Report

Food Prices 2013/14

Annual Review

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Key messages

- **Record global harvests** for 2013/14 for cereals, as farmers respond to recent high prices, have **pushed down prices.**
- **Uncertainty in Ukraine** has led to price rises for maize and wheat, but these are likely to be temporary interruptions to falling trends.
- Since 2008, cereals prices have been high and volatile, but it now seems **a new equilibrium has been reached.**
- **The supply response since 2008 has accelerated,** with most of the increases coming from the developing world.
- New studies (again) suggest **higher food prices may benefit some poor rural households.**

Abbreviations

CBOT	Chicago Board of Trade
CPI	Consumer Price Index
EU	European Union
FAO	Food and Agricultural Organization
FAS	Foreign Agricultural Service
FSU	Former Soviet Union
GIEWS	Global Information and Early Warning System on Food and Agriculture
ICG	International Grains Council
OECD	Organisation for Economic Co-operation and Development
SSA	Sub-Saharan Africa
US	United States
USDA	US Department of Agriculture

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Summary

Good harvests in 2013/14 have pushed down prices

The cereals marketing year 2013/14 (April 2013 to May 2014) saw record production, up by 8% on last year's harvests, thanks to few disruptions to production plans that were set high given high prices on offer. Production will exceed consumption, allowing stocks to be built up.

Consequently, prices of cereals fell throughout 2013, falls that have been interrupted only by the crisis in Ukraine, which has added a risk premium to maize and wheat prices since February 2014. The futures markets are, however, sanguine about this: they are well below spot prices for maize and wheat, indicating traders expect further falls in these prices in the remainder of 2014.

Rice prices, perched surprisingly high since 2008, have finally fallen as the Thai paddy pledging scheme has been abandoned and Thailand is selling off some of its inflated public stocks.

A cycle of instability may be passing as the grain markets enter a new equilibrium

For much of the past six years since the 2007/2008 spike, cereals prices have been high and volatile, leading some to suggest this is a new norm. Yet increasingly it seems a cycle of instability may be ending.

The spike was an unusual event, whereby short-term harvest fluctuations were superimposed on longer-run changes and topped off by panic reactions for good measure. With depleted stocks, world cereals markets have subsequently been sensitive to harvest failures, so price rises were sharp in response to poor harvests in 2010 and 2012.

For almost two years, however, there have been no harvest shocks; while some of the longer-run drivers of changes to the market have – at least temporarily – run out of steam, allowing farmers and traders to adjust to new levels of demand and supply.

Three things have shifted. On the supply side, higher oil prices and rising rural wages in Asia have pushed up costs of production. The oil price hike that began in the early 2000s has now settled down, however, with oil prices fluctuating in a band between US$100 and US$120 a barrel. On the demand side, the increase in the use of maize in the US for ethanol distilling since the early 2000s has been as massive as its scale has been unexpected. But this extraordinary increase has now levelled off, as the US approaches the blend wall for ethanol in transport fuels.

These changes mean cereals prices are higher than they were before the spike, but there is little now expected to increase those prices in the short and medium terms. Projections indicate that real prices could fall back a little over the next five years.

If a new equilibrium has been reached, this calls into question the wisdom of the radical proposals of 2008 for global public stocks and for reining in the futures markets. Increasingly, what was done in 2008 looks to have been a better option.

Strong production since 2008, especially from the developing world

The single strongest response internationally and nationally to the price spike of 2007/08 was to reinvest in promoting production of staples, especially in the developing world. This has paid off.

Two years ago, we reported a strong response by farmers to higher prices since 2008. In this Annual Review, we revisit this to find that the increases have been sustained. For all three main grains, production has accelerated since the spike, so that, in the past seven years, more than twice as much has been added to world grain production than was added in the seven years before the spike.

Equally remarkable, most of that increase, fully 73%, has come not from the capitalised farms of the agricultural power houses in Europe, North America and Australia/New Zealand but from the developing world, where smallholders dominate. In proportion, Africa has contributed particularly strongly.

Moreover, with the exception of maize, most of the increased production has come from higher yields, not from sowing greater areas to these crops.

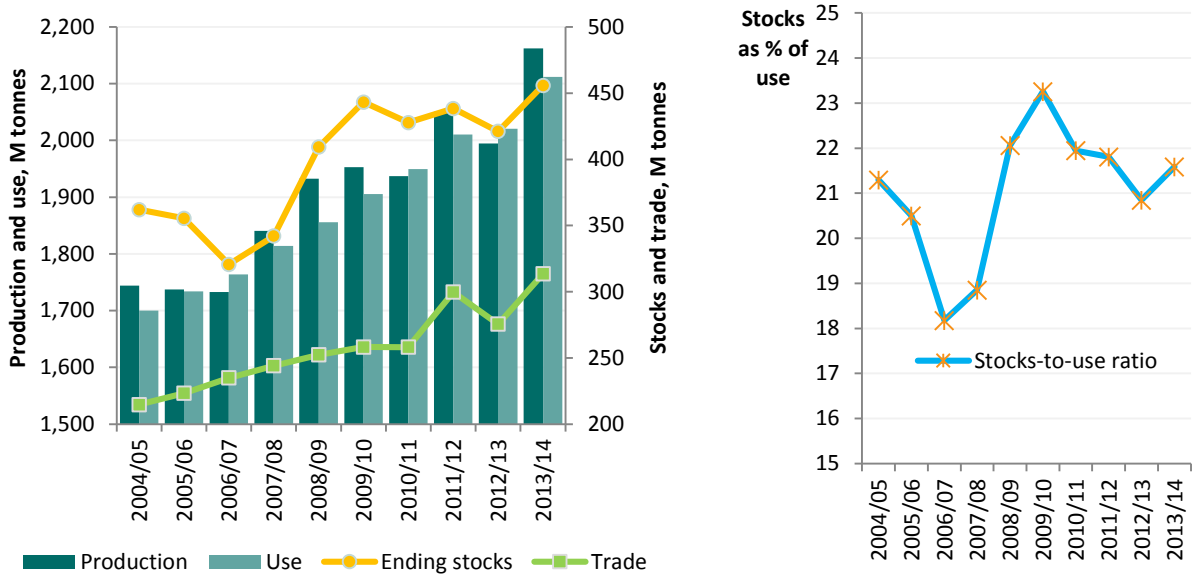
Intriguing new evidence on impacts of higher food prices

Two new studies show how higher food prices may have benefited (some) poor rural households, adding to the evidence we summarised in July 2013.

1 Good harvests bring down cereals prices in 2013/14

The world cereal harvest for 2013/14 will be at a record high, beating last year's production by 8% (Figure 1). In April 2014, the estimated harvest of major cereals for 2013/14 will be 2,162M tonnes, consisting of 968M tonnes of maize, 713M tonnes of wheat and 475M tonnes of milled rice.[1] Production will be some 50M tonnes more than expected consumption, so stocks will rise to reach 22% of annual use.

Figure 1: Major cereals global production, use, stocks, trade and stock-to-use ratios, 2004/05-2013/14



Note: Trade is constructed as an average of imports and exports, which are not always reported as equal on the global level.
Source: Data from USDA FAS for maize, wheat and milled rice.

1.1 Maize and wheat

Both maize and wheat saw large harvests after the high prices of late 2012 led farmers to plant greater areas. In the US, for example, the largest area since World War II was planted to maize.

Consequently, for much of the year prices fell (see Figure 2). By the end of 2013, maize prices were down by US$102 a tonne from where they were in May 2013, and wheat prices had fallen by US$51 a

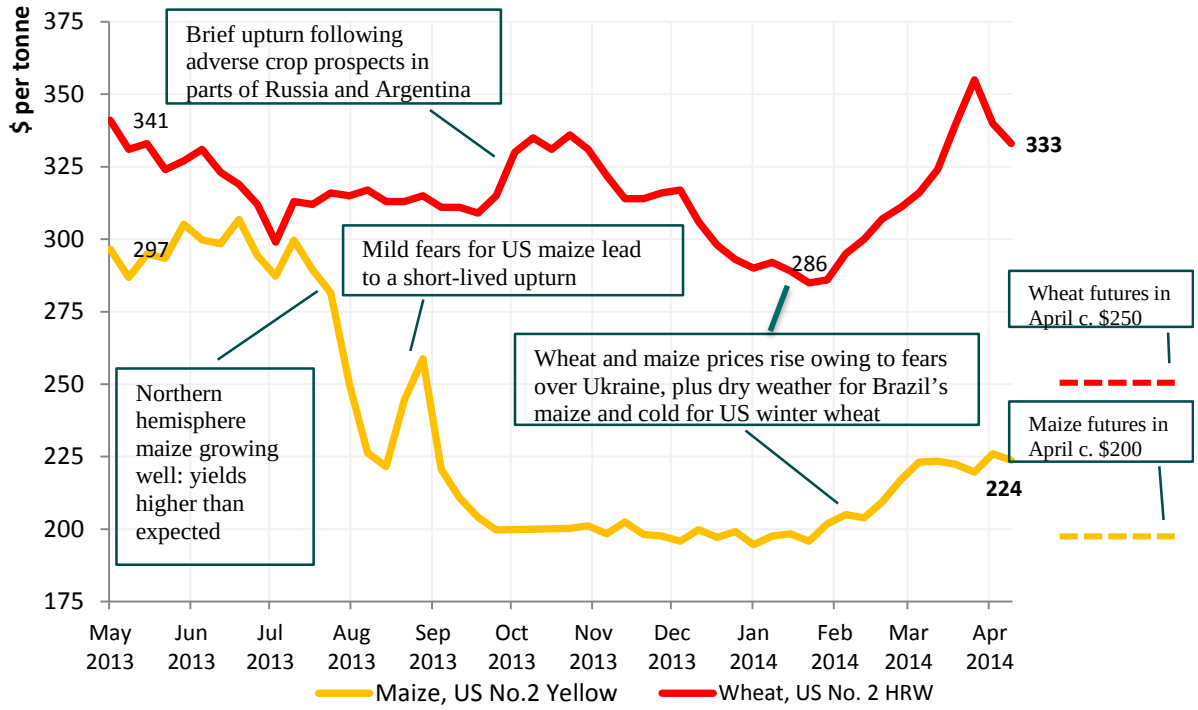
[1] Outcomes are higher than expected earlier. In May 2013, the US Department of Agriculture's first projections for key cereal harvests in 2013/14 predicted 966M tonnes of maize, 701M tonnes of wheat and 479M tonnes of milled rice; so only rice production has been lower than expected in early projections, and only by 4M tonnes (some 0.8% of global production); wheat production has exceeded expectations by 12M tonnes and maize by 2M tonnes.

tonne over that time. The margins too between maize and wheat, which reached historically very low levels in mid-2013, have widened (see Box 1).

Since early 2014, however, prices for both have risen in response to fears over Ukrainian harvests and losses to US winter wheat as a result of dry conditions. For maize, increases have been limited: by mid-April 2014 they were still more than US$70 a tonne below those at the start of the marketing year. Wheat prices have risen more strongly: by mid-April 2014 they were only US$8 a tonne below where they were at the start of the marketing year.

While the Ukraine crisis has created uncertainty – see Box 2 – and thus pushed up prices, futures prices for both maize and wheat are well below current spot prices (see Figures 3 and 4), indicating that prices will fall by the time of the 2014 autumn harvests in the northern hemisphere.

Figure 2: Maize and wheat prices, May 2013-mid-April 2014



Source: Weekly prices from FAO. Futures prices from CBOT, as in figures below.

