Food prices annual review
Year ending April 2013
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Reviewing the 2012/13 marketing year:

- 2012 saw yet another *sharp rise in maize and wheat prices* when in mid-2012 a one-in-50-year drought hit the US Mid-West cutting US production by 95M tonnes.

- *Even higher price rises were avoided* as harvest failures were largely limited to maize in the US, while Southern Hemisphere maize and wheat production reached a new record in early 2013.

- *Maize stocks remain very low*: too low to resist any shocks.

- *Rice prices remain high*, despite a series of good harvests, slowly growing demand, and healthy stocks.
Special: five years on from the price spike

- **Farmer response to high prices has been strong.** While initially the response came from farmers in OECD countries, with time the response from farmers in the developing world has been equally strong, if not stronger.

- **Prices, however, have not fallen back to their levels in 2006.** New spikes in 2010 and 2012 have — perhaps temporarily — interrupted that. Those spikes can be attributed to harvest failures and the strong growth of demand for maize, largely owing to ethanol distilling in the US that has repeatedly surprised farmers and traders.

- **Rice prices remain perched US$100–150 a tonne higher than they were before the spike of 2007/08.** Despite increasing harvests, prices have been buoyed up by rebuilding of public stocks in Asia and restricted exports from India 2007 to 2011 and Thailand since 2011. Above all costs of production have increased substantially, the consequence of higher oil prices and rising rural wages. The era of cheap rice may be over.
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1 Review of 2012/13: tracking cereal prices

1.1 Landmarks of the last year: May 2012 to April 2013

1.1.1 Maize & Wheat

Another price spike for maize and wheat
In May 2012,\(^1\) at the start of the cereals marketing year in review, cereals prices had been falling back gradually from the surge seen from mid-2010 to early 2011 after droughts in 2010 hit wheat production and Russia’s subsequent ban of wheat exports. The scene was set for a bumper maize crop in 2012, driven by the biggest ever planned US maize harvest, as US farmers looked to benefit from high prices.

Then came the shock: a one-in-50 year drought in the Mid-West which knocked global maize production estimates down from a hoped-for 945M tonnes to 850M tonnes. Maize prices jumped by 37%, with knock-on effects for wheat prices that rose by 33%.

A few nervous months followed, as traders awaited confirmation of just how poor the US maize harvest would be, while wondering about the next round of harvests in the Southern Hemisphere. At the time, meteorologists were tentatively predicting an El Niño that would bring destructively heavy rains in the western Pacific, and drought in the eastern Pacific and possibly also in southern Africa. In the event, the lions’ share of US maize losses were evident by August 2012, while the threatened El Niño failed to materialise. Southern hemisphere producers, who planted in expectation of high returns to wheat and maize, saw a good harvest.

Maize and wheat prices thus edged back from their heights seen in August and September 2012. Nonetheless, they remain 50% or more above their levels in early 2007, faced by a relentless growth in demand that has precluded any stock rebuilding.

Large world harvests, yet higher consumption
The maize harvest for marketing year (MY) 2012/13 ended up at an estimated 856M tonnes (USDA May 2013 estimate). Although this was the second highest in history after the 883M tonnes seen in 2011/12, it was still less than use in MY 2012/13 of 871M tonnes.

The global wheat harvest in 2012/13 was estimated at 655M tonnes, below the record 697M tonnes achieved in 2011/12, but still the fourth highest on record following the large harvests in 2009/10 and 2008/09, when prices not seen for some 30 years drove a strong supply response. Estimated wheat use in MY 2012/13 was also higher than production at

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\(^1\) Marketing years (MY) referred to in this report run from May to April, unless otherwise specified. [In practice, marketing years can vary by crop and country, and aggregate data presented may be summed across slightly different time periods.]
680M tonnes. Thus, world maize and wheat harvests for the last year were not quite large enough to keep up with use and stocks were drawn down.

Strong and growing demand for maize — largely from biofuel in the US — has eroded maize stocks. Consumption of maize for food, seeds, and industrial use (FSI) grew 6.6% a year from 2002/03 to the most recent year projected, compared to a rate of only 1.9% a year from 1995/96 to 2002/03, owing predominantly to increased biofuel use. Overall, however, maize use has been rising at an average of 3.5% a year in the last ten years, compared to 2.3% a year before, see Figure 2. The growth of wheat consumption has also accelerated, from 1.1% to 1.5% a year.

**Figure 1: Timeline of key events in international prices for maize and wheat**

Source: Data on weekly prices from FAO from the first week of March 2012 to the second week of April, 2013. ODI Food Price Updates, USDA WASDE, FAO WFS.

Note: HRW = Hard-Red Winter Wheat.

**Figure 2: Average annual growth rates in consumption of maize, rice, and wheat, globally over two periods: 1995/96 to 2002/03 and 2002/03 to 2013/14 (projected)**

Source: Authors’ construction. Data from USDA FAS

Figures charting changes in consumption of maize, rice, and wheat are available in Annex A.
Maize and wheat stocks reduced

Given the high demand for maize, stocks fell. By the end of 2012/13, coarse grain (predominantly maize) stock-to-use ratios had fallen to just 13% globally and 8% for key exporters (FAO estimates, see Figure 3). Maize stocks have been falling for most years since 2008/09 when stock-to-use ratios were 18%.

