, while still fundamental to the food security of many countries, is under intense review as Net Food Importing (NFIM) countries explore strategies to reduce their dependence on markets that have proved dangerously unstable. Some countries are investing in food production abroad through land investments. Others are investing in the expansion and diversification of agricultural production at home. Some are doing both. Food production in Africa as a whole is much more robust in early 2011, when prices in international markets are again on the rise, than it was in 2008. And while multilateral negotiations on climate change have failed to make any significant progress for several years, the evidence of unusual weather events disrupting production continues to amass, forcing public attention to the question of how best food production can adapt itself to the coming challenges.

This report sets out to explore different explanations for two closely linked phenomena - higher food prices and higher levels of food price volatility. There is considerable reason for governments to be concerned and to act. It is important to understand the full magnitude of the current changes to ensure that public policy responses are not limited to the short-term, but also look ahead to a long-term vision for building and maintaining resilient and sound food systems.

The first part of the report deals with the causes of the recent international food price increases. It proposes three different explanations. The first explanation defines food price rises as a problem of 'agricultural price volatility' (implying that high prices will not last) and as a quasi-natural and permanent problem of agricultural markets. The second explanation points to the existence of periodic international food crises (1950s, 1970s, and present) and claims they can be explained by the dynamic of investment in agriculture. The third explanation sees current price increases as an early signal of coming and lasting scarcities on agricultural markets. The report does not choose between these three explanations. Instead, it emphasizes their complementarities. For example, the need for significant public investment in agriculture will be conceived of differently if the third explanation (coming scarcities) is taken into account. The main concern here is that short and medium-term measures should be compatible with and even contribute to resolution of the long-term problems.

The second part of the report presents key policy recommendations to address price volatility and its consequences for food security. It discusses six objectives:

- Building a food security oriented trading system
- Precautionary regulation of speculation
- International coordination of national storage policies
- Food reserves and the World Food Programme
- Curbing the growth of developed country demand for agricultural products
- Refocusing public investment to achieve long term food security

As per the 1996 World Food Summit definition, food security exists when "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 healthy life". Therefore, food insecure people are those who do not have physical and economic access to enough food to meet their daily needs for sound nutrition. These people are sensitive to food price changes and vulnerable to the negative impacts of price volatility including detrimental consumption changes and reduction in purchasing power.

The third part of the report shows that international food price rises have been unevenly transmitted to

domestic prices in developing countries. In most countries transmission was delayed, but increases in domestic food prices persisted after international food prices dropped. In many poor countries, particularly in Africa, this volatility from the international market exacerbated chronic domestic volatility in local food prices. Information on the consequences of price volatility (imported and domestic) on the food security of vulnerable populations is also given.

Here vulnerability refers to susceptibility of food insecure people to the negative consequences of price volatility (among other factors) that threaten to deepen the level of hunger, deprivation and malnutrition. Vulnerable people include:

- people whose food consumption falls below adequate levels (typically children from conception to 5 years, pregnant and breastfeeding women, the poor, and displaced populations),
- the poor (rural and urban) who are net buyers of food,
- those for whom increases in food prices can cause consumption to fall below acceptable levels (i.e. are vulnerable to becoming food insecure), and
- farmers for whom market uncertainties amplify production and livelihood risks.

The report then turns to national level policy recommendations. After assessing possible policies, the report presents a menu of suggested available instruments for dealing with price volatility. It then stresses the necessity of taking into account the specificities of each country. It proposes that governments elaborate comprehensive national food security strategies that integrate price volatility as a component.

Finally, the report concludes on the specific role of CFS in relation to price volatility and food security.



# 1 RECENT PRICE BEHAVIOUR IN INTERNATIONAL FOOD MARKETS: THREE EXPLANATIONS

Since 2006, international food prices have risen sharply on two occasions. The second rise is still in motion. It is a situation not seen on international food markets for over 20 years.

Table 1 summarizes these price increases, ranging from 37.5 percent (for sugar) to 224 percent (for rice) between January 2007 and June 2008. Wheat rose 118 percent between January 2007 and March 2008, while maize rose 77 percent between January 2007 and June 2008. Prices started to fall at the end of 2008 (see Figures 1 and 2). After the steep increase, the prices for rice and wheat dropped by 55 percent in the second half of 2008 while maize dropped by 64 percent in the same period. International food prices then started to rise sharply again in the second half of 2010, and the price index of food surpassed the peak levels of 2007–08. The FAO Food Price Index increased by over 30 percent between June and December 2010, while the price index for cereals jumped by 57 percent during the same period.

These numbers demonstrate how volatile prices continue to be. Analysis of cereal price movements in international markets between January 2006 and December 2011 shows that prices have increased more than they have fallen, implying a general increase in average price levels. Food prices have not returned to their pre-2007/08 levels. Instead, prices are now fluctuating at around double the average level of the period 1990–2006.

**Table 1: Food Price Index (2000 = 100)**

	1990–2006 Average	2008 Highest monthly value	2009 Annual average	2010 Annual average	2011 January – March average
Food	124	292 (June)	205	224	284
Cereals	126	340 (April)	214	215	289
Rice	129	448 (April)	274	241	229
Wheat	130	305 (June)	196	196	281
Corn	122	324 (June)	187	209	319
Fats and oils	127	341 (June)	216	244	321
Sugar	120	165 (Feb)	222	260	348

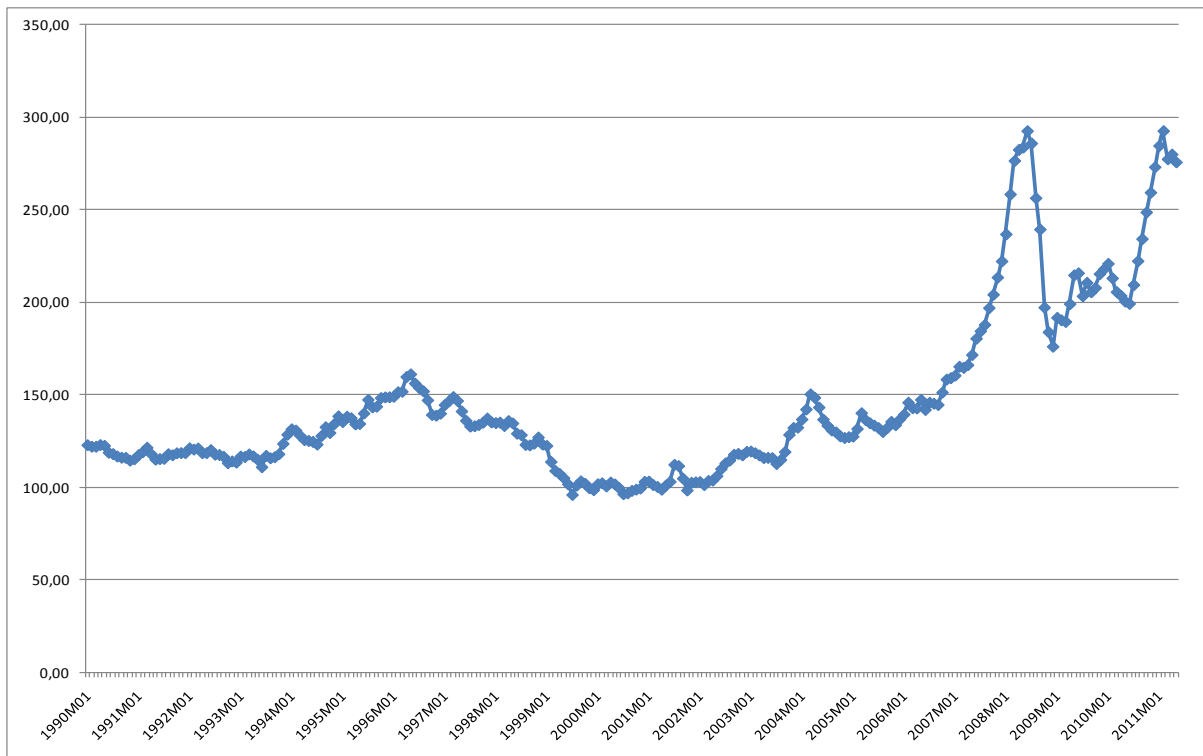
Source: World Bank (2011)

The analysis of the World Bank Food Price Index in constant dollars<sup>1</sup> puts the current price rise into its historical context (Figure 3). It shows that the recent doubling of food prices simply brought them back to the level of the 1960s and that they remained far below the level they reached during the 1974 food crisis. But the analysis also shows the specificity of the current situation. In the 1970s, the price spike occurred in the context of stable or declining food prices and was very brief; two years of price boom followed by two years of price falls, bringing prices back to their initial level. The 2007/08 price spike happened after six years of price increases. It was followed by just one year during which prices fell before they started to rise again.

Price volatility and price increases are two different phenomena that strongly interweave to affect welfare and food security. By impacting household incomes and purchasing power they can transform vulnerable people into poor and hungry people. In this report we deal with both price volatility and price increases.

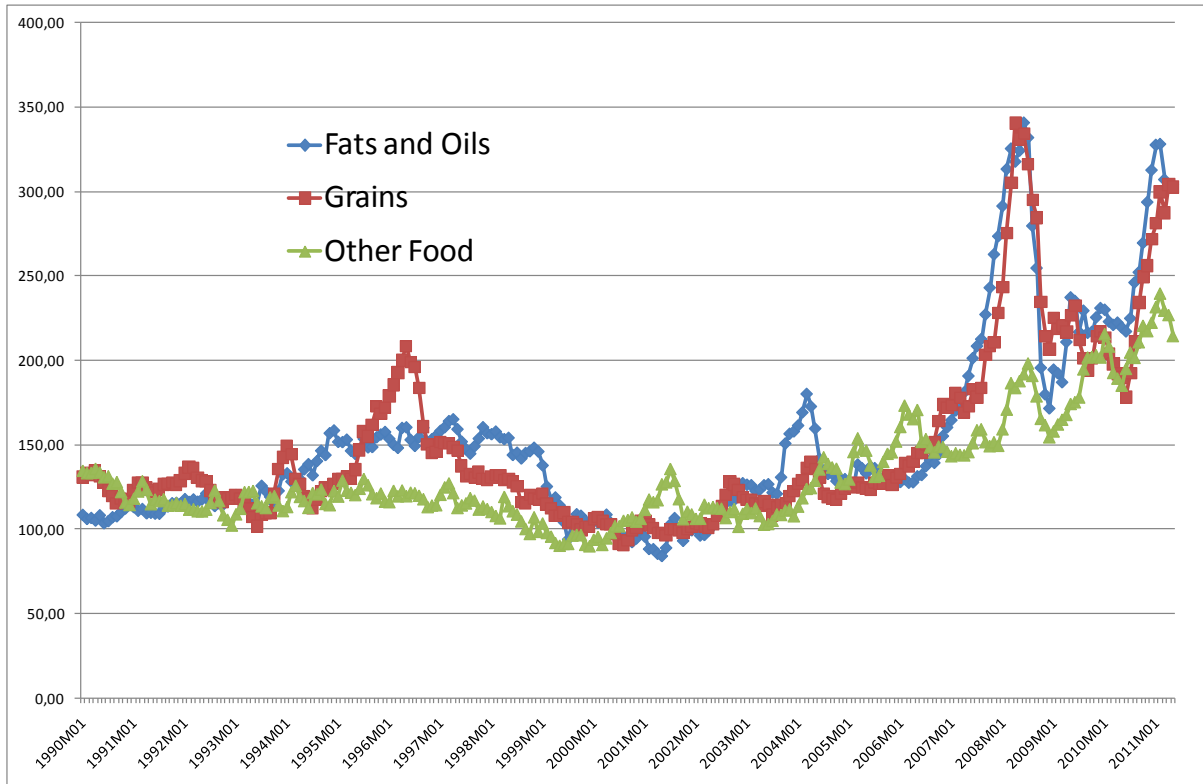
<sup>1</sup> The Food Price Index is calculated in constant dollars by deflating the index in current dollars by the Manufacture Unit Value (MUV) Index (the index is a weighted average of export prices of manufactured goods for the G-5 economies). The food index for 2011 has been calculated for the five first months. Its value in constant dollars has been calculated by using an estimated MUV.

**Figure 1: Food Price Index, monthly, January 1990–May 2011 (2000 = 100)**



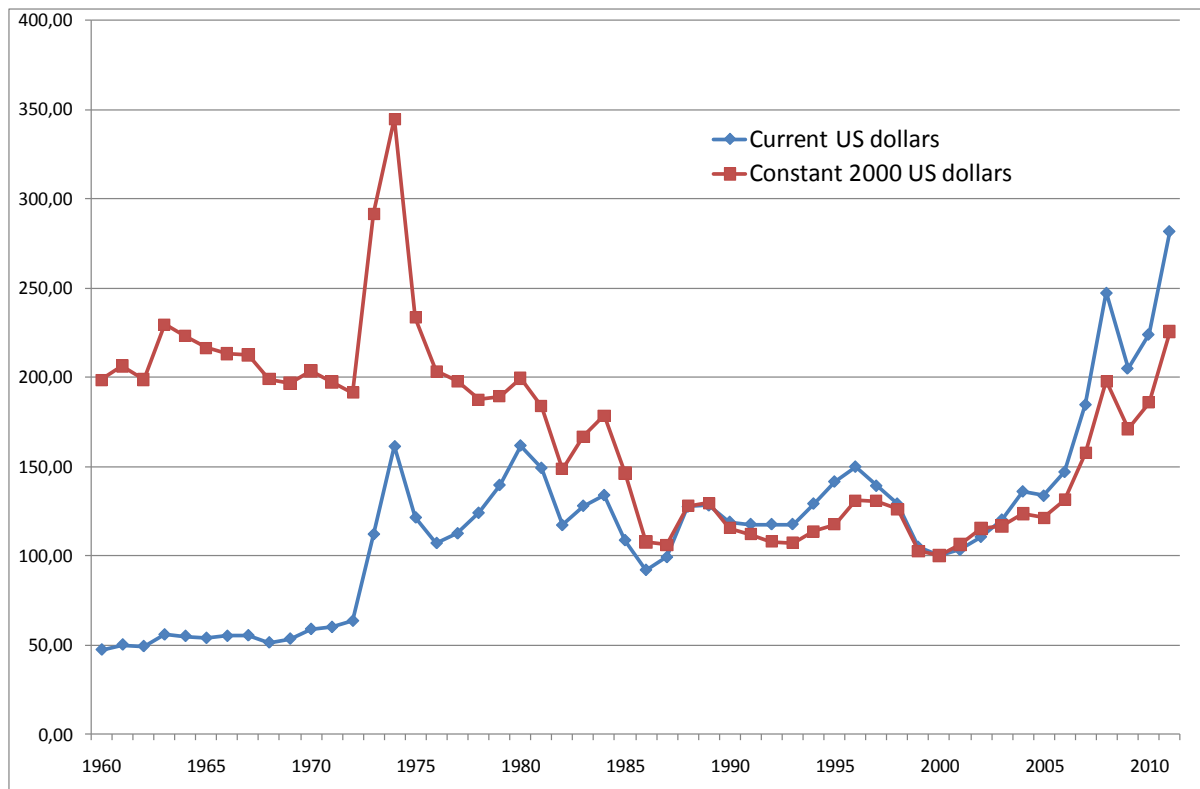
Source: World Bank (2011)

**Figure 2: Agricultural commodity prices index, monthly, 1990 January-2011 May (2000 = 100)**



Source: World Bank (2011)

**Figure 3: Food Price Index, current and constant US dollar, annually, 1960–2011 (2000 = 100)**



Source: World Bank (2011)

Under the current situation, it is very difficult and perhaps impossible to analyze price volatility, apart from price increases, in order to understand what is happening on international food markets. What is new on international food markets is the existence and persistence of upward pressures that provoke simultaneously higher and more volatile prices. The best illustration of these persistent upward pressures is the fact that markets needed one of the worst depressions since World War II (with a growth rate of world output falling from +5.4 percent in 2007 to +2.9 percent in 2008 to -0.5 percent in 2009) to get food prices down, and the fact that even with such a depression, food prices did not fall back to their pre-2006 levels. When world economic growth started again, food prices immediately started to rise once more. This does not, however, mean prices cannot go down again in response to another depression in the global economy as they did in 2009. In the longer term, another wave of agricultural investment might increase production sufficiently to re-establish another period of relatively low and stable prices. But for the time being, upward pressures on prices continue to be active.

The second reason is that the real concern for people and governments is high prices rather than volatility. Even if volatility is the focus, it is because the volatility is occurring at a moment of high prices. The effects of price volatility on food security and welfare depend on price levels. A given degree of price volatility has much more impact with higher prices. “Behind concerns about volatility lie concerns about prices levels and behind both lie concern about food security” said the ten international organizations’ report (FAO *et al*, 2011). Indeed, it is higher prices rather than volatility that provoked riots in 2008, the FAO summit in 2009 and the numerous political initiatives organized since the 2007/09 food price crisis.

This being said, it must be recognised that agricultural production will have to increase, by 70% according to some estimates, if we are to meet the food security demands of a growing global population estimated at 9.2 billion by 2050. The maintenance of remunerative process for commodity producers is an essential component to meet this objective. High commodity prices do not only benefit efficient agricultural productive and exporting countries, but provide incentives to current net food import countries that have the potential in agricultural production (which has been inhibited in the past

by the inflows of subsidised products from developed countries) to promote at least self-sufficiency policy objectives.

Excessive fluctuations in commodity prices, whether in situations of price increases or price depressions create uncertainties for farmers. This affects decisions regarding agricultural investment and as such has a long-term impact on world food security.

Finally, analyzing price volatility and price increases together allows a more open debate on policy options. For the last 15 years, the international debate on food price policy has been focused on risk management instruments. Volatility is the risk to be managed. From this point of view, framing the current price problem strictly as 'price volatility' points to a particular set of solutions. But the problems we are facing today on international agricultural markets are new. They need to be addressed with a more open perspective than the price volatility lens allows, even if we do not have familiar solutions to propose.

The recent behaviour of international food prices has generated a vast quantity of analysis and debate that seeks to characterize and solve the problem of food price volatility. The following discussion presents a summary of some of this analysis and debate. To understand the differing perspectives on the topic, it is helpful to distinguish three distinct but complementary explanations of recent food price volatility in international markets.

1. The first explanation defines food price rises as a problem of 'agricultural price volatility', implying that high prices will not last (in colloquial terms, that the cure for high prices is high prices). Price volatility is conceived as a natural and permanent problem of agricultural markets, related to such things as low elasticity of demand and climate shocks that curtail supply. In addition to the inherent 'normal' level of volatility in agricultural markets, analysts distinguish 'excess' volatility, such as has characterized much of the period since 2007.
2. The second explanation points to the existence of periodic international food crises (1950s, 1970s, and present) and says these can be explained by the cyclical nature of investments in agriculture, particularly the rise and fall of public investment.
3. The third explanation sees in the current price increases the early signal of coming and lasting scarcities on agricultural markets. The volatility is linked to the lack of equilibrium in supply and demand as a new context emerges. The explanation emphasizes the increasing pressures placed on natural resources, whether those directly linked to agricultural production (e.g. water, soil, biodiversity, greenhouse gases) or indirectly linked (e.g. oil.). The argument suggests new sources of demand – possibly coupled with diminishing productivity growth in agriculture – have combined to bring supply and demand too close together for stable prices to be a likely outcome.

Each of these three explanations of the current price volatility is related to different temporal horizons: short, medium and long-term. Each also highlights different problems of economic efficiency and equity at the international level. The rest of the discussion in this part of the report focuses on international food markets and elaborates on each of these explanations.

## 1.1 Excessive price volatility

Broadly, price volatility is the movement of a price up or down over a given time period. That movement can be close to zero (low volatility) or degrees of magnitude larger (high volatility). The period also matters. Volatility is measured over a relatively short time period. To economists, price variations are an essential component of the normal functioning of markets. Prakash (2011) reminds us of a basic premise of economics: "The essence of the price system is that when a commodity becomes scarce its price rises, thus inducing a fall in consumption and signalling more investment in the production of that commodity." Some degree of volatility is thus essential to functioning markets.

Most of the literature distinguishes between normal and extreme volatility, which might also be characterized as good and bad volatility. Defining the distinction is not easy, however. There is no

simple measure that applies to all situations. Moreover, the definition of extreme volatility in relation to vulnerability means that there is no universal criterion or threshold to identify it.

Beside its impact on individuals and countries, the assessment of whether price volatility is normal measures the relationship between price variations and the so-called 'market fundamentals'. 'Excess volatility' is sometimes used to qualify a price variation that cannot readily be explained by a change in supply or demand. This inherent vagueness opens assessments of volatility to unending controversy, as illustrated by the ongoing debate on the role of speculation in price formation and whether it has led to excessive volatility. It is not easy to establish a baseline from which to measure normal and excessive.

In a more pragmatic approach, several authors have used a variety of methods to assess whether food prices are becoming more volatile over time (Calvo 2008; Gilbert and Morgan 2010; Huchet-Bourdon 2010; Abbott 2011). They almost unanimously conclude that there is no tendency towards increased price volatility over the past 50 years (1960 to present). They point out that volatility in international agricultural commodity markets is currently higher than it was in the 1990s and 2000s but not higher than it was in the 1970s.

Is there any change in the usual determinants of food price volatility that could explain the current period of excessive volatility? This is the question we try to deal with in this section.

### **1.1.1 Food demand becomes less sensitive to price changes as income increases**

Almost every analysis of food price volatility starts with the reminder that food consumption is price inelastic: big price changes are necessary to adjust demand to any excess or deficit in supply. This much is well known. What is less discussed is the uneven distribution of food price elasticity at the world level. Everyone has to eat, but not everyone has the same capacity to pay more when prices rise.

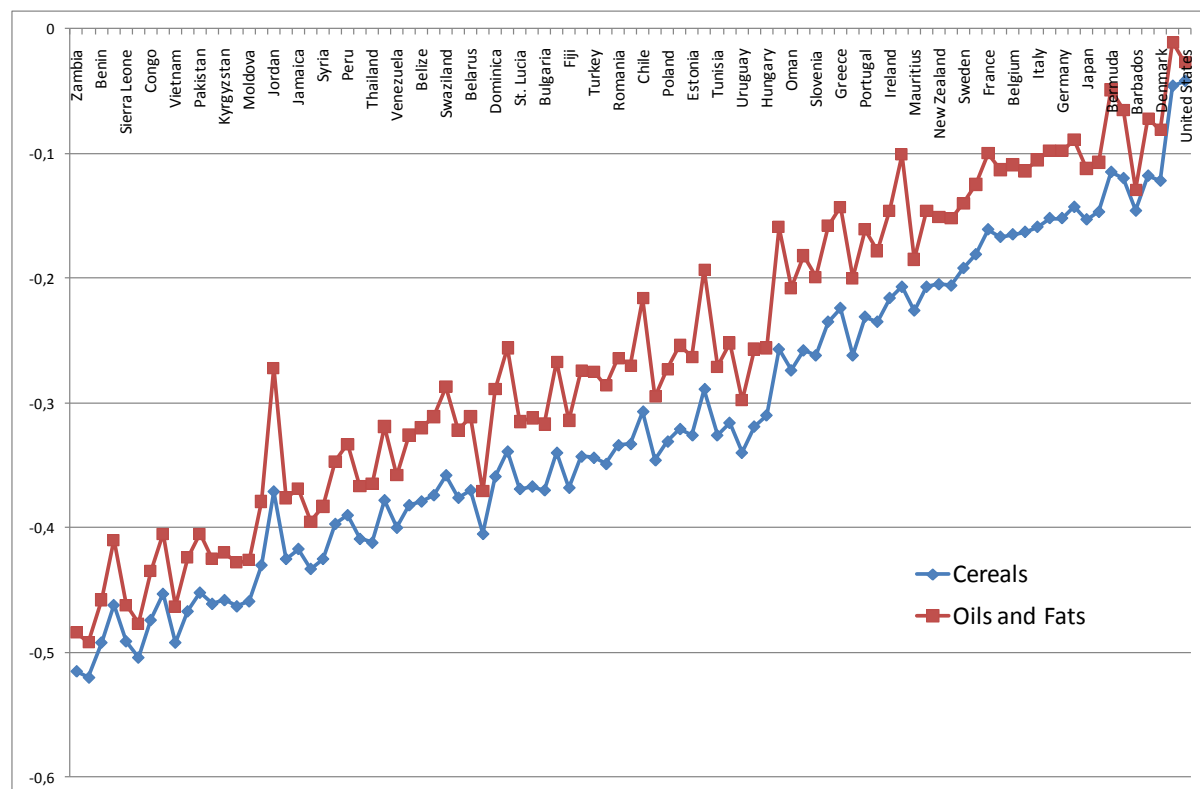
Consumers with very different levels of income, and buying very different products, are indirectly competing on international food markets. For the rich consumers of OECD countries, agricultural prices represent a small share of the overall value of the highly processed foods they eat and food expenditures are a relatively small part of their total budget. This makes richer consumers relatively indifferent to even quite large fluctuations in the price of raw commodities. They are more price inelastic, in economic terms, than poor consumers living in Least Developed Countries (LDCs) who mostly buy unprocessed commodities for their food. This means that agricultural commodity prices represent a large proportion of the final price poor consumers pay for food items, and that food expenditures are a relatively large part of their household expenditure. To illustrate, the budget share of food expenditure is about 70 percent in Tanzania and 45 percent in Pakistan against an average of 10 percent in the United States.