Box 1: Margins between wheat and maize

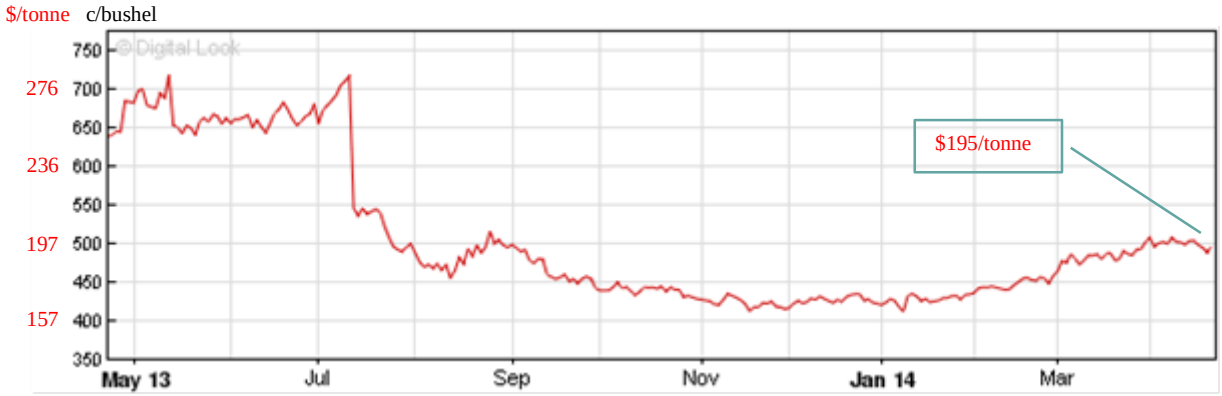
The margins between maize and wheat prices, which during 2011/12 were at almost the same level, widened again to around 50% in April 2014. This is closer to historical norms, whereby wheat enjoys a price premium over maize: from 2000 to 2014 the difference averaged 39% (Figure A1 in Annex).

In the future the margins are expected to be quite small, below 15% according to Organisation for Economic Co-operation and Development (OECD)/Food and Agricultural Organization (FAO) projections to 2022 (Figure 6, Section 2). This narrowing of the margin may reflect maize becoming a more valuable crop than before, when much of it was destined to become animal feed. There is now large demand for maize for ethanol distillation, combined with increasing demand for feed-grains, as diets in emerging economies shift to include more animal produce, most of which will be fed on grains.

While ethanol expansion may be levelling off, particularly in the US, demand for animal feed is set to grow faster than before. The International Grain Council (IGC) five-year projections, at end-2013, predicted a 2.3% annual increase in (maize) feed-grain use in the near future).

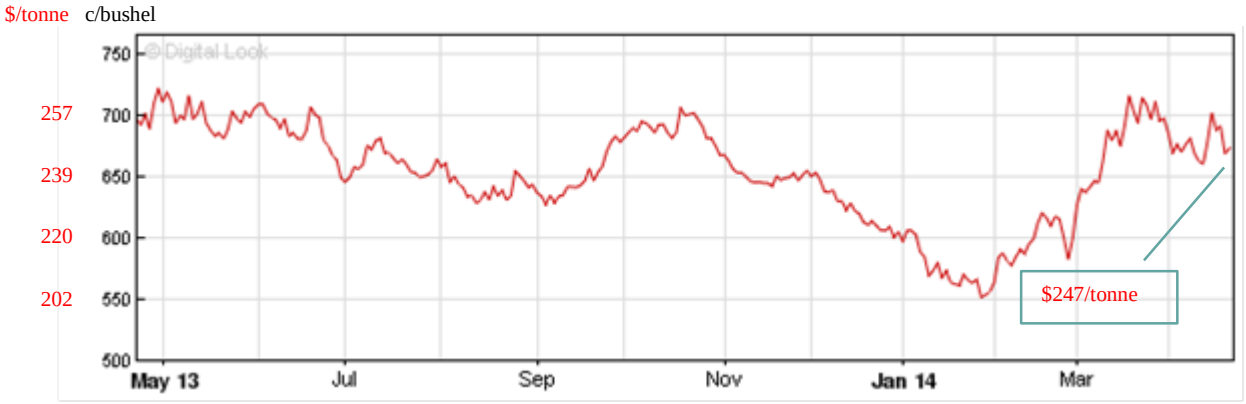
Sources: IGC (2013); http://www.oecd.org/site/oecd-faoagriculturaloutlook/

Figure 3: Chicago (CBOT) Maize Futures: US cents/bushel, 12 months to April 23, 2014



Note: US$/tonne added. Source: BBC Market data.

Figure 4: Chicago (CBOT) Wheat Future: US Cents/bushel, 12 months to April 23, 2014



Note: US$/tonne added. Source: BBC Market data.

Box 2: Ukraine events introduce uncertainty

After more than 15 months without any significant shocks to cereals production, events in Ukraine have introduced uncertainty. Should conflict break out, crop production and exports will likely be cut back. So far, exports of maize and wheat from the region have not been interrupted.[2] Not surprisingly, however, some traders have been spooked, and prices have risen.

How important is Ukraine to world cereal markets? In 2013/14, Ukraine was the third-largest maize exporter, shipping almost a fifth of global maize exports. For wheat, it was the seventh-largest exporter, with just under 7% of world wheat exports.

Were Ukraine harvests to be hit by conflict, world prices would rise further; although not necessarily by that much. Ukraine exported 18.5M tonnes of maize plus 10M tonnes of wheat in marketing year 2013/14. Were all future Ukrainian exports to be lost, these amount to no more than 10% of stocks of the two cereals. The world food system, which lost close to 100M tonnes of maize in the 2012 US Midwest drought, ought to weather a shock of this kind without large price rises.

Sources: ICG (2014) and USDA FAS data.

[2] 'The picture for wheat is clouded by a seasonal slowdown in new export business from the region, but there were reports of reluctant farmer selling due to concerns about sustained currency depreciation. There has also been speculation that some buyers might favour purchases from other origins due to perceived trading risks. However, exports from Ukraine and Russia have been sustained in recent weeks. Similarly for maize, export data indicated that Ukraine's shipments continued normally' (IGC, 2014).

1.2 Rice

Rice prices, perched at surprisingly high levels ever since the 2008 price spike, have finally fallen back to a level commensurate with production plus exporting costs.

Thai rice prices, which traditionally have marked the world price, have trended down over the past financial year, coming into line with prices offered by other key exporters, India and Viet Nam (see Figure 5). These latter prices, which have increasingly come to define the world market price, also fell a little over the year.

1.2.1 The end of Thai paddy pledging

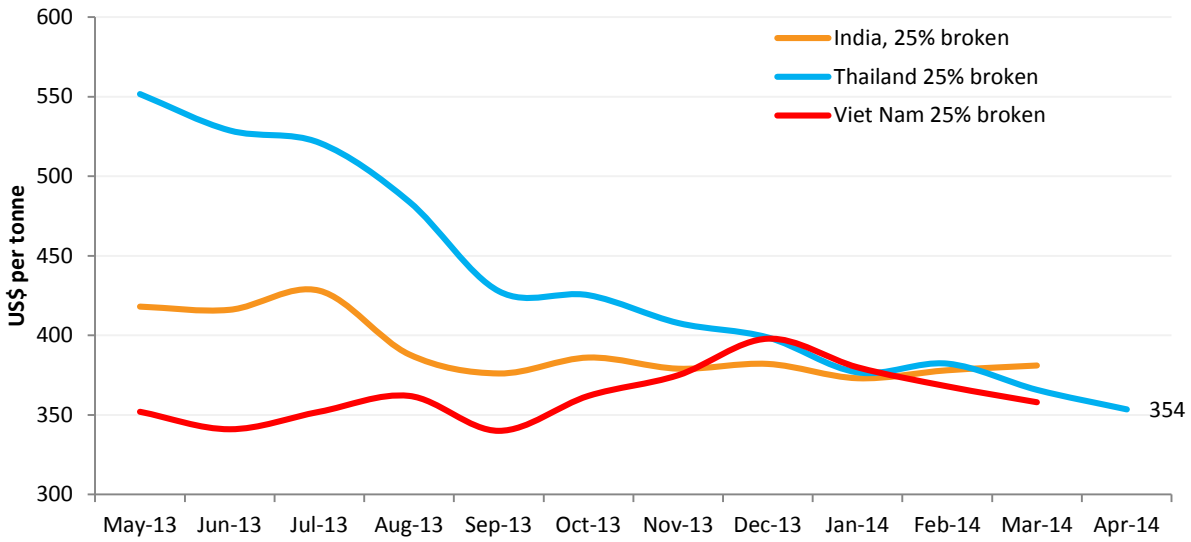
The paddy pledging scheme under which the Thai government purchased rice from farmers at above-market prices from 2011 was suspended in February 2014, with little likelihood of being reinstated.

The fall in Thai prices corresponds to selling off public rice stocks in a bid to raise funds to pay farmers their promised proceeds under the paddy pledging scheme. Some believe stocks have been sold at prices below market prices, with consequent heavy losses to the exchequer.

Since launching the rice intervention scheme in 2011, by March 2014 the Thai government had sold 13M tonnes, raising 173 billion baht (US$5.4 billion at the March 2014 exchange rate), a fraction of the 870 billion baht (US$27 billion at the March 2014 exchange rate) it is reckoned to have spent on the scheme between 2011 and 2013 (see Arunmas, 2014).

Rice prices may fall still further if more Thai stocks are sold off, particularly when the new Thai harvest comes in from the end of April into June 2014.

Figure 5: Rice monthly prices, May 2013-March/April 2014



Source: Data from FAO GIEWS.

2 Has the end of a cycle been reached?

Cereals prices entered a roller-coaster ride of instability in late 2007, which saw a sharp spike in early 2008 followed by two lesser spikes in prices in 2010 and 2012. Some thus concluded we had entered an era of instability in which the system worked differently to the way it had done previously.

Yet, at the time of writing (April 2014), six years since the initial spike, a very different picture is visible. In this account, the past six years become a period where unusual combinations of short-term factors – perfect storms perhaps – have occurred at the same time as three longer-lasting changes, in oil prices, Asian rural wages and demand for biofuels. Farmers may now have finally adjusted to these new circumstances. Prices have fallen from the various peaks they have reached over the six years to what may be a new norm: higher than they were previous to 2007 but lower than levels recently seen.

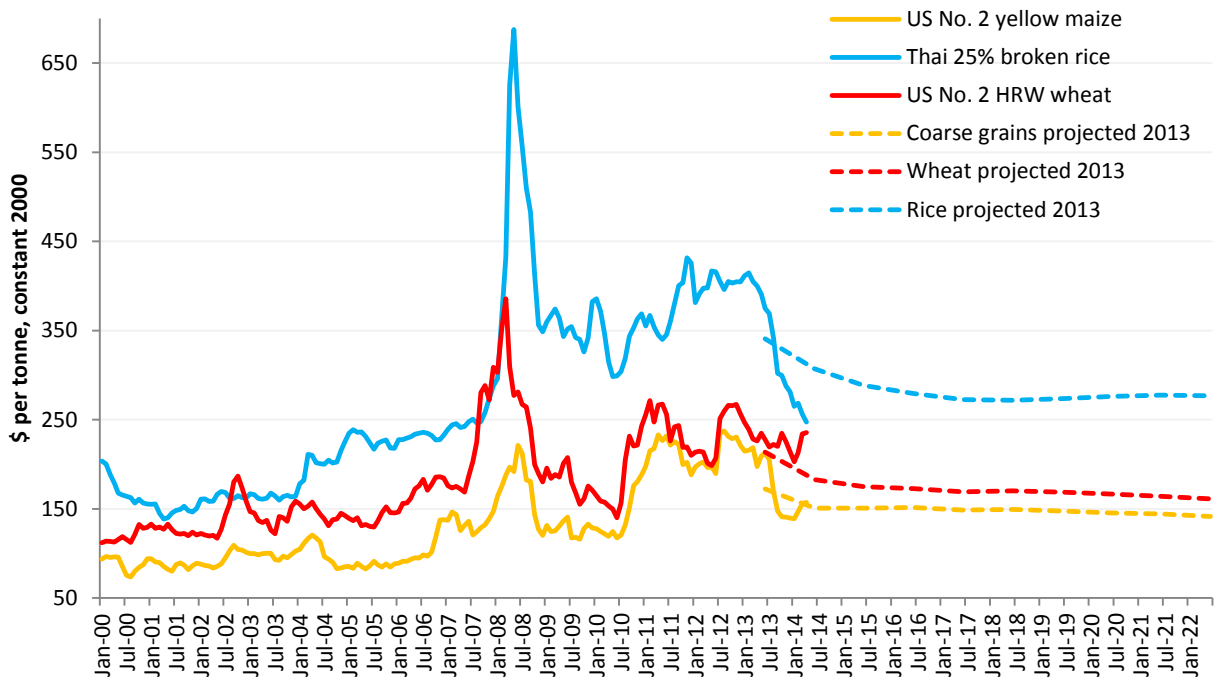
So has a cycle of instability and adjustment been completed? To an answer this, we briefly review price movements of grains since the early 2000s, argue that we are seeing a new equilibrium and then ponder the implications.

