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A note on the causes and consequences of the rapidly increasing international food prices

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Summary

The last few years have seen large increases in the world market prices of food. Following a steady increase by 25 percent between 2003 and 2006, the FAO food price index rose by 57 percent between March 2007 and March 2008. Developments in the markets for the three staple commodities, maize, wheat and rice have been particularly dramatic with world market prices in April 2008 reaching respectively 164 percent, 187 percent and 437 percent (measured in USD) above their low in 2001.

The present food price crisis is not a problem of lack of food, but a problem of restricted access to food due to high prices. Although growth in cereal output per capita has stagnated in the past 20 years, the amount of calories globally available for human consumption has continued to grow, also in per capita terms. Calories from consumption of oilseeds/vegetable oils and animal products more than compensate for the shortfall in calorie intake in the form of cereals.

The current situation is not an isolated phenomenon. Over the past 100 years, cereal prices declined steadily in real terms, reaching an all-time low around 2000. However, the downward sloping trend was disrupted by short periods of rapidly increasing prices followed by just as sudden price falls, during the two world wars and around 1974. The 1974 event prompted the establishment of an international system (in the form of the International Fund for Agricultural Development and the Committee on World Food Security) to address global food security.

There are different stories behind the recent large increases in global prices for maize, wheat and rice. The most important causes can be summarised as follows:

- Common for all three crops is a **decline in stocks**, accelerating after the turn of the century, caused by growth in demand having outpaced growth in supply. The modest agricultural output growth is a consequence of a long period of low commodity prices, which provided little incentive for investments in agricultural productivity and induced government to reform policies in order to limit surplus production.
- In addition, **high prices of fossil fuels** raises costs of production and marketing of all agricultural commodities. Fossil fuels are not only used in powering farm machinery, but are also important inputs in the production of fertilizers. Moreover, oil prices affect transportation costs and international freight rates, essentially raising barriers to trade in agricultural commodities.
- Demand growth in the **maize** market was largely driven by the long term structural shifts in global food demand towards a greater dietary content of meat and dairy, which absorbs large quantities maize as feed. More recently, rapid growth in the biofuel industry using maize as a feedstock, has added to the increasing demand.
- The current high **wheat** prices are mainly caused by three consecutive years (2005-2007) of weather-induced harvest shortfalls in some of the most important exporting regions, Australia, Europe, Former Soviet Union and North America, at a time where wheat stocks are historically low.

- The soaring price of **rice** is primarily a product of hoarding by some of the most important actors in the international rice markets, incl. Thailand, India and Vietnam, which have imposed severe export restrictions in attempts to secure rice supplies. The sense of urgency in rebuilding rice stocks is partly stimulated by events in the maize and wheat markets.

The expected future developments for the international cereal markets are discussed under three headlines, i) the immediate short term outlook, ii) the medium term outlook, and iii) the very long term outlook:

- **Short term outlook:** World cereal production in 2008 is expected to grow by 2.6 percent compared to last year's crop. The bulk of the increase is expected in wheat, due to an assumed return to normal harvests as well as expansions in the planted areas, whereas rice and coarse grains show modest growth rates. Despite the expected recovery in production, cereal markets are expected to remain relatively tight over the coming seasons, particularly for maize and rice, due to continued strong demand growth. Wheat prices seem to have peaked already, while the outlook for maize and rice prices will depend on the weather, developments in the biofuel industry (in the case of maize) and policy responses by major cereal exporters (particularly for rice). If large stocks of rice in Asia are released to the world market, the price of rice could be halved in a matter of months.
- **Medium term outlook:** The latest medium-term (10-year) projections by OECD and FAO show stabilisation of crops prices, albeit at a higher level than seen in the past. The tighter market conditions are driven by continued strong growth in food and feed demand, and, in the case of maize, for feedstock to the biofuel industry. The high cereal prices have not yet prompted governments to revise their support for cereal-based biofuel production.
- **Long term outlook:** In the long term, global agricultural production is likely to grow faster in response to higher commodity prices, by expansions in the agricultural areas combined with higher growth in agricultural productivity. Significant potential for output growth exists in countries in the former Soviet Union, particularly Russia, Ukraine and Kazakhstan, as well as Sub-Saharan Africa and South America, if infrastructural and institutional barriers can be overcome.

The consequences of the increases in global cereal prices for the developing countries are difficult to assess because the impact varies substantially across countries and across population groups within countries as several macroeconomic and microeconomic factors affect the transmission from world market to the national and local markets.

At the **macroeconomic level** the most pressing issue is the impact on the current account. Two factors determine the sign and magnitude of the change in the current account: (i) the net position in international food trade and (ii) the exchange rate vis-à-vis the US dollar.

In the short run many low-income countries will experience significant increases in the food import bill. The value of import requirements are projected by FAO to increase by 56 percent from 2006/07 to 2007/08 after having increased by 37 percent the previous year. However, the increase

in food import requirements is measured in US dollar. In the period 2003-2007 the low-income countries have had a real appreciation of domestic currencies of about 15 percent vis-à-vis the dollar. If the real appreciation continues, the increase in the value of the import requirement, measured in local currencies, will be somewhat lower. Furthermore, for most low-income countries the net imports of grains and cereals constitute a fairly low fraction of total imports. Hence, the impact on the current accounts is expected to be manageable for most countries.

In the medium term the higher food prices may be beneficial for the low-income countries because the majority of these countries are net agricultural exporters. Hence, if the higher food prices spill-over to higher prices on agricultural commodities in general, the low-income countries can gain. Alternatively, low-income countries can substitute production of raw food for other agricultural products thereby gaining from increased world market food prices. However, such a substitution takes time and it depends to a large degree on domestic policies and institutions.

At the **microeconomic level**, the impact on households' well-being is determined by factors similar to the macro level: (i) whether a particular household is a net producer or consumer of food and (ii) the magnitude of the price increase, which in turn is affected by the exchange rate movements, national policies and local market conditions determining the pass-through from world market prices to local prices.

A study of seven Asian countries shows that the domestic currency appreciated in real terms against the US dollar dampening the domestic price increases—in some cases considerably. In addition, all seven countries have taken policy measures in order to stabilize domestic rice prices. The specific policy measures range from reducing taxes and import tariffs on food grains over release of state held rice stocks to bans on rice exports. The overall result of the exchange rate appreciations and the domestic policies has been that the pass-through of world market prices is, on average, only about 50 percent. The price stabilization policies have thus clearly protected the domestic rice consumers. However, the majority of the countries have seen substantial increases in domestic rice prices.

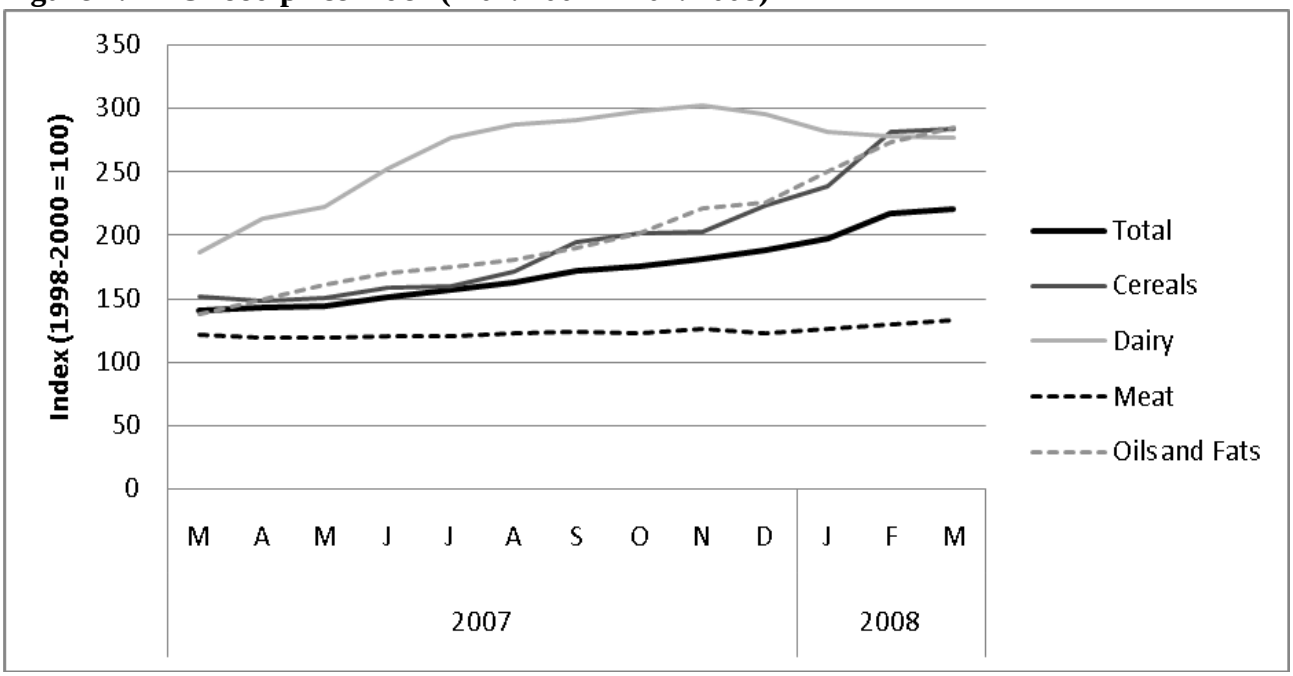
The rising domestic food prices lead to redistribution within the developing countries as the net producers benefit from the higher prices while the net consumers are hurt by them. Using this broad distinction between net producers and consumers one must expect poverty to increase in the urban areas while it may decrease in rural areas. Unsurprisingly, the impact varies across regions and depends on the specific commodity. The increase in the price on maize has in all likelihood increased poverty in Sub-Saharan Africa while poverty in Asia and Latin America are largely unaffected. The increase in wheat prices has mainly had an impact on poverty in Latin America and some Asian countries with less impact on poverty in Sub-Saharan Africa. Finally, the increase in rice prices has lead to increases in poverty in all three regions—which is probably why the governments in many countries have taken policy measures to stabilize the domestic rice prices.

The total effect on poverty of the recent food price increases (2005-2008) is estimated to be an average increase in the poverty rate of 4.5 percentage points. This is substantial considering that the average reduction in poverty has been 0.7 percentage points per year since 1984.

1. Introduction

The last few years have seen large increases in the world market prices of food. Following a steady increase by 25 percent between 2003 and 2006, the FAO food price index rose by 57 percent between March 2007 and March 2008 (Figure 1). Prices on dairy products, cereals and oils and fats had the highest growth rates, whereas meat prices have yet to show similar trends.

Figure 1: FAO food price index (Mar. 2007 - Mar. 2008)



Source: FAO World Food Situation website (http://www.fao.org/worldfoodsituation/FoodPricesIndex)

Reports from the leading food and agricultural research institutions (e.g. FAO, 2008a; IFPRI, 2008; FAO/IFAD/WFP 2008) and others (e.g. Slayton and Timmer, 2008) suggest that the current food market situation is created by the interaction of a range of demand- and supply-side factors, summarized in the following points:

- Long-run growth in food demand has outpaced the growth in food supply, gradually reducing the average surplus of food production and available food stocks;
- Recent consecutive seasons of below-average harvests in major food exporting countries, combined with historically low food stocks, produce sharp increases in food prices;
- High prices of fossil fuels add to the costs of food production and transportation, putting a further pressure on food prices;
- The rapid growth in the production of cereal-based biofuels, fuelled partly by the increasing price of fossil fuels and partly by public subsidization, has further reduced the supply of grains available for food production;

- Government policies put in place by some countries in efforts to control domestic food prices, such as export bans or price controls, have contributed to higher world market prices.

It is, however, important to recognise that not all of the factors are equally important and that different stories may be told for each food product. This note elaborates on the causes and consequences of the recent rapid growth in the world market prices of three of the most important food crops, wheat, maize and rice. Beyond this introduction, the note is structured in four sections, 2. World cereal production and prices in a historical perspective; 3. The current status of the international food market; 4. Outlook for the international cereal markets; and 5. Consequences for developing countries.

