

## Chapter 4

# Cereals

## Market situation

Supply and demand balances of major cereals were tight in the 2012 marketing year,<sup>1</sup> with global production of wheat and coarse grains falling short of global utilisation and pulling down stocks. Severe droughts in 2012 in the United States, and across a large part of Europe and into central Asia have been the main cause of the reduced wheat and coarse grains crops.

For 2013, world wheat production is expected to record the second largest crop after that of 2011. The increase is mainly driven by an expansion in area in response to high prices and an expected recovery in yields from below-average levels in 2012 in some countries, notably the Russian Federation, Kazakhstan and Ukraine. By contrast, the outlook in the United States is less favourable as severe drought conditions during the early stages of the growing season in the Southern Plains reduced winter survival rates and yields in affected areas.

Early prospects for world coarse grains production in 2013 are favourable as the production of maize in the United States, the world's largest maize producer, is likely to surpass pre-drought levels with recovery in yields and early indications suggesting the largest planned maize area since 1936.

Rice supplies in 2012 were sufficient to allow for a continued rebuilding of stocks. India emerged as the world's leading rice exporter in 2011 through the release of significant stocks built up over the previous four years of export restrictions and reduced competition from Thailand, where exporters' competitive edge had been eroded by the government's high producer price policies. In the near future, Thailand is expected to increase rice exports and recover its world leading position.

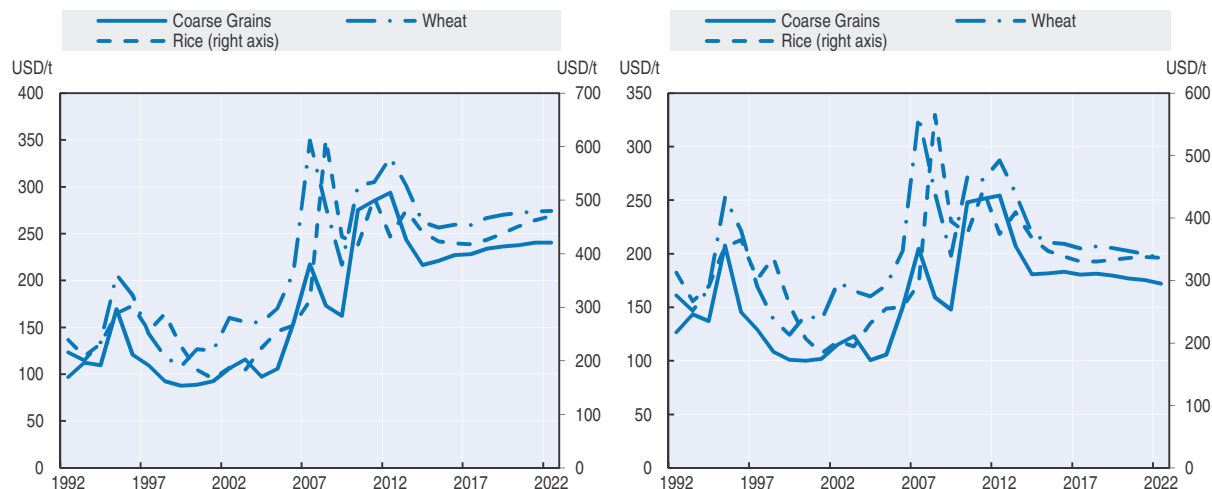
## Projection highlights

- World grains prices could remain under downward pressure in the short-term and continue to ease in real terms over the *Outlook* period following a slower than expected economic recovery of the world. Crude oil prices slightly grow in real terms over the *Outlook* period and this could weigh on grain markets.
- Wheat and coarse grains yields are estimated to increase by about 12% on average between the base year and 2022. In terms of area expansion, coarse grains are projected to experience a faster growth than wheat or rice.
- Short-term supply and demand imbalances (as measured in terms of changes in stocks) are solved within the first few years of the outlook but stock-to-use and stock-to-disappearance ratios remain well below historical averages over the baseline. This raises serious concerns about the vulnerability of cereal markets to unexpected shocks, especially from the supply side (e.g. severe drought episodes in major producing regions).