For wheat, global stock-to-use ratios fell from 26% last year to 23.4%, and from 18% to just 14% for major exporters, barely above the 13% seen in 2007/08 — see Figure 3.

**Figure 3: Stock-to-use ratios (%) for maize and wheat, end of year**

For maize, the global stock-to-use ratio has fallen to just 13% by the end of 2012/13, down from 18% in 2008/09. Major exporters’ stock-to-use ratio has fallen to 8%, barely above the 13% seen in 2007/08.

For wheat, the global stock-to-use ratio has fallen to 23.4% by the end of 2012/13, down from 26% last year. Major exporters’ stock-to-use ratio has fallen to 14%.

Source: Data from FAO World Food Situation, downloaded Apr 2013

FAO defines: ‘Major wheat exporters are Argentina, Australia, Canada, the EU, Kazakhstan, Russian Federation, Ukraine and the United States; major coarse grain exporters are Argentina, Australia, Brazil, Canada, the EU, Russian Federation, Ukraine and the United States.’

1.1.2 Rice: good harvest, growing stocks

Over the 2012/13 marketing year, rice prices have been relatively stable, especially compared to those of maize and wheat — see Figure 4. Thai export prices hovered around US$550 a tonne for A1 Super and between around US$580 and US$620 per tonne for 100%B over 2012/13.
Rice production has been good, estimated at 470M tonnes of milled rice, more than consumption of 467M tonnes, so that stocks have grown (USDA). Rice consumption has been growing by 1.5% since 2002/03, at similar rates to wheat but much less than maize, see Figure 2. It is thus surprising that rice prices have not fallen in the last year, nor indeed since 2008, given high production and slow growth of consumption. This puzzle is addressed in section 2.3 of this review.

### Figure 4: Weekly prices for benchmark international prices for rice: 1st week of March 2012 to 2nd week of April, 2013

Source: Data on prices from FAO, ODI Food Price Updates, USDA WASDE, FAO WFS.

Note: Rice expressed in milled terms.

Thai prices have been supported by farmer-friendly government policies to purchase rice at above-market prices, leading the Thai government to accumulate large rice stocks — see Box A.

**Box A Thai Paddy Pledging Programme under the Pheu Thai Party**

The 2011 election led to coalition government headed by the Pheu Thai Party (PTP) led by Mrs Shinawatra. The PTP campaign was characterised by popular but costly promises, including tax relief, boosting minimum wages, cash subsidies for the elderly, and — critically in a country still with some 40% of the population directly involved in farming — greater agricultural price support.

Prior to 2011 a pledging scheme was in place that allowed farmers to deliver paddy to public agencies in return for a guaranteed price, but since prices were not that attractive, little had been pledged in the preceding years. The new government then raised the pledge price by around 50%, to an average close to 15,000 baht (about US$500) per tonne — for paddy; the milled equivalent price would be no less than US$800, well above the world market price.

Consequently, in 2011/12 some 21M tonnes of rice were pledged, out of an estimated harvest of some 33M tonnes of paddy. Deliveries in 2012/13 have been even larger. The uptake of the rice pledging programme has led to rice that would have been exported being switched to the public scheme, so that government stores have filled with rice — with reports of stocks of an astonishing 12M tonnes (some reports even mention 16M tonnes).

These stocks cannot be exported without incurring a loss. Yet to finance the costly procurement scheme, the government has to sell some of its stores at a considerable discount to what it paid farmers, and moreover courting the disapproval of other rice exporters for subsidising rice exports — in contravention of WTO commitments. Since October 2011 it is reported that more than 40M tonnes have been pledged, at a total cost to the exchequer of almost US$20 billion. In early June 2013, Moody’s warned the rice pledging scheme had lost the Thai exchequer...
some US$6.5 billion.

The government has been trying to rein in some of the support: announcing that as from July 2013 prices would be cut by 20%, with limits to the amount any household can deliver.

Controversy over the scheme continues to run high, with allegations of heavy losses and corruption on the one side, and farmers protesting over decreases in the pledge prices on the other.

Sources: Mydans, 2011; IRIN, 2012; Prasertsri, 2013; USDA GAIN, July, 2013; Le Fevre, 2013; Yuvejwattana & Kate, 2013.; FAOSTAT; World Bank WDI.

Thai rice stocks rose to an estimated 12M tonnes for 2012/13, double their levels in 2010/11. Indeed, much of the growth in global rice stocks in recent years has been in Thailand, followed by China — see Figure 5. Global ending stocks of rice were estimated at around 105M tonnes in 2012/13, up from 99M tonnes in 2010/11. Global rice stock-to-use ratios have thus risen from 25% in 2006/07 to 36% in 2012/13, and from 17% to 28% for key exporters over the same period — see Figure 6.

More detail on the reasons for restocking can be found in section 2.3 that looks in more detail on the recent evolution of rice markets.