2.1 Grain prices since the early 2000s

In the early 2000s, maize, rice and wheat prices were historically very low in real terms. In 2001, prices for maize were 25%, for rice 20% and for wheat 31% of their levels in 1957 in real terms. Then they began to rise (see Figure 6), driven up by a combination of a slowdown in the growth in the production of cereals and an associated decline in cereal stocks, exacerbated by deliberate government decisions to stock less; rising oil prices feeding through to transport, machinery and fertiliser costs; a decline in the value of the US dollar; and economic growth boosting demand for commodities (see Wiggins and Keats, 2013). By late 2006 to early 2007, prices of the three main grains were 11% higher for maize, 72% higher for rice and 35% higher for wheat in real terms than they had been in the early 2000s.[3]

[3] Prices have been compared in constant terms, taking historic low points as the start and the last month before the acceleration of the price spike. For maize, these dates are January 2002 to August 2006, for rice May 2001 to June 2007 and for wheat January 2002 to May 2007.

Figure 6: Maize, rice and wheat prices, January 2000-April 2014, plus FAO/OECD projections to 2022, constant 2000



Source: Monthly price data from FAO, deflated by US Food CPI from FAO (2000 = 100) and imputed food CPI for 2014-2022.

Then came the price spike of 2007/08. On top of the changes mentioned came short-run triggers, namely, low wheat harvests in Australia and Ukraine in 2006 and 2007 and the US switching maize *en masse* to ethanol production. Prices increased sharply in 2007, prompting panic reactions: export restrictions, reduced import tariffs on food imports and restocking in an already tight market by consumers, traders and governments. The result was an extraordinary spike that saw cereal prices more than double for maize and wheat between early 2007 and mid-2008 and triple for rice from mid-2007 to early 2008.

The spike was broken when new harvests came in, with prices falling considerably during 2008 and continuing to fall until mid-2010. Drought then hit cereals harvests in the Black Sea region – leading to a ban on wheat exports from Russia; wet weather reduced Canadian harvests and the US maize crop was lower than expected. Prices once again rose quite sharply, given that stocks had not been rebuilt from 2007/08.

Prices fell back in 2011, before once again surging upwards when, in 2012, a one-in-fifty-year drought in the US Midwest knocked some 95M tonnes off its expected maize harvest in 2012.

Meanwhile rice prices remained perched some US$200 a tonne higher than their levels in the early 2000s, despite good harvests in every year since 2008, partly because of higher costs of production, and partly because of Thai policy from 2011 to 2014 to buy rice at well over the world price, diverting potential exports into government stores.

After the last major shock to world cereals markets – the US maize losses of 2012 – prices of grains fell throughout 2013, a trend interrupted in early 2014 for maize and wheat by anxieties over Ukraine. Should, however, Ukrainian and Russian grain exports be undisturbed, then recent rises will probably be reversed and, indeed, prices will continue to fall in 2014. The futures markets indicate that, by late 2014, maize prices should return to around US$200 a tonne, roughly their end-2013 level; wheat prices should drop to US$250 a tonne, below the levels seen in January 2014.

Thai rice prices have fallen in the past year or so by more than a US$100 a tonne, as Thailand has abandoned its rice pledging scheme.

All in all, grain prices seem to have sunk back from the shocks of 2010 and 2012 and may once again be at levels that correspond to costs of production plus post-harvest operations. The markets, it would seem, are back in equilibrium. For example, for the first time in several years, US maize farmers are not planning to raise production in 2014: the premium prices on offer in previous years have been trimmed back.

A cycle of instability may thus be over.

2.2 Discussion

If this is so, it prompts a set of questions, as follows:

Q: If this is a new equilibrium, then why are prices higher than before?

In January 2014, maize prices were 68% higher, in constant terms, than in the early 2000s, and 45% higher than just before the 2007 spike; for rice, the equivalent figures were 109% and 21%; and for wheat, 71% and 26%. Higher prices reflect the three long-term changes mentioned above: on the supply side, higher oil prices and rural wages in Asia; on the demand side, biofuels.

Oil prices in early 2014 were almost 50% higher, in real terms, than they were in 2005, which in turn were twice the levels seen in 2003. Oil prices have thus more than quadrupled in the past dozen years. This has driven up the costs of operating farm machinery, transporting produce and manufacturing nitrogenous fertiliser.

Rural wages in several countries in Asia – Bangladesh, China, India and Indonesia, for example – have risen substantially since the mid-2000s. These are driving up the costs of production of rice: in China, for example, costs rose by 50-70% between 2005 and 2010 (Keats and Wiggins, 2012), with half the increased costs coming from higher labour costs and most of the rest from rising costs of fuel and fertiliser.

Last but far from least, the expansion of US ethanol distilling from maize rocketed from 3.4 billion gallons in 2004 to 13.9 billion gallons in 2011. While it was no surprise to see more ethanol produced, given US mandates for the production of renewable transport fuels, the speed and scale of the increase took many by surprise. The impact on maize markets cannot be understated: in recent years, the US has sent 130M tonnes of maize to distilleries, in a world market where less than 100M tonnes are traded every year, with the US the single largest trader, supplying around half the world's exports. This explains why maize went from being the cheapest of grains, on offer at US$75 a tonne as recently as 2000, to becoming a premium grain traded at over US$300 a tonne in early 2012. It is only in the past two years that growth of ethanol production has stabilised as the blending wall in the US nears, after which additional ethanol use in vehicles will require changes to engines.[4] In the meantime, farmers have increased maize production to catch up with the new levels of demand.

Of these three major changes, two no longer drive: the oil price varies within a band between US$100 and US$120 a barrel, but with no signs of rising beyond this ceiling; US ethanol production has reached a plateau. Only Asian rural wages may still be rising, something that alone will have a modest effect on rice production costs, but not other grain markets.

[4] 'With low-level E10 (10% ethanol) blends already accounting for nearly all domestic fuel sales, and with fuel consumption on a downward trend due to better vehicle efficiency and high oil prices, the blend wall is expected to restrict further industry expansion. Unless there is significantly stronger than projected adoption of E15/E85 blends, much larger ethanol exports, or a rebound in transportation fuel demand, maize consumption by the US fuel ethanol sector is unlikely to rise much beyond levels seen in recent years' (IGC, 2013).

FAO/OECD projections (2013)[5] confirm this (see Figure 6): their model predicts that current maize and wheat prices, in constant terms, will fall slightly from current levels through to 2022. For rice, the model sees prices a little higher than at present, but again falling a little over the next eight years in real terms.

Q: Can we expect further instability in the next five to ten years?

Equilibrium does not mean price stability. When harvests vary, some of the adjustment to consumption will be met by stocks, but prices will move as well. That said, the spike of 2007/08 is unlikely to be repeated frequently: the largest shock to cereals markets seen since 1973/74, it may prove to be a one-in-thirty-four-year event.

Why is a repeat unlikely in the near future? Three reasons: stocks have been rebuilt for all three grains, so moderate variations in harvests should not perturb the markets unduly; the massive expansion of US biofuels over a few years has seemingly reached a plateau; and the panic measures taken by governments when the spike began to form in late 2007 may be less likely today since there is greater awareness of just how damaging export bans and restocking can be both to international markets and to domestic farmers.

The restrained reaction to uncertainty in Ukraine may be a sign of enhanced stability: the price of wheat, the crop most at risk, rose by US$70 a tonne, or 25%: this is a far cry from the increases seen in recent years.

Q: What have we learned from this for public policy?

Several things are increasingly clear.

The old adage of 'the best cure for high prices is high prices' has proved true once again (see next section). The world's ***farmers have responded strongly to higher prices*** by raising production well ahead of the growth of consumption and allowing some rebuilding of stocks. But, as is commented on below, it has not just been prices that have made this possible: in many countries, there has been determined public action to assist farmers to respond.

Some countries, with China the main example, have been reminded that shocks can happen, and they have ***rebuilt public stocks*** accordingly.

More speculatively, the arguments for ***open trade in grains*** seem to have gained ground, with fewer signs of governments today restricting trade or threatening to do so.

In 2008, there were calls for radical action to tame the markets by creating large public stocks held internationally and by reining in the futures markets, either restricting trading or creating public funds to counter any bubbles in these markets. Increasingly, these proposals look to have been unnecessary. Indeed, any attempt to create a public stock in the tight markets of the past six years would have introduced a new and inelastic demand into the system: the last thing needed.

Instead, what was done looks increasingly wise. There have been modest attempts to improve information available to producers, traders and governments. Above all, the various measures taken internationally, regionally and nationally to boost production of staples – including investing in agricultural research, promoting distribution of seed and fertiliser and improving rural roads and other such infrastructure – look as though they have paid off handsomely (see next section). The big increases in production have come in no small part from those countries where some doubted there would be any response to higher prices – most notably in Sub-Saharan Africa (SSA).

[5] http://www.oecd.org/site/oecd-faoagriculturaloutlook/

Q: What might we expect to see over the next few years?

Three things stand out for the next five years:

One, there are reports now that ***current prices are deterring farmers in exporting countries*** such as the US from the major increases in production planned in the past few years. This is what we might expect in a new equilibrium. This alone may curtail any further significant price falls.

Second, when governments spend on ***agricultural research and rural infrastructure***, the benefits will continue for several years. We may thus see a welcome acceleration of staples output in parts of the developing world, above all in Africa. It just may be that, in the next five years, Africa will begin to reduce its imports of grains such as rice, which it can replace with domestic production; prospects for replacing wheat are less promising.

Third, lest unbridled optimism be the only note, we may increasingly see the effects of ***erratic weather from global warming*** leading to more variable harvests across the world. The first defence against this will be trade, so that, where local harvests have failed, imports can meet demand. Some increase in production capacity ahead of consumption growth may allow for additional storage.

The next line of defence, creating farming systems that are more resilient to fluctuating weather, remains a tough challenge: not impossible if investments in research, extension and learnings are made, but difficult if these lag.

3 Update: supply response since the 2007/08 spike

The Annual Review of March 2012 reviewed the supply response to the elevated cereals prices seen since late 2007, reporting a strong response, with increases in the production of maize and wheat well ahead of increases in consumption. With a little more time since the spike, does that still stand?

3.1 Overall response to the spike

How have ***farmers responded*** to the high prices on offer?

We compare average production of the main grains in three periods: 1997/98-1999/00 ('early'), 2004/05-2006/07 just before the spike and the latest three years (2011/12-2013/14). This allows for comparison of growth rates before and after the 2007/08 spike.

In nominal terms, prices rose moderately for the seven years before the spike, by some 14% for maize, 3% for rice and 48% for wheat. Over the subsequent seven years since the spike, however, prices have risen far more, by 139% for maize, 89% for rice and 82% for wheat (see Figure 7).