2. World cereal production and prices in a historical perspective

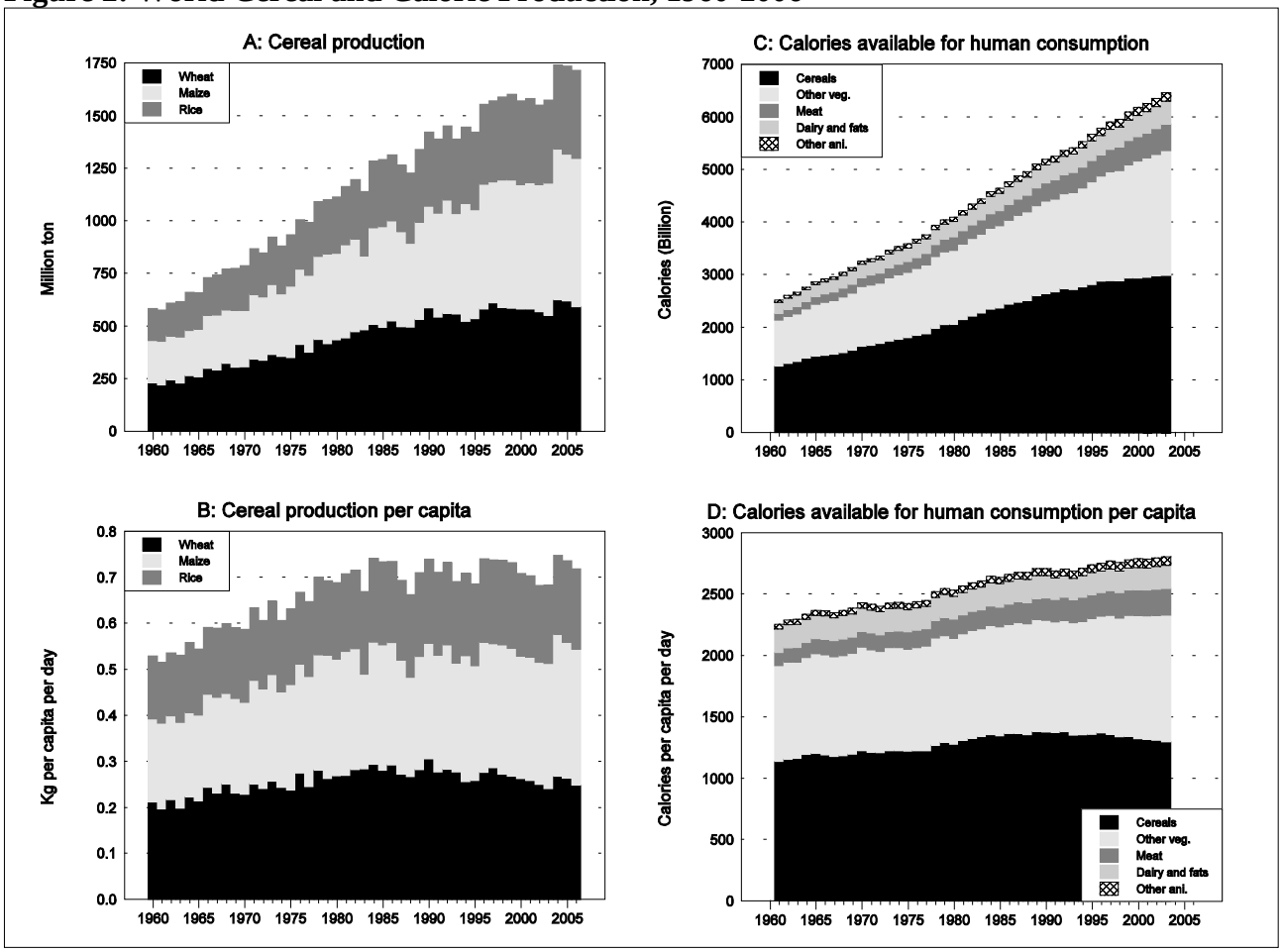
Cereal is the basic agricultural commodity upon which most other agricultural products are dependent either directly or indirectly. Cereals in the form of bread, porridge or other comprise 46 percent of the daily human calorie consumption on average in the world (FAO, 2003). Furthermore, cereals are a mainstay of animal feed from where the meat and dairy products are derived. Even prices of other crops such as soybeans are related to cereals prices through the competition for agricultural land. Thus, most human food consumption is highly dependent upon cereals. Consequently, changes in cereal prices will have repercussions throughout most of the food processing chain and will therefore always affect the consumer.

The total world production of cereals (wheat, maize and rice) has been increasing for decades. There is variation in the growth in each of the crops but the total cereal production has been clearly trending with an increase about 26 million ton per year. Panel A in Figure 2 shows the production of the three cereals in the period 1960-2007 using data from USDA. The more or less persistent annual increase in total cereal production has up until the mid 1980s provided for increasing per capita cereal output as seen from panel B in Figure 2, which shows the global cereal production per capita per day. In the period from 1960 to the mid 1980s cereal production per capita increased steadily, but from around 1985 the trend in per capita production has disappeared. Instead, the per capita output in the last twenty years has fluctuated around 0.7 kg/capita/day. Consequently, the steady increases in production have ceased to lie above the increase in world population, which has otherwise been the case historically. With the growing demand for cereals both to feed more animals due to growing demand for meat and milk and also to be used in bio-ethanol production in addition to the need to feed a steadily increasing human population, fewer amounts are available for direct human food consumption per individual. Naturally, the combined effects of these phenomena put an upward pressure on the cereal prices. Furthermore, these phenomena may not only have short term impacts, as past price spikes have been observed to be. Rather, a more permanent shift to a higher level for cereal prices is likely.

However, Panels C and D in Figure 2 illustrate that the current pressure on cereal prices is not a result of global food shortage as such. The total amount of calories produced and, in particular, the quantity of calories available for human consumption has been increasing throughout the period from 1961 to 2003, also in per capita terms. In 1961 total production food ensured an average of

2254 calories per person per day in terms of food available for human consumption. By 2003 output had increased to 2809 calories per person per day. During this period, calories from cereals have constituted a fairly constant amount, indeed, if anything, with a slightly increased level from the early 1980s onwards. Hence, the present food price crises is not so much a problem of lack of food, as it is a problem of restricted access to food due to high prices.

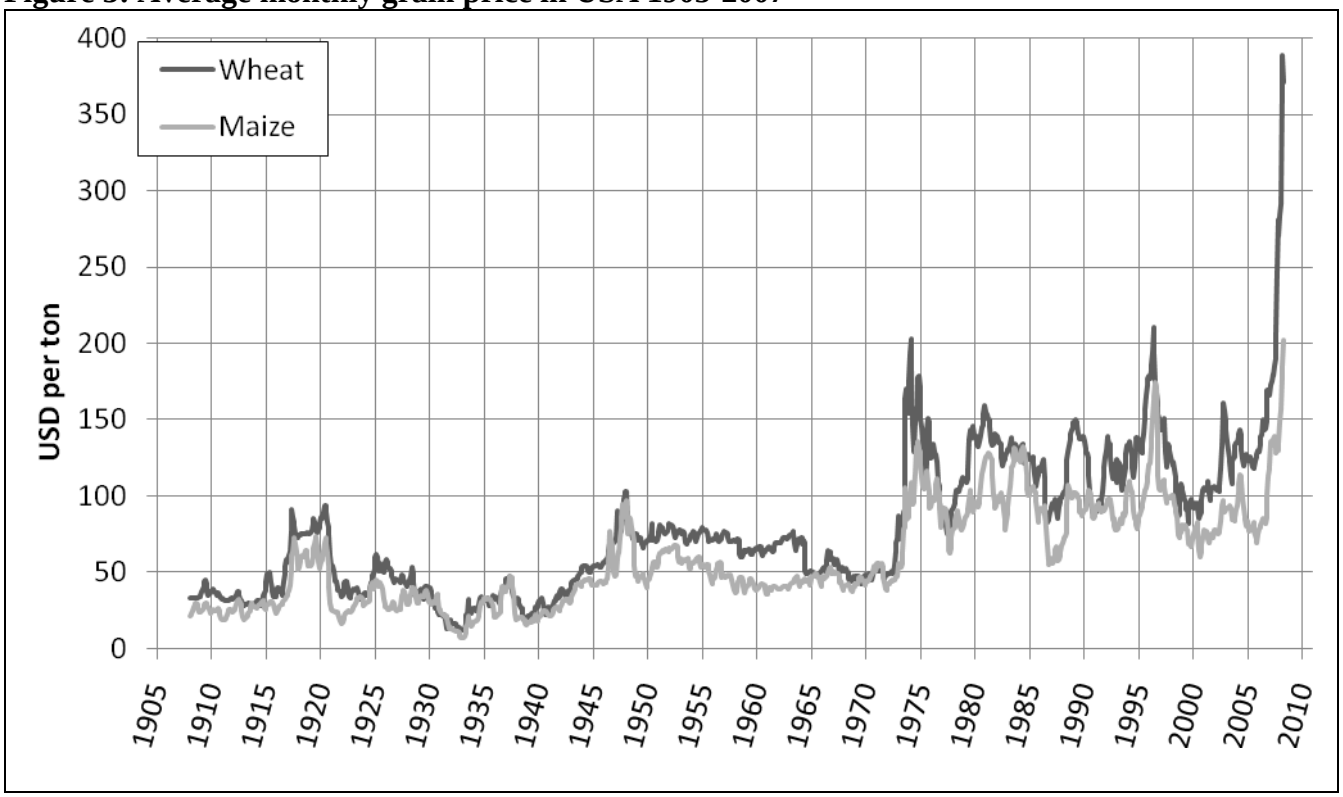
Figure 2: World Cereal and Calorie Production, 1960-2006



Source: own calculations based on data from USDA-ERS (www.ers.usda.gov) and FAOSTAT.

Figure 3 shows the monthly prices on wheat and maize in the period from January 1908 to March 2008 in USA, which is often referred to as the world market price due to the relatively free price regime and the large volume of trade. As seen, the recent price increases are quite dramatic and appear unparalleled in the past 100 years. In March 2008 the price on wheat reached an historic peak of USD 430 per tonne. Nevertheless, Figure 3 also reveals that prices have increased substantially in other periods only to decrease shortly after.

Figure 3: Average monthly grain price in USA 1905-2007

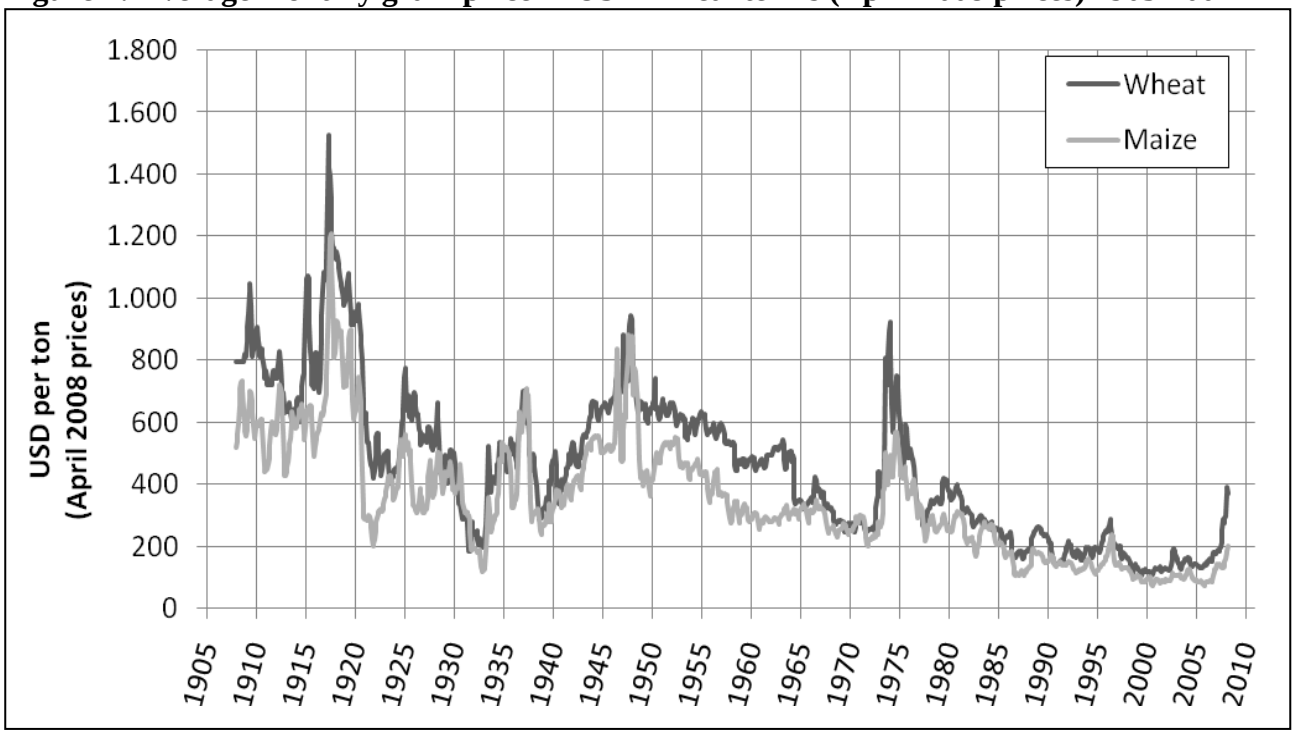


Source: USDA-ERS (www.ers.usda.gov)

The prices in Figure 3 are in nominal terms, which may distort the picture. In order to get a more realistic impression of the burden cereal prices puts on consumers, the prices are deflated by the US consumer price index in Figure 4. During the last century, real cereal prices have declined reaching an all-time low around 2000. Still, quite extraordinary price spikes have occurred occasionally showing that, in real terms, the recent price spike is less pronounced and, further, that the present price level is not unique. Looking at historical price spikes, naturally, the two world wars show up. But in the post-WWII era the 1974 event stands out.[1] From July 1972 to February 1974 the price *in real terms* displayed an increase of 270 percent. The price remained at a high level the following years, but eventually returned to its previous low levels towards the end of 1977.