**Figure 5: Changes in rice stocks from 2010/11 to 2012/13 (projection)**

Source: Data from USDA on year-end stocks
1.2 Record cereals production expected for 2013/14

Given the rise in maize prices, US farmers are once again investing heavily in the summer 2013 crop to benefit from prevailing high prices. Yields are expected to be high, around 9.9 tonnes per hectare, the third highest on record and above the previous five-year average of 9.3 tonnes per hectare.

Maize harvests across the world are expected to rise sharply for the 2013/14 marketing year to reach 966M tonnes, 109M tonnes up on 2012/13 (USDA), see Figure 7. Wheat production is also projected to rise, by 45M tonnes, while rice production is set to rise a more modest 9M tonnes.²

Figure 7: Global production estimates for maize, wheat, and rice, 2005/06 to 2013/14 (projection)

Source: Data from USDA FAS (10 May 2013). Note: Rice expressed as milled. Marketing years run May to April.

² The increases expected for 2013/14 compared to the previous five-year average are 14% for maize, 4% for wheat and 5% for rice. Year-on-year, the increases are 13% for maize, 7% for wheat and 2% for rice.
2 Special: Five years on from the price spike

2.1 A brief recap

Five years have passed since the price spike of 2007/08. What has been seen in this time?

The price spike of 2007/08 stemmed from an unusual combination of factors operating on different time-scales. The growth of cereals production slowed from the mid-1980s onwards, falling behind that of consumption so that by the early 2000s, stocks began to be depleted, an effect exacerbated by policies in China, the US and Europe that saw public stocks run down. From 2002, the oil price began to rise, pushing up costs of production while contributing to an unexpectedly large boom in US ethanol production from maize that started in mid-2003. Cereals prices rose from 2002 onwards, but accelerated rapidly as harvest failures in Australia, the Black Sea region and Europe in 2007 combined to reduce supply at the same time as demand for maize for ethanol distilling increased sharply as the oil price accelerated. Once prices began to spike, some governments panicked and restricted exports, while other governments, traders and households restocked in an already tight market, thereby leading to the sharp spikes seen in the first half of 2008.

This ‘perfect storm’, a rare coincidence of circumstances, was short-lived. It was thus not surprising that these dramatic price increases were followed by almost equally precipitous falls in the second half of 2008 as panic abated and the high prices prompted record harvests in 2008. Cereals prices continued to fall back, albeit more gradually, over the next 18 months, so that by mid-2010 the prices of maize and wheat had fallen to their levels seen before the spike, while the rice price remained surprisingly some US$100–150 a tonne higher than before — a puzzle that will be addressed in section 2.3, see Figure 8.

The return to normality, however, was rudely interrupted when in mid-2010 wheat prices were pushed up by drought in Russia and the Black Sea region, leading Russia to impose a wheat export ban. Maize prices tend to move in close conjunction with those for wheat, as the two crops are substitutes in livestock feed, so maize prices were also pulled upwards. This second spike saw prices of maize and wheat double by the end of 2010. Only by mid-2011 had production recovered sufficiently to allow prices to fall again. Prices fell modestly, however, so that they were still well above the levels seen before 2007. Indeed, for maize, with the exceptional and unexpectedly strong demand for maize for ethanol in the US, the 2010/11 spike was as severe as that seen in 2007/08.
Even so, it was expected that prices would fall further, as farmers in 2012 planned for large harvests given the high prices. Nowhere was that greater than in the US, where the area planted to maize was expected to reach levels not seen since the Second World War, while farmers invested in the inputs to achieve high yields per hectare. These hopes, however, were dashed by the severe, one-in-fifty-year drought which hit the US Mid-West in mid-2012, reducing harvests by almost 100M tonnes: a quite extraordinary loss. Prices of maize leapt back up at this news, reaching the levels seen in 2007/08 and 2010/11. While wheat largely escaped this drought, wheat prices were pushed up by movements in maize prices owing to the possibilities of substitution in livestock feed.

Rice prices also rose from mid-2010 through to mid-2012, driven largely by domestic Thai policies to offer guaranteed high prices to farmers. Fears of poor monsoons hitting harvests in India also contributed. Rice prices have, however, been relatively steady and flat since early 2012.

**Figure 8: Cereals prices Jan 2005 to Apr 2013**

a) Maize and wheat

![Graph of Maize and Wheat Prices](image)

b) Rice

![Graph of Rice Prices](image)

**Source:** Data from FAO ESC.

**Note:** Thai 100% B is the rice tracked by the IMF in its international commodity prices database. Thai A1 Super is a slightly lower quality variety which sells at a discount compared to 100% B.
2.2 Comment: what has been learned from these events?

Six things are increasingly clear.

1. **Farmer response to high prices has been strong.** As reported in the previous end-of-year review, farmers have reacted strongly to higher prices. While initially the response came from farmers in OECD countries, with time the response from farmers in the developing world has been equally strong, if not stronger — see last year’s review (Keats & Wiggins 2012). This makes the next point all the more pertinent.

2. **Prices, however, have not fallen back.** By late 2008, it seemed that cereals prices would return to their levels before the 2007/08 spike, but new spikes in 2010 and 2012 have — perhaps temporarily — interrupted that. So what has prevented a return to previous price levels?