This makes poorer countries much more responsive to changes in food prices than are wealthier ones (Regmi *et al.* 2001). Figure 4 presents price elasticity for cereals and vegetable oils calculated for 114 countries ranked in relation to their 1996 per capita GDP. It clearly shows the inverse relation that exists at the world level between income and food price elasticity. For the poorest countries, price elasticity for cereals and oil/fat demand is equal to -0.5. For the richest, it is almost zero. When prices rise, populations in poor countries eat less food.

The difference between food price elasticity in the poorest and richest countries seems to be increasing over time: the slope of the curve linking income and elasticity increases between 1980 and 1996. Price elasticity is becoming higher for poor countries and smaller for the rich (Regmi *et al.* 2001).

The inverse relation between income and food price elasticity, coupled with growing incomes in most of the world, means world food demand is becoming less and less price elastic. In turn, supply variations provoke higher levels of price volatility as demand does not lessen even as supply dwindles (Abler 2010).

**Figure 4: Price elasticity distribution at world level, 1996 (Unconditional Frisch own price elasticity)**



Source: Regmi *et al.* (2001)

Moreover, this inverse relation between income and food price elasticity at the global level implies that in an open market the poorest countries absorb a larger proportion of the quantitative adjustment necessary to balance supply and demand. The necessary reduction in demand for a given supply is not equally distributed.

### 1.1.2 Global food markets: more integrated but easily re-fragmented

Barriers to trade, especially non-tariff measures, are an important cause of international price volatility in economic theory. Trade barriers are designed to isolate domestic markets from international price fluctuations. As such, they reduce the number of consumers and producers participating in the quantitative adjustment between supply and demand. This in turn imposes a larger adjustment for the rest of the world, and therefore, a larger international price variation. The larger the world market, the smaller the price variations needed to balance supply and demand.

One of the objectives of liberalization policies and the WTO trade negotiations was to build an integrated world market that was big enough to absorb, with limited price variations, any localized supply or demand shock. From this point of view, the 'tariffication' of import barriers included in the Uruguay Round Agreements – as well as the liberalization policies implemented in the context of structural adjustment policies – were major advances towards a more integrated global food market. In many countries, including the member states of the European Union and the Former Soviet Union for example, current domestic prices are more connected to international prices than they were 20 years ago. The theory would therefore predict that trade policies are limiting volatility by encouraging greater integration into international markets.

It is nonetheless quite difficult to get a clear idea of the degree of market integration at the world level. We know that today the situation is very uneven. Some countries have connected their domestic prices to international prices (e.g. the European Union), while others, such as India and China, have kept stabilization policies that isolate domestic prices for rice or wheat from international price fluctuations (OECD 2009; Yang *et al.* 2008).



If the medium-term evolution of trade policies cannot explain the appearance of a higher price volatility era, it is quite clear that the trade measures adopted in reaction to the initial food price rises played a decisive role in amplifying the problem. Many authors point to abrupt changes in trade policy as one major explanation for the 2007/2008 price spikes. Export restrictions and import surges are invoked to explain rice price behaviour during this period. Several authors (Slayton 2009; Dawe and Slayton 2010; Headey 2011a) have proposed detailed accounts of the sequence of export restrictions implemented by exporting countries (India, Vietnam, Thailand) and the panic buying they generated on the international market. Yang *et al.* 2008 describe the different measures adopted by the Chinese government to limit the transmission of the 2007/08 price rise to the domestic markets, including the release of stock from public reserves, the elimination of subsidies for corn exports, the implementation of a new export levy and a grain export ban.

A FAO internet site<sup>2</sup> gives an account of the government policy measures taken in 2007 and 2008 to reduce the impact of soaring prices (see also Demeke *et al.* 2009; Sharma 2011). According to this survey, 25 of the 81 developing countries surveyed imposed export taxes or restrictions. More recently, the 2010 wheat price rise was in part caused by an export ban imposed by the Russian government after the severe drought and raging fires in Russia that summer.

It is clear that export restrictions and bans were a significant factor in the 2007/08 food price crisis, particularly for rice. In general, they exacerbated price increases and added to the uncertainty food importing countries faced as to the availability of supply (see Sharma 2011 for a review of the studies and price effects on rice, wheat and soy). They were likely to have been significant in the collapse of the Doha negotiations in April this year. The Doha Agenda had already been criticized for its one-sided focus on restricting market access barriers while leaving export restraints more or less untouched (Konandreas, 2010). The export restrictions imposed by exporters such as Russia, Argentina and India sent a strong signal to importing countries that the international market remains primarily a residual market in which domestic interests are still paramount.

### **1.1.3 Speculative funds in the futures market have dramatically increased, but so has the cost of hedging**

Speculation is an intrinsic part of how the futures market works. Speculators assume the price risk that market operators (traders, manufacturers) find hard, or do not want, to carry. Speculators provide a market for hedgers who have something to lose in the process of buying and selling. Farmers want to lock in prices when they plant to lessen the risk of low prices at harvest time; processors want to lock in prices in case of a poor harvest and increased prices. Speculators are expected to buy when the price is low and sell when the price is high (exactly as the manager of a stock would be expected to do). They thereby help with 'price discovery' (the level where prices should be, given supply and demand) and provide a service to both producers and buyers by providing liquidity (cash) in the short term for sales that are contracted months ahead of final delivery. In this way, speculators can reduce volatility by providing, at planting, an estimated price at harvesting, or between harvest (once or twice a year) and use (evenly spread over the year). Speculators are willing to buy and sell each day, ensuring there is money in the market, which in turn is supposed to reduce transaction costs for both buyers and sellers.

Speculation is associated with exaggerating volatility and with price bubbles, however. If speculation is not new, neither is the controversy that surrounds it. In the wake of the stock market crash of 1929 and the subsequent economic depression of the 1930s, the United States government established regulations and oversight mechanisms to limit the negative effects of unchecked speculation. Any actor in the commodity market that was not buying or selling physical stocks was forbidden to hold contracts worth more than 11 million bushels of grain (De La Torre Ugarte and Murphy 2008). These regulations were rolled back over the 1990s. Then in 2000, the United States Congress passed the Commodity Futures Modernization Act, which weakened the rules on position limits and created the possibility for speculation on unregulated so-called shadow markets (Frenk 2011).

Ann Berg, former director and trader at the Chicago Board of Trade (CBOT) highlights the changing circumstances of the 1990s and 2000s that changed the demands made on commodity markets:

---

<sup>2</sup> <http://www.fao.org/giews/english/policy/index.asp>

“The market liberalization that swept across the globe starting in the 1990s generated a surge in commodity exchange and derivative market development. The new exchanges differed markedly from previous models – shifting their focus from commercial concerns to producer needs. Income growth, rising demand for agricultural products and a reduced scope of price support systems created a need for risk management centres to deal the resultant regional price volatility” (Berg, cited in Prakash 2011).

Experts and governments continue to disagree as to the degree to which speculation was to blame for the food price crisis of 2007/08, and how the existing commodity trading mechanisms might be reformed to limit the possibility that speculation exacerbates instability. The volume of activity on the futures market leads many commentators to believe that increased speculation is an important, if not the leading, cause of increasing volatility of food prices. This phenomenon is one part of what has been described as the ‘financialization’ of the commodity markets (Domanski and Heath 2007).

Many authors (Ghosh 2010; de Schutter 2010a; UNCTAD 2009) refer to the passage of the Commodity Futures Modernization Act of 2000 as the origin of the commodity index. Commodity index funds are composed of different commodities. These index funds are sold by banks, which in turn hedge their exposure through commodities futures contracts on commodity exchanges. Estimates suggest the money invested in commodity index funds increased fivefold from \$46 billion in 2005 to \$250 billion in March 2008 (Jones 2010). By 2008, the two largest index funds held a combined position in grains of 1.5 billion bushels, while the total long position of all index funds was over 2.2 billion bushels (de la Torre and Murphy 2008). Today, the equivalent of an entire year’s wheat harvest can change hands in a day – and then again, day after day (Berg, cited in Prakash 2011).

Others authors argue speculation has no, or minimal, effect on prices. Sanders *et al.* (2008) conducted a very detailed analysis of the data published by the Commodity Futures Trading Commission (CFRC). They confirmed the dramatic increase in the number of investors in the futures market that started in late 2004 and continued into 2008. They also showed the very strong increase in index funds’ share of total open interest that happened between early 2005 and mid-2006 – before the food price crisis peaked. “For most markets, the index funds’ percent of open interest peaked in 2006 and has since stabilized, even though absolute position size continues to grow.” In other words, while the amount of speculative money continues to increase, the index funds’ share of the total has stabilized. Sanders *et al.* (2008) do not see the level of speculative activity as high by historical standards. That is, while the overall volume of trade has increased dramatically, there is no discernable trend in the activity that is pushing prices upward. The authors list two additional reasons to be sceptical about the role of speculation:

- The highest concentration of long only position speculative activity occurred in livestock markets rather than grain and oilseed markets, yet livestock markets did not experience a price boom in 2007–2008;
- Very high prices were recorded for commodities without futures markets and in agricultural futures markets that are not included in the most prominent commodity index (e.g. rice, milk).

Nonetheless, while speculation was clearly not the only factor operating in commodity price increases and volatility of 2007/08, a number of questions are not answered satisfactorily by the analysis available to date. A series of factors: the deregulation of markets; the breakdown of the regulatory walls that once separated banks from insurance firms; the mobility of capital in the global economy; the important volume of trading ; and, the enlarged mix of interests among those trading contracts, raise new questions that need attention. It seems reasonable to say that speculation played more of a role in the volatility of some commodities than others, and that the overall importance of speculation in volatility remains contested. The introduction of new instruments, such as index funds, may have confused traders for a time. So might the apparent fact of higher prices that now are widely expected to continue, albeit with continued volatility.

To be conclusive, the analysis of the consequences of an increased speculation on the futures market should also include an evaluation of the advantages it brings to futures market users. Beside its role for price discovery, the futures market is supposed to eliminate part of the price risk for the economic agents operating on the physical market (traders, millers, farmers, etc...). However, this sort of insurance provided by the futures market has to be paid, like any insurance. One of the supposed advantages of allowing increasing numbers of speculators into the market is precisely to reduce this cost. Is such a reduction in the costs of hedging actually evident? In other words, what do the physical

operators, and after them food consumers, gain from the increase of speculation in the futures market? This question seems to have been lost in the debate.

The answer is hard to discern and even harder to understand for non-specialists. A way to approach it is by using the indicator 'implied volatility'. Implied volatility represents the market's expectation of how much the price of a commodity is likely to move in the future. It is called 'implied' because as it is dealing with future events it cannot be observed, and can only be inferred from the prices of derivative contracts such as options (FAO 2010a): According to the FAO calculation, implied volatility would have increased from an average of 10 percent for wheat, corn and soybeans in 1990 to about 35 percent in 2008 and 2009. This means that the cost of placing an option to buy in the future, and then hedging that option did increase with the boom in speculation.

## 1.2 Recurrent food crises

The idea that food crises are a periodic occurrence can be found in many analytical papers (Gardner 1979; Timmer 2010; Headey and Fan 2010; Prakash 2011; Abbott *et al.* 2008; World Bank 2009) and political declarations (for example, the 'L'Aquila Declaration of the Leaders'). Timmer (2010) gives the following short and simple presentation of the idea: "World food crises are relatively rare events, occurring roughly three times a century. But they also tend to be regular events; every three decades or so, suggesting there is an underlying cyclical cause." The World Bank, in its Global Economic Prospect 2009 (World Bank 2009), offered a century long presentation of these cycles, identifying four commodity booms since World War I: 1915–1917, 1950–57, 1973–74 and 2003–2008 (see Table 2).

**Table 2: Principal characteristics of commodity booms**

Common features	1915–17	1950–57	1973–74	2003–08
Rapid global real growth (average annual percent)	—	4.8	4.0	3.5
Major conflict and geopolitical uncertainty	World War I	Korean War	Yom Kippur War, Vietnam War	Iraq conflict
Inflation	Widespread	Limited	Widespread	Limited second round effects
Period of significant infrastructure investment	World War I	Post-war rebuilding in Europe and Japan	Not a period of significant investment	Rapid build up of infrastructure in China
Cantered in which major commodity groups	Metals, agriculture	Metals, agriculture	Oil, agriculture	Oil, metals, agriculture
Initial rise observed in prices of	Metals, agriculture	Metals	Oil	Oil
Preceded by extended period of low prices or investment	No	World War II destroyed much capacity	Low prices and supply shock	Extended period of low prices
Percentage of increase in prices (previous trough to peak)	34	47	59	131
Years of rising prices prior to peak	4	3	2	5
Years of declining prices prior to peak	4	11	19	—

Source: World Bank (2009)

### 1.2.1 A decline of world stocks

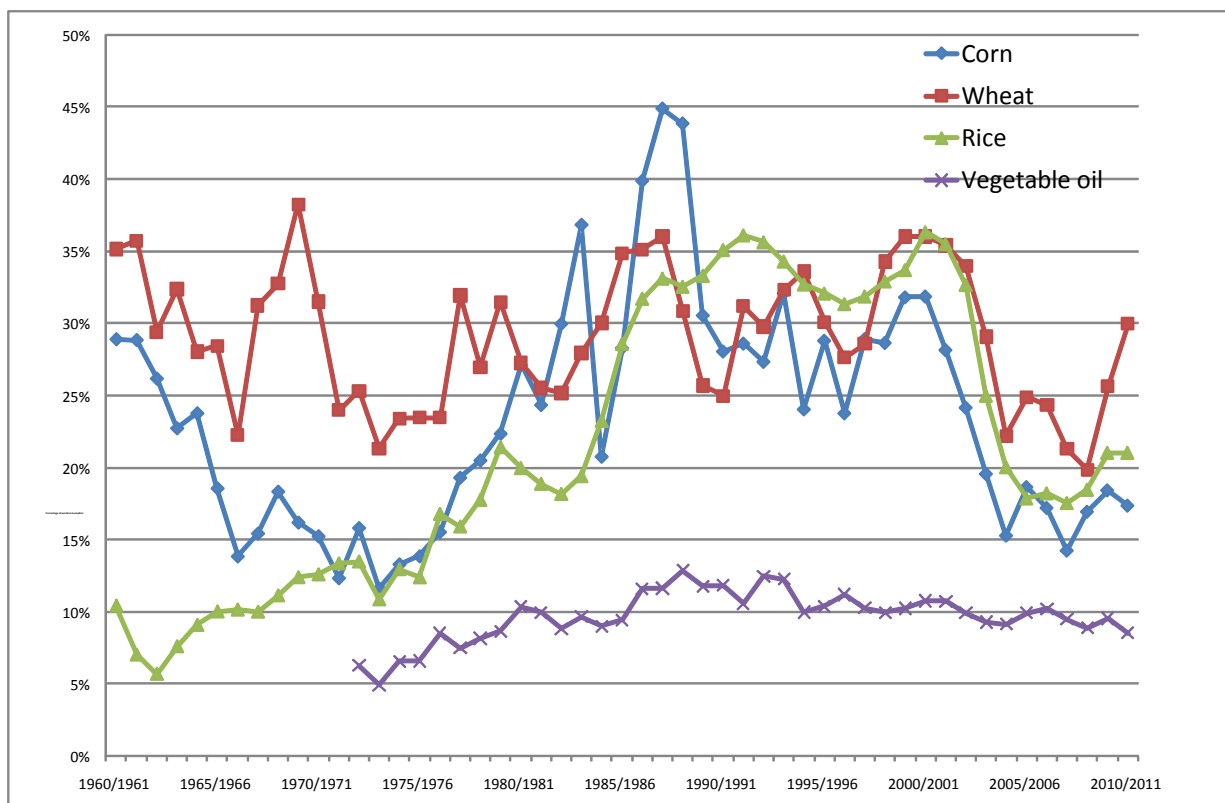
In preceding food crises, it is typical to see stocks run low. International food prices and volatility are closely related to the level of world food stocks. This relationship on the grain markets has been recently discussed by Gilbert (2010). He explains: "Low elasticities imply that small shocks to production can have a large price impact. However, the impact of shocks on commodity prices is moderated by stockholding. Low prices, caused either by positive supply shocks, negative demand shocks, or both of these, imply probable positive returns to stockholding. Consumption demand is therefore augmented by stock demand until the point at which at the expected return from holding stocks is equal to the rate of interest on comparably risky investments. The fall in prices is moderated

to the extent that excess supply is absorbed in stocks. The same mechanism works for excess demand resulting from negative supply shocks or positive demand shocks. These result in destocking thereby augmenting supply. The catch is that destocking requires an inventory. Once stockout occurs, price is determined simply by equality of production and consumption demand.” Gilbert concludes that, “low stocks appear to have been necessary but not sufficient for high prices historically, suggesting that stocks provide at best partial explanation for price movements”.

Recent price rises, as was the case with the food crisis of the 1970s, occurred in the context of historically low world stocks. Figure 5 shows the evolution of world stocks for various products measured as a percentage of world consumption. A cyclical dynamic is clearly visible for maize, with a stock decrease during the 1960s and a low point in early 1970s, followed by a rapid accumulation until the end of the 1980s and then, once again, a decrease until the mid-2000s. A similar evolution can be observed for the vegetable oils market since the early 1970s (no available data for the 1960s) where an increase in stock volumes was seen until the end of the 1990s when a slow, ongoing decrease initiated. World stocks for rice also show rise-and-fall behaviour, but over a longer period, with stocks increasing continuously between the early 1960s and the beginning of the 1990s and declining abruptly since 2000.

Historically, periods of high levels of world stocks, coupled with low and relatively stable prices, were also characterized by an uneven distribution. More specifically, they were characterized by the central role played by the United States in holding stocks for the world, both at the beginning of the 1960s and again in the 1980s, of both corn and wheat. In the 1980s, USDA claims the United States controlled up to 80 percent of the world stocks of these two crops. Then China took over during the 1990s, controlling up to 75 percent of world stocks of corn, 50 percent of wheat and 78 percent of rice. Other countries have not accumulated significant stocks, even in periods of overproduction. The European Union, for example, always controlled only a small share of world wheat and corn stocks.

**Figure 5: World stocks as a percentage of world consumption for corn, wheat, rice and vegetable oils, 1960–2010**



Source: USDA (2011)

## 1.2.2 A decline of agricultural investment

The cyclical dynamic of international food prices and world agricultural stocks can be attributed to the mid-term evolution of public and private investments in agriculture. Table 3 shows how the annual rate of growth in ACS declined continuously at the world level between the end of the 1970s and the end of the 1990s, falling from about 1.4 percent to 0.3 percent on average. This slowing was mostly caused by changes to ACS in developed countries, which actually decreased in absolute terms during the 1990s. Every region of the developed world has experienced a decapitalization process that affected agriculture: North America came first, starting at the beginning of the 1980s, then Western Europe and Oceania in the early 1990s and, finally, Eastern Europe and the Former Soviet Union. During this first period (1975–2000), the rate of growth in ACS evolved differently in developing countries. The growth rate stayed at quite a high level until the mid-1990s when growth decreased because of a fall in Latin America.

Since the early 2000s the rate of growth in ACS is increasing again at the world level. This is because of a reversal of growth trends in developed countries. The rate of ACS growth is still negative in Western Europe, Eastern Europe and the Former Soviet Union but much less than before and growth is now positive in Oceania and (slightly) in North America. On the contrary, the rate of growth in ACS is still decreasing in developing countries with very divergent evolution between developing regions.

Since mid-2000, the rate of growth in Latin America, sub-Saharan Africa and South Asia is much lower than in the 1970s. East and South East Asia is the only developing region where the rate of ACS growth remained more or less stable.

**Table 3: Average annual rates of growth in agriculture capital stock**

Region	1975–79	1980–84	1985–89	1990–94	1995–99	2000–04	2005–07
<b>World</b>	1.43	1.03	0.93	0.79	0.32	0.48	0.52
<b>Developed</b>	1.23	0.64	0.17	-0.11	-0.76	-0.28	-0.11
N. America	1	-0.16	-0.23	0.05	0.14	-0.12	0.02
W. Europe	0.93	0.74	0.06	-0.5	-0.27	-0.14	-0.1
Oceania	-0.84	0.24	0.51	-0.17	-0.54	0.49	0.42
Transition	2.03	1.55	0.62	0.07	-2.77	-0.71	-0.31
<b>Developing</b>	1.67	1.46	1.73	1.67	1.27	1.1	1.01
Latin A & C	2.15	1.4	1.76	1.4	0.39	1.16	0.22
Near East & North Africa	0.93	1.76	1.99	1.87	0.71	0.93	0.99
Sub-Saharan Africa	1.68	1.42	1.23	1.86	1.65	1.64	0.96
East & South East Asia	1.75	1.37	2.04	1.8	1.86	1.35	1.73
South Asia	1.61	1.49	1.19	1.42	1.22	0.34	0.32

Source: von Cramon-Taubadel *et al.* (2009)

## 1.2.3 A decline of public spending on agriculture

The slowing down in agricultural investment growth occurred during a period of restricted public support to agriculture. Fan and Saurkar (2006) used the International Monetary Fund (IMF) *Government Finance Statistics* Yearbooks to calculate government expenditures in real dollars (set in 2000) in 44 developing countries. Table 4 presents a summary of the results of this study. For the whole group, agriculture expenditure increased with a rate of annual growth of 3.2 percent between 1980 and 2002. Calculated as a percentage of agricultural GDP, public spending decreased from 11 percent in 1980 to 8 percent in 1990 before returning to 10 percent in 2002. Compared with developed countries, where the ratio was frequently more than 20 percent, this level is extremely low. In Africa, expenditure remained at a relatively stable level (6 to 7 percent). In Asia, agricultural expenditure increased very slightly (from 8 to 10 percent); while in Latin America it decreased strongly (from 19 to 11 percent).

The growth rate of agricultural public expenditure in developing countries was particularly slow between 1980 and 1990. Measured in 2000 international dollars, it fell by two-thirds in Latin America and stagnated in Africa. Asia was the only developing region where agricultural public expenditure continued to grow quite steadily, more than doubling between 1980 and 2000. This general slowing of government expenditure adversely affected agricultural research. Table 5, taken from Beintema and Elliot (2009) shows the extent of decreased public investment in agriculture between 1981 and 2000.