[1] This crisis was a result of large and unexpected purchases of grain by the Soviet Union from the US. Simultaneously, El Nino effects made the fish off Chile's coast disappear whereby a substantial portion of the world's protein supply failed. Added to this, bad harvests plagued the soybean producers in the USA.

Figure 4: Average monthly grain price in USA in real terms (April 2008 prices) 1905-2007



Source: USDA-ERS (www.ers.usda.gov)

The 1974 cereal price crisis led to the world food conference in 1974. One of the major results of the world food conference was to put the issue of food security on the international agenda, and the UN organisation IFAD (International Fund for Agricultural Development) was established as a result of the conference.

Another specific result was the establishment of the Committee on World Food Security in 1975. This committee has the "function of evaluating the adequacy of food stocks, especially cereals", FAO (1983). To achieve the objectives of the committee a minimum safe level of world cereal stocks was estimated by the FAO secretariat in 1974. They concluded that a minimum safe level of world carry-over stocks for all cereals should be within a range of 17-18 percent of world cereal consumption. The major part of this level consists of working stocks, which include cereals stored at different points in the distribution chain from the farmer to the end-user, whereas the reserve element amounts to 5-6 percent of world consumption.

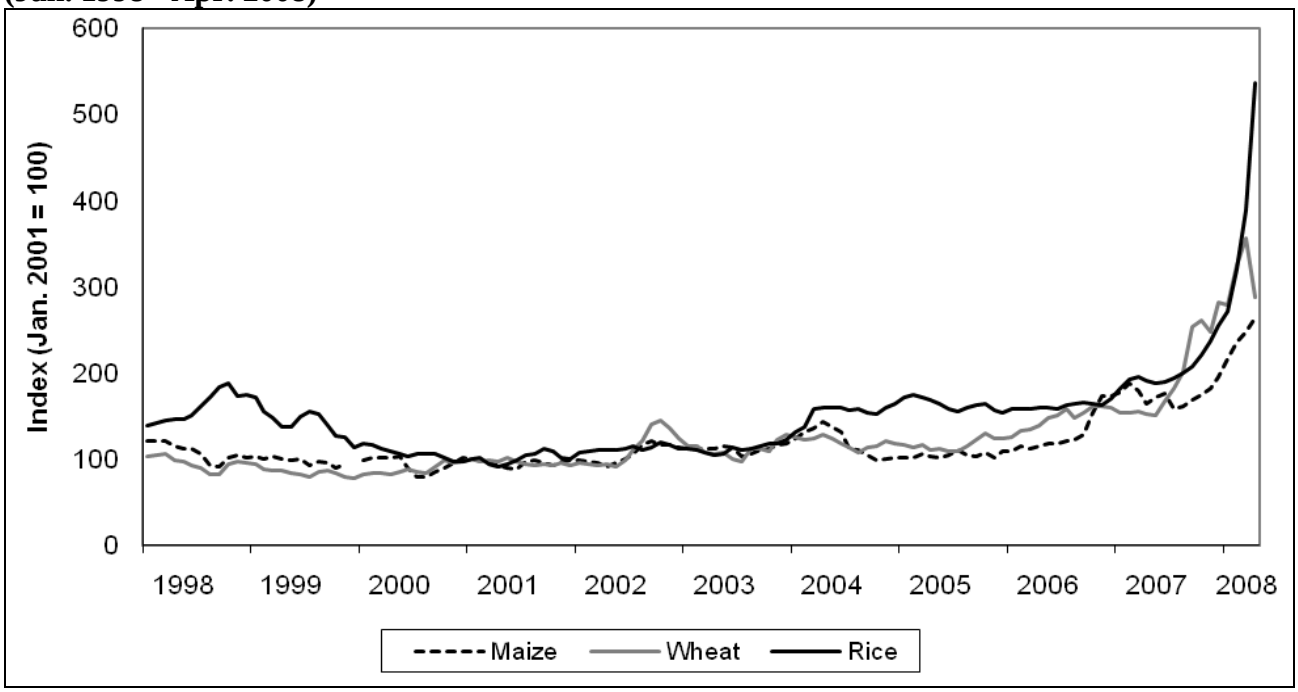
The price increases in 1996 spurred the second global food conference called the World Food Summit. At this conference the need for keeping stocks were reemphasised, specifically in the light of the recently concluded Uruguay Round of trade negotiations in GATT. A fear had emerged that the liberalizations due to the new agricultural trading regime could lead to lower cereal stock levels.

3. The current status of the international food market

3.1. International markets for wheat, maize and rice

Figure 5 shows the development in monthly average world market price of maize, wheat and rice in the period January 1998 – April 2008. All prices are measured in USD per tonne and are therefore affected by the depreciating dollar exchange rate. When adjusted for the dollar depreciation, the price increases are lower, but still drastic.

Figure 5: Monthly average world market price of maize, wheat, and rice (Jan. 1998 - Apr. 2008)



Notes: Maize: US No. 2, Yellow, US Gulf (Friday); Wheat: US No. 2, Hard Red Winter, US fob Gulf (Tuesday); Rice: White Broken Rice, Thai A1 Super, fob Bangkok (Friday). All prices are measured in USD per tonne, indexed with Jan. 2001 = 100. Thus, prices are affected by the deteriorating dollar exchange rate.
Source: FAO international commodity prices database (http://www.fao.org/es/esc/prices/PricesServlet.jsp?lang=en)

Up until the beginning of the new millennium, world market prices of the three cereal crops showed downward sloping or stagnating trends. However, after around 2001 these trends reversed and prices started to rise slowly. Although the growth rates picked up the pace after 2004, the current price hikes are a fairly recent phenomenon.

When analysing the international markets for particular crops, it is instructive to distinguish between direct and indirect effects. The price of each crop is directly affected by long run structural changes in demand and supply and by short term shocks occurring on that specific market (i.e. for that particular crop). These direct effects may contribute to explanations of long run trends and serve as primary causes of the short run price volatility. However, in the medium and longer term each market may be affected by supply and demand shocks taking place in related markets (i.e. for other crops). For instance, a negative supply shock on the wheat market (e.g. due to poor harvests)

would in the short run lead to an increase in the wheat price faced by consumers as well as producers. Over time, the higher prices induce consumers to substitute wheat for cheaper cereals, such as maize or rice, thus raising demand for these crops. Similarly, if the high wheat prices are expected to persist over the next couple of seasons, producers have incentives to plant wheat instead of e.g. maize, lowering future supply of maize. Together, the expansion in demand and contraction in supply serve to tighten rice and maize markets, raising prices as well. Hence, over the longer run all crop prices (and indeed agricultural commodity prices in general) tend to be interrelated.

3.2. Explaining the current situation

Long term divergence in supply and demand growth

Demand for crops increases over time due to population growth and economic transition. As poor people's incomes rise and populations become more urbanised, the composition of their diets shifts from high dependency on staple crops to a more varied diet with a higher content of meat and dairy products. According to a recent European Central Bank paper (ECB, 2008), FAO reports that between 1991 and 2001, consumption of meat and dairy products in developing counties increased by 67 percent and 44 percent respectively. Although the household consumption of cereals tends to decline, the use of grains as feed in livestock production increases, generating a net expansion in crops demand. Table 1 shows the average annual growth rates in world population and production since 1980 and Table 2 presents the average annual growth rates of world area harvested and average crop yields of the three crops over the same period.

Table 1: Average annual growth rates of world population and production (percent)

	World population			World production			
	Total	Rural	Urban	Maize	Rice	Wheat	Meat
1980 – 1990	1.74	1.05	2.73	1.43	2.76	2.48	2.84
1990 – 2000	1.43	0.72	2.30	2.25	1.54	0.50	2.72
2000 – 2005	1.21	0.40	2.10	3.28	0.72	1.16	2.63

Note: The beginning and end years of the intervals are calculated as three-year averages around the interval year. For instance, 1980 production is calculated as the average of production in 1979-1981.
Source: Own calculations based on FAOSTAT.

The figures in the two tables suggest that population growth as well as shifts in diet compositions towards meat consumption has had direct as well as indirect effects on the markets for maize, rice and wheat. Although the population growth rate has declined from 1.74 percent in the 1980s to 1.21 percent in the first five years of the new millennium, in the last 10-15 years population growth has been higher than the increase in production of wheat and rice. This suggests that some of the tightening of these markets may be explained simply by the fact that agricultural productivity has failed to keep up with population growth as seen from Figure 2. At the same time, the world population has become more urbanised, with urban population growth rates higher than rural, and diets have

shifted towards a greater content of meat, as evidenced by the higher growth in meat production compared to wheat and rice.

Table 2: Average annual growth rates of world area harvested and average crop yields (percent)

	Area harvested			Crop yields per hectare		
	Maize	Rice	Wheat	Maize	Rice	Wheat
1980 – 1990	0.51	0.28	-0.43	0.91	2.48	2.83
1990 – 2000	0.53	0.45	-0.57	1.71	1.09	1.08
2000 – 2005	0.80	-0.17	0.35	2.46	0.88	0.80

Note: The beginning and end years of the intervals are calculated as three-year averages around the interval year. For instance, 1980 production is calculated as the average of production in 1979-1981.
Source: Own calculations based on FAOSTAT