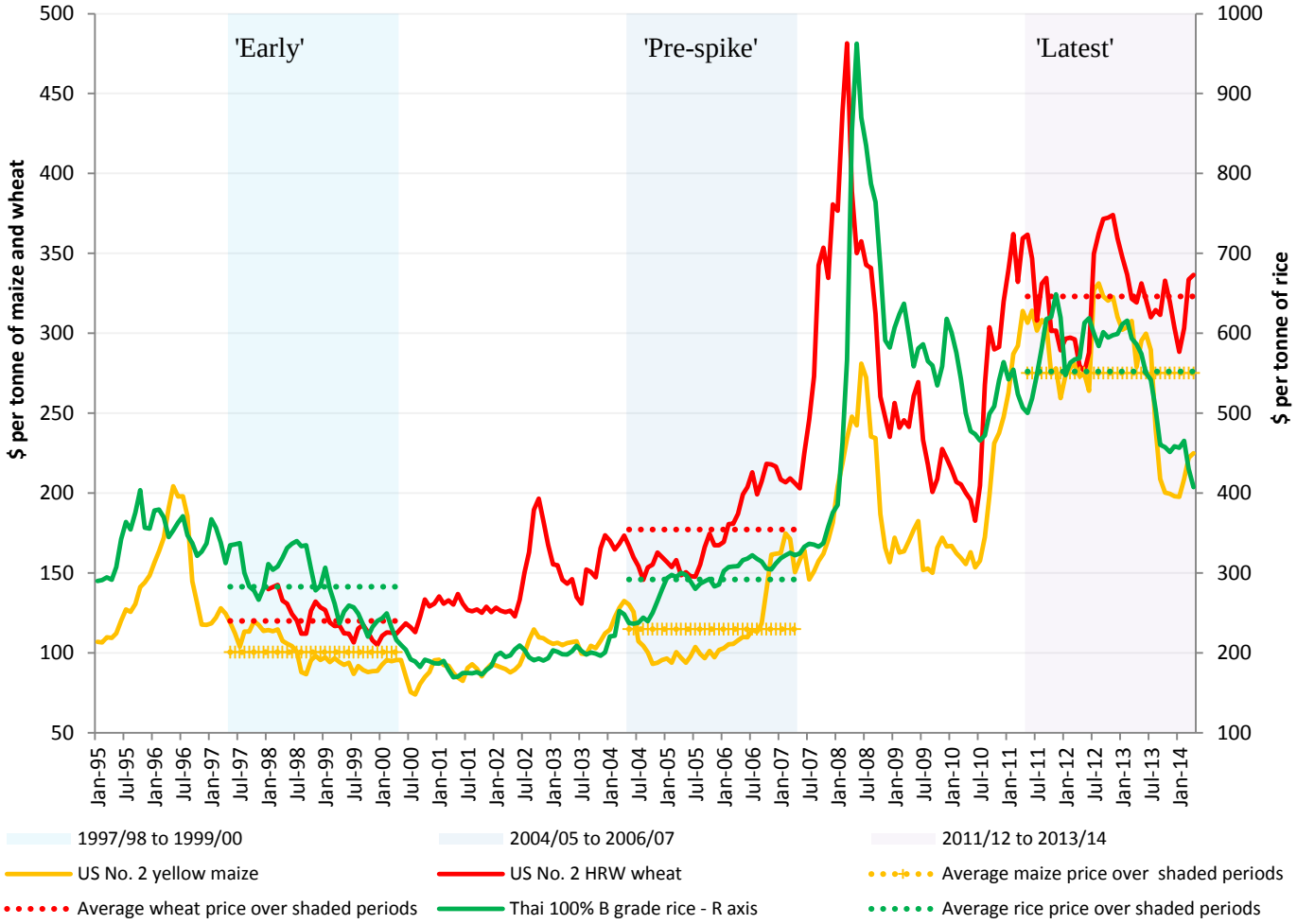
Production increases post-spike are much greater than in the previous seven-year period

Production of all three grains has increased by far more in the seven years since the spike than in the seven years before. In the seven years before the spike, the addition to world grains was ***146M tonnes, by 9%***: in the seven years since the spike, the corresponding increase has been ***329M tonnes, a 16%*** increase.

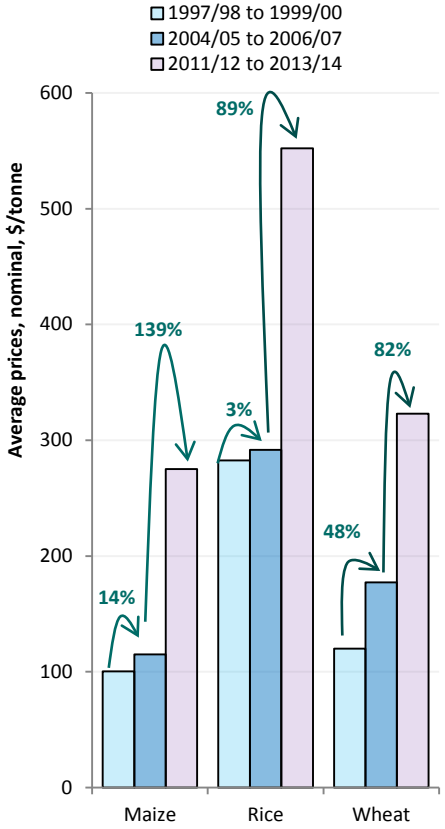
Most of the increase has come from the developing world

Most of the extra grain produced since 2008 has come from the developing world (see Figure 8). Of the 329M tonnes more produced, fully 73% came from the developing world. In the seven years before the spike, the developing world contributed 51% of world increases in production.

Figure 7: a) Looking back at maize, rice and wheat prices, January 1995-April 2014

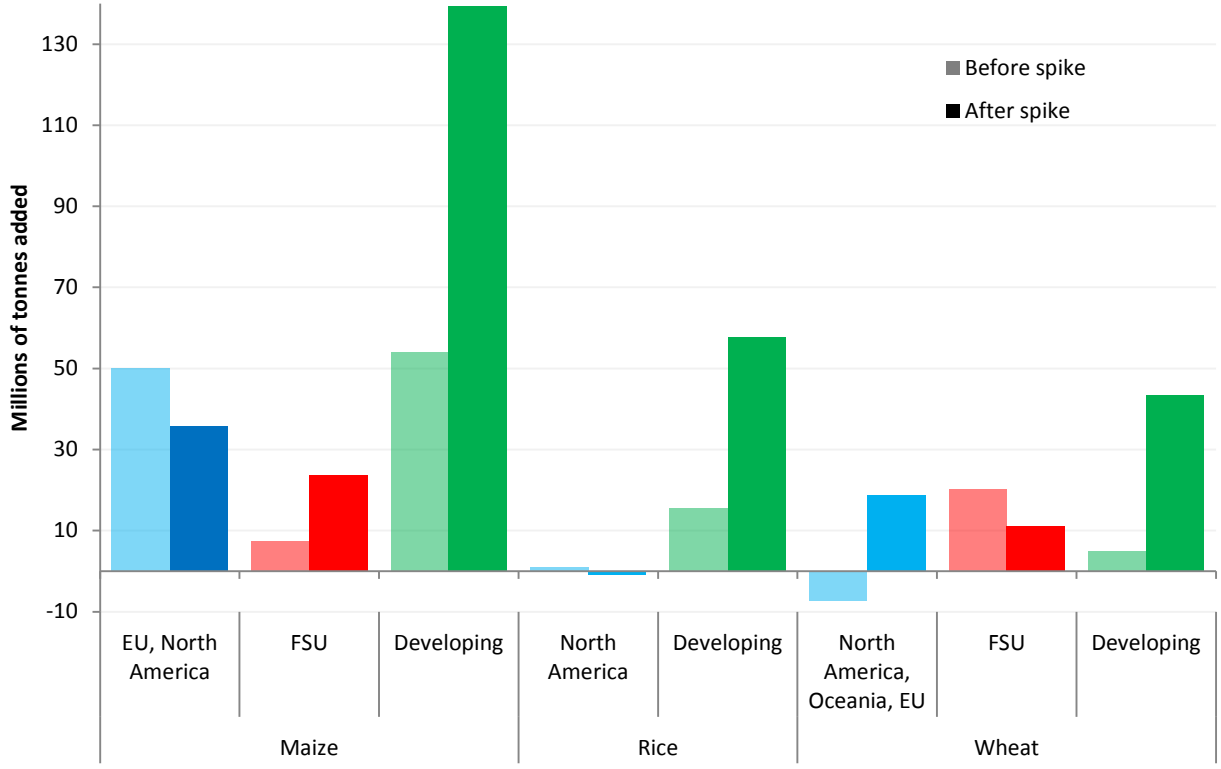


b) Nominal price changes



Note: Data downloaded 16 April 2014, so monthly average price for April 2014 is from the first two weeks.
Source: Price data from FAO.

Figure 8: Growth of world maize, rice and wheat production before and after the 2007/08 spike



Note: 'Before spike' refers to changes from 1997/98-1999/00 to 2004/05-2006/07, and 'after spike' to 2004/05-2006/07 to 2011/12-2013/14. Regions across the horizontal axis change for each crop depending on major producers, but combined for each crop produced at least 97% of world production in 2013/14.

Source: Data from USDA FAS Production, Supply and Distribution.

3.2 Response by crop

3.2.1 Maize

Large relative maize production increases in ***the Former Soviet Union, South America, Sub-Saharan Africa, East Asia***

Maize showed the largest increases for both periods, probably spurred by demand for animal feed and biofuel, rising by ***83M tonnes more*** than it did over the previous seven-year span: proportionate increases were 14% for the seven years before the spike and 28% for the seven after the spike.

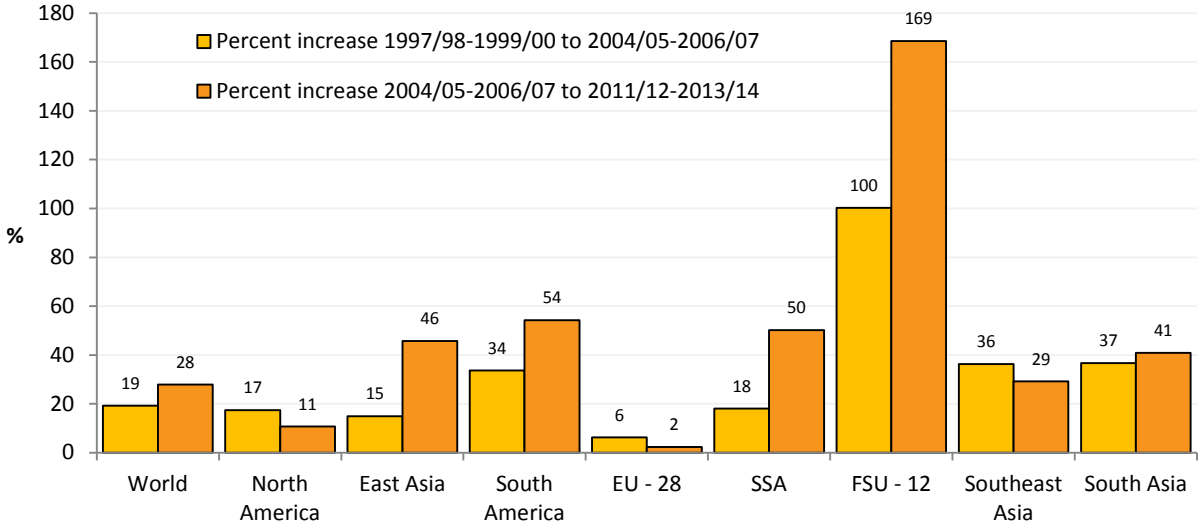
In all but three regions, growth of maize production was greater after the spike than before (see Figure 9). The strongest proportionate responses to higher prices since the spike can be seen for the Former Soviet Union (FSU-12) (169%), by a large margin – thanks in large part to having additional land to plant, followed by South America (54%), Sub-Saharan Africa (SSA)(50%), East Asia (46%), South Asia (41%) and Southeast Asia (29%).