This trend was not equal across all regions of the world. In the Asian region, public investment in agriculture decreased but stayed quite high (around 4 percent) mostly because of the high growth of agriculture research and development in China and India. In contrast, spending in Africa almost stagnated between 1980 and 2000 and actually diminished during the 1990s. In Latin America, public spending for agricultural research and development grew slightly in the 1990s (less than one percent) after a spectacular slowing down from the late 1970s.

Financial aid provided to developing countries by OECD countries and multilateral agencies did not counter this trend. Instead, ODA spending contributed to the trend away from public investment in agriculture in the poorest countries. Measured in constant terms, the aid provided by OECD countries for agriculture decreased almost continuously from the end of the 1980s to the mid-2000s, reaching a quarter of its former level. Aid provided by multilateral agencies decreased earlier (mid-1980) and stabilized from the mid-1990s at a third of their initial volume (See Figure 6).

**Table 4: Government expenditures in agriculture (44 developing countries)**

	2000 USD dollars, billions				Percentage of agricultural GDP			
	1980	1990	2000	2002	1980	1990	2000	2002
Africa	7.3	7.8	9.9	12.6	7.4	5.4	5.7	6.7
Asia	74.0	106.5	162.8	191.8	9.4	8.5	9.5	10.6
Latin America	30.5	11.5	18.2	21.2	19.5	6.8	11.1	11.6
Total	111.8	125.91	190.89	225.61	10.8	8.0	9.3	10.3

Source: Fan and Rao (2003); Fan and Saurkar (2006)

**Table 5: Growth rates in public agricultural research expenditures, 1981–2000**

	1976–81	1981–91	1991–2000
Sub-Saharan Africa	0.94	1.02	-0.15
Asia-Pacific	7.98	4.67	3.35
Latin America & the Caribbean	8.54	1.86	0.32
West Asia & North Africa	-	4.12	2.93
High Income	2.5	2.43	0.52

Source: Beintema and Elliott (2009).

**Figure 6: Overseas Development Aid to agriculture, DAC countries and multilateral agencies, 1971–2008**



Source: OECD (2010)

## 1.3 Emerging scarcities

Do the recent price increases signal a more radical change in the ability of world agriculture to supply a demand growth that seems to be without limit? Scarcity is the key word of this third explanation of the food price rises, a word that can be found in a growing number of publications from a large range of observers: academics (Koning *et al.* 2008; Standing Committee on Agricultural Research 2011; McIntyre *et al.* 2009; Evans 2010), think tanks (Brown 2011; Evans 2009), banks (Rabobank 2010; Schaffnit-Chatterjee 2009), CSOs (Heinberg and Bomford 2009), international organizations (IMF 2011). The question is whether the food crisis is indicative of the end of a long period of structural overproduction in international agricultural markets, made possible by the extensive use of cheap natural resources (e.g. oil, water, biodiversity, phosphate, and land). In other words, are we at the end of a period of historically unprecedented agricultural production growth that relied on a strategy akin to mining?

In the context of this third explanation of why food prices increased, 'scarcity' is used in a broad sense to mean, "not only an observed shortage of natural resources, but also a perceived dependency on natural resources and fear of their global depletion" (Passenier and Lak 2009). It is a societal and not a natural concept "because scarcity depends on the level of demand" (Standing Committee on Agricultural Research 2011); it is not that there are not enough resources to meet human *needs*, only that there are not enough resources to meet human *demand*.

### 1.3.1 An unlimited demand for agricultural products

World demand for food commodities seems to be permanently growing, the growth even accelerating between the 1990s and the 2000s for cereals and vegetable oils (see Table 6). The growth of the world population and income, particularly in Asia, has often been underlined as the main cause of this dynamic, making it an inevitable trend associated with world development and prosperity.

**Table 6: World consumption growth rate for cereals, vegetable oils and oilseed meals, 1980–2009**

	1980–89	1990–99	2000–2009
Cereals	1.8%	1.0%	1.8%
Vegetable Oils	4.9%	4.5%	5.2%
Oilseed Meals	3.6%	4.2%	3.8%

Source: data from USDA (2011)

Indeed, income growth, together with urbanization has been a major driver of change in food consumption. It is accompanied by a move towards sugar, vegetable oil and livestock products (Kearney 2010). Consumption of livestock products has been increasing dramatically in developing countries since the 1960s. Consumption of milk has almost doubled, consumption of meat has tripled and egg consumption has increased fivefold over the same period (FAO 2010b). However, this growth is very unevenly distributed. The greatest growth has occurred in East and South East Asia. In China, per capita consumption of meat, milk and eggs increased by a factor of four, ten and eight respectively.

Food waste has also increased with income and urbanization. In the United Kingdom it is estimated that about a third of the food bought by households is thrown away (WRAP 2009). Hall *et al.* (2009) calculated the energy content of all United States food waste and showed that per capita food waste increased by 50 percent from 1974 to 2003, reaching more than 1400 kcal per person per day. Food waste has progressively increased from about 30 percent of the available food supply in 1974 to 40 percent in recent years (Hall *et al.* 2009).

The evolution of world demand for food commodities over the last ten years has also been shaken by a contingent event that has no relation to the growth of world population and income: the biofuel boom in the United States and European Union (see Table 7). While the use of biomass for energy is widespread across developing countries, the biofuel industry that now competes for agricultural commodities is overwhelmingly based in industrial and emerging economies. The biggest biofuel users are the European Union, the United States, and Brazil, while China and India are emerging as big users (International Energy Agency 2010).

**Table 7: Biofuel production (millions of litres)**

	1995–1997	2000–2002	2007–2009
<b>USA</b>			
Ethanol	4 542	7 167	34 887
Biodiesel	0	29	2 318
<b>EU</b>			
Ethanol	102	1 034	4 889
Biodiesel	450	978	8 041
<b>Brazil</b>			
Ethanol	14 177	11 490	25 308
Biodiesel	0	0	957

Source: OECD 2011

Brazil and the United States jointly produce more than 75 percent of the world's ethanol supply (Brazil uses sugarcane and the United States uses maize). The European Union produces almost 80 percent of global biodiesel, with almost half of global biodiesel production occurring in Germany, using canola (UNCTAD, 2006). The biofuel industry today uses almost 40 percent of United States corn production and two-thirds of the European Union's production of vegetable oils.

Such a spectacular development of the biofuel industry has been made possible only because of massive public support: subsidies, tax exemption and mandatory use in gasoline. In 2009, governmental support for biofuels reached about 8 billion dollars in the European Union and the United States (International Energy Agency 2010). This massive public support for biofuels is the glaring exception to the general movement to reduce financial aid to agriculture in OECD countries. In a quite incoherent way, the European Union and United States have boosted demand for agricultural commodities, including food products, by their support for the biofuel industry, at the same time as they have reduced support to agricultural production, at home and in their overseas assistance to poor countries.

The biofuel boom had a major impact on the evolution of world food demand for cereals and vegetable oils. Table 8 presents the growth rate of world consumption of cereals and distinguishes between feed and non-feed uses. It appears that, following a slowing down provoked by the collapse of the USSR, the acceleration of the world consumption growth between the 1990s and the 2000s was supported by the acceleration in the growth of both feed and non-feed uses.

**Table 8: Growth rate of cereals consumption**

	1960–69	1970–79	1980–89	1990–99	2000–11
Total consumption	3.5	2.6	1.7	0.9	1.8
Feed consumption	4.5	2.5	1.5	0.4	1.1
Non-Feed (FSI)	2.4	2.7	1.9	1.3	2.2
Non-Feed less use for biofuel in USA	-	-	-	-	1.4
Total consumption less use for biofuel in USA	-	-	-	-	1.3

Source: USDA (2011); OECD (2011)\_(cereal use for biofuel in USA)

The apparent acceleration of feed use in the last decade, however, is more linked to a recovery of feed use in the Former Soviet Union after the 1990s. It means that, even with the booming demand for meat in Asia, the growth of feed consumption outside the Former Soviet Union is not accelerating but is slowing down. Conversely there is a real acceleration of non-feed uses boosted by biofuel development. Excluding use for biofuel, the growth rate for non-feed use is stable compared with the 1990s and markedly inferior to its historical performance. Without biofuel, the growth rate of world cereal consumption is equal to 1.3 percent compared with 1.8 percent for biofuel.

The growth in vegetable oils and oilseed consumption has been even more sensitive than cereal to the development of biofuel. Table 9 shows that the use of vegetable oils for food slowed down between the 1990s and the 2000s (from 4.4 percent per year to 3.3 percent) but industrial use of vegetable oil soared, pushed by the booming European biofuel industry. As a result, the share of industrial use in world consumption of vegetable oils jumped from 11 percent to 24 percent between 2000 and 2010.



**Table 9: Vegetable oil: growth rate of world consumption and share of industrial use in world consumption**

	1990–99	2000–09
Total consumption	4.5%	5.1%
+ Food consumption	4.4%	3.3%
+ Industrial consumption	5.6%	15.4%
– Use for biofuel production	-	23.0%
– Other industrial uses	-	4.7%
	<b>2000</b>	<b>2010</b>
industrial use in world consumption	11%	24%

Source: USA PSD; OECD AgLink

Leaving aside the biofuel boom during the 2000s, the growth of world cereal consumption and vegetable oils is actually slowing down. This is not to minimize either phenomenon but to explain that the actual acceleration of world consumption growth is not the mechanical and inevitable consequence of world economic development. It is the result of a public policy implemented by the United States and European Union governments; the result of a clear – and reversible – political choice.

Our fossil fuel dependent societies have grown accustomed to limiting the demands they make on biomass to the provision of food and little else. Land-use in industrialized societies, except forests, is marginally directed to non food uses such as building materials (other than wood), clothing, or heating. This absence of non-food uses of land is a radical departure from the situation that prevailed throughout human history. Today, the possible end of fossil fuel reserves, or the need to restrict their use because of climate change, brings industrialized societies to a new watershed. Biofuels can be seen as the first significant move back to using biological resources (or biomass) for non-food purposes. Some argue that the world is making a transition toward a bioeconomy or a bio-based economy (Langeveld *et al.* 2010), which would create a radically new context for food markets.

### 1.3.2 The Green Revolution finds its limits

Since the 1950s, the growth of agricultural production has been based largely on the growth of yields per hectare (ha). Since then, the total cultivated area increased relatively little, from 1.4 million to 1.5 million ha between 1950 and 2005 (McIntyre *et al.* 2009). Yet production increased at a rate unprecedented in human history. This spectacular growth of agricultural yield is tightly linked to the increased use of inputs per ha, in particular the use of synthetic fertilizers. Figure 7 shows how, since 2000, growth of agricultural production is correlated very closely to increases in the use of nitrogen fertilizers. Genetic improvement of crops also played a major role in agricultural growth providing a continuous stream of new cultivars for farmers.

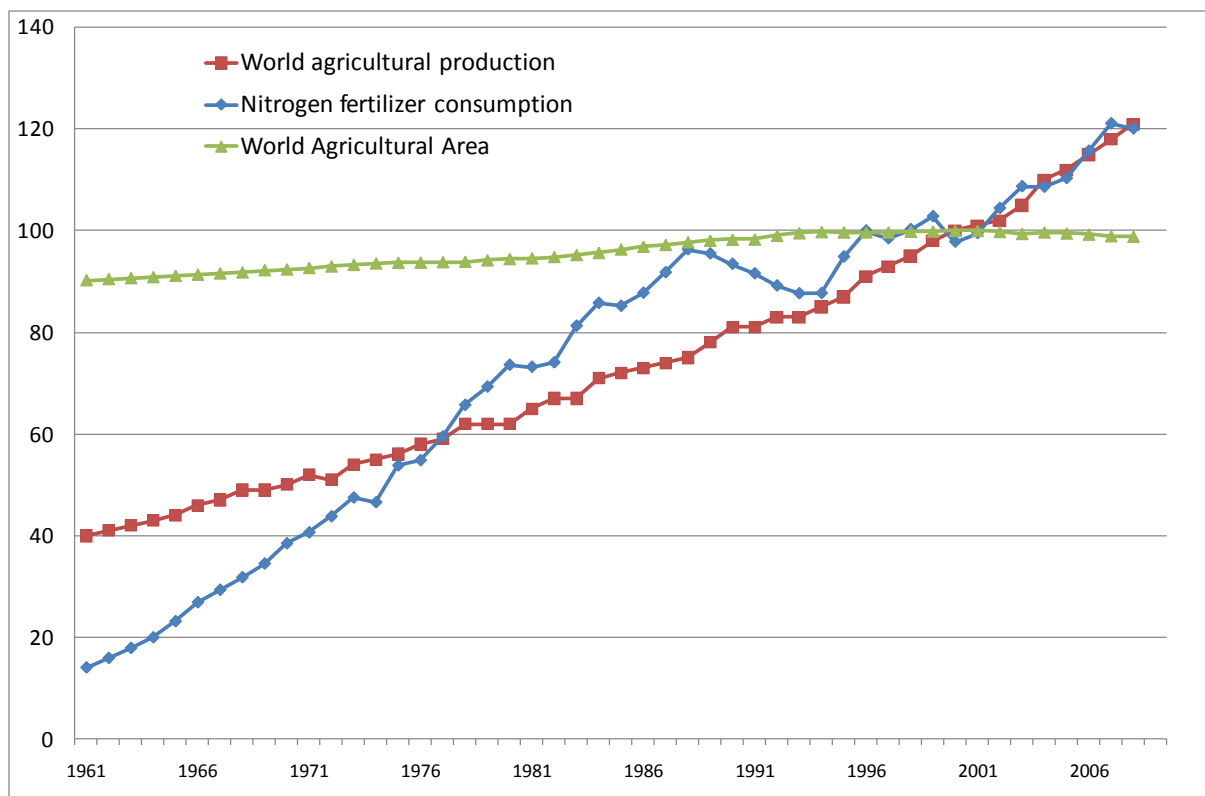
This model of agricultural growth, known as the ‘green revolution’ is currently the subject of intense debate. It is not possible to review adequately the literature on this topic in this paper. However, the following sections emphasize some of the trends that represent powerful limitations on the future of this model for raising agricultural productivity. This presentation of current constraints does not take into account the projected effects of climate change that are expected to reinforce some of the trends towards depletion that already exist, particularly for water<sup>3</sup>.

#### A closing yield gap

The evolution of the yield potential of new cultivars and the yield gap is the first concern. Yield potential is defined as the yield of a crop cultivar when grown in environments to which it is adapted, with unlimited nutrients and water, and pests and diseases effectively controlled. The difference between yield potential and the actual yield achieved by farmers represents the exploitable yield gap.

<sup>3</sup> A report on climate change and food security will be prepared by the HLPE at the request of the CFS for October 2012.

**Figure 7: Indices of world agricultural production, nitrogen fertilizer use and world agricultural area (100 = 1999–2001)**



Source: FAO (2011a)

According to Cassman *et al.* (2003), “while maintenance breeding continuously identifies new cultivars with yield potential equivalent to older cultivars there is no increase in yield potential per se”. In other words, the best cultivars cultivated in the best conditions 30 years ago had a yield equivalent to the best cultivar cultivated in the best conditions today. This means that most of the genetic improvement has been devoted to countering the increasing pressure of the environment (mostly disease and insect pressures).

Despite this almost stagnant yield potential of the new cultivars, actual yields have been growing continuously at the world level. However, actual yields have only improved because of changes to growing conditions that have allowed producers to narrow the yield gap, not because new cultivars with higher yield potential have emerged. Currently, actual yields for rice in China, India and Indonesia and for wheat in Mexico have reached about 80 percent of the potential yield, a level that is considered by Cassman *et al.* (2003) as an on-farm maximum (higher yields are only possible under more controlled situations). The situation is particularly acute for rice. Today, yield trends show evidence of stagnation in several Asian regions (McIntyre *et al.* 2009).

### **Spoiling the ecological foundations**

The pursuit of continued agricultural growth is also directly threatened by the depletion of many of the resources that have sustained it. Since 1960, a third of the world’s farmland has been abandoned because it has been degraded beyond use, and it is estimated that about 10 million ha are destroyed every year (Schade and Pimentel 2010). Over extraction of ground water is evident, particularly in Middle East and North Africa, where irrigation draws on fossil aquifers. In large areas of China and India, groundwater levels are falling by up to three metres per year (Global Perspective Unit (FAO) and Natural Resources Department (FAO) 2011). The future of irrigated agriculture is also threatened by salinization. However, estimates of the area likely to be affected by salinization vary significantly, ranging from 10 to 50 percent of irrigated land.

Agriculture, like the rest of the economy, is confronted with probable future scarcity of oil and natural gas. For the last 50 years agricultural growth, and more generally the supply of food, has been based largely on the intensive use – direct and indirect – of these fossil fuels. The estimates of the performance of the agrofood system are widely divergent. According to Heinberg and Bomford (2009), each calorie of food energy produced by the agrofood system of the United States mobilizes the use of more than seven calories of energy – mostly from fossil fuel, and 20% of it on farm, the rest in other stages like transportation and transformation. This is enough to mean that agriculture consumes significantly more calories than it generates. The same poor performance has been estimated in the British food system (Lucas *et al.* 2006). A large part of the energy used at the farm level is for fertilizers, particularly nitrogen fertilizers. In British wheat bread production, half of the energy used is for fertilizers, 90 percent of which is for nitrogenous fertilizer production (Woods *et al.* 2010).

Phosphate is another essential input that may face serious depletion in coming years. Intensive agricultural production is dependent on phosphate fertilizers derived from mined rock. Since World War II, global extraction of phosphate rock has tripled. The world's phosphate rock reserves are concentrated in a limited number of countries, including China, the United States and Morocco. The supply of phosphate fertilizers is threatened by shrinking reserves although estimates of the stocks are contradictory. Some studies claim that at current rates of extraction, reserves will be depleted in 50 to 100 years (Cordell *et al.* 2009). Others claim an imminent phosphorus peak (Dery and Anderson 2007). Still others say that depletion is not very likely in the near term and that about only 40–60 percent of the current resource base will have been extracted by the end of the century.

### **Polluting local and global commons**

Nitrogen pollution from synthetic fertilizers' use, but also from fixation via the cultivation of leguminous crops and the spreading of animal manure, is a source of concern regarding its interference with the nitrogen cycle. Human activities now transform more nitrogen from the atmosphere into reactive forms than do all terrestrial processes combined. A large part of the reactive nitrate ends up in waterways and coastal zones, in turn contributing to eutrophication. In humid regions, up to 30 percent of nitrogen input into agriculture is leached into water systems. According to the first European Nitrogen Assessment (Sutton *et al.* 2011), the total cost of the nitrogen pollution of water, atmosphere, and other impacts on ecosystems and climate change, is estimated at between 70 to 320 billion Euros a year (150 to 736 Euros per person per year), which is more than twice the monetary benefits derived from agriculture.

Rockström *et al.* 2009 identified a number of environmental variables (climate change, ocean acidification, stratospheric ozone, biogeochemical nitrogen and phosphorus cycle, land system change, rate of biodiversity loss) as 'the planetary boundaries' – the limits within which humanity is able to operate safely. These authors estimated that the current amount of N<sub>2</sub> removed from the atmosphere for human use should be reduced to about 25 percent of present levels.

In 2005, greenhouse gas emissions from agriculture (mainly of nitrous oxide deriving from commercial fertilizers' use and methane from livestock and rice production), accounted for 10–12 percent of global emissions. This share in global GHG emissions increases to 30 percent if carbon dioxide emissions resulting from land use change and deforestation are taken into account (IPCC 2007). This makes the agricultural sector, deforestation and land-use change included, one of the first contributors to global warming, together with industry and greater than transport.

-----

In the preceding pages, it is argued that it is not any one of these factors alone that explains the crisis, nor yet any one of the three narratives looking at short, medium and long-term issues.

Rather, it is necessary for governments to understand the interaction of these many factors, and to consider how different circumstances and vulnerabilities might change how these factors interact within national contexts.

Before turning to the national policy context, however, we propose a series of policy options at the international level for consideration.



## 2 INTERNATIONAL POLICY OPTIONS TO ADDRESS PRICE VOLATILITY

### 2.1 Building a food security oriented trading system

Many Low Income Food Deficit Countries (LIFDCs) have lost confidence in the international trading system to guarantee food security. Their mistrust arises from:

- Arbitrary use of export restraints and export bans;
- The prolonged failure to make progress on the WTO Doha Agenda;
- The neglect of special and differential treatment in investment treaties and bilateral and regional trade agreements even among countries at very different levels of development;
- The continued failure to transform food aid into a tool that meets first the needs of vulnerable populations rather than donor countries;
- The lack of funding for mechanisms designed to support access to food imports during periods of high prices;
- The lack of information about the level of physical food reserves around the world;
- The lack of institutional devices to oblige commercial firms to deliver on contracted food imports;
- The failure of exporters to provide some guarantee that adequate stocks exist to make good on contractual obligations in the short term, before the next harvest ripens.

For global trade, the most lasting impact of the food price crisis has been to undermine what remained from the Doha negotiations. Increasingly, the Doha Agenda seems to be a hindrance to the multilateral trade reforms that now seem most urgent in light of higher agricultural prices, restricted supplies, and increased price volatility. The latest negotiations in Geneva have focused, to date unsuccessfully, on what can be salvaged from the negotiations so as to have something to show for the last ten years. Some WTO members are asking openly how an agenda agreed in 2001, itself a response to an agenda first drafted in 1986 and concluded in 1994, can respond to a world that has changed so much in the intervening years. Since the Uruguay Round, negotiations on agriculture have been conducted in the context of structural overproduction. Because of this situation, trade conflict between exporting countries was seen as the major problem to be solved. The objective was to guarantee fairness of competition between suppliers and market access for exporters, not for importers. In other words, WTO negotiations on agriculture were oriented to the interests of exporting countries.

Multilateral rules are more essential than ever. Governments should continue to focus on building a transparent, accountable and rules-based system. These rules need to better account for the heterogeneity of countries, and focus on public policy concerns, including food security. Markets are deeply embedded in regulations of all kinds. These regulations need to grow and adapt to changing conditions. When the primary causes of price instability are created by uncertain domestic supply conditions, international trade offers an obvious and important channel to stabilize prices. But when international markets are unstable, it is important that governments act collectively to restore confidence.

Measures to consider for WTO rules include:

- Disciplines on export restrictions (including advance notification; exemptions for commercial exports to LDCs and for humanitarian assistance; and consideration of quotas akin to the tariff rate quotas established by the Uruguay Round);
- Safeguard measures that effectively protect against import surges;
- Flexibility to raise tariffs according to pre-defined conditions, possibly including price bands for vital crops;
- Measures to better ensure commercial actors respect contractual obligations; and,
- Flexibility to protect non-traded agricultural sectors that are vital to food security.

Open markets imply competition between rich and poor consumers for access to food. It is a world where the behaviour of rich consumers creates problems for poor consumers in two ways. Firstly, they are more insensitive to price increases. This means that in a situation of food shortage their

consumption is less likely to decrease. This then transfers the burden of consumption reduction onto the more price sensitive poor. Secondly, rich consumers are expressing new demands for agricultural products that compete directly with their use for food and increase price inelasticity even more.

For the last 20 years, the policy options proposed to poor countries by the international community to deal with the so-called 'volatility problem' have been, beside market liberalization, systematically focused around two kinds of solution:

- Market-based risk management instruments
- Social safety nets

Risk management instruments are theoretically able to cope with price volatility and even protect the poor (whether households or countries) from its impact if some measures are taken to give them access to financial markets. This solution has been actively promoted and supported by several aid agencies since the 1990s. Few success stories have been known, however. A systematic evaluation of the various experiments should help to clarify the debate regarding the feasibility of this solution. On the other hand it will not help if international prices are on a rising trend, driven up by increasing competition from demand for non-food uses in rich countries. Moreover, this type of policies increases in effect the importance and power of the financial sector, something that has given rise to mounting concerns over the past several decades.