3. **Bad weather has struck hard on two occasions.** Indeed, for those who see the world food system as broken, the US drought was a stern test. Some reassurance may be drawn from such a heavy harvest loss leading to no more than US$70 a tonne being added to the maize and wheat prices.

4. **Growth of demand for maize for ethanol in the US has repeatedly surprised farmers and traders.** Few observers in the mid-2000s would have imagined that by 2012, more than 130M tonnes of US maize would be distilled. Yes, it was expected that the market for ethanol would grow under the stimuli of the renewable fuel mandates, the abandonment of MTBE as a gasoline additive, and the rising oil price; but few imagined just how much it would grow. It has taken almost a decade of surprisingly large increases in ethanol production for farmers and traders to react proportionately.

5. **Stocks of maize have never recovered from their low levels in the early 2000s** that left the maize market vulnerable to shocks. The surprising increases in demand have seen to that. Maize stocks are very low indeed: in the amber if not the red zone.

6. **Rice prices remain perched US$100–150 a tonne higher than they were before the spike of 2007/08.** Given the increases seen in rice production, the slow growth of demand, and the absence of harvest failures since 2008, this is surprising. The next section addresses this puzzle.

Some have interpreted the persisting high and volatile cereals prices as evidence that the world cereals system needs major reform. Some of the structural reforms being advocated include further allowances for low income countries to impose trade restrictions, regulation of the commodities futures to deter index investments in food crops, abandonment of inflexible biofuel mandates in the EU and US, and the re-creation of large public stocks.³

Most observers agree that inflexible biofuel mandates aggravate volatility and their relaxation would ease pressure on prices, those of maize in particular⁴. Volatility since 2008 strengthens the case for greater public stocks. That said, had a global public stock of some 70M tonnes of cereals been created in the last five years, this would have heaped pressure on the prices seen in markets. It is bad enough to have inflexible biofuel mandates, without adding in public stock managers with a mission to build stocks no matter what the state of the market. Either that, or else they would have been twiddling their thumbs for much of the last five years, waiting for an appropriate moment to make their purchases.

The most persistent controversy is the idea that less index investment would reduce volatility and prevent spikes. This belief has persisted, despite mounting evidence (see for example Aulerich et al 2012, Gilbert 2012) that finds index investment to be at most a

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³ See, for example, Clapp & Murphy, 2013.

⁴ Depending somewhat on relative prices of oil and maize. If the oil price is high enough, the profitability of maize ethanol ought to encourage its production. Given volatility and unpredictability of oil prices however, mandates mitigate risk associated with investing in biofuels.
minor contributor to the 2007/08 spike, if it was at all\(^5\). Furthermore, those who favour controls do not seem to attribute the subsequent spikes in 2010/11 and 2012 to such investments. Some commentators have thus moved to the position that such investments be regulated on the precautionary principle (Spratt 2013).

Commentary aside, what then has happened in the rice market?

2.3 The rice market mystery\(^6\)

2.3.1 The facts

Rice production has been growing steadily, outstripping consumption in every year since 2005/06, see Figure 9. These conditions should at first sight have pushed rice prices down. But as seen, they have not: instead rice prices that stood at no more than US$225 a tonne in 2005 were above US$550 a tonne in early 2013. So what explains this mystery?

2.3.2 Potential explanations

Several factors may help to explain the prevailing high prices seen for rice: costs of production; restocking; and changing patterns of exports and imports.

Rising costs of production

Costs of rice production have risen in some of the main producing countries, owing to higher oil and fertiliser prices, and to rising wages. The supply curve for rice has thus probably shifted left, so that for any given level of demand the market will clear at a higher price.

Figure 9: Rice production and consumption, 2005/06 to 2012/13

![Figure 9: Rice production and consumption, 2005/06 to 2012/13](image)

Source: Data from USDA FAS

Higher oil prices make inputs, especially nitrogenous fertiliser, more expensive. Soaring fuel costs also raise other costs of operating machinery and transporting both inputs and production. The oil price remains well above its position prior to the spike in 2007/08: see Figure 10. From January 2009 to April 2013, oil prices correlated with Thai rice prices with a coefficient of 60%, and correlated with Vietnamese rice prices with a coefficient of 35%.

\(^5\) Some analyses even suggest that index investment may have tended to stabilise prices on futures markets.

\(^6\) Many thanks for Dr Concepción Calpe of FAO for specialist advice on this section. Any errors and omissions are, however, solely our responsibility.

\(^7\) While rice prices correlate with oil, this is less marked than for maize and wheat. There is an 85% correlation coefficient between oil and maize and about a 70% correlation coefficient between oil and wheat over the same
Improved wages for farm labourers have also contributed. Recent surveys show that labour often contributes more than half of the variable costs of rice production in Southeast Asia, see Figure 11.