The largest absolute increases over the past seven years were in East Asia, followed by South America, North America, FSU and SSA (see Figure A2 in the Annex).

The three regions where production slowed after the spike include some surprises: North America, the European Union (EU) and Southeast Asia. That two of the

most sophisticated farm economies in the world should slow production rather scotches the perception that price response comes only from highly capitalised farms. Equally interesting is that the proportionate increase in maize production from Africa was one of the strongest, beaten only by the FSU and South America.

Figure 9: Changes in maize production before and after the 2007/08 spike, world and major producing regions (%)



Note: The regions depicted accounted for over 97% of global maize production in 2013/14, in decreasing order of importance from left to right.
Source: Data from USDA FAS.

3.2.2 Rice

Large relative rice production increases ***in Sub-Saharan Africa, South Asia, Southeast Asia***

Rice production increased by ***42M tonnes more***, with proportionate increases of 4% and 14% for the seven years before and after the spike.

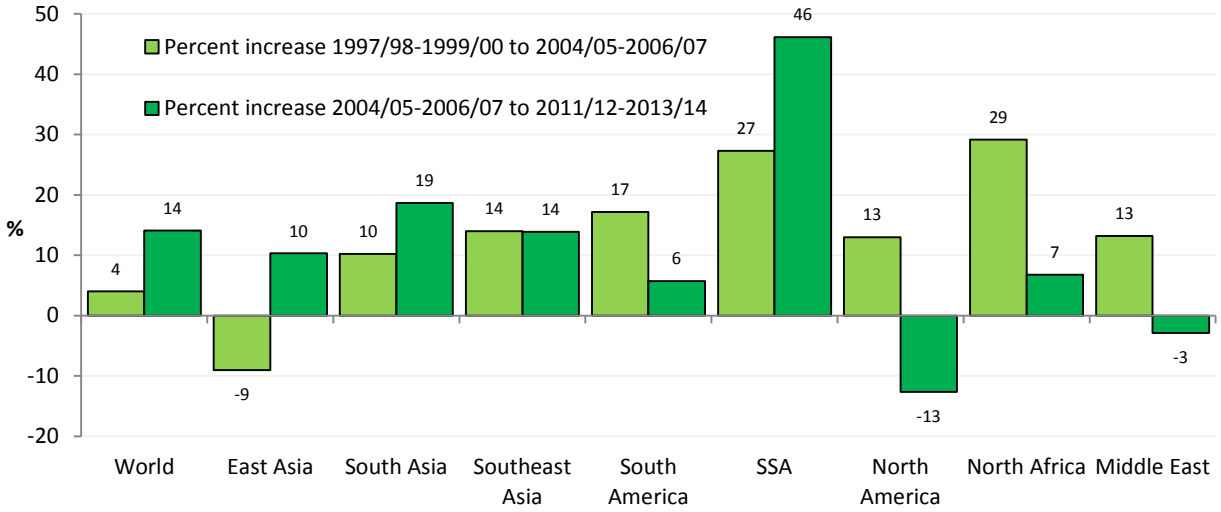
More rice was grown in most of the main producing regions across both seven-year periods, except in East Asia, where it declined over the earlier seven-year period, and in North America and the Middle East, where it declined in the most recent seven-year period.

Relative increases across regions showed less consistent improvement from the earlier to the later seven-year period than they did for maize, with increases in the second period outstripping earlier increases only in three regions: East Asia (where they had been declining), South Asia and SSA (see Figure 10).

The largest relative increases over the last seven-year period were seen in SSA (close to a 50% boost), followed by South Asia (19%), Southeast Asia (14%) and East Asia (10%). The relative increase in East Asia is particularly impressive following a decline of close to 10% over the earlier seven-year period. Once again, the African response stands out against the perception that African farms cannot respond to price incentives. The slowdown in growth in production for South America and North Africa is surprising, while the absolute declines in North America and the Middle East, owing to area declines, are mystifying.

Absolute increases in production since the 2007/08 price spike were greatest in South Asia, followed by East Asia and Southeast Asia – with yield share accounting for 10.5 times as much of the increase as area share in South Asia, and some 1.8 times as much as area share in East Asia. Increases in Southeast Asia were about half area- and half yield-driven (see Figure A3 in the Annex).

Figure 10: Changes in rice production before and after the 2007/08 spike, world and major producing regions (%)



Note: The regions depicted accounted for over 98% of global rice production in 2013/14, in decreasing order of importance from left to right.
Source: Data from USDA FAS.

3.2.3 Wheat

Large relative wheat increases ***in Oceania, South Asia, East Asia***

Wheat production grew by ***57M tonnes more*** after the spike than before, with proportionate increases for the seven years before the spike of 3% and 12% after the spike.

Wheat production increased in most of the top producing regions across both seven-year periods, except in East Asia, North America and Oceania, where it fell over the earlier seven-year period, and in the Middle East and South America, where it fell over the most recent seven-year period.

Relative increases showed less consistent improvement from the earlier to the later seven-year period than for maize, with increases in the second period outstripping earlier increases in only four of the nine regions shown: South Asia, and the three regions where it had declined over the early period: East Asia, North America and Oceania (see Figure 11).

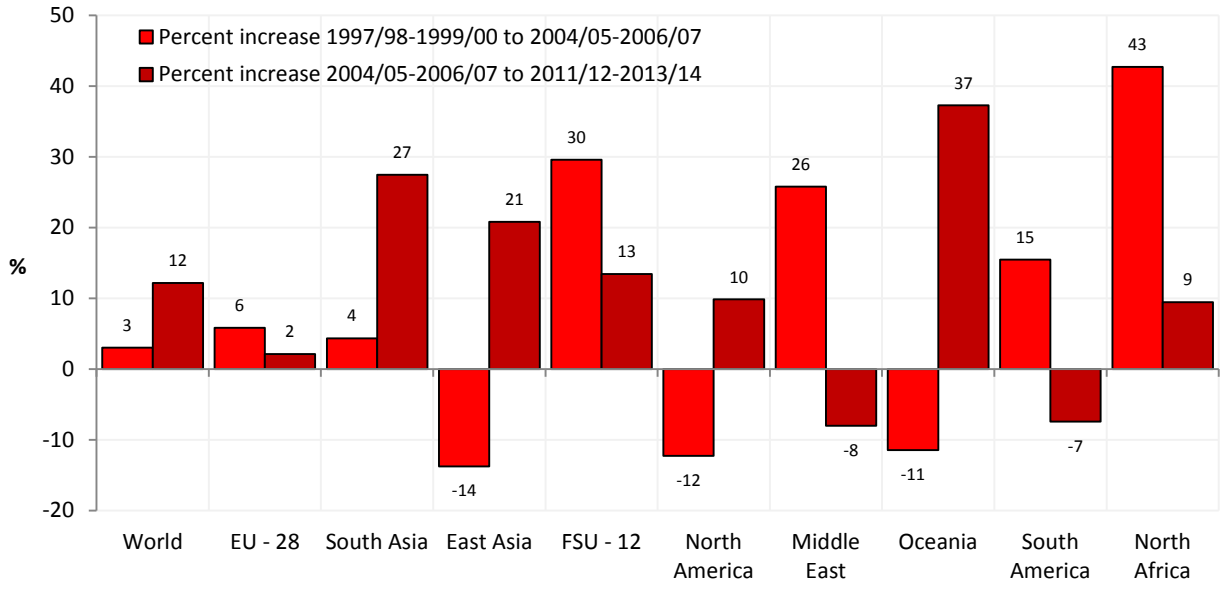
Over the latest seven-year period, the largest relative increases were seen in Oceania (37%), South Asia (27%), East Asia (21%), the FSU (13%) and North America (10%). The East Asian and North American increases were particularly impressive considering they followed falls over the previous seven-year period.

Absolute increases in production since the 2007/08 spike were greatest in South Asia, followed by East Asia, the FSU and North America. For East Asia, this

represents a strong turnaround since area reductions in the earlier seven-year period reduced wheat production by some 27M tonnes.

Most of the increases in wheat production were yield-driven in these regions, with area expansion accounting for just over a third of the increases in South and Southeast Asia and just under a quarter of the FSU increases, while North American areas under wheat actually reduced: see Figure A4 in the Annex.

Figure 11: Changes in wheat production before and after the 2007/08 spike, world and major producing regions (%)



Note: The regions depicted accounted for over 98% of global wheat production in 2013/14, in decreasing order of importance from left to right.
Source: Data from USDA FAS.

3.3 Commentary on supply response

Three things stand out from this review. One is that production of cereals has accelerated since the 2007/08 spike. More than twice as much grain has been added to world supplies in the seven years since the spike compared with the seven years prior.

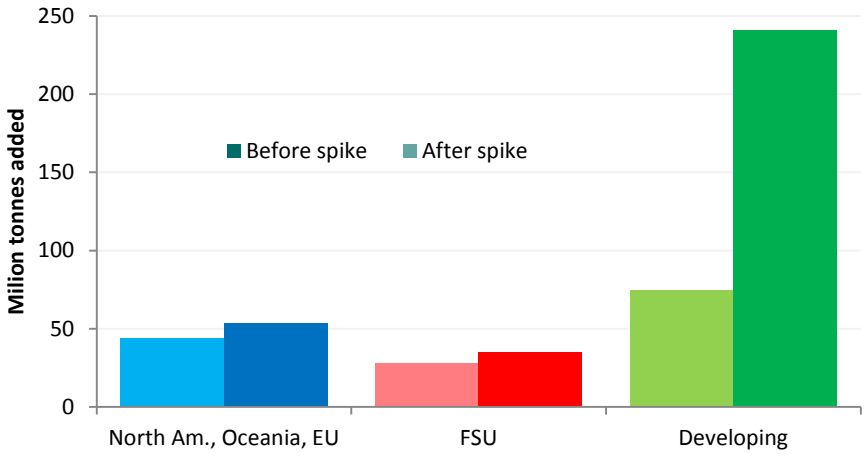
In this brief analysis, it has not been possible to probe further to explain the drivers of the acceleration of production, although two candidates are clear. One driver is the higher prices themselves, which were transmitted to some degree in most countries. The other potential driver is the considerable public effort that went into stimulating production of staples in the developing world, where national efforts were complemented by international funding mobilised at the L'Aquila meeting of the G8 in July 2009 and confirmed at the Pittsburgh meeting of the G20 later that year, at which US$22 billion was promised to promote agriculture, rural development, food security and nutrition. These funds plus national resources have gone into agricultural research and extension, investments in rural roads, irrigation and other productive infrastructure, and into provision of seed and fertiliser to farmers.

It would take some considerable additional analysis, however, to tease out how much the demand stimulus of the prices caused the increases, and how much came from the supply-side push of public investments. Given that the former applied across the world whereas the latter was very largely in the developing world, and given the bulk

of the increased production that came from the developing world, the public investments may well have made most of the difference.

The second point is that almost three-quarters of the response has come not from the traditional grain exporters in North America, Europe, Australasia and the FSU, but from the developing world. Figure 12 shows just how marked this has been.

Figure 12: Increased production of cereals since the 2007/08 price spike, by major region



Note: 'Before spike' refers to changes from 1997/98-1999/00 to 2004/05-2006/07, and 'after spike' to 2004/05-2006/07 to 2011/12 to 2013/14.
Source: Compiled from USDA data. A more detailed regional breakdown of the changes is available in Annex Figure A5

Some thought higher prices would see highly capitalised farms in OECD countries produce much more, while farmers in the developing world would struggle to respond, hindered by lack of capital and know-how, poor infrastructure and so on. Those expectations have clearly been proved dramatically wrong. Indeed, the response was muted in most of the richer regions, including in the EU, where global prices appear to have had little effect on cereal production. The most remarkable response has come from SSA, long thought to be the least likely region to respond to higher prices, but proportionate increases for maize and rice, the two grains Africa can most readily grow, have been amongst the strongest in the world.