- The additional demand for biofuel feedstocks over the projection period (mainly maize) is driving the large expansion of coarse grains in developed countries. In developing countries, the main driver is the feed demand for livestock production.
- Exports of wheat, coarse grains and rice are set to increase over the projection period with new Asian rice exporters expected to make major inroads.

**Figure 4.1. Grain prices stabilise over the medium term**

Evolution of prices expressed in nominal and real terms



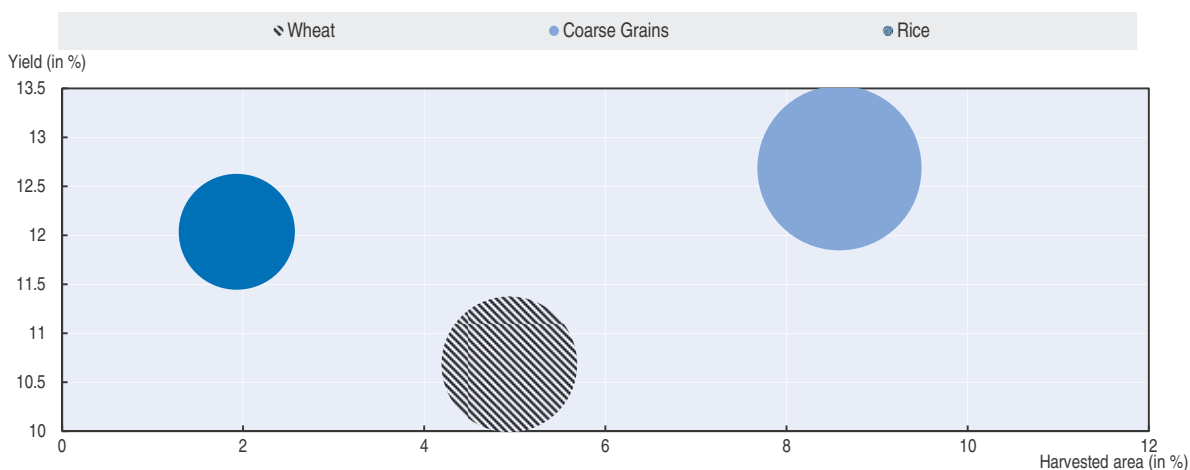
Note: The left figure shows nominal prices and the right figure shows real prices.

Source: OECD and FAO Secretariats.


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**Figure 4.2. Moderate yield increases and weak area expansion for cereals over the medium term**

Evolution of global cereal harvested area and yields over the projection period



Source: OECD and FAO Secretariats.

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## Market trends and prospects

### Prices

Extreme droughts in 2012 in Central Asia, Eastern Europe, and the United States led to tighter supplies of wheat and coarse grains and a spike in prices. However, as early prospects for 2013 cereal production are favourable, wheat prices are expected to fall below USD 265/t in 2014. Starting from this level, wheat prices are projected to approach USD 274/t in nominal terms by 2022. Although the trend is fairly stable, average nominal prices for the projection period are expected to increase relative to the previous decade. In real terms, however, wheat prices decrease from current high levels over the next decade by around 2% p.a. (Figure 4.1).

Maize yields and production in the United States are expected to recover to trend values in 2013, allowing for a sizeable rebuilding of depleted stocks. Over the Outlook period, coarse grain prices are projected to slightly increase in nominal terms to reach USD 241/t by 2022 (Figure 4.1). The price differential between wheat and maize is expected to converge even further to a 1.1-1.2 range. The primary factor behind this would be the tighter projected supply and demand balance for coarse grains relative to wheat. This is directly linked to the increasing sources of demand for coarse grains, most-importantly ethanol production in developed countries and feed use in developing countries.

Rice export prices fell in 2012 in the major exporting economies. This was not the case for Thailand, where government purchases under the “pledging programme” (Box 4.1) supported prices. Due to this disconnect between the Thai and world prices, the benchmark price used for the projections was replaced by the Viet Nam price (i.e. white 5% broken, f.o.b. Ho Chi Minh).<sup>2</sup> In the medium-term rice prices are expected to decrease until 2017, before strengthening slightly in real terms until 2022. This generally stable trend reflects ample supply in a few rice exporting countries in Southeast Asia to meet growing import demand from other developing countries.