**Figure 11: Share of input and labour in variable costs of rice production in SE Asia**

Source: Maligalig et al., 2012.  
Note: WS and DS refer to wet and dry seasons. AE refer to agro-ecology type where 2 = Irrigated/other; 3 = Irrigated/Irrigated; 5 = Rainfed; 6 = Rainfed/Rainfed; 7 = Rainfed/other; and 8 = Rainfed dry/upland

Though data on wages are patchy, evidence from several Asian countries suggests that rural wages are increasing, especially in some of the larger rice consuming countries. For instance, in China, rural wages have been rising with reports of wages doubling in the four years from 2003 onwards (Wiggins & Keats, 2011, quoting Zhang et al., 2010). Between period. The closer relation of oil prices to those of maize and wheat probably stems from links in the biofuels market. For an explanation of this relationship see for instance Gilbert, 2008.
2005 and 2010, labour costs in rice production rose between 54% and 75%, for different kinds of rice, while other input costs (mainly fertiliser) rose by 54% to 87%, see Figure 12.

**Figure 12: Rising costs of rice production in China, 2005 to 2010**

![Graph showing rising costs of rice production in China, 2005 to 2010](image)

**Source:** Production costs from Prof Jikun Huang, converted at official exchange rates to US$. Costs are shown as national averages, but also for the main centres of production of the three cereals. Indica rice is grown in Southern China, while Japonica rice is grown in northern China, particularly in Northeast China.

**Note:** Some production cost increases are exaggerated in dollars owing to yuan appreciation. For instance, nationally, variable cost increase per tonne of paddy from 2005 to 2010 measured in yuan is about 41%, compared to 71% in dollars.

In Bangladesh, production costs for inputs and labour of the two main rice seasons — Boro and Aman — have also risen, with the change in input costs for Boro high-yielding varieties of rice particularly striking, owing largely to higher irrigation costs resulting from more costly fuel, see Figure 13.

**Figure 13: Rising costs of rice production in Bangladesh, 2001 to 2008/09**

![Graph showing rising costs of rice production in Bangladesh, 2001 to 2008/09](image)


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*In the Boro season, from November to May, rice is mainly grown under irrigated conditions. The Aman rice crop, from July to December follows the monsoon rains and is mainly rainfed. (Gumma et al., 2012)*
In India, increased wages may be pushing up costs of production even more. Real daily farm wages (in 2011/12 terms) rose from about 110 rupees in 2006/07 to about 155 rupees in 2011/12 — an increase of around 40% — see Figure 14. Over the period 2007/08 to 2011/12, nominal farm wages grew at a rate of 17.5% per year, compared to a rate of only 1.8% a year from 2001/02 to 2006/07 (Gulati et al., 2013).

Figure 14: Average farm wage rate at constant 2011/12 prices, 1990/91 to 2011/12

Source: Figure 2 in Gulati et al., 2013.
Rural wages in Thailand have also been rising, at an average of around 3.3% a year, between 2001 and 2009 [from data in Report of the Labor Force Survey, National Statistical Office, 2010].

Costs of production in Asia may also be rising as additional rice has increasingly to be produced from areas without the natural advantages seen in the great river valleys and deltas with their fertile alluvial soils and ready supply of irrigation water.

Restocking is displacing exports
Public restocking is taking up rice that could be exported. The price spike in 2008 was a rude shock for rice consuming countries, leaving some governments determined to build stocks to protect against future events. Three countries have notably built up rice stock from 2005/06 to 2012/13: India, China, and Thailand, see Figure 15. In contrast, stock levels in the US and the EU, as well as the rest of the world, have been relatively stable. Curiously, in the Philippines where public restocking might have been expected, stock levels have fallen slightly from 2007/08. Overall, between 2005/06 and 2012/13, the estimated stocks for rice rose by 29M tonnes.

The three Asian countries that have restocked at scale did so for quite different reasons. India’s rice stocks grew some 12.6M tonnes from end MY 2006/07 to end MY 2012/13, doubling the country’s stock-to-use ratio between 2005/06 and 2009/10. While there may have been the intention to increase stocks, the immediate cause of this was the export ban on non-basmati varieties introduced in late 2007 and only removed in late 2011. India has minimum support prices for rice and other key foods, so that harvests in excess of domestic demand can be sold into public stocks: the combination of the export restrictions and good domestic harvests led to much more rice being delivered to public warehouses, see Figure 16.

9 The Philippines’ controversial stock-building over the 2007/08 period is thought to have contributed to the international spike at the time, but the country has since been drawing down stock.
China keeps large grain stocks, rice and wheat in particular, as part of a food self-sufficiency strategy. After the shock of 2008, it was announced the China would aim to increase public stocks held. It is believed that rice stocks increased by almost 10M tonnes from 2005/06 to 2012/13, a period over which it is estimated that production exceeded consumption by about 6.9 M tonnes. It seems then that net imports of some 0.8M tonnes over this period helped boost stocks.

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10 Estimates of Chinese stocks of grain are in doubt. Officials are reluctant to supply statistics. Given that stocks are held at national, provincial and lower levels, it may well be that no-one knows with any certainty how large the stocks are. Moreover, it is thought that Provincial officials have incentives to report stocks higher than they may actually be.
Stock increases in Thailand, as discussed in Section 1.1, are primarily driven by domestic Thai policies to procure rice from farmers at prices well above the world market levels. This drives increased production above that consumed locally or that can be exported at the government procurement prices. Thai stocks have thus risen from 3.5M tonnes in 2005/06 to almost 12M tonnes in 2012/13, as stock-to-use ratios soared from 38% to 111%, see Figure 18.