Against a background of unfair competition between rich and poor countries, international social safety nets appear to be the most obvious solution. They can be presented as a sort of compensation for pecuniary externalities at international level (the poverty as negative externality resulting from the competition observed). Yet international safety nets, whatever form they take, have two major weaknesses. Firstly, funding depends on the willingness of foreign donors. It is well established that aid budgets are always the first to adapt to changing domestic pressures – food aid provides perhaps the ugliest illustration of this rule. Secondly, international safety nets are plagued with implementation problems, including slow disbursement mechanisms and an inability to respond in time to short run devastation of sudden price spikes.

To avoid unfair competition between rich and poor countries, isolating the price in poor countries from the price paid by the rich countries offers a more effective solution than the insistence on a single world market flanked by international safety nets, as promoted during the last 20 years. We will come back to this point in the section on national policies.

## 2.2 Precautionary regulation of speculation

Given the costs of allowing a system that may increase excessive price volatility, together with the failure of deregulated commodities trading to reduce costs for hedgers or in other ways to prove themselves useful to commerce in food, there would seem to be an argument for working with a precautionary approach to the use of commodity futures trading in a food system meeting basic human needs.

Many governments are unhappy with the existing regulation of commodity markets. The Task Force on Commodities Futures Markets, for example, was formed by the Technical Committee of the International Organization of Securities Commissions in response to a G8 request to look at the functioning of several of the futures markets (particularly oil). More recently, the G20 has focused on the concerns of some governments that the markets are not working as they should, although no agreement has been achieved yet. Among the topics discussed figure:

- Increase transparency by requiring exchange trading and clearing of agricultural commodity contracts
- Provide government agencies with the authority and the means to regulate over-the-counter derivatives. This oversight will help counter the temptation for big investors to manipulate commodity markets
- Re-establish strong position limits
- Re-introducing rules that distinguish market operators (who want to buy or sell commodity) from speculators

The futures market plays an overly central role in international food price formation and in the food security of too many people to let their regulation be decided only in reference to financial interests.

## 2.3 International coordination of storage policies

If a low level of world stock is a necessary condition for price volatility (Gilbert 2010, Tangerman 2011) then a certain level of world stock could be a sufficient condition for price stability. Governments could act to organize minimum storage levels. OECD countries are already organized in this way for oil stocks because they agree on their strategic importance. Food is even more strategic, yet debate on the possibility of coordinated food stocks seems to be forbidden. We think debate needs to be reopened urgently in a pragmatic way and with a clear focus on food security issues.

Various factors contributed to the policy silence over the last decades on international cooperation for food stocks. Economists such as Brian Wright (1984, 2011) have demonstrated the optimality of private storage. Chris Gilbert (2010) and others have robustly documented the failure of international buffer stocks. However, these arguments are not sufficient to conclude on the undesirability and unfeasibility of some form of international cooperation regarding world stocks and food security. On the one hand, some of the hypotheses used to evaluate the welfare effect of private storage clearly do not apply to developing countries where food is a major component of consumer expenditures and where private traders cannot protect themselves from price risk. On the other hand, the historical experience of international buffer stocks that were intended primarily to support prices does not teach us how to avoid price spikes. Moreover, the stocks of the 1980s operated in very different conditions to those that pertain today. The changes in storage, transportation and communication technology, for example, all make a difference. Another objection is that reserves interfere with markets: they reduce the incentive for the private sector to hold stocks of their own. It is true that the cost of holding stocks makes it unappealing to commercial firms. In addition, private sector reasons for stockholding are entirely different from public sector interest. One reason for public stocks is to create more transparency; private stock levels are deliberately kept secret.

What kind of international cooperation could be organized to maintain a minimum level of world stocks aimed at reducing the occurrence of food price spikes, and ultimately food insecurity in poor countries? The first step is certainly better information. The elimination of most public stocks in OECD countries and the privatization of most state-trading enterprises has concentrated knowledge about how much of which agricultural commodity is available where in the hands of a small number of tightly controlled companies that depend on secrecy to thrive. The Agricultural Market Information System (AMIS) proposed in the report of the international organizations for the G20 (FAO *et al.*, 2011) is an important initiative to improve the current situation regarding information on stocks. It proposes to associate trading firms on a voluntary basis. Instead, food insecurity is enough of a problem to merit some form of mandatory reporting regarding stocks, something equivalent to the reporting system created in the banking sector after the financial crises.

The second step should be the practical organization of a minimum level of world stocks. In recent history, the United States and China have been important stock holders for world markets. They seem not longer willing (United States) or less willing (China) to continue to play this role. The international community is left with a collective action problem. How to share the burden of world stocks? No turnkey solution exists. Only guiding principles can be proposed at this stage. Contrary to past international agreements, such as the International Wheat Agreement, that were conceived mostly as instruments for exporting countries, international cooperation about world stocks in relation to food security should be conceived, in terms of rights and obligations, from the consumer's point of view. The objective would not be to defend a price band but to avoid price spikes by releasing stock when prices start to boom. The International Energy Agency is perhaps a model governments could consider for coordinating storage policy.

## 2.4 Food reserves and the World Food Programme

Stocks are widely criticized by some economists and many donor countries governments for being too expensive. Donors prefer cash reserves – cash does not rot. However, neither is cash edible, and money is no guarantor of supply if the international market is short. The costs of operating a reserve need to be set against the cost of humanitarian interventions, which are among the least efficient ways countries can spend their development assistance, and against the high costs in human suffering of doing nothing. Invariably, at the point when a situation reaches crisis level, some lives have already been lost and many others compromised beyond repair (malnourished infants and

young children lose cognitive capacity that can never be recovered). At the societal level, short-term demands for coping with a food emergency come at the expense of smarter long-term investments in a stable and profitable agricultural sector.

WFP relies on money to be able to purchase on international markets the food aid it needs to do its work. Furthermore, most of its funding is provided after the need is declared, necessitating purchases on the spot market, often when prices are highest. Excessive and unexpected volatility cripples the capacity of the agency to respond to human needs. Upward price spikes have the same effect as a budget cut for WFP. In March 2008, WFP made an extraordinary appeal to cope with soaring food and fuel prices: the number of persons who needed its help was rising rapidly whereas, at the same time its United States dollar-based budget was capable of buying less and less on the market<sup>4</sup>. The impact of monetarisation of food aid on domestic prices should be further investigated.

WFP piloted a regional stocking programme in 2008, called the Forward Purchase Facility, in East and Southern Africa<sup>5</sup>. The aim of the system is to reduce delivery time. The strength of the system includes cost savings by having some control on when to buy and buying in bulk; reduced delivery times because the food is already in place in the region; more accurate provision because of reduced time lags between request and delivery; and increased flexibility. WFP identifies some constraints, most of which could be overcome by donors. They include funding to expand the pilot project; eliminating the restrictions donors place on food aid; and increasing the availability of advance financing in particular.

## 2.5 Curbing the growth of developed countries' demand for agricultural products

If we take the implications of the third explanation of the current food price rise seriously, then world food demand must also be subject to policy interventions. The same countries that seek significant new market liberalization through global trade talks (United States, Canada, Brazil) are also active users (and in some cases subsidizers) of biofuels. If there is no mechanism to restrain the demand from the energy sector when supplies are tight, as they have been, then it is difficult to see why a developing country would increase its dependence on international markets. Those markets are not just making new supply available – they are also introducing new forms of competition for scarce resources in the form of new demand.

In front of a supply growth encountering an increasing number of constraints the demand seems to be without any limit. Moreover, it is always analyzed as an exogenous variable that cannot be questioned. Indeed, some reports estimate that by 2050 consumption will have increased by 70 percent or even twofold. The immediate conclusion is that production will have to increase by the same amount and rate. But many authors underline the fact that this is not possible (Schade and Pimentel 2010). Curbing food demand must be integrated as an objective of developed country public policies.

After some initial debate, hardly anybody today contests the fact that biofuel production was a major factor in the recent food price increases (FAO 2008; Mitchell 2008; OECD 2008). Indeed, limiting the use of food to produce biofuel is the first objective to be pursued to curb demand. Mandated incorporation of biofuel in liquid fuel, and financial support, should be abandoned. Stronger measures could be necessary in the future. Several studies point out that taking into account the rising price of oil and the economies of scale, biofuel production will become soon competitive without public support. Taxation of biofuel could then become a necessary solution to maintain a minimum of stability on international food market.

The consumption of livestock products should also be questioned. Improving nutritional intake should be integrated as an objective of public policies and linked to the costs of managing the serious public health challenges posed by rapidly rising levels of overweight and obesity. The significant expansion in the production of animal products also raises questions as a number of associated costs are not internalized in prices, and because industrial meat production places significant demands on cereal stocks and freshwater reserves. Moreover, the livestock industry makes a significant contribution to greenhouse gas emissions. According to Pelletier and Tyedmers (2010), using FAO projections, by

<sup>4</sup> <http://www.wfp.org/node/7904>

<sup>5</sup> <http://home.wfp.org/stellent/groups/public/documents/resources/wfp202623.pdf>



2050 the livestock sector alone “may either occupy the majority of, or considerably overshoot, current best estimates of humanity’s safe operating space”.

## **2.6 Refocusing public investment to achieve long term food security**

As advocated by the World Development Report 2008 (WDR) (World Bank 2007), investment in agriculture is imperative. The WDR was at the time defending the essential contribution of agriculture to poverty alleviation. Since the publication of the report, the repeated food price rises have demonstrated that investing in agriculture is also a necessity to guarantee world food security.

It is however misleading to set global production growth as the top priority. World agricultural production is already growing at a steady pace. As a result of the slowdown in world population growth, the growth rate of world food production per capita is today the highest it has been for 50 years (1.3 percent per year). There is no need to boost agricultural growth but there is an urgent need to guide that growth toward long-term food security.

A new wave of investment that ignores long-term concerns will only worsen existing problems. Recently, significantly higher prices in global markets, uncertainty about future supply and public mandates to increase biofuel consumption have all encouraged a number of richer net food importing (NFIM) countries and private investors to buy or lease land in developing countries. Undeniably, this wave of investments could generate a new phase of agricultural growth. This is the purpose of 2003 Maputo Declaration – Africa’s plan for agricultural growth for food security (CAADP).

It is also probable, however, because agricultural production generates so many negative externalities, that the wave will also generate social, environmental and food security problems. To ensure this does not happen, governments need to improve the governance of foreign investment in agriculture, with a view to safeguarding the interests of local food producers, protecting natural resources and guaranteeing access to food<sup>6</sup>. Because in agriculture there is a strong pattern of cyclical alternations between under and over-investment, some form of world coordination is highly desirable. Clarifying investment rules is a necessary part of the solution. But it will not suffice. Public investment must also help to solve the problem.

Thus, new public investments are very necessary but they must be aimed at a transition to more sustainable models of production. Governments must commit to alleviate poverty, to increase resilience to shocks and to fund the cost of the transition toward ecological production systems. Knowledge intensive agriculture and food systems, including traditional knowledge, will allow both increased production and efficiencies (de Schutter 2010a; de Schutter 2010b; Swaminathan 2010; UNEP-UNCTAD 2008; FAO 2011b). This will require investment from bilateral donors and the use of multilateral initiatives such as the Global Agriculture and Food Security Programme Multi-national Trust Fund (GAFSP). Agricultural research and innovation should be reinforced and supported through the national agricultural research systems and the Consultative Group on International Agricultural Research (CGIAR).

There are a number of models of agricultural systems that respond to growing ecological constraints. Sustainable intensification of crop production, advocated by FAO (2011b), aims to realize this objective by integrating four dimensions:

- Improved use of resources, including genetic resources and water, conservation agriculture and integrated nutrient management.
- Enhancing sustainable crop protection through Integrated Pest Management (IPM), and minimizing pest problems, misuse of pesticides, and environmental pollution.
- Managing and valuing biodiversity and ecosystem services.
- Increased productivity and diversification within the value chain.

---

<sup>6</sup> A report on land tenure and international investments in agriculture is currently prepared by the HLPE on the request of the CFS and will be released in October 2011.

This approach needs to be extended to whole food systems, including livestock production. A focus on reducing food losses and waste is essential (FAO 2011d). Governments should look at the work on agro-ecology and some of the alternative ways of understanding the costs and benefits of investment in different models of agriculture (UNEP-UNCTAD 2008; Pretty, 2006; McIntyre, et al. 2009; Swaminathan 2010). Because of the low use of commercial inputs, agro-ecology is also well adapted to poor farmers with no access to input and credit markets (de Schutter 2010b). Because of the diversification of production within farm, agro-ecology also increases resilience in the face of biological, climatic and economic shocks (Power 2000).

No technology should be neglected as far as it contributes to the poverty alleviation, increased resilience and a transition toward an ecological agriculture, however. The understanding derived from modern genetics need not be at odds with ecologically-based farming systems. Symbiosis among different approaches should be promoted.

In addition to research development, public investment should focus on public goods (roads, education, health, knowledge, seed systems) instead of private goods (direct subvention of fertilizers and seeds). Moreover, public funds should help to support transition costs associated with the shift to ecological agriculture. These costs include (Pretty 2008):

- Learning, including the chance to make and learn from mistakes;
- New investments (for instance in the rebuilding of depleted natural buffers of predator stocks and wild host plants, trees, soil and water conservation devices, manure storage equipments);
- Lower yields during the conversion of industrialized agro-ecosystems.

Finally, public policy should support participatory processes. The green revolution was commodity centred and laboratory based. Today, we need to integrate natural resource management and to carry out research with marginal and resource poor farm families (Kesavan and Swaminathan 2008).

Further downstream, such policy changes should be complemented with public policies that begin to internalize the externalities (positive or negative) of agricultural production systems within a more appropriate pricing environment and within commodity prices. Negative externalities are still not taken into account in agricultural trade negotiations even though they should clearly count as subsidies (see OECD 2005; Valsecchi *et al.* 2007).

Today's food price increases represent an opportunity for developed countries where consumers have hardly felt the change. In developed countries, higher prices offer an opportunity for public policy to at least begin this process of internalizing what are now known costs of industrial agriculture. Taxation of fertilizers or animal feed in areas affected by nitrogenous pollution, and tighter regulation on pesticide applications, are some of the instruments that should be considered. They should be selected on the basis of a comparative evaluation of their implementation, monitoring and information costs. Better accounting of the various costs of industrial agriculture will go some way to ensuring that agribusiness pays its share of the cost of its model for agriculture, while allowing the economic and ecological efficiencies of small-scale producers to ensure a fairer return. Without some international agreement on these efforts, however, national efforts are made impossible by the existing trade rules, which leave only limited space for full-cost accounting without losing competitive edge.

### 3 SOURCES, TRANSMISSION AND CONSEQUENCES OF FOOD PRICE VOLATILITY ON FOOD SECURITY

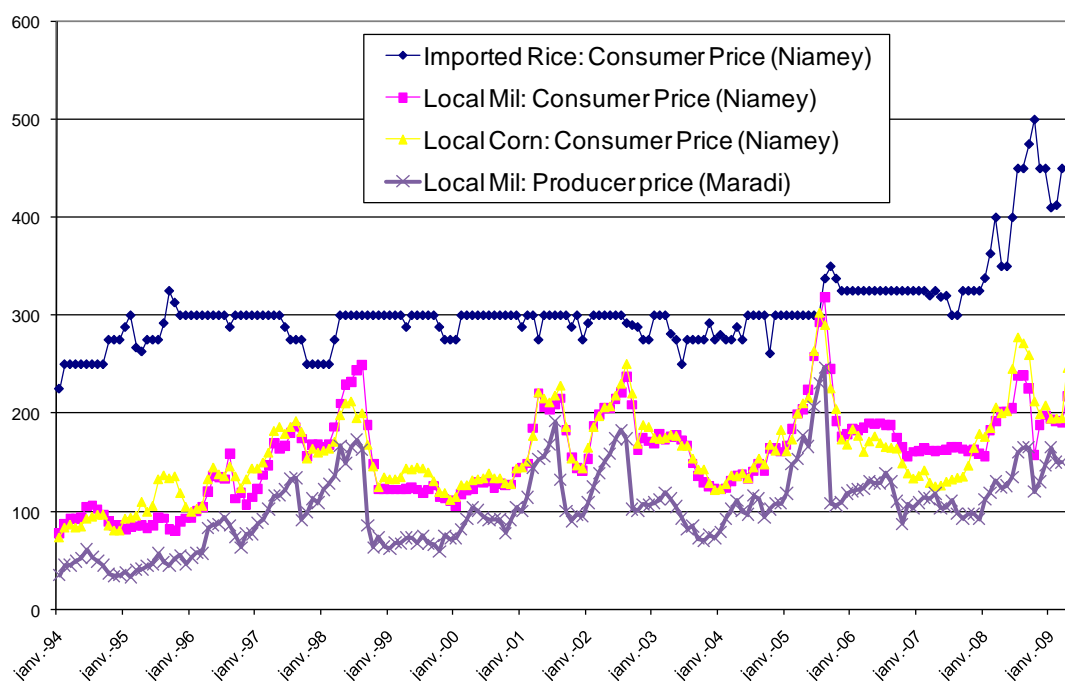
#### 3.1 Price volatility that results from domestic sources is a permanent problem in many poor countries

According to Galtier (2009), price volatility in developing countries has two main sources: imported volatility from world markets and domestic sources of volatility. Studies conducted prior to recent international price rises indicate that international price variability explains a very small share of domestic price variability in developing countries, meaning that domestic price volatility is mainly of domestic origin (Byerlee *et al.* 2005).

Imported volatility operates only to the extent that international trade occurs and the country allows international prices to be transmitted into domestic markets. Landlocked countries and countries with high internal transport costs (typical of sub-Saharan Africa) and marketing costs, or staple foods that are not traded internationally, have a much larger scope for domestic price volatility without being able to rely on the potentially stabilizing effects of imports or exports. Therefore, these countries are more subject to domestic sources of volatility than imported volatility.

Daviron *et al.* (2008) examined the pattern of the transmission of the changes in international food prices to national markets in four African countries with fully liberalized cereals markets (Senegal, Mali, Niger, and Madagascar) before the food crisis. The dynamics of markets for local coarse grains (millet and sorghum) in the Sahel were found to be completely disconnected from the international food prices. However, consumer prices of local coarse grains were much more unstable than consumer prices for imported rice – even though they were lower than international prices, reflecting domestic supply conditions and thin markets (see Figure 8). Indeed, prior to the current international food price swings, these countries relied on international markets to gain some price stability at the consumer level.

**Figure 8: Niger, consumer prices for imported rice, local corn and local millet and producer price for millet**



Source: Daviron *et al.* (2008)

In Addis Ababa, from 1996 to 2003, when international maize prices were relatively stable, the wholesale price of maize varied from \$50 per metric ton to \$250 per metric ton (Byerlee *et al.* 2005). Consumers in southern Africa (Malawi, Mozambique and Zambia) have also experienced highly variable retail prices for white maize between 1994 and 2004.

The existence of domestic sources of price volatility is not limited to Africa. Hazel *et al.* (2005) compared international and producer price volatility between 1971 and 2003 for wheat and maize in importing developing countries. Coefficients of variation of more than 65 percent have been recorded for maize and wheat in Bolivia, Brazil, and Mexico compared with coefficients of 23 and 29 percent respectively on international markets.

Only Asia showed more stable prices, with coefficients of variation of 8 percent for wheat in India (Hazel *et al.* 2005), 5 percent for the producer price of rice in Viet Nam (Minot *et al.* 2000); and coefficients of variation for wholesale rice prices in six Asian countries ranging from 12 percent in Bangladesh to 25 percent in the Philippines.

The natural factors that exacerbate price volatility in developing countries are compounded by high-cost and risky marketing systems (which are in turn made more risky by erratic government policies that discourage private stock holding and cost-reducing investments in marketing infrastructure). A number of structural conditions in these markets contribute to their high cost and volatility. The markets in these countries tend to be very thin, as farmers sell only a small share of their production, which is mainly destined for self-provisioning. For example, farmers in Burkina Faso sell only 10 to 20 percent of their cereal production – mainly at harvest (Brown *et al.* 2009).

When production falls, farmers reduce their sales more than they reduce production and, when production increases, farmers increase their sales more than they increase production. Given the inelastic nature of food demand, such large variability in marketed surplus of non-tradables will be associated with large price volatility. In addition to the thinness of the markets, demand and supply shift because many farmers who are net sellers during normal or good years become net buyers during bad years. This instability in demand and supply, coupled with poorly developed marketing infrastructure and institutions and the lack of market information for most actors, amplifies domestic price volatility. Furthermore, the structure of most urban markets for tradable agricultural products in sub-Saharan Africa tends to be dominated by a few large operators with large import capacities who finance most of the domestic grain assembly, imports, and what little commercial storage activity that does take place.

Beside variations in domestic production resulting from natural and weather shocks and the poor performance of domestic agricultural markets, poor policies contribute to domestic price volatility in developing countries. In many cases, governmental interventions discourage private stockholding and investment in marketing infrastructures that could contribute to more stable domestic markets. Examples of such poor policies include unstable trade policies, unpredictable government interventions, and local procurement and food distribution practices in food markets by NGOs.

Macroeconomic instability also leads to domestic food price instability. This was more obvious in the 1980s and 1990s in Latin American countries that experienced macroeconomic shocks, especially sharp devaluations of exchange rates and high domestic inflation. This is no longer common, but some countries did face sharp rises in both general and food Consumer Price Index (CPI). Ethiopia is one such example, where two macroeconomic policy factors exacerbated the 2007/8 food price situation. During 2005–2007, money supply outpaced overall growth in Ethiopia, resulting in overall nominal inflation (World Bank 2007). In early 2008, as a result of a sharp increase in fuel subsidy bills, the government encountered a balance of payment shortage. To combat this problem, the central bank started rationing foreign exchange, which prevented private sector imports. As a result, domestic prices went way above the import parity level. It is interesting to note that domestic prices started increasing before the global food crisis; did not follow world price during the global food crisis; and started increasing sharply long after the world prices nosedived. For almost two years, poor consumers continued to suffer from this price shock.

In conclusion, in many developing countries during the 1990s and the first half of the 2000s, when international food price fluctuations were limited, prices for local food products experienced high volatility stemming from domestic sources. However, food imports offered a form of insurance for urban consumers – a source of security and stability they have lost with the recent successive international price rises.

### 3.2 International price volatility has been transmitted unevenly to developing country domestic markets

Although rising food prices in global markets represent a serious threat to vulnerable people in developing countries, it is domestic food price inflation and volatility that determine the poverty and food security impact of international food crises (Mousseau 2009). The consequences of international food price volatility on food security can be very different both across and within countries depending on the degree of transmission of world food price hikes in domestic markets.

Dawe (2008) analyzed the transmission of the 2007/08 increases in international rice prices to the domestic markets of seven large Asian countries (see Table 10). He used the simple method of cumulative changes in international and domestic real rice prices between the fourth quarter of 2003 and the fourth quarter of 2007, i.e. before the end of the price rise. The results show that the increases in real domestic rice prices represented 5 percent of the increases in real world rice prices in the Philippines against 63 percent in China.

**Table 10: Cumulative percentage changes in real rice prices, Quarter 4 2003 to Quarter 4 2007**

Country	World price (US\$)	World price in domestic currency	Domestic price increase in domestic currency	Pass-through (%) = 3/1
Bangladesh	56	55	24	43
China	48	34	30	63
India	56	25	5	9
Indonesia	56	36	23	41
Philippines	56	10	3	5
Thailand	56	30	30	54
Viet Nam	39	25	3	8

Notes: Data for China compare 2003 and 2007; data for Viet Nam compare 2003 and 2006 (annual)  
Source: Table reproduced from Dawe (2008)

The pass-through percentages were used to classify the seven countries into two groups. The first group (India, Bangladesh, Indonesia, Philippines, and Viet Nam), includes countries defined as 'stabilizers,' with the increases in domestic prices being less than half of the increase in world market prices. These countries used policy instruments such as government stocks, procurement, distribution, and trade restrictions to decouple their domestic prices from price increases in international markets. The second group of countries allowed the international price movements to be transmitted to their domestic markets. China and Thailand constitute this group with pass-through rates greater than half of the increases in international prices. Even though these countries used storage and procurement, domestic prices were allowed to mirror the movements of international prices. The result for China is quite surprising considering the trade policy pursued by the country (OECD 2009). It illustrates higher domestic inflationary pressure within the country more than a real transmission of the international price rise.