### Production

Wheat and coarse grains yields are estimated to increase by about 12% on average between the base year and 2022 (Figure 4.2). This is well above the yield increases forecasted for other crops such as sugar cane and cotton and below those for oilseeds (Figure 1.9 in the Overview). In terms of area expansion over the projection period, coarse grains are projected to experience a faster growth than wheat or rice.

World wheat production is projected to reach 784 Mt by 2022, about 16% higher than in the 2010-12 period, but with slower annual growth relative to the previous decade (Figure 4.4). The underlying factor for this deceleration is an anticipated slower pace in yield growth and less area expansion, which can be explained by the rapid uptake of coarse grain demand (feed and fuels) over the baseline and competition for land with wheat. Within this overall trend, large area expansions are projected for Kazakhstan, the Russian Federation and Ukraine.

Driven by the droughts in the United States and the Russian Federation, carryover stocks into 2013 are below the previous three-year average. With the assumption of normal weather patterns, wheat stocks are expected to gradually recover over the projection period, reaching 206 Mt in 2022. At this higher level, the ratio of world wheat stocks to its utilisation will approach 26% in 2022. Most of the build-up with respect to the base period is expected to occur in the CIS countries. Figure 4.4 includes the wheat supply and demand

### Box 4.1. Thailand's rice exports reduced by its rice pledging programme

Thailand's rice pledging programme, first introduced in 1981, was re-instated in October 2011 by the newly elected Thai government. The programme allows producers to mortgage their rice for a three-month period and receive a loan equivalent to the value of the rice pledged, calculated at pre-determined programme prices.

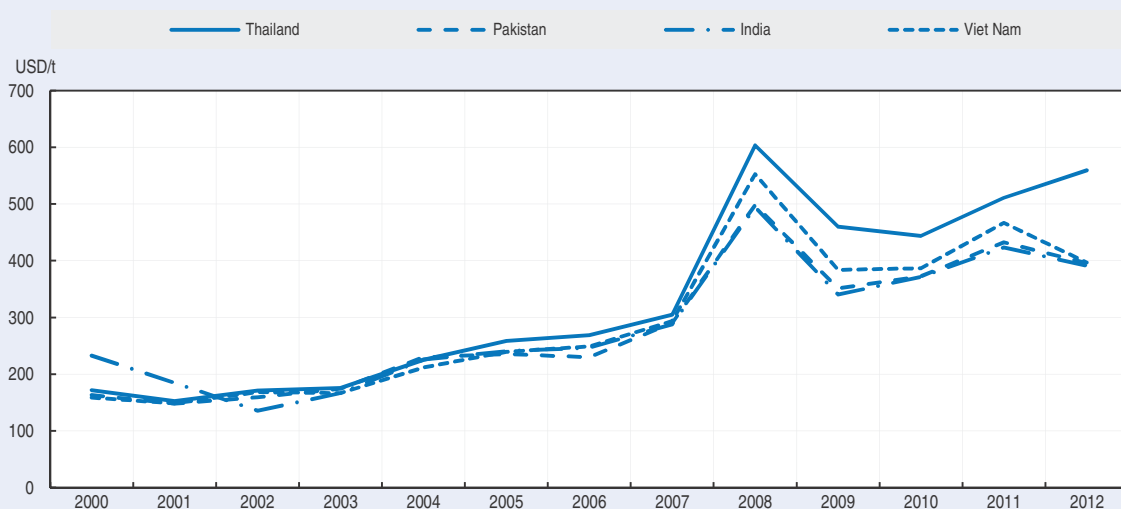
Farmers have the option to redeem their produce by repaying the loan plus a minimum interest rate, which they would do if market prices rise above the programme levels, or forfeit it altogether. As a result, the programme acts as a minimum support level to producers. In normal circumstances, the programme prices are set at levels that do not exceed those prevailing in the market, providing a floor against unexpected slumps and containing the volumes to be procured and stored by the government.

In both 2011/12 and 2012/13, the guaranteed prices were set at levels well above the corresponding market levels. As a result, large volumes entered the programme in 2011/12, with 7.0 Mt from the main crop and a further 14.5 Mt from the secondary crop.<sup>1</sup> For 2012/13, the volumes mortgaged have been projected even higher, with farmers expected to mortgage 15.0 Mt from the main crop alone. The government has had to make large budgetary outlays to cover the costs associated with the programme. Some THB 435 billion (USD 14.0 billion) were allocated to cover the running of the scheme for the 2011 main crop alone.