Thai exports that, in the past, have been 9M to 10M tonnes, have in recent years sunk to less than 8M tonnes. Some of the longstanding surplus between production and consumption that has made Thailand the world’s largest exporter of rice has been switched into public stocks, as millers find it more profitable to sell to the public scheme rather than to export.

**Changing trade patterns: exports and imports**

As seen, exports from India and Thailand, traditionally two of the main rice exporters have been reduced by domestic policies. From 2008/09 to 2011, *India’s* rice exports were much...
reduced owing to export restrictions, see Figure 19. With the lifting of the ban, there has been a strong return to the export market with India becoming the single largest exporter.

**Figure 19: Rice exports for the top ten exporters and the rest of the world, 1990/91 to 2012/13 (projected)**

![Rice exports chart](chart.png)

*Source: Data from USDA FAS PSD. Note: 2013/14 is a projection for marketing year May 2013 to April 2014*

**Thailand**, on the other hand, has seen its share of world rice exports reduced since 2011/12 as the pledging scheme has come into operation. While the Thai share of exports in the world rice market averaged 30% between 2000/01 and 2002/03, it was down to 24% over the last three marketing years: see Figure 19.

For these two exporters, *exchange rate movements* have accentuated changes in their exports. Appreciation of the Thai baht against the US dollar means that Thai exporters have had less incentive to export than they might have. In US dollars, Thai rice [5% broken] was in April 2013 twice the level of 2005; but expressed in baht, prices were only 40% higher, see Figure 20a. Given that prices on offer domestically in pledging rice to the government were well above the world market prices (see Box A), it is little surprise that Thai exports have been falling in recent years.

On the other hand in India, the opposite has been seen as the Indian rupee has lost value against the US dollar. Recent export prices in US dollars have been some 80% above where they were in 2005, while prices in rupee terms are about 130% higher, see Figure 20b, giving a strong incentive to export.

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11 Although the Indian government did make exceptions over the food price crisis and export to low-income countries thought to be particularly food insecure, including for instance Bangladesh and LICs in Africa.
Vietnam, with low costs of production, has just about doubled its rice exports since the new
century began. The leading rice exports on the world market are today more evenly shared
between India, Thailand and Vietnam, with each supplying 20–21% of total exports, See
Figure 21.

One consequence of these shifts in trade patterns, presumably temporary, has been the
surprising divergence of Thai export prices from those of India and Vietnam, see Figure 22.
Thai rice prices have in the past been taken as a benchmark for international prices, since
the country has been a low-cost producer. With rising costs of production and an
appreciating baht that is increasingly no longer the case. What matters for most low income
countries importing economy grades of rice increasingly is not the price in Bangkok, but the
offers made on the wharves of Bay of Bengal and Saigon.

Figure 21: Rice exports from the top five exporters in 2012/13
(Million tonnes and % of total)

Source: Data from USDA FAS PSD
Figure 22: Rice export prices from Thailand, India and Vietnam, Jan 2011 to April 2013

Source: Data from FAO GIEWS, all prices quoted as export prices in US$.

Figure 23: Real world rice prices from Thailand, India and Vietnam, 2005 to 2013

Source: Data from FAO GIEWS, all prices quoted as exports in US$. Deflated by US implicit GDP deflator
Prices of comparable grade\textsuperscript{12} Indian and Vietnamese rice exports were in April 2013 some US$140 to US$190 a tonne lower than Thai A1 Super.\textsuperscript{13} When India returned to the rice export market, Vietnam’s prices, which had previously followed the Thai prices fairly closely, fell and began to move in line with the lower Indian prices.

Does the big gap between Vietnamese and Thai prices mean the notion of ‘world’ rice prices being inexplicably high is something of a red herring? Not exactly. While cheaper options than Thai rice may be available, prices of these are still high in real terms; some US$100/tonne higher in real terms than their levels in 2005, evident in Figure 23. The drop in non-Thai prices happened relatively recently and does not explain much of the disparity in rice prices from before and after the global food price crisis.

\textit{Changes to patterns of imports} have been less marked, although two are worth mentioning. \textit{Africa} is emerging as the largest market for rice, see Figure 24. Imports of rice to Sub-Saharan Africa (SSA) have increased considerably since the food price crisis. Over the last decade, (from 2002/03 to 2012/13) SSA rice imports increased by 43% or 3.3M tonnes. Nigerian imports over the same period went up by about 1M tonnes or 53\%.\textsuperscript{14}

\textbf{Figure 24: Rice trade in selected regions, 2000/01 to 2013/14 (projected)}

\textit{Source: Data from USDA FAS. 2013/14 is a projection for the present marketing year}

\textsuperscript{12} See Annex B for explanation of rice grades
\textsuperscript{13} And even lower than Thai 25\% B. In February 2013, 25\% B grade rice from Thailand was 37\% more expensive than a comparable grade from India, and around 55\% more expensive than the Vietnamese equivalent.
\textsuperscript{14} Increased demand from Nigeria was particularly high in the last two years ahead of an expected rise in import duties. Nigeria is to begin implementing an import substitution scheme (involving higher import duties) to encourage local production, so imports are expected to be lower in 2013 (ICG Grain Market Report 430, Feb 2013). Though it remains likely considerable amounts of Asian rice will enter Nigeria via neighbouring countries.
The other notable change can be seen for *China*, which went from exporting half a million tonnes of rice in 2008 to importing 2.6M tonnes in 2012/13. USDA estimates this will increase to 2.8M tonnes in 2013/14 — see Figure 25 which shows China’s rice trade since 1990/91. China appears to be moving to a net importer as domestic costs of production are rising and lower cost producers like Vietnam are so nearby.