Blein and Longo (2009) reviewed studies analyzing the transmission of international prices to domestic markets in developing countries for rice and maize during the 2007/08 price spike and concluded that most domestic markets have been less exposed to world price shocks, although the situation varies by country and region. For example, price transmission in Darfur is high, which makes sense given the region is almost entirely dependent on food imports and because the Sudanese government has not implemented measures to control price transmission (FAO 2011c). Where domestic and international prices move together, about 54 percent of the increase in world prices is, on average, transmitted to domestic markets in sub-Saharan Africa, while on average, one-third of the increase in international real rice prices was transmitted to Asian domestic markets. Strong price transmission was found for rice in Senegal, which depends on rice imports from Asian exporters for more than 83 percent of its domestic consumption needs (Blein *et al.* 2009).

Minot (2010) examined the trends in food prices in sub-Saharan Africa over 2007–08 and found that across 83 food prices in 12 African countries the average increase was 63 percent in United States dollar terms between June 2007 and June 2008. On average, this increase represented 71 percent of the rise in the price of corresponding commodities in international markets. The highest transmission of world price changes to national markets was recorded for Malawi and Ethiopia, where the domestic price increased more than world prices as a result of domestic policy factors and production shocks.

South Africa, Ghana, and Cameroon experienced the lowest price increases, which represented between 25 and 39 percent of the rise in world food prices. Across commodities, the transmission of world price changes to national markets in the 12 African countries was highest for wheat (111 percent) and maize (112 percent). The corresponding figure for rice was only 41 percent, reflecting the predominance of eastern and southern African countries in the sample, where rice is less important in the total consumption mix compared with West Africa. Indeed, an examination of the transmission patterns by country and commodities shows that domestic rice price increases in Senegal represented on average 87 percent of the increase in world prices compared with only 35 percent in Mozambique.

In another publication, Minot (2011) analyzed volatility in grain prices<sup>7</sup> in sub-Saharan Africa and world markets, from June 2007 to June 2008, using coefficients of variation (see Table 11). Volatility of domestic prices of locally produced maize and wheat<sup>8</sup> is slightly higher than the observed volatility in world prices. Only locally produced rice shows lower volatility in Africa than rice prices in world markets. The coefficients of variation of the import parity prices are lower than those of world prices for maize, wheat and rice, confirming the findings that most prices in developing countries exhibit incomplete pass-through of world price changes to domestic prices. This incompleteness of pass-through reflects mainly policy measures aimed at isolating domestic markets from movements in world prices. Variation in parity price appears lower than the observed variation in the prices of locally produced maize and wheat except for locally produced rice which appears more stable than imported rice.

**Table 11: Cereal prices in Africa: Comparison of price volatility**

	Mean (US\$/ton)	Standard deviation	Coefficient of variation	Coefficient of variation of import parity price
<b>World prices</b>				
Maize	121	39	33%	18%
Rice	210	88	42%	28%
Wheat	167	61	36%	23%
<b>Domestic price in sub-Saharan Africa</b>				
Maize	180	68	38%	
Rice	477	105	22%	
Wheat	261	99	38%	

Source: Minot (2011)

A recent UNICEF study (Ortiz *et al.* 2011) shows that, even if the rise in prices was delayed in some continents (Africa, Latin America), a significant portion of the 2007/08 international price rise was transmitted to domestic prices<sup>9</sup>. Moreover, it appears (see Figure 9) that the national price index did not drop as sharply as did the international prices after July 2008. In many continents, prices rose again as soon as international prices moved upward. Thus, price transmission to national markets was muted on the downside during the crisis, not just on the upside. Once international prices started to fall for a variety of reasons, the full extent of the fall was not transmitted to developing countries.

When comparing countries by level of income, price data indicate that low-income countries have faced higher price increases than have middle-income and rich countries. This tendency of low-income countries to face greater price increases was magnified during the 2007–08 food crisis and again in the second half of 2010. For example, food prices were 8.3 percent higher in low-income countries than in middle-income countries in August 2010, and reaching 12.6 percent in November 2010 (Ortiz *et al.* 2011). Food prices increased by 5 percent on average in low-income countries, while they fell by 0.8 percent in middle-income countries between August 2010 and November 2010.

In summary, the evidence from the different studies on the transmission of the 2007/08 price spike indicates that most prices in developing countries exhibit incomplete pass-through of international price changes to domestic prices, characterized by a slow adjustment process with a limited response of national prices to world prices in the short run, but a higher response in the medium term (Dawe 2008; FAO 2009; Daviron *et al.* 2008; Minot 2010; Blein and Longo 2009; Dialo *et al.* 2010).

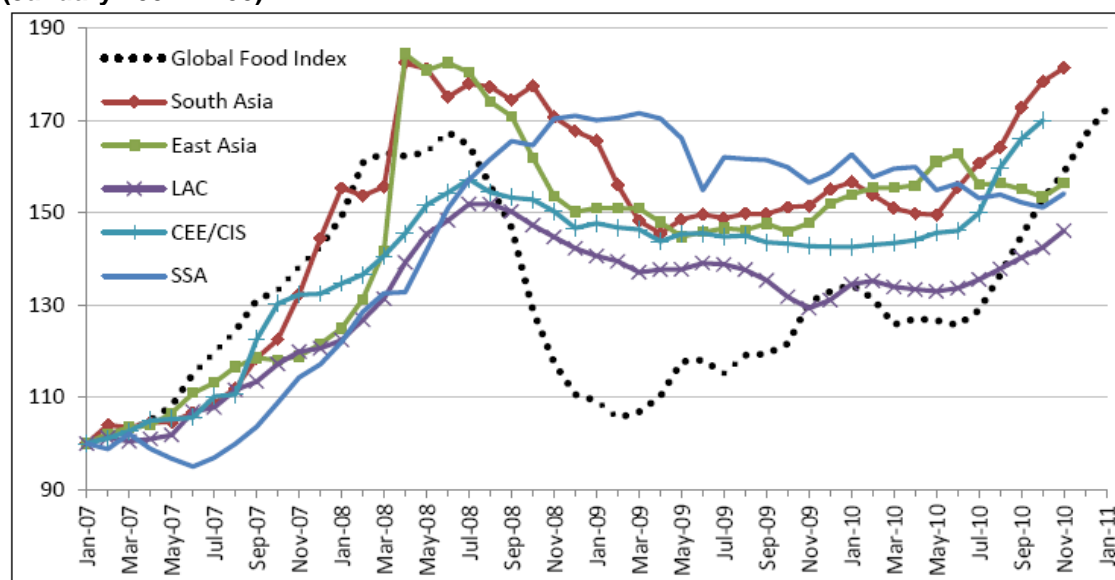
<sup>7</sup> African domestic prices are converted to US dollar per ton and deflated by US consumer price index. World prices relate US No.2 yellow maize, FOB Gulf of Mexico, US No.2 hard red winter wheat FOB Gulf of Mexico, and Thai Super A1 broken rice, FOB Bangkok.

<sup>8</sup> Domestic prices of locally produced wheat are from Ethiopia.

<sup>9</sup> The authors of the report underlines that the interpretations for East Asia and South Asia should be taken with caution owing to the limited number of observations for each region (five).

Moreover, the degree of transmission varies across developing countries depending on the effectiveness of policy measures adopted to insulate the domestic markets from the international markets (see Table 12 and annex A2). This difference in the degree of price transmission reflects in part the fact that it takes resources to insulate domestic markets from international markets. Since low-income countries that depend on international trade for their food security have fewer resources to spend on limiting price transmission, they are likely to bear most of the adjustment burden as more and more countries insulate themselves from the international markets.

**Figure 9: Local food prices by region, January 2007–November 2010 or latest available (January 2007 = 100)**



Source: Ortiz *et al.* (2011) Note: Sample includes 5 countries from South Asia, 5 from East Asia, 16 from LAC, 7 from CEE/CIS and 24 from SSA; MENA is not included since there is data for only one developing country from that region (Djibouti). The Global Food Index in the figure is derived (authors calculation) from the FAO's food price index<sup>10</sup>.

**Table 12: Policy interventions adopted by countries to address the 2007/08 food crisis**

	Africa	Asia	LAC	Overall
Countries surveyed	33	26	22	81
Interventions to prevent price increases				
Trade policies:				
Reduction of tariffs/custom fees On imports	18	13	12	43
Restricted or banned exports	8	13	4	25
Domestic market measures:				
Suspension/reduction of VAT/Taxes	14	5	4	23
Release public stocks at subsidized prices	13	15	7	35
Administered prices	10	6	5	21
Interventions to support the poor' access to food				
Safety net programmes				
Cash transfer	6	8	9	23
Food assistance	5	9	5	19
Increase disposable income	4	8	4	16
Interventions to boost domestic food supply in the short run				
Production support(input subsidies)	12	11	12	35
Production safety nets	6	4	5	15
Fertilizer/seed programmes	4	2	3	9
Market interventions	4	9	2	15

Source: Demeke *et al.* (2009)

<sup>10</sup> The Food Price Index is an index of international food prices calculated by FAO.  
<http://www.fao.org/worldfoodsituation/wfs-home/foodpricesindex>

It is felt that the transmission effect of international price volatility to domestic markets and, in particular to food producers, warrants further research. Little has been done to assess the impact of governmental policies affecting the transmission of international price increases on domestic prices among farmers with the potential comparative advantage to increase production and the potential for curtailing national imports. Similarly further studies should be undertaken on price transmissions on the supply side - wholesale and retail prices - in individual countries.

### **3.3 Actual consequences of price volatility on global food security are not well understood**

Price volatility has a strong impact on food security because it affects household incomes and purchasing power. It can increase the number of poor and hungry people. Price volatility and price levels interweave to affect welfare and food security. The higher the price, the stronger are the welfare consequences of volatility on consumers, while the opposite is true for producers. Moreover, the volatility of prices leads to a lot of uncertainty in the whole food system, causes actors to hold reserves in more liquid form, and thus discourages longer-term investments that can increase productivity and promote trade. The longer-term impacts on food security of food price instability can be great even if prices are not constantly moving higher (Timmer 1990).

The State of Food Insecurity in the World (FAO 2010c) provides a yearly estimate of the number of undernourished people in the world. This number rose from about 848 million in 2003–05 to about 1 023 million in 2009. The number of undernourished increased by 24 million in sub-Saharan Africa, 4 million in the Near East and North Africa, 6 million in Latin America/Caribbean, and 41 million in Asia/Pacific for a total of 75 million.

A simulation of different scenarios of increases in food prices by the Asian Development Bank (ADB, 2008) projected that the number of poor people would increase by 5.67 million in the Philippines and 14.67 million in Pakistan if food prices rose by 20 percent. The number would rise to 8.85 million in the Philippines and about 22 million in Pakistan if prices were to increase by 30 percent. Both the Philippines and Bangladesh are countries that depend on a single major staple for their food consumption, and this means that poor people in these countries have fewer possibilities of substitution in their consumption bundle when food prices soar. Wodon and Zaman (2008) found that a 50 percent increase in food prices would push on average 30 million people into poverty in a selected set of countries in sub-Saharan Africa (Mali, Burkina Faso, Ghana, Democratic Republic of Congo, Guinea, Liberia, Niger, Nigeria, Senegal, Sierra Leone, and Togo) .

Rapsomanikis (2009) simulated the impact of price increases on food security in Malawi, Zambia and Uganda. He found that a 50 percent increase in the price of all grains would lead consumers to reduce maize consumption by 8.5 percent in Malawi and 15.6 percent in Zambia. Poor and food-insecure households were found to reduce the consumption of maize, the main staple food, less than non-poor and food-secure households, reflecting limited margins of manoeuvre. For example, the author found that poor and food-insecure households reduced per capita maize consumption by 4.4 percent compared with 11.8 percent for rich and food-secure households.

However, all this data, including the FAO estimations, are simulations that are strongly questioned. In the most recent critique, Headey (2011b) carried out a careful analysis of the methods used by FAO. He shows how the insufficient coverage of the largest developing countries, especially China and India, creates big uncertainties in the results. Headey then compared the FAO data with the self-reported food insecurity data from the Gallup World Poll and finds not an increase, but a fall in the number of food-insecure people from 2005 to 2008. Finally he explains this surprising result by the positive impact of the rapid economic growth in emerging countries and the existence of price stabilization policies in several of them, notably those countries with the largest populations. The Gallup Poll data is imperfect, as Headey and Gallup both acknowledge. But Headey's findings show that existing methodologies to measure the extent of hunger are not accurate enough.

Clearly, the existing literature does not give an overall assessment of the actual impact of the recent international price volatility on food security. It is salutary to compare the large number of models elaborated to simulate the impact *ex ante* with the scarcity of studies providing evidence of the actual consequences *ex post*. Here we only get a very fragmented vision of the situation.



Devereux (2009) has studied the volatile effect of food market seasonality in Ghana, Namibia, Malawi, and Ethiopia and pointed out how damaging this price volatility is for nutrition. In Malawi, for example, the causal linkage between maize prices and child malnutrition is dramatic: between October 2004 and January 2005, during which time maize prices doubled, admission for severe acute malnutrition increased by a factor of 7, falling back when maize prices started decreasing.

Lustig (2008) reviewed a large set of studies on the impact of the increases in food prices on poverty and found that on average, higher food prices increase poverty in the majority of countries. The poor are hit the hardest as they spend a larger percentage of their income on food as compared with richer income groups. For example, Ivanic and Martin (2008) reported that at least 105 million people in LDC have slipped into poverty because of the high food price inflation since 2005. These 105 million new poor represent “close to seven lost years of progress in poverty reduction” (Ivanic and Will 2008). Robles *et al.* (2008) reported that 21 million people were pushed into poverty because of rising food prices in middle-income Latin America from January 2006 to March 2008 (Robles, Cuesta *et al.* 2008). This number may reflect the inadequacy of social safety nets in some of these countries.

Compton *et al.* (2010) compared evidence from field studies with predictions made at the beginning of the 2007–2008 price spike and found that “poor net food importing countries – island nations such as Haiti, countries in conflict, and rice-importing areas of West Africa – were among the first to feel the effect of rising world food prices. However, high food prices were also recorded as having a serious impact on poor consumers in net food exporting areas such as Thailand, Uganda, and northern Mozambique.” The worst affected population groups were casual wage labourers (rural and urban), land poor farmers who produce no, or minimal, surplus for sale, and petty food traders and producers of commodities whose terms of trade declined against food grains.

Bibi *et al.* (2009) analyzed the impact of the increase in food prices on child food poverty in Mali following the food crisis. The authors measured food poverty by “comparing each individual’s real food expenses to the expenditures required to satisfy his caloric requirements”. They found that increases in food prices led to an increase in food poverty among children (0–14 years old) from 41.5 percent to 51.8 percent. The total percentage of the people falling into food poverty was found to be greater in rural areas than in urban centres. Furthermore, the authors showed that urban households had a greater capacity to absorb the impact of rising food prices by reducing their non-food consumption. Indeed, the budget share of non-food consumption among urban households dropped from 48.3 percent to 41.9 percent after the food price rise while rural households changed their budget allocation from 34.4 percent to only 33.3 percent.

Some studies have also looked at the impact of the world food price increases on the nutritional status of children. Thus, Compton *et al.* (2010) found that “the prevalence of underweight and wasting in young children went up by about half in surveys in Bangladesh, Cambodia and Mauritania following food price rises (e.g. from 17 percent to 26 percent wasting in rural Bangladesh). Among the factors responsible were cutbacks on special complementary (weaning) foods, as well as reduced consumption of more expensive and nutritious foods. Food price rises led to widespread reduction in dietary diversity, which is a predictor of micronutrient malnutrition.” The authors also point out, however, that evidence on differential impacts within the household is scant because much of the reporting from the food crisis was blind to gender and other differences.

A study in Ethiopia, the Central African Republic, Sierra Leone and Liberia by Action Against Hunger in 2008 provides some information about the impact of the price rise on food security (ACF 2009). The organization choosed these countries because admission rates to feeding programmes there increased early in relation to the seasonal norm. Their data show that in Ethiopia high prices were closely followed by an increase in malnutrition and under-five mortality rates. However, ACF also notes that “not all countries have been affected equally. Findings from the Central African Republic reveal only modest increases in prices and statistically insignificant increases in malnutrition. Research in Sierra Leone showed that even in Freetown, the capital city, prices and household reactions varied. These results may reflect the fact that roots and tubers play a more important role in the national diet in these countries than they do in Ethiopia. Studies by Dialo *et al.* (2010) showed that root and tuber prices in West Africa (largely non-tradables) were not affected much by the high world grain prices, and that the use of these staples may have offered some protection to consumers from the high cereal prices.

In one of the first studies of the consequences of the 2010/2011 price rise, IDS research partners and Oxfam went to study the food security situation in eight communities in Bangladesh, Indonesia, Kenya and Zambia that had previously been visited in 2009 and 2010 (Hossain and Green 2011). They

noticed a more varied impact than during the 2007/08 price spike but also an overall pattern of 'weak losers and strong winners'. The informal urban sector, small-scale farmers and small traders have generally not done well. On the other hand, commodity producers and workers in export sectors have improved their situation because of the global economic recovery. In terms of nutrition, "the most usual pattern is for people to shift to cheaper and less preferred, and often poorer quality foods". Finally, the report underlines that government safety nets have generally failed to protect people from the effects of the price rise with a resulting increase in the level of discontent and stress.

In summary, the recent world food price swings have certainly pushed many consumers into poverty in developing countries and led to a crisis of food access. However, there is no institutional mechanism that systematically collects and analyzes the data with a view to informing a global and dynamic vision of the actual impact of the food price crises on vulnerable populations. This gap needs to be filled.

## 4 NATIONAL POLICY OPTIONS TO ADDRESS PRICE VOLATILITY

Food security is a complex multidimensional issue and a national responsibility. Building resilience at all levels is necessary to reduce, manage and cope with multiple shocks and stresses, including price volatility.

Therefore, every country needs a comprehensive national food security strategy that takes into account the specificities and special characteristics of the country. Such strategies should include policies to reduce, manage and cope with price volatility and efforts to increase the incomes of the poor in general. The elaboration of the national strategies should be based on robust data collection and analysis (evidence-based). Regular policy review and coherence is necessary in a rapidly changing environment.

The development, implementation and review of national strategies should be coordinated and facilitated by an inter-sectoral and inclusive (civil society and Farmers' Organisations) national team.

An example of the guidelines for such national strategies and their coordination can be found in the CAADP African Framework for Food Security (AU and NEPAD, 2011).

The elaboration of national food security strategies is consistent with the Rome Principles.

### 4.1 Policy instruments to deal with price volatility

Price volatility generates food security problems because it affects household incomes and purchasing power. Thus, two categories of policies and programmes can be considered in an attempt to solve the volatility problem. The first aims at stabilizing prices. The second aims at reducing the impact of price volatility on incomes and purchasing power (Galtier 2009). This can be done either *ex ante* relative to price shocks through the management of price volatility, or *ex post* relative to price shocks through coping with price volatility (Byerlee *et al.* 2010). The policy and programme instruments can be further divided into three groups corresponding to the distinct development roles of the market, state, and civil society: market-based instruments, direct state interventions in markets, and interventions through civil society organizations. Combining the three policy objectives (stabilization, management, and coping) with the three categories of instrument (market, state, and civil society) gives nine classes of instruments (see Table 13). The proposed typology constitutes a convenient way of organizing the multitude of policy instruments used by developing countries and advocated by different analysts during the recent world food price swings. This typology allows the identification of the policy instruments that can be combined in the country-specific comprehensive food price volatility and food security strategies discussed below. Similar matrixes with additional ideas for national policy instruments for short, medium and long-term food security can be found in FAO's country policy and programme guide (FAO, 2011e) to addressing high prices and the CAADP African Framework for Food Security.

**The first class of instruments** (A) aims at **making markets work better in time and space**. The basic idea here is that if producers, traders, manufacturers, and consumers who buy or sell food products react quickly and adequately, small price fluctuations will be sufficient to remedy the disequilibrium. The instruments included in this class are supposed to facilitate the choices (regarding time, place, product, and technology) made by individuals. The instruments proposed are mostly material and institutional infrastructures of the market. They include information systems, clear rules for government interventions in markets, transport and communication infrastructure, reduced transactions costs on markets, storage capacity, and grading.

**The second class of instruments** (B) aims at giving to producers, traders, and manufacturers the possibility of **managing price risk *ex ante* relative to price shocks (B1) and of coping with price shocks *ex post* (B2)** with the objective of stabilizing real incomes. Both risk management and risk coping instruments are costly, and trade-offs exist in the optimum combination of both approaches. Market-based risk management instruments (B1) include financial products (weather insurance, forward contracts and options, and credit and saving associations) and investments in agriculture,

both to increase domestic food production and to stabilize food production through diversification and resilience of food systems. Market-based risk coping instruments (B2) include emergency loan programmes to reinforce the possibility of responding to a shock.

**The third class of instruments (C)** is about **direct state interventions to reduce price volatility in domestic markets**. Interventions can use foreign trade (acting directly on import/export prices through tariffs and taxes or on quantities exchanged, for instance through export bans), public food reserves (as buffer stocks or emergency reserves), and price band schemes. Reducing import tariffs to mitigate the transmission from international to domestic prices implies loss of fiscal revenues. However, trade liberalization over the last 20 years has reduced the effectiveness of this instrument. Public stocks can be managed as a buffer stock or an emergency food reserve. Usually buffer stocks are used to stabilize domestic food prices within a price band, and benefit poor and non-poor consumers and farmers through minimum procurement and sale prices. The main constraint to their use is the high fiscal cost, which exceeds the budgetary capacities of many countries. This has been the experience of sub-Saharan countries in the 1970s, when the marketing boards that managed these stocks went bankrupt. The buffer stocks were consequently scaled down to become emergency food reserves or food security stocks that target mainly localized food crises within countries. Another related constraint is the difficulty that arises when borders are porous and neighbouring countries are not following similar price policies. A country that tries to implement a buffer stock policy is then forced to try to stabilize not only its domestic price, but that of all its neighbouring trading partners – a situation that makes these operations even less financially sustainable.

**In the fourth class of instruments, ex ante price volatility management instruments (D1)** are used to boost short-run supply and raise productivity of smallholders. They include the provision of subsidized inputs (mainly fertilizers and seeds) and extension services. These instruments were implemented vigorously through heavy use of subsidies, raising the issue of the fiscal sustainability. An important function of smallholder farming in the context of price shocks is production for home consumption for the large majority of small farmers who are net buyers of food. In poor countries with low administrative capacity to manage social protection, production for home consumption, where the poor work on their own farms, may be one of the cheapest and most effective approaches to *ex ante* risk management. Policy instruments in this category also include the promotion of employment in the rural non-farm economy through decentralization and programmes in support of small and medium rural enterprises. These off-farm opportunities are powerful income stabilizers when agriculture is subjected to price or quantity shocks.

**The fifth class of instruments includes the large variety of social protection instruments (D2)** elaborated during the last few decades: cash and food transfers, school feeding programmes, productive safety nets, guaranteed employment schemes, and other programmes such as food-for-work or food-for-training<sup>11</sup>. The food security impact of the recent world food price shocks has been severe in countries that were not able to provide food assistance to people who lacked purchasing power. The two-legged strategy implemented by most countries consisted of trying to limit increases in domestic food prices and ensuring that people who were priced out of the market did get access to food through enhanced social protection schemes. There exists a wide range of types of social protection programmes, their objective is to help those who lack purchasing power during food crises to access food either through enhanced purchasing power (cash transfer) or direct food distribution. School feeding and nutrition assistance programmes are also powerful instruments for human capital development and if procured locally, they provide marketing opportunities for smallholders. Social protection programmes should seek to ensure sound nutrition throughout the human life-cycle. Design of social protection programmes shall take into account the necessity to ensure a balanced diet during the first 1000 days of life, including pregnancy and lactating mothers.