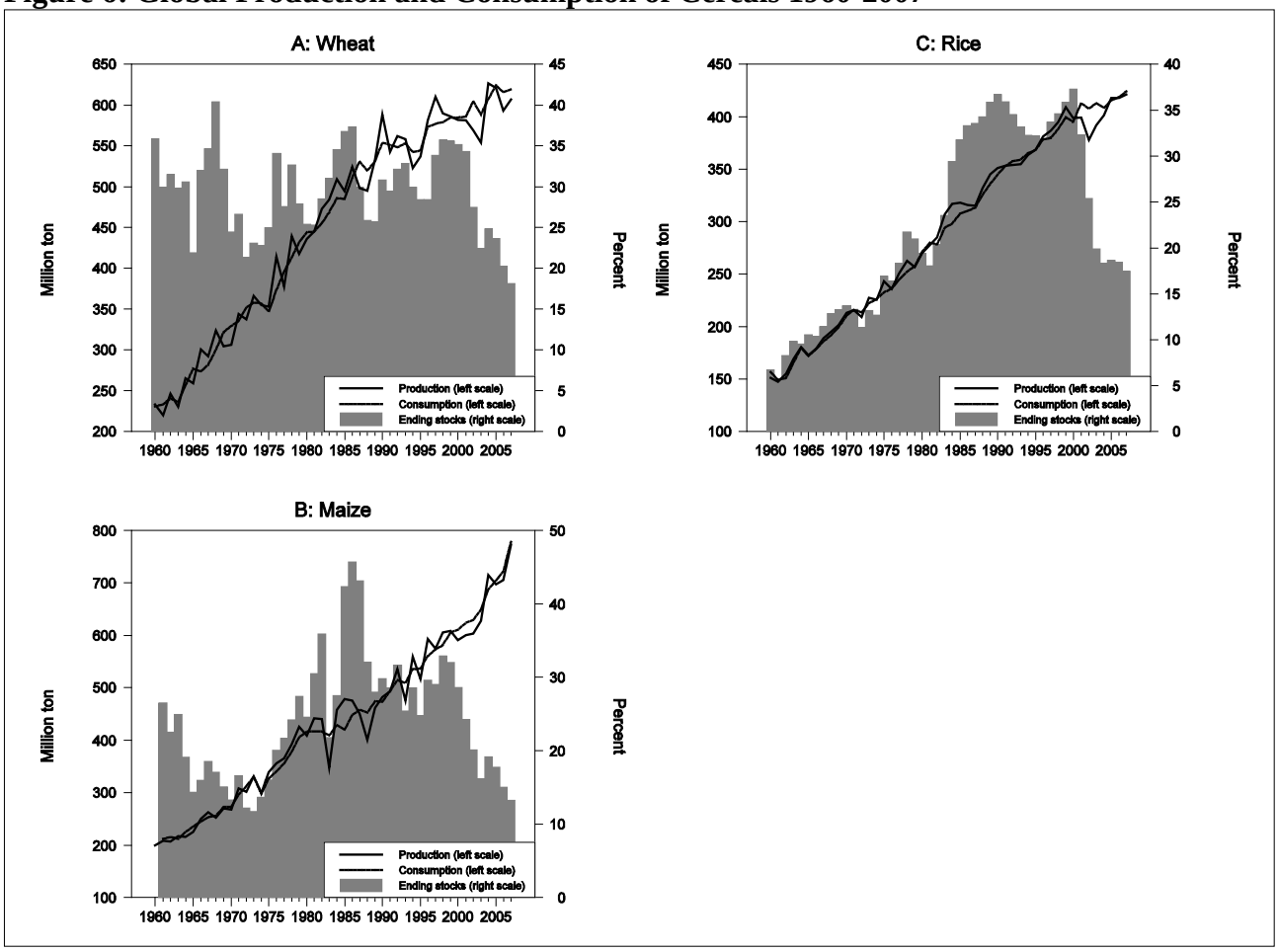
Whereas population growth seems to exert a direct influence on all three markets, the expansions in meat production is likely to have the largest direct effect on maize prices and only indirectly on wheat and rice. Livestock feed account for around 65 percent of total demand for maize, compared to 17 percent of wheat and just 2 percent of rice demand (average of 2001-2003). However, some of the expansion in livestock demand for maize is met by increasing the area of land dedicated to maize production, possibly at the expense of wheat plantings (maize and rice are not close substitutes in production, as the two crops demand different soil and climatic conditions; however, other indirect substitution effects, e.g. in consumption, may occur).

The relatively low growth rates in rice and wheat production are caused by small expansions (or even declines) in harvested areas as well as relatively slow growth in agricultural productivity (yields per hectare). In the case of rice, the International Rice Research Institute (2008) suggests that this decline in productivity growth is mainly caused by reductions in public investment in agricultural research and development. However, the decline in rice and wheat production may also be an outcome of the prevailing market conditions. Until recently, prices of crops have declined in real terms following decades of high agricultural productivity growth and generous agricultural support programmes in major agricultural exporting countries generating a food supply surplus. Such a market environment provides little incentives for large scale investment in agricultural research and development and has induced governments to reform policies in order to limit surplus production. The prospects for higher future price levels for agricultural commodities (though not necessarily at the current very high levels) may provide important incentives for investment in agricultural productivity.

The divergence in supply and demand growth has served to lower the level of food stocks. Figure 6 shows the global production, consumption and stocks held ultimo the year (as percentage of consumption) for wheat, maize and rice respectively. For all three crops, the steady increase in production during the period, already shown in Figure 1, is tracked by increasing demand. Yet the devel-

opment in the stocks relative to total consumption varies across the three crops. For wheat the stocks fluctuate (mostly) between 25 and 35 percent of consumption from the early 1960s to the turn of the millennium. In contrast, maize stocks show a pronounced cyclical movement with sharp increases following the price crises in 1974, reaching a peak of about 45 percent in the mid 1980s before tapering off and reaching a level of 30 percent, well above the estimated minimum safe level, at the end of the 1990s. For rice, the stocks were building up from a very low level in the 1960s to a peak at some 35 percent of consumption in the 1990s.

Figure 6: Global Production and Consumption of Cereals 1960-2007



Source. USDA-ERS (www.ers.usda.gov)

From the early 2000s the three cereal stocks show parallel patterns of significant decline. This is in part explained by a series of meagre harvests but other factors have also played important roles. As noted in Trostle (2008), government-held buffer stocks were perceived to be less important after decades of declining food prices (in real terms) and for the private sector years of readily available supplies and use of just-in-time production provided strong incentives to reduce stock holdings. Moreover, changes in agricultural support programmes had an impact on the production level, in particular in the EU. As a result of these factors, global production of cereals was exceeded by consumption in seven of the eight years since 2000.

At the end of 2007 the stocks of wheat, maize and rice constituted only 18, 13 and 17 percent of consumption respectively, which is close to (and for maize well below) the FAO recommendation. Whether this presents a real problem for the world community is not immediately apparent, but it is clear that supply shocks in the near future cannot be cushioned in the same way as has been done historically by changes in stocks. This is likely to be one of the reasons for the rather aggressive behaviour by some governments in relation to import and export of rice.

Short-term supply shocks caused by poor harvests

As discussed above the long term structural changes in supply and demand has driven global cereal stocks, particularly wheat, to their lowest level since the 1970s (Figure 6). Food stocks provide a buffer against high price volatility caused by short term discrepancies between supply and demand. With historically low food cereal stocks this buffer is drastically reduced and consecutive seasons of poor harvests in major cereal exporting countries during 2005-2007 caused cereal prices to increase steeply.

The weather-induced short term shocks were most severe for wheat and coarse grains (including maize). Australia, suffering a severe drought, harvested 61 percent less wheat and 51 percent less coarse grains during the 2006-2007 season compared to the previous year. Together, Australia, EU and USA produced 57 million ton less wheat and coarse grains than in the year before.

High price of fossil fuels

Fossil fuels are important inputs in agricultural production and rising oil prices have a direct impact on agricultural production costs. OECD (2006) analyses cost data for Argentina and USA and estimates that the energy share of total crop production costs are 43 percent and 25 percent respectively. Fossil fuels are not only used in powering farm machinery, but are also important inputs in the production of fertilizers. Moreover, oil prices affect transportation costs and international freight rates.

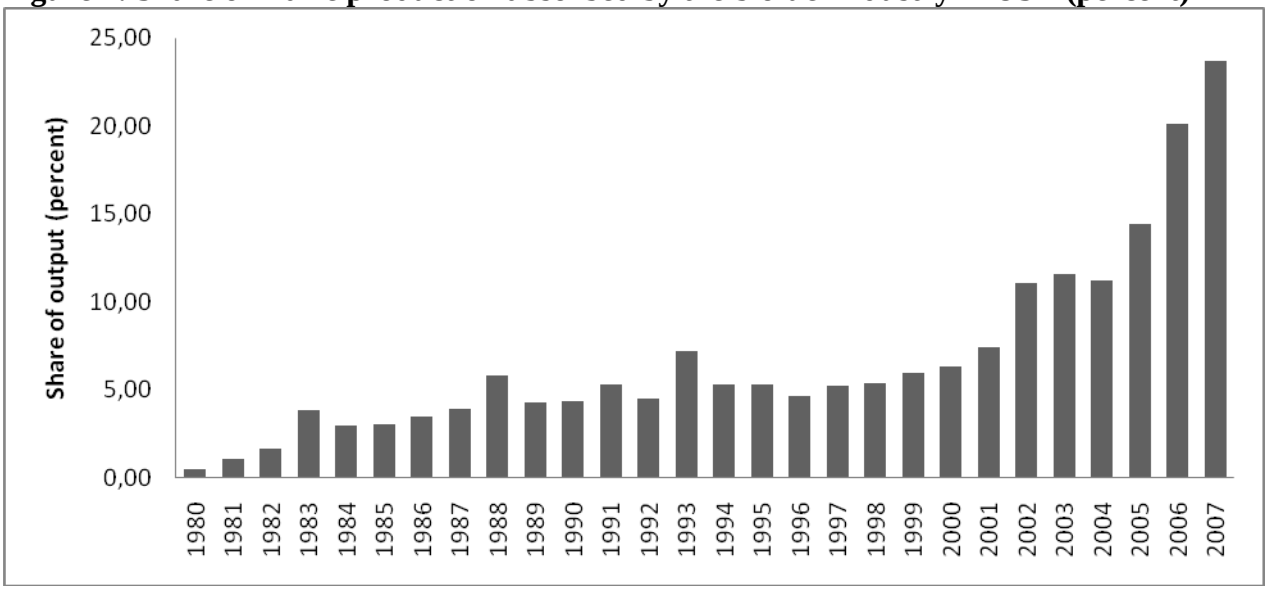
Expanded use of crops for biofuel production

The short term supply shocks discussed so far coincides with a period of great expansion in the production of grain-based biofuels, which absorb a growing share of world grain output. Grain-based biofuels are predominately made from maize (accounting for roughly 95 percent of total cereal feedstock – FAO, 2008b) with USA as the largest producer.

Figure 7 shows the share of maize production in USA absorbed by the biofuel industry over the period 1980-2007.

Until recently, the biofuel industry in UAS used less than 12 percent of domestic maize production. However, in just three years, 2005 – 2007, the biofuel share of output doubled and now takes about a quarter of US maize production. Considering the fact that USA accounts for roughly half of the worlds export of coarse grains (OECD-FAO, 2007), this expansion in demand is bound to have a significant impact on world market prices.

Figure 7: Share of maize production absorbed by the biofuel industry in USA (percent)



Source: Own calculations based on USDA, ERS Feed Grains Database

However, increased biofuel production has not yet had any significant impact on wheat and rice markets. Wheat-based biofuel production is still in its infancy (although future expansions are planned) and rice is not seriously considered as feedstock. Also, the indirect effects on rice and wheat markets of a biofuel-driven increase in maize prices are yet likely to be small. Maize and rice are not in direct competition for land as they have different climatic requirements (rice is grown along the southern part of the Mississippi river, whereas maize is mainly planted in the northern plains of the Midwest; USDA-NASS, 2008a,b,c). Although wheat plantings in USA has shown a declining trend since the 1980s due to poor returns relative to other crops, displacement by maize due to increased demand from the biofuel industry is only a minor explanation among many others, such as enrolment in the Conservation Reserve Program (CRP), leaving wheat land fallow for environmental reasons (USDA-ERS, 2008a). There is no indication of recent large scale displacement of wheat plantings by maize in USA – areas dedicated to maize have increased rapidly in the recent years, but mainly at the expense of oilseeds (soybeans) rather than wheat. For instance, the 14 percent decline in USA wheat production in 2006 (compared to the year before) was a consequence of poor yields due to unfavourable weather conditions – the area planted was virtually the same as the season before (USDA-ERS, 2008b). Large scale demand substitutions of wheat and rice for maize are harder to detect but seem unlikely also. Global utilization of coarse grains for food consumption has actually increased by more (3.7 percent) between 2005-2007 than food consumption of wheat (2.1 percent) and rice (2.6 percent) (FAO, 2007).

Government policies

The explosive development in the price of rice witnessed during the first four months of 2008 cannot be explained by market fundamentals alone (i.e. changes in demand and supply). Although demand for rice has grown faster than rice supply (in relative terms) in recent years, there have been no major supply shocks that could explain the sudden soaring of prices. Rather, the situation is

mainly explained by a sense of panic spreading among the major rice consuming countries leading to large scale hoarding of rice (Slayton and Timmer, 2008).