**Figure 25: China’s rice trade, 1990/91 to 2013/14 projection**

![Chart showing China's rice trade, 1990/91 to 2013/14 projection](source: Data from USDA FAS. Years are MY beginning. 2013/14 is a projection for the present marketing year.)

### 2.3.3 Rice prices demystified

So what does the balance of evidence suggest is propping up high rice export prices? Two factors dominate: rising production costs and restocking.

**Costs of production are rising** in some parts of Asia, such as Bangladesh, China, India and Thailand— and, in all likelihood, across much of Asia. Moreover, the rising yuan and baht mean that increases in costs of production in China and Thailand are that much greater when expressed in US dollar terms. Where currencies appreciate, farmers are less willing to export.

**Restocking has been considerable.** From 2007/08 to 2012/13, something like 24M tonnes have been added to global stocks in just five years: this in a world market that trades around 30M tonnes a year. Close to 5M tonnes a year on average over 2007/08 to 2012/13 were added to global rice ending stocks: equivalent to about a 15% boost to import demand in a notoriously thin market where global production has grown on average by only about 7.5M tonnes a year from 2007/08 to 2012/13.

To this pair of factors can be added the temporary restrictions to India’s exports from 2007 to 2011, and reduced Thai exports since the introduction of the domestic pledging scheme in 2011.

While restocking will not necessarily continue — there are limits to what the warehouses can hold and public exchequers will finance — higher costs of production are probably a long-term factor. The low costs of fuel, fertiliser and rural wages in Asia have come to an end, and with this, the end of cheap rice.
3 References


Calpe, Concepción, Senior Economist, Secretary, Intergovernmental Group on Rice, Trade and Markets Division, FAO: Personal Communication


Gumma, Murali K., Andrew Nelson, Aileen Maunahan, Prasad S. Thankabail, and Saidul Islam, 2012, Rice cropping patterns in Bangladesh. IRRI.


Prasertsri, Ponnarong, 2013, Thailand Grain and Feed Annual 2013. GAIN Report Number TH3027. USDA FAS.


A: Consumption trends in maize, rice, and wheat, by region

The figures that follow show consumption trends of the last few decades – patterns in maize, rice, and wheat use by top regions. Maize use has grown the most dramatically, increasing almost a quarter of a billion tonnes in the last 11 years — an increase that previously took over twice as long to achieve. Rice consumption in contrast has grown at a remarkably stable rate over the last 20 or so years.

Figure A1: World maize consumption by region, 1978/79 to 2013/14 (projected)

Source USDA data. Note: 2012/13 figure is the USDA estimate from May 2013. The Figure for 2013/14 is the first USDA projection for marketing year 2013/13.
Figure A2: World rice consumption by region, 1990/91 to 2013/14 (projected)

Source: USDA data. Note: 2012/13 figure is the USDA estimate from May 2013. The Figure for 2013/14 is the first USDA projection for marketing year 2013/14. Global trade in the key staples since 1960/61

Figure A3: World wheat consumption by region, 1986/87 to 2013/14 (projected)

Source: USDA data. Note: 2012/13 figure is the USDA estimate from May 2013. The Figure for 2013/14 is the first USDA projection for marketing year 2013/14. Global trade in the key staples since 1960/61
B: Rice grades

Japonica and Indica rice are the two main types of rice, with the latter the most widely consumed and traded, perhaps 70% of rice that is traded.

Indica rice comprises the premium fragrant and aromatic grades that may represent 10% to 15% of world trade, and non-fragrant rice that makes up the bulk of the market. This rice is then distinguished by the grains — whether long or short, and the fraction that are broken; the composition of grains, above all the extent to which there are blemished kernels and impurities; and the grade of milling — see below the categories for Thai rice.