Food security stocks address generally localized food crises within a country, and thus management is dependent on the existence of warning systems. The Sahelian food crisis of 2004–05 showed that these stocks are not well adapted to large-scale, multi-country food crises. They are better able to handle local seasonal price spikes and localized production shortfalls, especially when linked to community-level stocks. Given the inability of food security stocks to handle price volatility at the national level, developing countries should consider transforming the current food security stocks into buffer stocks linked to community-level reserves to reduce large seasonal swings in prices and other types of volatility in domestic markets.

---

<sup>11</sup> A report on social protection will be prepared at request of the CFS by the HLPE for October 2012.

**Table 13: Illustrative suggestions for national policy and programme interventions to reduce, manage, and cope with price volatility**

<b>Policies and Programmes</b>	<b>Reduce the eventuality and size of price shocks</b>	<b>Ex-ante interventions relative to price shocks</b>	<b>Ex-post interventions relative to price shocks</b>
<b>Programmes</b>	<b>Reduce price volatility</b>	<b>Manage price volatility</b>	<b>Cope with price volatility</b>
<b>Interventions through markets and with the private sector</b>	<b>A. Make markets work better in time and space</b> <ul style="list-style-type: none"> <li>- Information systems</li> <li>- Transport and communication infrastructure</li> <li>- Increase competition in domestic market and trade</li> <li>- Private sector storage development through improved access to financing</li> <li>- Grades and standards</li> </ul>	<b>B1. Financial products</b> <ul style="list-style-type: none"> <li>- Crop/livestock insurance (index-based)</li> <li>- Credit and savings associations</li> </ul>	<b>B2. Emergency loan programmes</b> <ul style="list-style-type: none"> <li>- Access of importers to trade loans</li> <li>- Loans to producers and consumers</li> </ul>
		<b>B1. Investment in agriculture</b> <ul style="list-style-type: none"> <li>- Increase domestic food production</li> <li>- Diversification and resilience of food systems</li> <li>- Growing local crops</li> <li>- Food storage systems at all levels including community storage</li> </ul>	
<b>Direct state interventions</b>	<b>C. Intervene in markets</b> <ul style="list-style-type: none"> <li>- Public stocks</li> <li>- Price bands schemes</li> <li>- Price stabilization</li> </ul>	<b>D1. Enhance productivity in smallholder farming</b> <ul style="list-style-type: none"> <li>- Resilience of farming systems</li> <li>- Targeted input subsidies (seeds, fertilizer)</li> <li>- Production for home consumption</li> </ul>	<b>D2. Social protection for vulnerable households</b> <ul style="list-style-type: none"> <li>- Cash and food transfers</li> <li>- School feeding programmes</li> <li>- Taking into account human life-cycle</li> </ul>
		<b>D1. Employment in the rural non-farm economy</b> <ul style="list-style-type: none"> <li>- Decentralization</li> <li>- Small and medium rural enterprise programmes</li> </ul>	
<b>Interventions through and with civil society</b>		<b>E1. Negotiated ex ante social protection</b> <ul style="list-style-type: none"> <li>- Minimum wage, right to food</li> </ul>	<b>E2. Community-driven productive social protection</b> <ul style="list-style-type: none"> <li>- Workfare (coping) with community-driven development projects (management)</li> </ul>
		<b>E1. Producer organizations' services to members</b> <ul style="list-style-type: none"> <li>- Rotating credit schemes</li> <li>- Group insurance</li> <li>- Local purchases for food distribution systems (e.g. WFP's P4P)</li> </ul>	

This will require very clear and transparent rules on acquisition and release prices: if these stocks are poorly managed, they can crowd out private storage, when private storage needs to be fully promoted to reduce the fiscal cost of limiting price volatility.

**Interventions can be organized through and with civil society organizations in (E) instruments.**

**Ex ante relative to shocks (E1)**, civil society organizations have an important role to play in providing oversight and accountability in social protection programmes such as minimum wage and right to food. Producer organizations can also manage collective action in support of their members with programmes such as rotating funds, group insurance, and local purchase for social programmes.

**Ex post relative to price shocks (E2)**, civil society organizations can also be effective in managing social protection programmes. Productive safety nets operate as short run workfare programmes by providing immediate wage income to food-insecure participants (risk coping) while using the labour contributions to build infrastructures that enhance the longer-term resiliency of local food production systems (risk management) through such community projects as small irrigation infrastructure, soil and water conservation, and agroforestry. Projects are defined and implemented by local community organizations in community-driven development (CDD) schemes. Like conditional cash transfer programmes (e.g. Oportunidades in Mexico, Bolsa Familia in Brazil that combine cash payments with human capital development), they have the advantage of providing both short-term risk coping (E2) with long-term risk-management (E1) instruments.

In the context of trade liberalization policies, instruments that aim at managing price volatility (financial products and credit) and coping with price volatility (social protection) have been actively promoted as the optimal strategy. Letting prices fluctuate and treating the consequences was seen as the most effective and efficient way of solving the price volatility problem. Both classes of instruments appeared to be complementary, the first being mostly oriented toward producers and traders, the second toward consumers. However, financial products to cope with food price volatility in developing countries did not develop as much as expected. Moreover, the social protection programmes appeared to be unable to avoid the decapitalization and weakening of the poorest households. The 2005 food crisis in Niger with a succession of weather shocks leading to the sale of assets by households has been particularly revealing of this weakness.

Therefore, a combination of policy instruments identified in Table 13 should be implemented as part of a national food security strategy to achieve long-term and stable food security that will provide resilience in times of price volatility and in facing a variety of inevitable shocks. The goal of these inter-sectoral and comprehensive strategies is to ensure sufficient domestic supplies and protect domestic prices from extreme variations to reduce the risks for both traders and smallholders and stimulate their investment in food production. An optimal food security strategy will combine domestic production, buffer stocks, trade as well as social protection and emergency contingency plans.

These strategies need to be backed by coherence in the entire policy context and government actions at the subregional, regional, and international level. Regional trade has the potential to mitigating national food price volatility, as it broadens the scale of trade by making supply more elastic so that a change in national output related to weather conditions will not cause extreme price movements in the domestic market. For example, Mauritania, Senegal, and Sierra Leone in West Africa have food security strategies based on a combination of large imports of Asian rice and imports of coarse grains (millet, maize, and sorghum) from neighbouring countries (Staatz *et al.*, 2008).

However, the reliability of the regional markets as a food security instrument was seriously damaged during the 2008 food crisis when countries banned and restricted exports to regional markets both in Africa and Asia. Confidence will have to be restored in regional markets, requiring regional organizations to address this issue. For example, the CAADP (Comprehensive Africa Agricultural Development Program) seeks to improve harmonization of national agriculture and trade policies and develop regional food security strategies to deal with regional trade barriers and important spillovers (e.g. regionally certified storage facilities as a way of trying to keep regional trade fluid during periods of high prices).

## 4.2 Guiding principles for national options

Some guiding principles can be identified to guarantee the best use of the diverse instruments:

- Policies and instruments to cope with price volatility should be in place before shocks happen and with clear rules of engagement:
  - If governments have cereal stock policies, the stocks should be optimally determined and procurement and distribution policies should be transparent and rule based.
  - Similarly, if directly distributed food is an option to cope with price volatility, this should be based on transparent criteria regarding who will qualify for assistance and on what terms.
- In order to effectively target interventions, households should be categorized in terms of not only their chronic malnutrition and hunger status, but also their vulnerability to various shocks such as price changes and uncertainty. With rising price volatility, poverty and hunger will become an increasingly important social condition. Vulnerability is still not well understood by policy makers.
- Market-based instruments, such as insurance and credit, may require public expenditures either as investments or as subsidies. Subsidies can be justified if they internalize a social cost or if they provide transitional support toward a self-sustaining activity (for instance through training or for reaching a critical mass of participants).
- Social protection programmes are legitimate public programmes irrespective of the country's level of development. However, one type of social protection programme cannot address the needs of all poor and vulnerable populations within a country.
  - The poorest of the poor with no prospects of overcoming poverty in the future will have to be supported for their survival through direct transfers of cash or food – although there is evidence that cash transfers need to be used carefully. This is a collective responsibility.
  - Poor households that include economically active adults and young children can participate in conditional transfer programmes (food/cash for work programmes, conditional cash transfers etc.). These programmes will not only ensure food security but also allow families to invest in their future, for example by helping children to stay at school. Note that these novel approaches to food security using programmes that protect against price volatility need further experimentation and evaluation.
  - Households that are marginally above the poverty line do not generally qualify as beneficiaries of national social protection programmes. However, they are not any less vulnerable to shocks. With a sudden shock, they may slip into food insecurity and poverty and get trapped there. Social protection programmes should factor in the capacity to accommodate vulnerable populations that may be forced to restrict consumption in times of crisis and to limit the likelihood of price shocks deepening and widening the incidence of hunger and poverty.
- Increasing the productivity of subsistence farming (by distributing vouchers for fertilizer–seed mini-kits, for example) is one of the cheapest social protection options for vulnerable rural populations.
- Respect for human rights, including the right to food and the right to free association and collective bargaining (for farm workers in particular) are essential to redress the significant market power imbalances that are typical in national and international food systems. Civil society organizations have an important role to play in securing these rights.
- Governments need information systems to be able to assess hunger and malnutrition, provide early warnings and target appropriate assistance effectively. Establishing or strengthening existing systems should be a top priority in national efforts to address food insecurity and price volatility.

### **4.3 Accounting for country specificities in managing food price volatility**

The track records of policies dealing with price volatility have been mixed at best. One reason for such mixed results might be rooted in the fact that these policies failed to account for the dynamics and heterogeneity of the country contexts. Policy rationales are dynamic and hence the policy instruments need to adjust with the changing rationales. For instance, agricultural price policies that Asian countries adopted to promote the Green Revolution were formulated at a time when these countries lacked adequate infrastructures, price information, and institutions for risk management. Many of these contexts changed and, in the countries that did not adjust to the change, those policies became expensive or even counter-productive in some cases (Rashid, *et al.* 2007). Similarly, as country contexts are diverse, there are wide variations across developing countries.

The issue of an optimum policy directed at managing food price volatility is to find the right combination of the various instruments presented above. Such a combination, to be effective and efficient, must be adapted to the specificities of each country. Three country characteristics seem to be particularly relevant:

#### **The nature of domestic price volatility**

Domestic price volatility can be of domestic origin, such as weather-induced variability of domestic production and poor performing domestic markets, or imported from international markets through trade and integration to world markets, or both. Galtier (2009), after Byerlee *et al.* (2005), argues that the optimal policy instruments used to contain price volatility will likely vary according to the source of the variability.

Actually, the relative importance of imported and domestic volatility mostly depends on the degree of integration of the country with the international market (openness and tradability of the main staples) and of its macroeconomic condition.

#### **The vulnerability of the country and households**

Countries that spend a larger share of import bills on food are more vulnerable to international prices shocks. In this case, high import bills can potentially create balance of payment problems, which in turn can lead to other macroeconomic problems and instability.

On the other hand, households that rely on one or two main staples will be more vulnerable to domestic price shocks than are the households with more diversified basket of consumption. The underlying idea is simple. When consumption is concentrated on one commodity – such as rice in Bangladesh or maize in southern African countries – it accounts for a large share of household expenditure, and hence a price spike can jeopardize the food security conditions of the poor. By contrast, if the consumption basket is diversified, fluctuations in supplies and prices in one commodity market can be partially absorbed by other markets. This is particularly true when households are used to consuming staples that are non-tradable such as cassava, teff, and plantain. However, Compton *et al.* (2010) point out that the national level in many countries is not a relevant measure for estimating the degree of diversification of the consumption basket. What seems, from national statistics, diversified consumption baskets can actually recover different (but less diversified) regional patterns of consumption.

A fundamental step toward accounting for diversity will be to have a better understanding of household income groups, which will not only help to target interventions but also to formulate policies according to household-specific needs. As this note has argued, even though social protection programmes are legitimate programmes irrespective of the country's level of development, these programmes need to be tailored according to the income and resource status of households. For poor populations, there can be two types of safety net programmes – one focusing on poor populations without an active labour force or productive assets and the other on populations with an active current and future labour force. Supporting the first group is a social responsibility; these populations will require free distribution. On the other hand, households with active labour force can be supported by conditional transfers or productive safety net programmes – such as food-for-work or food (or cash)



for education. A third category includes those households that are marginally above the poverty line. This group is no less vulnerable to shocks than households that fit our poverty definition. They do not qualify for social safety net programmes nor can they afford market-based risk management tools such as insurance and credit. Therefore, any sudden shock may push these households into poverty, where they can then become trapped. This has large social costs; hence, public subsidies may be justified to internalize social costs or to support self-sustaining institutions.

## **Institutional capacity**

The capacity to implement instruments managing price volatility varies widely across countries. Consider the case of implementing well targeted safety net programmes. These are justified policy interventions irrespective of the level of development and are indisputably advocated by all as an instrument to cope with food price shocks. Some inevitable challenges of implementing these policies include national capacity to assess vulnerability, targeting beneficiaries, and effectively delivering transfers (food or cash).

This discussion underscores one fact: unless attention is given to the heterogeneity of institutional capacity across countries, commonly recommended policy instruments may not yield the desired results. While the illustration is for safety net programmes only, exactly the same argument can be made about weather insurance, regional stocks, or even Strategic Grain Reserves (SGRs) or trade control measures.

The three different country characteristics – nature of domestic price volatility, vulnerability and institutional capacity – presented previously could be used to develop a comprehensive typology. Compton *et al.* (2010) underline the importance, for international organizations and national governments, of quick and accurate predictions regarding countries and populations most affected by food price shocks. Such a typology would be very useful in improving the speed and accuracy of action. An attempt by the World Bank in 2000 fell short of identifying and ranking the countries in terms of their exposure to global price shocks and associated vulnerability. There are other reasons to further develop the earlier World Bank typology exercise. The WFP undertakes vulnerability assessment work in many countries and inputs from these studies will enrich the typology exercises. The more important inputs to incorporate into the typology will be the lessons learned from the 2007–08 global food crises. Country case studies on how governments responded to the 2007/08 food crisis are becoming increasingly available. These will provide rich information about how countries responded and whether the institutional capacities were adequate to implement the policies.



## 5 FOOD PRICE VOLATILITY AND THE COMMITTEE ON FOOD SECURITY (CFS)

The recent food crisis shows that there is need and opportunity to reduce the occurrence and severity of food crisis by better management of information, learning from experience, and coordination of policy interventions at a world level.

The CFS, drawing from its roles, could contribute to better intergovernmental coordination, in the short and long term, in these domains.

There is currently no institutional mechanism that systematically collects and analyzes available data so as to inform a global and dynamic vision of the actual effects of food price crises on vulnerable populations.

The CFS is not a forum for the negotiation of trade rules. Governments have created the WTO for that purpose. Nonetheless, the CFS could play an invaluable role as a forum for more open debate on what governments want trade rules for agriculture to achieve and how best those rules could support positive outcomes for food security. This debate is urgently needed to ensure multilateral trade rules are more responsive to the needs of Low Income Food Deficit Countries (LIFDCs) and better balanced between the requirements of importing and exporting countries but also between producers and consumers and between the interests of the handful of firms and the billions of people who depend on that trade for some part of their food security.

Agricultural investment strategies and the regulation of commodity futures and exchanges are also areas where debate, analysis and learning could be invaluable, even as these sectors are governed by regulation that is decided elsewhere. It is impossible to develop a coherent and effective global food system if the ministries and international organizations in charge of trade and finance do not engage in open discussion. Food security is not about trade or finance or agricultural production or technologies in isolation.

There is no global platform for shared learning, oversight and coordination of national storage policies where governments can discuss the weaknesses of existing stockholding in international markets. Robust debate is needed on what role stocks might play in the face of the many challenges facing today's food systems.

It is clear there is much to be done. It is also clear there are many opportunities for change. The recent rise, continuing high food prices and volatility are an opportunity to initiate necessary changes.

Therefore, the following recommendations are put forward that specifically relate to the role of CFS to reduce the occurrence and severity of food crises by better management of information, learning, and coordination of policy interventions at a world level:

- The CFS should ensure that the information on food security is appropriately managed as well as the coordination of policy interventions at the global level.
- The CFS could play a role in the establishment of the Agriculture Market Information System (AMIS) and the Rapid Response Forum (RRF) proposed by the G20. It is recommended that the AMIS market information be extended to include food crops other than the usual global cereals, including livestock and fish. AMIS should also include reliable, disaggregated and accurate information on hunger to support the achievement of food security. The AMIS could play a role in early warning.
- The CFS continues to explore forms of international cooperation regarding world food stocks and food security including the establishment of guidelines for the efficient management of such stocks.
- The CFS should coordinate short and long term policy measures taken in relation to price spikes (considering trade barriers, food aid, input subsidies, stocks, etc...).

- The CFS should demand of governments the abolition of targets on biofuels and the removal of subsidies and tariffs on biofuel production and processing.
- The CFS should also serve as a body where donors and governments make long term commitments to public investments in food security and a body where those commitments are monitored and enforced.
- The CFS should contribute to better inter-governmental coordination, including emergency policy measures taken in relation to price volatility.
- The CFS, as the highest governance body on world food security should stimulate and facilitate debate and learning on food security issues, including as a forum for more open debate on how agricultural trade rules could support food security.
- The CFS should establish codes of conduct on food security issues for better international cooperation.
- More studies are required on global governance on agriculture and food security, to inform the Global Strategic Framework on Food Security and Nutrition
- The CFS should encourage and support the establishment or review of existing national food security strategies in each member country. This should include human and institutional capacity to develop, implement and monitor food security

## REFERENCES

- Abbott, P. (2011). Stabilisation policies in developing countries after the 2007-08 Crisis. Paris, OECD: 54.
- Abbott, P., C. Hurt, et al. (2008). What's driving food prices? Oak Brook, Il., Farm Foundation: 80.
- Abler, D. (2010). Demand Growth in Developing Countries. Paris, OECD: 48.
- ACF (2009). Feeding Hunger and Insecurity: The Global Food Price Crisis. New York, ACF: 16.
- Asian Development Bank (2008). Soaring Food Prices. Response to the Crisis, 2008  
<http://www.adb.org/Documents/Papers/soaring-food-prices/soaring-food-prices.pdf>
- AU and NEPAD. The CAADP African Framework for Food Security. NEPAD, MidRand, South Africa. 2011 <http://www.nepad-caadp.net>
- Beintema, N. and H. Elliott (2009). Setting meaningful investment targets in agricultural research and development: Challenges, opportunities and fiscal realities. Roma, FAO: 29.
- Bibi, S., J. Cockburn, et al. (2009). The Impact of the Increase in Food Prices on the Child Poverty and the Policy Response in Mali. New York, UNICEF.
- Blein, R. and R. Longo (2009). Food price volatility - how to help smallholder farmers manage risk and uncertainty. Discussion paper prepared for the Round Table organized during the Thirty-second session of IFAD's Governing Council.
- Brown, L. R. (2011). World on the edge. New York, W.W.Norton&Company.
- Brown, M. E., B. Hintermann, et al. (2009). "Markets, Climate Change and Food Security in West Africa." *Environmental Science and Technology* 43(21).
- Byerlee, D., A. de Janvry, et al. (2010). Agriculture for Development-Revisited: Lessons learned from the University of California at Berkeley Conference October 1 and 2, 2010. Berkeley, University of California: 19.
- Byerlee, D., T. S. Jayne, et al. (2005). Managing Food Price Risks and Instability in an Environment of Market Liberalization. A. a. R. D. Department. Washington, World Bank: 80.
- Calvo, G. (2008). Exploding commodity prices, lax monetary policy, and sovereign wealth funds, *Vox* : research-based policy analysis and commentary from leading economist.
- Cassman, K. G., A. Dobermann, et al. (2003). "Meeting Cereal Demand While Protecting Natural Resources and Improving Environmental Quality." *Annual Review of Environment and Resources* 28: 315-58
- Compton, J., S. Wiggins, et al. (2010). Impact of the global food crisis on the poor: what is the evidence? London, ODI: 99.
- Cordell, D., J.-O. Drangert, et al. (2009). "The story of phosphorus: Global food security and food for thought." *Global Environmental Change* 19: 292-305.
- Daviron, B., M. Auber, et al. (2008). Les mécanismes de transmission de la hausse des prix internationaux. Paris, Fondation Farm.
- Dawe, D. (2008). Have recent increases in international cereal prices been transmitted to domestic economies? The experience in seven large Asia Countries. *ESA Working Paper*. Rome: 12.
- Dawe, D. and T. Slayton (2010). The world rice market crisis of 2007-2008. The rice crisis: markets, policies and food security. D. Dawe. London, Earthsan and FAO: 15-29.
- De La Torre Ugarte, D. and S. Murphy (2008). The Global Food Crisis: Creating an Opportunity for Fairer and More Sustainable Food and Agriculture System Worldwide. Bonn, Misericordia, the Heinrich Böll Foundation with the Wuppertal Institute.
- de Schutter, O. (2010a). Food commodities Speculation and Food Price Crises. Geneva, United Nations Special Rapporteur on the Right to Food: 14.
- de Schutter, O. (2010b). Agroecology and the right to food. Genève, United Nations Human Rights Council: 21.
- Demeke, M., G. Pangrazio, et al. (2009). Country responses to the food security crisis: Nature and preliminary implications of the policies pursued. Roma, FAO: 29.
- Dery, P. and B. Anderson (2007). "Peak phosphorus." *Energy Bulletin* 13.
- Devereux, S. (2009). Seasonality and Social Protection in Africa, *Future Agricultures & Centre for Social Protection*: 28.
- Dialo, B., N. N. Dembele, et al. (2010). Transmission des hausses des prix internationaux des produits alimentaires en Afrique de l'Ouest: Leçons de la crise de 2007-08 pour l'expansion de la production.
- Domanski, D. and A. Heath (2007). "Financial investors and commodity markets." *Bank of International Settlements Quarterly Review*: 53-67.