Whereas global rice output rose slightly in 2006 (compared to the year before), some of the most important exporting countries, in particular India, Pakistan, Thailand and USA, were hit by poor harvests mainly due to pest attacks and adverse weather effects (OECD-FAO, 2007). Faced with rising domestic prices and stimulated by events in other cereal markets, mainly wheat, one rice exporting country after another imposed export restrictions in the fall of 2007, contributing to a decline in rice trade and a further strengthening of world prices. In the words of Slayton and Timmer (2008), rice has returned as the "political commodity" influencing the fate of poor consumers and, consequently, the stability of political regimes. Expectations of future price increases lead to urgent efforts by governments to secure supplies by restricting exports or capturing imports, at almost any price. Rising demand and falling supply pushes the rice price up, fuelling expectations of further increases and eventually resulting in a spiralling price bubble. According to Slayton and Timmer (2008) there is no global shortage of rice – only the unwillingness (or political inability) of some governments to release considerable stocks of rice on the world market.

Summary

To summarize, there are different stories behind the large increases in world prices for maize, wheat and rice. Developments in the maize market are largely driven by the long term structural shifts in global food demand towards a greater dietary content of meat and dairy and, more recently, rapid growth in the biofuel industry using maize as a feedstock. The current high wheat prices are mainly caused by three consecutive years of weather-induced harvest shortfalls in some of the most important exporting regions, Australia, Europe and North America, at a time where wheat stocks are historically low. Finally, the soaring price of rice is primarily a product of hoarding by some of the most important actors in the international rice markets, which have imposed severe export restrictions in attempts to secure rice supplies.

4. Outlook for the international cereal markets

We discuss the outlook for the international cereal markets under three headlines, i) the immediate short term outlook, which summarises the most up-to-date forecasts over the current growing season, ii) the medium term outlook, discussing the forecasts and assumptions made by leading agricultural research institutions (mainly OECD-FAO, 2007) over the next decade; and iii) the very long term outlook, highlighting in a more qualitative manner some of the potential opportunities and limitations for increasing supply to meet the growing demand for food.

4.1. Short term

World cereal production is expected to reach almost 2.2 million ton in 2008, representing a 2.6 percent increase compared to last year's crop.[2] The bulk of the increase is expected in wheat, with out-

[2] Unless otherwise specified the short term outlook is based on FAO (2008b).

put 6.8 percent higher than 2007, whereas rice and coarse grains show modest growth rates (1.8 percent and 0.6 percent respectively). Although the increase in wheat production is significant, it is measured against a season of poor harvests in some of the major wheat producing countries, including Europe, Canada and Australia, and a large part of the expansion simply represent an assumed return to 'normal' harvests. As yet, there are no indications of any significant adverse weather impacts on crops. In addition, many producers have responded to the high wheat prices by expanding the area of winter wheat plantings in USA, Europe, Ukraine and Russia, and early indications on the plantings of summer wheat show even greater expansions (e.g. by 10 percent in USA).

Despite the expected recovery in production, cereal markets are expected to remain relatively tight over the coming seasons. Although FAO (2008b) do not forecast consumption of the 2008 harvest (the 2008/2009 utilisation), they estimate the 2007/2008 utilization to reach 2.1 million ton, an increase by 2.9 percent from the previous season in spite of high food prices. If this trend continues, 2008/2009 utilization could amount to 2.2 million ton (calculated by extrapolating this seasons estimated increase) producing another season with demand (marginally) outstripping supply. Surplus demand would mainly occur in coarse grains reflecting increased use of maize in biofuel production, and to a lesser extent rice, whereas wheat harvests should produce a comfortable supply surplus. However, this may be a worst case scenario. The recent increase in utilization is well above the long term average growth rate (around 2 percent), and the extrapolation does not account for the demand dampening effects of the high cereal prices.

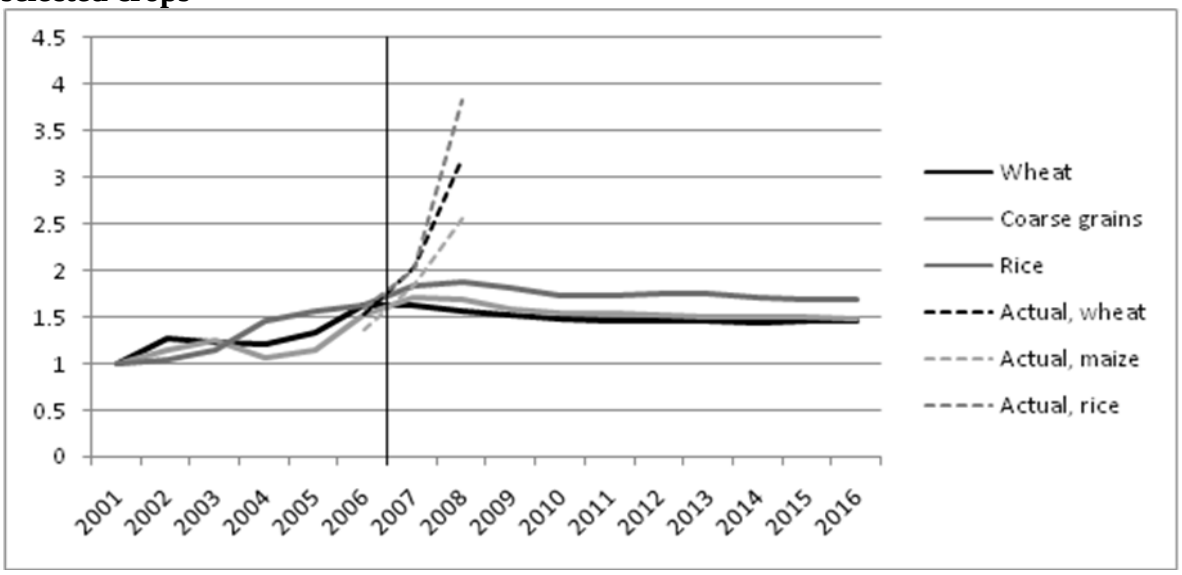
With wheat markets expected to loosen up, prices should decline from their present high levels. The outlook for rice and maize is less certain. If rice demand continues to exhibit high growth rates in spite of high prices, markets could end up showing a small global supply deficit in the coming season, which could support relatively high prices. However, as noted, the extremely high rate of the rice price increases observed over the last few months suggest that the development is driven more by hastened policy responses by large rice exporters to curb exports (and by importers to build stocks) than by sudden changes in global supply and demand. If governments could be persuaded to release rice stocks, we would expect to see rice prices coming down as well (perhaps by as much as 50 percent – Slayton and Timmer, 2008). Market conditions for maize are expected to remain tight, particularly if the biofuel industry in USA continues to grow as predicted. The latest agricultural projections by the US Department of Agriculture, from February 2008 (USDA, 2008), forecasts the use of maize for biofuel production to reach 103 million ton in the 2008/2009 season or 31 percent of expected maize production in USA, representing an increase by 28 percent compared to 2007/2008. This development suggests that maize prices will remain high and perhaps even increase further.

In summary, the immediate short term prospects indicate an improvement in the global food situation, particularly for wheat, but markets are expected to remain tight for some time, depending on the weather, developments in the biofuel industry (in the case of maize) and policy responses by major cereal exporters (particularly for rice).

4.2. Medium term

The latest medium-term price projections by OECD and FAO (2007) are already outdated, as illustrated in Figure 8 (according to EBRD-FAO, 2008, the next outlook is expected in May 2008). It predicts levelling off of prices in 2007, small declines in 2008-2010 and stabilization around levels 50 percent higher than 2001 lows (70 percent in the case of rice). However, these projections have been overtaken by the recent unforeseen events: another season of poor harvests, drastic policy responses to curb cereal exports by leading food exporters, and continued increases in fossil fuel prices as discussed above.

Figure 8: Price projections 2007 – 2016 by OECD and FAO and recent commodity prices for selected crops



Note: The wheat, coarse grains and rice price indices have been reindexed to 2001 = 1 as this year seems to be the turning point between declining and rising cereal prices. Actual wheat, actual maize and actual rice are annual averages of the same commodity prices presented in Figure 5 above. Coarse grains include all other grains than wheat and rice, primarily maize, but also barley, sorghum, oats, etc. The vertical line represents the dividing line between actual price developments and projections in OECD-FAO (2007).
Source: OECD-FAO (2007) and FAO International Commodity Prices database.

However, the medium term trends in the projections—declines from present highs and stabilization of prices around a new long term price levels—still remain valid to the extent that the underlying assumptions remain unchanged. The price projections are determined by developments in global supply and demand. Population and economic growth continue to shift demand towards a greater content of animal products, and the cereal-based biofuel industry is expected to grow further, not only in USA, but also in Europe, Canada and China. Global supply is expected to continue growing at modest rates. Table 3 shows the annual production growth rates for selected food products for the period 2007 – 2016 as projected by OECD-FAO (2007).

Table 3: Projected annual production growth rates for selected food products, 2007 - 2016, by OECD and FAO

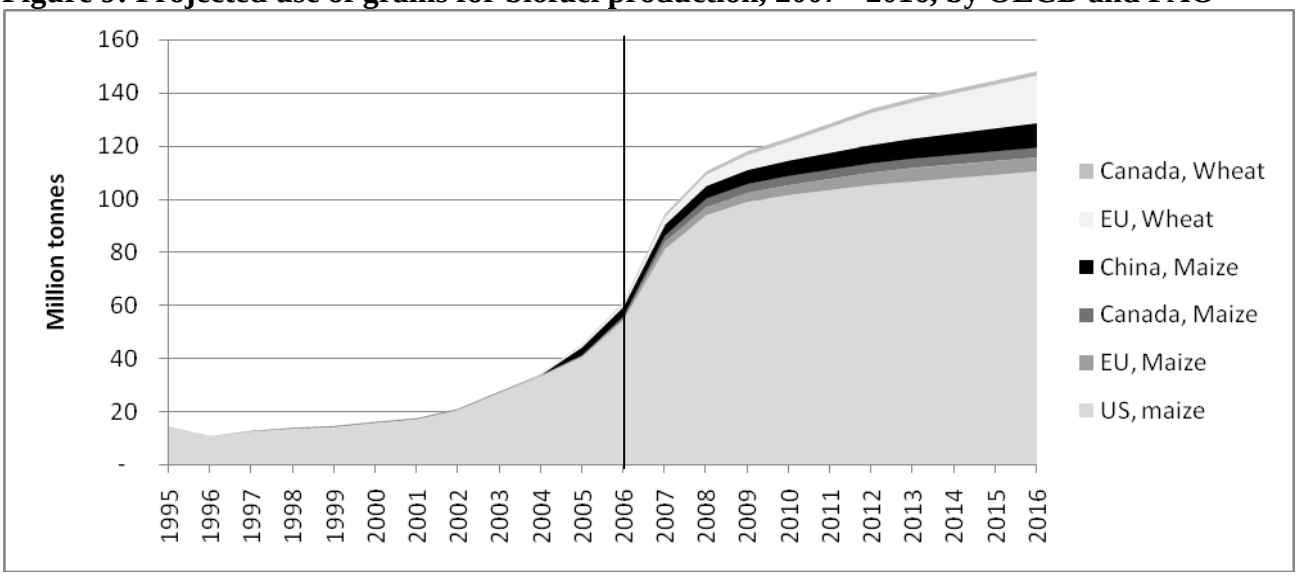
	Total	OECD	Non-OECD
Wheat	0.7	1.0	0.5
Rice	0.9	0.1	1.0
Coarse grains	1.2	1.2	1.3
Beef	1.5	0.2	2.4
Pig meat	1.7	0.4	2.3
Poultry meat	1.9	1.0	2.6

Source: OECD-FAO (2007)

Production of wheat and rice is projected to continue the relatively slow growth as witnessed in the past 10-20 years (see Table 1, above). Expansion in wheat production largely takes place within the OECD, whereas rice output grows mostly in non-OECD countries (mainly the current large producers in Asia). Maize output growth is a little harder to judge as OECD-FAO (2007) group maize in coarse grains together with barley, oats, sorghum and other cereals. Although meat production continues to outgrow cereal production, particularly in non-OECD countries, the rates are lower than previously experienced.