The programme is reported to have attracted massive flows of rice supplies from neighbouring countries and to have encouraged Thai producers to shift to higher yielding hybrids at the expense of quality rice cultivation. Moreover, Thai consumer and export prices were boosted above those of competitors as large supplies were kept in government stocks, creating additional market tightness. In 2012, the differences between Thai and the other main export prices exceeded USD 160/t (Figure 4.3).

This situation has undermined Thailand's competitiveness. In the 2011 marketing year, Thailand lost its leadership among rice exporting countries, after several decades of uninterrupted primacy. Exports declined 35% from the 2010 level, resulting in a slide to third position among rice exporters, behind India and Viet Nam.<sup>2</sup>

Figure 4.3. Export prices of rice 25% broken

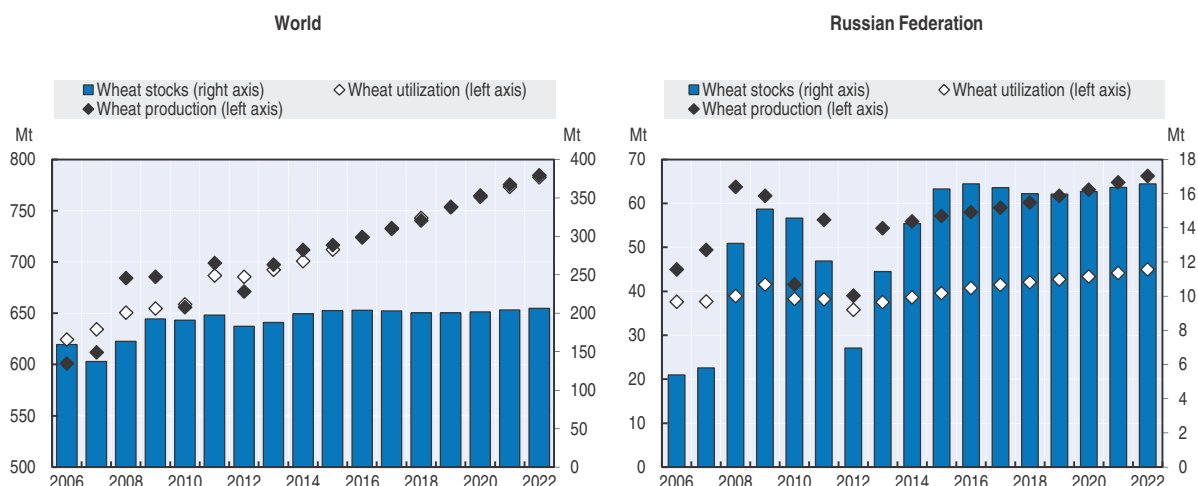


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1. Thai government divides the pledging programme into two periods according to the multiple cropping of rice in the country. While no limits were imposed on the value or volume of the rice that could be mortgaged under the main crop paddy pledging scheme, farmers' participation in the secondary crop mortgage scheme was subject to a 33 t and THB 500 000 per household ceiling.
2. In view of the rice market distortions in Thailand, the 2013 Outlook has changed the world reference price from the one in Bangkok to a similar rice traded in Ho Chi Minh, Viet Nam.

Figure 4.4. **A gradual recovery of wheat stocks led by production increases in the Russian Federation**

Evolution of supply, demand and stocks; World and Russian Federation



Source: OECD and FAO Secretariats.