Third, yield increases have accounted for most of the extra production of rice and wheat. Only for maize has area expansion been the main driver.

4 Update: impacts of higher food prices

In July 2013, we summarised thinking about impacts of the 2007/08 food price spike in a brief (Wiggins and Keats, 2013) (see Box 3 for a recap).

Box 3: Impacts of higher food prices

Here is what we wrote in July 2013:

'At the time of 2007–2008 spike, impacts were largely inferred from quantitative models and plausible logic. Most expected that high prices would lead to hardship and suffering on a large scale. The World Bank speculated that another 105 million people had been pushed into poverty (Ivanic and Martin, 2008); the United Nations Food and Agricultural Organization (FAO) raised its estimate of the numbers suffering under-nourishment from 848 million to 923 million (FAO, 2008).

'Five years on, more evidence of what happened can be found. Many surveys of vulnerable groups at local level in the developing world report hardship, increased poverty and hunger, and desperate measures to cope (Hossain et al., 2013).

'Yet a body of quite contradictory evidence now exists. Gallup surveys over the time of the spike indicate that the numbers of people who were food insecure may have fallen by several hundred million; albeit that most of these fortunate people were living in China, India and other fast-growing Asian economies where wages were rising (Headey, 2011). Afrobarometer surveys show increased food insecurity in urban Africa, but more food security in rural areas — where food insecurity was worse than in urban areas (Arora et al., 2012). At the time of the spike, a lone researcher ran a model that predicted that the rural poor of India would benefit from higher rice prices (Polaski, 2008). This forecast has now been proved (Jacoby, 2013) by analysis of data from across India that shows that the welfare of rural households improved with higher prices, the reason being that higher agricultural prices prompt more use of labour on farms and additional investments, thereby raising rural wages. Those with land benefit most, but the rural landless do also benefit.

'A rapid check on child stunting rates seen in national surveys before and after the spike, available for more than 50 countries, shows that the incidence of stunting rose in only six countries: in 37 others it fell, and for some by considerable amounts. Lacking a counter-factual, it is possible that had prices not risen, the changes seen would have been even better. On this evidence, however, the fear that a generation of infants have been blighted by the price spike can be set aside.

'What might explain the difference in perspective from the hardship reported in the field surveys, and this contrary evidence? One explanation is the diversity of impacts. The food-price spike took place against a background of other economic shocks, such as rising costs of fuel and the early effects of the global financial crisis. But in some countries, economic growth was rapid — much faster in Africa by that time than had been seen for several decades. Another variable was the performance of their governments in providing public goods and services, and social protection. Given all these considerations, local experience could be highly diverse.

'But something else may apply, as the Indian analysis indicates. The general equilibrium effects of higher prices may not be seen in the short run, but strong effects can emerge over a period of years, ranging from higher food prices to more jobs and higher wages in farming. When people are asked about food prices, they report the difficulties that this creates. Not all will readily realise that the same price rises may have seen them gain more employment with better wages.'

Source: Wiggins and Keats (2013)

Reports that appeared in the first year or two after 2008 told of widespread hardship: these accounts were being qualified by direct observations and analyses that suggested some of the rural poor had benefited from higher prices. In the past 12 months, two more reports in this vein have appeared.

For Uganda, van Campenhout et al. (2013) model the effects of a rise in food prices on different groups of households. A simple household model looked at the effect of higher agricultural prices on consumption and income, assuming no changes in either of these in response to prices. This restrictive assumption might apply in the short run. Not surprisingly, most households were worse off as a result of higher agricultural prices since they bought in agricultural products. Even rural households were worse off, since any gains to their incomes were outweighed by the costs to their budgets.

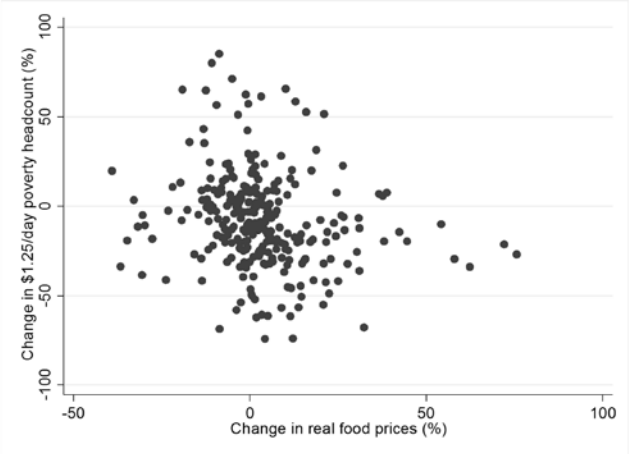
But then the authors ran a computable general equilibrium model allowing full adjustment to new price levels, with households able to change both consumption and production in response to movements of prices of goods and services. This would be expected to mitigate the effect of higher costs for food spending, since households would shift their diets towards food showing the lowest price increases. And it would allow farm households to produce more to take advantage of higher farm output prices, and in the process hire more labour to do so.

The authors ran simulations with the model, some of which just had agricultural prices rising with potential to benefit rural households; others also allowed for higher oil and transport costs, and limitations to agricultural supply response that would tend to diminish benefits. When these differing effects were combined, the results were striking. The welfare of almost all household groups rose, with rural non-farm households the only (slight) losers. Rural farming households were the big winners, with welfare up by more than 3%. Even urban households benefited, presumably as the effects of a stronger farm sector spread through the economy. The poverty headcount fell by 4% nationally, even falling by 1.1% in urban areas.

These results, of course, come from modelling, rather than observation. Hence, a useful complement is Headey's (2014) study that uses observations. Headey earlier (2011) reported good news of reduced food insecurity after the price spike from self-assessments of households interviewed in Gallup Polls. Now he has compared changes in recent decades in observed food prices to estimates of changes in the prevalence of poverty across developing countries, from a usable database of 273 cases.

The raw statistics produce the following rather messy scatter plot that suggests little systematic relation between the two variables:

Figure 13: A scatterplot of the relationship between changes in $1.25/day poverty headcounts and changes in real food prices

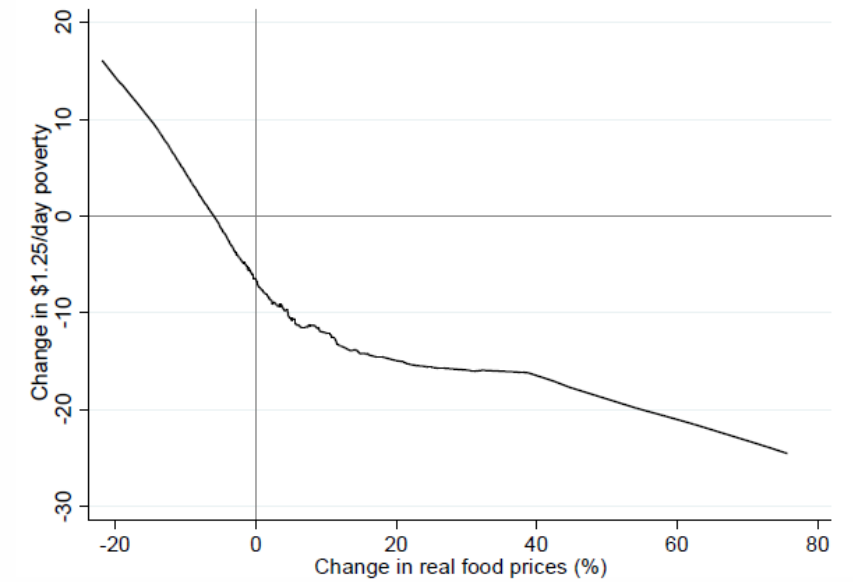


Notes: This graph shows a scatterplot of percentage changes in the $1.25/day poverty headcount against percentage changes in real food prices. The scatterplot labels are World Bank three-letter country codes along with the time span of the poverty episode. Thus, ZMB:91:93 refers to food price changes and poverty change in Zambia from 1991 to 1993.

Source: Headey (2014).

Yet, when regression is used to look at the effect of prices on poverty, the first striking result comes from a simple model that shows that, as food prices rise, so poverty falls, thus:

Figure 14: A LOWESS prediction of the relationship between changes in real food prices and changes in $1.25/day poverty headcounts



Notes: This graph shows kernel-weighted local polynomial predictions of percentage changes in the $1.25/day poverty headcount against percentage changes in real food prices, along with the 95% confidence intervals in grey shade. LOWESS predications are locally weighted regressions estimates, in this case implemented in SATA v13.

Source: Headey (2014).

When more sophisticated regression models are run that control for other factors likely to influence poverty, the significance of the food price variable is in every case negative, significant, robust to specification changes and most probably causal. It seems that a 10% rise in food prices is associated with a 3.2-6.4% reduction in poverty headcount. Effects are stronger for deep, US$1.25-a-day poverty than for moderate poverty. Yes, the magnitude of the effect is subject to wide margins of confidence, but the direction is not: higher food prices, less poverty.

These coefficients allow Headey to estimate what difference recent food price increases might have made for poor people in 37 countries with 80% of the world's population. The model suggests 87M to 127M fewer poor people.

The regression analysis thus provides striking support to the more detailed study of Jacoby (2013) for India, where the causal path very probably ran from higher food prices to increased investment by farmers to more labour hiring in rural areas to higher rural wages and hence to less rural poverty. It also helps explain why the direct observations of changes in Africa since the spike reported by Afrobarometer (Arora et al., 2012) show that, while higher prices may leave urban households worse off, they may reduce food insecurity in the countryside.

Increasingly, then, the evidence suggests that, given time to adjust, higher agricultural prices benefit the rural poor and reduce poverty overall. 'Given time to adjust' – but how long is this, and what happens to the poor in the meantime? Headey runs the regressions down to one-year responses and still sees higher food prices as reducing poverty.

There is clearly more study to be done here. Once again, a breach opens between economists who like to see general equilibrium effects that play out over several years and the perspectives of other social scientists who observe changes in welfare in the moment (Kanbur, 2001). The former may thus be over-optimistic, whereas the latter may miss longer-run changes with potentially profound implications. But longer-term improvement is no comfort to highly vulnerable households that may be shattered by short-term adversity.

For those, however, who fear the food price spike might have irreversibly hit vulnerable households, the simple comparison we made last year of stunting rates before and after the spike, as seen in national surveys, showed that, for most developing countries, stunting rates fell, suggesting the food price spike had not created a blighted generation of infants. That, of course, begs many questions about the detail, the fear being that national statistics could hide damage to specific groups that such sample surveys cannot identify.

Evidence thus remains inconclusive on the impacts of the price spike. What the good news reported from these two studies does seem to underline is that better conditions for farmers that cause and allow them to invest and innovate lead to significant and worthwhile improvements in the welfare of rural households, including poor rural households. The implication is not so much that we should welcome higher food prices – on the contrary, we want prices to fall so long as they cover costs of production – but that agricultural development – and broad-based agricultural development at that – can raise welfare.

References

Arora, A., Swinnen, J. and Verpoorten, M. (2012) 'Self-Reported Food Insecurity in Africa during the Food Price Crisis'. Selected Paper for the International Association of Agricultural Economists Triennial Conference, Foz do Iguaçu, 18-24 August.

Arunmas, P. (2014) '34 Parties Bidding in Latest Rice Auction'. Bangkok Post, 11 March, http://www.bangkokpost.com/business/finance/399206/34-parties-bidding-in-latest-rice-auction

Headey, D. (2011) 'Was the Global Food Crisis Really a Crisis? Simulations Versus Self-Reporting'. Discussion Paper 01087. Washington, DC: IFPRI.