- Evans, A. (2009). *The Feeding of the Nine Billion: Global Food Security for the 21st Century*. London, Chatham House: 59.
- Evans, A. (2010). *Globalization and Scarcity: Multilateralism for a world with limits*. New York, Center on International Cooperation, New York University: 62.
- Fan, S. and N. Rao (2003). *Public spending in developing countries: trends, determination and impact*. Washington, IFPRI: 42.
- Fan, S. and A. Saurkar (2006). *Public spending in developing countries: trends, determination and impact*. mimeo.
- FAO (2008). *The State of Food and Agriculture 2008. Biofuels: prospects, risks and opportunities*. Rome, FAO.
- FAO (2009). *The State of Agricultural Commodity Markets: High food prices and the food crises - experiences and lessons learned*. Roma, FAO.
- FAO (2010a). *Food Outlook: Global Market Analysis November 2010*. Rome FAO.
- FAO (2010b). *The State of Food and Agriculture 2009: Livestock in the balance*. Rome, FAO.
- FAO (2010c). *State of Food Insecurity in 2010*. Rome, FAO.
- FAO (2011a). FAOSTAT.
- FAO (2011b). *Save and Grow*. Rome, FAO.
- FAO (2011c). *Global Food Monitor*. Roma, FAO, The Global Information and Early Warning System on Food and Agriculture (GIEWS).
- FAO (2011d). *Global food losses and food waste: Extent Causes, and Prevention*, Rome FAO 2011
- FAO (2011e). *FAO's Initiative on Soaring Food Prices. Guide for Policy and Programmatic Actions at Country Level to Address High Food Prices*, Rome, FAO 2011.
- FAO, IFAD, IMF, OECD, UNCTAD, WFP, the World Bank, the WTO, IFPRI and the UN HLTF (2011). *Price Volatility in Food and Agricultural Markets: Policy Responses*. Rome, FAO.
- Frenk, D. (2011). *Excessive Speculation. Excessive Speculation in Agricultural Commodities: Selected Writings from 2008-2011*. B. Lilliston and A. Ranallo. Minneapolis, IATP.
- Foresight (2011). *The Future of Food and Farming*. The Government Office for Science, London
- Galtier, F. (2009). *How to manage food price instability in developing countries?* Montpellier, Cirad/MOISA.
- Gardner, B. L. (1979). *Optimal stockpiling of grain*. Lexington, Mass, Lexington Books.
- Ghosh, J. (2010). "The Unnatural Coupling: Food and Global Finance." *Journal of Agrarian Change* 10(1): 72-86.
- Gilbert, C. (2010). *An assessment of international commodity agreements for commodity price stabilization*. Paris, OECD: 36.
- Gilbert, C. and C. W. Morgan (2010). "Food price volatility." *Philosophical Transactions of the Royal Society* (365): 3023-3034.
- Global Perspective Unit (FAO) and Natural Resources Department (FAO) (2011). *Rising vulnerability in the global food system: environmental pressures and climate change. Safeguarding food security in volatile global markets*. A. Prakash. Roma, FAO: 66-86.
- Hall, K. D., J. Guo, et al. (2009). "The progressive increase of food waste in America and its environmental impact." *PLoS One* 4(11): 1-6.
- Hazel, P., G. Shields, et al. (2005). *The nature and extent of domestic sources of food price instability and risk*. Washington, World Bank: 25.
- Headey, D. (2011a). "Rethinking the global food crisis: The role of trade shocks." *Food Policy* 36: 136-146.
- Headey, D. (2011b). *Was the Global Food Crisis Really a Crisis?* IFPRI, Washington: 66.
- Headey, D. and S. Fan (2010). *Global food crisis: How did it happen? How has it hurt? And how can we prevent the next one?* Washington, IFPRI: 122.
- Heinberg, R. and M. Bomford (2009). *The food and farming transition: toward a post carbon food system*. Sebastopol, CA, Post Carbon Institute: 41.
- Hossain, N. and D. Green (2011). *Living on a Spike: How is the 2011 food price crises affecting poor people?* London, IDS/Oxfam: 47.
- Huchet-Bourdon, M. (2010). *Developments in commodity price volatility*. Paris, OECD: 51.
- IMF (2011). *World Economic Outlook*. Washington, IMF.
- International Energy Agency (2010). *World Energy Outlook 2010*. Paris, IEA: 731.
- IPCC (2007) *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M.Tignor and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

- Ivanic, M. and M. Will (2008). Implications of higher global food prices for poverty in low-income countries. Washington, World Bank.
- Jones, T. (2010). The great hunger lottery: How banking speculation causes food crises. London, World Development Movement.
- Kearney, J. (2010). "Food consumption trends and drivers." *Phil. Trans. R. Soc. B* 365: 2793-2807.
- Kesavan, P. C. and M. S. Swaminathan (2008). "Strategies and models for agricultural sustainability in developing Asian countries." *Phil. Trans. R. Soc. B* 363: 877-891.
- Koning, N., M. Van Ittersum, et al. (2008). "Long-term global availability of food: continued abundance or new scarcity?" *NJAS Wageningen Journal of Life Sciences* 55(3): 229-292.
- Langeveld, J. W. A., J. Dixon, et al. (2010). "Development Perspective of the Biobased Economy: A Review." *Crop Science* 50: 142-151.
- Lucas, C., A. Jones, et al. (2006). *Fuelling a food crisis: The impact of peak oil on food security*. Brussels, The Greens European Free Alliance: 38.
- Lustig, N. (2008). *Thought for Food: The Challenge of Coping with Soaring Food Prices*. Washington, Center for Global Development.
- McIntyre, B., H. Herren, et al. (2009). *Agriculture at the Crossroads: International Assessment of Agricultural Knowledge, Science and Technology for Development*. Washington, Island Press.
- Minot, N. (2010). *Transmission of World Food Changes to African Markets and its Effects on Household Welfare*. Washington, IFPRI.
- Minot, N. (2011). *Transmission of World Food Price Changes to Markets in Sub-Saharan Africa*. Washington, IFPRI: 34.
- Mitchell, D. (2008). *A note on rising food prices*. Washington, World Bank: 20.
- Mousseau, F. (2009). *The High Food Challenge: A Review of Response to Combat Hunger*. Oakland, The Oakland Institute & The UK Hunger Alliance.
- OECD (2005). *Environmentally Harmful Subsidies: Challenges for Reform*. Paris, OECD: 160.
- OECD (2008). *Biofuel Support Policies: An economic assessment*. Paris, OECD: 138.
- OECD (2009). *Agricultural Policies in Emerging Economies: Monitoring and Evaluation*. Paris, OECD.
- OECD (2010). *Measuring Aid to Agriculture*. Paris, OECD: 7.
- OECD (2011). "AgLink Database."
- Ortiz, I., J. Chai, et al. (2011). *Escalating Food Prices: The threat to poor households and policies to safeguard a Recovery for All*. New York, UNICEF: 38
- Passenier, A. and M. Lak (2009). *Scarcity and transition: Research questions for future policy*. The Hague, Ministry of Housing, Spatial Planning and the Environment and Ministry of Foreign Affairs: 74.
- Power, A. G. (2000). "Linking Ecological Sustainability and World Food Needs." *Environ Dev Sustain* 1: 185-196.
- Prakash, A. (2011). *Safeguarding food security in volatile food markets*. Roma, FAO: 554.
- Pretty, J. (2006). *Agroecological approaches to economic development - contributions by Rimisp-Latin American Center for Rural Development to the preparation of the World Development Report 2008 "Agriculture for Development"* <http://www.rimisp.org/getdoc.php?docid = 6440>,
- Pretty, J. (2008). "Agricultural sustainability: concepts, principles and evidence." *Phil. Trans. R. Soc. B* 363: 447-465.
- Rabobank (2010). *Sustainability and security of the global food supply chain*. Utrecht, Rabobank Group: 45.
- Rashid, S., R. Cummings, et al. (2007). "Grain Marketing Parastatals in Asia: Results from Six Case Studies." *World Development* 35(11): 172-1888.
- Rashid, S., and A. S. Taffesse. 2009. *Grain markets and large social transfer: An analysis of grain markets Productive Safety Net Program (PSNP) in Ethiopia*. Selected paper for presentation at the XXVII International Association of Agricultural Economists (IAAE) conference (August 16–22) in Beijing, China
- Regmi, A., M. S. Deepak, et al. (2001). *Cross-Country Analysis of Food Consumption Patterns. Changing Structure of Global Food Consumption and Trade*. A. Regmi. Washington, USDA: 14-23.
- Robles, M., J. Cuesta, et al. (2008). *Rising Food Prices and Poverty in Latin America: Effects of the 2006-2008 Price Surge*. Washington, Inter-American Development Bank.
- Rockström, J., W. Steffen, et al. (2009). "Planetary Boundaries: Exploring the safe operating space for humanity." *Ecology and Society* 14(2).
- Sanders, D., S. Irwin, et al. (2008). *The adequacy of speculation in Agricultural Futures Markets: Too Much of a Good Thing? Urbana-Champaign, Department of Agricultural and Consumer Economics, University of Illinois: 34*

- Schade, C. and D. Pimentel (2010). "Population crash: prospects for famine in the twenty-first century." *Environ Dev Sustain* 12: 245-262.
- Schaffnit-Chatterjee, C. (2009). *The Global Food Equation: Food security in an environment of increasing scarcity*. Frankfurt am Main, Deutsche Bank Research: 38.
- Sharma, R. (2011). *Food Export Restrictions: Review of the 2007 - 2010 Experience and Considerations for Disciplining Restrictive Measures*. Rome, FAO.
- Slayton, T. (2009). *Rice crisis: How Asian governments carelessly set the world rice market on fire*. Washington, Center for Global Development: 41.
- Standing Committee on Agricultural Research (2011). *The 3rd SCAR Foresight Exercise: Sustainable food consumption and production in a resource-constrained world*. Brussels, European Commission: 149.
- Sutton, M., C. Howard, et al., Eds. (2011). *The European Nitrogen Assessment: Sources, Effects and Policy Perspectives*. Cambridge, Cambridge University Press.
- Swaminathan, M. S. (2010). *From Green to Evergreen Revolution: Indian Agriculture, Performances and Challenges*. New Delhi, Academic Foundation.
- Tangerman, S. (2011). *Policy Solutions to Agricultural Market Volatility: A Synthesis*. Genève, ICTSD: 65.
- Timmer, C. P. (1990). *The Agricultural Transformation. The Handbook of Development Economics*. H. B. Chenery and T. N. Srinivasan. Amsterdam, North Holland, Elsevier.
- Timmer, C. P. (2010). "Reflections on food crises past." *Food Policy* 35: 1-11.
- UNCTAD (2006). *The Emerging Biofuels Market: Regulatory, Trade and Development Implications*. Genève, UNCTAD: 52
- UNCTAD (2009). *Trade and development report 2009*. Geneva, UNCTAD: 218.
- UNEP-UNCTAD (2008). *Organic Agriculture and Food Security in Africa*. New York and Geneva, UNEP-UNCTAD: 61.
- USDA (2011). *Production, Supply and Distribution Online*. <http://www.fas.usda.gov/psdonline>.
- Valsecchi, C., P. ten Brink, et al. (2007). *Reforming Environmentally Harmful Subsidies*. London, IEEP, Ecologic, FEEM and IVM: 224.
- von Cramon-Taubadel, S., G. Anriquez, et al. (2009). *Investment in developing countries' food and agriculture: Assessing agricultural capital stocks and their impact on productivity*. Rome, FAO: 29.
- Wodon, Q. and H. Zaman (2008). *Rising Food Prices in Sub-Saharan Africa: Poverty Impact and Policy Responses*. Washington, World Bank: 28.
- Woods, J., A. Williams, et al. (2010). "Energy and the food system." *Phil. Trans. R. Soc. B* 365: 2991-3006.
- World Bank (2007). *Explaining sources of food price inflation in Ethiopia: A "Just-in-time" Policy Note*. Mimeo.
- World Bank (2007). *World Development Report 2008: Agriculture for Development*. Washington, World Bank.
- World Bank (2009). *Global Economic Prospects 2009: Commodities at the Crossroads*. Washington, World Bank: 140.
- World Bank (2011). *Commodity prices (Pink Sheet)*, <http://go.worldbank.org/4ROCCIEQ50I>
- WRAP, W. R. A. P. (2009). *Household Food and Drink Waste in the UK*, [[http://www.wrap.org.uk/retail/case\\_studies\\_research/report\\_household.html](http://www.wrap.org.uk/retail/case_studies_research/report_household.html)].
- Wright, Brian (2011). *The economics of grain price volatility*, *Applied Economic Perspectives and Policy* 2011, volume 33, number 1, pp. 32–58.
- Wright, Brian and Jeffrey C. Williams (1982) *The Economic Role of Commodity Storage* *The Economic Journal*, Vol. 92, No. 367 (Sep., 1982), pp. 596-614
- Yang, J., H. Qiu, et al. (2008). "Fighting global food price rises in the developing world: the response of China and its effect on domestic and world markets." *Agricultural Economics* 39: 453-464.



## APPENDICES

### **A1: Two examples illustrating the importance of national institutional capacity in the implementation of food security policy**

Two country examples can further illustrate this point. The first example comes from India, where, like in other Asian countries, safety net programmes evolved out of government's agricultural price policies that involved procurement-stocking-distribution. Social safety net programmes, such as the Public Distribution System (PDS) and Employment Guarantee Scheme, served as the outlets of the stocks that the government procured under its price support programme. Implementing these programmes required building enormous institutional and human capacity that included a food logistic agency with warehousing infrastructure throughout the country, a dedicated ministry, and almost half a million ration shops. Yet, efficiency of the country's safety net programmes has been questioned on the grounds of leakage and high costs of transferring benefits to the poor consumers. It costs about \$7 to transfer \$1 worth of benefits to the beneficiaries of the Indian PDS and allegedly 20–30 percent of the food intended for the social protection programme beneficiaries are leaked to the market.

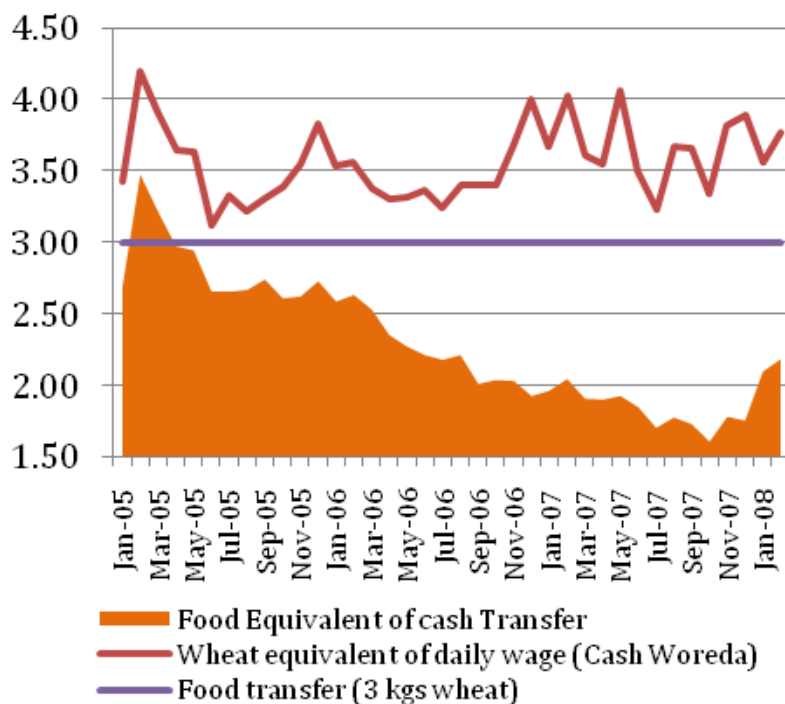
The second example comes from Ethiopia, where the government launched one of the largest programmes of its kind in Africa, called the Productive Safety Nets Program (PSNP), in 2005. It was a bold move on the part of the government, especially because it involved both cash and food transfer to the beneficiaries. Beneficiaries in remote areas received food transfer (3 kg of wheat) and the beneficiaries in the less remote areas received the cash equivalent (6 Ethiopian Birr (ETB)). When the programme started, benefits for food and cash recipients were equivalent. However, the country experienced very high inflation in the following years, with food inflation reaching about 100 percent in 2008. This meant cash recipients could buy only half of what they could buy in 2005 with their ETB 6.0, causing severe erosion of benefits to the households receiving cash transfers.

This is illustrated in Figure 10, where black horizontal lines represent the value of food (3 kg of wheat) and the red shaded area shows the value of cash in terms of how much household can buy with ETB 6.0. If the price of wheat is ETB 2.0 per kilogram, benefits should have been equivalent (ETB 6.0 can buy 3 kg wheat) to both types of beneficiaries.

Therefore an adjustment was immediately needed to the benefits for both types of beneficiaries. However, the government did not adjust the cash transfer rates for about two years because of fears that it would further fuel inflation and that it would be difficult if they revised it downward afterwards.

Safety net programmes in these two countries evolved over decades; and perhaps these countries have the best institutional capacity to implement safety net programmes in their respective continents. In other countries, institutional capacity to implement safety net programmes may be either weak or non-existent. A recent IFPRI study on the operational performance of SGRs in Africa reports that a critical determinant of operational efficiency is whether SGRs are well integrated with the social protection and emergency programmes. In the absence of such linkages, cost of holding stocks (both direct financial costs and indirect negative impacts on markets) becomes exorbitantly high. Another key finding of the report is that links between SGRs and essential safety net programmes – school meals/feeding or food for education – are practically non-existent in some countries. Consider the following specific findings from four countries: Ethiopia, Kenya, Malawi, and Mali.

**Figure 10: Challenges of productive safety nets programs in Ethiopia**



Source: Rashid and Taffesse (2009). Y-axis shows the wheat equivalent of daily wage (kgs).

In Malawi, scaling up the school mealsfeeding programme is under serious discussion, while in Mali and Ethiopia, the size of school meal programmes are 4000 tons and 6500 tons, respectively. Given the size of total school enrolment, these numbers are minuscule. According to the estimates of that study, in order to feed the children who go to school hungry, total additional demand will be 450,000 tons in Ethiopia, 108,000 tons in Kenya, 152,000 tons in Malawi, and about 90,000 tons in Mali. These numbers suggest that there is a large latent demand for school meal programmes that can only improve human capital in the future.

## **A2: National responses to the 2007–2008 price spike**

Mousseau (2009) and Demeke *et al.* (2009) reviewed the different measures initiated by developing countries to contain food price volatility. These measures can be classified by the objectives sought by the implementing country. The first sets of interventions tried to prevent increases in domestic prices by limiting the transmission of the changes in international food prices to national markets. The second set supported the poor's access to food, while the third set supported short-term agricultural supply response.

### **Interventions to prevent increases in domestic food prices**

These sets comprised trade/fiscal measures, management/release of public stocks, and price control/anti-speculation measures:

- ***Trade and fiscal measures***

These measures were widely adopted by developing countries. Of the 81 countries covered by FAO's census of measures adopted by developing countries, 76 countries adopted import-tariff-reduction measures to reduce domestic food price inflation in mid-2008. Twenty-two other countries reduced the value-added tax on imported food commodities. About 25 countries or 31 percent of the countries surveyed banned or restricted cereals exports during the first half of 2008. Import tax reductions were less effective in containing domestic food price inflation as these taxes were already low because of structural adjustment programmes that had slashed tariffs in developing countries. These measures were not only ineffective in containing food price spikes, but their budgetary costs were very high and unsustainable in many low-income countries.

Export bans and restrictions were found to be effective in containing consumers' food price inflation, although the practice created panic buying among importing countries and amplified price volatility, especially for rice. Mousseau (2009) reports from his review of the literature that the main determinant of the difference in the price transmission from world to domestic markets in Asian countries was the governments' measures to limit exports in order to keep enough supplies in the domestic markets. Food prices also decreased in Tanzania in 2008 because of a good harvest, imports, and export bans, in contrast to neighbouring Kenya, where prices soared.

- ***Management/release of public stocks***

Countries with appropriate stock levels and well-defined rules of release were better able to stabilize their domestic food prices. These are countries that tend to have well developed food security strategies. Many Asian countries such as India, Indonesia, and Pakistan have been very successful in containing domestic food price inflation through the management and release of public stocks. The management and release of public stocks was implemented by 35 countries according to the FAO survey. This figure represents 43 percent of the total of countries surveyed. The release of public stocks took three forms: subsidized sales, food assistance programmes, and replenishment of community food security stocks, as in Mali. Depending on the size of the stocks and the speed of release into the domestic markets to limit hoarding by farmers, traders and consumers, public stocks are powerful tools to contain food price volatility, especially for landlocked countries, although the fiscal cost can be very high. Public stocks and community-level food security stocks have been the main mechanism to contain food price volatility in Mali since the food crisis of 2004–05, specifically the high seasonality of food prices. The mechanism has helped Mali manage the 2007–2008 food price shocks without experiencing any urban riots like those experienced in the neighbouring countries of Senegal, Ivory Coast, and Burkina Faso. Dorosh (2009) also found that public stocks have helped countries in South Asia to prevent a "very large price increase". Indeed, India, Pakistan, and Bangladesh relied on existing public stocks to manage the food crisis and limit its negative impact on food security of their citizens.

- ***Price control/anti-hoarding measures***

Some countries have tried to control food prices through the implementation of anti-hoarding regulation. Other countries tried to negotiate with the private sector over the evolution of food prices.

These negotiations were usually conducted with the big private exporters and importers either to limit exports or assure adequate supplies at prices accessible to the majority of consumers. This was the case in Mali, Senegal, Burkina Faso and Niger during the 2007–08 crisis. Experience of countries in West Africa indicates that this type of intervention failed to contain food price inflation. Indeed, in an environment characterized by rapidly rising food prices, it had been difficult for importers to respect the prices agreed upon with government.

## **Interventions to support the poor's access to food**

These measures include responses from both governments and international organizations.

The interventions of governments and international organizations focused mostly on social safety net programmes. Existing programmes were scaled up in many countries, while new ones were implemented. For example, funding for safety net programmes in Bangladesh increased from \$688 million to \$854 million with \$300 million used to start a cash-for-work programme (Monceau 2010). The majority of these programmes involved either cash or food transfer mechanisms and included school meal interventions. Other programmes focused on nutrition, targeting mainly children and pregnant and lactating women.

The most successful cash and food transfer interventions are found in Brazil, Mexico and some Asian countries. Many donors prefer cash transfer to food transfer programmes because the former save on public sector costs of food distribution and do not create distortions in domestic food markets. However, unless the programme is indexed to food price inflation, the amount of the cash given to any household will buy less and less food as the price level continues to rise. Therefore, cash transfer programmes are less effective when prices are rising rapidly, as was the case in 2008 in many developing countries, and they may be subject to mismanagement.

Cash transfers should not be seen as a substitute for other forms of government interventions. In a situation of tight food supply, increased purchasing power arising from cash transfers needs to be accompanied by release from public stocks or commercial imports to add to domestic availability to contain the pressure on prices that will result from the added demand. In the absence of increased supply, injecting increased purchasing power into the system will mainly feed food price inflation. Therefore, the optimum intervention should combine price stabilization measures such as release from public stocks or facilitation of increased imports to augment food availability with cash transfers and rationing eventually to increase the poor's access to food (Dorosh 2009).

## **Interventions to boost domestic food supply in the short run**

Before the food crisis, most developing countries moved away from policies based on national food self-sufficiency to food security policies that advocate a combination of national production and trade, particularly regional trade that takes account of the complementarities of resources within subregions. The recent world food price shocks, characterized by trade bans and restrictions, has raised the risks of a trade-based approach to national food security, and many developing countries are re-orienting their food security strategies towards greater national self-sufficiency in basic staples (Staatz *et al.*, 2008).

A striking example of the policy initiatives launched during the 2007/08 crisis is Senegal's 'Grand Agricultural Offensive for Food and Abundance' (GOANA), aimed at moving the country from 20 percent rice self-sufficiency in 2007/08 to 100 percent self-sufficiency by 2015. Like Senegal, the Philippines also declared self-sufficiency in rice as a medium-term policy objective. Staatz *et al.* (2009) argue that these strategies of self-sufficiency have the merit of focusing attention on the agricultural sector and may lead to higher levels of productive investment in agriculture. However, they note that the risk of resource misallocation is very high with such policies, as they ignore the gains from both regional and international trade arising from comparative advantage.

Countries have used a large set of interventions to increase food production in the short to medium term with the objective of reducing dependency on high-cost and uncertain imports from the world markets brought about by the recent world food price shocks. According to Mousseau (2009), the main instruments used to boost agricultural supply during the crisis were:

- Subsidies and distribution of agricultural inputs (fertilizers, seeds etc.);
- Tax reductions, vouchers, and subsidies on fuel for irrigation pumps;
- Guaranteed minimum farm-level prices, along with government procurement;
- Expansion of extension services;
- Support for credit, insurance, and cancellation of farmers' debts;
- Support for irrigation and storage infrastructure;
- Support for value chain management and market information.

The most widely used instrument across the developing world is the provision of subsidized inputs, mainly seeds and fertilizers. For example, Mousseau (2009) reports that FAO supplied agricultural inputs to 370,000 smallholders in some 80 countries, while the World Bank used its Global Food Crisis Response Program (GFRP) to assist 20 countries to supply their farmers with agricultural inputs.