OECD-FAO (2007) projects a relatively high growth in cereal-based biofuel production in USA, Europe, Canada and China, as shown in Figure 9. Although the EU biofuel industry is projected to absorb a significant quantity of wheat by 2016, it is clear that the bulk of cereal-based biofuel production is expected to remain in USA and to use maize as a feedstock. In fact, OECD-FAO's projections may even be on the low side as more recent projections by USDA (2008) suggest that maize use for biofuel production may reach 120 million ton by 2016. This is not even reflecting the Energy Independence and Security Act of 2007 (enacted after the USDA projections were completed), which sets a goal for maize-based biofuel production 15 percent higher than the USDA projections. Canadian biofuel production is assumed to reach the stated goal of 5 percent of domestic gasoline consumption, whereas the EU is expected to be able to replace 3.3 percent (and not the stated goal of 5.75 percent) of transport fuel consumption by biofuels (including biodiesel, not discussed here).

Figure 9: Projected use of grains for biofuel production, 2007 - 2016, by OECD and FAO



Note: The vertical line is the dividing line between actual use and projections.
Source: OECD-FAO (2007)

4.3. Long term potential

It is not possible to make detailed projections for the very long term, but it is instructive to discuss some of the potential opportunities and limitations of the future food market. The following short discussion focuses on possible developments in global demand and supply of maize, wheat and rice.

Demand

The shift in global demand patterns towards a greater emphasis on meat and dairy products is a natural transition in diets as incomes rise. As such, it can be viewed as a sign of successful development in parts of the world that have for a long time struggled with poverty, and it should continue for a long time to come. On this background, it is reasonable to question the sustainability of devoting a large share of cereal output to the production of biofuels, particularly in the light of the relatively poor energy-efficiency of cereal-based biofuels compared to e.g. Brazilian ethanol based on sugar cane (Doornbosch and Steenblik, 2007). Even with record high fossil fuel prices, grain-based biofuel production would be significantly smaller if the industry was not heavily subsidised. Imposing mandatory blending targets (e.g. mandating that gasoline contains a minimum of 5 percent bioethanol) threatens to deteriorate the situation even further by effectively suspending the market forces. In an unregulated market high grain prices would reduce the profitability of biofuel production, whereas blending targets would force consumers to purchase a minimum of biofuels regardless of price. One way to limit the growth in cereal demand by the biofuel industry is to dismantle government support for biofuel, be it subsidies, tax breaks or blending targets (there are other, cheaper and more appropriate ways of meeting CO_2 targets – see e.g. Ministry of Food, Agriculture and Fisheries, 2008).

Supply

If the prospects of reducing growth in demand are limited, long term market equilibrium may be restored by increasing supply growth. The relatively low growth rates in wheat and rice production (Table 1) experienced for the past 20 years must be seen in a long term perspective. Though the recent cereal price increases are dramatic, they occur after a long period of downward trending real prices (Figure 4), reflecting the fact that global production outgrew global demand for the major part of the last century. We have no firm evidence of the causes for the decline in output growth, but it is likely that the historically low cereal prices have provided poor incentives for major investment in agricultural productivity and land expansions. The agricultural projections over the medium term suggest that cereal prices stabilise at a higher level than that seen for the past 10-15 years. This should induce higher growth in output.

In the short and medium term, output growth is likely to come from USA, Europe, Canada and countries in the former Soviet Union, largely based on expanded use of land (set aside land in the EU, and CRP reserves in USA). In the long term, the potential for high output growth in Europe and North America is probably limited. Agricultural land in these regions is fixed and producers are already highly productive suggesting that further improvements require large investments. However, considerable potential for output growth exists in countries in the former Soviet Union, particularly Russia, Ukraine and Kazakhstan, as well as Sub-Saharan Africa and South America, if infrastructural and institutional barriers can be overcome. For instance, EBRD-FAO (2008) estimates that between 11 and 13 million hectares of non-marginal land in Russia, Ukraine and Kazakhstan, taken out of cultivation during transition, could be restored to production if grain prices and profit margins remain high. In addition, relatively low agricultural yields per hectare leave much room for improvements. The ‘estimated maximum potential’ (defined as production from available land with western levels of agricultural yields) of these three countries could be as high as 280 million ton representing an 80 percent increase from current levels. However, this is considered an upper limit rather than a plausible outcome.

5. Consequences for the developing countries

The surge in world market cereal prices over the past couple of years and in particular the recent hike in world market rice prices has intensified speculations and discussions about the impact on the poor people in developing countries and about appropriate policy actions. (See e.g. *The Economist*, April 17th 2008; IFPRI Policy Brief, April 2008 and ODI Briefing Paper, April 2008). It is, however, not easy to infer the consequences of the increases in world market prices as the effects differ substantially across countries and across population groups within countries because several macroeconomic and microeconomic factors—and direct policies—affect the transmission from the world market to the national and local markets.

Looking across countries, at the national level, the most pressing issue is the impact of the increasing world market food prices on the current account. Two factors determine the sign and magnitude of the change in the current account following the increased world market prices: (i) the net position in international food trade (net exporters or importers of cereal and, more generally, food), and (ii) the exchange rate vis-à-vis the US dollar (USD). For net food exporters the improved terms-of-trade is beneficial—unless the countries limit exports to protect national consumers. In contrast, net food importers are experiencing a negative terms-of-trade shock and they may face serious deteriorations in the current account because of the increase in the import bill. For both net exporters and importers the magnitude of the gain or loss depends on the development in the exchange rate. The importance of exchange rate movements can be illustrated by noting that the price of wheat increased by 240 percent from January 2000 to January 2008, when measured in USD, whereas the increase was 134 percent, when measured in euro (EUR).

Within countries the impact on households is determined by factors similar to the macro level: (i) the net trade position—i.e., whether a particular household is a net producer or consumer of food—and (ii) the magnitude of the price increase, which in turn is affected by the exchange rate movements, national policies such as product related tariffs, taxes and subsidies and local market conditions determining the pass through from world market prices to local market prices.

In the following sections we address some of the above mentioned issues, notably the extent to which developing countries are net exporters or importers of food and agricultural products in general; the magnitude of the pass through from world market prices to national prices and, finally, the impact on poverty in a small number of countries. Because of severe data limitations the analyses of the pass through of world market prices and the impact on poverty are only indicative and illustrative.

5.1 Net food exporting and importing developing countries

FAO classify 82 developing countries as low-income food-deficit countries (LIFDC). In the classification FAO use four criteria of which the two main conditions are that the country must be a low- or middle-income country according to the World Bank classification, and that the country must

have an aggregate, calorie based, food deficit in the sense that national food demand exceeds production.[3]

FAO (2008) estimate cereal imports by volume and value for 2006/07 and forecasts imports for 2007/08 for the 82 LIFDCs. The volume of total imports for the group of LIFDCs is estimated to decrease marginally from 2006/07 to 2007/08 while there is a marginal increase in the volume of food aid (Table 4). It is noteworthy, though, that the volume of cereal imports to the group of African LIFDCs is expected to increase. When measured in values, using world market prices, the projected import requirements show an increase of 56 percent from 2006/07 to 2007/08 after having increased by 37 percent in the previous year (Table 5). The largest relative increase is in the European group of LIFDCs (78%), from a low base, followed by the African group (74%). Across the three main cereal products the largest increases in import values are for wheat and rice that are both projected to increase by 61 percent from 2006/07 to 2007/08.

Table 4: Cereal import and forecasted import requirement of LIFDCs (Thousand ton)

	Actual imports for 2006/07		Forecasted requirements for 2007/08	
	Total imports	Of which food aid	Total imports	Of which food aid
Africa (44 countries)	36,012	2,240	38,525	2,364
Asia (25 countries)	42,527	1,550	39,862	2,021
Latin America and Caribbean (4 countries)	2,604	186	2,543	198
Oceania (6 countries)	416	0	416	0
Europe (3 countries)	1,569	0	1,070	20
Total (82 countries)	83,128	3,976	82,416	4,603

Notes: The requirement is the difference between utilization (food, feed, other uses, exports plus closing stocks) and domestic availability (production plus opening stocks).
Source: FAO (2008), Tables 5 and A4.

[3] Specifically, the first criterion requires that per capita income (GNI) was less than USD 1,575 in 2004. The second criterion is that the country must be a net food importer based on the net food trade position averaged over the preceding three years. In this calculation trade volumes for a broad basket of basic foodstuffs (cereals, roots and tubers, pulses, oilseeds and oils other than tree crop oils, meat and dairy products) are converted and aggregated by the calorie content of individual commodities. The third criterion, self-exclusion, is applied when countries that meet the above two criteria specifically request to be excluded from the LIFDC category. Fourth, an additional factor, called "persistence of position", is taken into consideration which postpones the "exit" of a LIFDC from the list, despite the country not meeting the LIFDC income criterion or the food-deficit criterion, until the change in its status is verified for three consecutive years. During these three years, the country in question would be considered to be in a "transitional" phase. The list of LIFDCs can be found at www.fao.org/countryprofiles/lifdc.asp?lang=en.

Table 5: Cereal import bill in LIFDCs by region and type (USD million)

	2005/05	2006/07 Estimate	2007/08 Forecast
Africa (44 countries)	8,369	10,297	17,892
Asia (25 countries)	8,900	13,498	19,277
Latin America and Caribbean (4 countries)	468	594	898
Oceania (6 countries)	82	100	164
Europe (3 countries)	209	260	464
Total (82 countries)	18,028	24,749	38,696
Wheat	10,589	14,083	22,705
Coarse grains	3,099	4,522	6,097
Rice	4,340	6,144	9,894

Source: FAO (2008), Table 5.

FAO's classification of LIFDCs and the projections of cereal imports is not without problems. First of all, the estimated cereal import bills for the countries are not sufficient as indicators for the macroeconomic consequences of the increasing food prices because the impact on the trade balance and the current account depend on the share of these imports in total imports and further on the development in the prices on (agricultural) commodities that the countries' export. A related problem in the classification is that the definition of food deficient countries is rather narrow in terms of agricultural commodities included.

World Bank researchers Francis Ng and Ataman Aksoy have looked at net food importing countries using different definitions of food and agricultural products, based on the SITC classification in the UN COMTRADE database (Ng and Aksoy, 2008). Ng and Aksoy use two definitions of food. The first category, termed 'raw food', includes meats and dairy, grains and fruits and vegetables. The second category, termed 'all agriculture', is raw food plus 'cash crops and feeds', which are tropical foodstuffs and agricultural raw materials; e.g. coffee, tea, cocoa, spices, nuts and feeds and cotton, etc. The main reason for looking at a broader classification of food is that there are substitution possibilities within the agricultural commodities implying that farmers who produce topical products or agricultural raw materials could shift into farming food crops if relative prices change sufficiently.

Table 6: Developing Country Classifications by Raw Food Trade, All Agricultural Trade, and by income group based on COMTRADE data 2004/05

	Raw food trade		All agricultural trade		Total
	Net exporter	Net importer	Net exporter	Net importer	
Middle income, all	36	69	41	64	105
Oil exporters	3	17	5	15	20
Civil conflict states	1	3	0	4	4
Small Islanders	5	25	8	22	30
Other Middle-income	27	24	28	23	51
Low-income, all	16	42	34	24	58
Oil Exporters	2	5	4	3	7
Civil conflict states	1	7	2	6	8
Other Low-income	13	30	28	15	43

Notes: Food is defined as raw food in SITC Revision 2, excluding cash crops, processed food and seafood. All agriculture is defined as all raw food, cash crops and agricultural raw materials in SITC Revision 2, excluding processed food and seafood products.
Source: Ng and Aksoy (2008), Tables 1 and 3.

Table 6 shows the distribution of 163 developing countries in terms of their net trade balance for the 'raw food' and 'all agriculture' definitions respectively. Looking first at the classification by the raw food definition it is clear that most developing countries are net food importers. Specifically, some 66 percent of the middle-income countries and 72 percent of the low-income countries are net food importers. If oil exporters, countries in conflict and small island states are excluded the ratio decreases to 47 percent for the middle-income countries, but stays fairly constant (70 percent) for the low-income countries. Hence, 'normal' middle-income countries are much less likely to be food importers compared to 'normal' low-income countries implying that the present food price situation puts more pressure on low-income countries compared to middle-income countries.