Headey, D. (2014) 'Food Prices and Poverty Reduction in the Long Run'. Discussion Paper 01331. Washington, DC: IFPRI.

IGC (International Grains Council) (2013) 'Five-Year Global Supply and Demand Projections'. London: IGC.

IGC (International Grains Council) (2014) 'Grain Market Report'. March. London: ICG.

Jacoby, H.G. (2013) 'Food Prices, Wages, and Welfare in Rural India'. Policy Research Working Paper 6412. Washington, DC: World Bank.

Keats, S. and Wiggins, S. (2012) 'China: Are Changes Afoot for Cereals? Working Paper. London: ODI.

Kanbur, R. (2001) 'Economic Policy, Distribution and Poverty: The Nature of Disagreements'. *World Development* 29(6): 1083-1094.

Polaski, S. (2008) 'Rising Food Prices, Poverty, and the Doha Round'. Policy Outlook, May. Washington, DC: Carnegie Endowment for International Peace.

Van Campenhout, B., Pauw, K. and Minot, N. (2013) 'The Impact of Food Price Shocks in Uganda. First-Order Versus Long-Run Effects'. Discussion Paper 01284. Washington, DC: IFPRI.

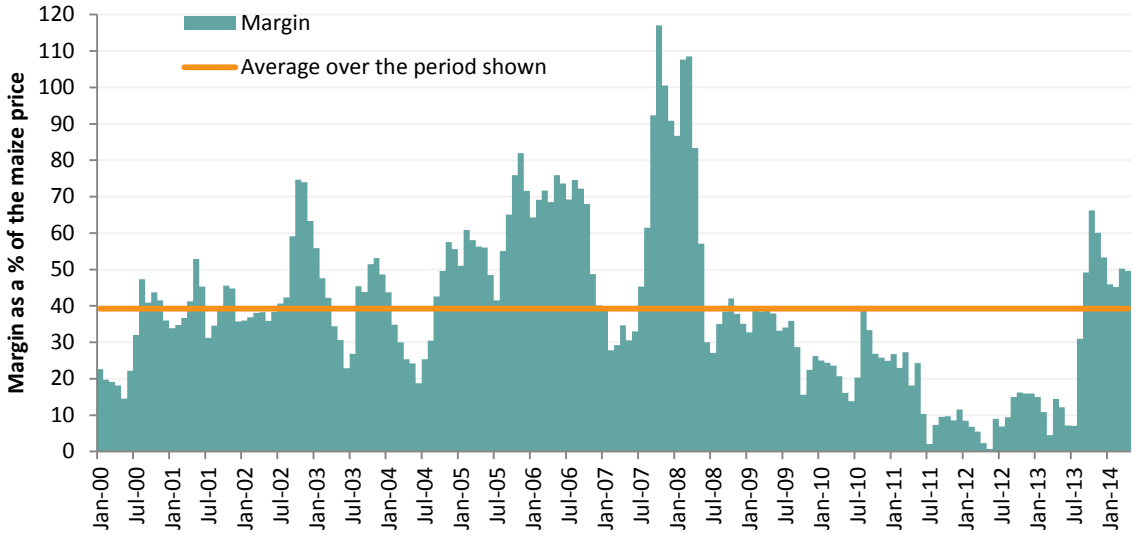
Wiggins, S. and Keats, S. (2013) 'Looking Back, Peering Forward: What Has Been Learned from the Food-Price Spike of 2007–2008? Briefing 81. London: ODI.

Annex

Historical margins between maize and wheat prices, January 2000 to April 2014

Figure A1 shows the margin between maize and wheat prices, expressed as a percentage of the maize price, from January 2000 to April 2014.

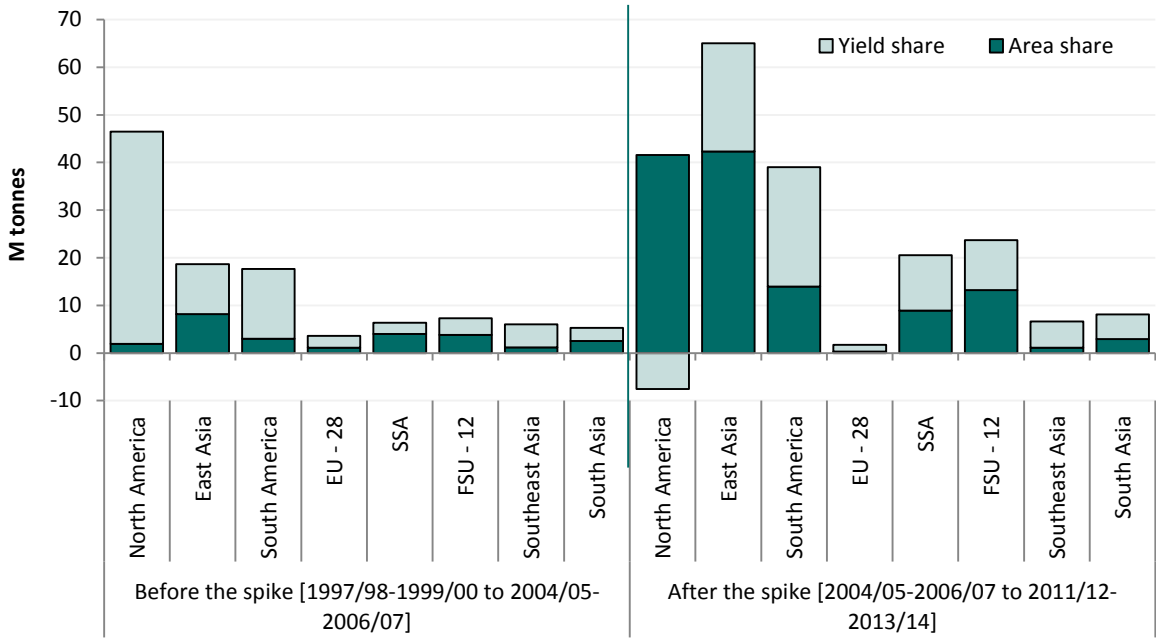
Figure A1: Margin between wheat and maize prices, January 2000-April 2014, % of maize price



Note: Maize and wheat spot prices for US No 2 Yellow Maize and US HRW Wheat.
Source: Data from FAO.

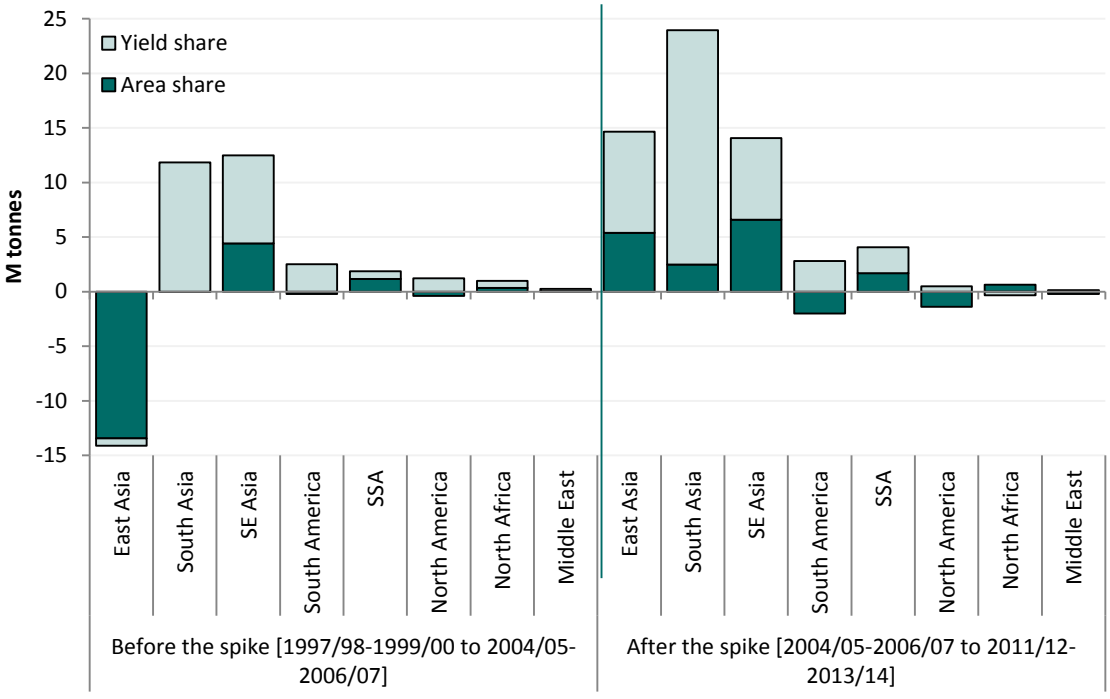
Extra detail on regional supply response: absolute values

Figure A2: Maize production changes by major producing region over the two seven-year periods (M tonnes)



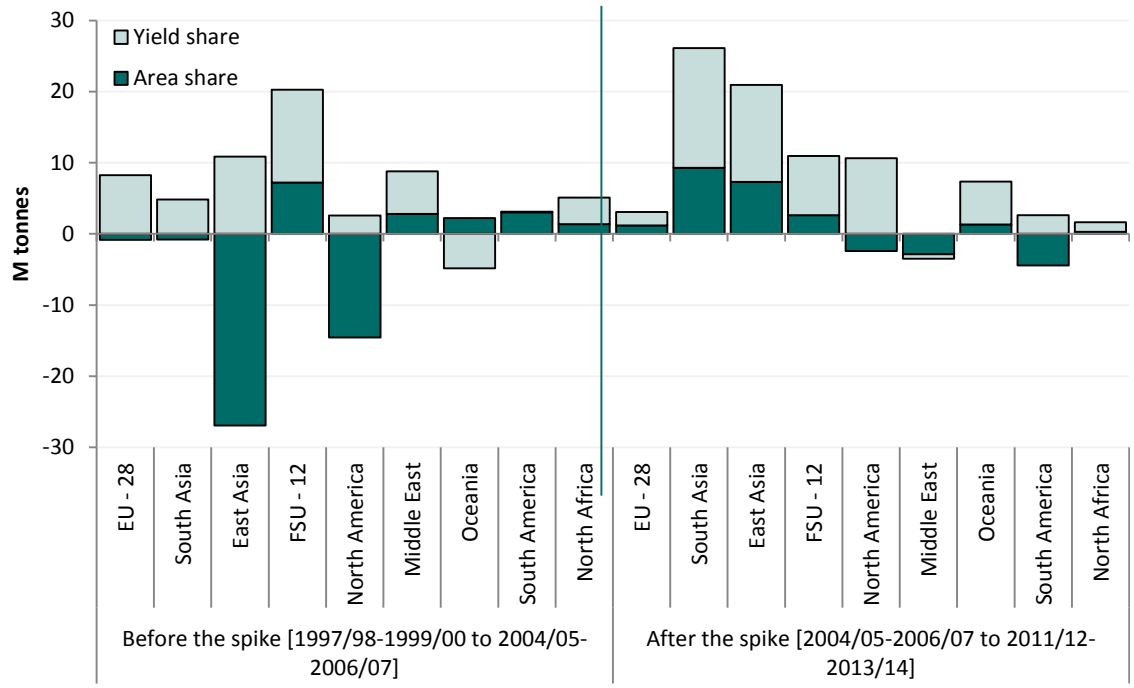
Note: The regions depicted accounted for over 97% of global maize production in 2013/14, in decreasing order of importance.
Source: Data from USDA FAS.