Table 1: Categories of Thai rice

<table>
<thead>
<tr>
<th>White rice</th>
<th>Cargo rice (Loonzain rice, Brown rice, Husked rice)</th>
<th>White glutinous rice</th>
<th>Parboiled rice</th>
</tr>
</thead>
<tbody>
<tr>
<td>White rice 100% Grade A</td>
<td>Cargo rice 100% Grade A</td>
<td>White glutinous rice 10%</td>
<td>Parboiled rice 100% Sorted</td>
</tr>
<tr>
<td>White rice 100% Grade B</td>
<td>Cargo rice 100% Grade B</td>
<td>White glutinous rice 25%</td>
<td>Parboiled rice 100%</td>
</tr>
<tr>
<td>White rice 100% Grade C</td>
<td>Cargo rice 100% Grade C</td>
<td>White glutinous broken rice A1</td>
<td>Parboiled rice 5% Sorted</td>
</tr>
<tr>
<td>White rice 5%</td>
<td>Cargo rice 5%</td>
<td>Parboiled rice 5%</td>
<td></td>
</tr>
<tr>
<td>White rice 10%</td>
<td>Cargo rice 10%</td>
<td>Parboiled rice 10% Sorted</td>
<td></td>
</tr>
<tr>
<td>White rice 15%</td>
<td>Cargo rice 15%</td>
<td>Parboiled rice 10%</td>
<td></td>
</tr>
<tr>
<td>White rice 25% Super</td>
<td></td>
<td>Parboiled rice 15%</td>
<td></td>
</tr>
<tr>
<td>White rice 25%</td>
<td></td>
<td>Parboiled rice 25%</td>
<td></td>
</tr>
<tr>
<td>White rice 35%</td>
<td></td>
<td>Parboiled broken rice A1</td>
<td></td>
</tr>
<tr>
<td>White rice 45%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White broken rice A1 Extra Super</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White broken rice A1 Super</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White broken rice A1 Special</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The two most commonly quoted rice grades are 25% Broken white rice, and A1 Super that despite its name is composed of 100% broken grains and hence trades at a discount to 25% Broken.
### Table 2: Rice grades and key defining characteristics

<table>
<thead>
<tr>
<th>Grain classification</th>
<th>Grain composition</th>
<th>Milling</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>100% Grade B white rice</strong></td>
<td>At least 40% Long grain class 1 No more than 5% Short grain And the rest made up of Long grain class 2 or 3.</td>
<td>Whole kernels &gt;= 60% Broken &lt;4.5%, of which &lt;0.5% are Small broken C1. Yellow kernels &lt; 0.2% Chalky kernels &lt; 6% Damaged kernels &lt;25% Glutinous rice &lt;1.5% Paddy &lt;7 grains per kg of rice Undeveloped kernels, immature kernels, other seeds and foreign matter singly or combined &lt;0.2%.</td>
</tr>
<tr>
<td><strong>25% Broken white rice</strong></td>
<td>Short grain &lt; 50% The rest a combination of Long grain Class, 1, 2, or 3.</td>
<td>Whole kernels &gt;= 40% Broken &lt;28%, of which small broken C1 &lt;2% Red / under-milled kernels &lt;7% Yellow kernels &lt;1% Chalky kernels &lt;8% Damaged kernels &lt;2% Glutinous rice &lt;2% Paddy &lt;20 grains per kg of rice Undeveloped kernels, immature kernels, other seeds and foreign matter singly or combined &lt;2%</td>
</tr>
<tr>
<td><strong>A1 Super white rice</strong></td>
<td>By-product milling 100%, 5%, and 10%. (5% has at least 20% long grain class 1 and short grain &lt;10%, with the rest long grain class 2 or 3. 10% has at least 10% long grain class 1 and short grain &lt;15%, with the rest long grain class 2 or 3)</td>
<td>Most of the grains are broken so that they are &lt;65% of their whole kernel size. &lt;15% is whole or longer broken grains. Small broken C1 &lt;= 5% Glutinous rice &lt;1.5%. Glutinous broken C1 &lt;0.5% Foreign matter &lt; 0.5%</td>
</tr>
</tbody>
</table>

*Source: Data on rice grades from Dr Concepción Calpe, FAO.*

### 4.1.1 Grain classification

**Long grain class 1** = whole kernel with length > 7mm;

**Long grain class 2** = whole kernel with length 6.6 to 7mm;

**Long grain class 3** = whole kernel with length 6.2 to <6.6mm;

**Short grain** = whole kernel <6.2mm.

### 4.1.2 Grain composition

**Broken kernels** are any that are not whole.
Small broken C1 means small broken kernels that pass through a round hold metal sieve No. 7 (Sieve is 0.79mm thick with hole diameter of 1.75mm)

**Under-milled kernels** = those below the milling degree specified for the grade

**Red kernels** = rice kernels with red bran covering kernels wholly or partly

**Yellow kernels** = rice kernels with some parts turned obviously yellow (including parboiled kernels that are light brown)

**Chalky kernels** = kernels where at least half the grain has an opaque chalky appearance.

**Damaged kernels** = those with obvious damage (seen by the naked eye) owing to moisture, heat, fungi, insects, or other.

**Undeveloped kernels** = those which haven’t developed normally, are flat and lacking starch.

**Immature kernels** = those that are light green, obtained from immature paddy.

**Other seeds** = seeds of plants other than rice

**Foreign matter** = matter that is not the rice kernel, and includes rice husk and bran detached from the kernels.

### 4.1.3 Milling degree

**Extra well milled** = bran removed entirely and kernel looks especially nice;

**Well milled** = bran removed entirely and kernel looks nice;

**Reasonably well milled** = a large amount of bran has been removed and the kernel looks reasonably nice;

**Ordinarily milled** = only some bran is removed.

For more detail on causes and consequences of the food price crisis in 2007/2008, thoughts on future prices, and policy implications, have a look at our recent publication in the Shockwatch series here:

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