Extending the definition to 'all agriculture' changes the status for net importers and exporters significantly. In particular, only 88 developing countries are net agricultural importers. The main change in status occurs in the low-income group of countries as the share of net importers falls to 41 percent compared to the 72 percent when using the more narrow definition of net importers. Exclusion of oil exporters, countries in conflict and small island states has only a significant impact on the classification in the middle-income group, whereas the classification in the low-income group is more or less unchanged. Hence, while the present surge in cereal prices has a negative impact on the current account in the short run for the majority of the developing countries, the medium and long term perspectives in increasing agricultural prices in general may actually be beneficial for the developing countries because the majority of the countries are net exporters of agricultural products.

Table 7: Net Imports as Percentages of All Goods Imports for Grains and Cereals, Raw Food, and All Agriculture, by income group based on COMTRADE data 2004/05

	Grains and Cereals	Raw food	All agriculture
Middle income, all (105)	-0.3	0.1	0.7
Oil exporters (20)	-1.0	-2.8	-2.2
Civil conflict states (4)	-0.6	-3.0	-2.5
Small Islanders (30)	-0.3	-1.8	-1.0
Other Middle-income (51)	-0.2	0.7	1.2
Low-income, all (58)	-0.6	-0.2	4.8
Oil Exporters (7)	-4.2	-4.6	0.6
Civil conflict states (8)	-2.5	-4.0	-1.7
Other Low-income (43)	0.1	0.7	5.9

Source: Ng and Aksoy (2008)

In addition to the net trade position the magnitude of food exports and imports is important in determining the impact of the world food prices on the trade balance and the current account in the developing countries. Ng and Aksoy (2008) have calculated the trade balances for each of the 163 countries and for the country groupings given in Table 6. These statistics are reported in Table 7. Besides the trade balances for 'raw food' and 'all agriculture' we also show the balances for the commodity group 'grains and cereals' as this is where world market prices have soared in recent years. In the Table average trade balances are shown as percentages of all goods imports in order to illustrate the relative importance of the food imports. Further, it should be noted that the balances are calculated for the years 2004/05 whereby the recent increases in world prices on cereals are not included.

Table 7 shows that the net imports of grains and cereals constitute a small fraction of all goods imports. Further, the overall net import status of the low-income countries is driven by oil exporters and civil conflict countries. The average net food balance for the 43 'normal' low-income countries shows a small surplus in the trade with grains and cereals. Looking at the trade with raw food (column 2 in Table 7) the computations show that middle-income countries, as a group, are net food exporters. The overall surplus as a percentage of total imports is, however, small. Excluding the oil exporters, countries in conflict and small island economies results in a much larger export surplus. According to Ng and Aksoy this surplus is caused primarily by net exports of fruit and vegetables with deficits in meats and dairy and grains and cereals. Hence, the export surplus may be threatened if the current world market prices on grains and cereals do not spill-over on prices of fruit and vegetables. Yet, there is market heterogeneity in the middle income group. The largest five net importers are Korea, Hong Kong, Taiwan, Singapore and Malaysia. These countries are well outside the classification as low-income food deficit countries.

The low-income countries have a small food trade deficit, overall, which amounts to 0.2 percent of total imports. The reason for the net import status of the low-income countries is the large food imports by the oil exporting and conflict countries. By excluding the latter countries it becomes apparent that 'normal' low-income countries are net exporters of food, narrowly defined, and the surplus amounts to 0.7 percent of total imports.

Moving from raw food trade to trade in all agriculture products does not change the net trade balances significantly for the middle-income countries. The orders of magnitude of the deficits and surpluses change slightly, but there are no changes in signs. For the low-income countries the changes are significant, though. The overall trade deficit in food changes to a large surplus constituting 4.8 percent of total imports and 'normal' low-income countries have an overall agricultural trade surplus which constitutes almost 6 percent of total imports.

Hence, the low-income countries, as a group, are agricultural exporters, and if they substitute production of raw food products for other agricultural products, they could gain from increased world market food prices in the medium run. In the present situation it is, however, important to emphasize that substitution from other agricultural products takes time, which is why it is essential to distinguish between developing countries' needs and opportunities in the short run, as raw food importers, and the longer run as possible raw food exporters. Further, as noted by Ng and Aksoy, there is a group of countries experiencing civil conflicts which are often large importers of food that cannot easily adjust their production and meet basic needs. These countries also need special assistance in the distribution of food within their boundaries. It is therefore important to establish appropriate mechanisms to ensure the availability of food aid at a level which is sufficient to continue to provide assistance that meets the food needs of poor conflict countries.

5.2. The price transmission from world markets to domestic markets

The surge in world market food prices has been accompanied by a rather large depreciation of the USD against many currencies across the world. Some researchers see this depreciation as one of the causes of the high commodity prices because (real) exchange rate appreciation vis-à-vis the USD will neutralize some of the impact of increased world market prices measured in USD terms. Table 8 shows that real exchange appreciation against the USD has been widespread and that the average developing country has appreciated more against the USD than the average high income country. Hence, reporting world market food prices in EUR may be more appropriate at present given the steady worldwide decline in the USD.

The exchange rate movements against the USD are highly heterogeneous within the developing countries. When the magnitude of exchange rate appreciation varies across countries, changes in world market prices—in domestic currency terms—will also vary across countries, even for the same commodity, making precise analyses of the impact of the world food price increases on developing countries very imprecise. Moreover, in addition to the overall dampening effect of the real exchange rate movements many countries have taken political measures to limit the transmission from world market prices to domestic food price.

Table 8: Real exchange rate appreciations of domestic currencies versus the USD 2003-2007

World Bank country classification	Real exchange rate appreciation of domestic currencies
Low Income	16
Lower middle income	14
Upper middle income	19
High income	12

Notes: Country group appreciations are simple averages of all countries in a given group for which data were available.
Source: Dawe (2008)

David Dawe from FAO has analyzed the extent of price transmission from the world market to the national markets in seven large Asian countries focusing on the transmission of rice prices (Dawe, 2008). The main results of his analysis are reported in Table 9.

Column (1) in Table 9 reports the percentage change in the world market rice price from 2003Q4 to 2007Q4 while column (2) reports the world price in the local currency for the seven countries. The ratio of the two changes is a measure of the cumulated real exchange rate effect (given in column 4). The seven countries have all appreciated against the USD, but the degree of real appreciation varies considerably from Bangladesh where there is virtually no exchange rate effect to the Philippines where the growth rate in the local currency world rice price is only 17 percent of the growth rate in the USD world price. Still, none of the countries have real appreciations that nullify the increase in world market prices.

Table 9: Cumulative percentage changes in real rice prices, 2003Q4 to 2007Q4

Country	World price USD (1)	World price LCU (2)	Domestic price LCU (3)	Exchange rate effect (%): 100*(2)/(1)	Local policy effect (%): 100*(3)/(2)	Pass trough (%): 100*(3)/(1)
Bangladesh	56	55	24	98	44	43
China	48	34	30	71	88	64
India	56	25	5	45	20	9
Indonesia	56	36	23	64	64	41
Philippines	56	10	3	17	30	6
Thailand	56	30	30	54	100	53
Viet Nam	39	25	3	64	12	11

Notes: Data for China compare annual averages for 2003 and 2007. Data for Viet Nam compare annual averages for 2003 and 2006.
Source: Dawe (2008)

Box 1: Some policy measures taken by governments to limit the price increases

Bangladesh: Has reduced taxes on food grains, is selling its rice stocks at subsidized prices in urban areas and has introduced export restrictions.

China: Has introduced a series of quotas/bans on grain exports and additional agricultural production support measures, including increases in the minimum purchase prices of wheat and rice and agricultural inputs subsidies.

India: Has banned non-basmati rice exports, has set the minimum export price for basmati rice at USD/ton 1,200, and authorized duty-free imports of rice.

Indonesia: Has reiterated that it will take a series of measures to stabilize food prices.

Philippines: Has reduced rice and maize import tariffs and has encouraged the private sector to participate in importing 163,000 ton of rice together with the National Food Authority (NFA). The NFA is also selling its rice stocks at subsidized prices.

Thailand: Will release 650,000 ton of rice from state stocks to be sold at subsidized prices.

Viet Nam: Has banned rice exports and announced in late March that total rice exports permitted in 2008 would be cut to 3.5 million ton, down from 4.5 million ton in 2007.

Source: FAO (2008)

The impact of the price increases on consumers is measured by the percentage changes in the domestic prices, which is given either as the wholesale or the retail rice prices (column (3) of Table 9). The ratio of the local currency world market price to the domestic price is a measure of the outcome of the domestic policy measures taken by the governments in the seven countries. (The specific policy measures are given in Box 1). Also the outcomes of the domestic policy measures vary markedly across the countries. In Thailand the domestic price follows the local currency world market price (up to the fourth quarter of 2007) and in China the growth rate of the domestic price is 88 percent of the growth rate in the local currency world market price. At the other extreme Viet Nam has taken measures to almost completely keep a constant rice price (in real terms) from 2003 to 2006 and in India the growth rate of the domestic price is only 20 percent of the growth rate of the local currency world market price.

The main conclusion from Table 9 is that for all countries, save China, the pass through of world market prices is less than 60 percent. Thus, in the period 2003 to 2007 there has been a substantial damping of international rice price increases, which is beneficial for the rice consumers but at the same time distorting the incentive for rice producers to increase the rice production. This distortion has been reinforced by the increase in energy prices as energy price increases have a significant impact on agricultural production costs.

The limited information available for the first quarter of 2008 shows that domestic rice prices have increased substantially in Bangladesh, the Philippines, Thailand and, to a lesser extent, in India. However, none of the price increases are comparable with the hike in world market rice prices, meaning that the pass trough is still fairly low. In China and Indonesia domestic prices have been

relatively stable over the past six months. Hence, China and Indonesia are presently, by and large, isolating the local markets from the world market.

As a final note on the study of the pass through of prices in the seven Asian countries it is worth emphasizing that the estimates of the pass through from world market prices to domestic consumer prices, presented in Table 9, are likely to be downward biased. Food consumption constitutes a relatively large fraction of total household expenditure in the seven countries whereby international price increases of the order of magnitude experienced since 2003 will have an impact on inflation. This upward pressure on inflation has been boosted by the increase in energy prices, caused by the large increases in world market oil prices, making it difficult to separate the individual effects. If inflation has increased because of the increases in food prices then the local rice prices reported in the Table, which are adjusted for inflation, will underestimate the full effect leading to a downward bias in the estimated pass through.

At present the pass through of world market food prices to domestic consumer prices has not been analyzed for low-income African countries. According to the Director General of IFPRI, Joachim von Braun, domestic prices on maize are getting closer to world market prices in low-income East African countries, specifically Ethiopia, Kenya and Uganda (von Braun, 2008b). For the 14 West and Central African countries with the CFA franc currencies the situation is in all likelihood different as the currencies are pegged to the euro whereby the appreciation of the euro against the USD leads to an appreciation of the CFA franc vis-à-vis the USD. This appreciation of the currency cushions the effect of the increasing world market prices as noted above. In addition, several African countries have taken policy measures to address the rising food prices. The World Bank has recorded and classified some of these country specific policy measures and this classification is reproduced in Box 2. It must be noted, however, that the precise outcomes of the policies are unknown.

Summarizing the impact of the rising world market food prices it is clear that the pass through of the world prices is quite far from 100 percent in most developing countries due to the appreciation of the dollar and domestic price stabilization policies. Further, at the macroeconomic level the higher food prices have generally been mitigated by rising non-food commodity prices whereby the terms-of-trade effects are in many cases positive—in particular for oil exporting countries (World Bank, 2008). However, while the price transmission varies there have been significant increases in domestic food prices and this contributes to a pressure on the overall inflation in the countries possibly leading to macroeconomic instability. Further, even relatively small changes in food prices may have negative effects on the well-being of poorer households. This problem is addressed in the next section.