Figure A3: Rice production changes by major producing region over the two seven-year periods (M tonnes)



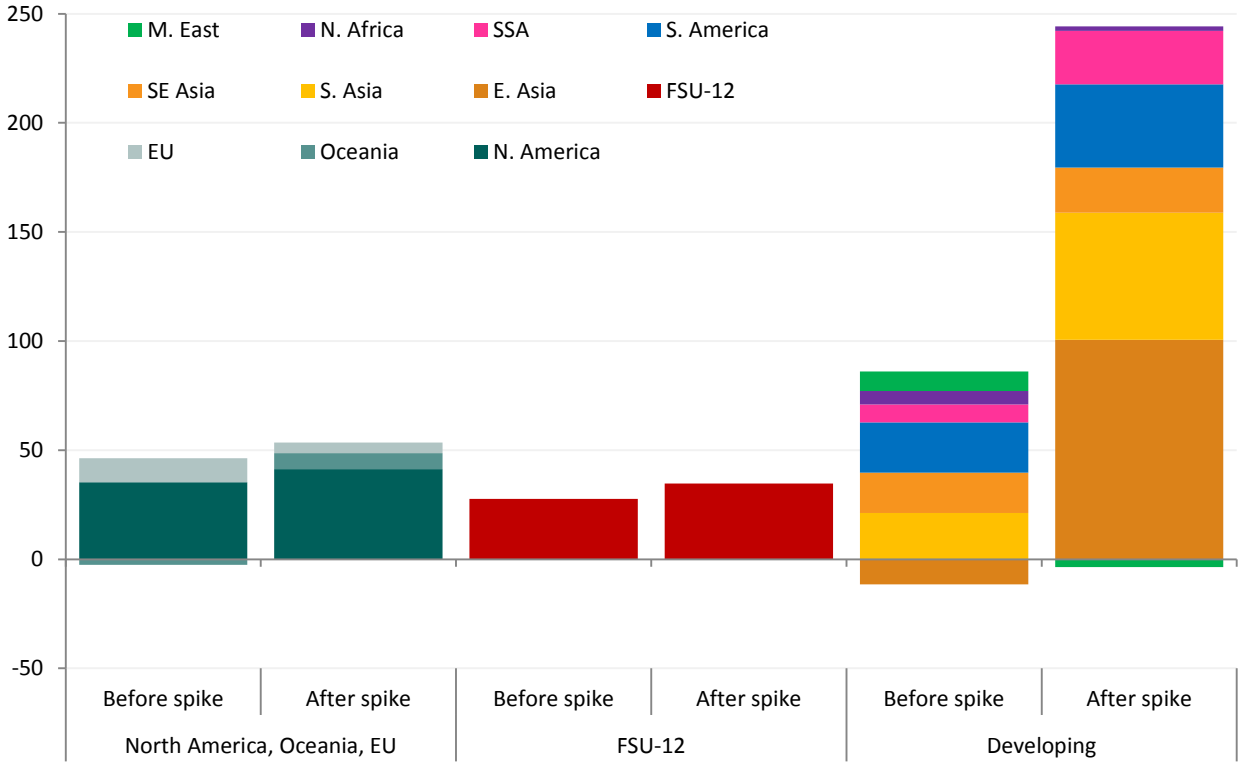
Note: The regions depicted accounted for over 98% of global rice production in 2013/14, in decreasing order of importance.
Source: Data from USDA FAS.

Figure A4: Wheat production changes by major producing region over the two seven-year periods (M tonnes)



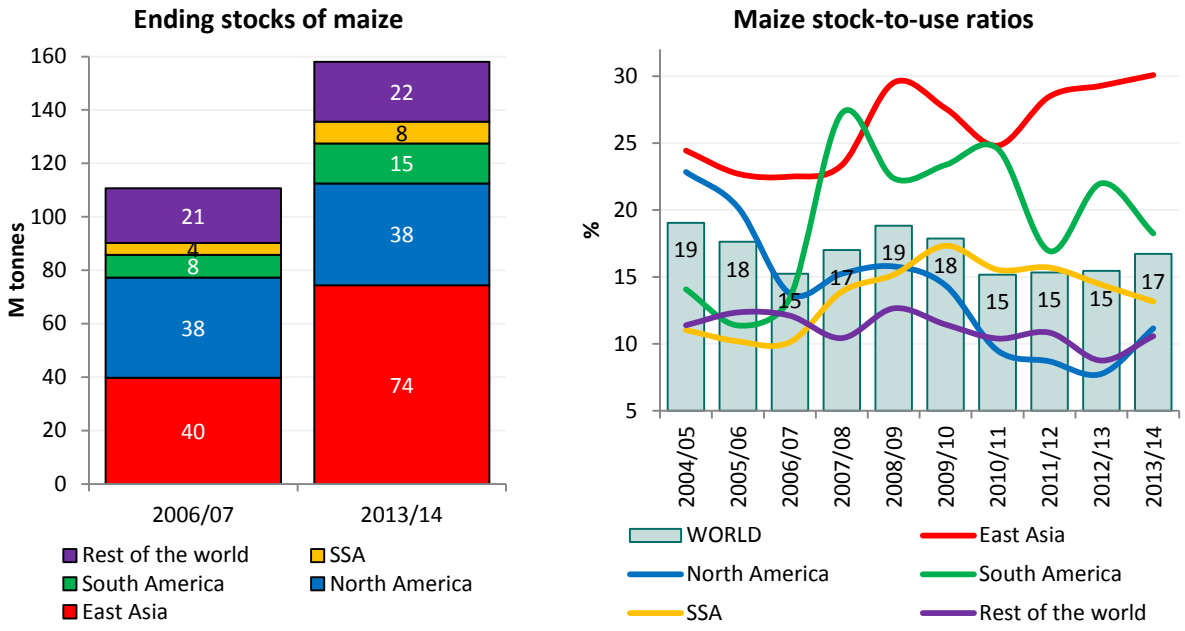
Note: The regions depicted accounted for over 98% of global wheat production in 2013/14, in decreasing order of importance.
Source: Data from USDA FAS.

Figure A5: Changes in production of cereals before and after the 2007/08 price spike, by major region and sub-region (M tonnes)



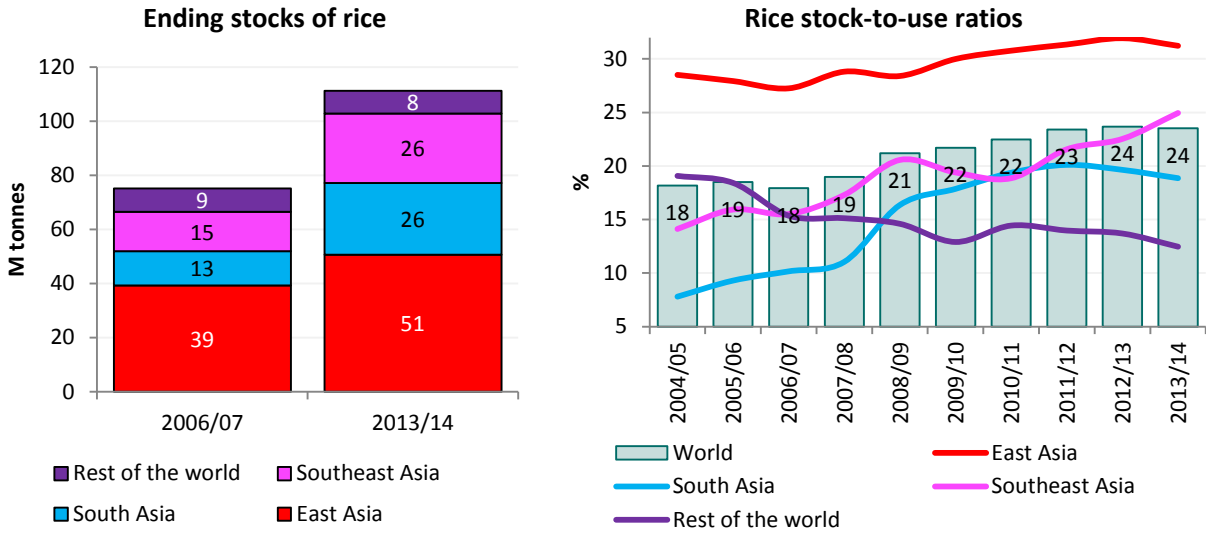
Source: Compiled from USDA data. Note: 'Before spike' refers to changes from 1997/98-1999/00 to 2004/05-2006/07, and 'After spike' to 2004/05-2006/07 to 2011/12 to

Figure A6: Maize stocks and stock-to-use ratios for major stocking regions and the world



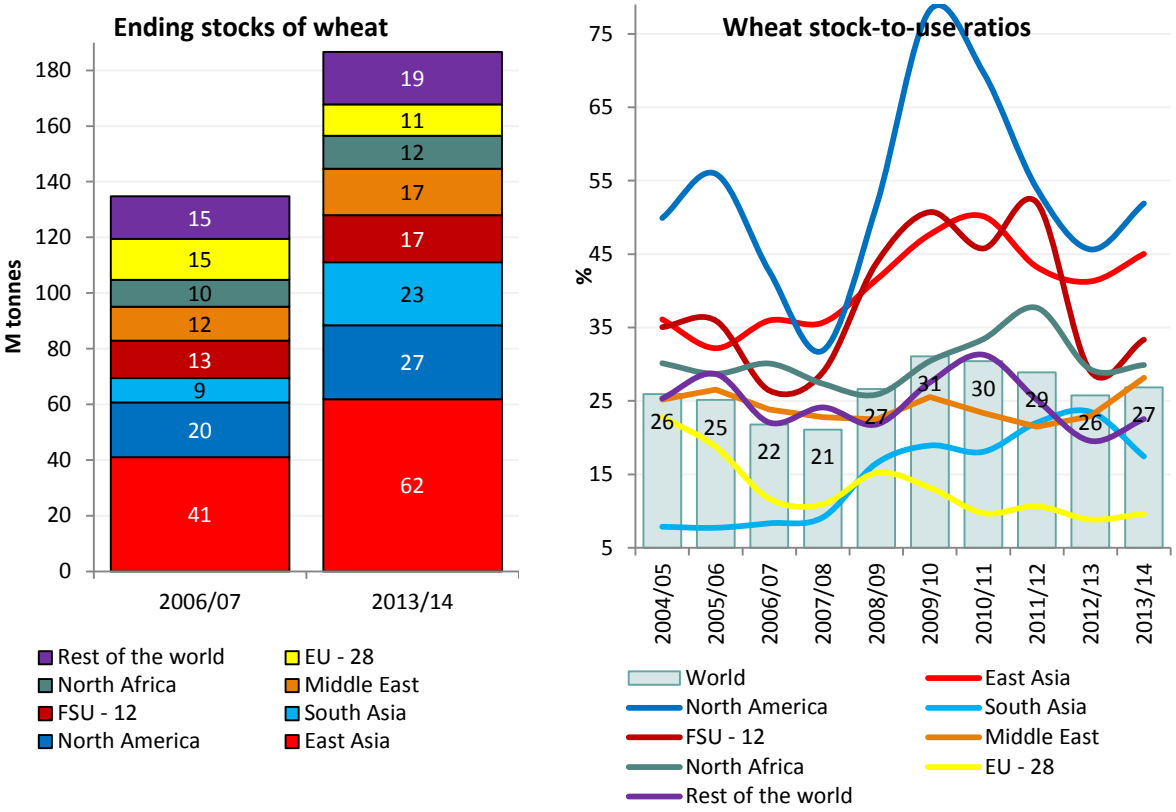
Source: Data from USDA FAS.

Figure A7: Rice stocks and stock-to-use ratios for major stocking regions and the world



Source: Data from USDA FAS.

Figure A8: Wheat stocks and stock-to-use ratios for major stocking regions and the world



Source: Data from USDA FAS.

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This material has been funded by UK aid from the UK Government, however the views expressed do not necessarily reflect the UK Government's official policies.

ISSN: 2052-7209

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