Other implemented measures were support to irrigation investment and extension services, and the cancellation of smallholders' debts of \$15 billion in 2008 by the Indian government. Price supports to farmers were more common in Asia than in other parts of the world, along with subsidized irrigation for marginal and poor smallholders. In West Africa, the set of policy measures focused mainly on subsidized fertilizer and seeds for rice and maize, extension services, improved access to credit, and subsidized farm and processing equipment in some countries.

It is difficult to evaluate the effectiveness of individual interventions because countries implemented packages of measures instead of individual measures. Nonetheless, the supply responses have been positive in many countries (Dialo *et al.*, 2009), and most countries continue to implement some of these measures. Although the effectiveness of these measures is not questioned, it is their fiscal sustainability arising from the strong focus on subsidies that poses a serious problem. Another issue is whether the subsidies lead farmers to adopt new technologies that reduce economic (not just the financial) unit costs of production or simply expand production at higher marginal cost along the existing supply curves without changing technologies? Even if the subsidies lead farmers to adopt cost-reducing technologies by reducing the risk of trying out these technologies, can the governments phase out the subsidies over time? Answers to these questions are crucial for the design of fiscally sustainable input subsidies strategies.



### A3: Comparative table of recommendations made in recent Price volatility reports

ISSUE	HLPE Report (2011)	Interagency Report for the G20 (2011)	ICTSD Report – Tangermann (2011)	Foresight Report (2011)
<p><b>General consideration on policy responses</b></p>	<ul style="list-style-type: none"> <li>- This report looks at explanations for both higher food prices and higher levels of food price volatility, two phenomena that are closely linked. There is reason for governments to be concerned, and reason to act.</li> <li>- The full magnitude of the changes in play must be understood to ensure that public policy responses do not stop with the short-term, but look ahead to a long-term vision for building and maintaining resilient and inclusive food systems.</li> <li>- The report recommends possible roles of the CFS, its members and participants for all the issues below.</li> </ul>	<ul style="list-style-type: none"> <li>- The international organisations that have prepared this report are asked to continue collaboration with the G20 to further elaborate the recommendations and, as appropriate, to implement them.</li> <li>- The CFS should be charged with the broad task of monitoring the implementation of the recommendations of this report.</li> </ul>	<ul style="list-style-type: none"> <li>- There is no effective way of doing much about price behavior on world markets for agricultural commodities (no recipe against that malady)</li> <li>- Governments should agree on the futility of fighting the phenomenon of agricultural price volatility, and on the need to deal with the negative impacts of extreme price spikes.</li> </ul>	
<p><b>Innovation (R+D, education, technology transfer)</b></p>	<ul style="list-style-type: none"> <li>- New public investments are necessary in both research and development.</li> <li>- A significant global expansion in funding for agricultural research and development is recommended. Strengthening the current reform process of the CGIAR and support for national research systems will contribute to long-term solutions to food insecurity, especially in the context of land degradation, water scarcity and climate change.</li> <li>-The creation of new varieties should be promoted by international and national agronomic research centers, as should research aimed at maximizing biomass on diversified agricultural production systems.</li> <li>- Collaboration between international agronomic research centers and agro-ecology supporting organizations should be encouraged.</li> </ul>	<ul style="list-style-type: none"> <li>- Improve food and agriculture innovation systems, encompassing public and private investments in scientific research and development, technology transfer, and education, training and advisory services and ensure that successful practices are scaled up.</li> <li>- Strengthen the CGIAR system to support technological innovation and global dissemination of technology, in particular to improve productivity performance in less developed countries taking into account the needs of smallholder and especially women farmers.</li> <li>- Support the development of technologies and provide the appropriate incentives to address challenges specific to climate change and sustainable resource use (land and water).</li> </ul>		

ISSUE	HLPE Report (2011)	Interagency Report for the G20 (2011)	ICTSD Report – Tangermann (2011)	Foresight Report (2011)
<b>National Food Security Strategies</b>	<p>-Governments should consider establishing Food Security Strategy Programs (FSSP), at the national and regional level, that includes policies to reduce, manage and cope with price volatility.</p> <p>- Success will require an inclusive process</p> <p>- The CFS should encourage and support the establishment or review of existing national food security strategies in each member country. This should include human and institutional capacity to develop, implement and monitor food security.</p> <p>There should be an inter-sectoral national coordination structure, including civil society representatives and farmers' organizations representatives, to coordinate implementation of the national strategies.</p> <p>- The vast array of instruments (such as those identified in this paper including social protection) should be combined to achieve the maximum impact and to fit the food security strategy of each particular country.</p> <p>It is recommended that a typology of countries and vulnerable groups may help policy makers in selecting the most appropriate policy instruments. This should include consideration for the various stages of the human life-cycle.</p>	<p>-Support comprehensive national food security strategies that are country-owned and led, evidence-based and inclusive of civil society and farmer organizations. In this respect, follow up on previous G 20 commitments, such as the Pittsburgh summit commitment, to fund the Global Agriculture and Food Security Program</p>		
<b>Investment</b>	<p>- Stable and sustainable long-term investment in agriculture is a necessary condition for addressing the challenges in food security and to avoid a repetition of the food crisis.</p>	<p>- Increase public (ODA and national governments) investment in developing country agriculture, and in activities strongly linked to agricultural productivity growth, such as agricultural institutions, extension services, roads, ports, power, storage, irrigation systems and information and communication technology, where appropriate. link public</p>		



ISSUE	HLPE Report (2011)	Interagency Report for the G20 (2011)	ICTSD Report – Tangermann (2011)	Foresight Report (2011)
<b>Investment (cont'd)</b>	<ul style="list-style-type: none"> <li>- With investments in ecological agriculture national governments should reinforce local capacity and the resilience of the food production system.</li> <li>- Investment at all levels should respect the plurality of knowledge systems, including women's knowledge and the knowledge of indigenous peoples</li> </ul>	<p>investment to the provision of sustainable public-private-civil society partnerships</p> <ul style="list-style-type: none"> <li>- Provide the enabling environment for farmers and other private sector actors to scale up investments, above and beyond ODA and national government spending, to achieve the increased productivity and enhanced resilience on which long term food security will depend. To elicit the needed level of private sector investment, less developed countries in particular will need to support introduction of effective governance systems and institutions, stable macroeconomic conditions, sound structural policies, human capital development and public services.</li> </ul>		
<b>Information on Agricultural markets</b>	<ul style="list-style-type: none"> <li>- The recent food crisis shows there are an opportunity and a need to reduce the occurrence and severity of food crises by better management of information, learning and coordination of policy intervention at the world level. The CFS could play a major role in the three domains.</li> <li>- Better and transparent information systems are essential for policy decisions and management of stocks.</li> <li>- The AMIS system proposed by the Inter-agency Report for the G20 is welcomed</li> <li>- It is recommended that the AMIS market information be extended to include food crops other than the usual global cereals, including livestock and fish.</li> <li>- The CFS could play a role in the establishment of the Agriculture Market Information System (AMIS) proposed by the G20</li> </ul>	<ul style="list-style-type: none"> <li>-Create the Agricultural Market Information System AMIS to provide timely information on food production, consumption, and stocks; monitoring, reporting and analyzing of current conditions and policy developments in major markets; encouraging information sharing, improving data reliability and increasing transparency, and introducing a global early warning system; improvement of national or regional systems to monitor stocks, production, forecasts (with improved modeling and weather forecasting), food and nutrition security and vulnerability, in order to enhance Early Warning Systems in vulnerable developing countries and regions</li> </ul>	<ul style="list-style-type: none"> <li>- There should be optimal information and full transparency on market developments to allow for rational responses at all levels (for example to be able to distinguish a price explosion from a fundamental change in market conditions)</li> </ul>	<p>Improve measurement on private and public stocks, and provide and promulgate better information. (role for the FAO and OECD + EC and/or other international bodies)</p>

ISSUE	HLPE Report (2011)	Interagency Report for the G20 (2011)	ICTSD Report – Tangermann (2011)	Foresight Report (2011)
<b>Information on food security</b>	<ul style="list-style-type: none"> <li>- AMIS should also include reliable, disaggregated and accurate information on hunger to support the achievement of food security.</li> <li>- Governments need information systems to be able to assess hunger and malnutrition (akin to poverty assessments) and to provide early warning of any disruptions (including of regarding price transmission from international markets and causes of domestic price volatility). They also need the capacity to conduct the necessary policy design and to implement the policies with donor participation</li> <li>- The CFS could guide and oversee the development of a framework to collect and store information as well as provide analysis and develop early warning systems that monitor threats to food security, including from price volatility</li> </ul>	<ul style="list-style-type: none"> <li>- Improvement of national or regional systems to monitor food and nutrition security and vulnerability (as part of AMIS, see above)</li> </ul>		
<b>Rapid Response</b>	<p>The report highlights the possible role of the CFS in the coordination of policy intervention</p> <ul style="list-style-type: none"> <li>- The CFS could play a role in the Rapid Response Forum (RRF) proposed by the G20</li> </ul>	<ul style="list-style-type: none"> <li>- Establishment of a Rapid Response Forum building on the proposed AMIS to promote policy coherence and coordination in times of crisis</li> </ul>		
<b>Future Markets</b>	<ul style="list-style-type: none"> <li>- Action regarding transparency in futures markets and tighter regulation of speculation is necessary.</li> <li>- Increasing transparency, by requiring exchange trading and clearing of most agricultural commodity contracts, and setting lower limits for non-commercial actors could be the first set of measures taken by the countries that house major commodity exchanges</li> </ul>	<ul style="list-style-type: none"> <li>- Need to improve information and transparency in futures and over-the-counter markets and encourage appropriate rules to enhance their economic functions paying attention to the need for harmonization across exchanges in order to avoid regulatory arbitrage.</li> <li>- Proposed changes should be considered in light of the on-going review of regulatory oversight of all financial markets and not solely agricultural commodity markets, in particular by G20 Finance Ministers and Central Bank Governors.</li> </ul>	<ul style="list-style-type: none"> <li>- Better regulation of futures markets is desirable but would not do away with market volatility</li> </ul>	<ul style="list-style-type: none"> <li>- no firm evidence for or against measures of limitation of speculative positions in markets</li> <li>- explore options for the development of, and access to, futures and options markets.</li> </ul>

ISSUE	HLPE Report (2011)	Interagency Report for the G20 (2011)	ICTSD Report – Tangermann (2011)	Foresight Report (2011)
<b>Future Markets (cont'd)</b>		<ul style="list-style-type: none"> <li>- Supports the efforts made by the United States, the European Commission and others in addressing transparency and efficiency issues in futures markets.</li> </ul>		
<b>Trade and markets</b>	<ul style="list-style-type: none"> <li>- Governments should continue to focus on building a transparent, accountable and rules-based multilateral trading system. However, these rules need to give a larger place to public policy concerns regarding food security, better account for the heterogeneity of World Trade Organization (WTO) member states and taking into account special needs of poor and vulnerable countries or social groups.</li> <li>- Measures to consider include disciplines on export restrictions, safeguarding measures to protect against import surges, measures to better ensure that commercial actors respect contractual obligations, and exemptions for genuine responses to food emergencies (food aid practices continue to require further reforms as well).</li> <li>- Distinct rules for low-income food-deficit countries (LIFDCs) should be explored.</li> </ul>	<ul style="list-style-type: none"> <li>- G20 governments demonstrate leadership in on-going WTO DDA negotiations, moving immediately to strengthen international disciplines on all forms of import and export restrictions, as well as domestic support schemes, that distort production incentives, discourage supply in response to market demand, and constrain international trade of food and agriculture products. Specifically, <ul style="list-style-type: none"> <li>- Substantially improve market access, while maintaining appropriate safeguards for developing countries, especially the most vulnerable ones;</li> <li>- Substantially reduce trade distorting domestic support, especially by developed countries; and,</li> <li>- Eliminate export subsidies.</li> </ul> </li> <li>Taking existing WTO rules into account and the state of play in the DDA negotiations G20 governments should: <ul style="list-style-type: none"> <li>- Widen, strengthen and enforce consultation and notification processes currently in place at the WTO. The intention to impose an export restriction would have to be notified in advance of the action being applied and a “fast track” consultation process could be put in place to discuss whether the measure can be avoided and how. Consultation should be on-going and regular with a view to ensuring that the measure, once in place, is removed at the earliest possible moment.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- No justification can be provided for market interventions in developed countries</li> <li>- In developing countries, governments should try and avoid market interventions domestically and in intl trade (costly, not targeted, cause trouble on intl markets)</li> </ul>	<ul style="list-style-type: none"> <li>- Adoption of more market-oriented agricultural policies in individual countries</li> <li>- Further liberalization of agricultural trade</li> <li>- Rectify current unbalanced WTO rules (addressing export taxes and quantitative restrictions).</li> <li>- Improve regulation of land, labor and capital markets</li> </ul>

ISSUE	HLPE Report (2011)	Interagency Report for the G20 (2011)	ICTSD Report – Tangermann (2011)	Foresight Report (2011)
<b>Export restrictions under food crisis</b>	<ul style="list-style-type: none"> <li>- Measures to be considered include disciplines on export restrictions.</li> <li>- Calls for the establishment of stricter rules on export restrictions: notify intent in advance, make measures time-limited.</li> </ul>	<ul style="list-style-type: none"> <li>- Develop an operational definition of a critical food shortage situation that might justify consideration of an export restricting measure. An export ban would be defined as a time-limited measure of last resort, allowed only when other measures, including triggering domestic safety net measures for the poorest, have been exhausted, and taking into account, in particular, the food security needs of least developed countries and net food importing developing countries.</li> <li>- G20 governments strengthen the commitments made at the L'Aquila and Rome Summits, calling on all nations to allow purchases of humanitarian food, especially by WFP, to be exempted from food export restrictions and/or extraordinary taxes, so that humanitarian food can be purchased, exported and/or transited regardless of any prohibitions, restrictions or extraordinary taxes imposed; and resolve to bring this commitment and call to the UN General Assembly and to the WTO.</li> </ul>	<ul style="list-style-type: none"> <li>- International grain clearing agreement (IGCA) to protect importing countries when export restrictions are imposed</li> <li>- Protection of domestic markets aggravates volatility in international markets</li> <li>- Negotiate more effective disciplines in the WTO on export taxes restrictions and bans.</li> </ul>	<ul style="list-style-type: none"> <li>- Rectify current unbalanced WTO rules (addressing export taxes and quantitative restrictions).</li> </ul>
<b>Biofuels</b>	<ul style="list-style-type: none"> <li>- Given the major roles played by biofuels in diverting food to energy use, the CFS should demand of governments the abolition of targets on biofuels and the removal of subsidies and tariffs on biofuel production and processing.</li> </ul>	<ul style="list-style-type: none"> <li>- G20 governments remove provisions of current national policies that subsidize (or mandate) biofuels production or consumption. At the same time, governments should:</li> <li>- Open international markets so that renewable fuels and feed stocks can be produced where it is economically, environmentally and socially feasible to do so, and traded more freely.</li> <li>- Accelerate scientific research on alternative paths to reduced carbon emissions and to improved sustainability and energy security.</li> <li>- Encourage more efficient energy use, including in agriculture itself, without</li> </ul>	<ul style="list-style-type: none"> <li>- Option arrangements to divert use of agricultural products from biofuel feedstock in global food crisis.</li> </ul>	<ul style="list-style-type: none"> <li>- Flexible mandates for biofuels could act as stabilizer</li> </ul>

ISSUE	HLPE Report (2011)	Interagency Report for the G20 (2011)	ICTSD Report – Tangermann (2011)	Foresight Report (2011)
<b>Biofuels (cont'd)</b>		drawing on finite resources, including those needed for food production. - Failing a removal of support, G20 governments should develop contingency plans to adjust (at least temporarily) policies that stimulate biofuel production or consumption (in particular mandatory obligations) when global markets are under pressure and food supplies are endangered.		
<b>Social protection and assistance</b>	<ul style="list-style-type: none"> <li>- Policies and instruments to cope with price volatility should be in place before shocks happen with clear rules of engagement.</li> <li>- The poorest of the poor with no prospects of overcoming poverty in the future will have to be supported for their survival through free transfers. This is a collective responsibility.</li> <li>- Poor households that include economically active adults and young children can participate in conditional transfer programs (productive safety nets, conditional cash transfers, etc).</li> <li>- Social protection programmes should factor in the capacity to accommodate vulnerable non-poor populations in times of crisis, to limit the likelihood of price shocks deepening and widening the incidence of poverty.</li> </ul>	<ul style="list-style-type: none"> <li>- A code of conduct be developed by International Organizations to ensure the free flow of humanitarian food supplies, to enhance responsibility and transparency, strengthen the global food security architecture and avoid negative effects on the market.</li> <li>-G20 governments put in place sustained support for the efforts of humanitarian agencies to assist countries facing crises by ensuring that they have predictable and reliable access to the financing needed, (for example for advance purchasing facilities).</li> <li>- G-20 governments support continued provision of efficient, well functioning international mechanisms to assist low income developing countries during food price crises including provision of adequate contingent financing from the international financial institutions.</li> <li>- G-20 governments support the development of appropriate, targeted and cost effective national safety nets that can be stepped up when needed, ensuring that they are adequately resourced, contribute to the improvement of nutrition, and link, when appropriate, to the proposed regional emergency food reserves and distribution systems.</li> </ul>	<ul style="list-style-type: none"> <li>- Establishment of a food import financing facility</li> <li>- Developing countries should establish social safety nets programs and contingency plans in how to operate those in time of crisis</li> <li>- Creation of a fund for safety nets programs when they run out of money</li> </ul>	<ul style="list-style-type: none"> <li>- Establishing an emergency food reserve and financing facility for the WFP to help low-income countries facing sudden increases in food import bills when price spikes occur</li> <li>- Develop social safety nets (poor people in low-income countries. Particular urban poor, who cannot grow their own food)</li> <li>- WFP to or major NGOs with public support, to continue to provide the safety net of emergency food resources where countries are unwilling or unable to provide safety nets relating to food</li> </ul>

ISSUE	HLPE Report (2011)	Interagency Report for the G20 (2011)	ICTSD Report – Tangermann (2011)	Foresight Report (2011)
<b>Stocks</b>	<ul style="list-style-type: none"> <li>- The current context is different to the past. Therefore, it is recommended that the CFS continues to explore forms of international cooperation regarding world food stocks and food security including the establishment of guidelines for the efficient management of such stocks.</li> <li>- Better and transparent information systems are essential for policy decisions and management of stocks. The AMIS system proposed by the Inter-agency Report for the G20 is welcomed.</li> </ul>	<ul style="list-style-type: none"> <li>- Recognizing the primary responsibility of countries themselves, G20 governments provide support where there is need to increase capacity to implement food emergency reserve systems</li> <li>- G20 governments support the World Food Programme in the development of a cost-effective system of small, strategically positioned emergency food reserves by the end of 2011.</li> </ul>	<ul style="list-style-type: none"> <li>- Buffer stocks and virtual reserves do not work because it is impossible to identify the appropriate price triggers.</li> <li>- Physical preparedness has a role to play, but a small one considering the cost of reserves: 3 categories of reserves would make sense - national emergency reserves in importing countries; decentralized international emergency reserves administered by an intl. org; back up the IGCA with grain reserves to cover a deficiency of an exporting country.</li> </ul>	<ul style="list-style-type: none"> <li>- Publicly-held stocks for intervention is fraught with problems, but there may be some role, however, for higher public stockholdings at the national or regional level.</li> <li>- Virtual reserves pose a lot of problems</li> </ul>
<b>Risk Management</b>	<ul style="list-style-type: none"> <li>- Two categories of policies and programs can be contemplated at the national level to solve the volatility problem in relation to food security. The first aims at stabilizing prices. The second aims at reducing the impact of price volatility on incomes and purchasing power. The policy and program instruments can be divided into three groups : market-based instruments, direct state interventions, and interventions through civil society organizations.</li> <li>- Countries should consider which combination of measures is best suited to their particular circumstances.</li> <li>- Market-based instruments, such as insurance and credit, may require public expenditures either as investments or as subsidies.</li> </ul>	<ul style="list-style-type: none"> <li>- G-20 governments support the scale up of efforts to provide vulnerable households (including producers), communities and governments with effective, market-based risk management options.</li> <li>- G-20 governments support the scale up of a broader set of fiscal risk management services which include facilitation of commodity hedging, advisory services to strengthen in-country financial risk management capacity, disaster risk financing, and modernization of meteorological services.</li> </ul>	<ul style="list-style-type: none"> <li>- Governments should establish an institutional and legal framework plus physical infrastructure to allow private market participants to manage risks (but governments should stay away from compensating the implications of normal price volatility)</li> <li>- The intl. donor community can help preparedness and assistance in crisis times: in supporting the establishment of institutions and infrastructures to manage market risk.</li> <li>- When the banking system exhibits bottlenecks, measures to facilitate farmer’s access to credit can help.</li> <li>- In developed countries, tax provisions (smooth reported income across years) to assist farmers</li> </ul>	<ul style="list-style-type: none"> <li>- Avoid publicly provided crop insurance</li> <li>- Need for more product-related and institutional innovation in this area, and for a stronger public sector role – both national governments and multinational agencies – in helping to launch new programmes, develop infrastructure and establish appropriate delivery mechanisms</li> <li>- Improve awareness of the options available for better risk management,</li> </ul>
<b>Incorporating externalities associated with food production</b>	<ul style="list-style-type: none"> <li>- High food prices are an opportunity to promote internalization of externalities to create incentives for improving the efficiencies of production systems</li> <li>- It is recommended that this issue should be considered in food security debates. Further research is needed to identify and test such incentives.</li> </ul>			

ISSUE	HLPE Report (2011)	Interagency Report for the G20 (2011)	ICTSD Report – Tangermann (2011)	Foresight Report (2011)
<b>Curbing food demand in developed countries</b>	<ul style="list-style-type: none"> <li>- Governments should explore incentives for the reduction of waste in the food system including addressing post harvest losses.</li> </ul>			
<b>Policy Coordination</b>	<ul style="list-style-type: none"> <li>- The CFS should ensure that the information on food security is appropriately managed as well as the coordination of policy interventions at the global level.</li> <li>- The CFS should coordinate short and long term policy measures taken in relation to price spikes (considering trade barriers, food aid, input subsidies, stocks, etc...).</li> <li>- It should also serve as a body where donors and governments make long term commitments to public investments in food security and a body where those commitments are monitored and enforced.</li> <li>- The CFS should contribute to better inter-governmental coordination, including emergency policy measures taken in relation to price volatility.</li> <li>- CFS, as the highest governance body on world food security should stimulate and facilitate debate and learning on food security issues, including as a forum for more open debate on how agricultural trade rules could support food security.</li> <li>- The CFS should establish codes of conduct on food security issues for better international cooperation.</li> <li>- More studies are required on global governance on agriculture and food security, to inform the Global Strategic Framework on Food Security and Nutrition.</li> </ul>	<ul style="list-style-type: none"> <li>- The G-20 should support the proposals made throughout this report to strengthen policy coordination in relation to food price volatility, building on and strengthening existing institutions and networks, improving coordination and timeliness in order to improve readiness, and promoting policy coherence and coordination in times of crisis.</li> <li>- The CFS should be charged with the broad task of monitoring the implementation of the recommendations of this report</li> </ul>	<ul style="list-style-type: none"> <li>- All national and international measures shall be well coordinated into an integrated consistent comprehensive response.</li> <li>- Do not create new institutions to implement the multilateral response.</li> </ul>	





# Price volatility and food security

A report by

The High Level Panel of Experts

on Food Security and Nutrition

July 2011



Secretariat HLPE c/o FAO  
Viale delle Terme di Caracalla  
00153 Rome, Italy

Website: [www.fao.org/cfs/cfs-hlpe](http://www.fao.org/cfs/cfs-hlpe)  
E-mail: [cfs-hlpe@fao.org](mailto:cfs-hlpe@fao.org)