Box 2: Country Policies to Address Rising Food Prices

Country	Reduce taxes on food grains	Increase supply using stocks	Price controls/ Consumer subsidies	Export restrictions
Angola	X			
Burkina Faso	X	X		
Burundi	X			
Cameroon	X		X	
Congo, Rep.			X	
Eritrea			X	
Ethiopia	X	X		X
Kenya				
Lesotho	X			
Madagascar	X			
Mauritius			X	
Mozambique				
Niger			X	X
Nigeria				
South Africa	X			
S.T. Principe	X	X		
Sudan	X	X		X
Tanzania	X	X		X
Uganda				
Zambia	X	X		
Zimbabwe			X	

Source: World Bank (2008)

5.3 Distributional impacts and implications for poverty

Within the developing countries the rising food prices lead to redistriubtion as some households benefit from the higher prices while others are hurt by them. At the most general level the income for net producers of food will increase while net consumers will experience a tighter consumption budget. Using this broad distinction between net producers and consumers one must expect poverty to increase in urban areas while it may decrease in rural areas. The latter depends, in part, on the distribution of land, though, because landless poor in the rural areas will only benefit if the price increases spill-over on the wages for unskilled labor.

Moving beyond these general statements is difficult because the distribution of urban and rural poor varies greatly across countries and, furthermore, there is large variation in the types of food commodities produced across countries. In order to get a sense of the poverty impact of the world price changes World Bank researchers Maros Ivanic and Will Martin have looked into the consequences on poverty of specific food price increases in nine developing countries using nationally representa-

tive household survey data for each country (Ivanic and Martin, 2008). Specifically, Ivanic and Martin estimate the short-run impacts on households' income and cost of living following a change in specific food prices. Based on the estimates the impact on poverty within each of the nine countries can be calculated and, by this, it is possible to get a more precise prediction of the overall implications for poverty reduction. It should be noted, though, that this approach only includes the direct impacts of price changes. Second order implications such as the impact of higher inflation in the countries are not included in the analysis.

Table 10 reports the results of a hypothetical 10 percent increase in the prices of individual products on the poverty rate in each of the nine countries. The Table shows that the impact of changes in each product price on poverty differs greatly between both products and countries. Across regions an increase in the price of maize will generally increase both urban and rural poverty in Sub-Saharan African countries (Malawi and Zambia) while Asian countries are largely unaffected. In Latin America, the rural populations benefit (Bolivia and Nicaragua) while there is a small increase in urban poverty in Nicaragua. The overall poverty rate in the Latin American countries is unchanged following this price shock. For wheat the situation is quite different as the poverty rate increases in all three Latin American countries, and this is so for both the rural and the urban poverty rates. The East Asian countries (Cambodia and Viet Nam) are unaffected by a price increase on wheat but rural poverty in Pakistan increases. In Sub-Saharan Africa there is no change in poverty in Malawi and Zambia, while the urban poverty increases somewhat in Madagascar.

The most important cereal price appears to be rice, as an increase in the rice price leads to increases in poverty across all three regions. There are large effects on poverty in both Bolivia and Nicaragua in Latin America, in Cambodia in Asia and in Madagascar and Zambia in Africa. Not surprisingly rice price increases are beneficial for the overall poverty rate in Viet Nam and Pakistan, although urban poverty in Viet Nam increases.

Looking at the effect of a 10 percent increase in all prices (including beef, poultry, dairy and sugar) it is clear that the poverty rate will increase in most of the nine countries and some of the increases are substantial, in particular in Nicaragua and Madagascar. The two exceptions are Peru and Viet Nam which will benefit from increased agricultural prices in terms of the overall poverty rates.

Ivanic and Martin (2008) use the results of Table 10 to simulate the impact on poverty of the recent increases in world market food prices. Specifically, they simulate the effect of increases in the domestic prices in each country amounting to 80 percent for maize, 70 percent for wheat, 25 percent for rice, 90 percent for dairy products and 15 percent for poultry. These price increases are in accordance with the world market price increases from 2005 to 2007. The outcome of the simulation study is a rise in the average poverty rate of 3 percentage points. The increase in urban poverty is higher, at 3.6 percentage points, while rural poverty rises by 2.5 percentage points. However, as expected from the results in Table 10 Peru and Viet Nam are likely to have benefitted from the price increases. In contrast, poverty in Nicaragua is likely to have increased substantially.

Adding the price increases in the first quarter of 2008 the average poverty rate is more likely to have increased by 4.5 percentage points. This is a substantial estimated increase considering that the

average reduction in poverty has been 0.7 percentage points per year since 1984. Hence, despite the uncertainty in the estimates it is reasonable to conclude that the world market cereal price increase have had a significant negative impact on poverty.

Table 10: Initial $1 per day poverty rates and impacts of a 10 percent price increase on poverty (percent and percentage points change)

		Initial poverty	Maize	Wheat	Rice	Beef	Poultry	Dairy	Sugar	All
Latin America										
	Rural	40.9	-0.1	0.3	0.2	0.2	0.1	0.0	0.2	0.5
Bolivia	Urban	9.9	0.0	0.2	0.0	0.2	0.1	0.0	0.1	0.6
	Total	23.2	0.0	0.2	0.1	0.2	0.1	0.0	0.1	0.5
	Rural	61.1	-0.2	0.4	0.4	0.1	0.2	0.2	0.2	1.5
Nicaragua	Urban	32.2	0.1	0.2	0.5	0.2	0.5	0.6	0.2	2.7
	Total	45.1	0.0	0.3	0.4	0.1	0.4	0.4	0.2	2.1
	Rural	12.9	0.0	0.1	0.0	-0.1	0.0	0.0	0.0	-0.1
Peru	Urban	11.5	0.0	0.1	0.0	-0.1	0.0	0.0	0.0	-0.1
	Total	12.5	0.0	0.1	0.0	-0.1	0.0	0.0	0.0	-0.1
Asia										
	Rural	38.7	0.0	0.0	0.6	-0.3	0.0	0.0	0.1	0.3
Cambodia	Urban	15.7	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.5
	Total	34.1	0.0	0.0	0.5	-0.2	0.0	0.0	0.0	0.3
	Rural	20.9	-0.1	0.0	-1.0	-0.1	-0.2	0.0	0.0	-1.4
Viet Nam	Urban	7.6	0.0	0.0	0.2	0.0	-0.1	0.0	0.0	0.2
	Total	17.7	-0.1	0.0	-0.7	-0.1	-0.2	0.0	0.0	-1.0
	Rural	20.8	0.0	-0.1	-0.1	0.0	0.0	-0.1	0.0	-0.1
Pakistan	Urban	10.4	0.0	0.4	0.0	0.0	0.0	0.2	0.1	0.8
	Total	17.0	0.0	0.1	-0.1	0.0	0.0	0.0	0.0	0.3
Sub-Saharan Africa										
	Rural	76.8	0.0	0.0	1.7	0.2	0.0	0.0	0.2	1.9
Madagascar	Urban	50.4	0.0	0.3	1.2	0.5	0.1	0.2	0.1	1.8
	Total	61.0	0.0	0.2	1.4	0.4	0.0	0.1	0.1	1.8
	Rural	23.3	0.5	0.0	0.0	0.0	0.0	0.0	0.1	0.6
Malawi	Urban	3.7	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.4
	Total	20.8	0.5	0.0	0.0	0.0	0.0	0.0	0.1	0.5
	Rural	72.2	0.8	0.0	0.1	0.0	0.2	0.0	0.0	1.1
Zambia	Urban	79.5	0.2	0.0	0.0	0.1	0.1	0.1	0.0	0.6
	Total	75.8	0.5	0.0	0.0	0.1	0.2	0.0	0.0	0.8

Source: Ivanic and Martin (2008)

References

von Braun, Joachim, 2007. "The World Food Situation – New Driving Forces and Required Actions." Washington DC: International Food Policy Research Institute.

von Braun, Joachim, 2008a. "Rising food prices: what should be done?" *IFPRI Policy Brief*, April 2008. Washington DC: International Food Policy Research Institute.

von Braun, Joachim, 2008b. "High and rising food prices." Slide presentation at USAID conference on "Addressing the challenges of a changing world food situation: Preventing crisis and leveraging on oppertunity" Washington, D.C., April 11, 2008.

Chicago Board of Trade: www.cbot.com

Dawe, David, 2008. "Have recent increases in international cereal prices been transmitted to domestic economies? The experience in seven large Asian countries." ESA Working Paper No. 08-03, April 2008. Agricultural Development Economics Division, FAO.

Doornbosch, Richard and Ronald Steenblik (2007), "Biofuels: Is the Cure worse than the disease?" OECD, Round Table on Sustainable Development, 11-12 September 2007.

ECB, 2008. "Recent Developments in World Food Prices and Their Impact on Euro Area HICP Inflation", European Central Bank

EBRD and FAO, 2008. "Fighting food inflation through sustainable investment", European Bank for Reconstruction and Development and FAO, 10 March 2008

The Economist. "The silent tsunami." Opinion Leaders, *the Economist*, April 17th 2008.

FAO, 1983. "Approaches to world food security." *FAO economic and social development paper*, 32, Food and Agriculture Organization of the United Nations, Rome.

FAO, 2007. "Food Outlook – Global Market Analysis", Global Information and Early Warning System (GIEWS), November 2007.

FAO, 2008a. "Growing Demand on Agriculture and Rising Prices of Commodities – An Opportunity for Smallholders in Low-income, Agricultural-based Countries?", Paper prepared for the Round Table organized during the Thirty-first session of IFAD's Governing Council, 14 February 2008.

FAO, 2008b. "Crop prospects and Food Situation", Global Information and Early Warning System (GIEWS), April 2008.

FAO/IFAD/WFP, 2008. "High Food Prices: Impact and Recommendations", Paper prepared by FAO, IFAD and WFP for the meeting of the Chief Executives Board for Coordination on 28-29 April 2008, Bern, Switzerland.

FAOSTAT: www.faostat.fao.org.

IFPRI, 2008, "Supply and Demand of Agricultural Products and Inflation – How to Address the Acute and Long-Run Problem." Paper Prepared for the China Development Forum, Beijing, March 22-24.

IRRI, 2008. "The Rice Crisis: What Needs to be Done?", Background Paper, International Rice Research Institute. Los Baños (Philippines).

Ivanic, Maros and Will Martin, 2008. “Implications of higher global food prices for poverty in low-income countries”. Policy Research Working Paper 4594, April 2008. Development Research Group, The World Bank.

Ng, Francis and M. Ataman Aksoy, 2008. “Who are the net food importing countries?”. Policy Research Working Paper 4457, January 2008. Development Research Group, the World Bank.

Ministry of Food, Agriculture and Fisheries, 2008. *Jorden – en knap resource. Fødevareministeriets rapport om samspillet mellem fødevarer, foder og bioenergi*, Januar 2008.

OECD, 2006. “Agricultural Market Impacts of Future Growth in the Production of Biofuels”. Working Paper, February 2006, OECD, Paris.

OECD-FAO, 2007. *Agricultural Outlook 2007-2016*. OECD/FAO (www.agr-outlook.org).

Slayton, Tom and C. Peter Timmer, 2008. “Japan, china and Thailand Can Solve the Rice Crisis – But U.S. Leadership is Needed”. Center for Global Development Notes, May 2008.

USDA, 2008. *USDA Agricultural Projections to 2017*. USDA (www.ntis.gov)

USDA-ERS, 2008a. “Briefing Room – Wheat: Market Outlook”, USDA wheat baseline 2008-17, USDA Economic Research Service 12 March 2008.

USDA-ERS, 2008b. *Wheat Yearbook 2008*, USDA Economic Research Service.

USDA-NASS, 2008a. *Corn country maps, planted acreage by county*, USDA National Agricultural Statistics Service, downloaded 21/05/08.

USDA-NASS, 2008b. “Rice country maps, planted acreage by county”, USDA National Agricultural Statistics Service, downloaded 21/05/08.

USDA-NASS (2008c), “Wheat country maps, planted acreage by county”, USDA National Agricultural Statistics Service, downloaded 21/05/08.

Ttrostle, Ronald, 2008. “Global agricultural supply and demand: factors contributing to the recent increase in food commodity prices.” WRS-0801, USDA, May 2008.

Wiggins, Steve, 2008. “Rising food prices: a global crisis”. *ODI Briefing Paper*, April 2008. Overseas Development Institute. (www.odi.org.uk).

World Bank, 2008. “Country policies and programs to address rising food prices.” Processed. The World Bank, Washington, D.C.