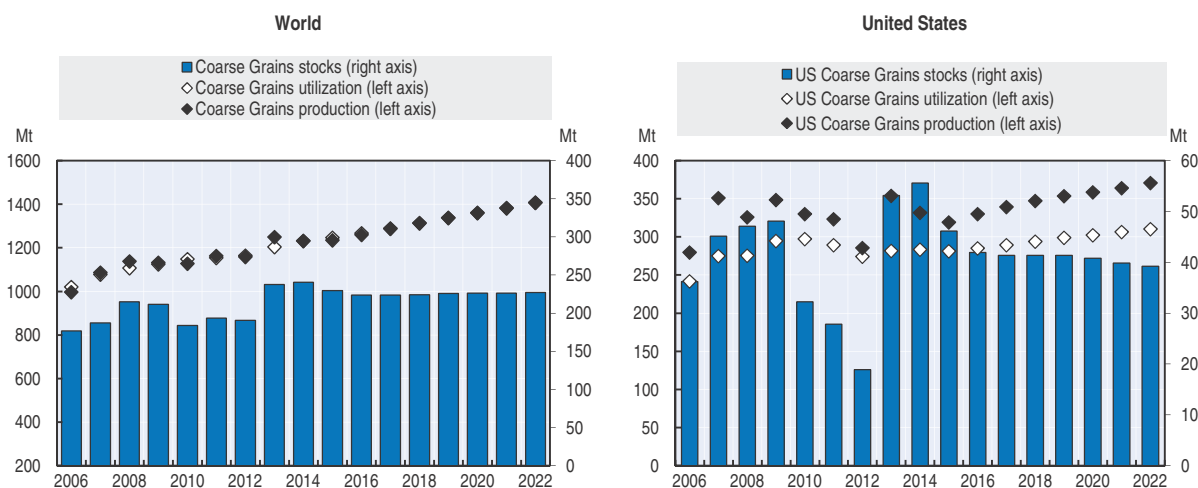
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projections for the Russian Federation. A strong recovery from the drought in 2012 and a consistent production surplus over the medium term will lead to a gradual increase of stocks and exports.

World production of coarse grains is projected to reach 1 407 Mt by 2022, up 22% from the 2010-12 base period (Figure 4.5) with significant increases projected for Argentina, Brazil, China, the Russian Federation, Ukraine and the United States. As in the case of wheat, yields are projected to increase at a slower rate than in the past, therefore limiting the scope for production growth. An increasing oil price is assumed to impact the cost of

Figure 4.5. **A rapid recovery of coarse grains stocks led by higher production of US corn**

Evolution of coarse grains supply, demand and stocks; World and United States



Source: OECD and FAO Secretariats.

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fertiliser and chemicals among other inputs, and resource pressures on water and land availability are anticipated to intensify in coming decades. Assuming normal weather conditions and minor impacts of the proposed changes in agricultural policies (Box 4.2), the recovery of coarse grains production in the United States is comparable to that for wheat production in the Russian Federation (Figure 4.4). Nevertheless, world coarse grain production in 2013 is expected to exceed utilisation, helping stocks to rebuild from their critically low levels. Wheat stocks and exports represent a much higher share of production in the Russian Federation, which makes the reaction to short-term market imbalances much more sluggish over time.

The ratio of world stocks of coarse grains to utilisation is projected to fall to 16% in 2022, well below historical averages. More importantly, the ratio of major exporters' stocks-to-disappearance of coarse grains is projected to approach historical lows of 12% in 2022. This situation is largely due to the tightness of the coarse grains markets. It may also be the case that stock levels are becoming less significant as a means of supply because of the development of information technology and transport logistics worldwide. At the same time, prices are projected on a higher plateau than for the last decade which indicates the on-going influence of tight markets.

#### Box 4.2. **US farm bill proposals for grain producers: from direct to risk-based payments\***

The Agriculture Reform, Food and Jobs Act of 2012 was approved by the US Senate on 21 June 2012. This Bill would eliminate and streamline numerous programmes while strengthening the tools available to producers to help manage risks and conserve natural resources. More specifically for grain commodities, the proposal introduces the following measures.

- Elimination of Direct Payments (DP), Counter-Cyclical Payments (CCPs) and the Average Crop Revenue Election (ACRE) Program at the end of the 2012 crop year (the 2008 Farm Bill was extended to the end of the 2013 crop year by the American Taxpayer Act of 2012). Also eliminated was the Supplemental Revenue Assistance Payments (SURE) Program which covered crop losses that occurred through 30 September 2011.
- Farmers will have access to a single, risk-based coverage programme called Agricultural Risk Coverage (ARC) that complements crop insurance to protect against both price and yield losses. Farmers will make a one-time irrevocable choice between revenue-based coverage at the individual farm level or at the county-level. Payments to farmers will be available only when actual revenues are below a benchmark revenue, which will be calculated using the Olympic average of national average market prices and yields for the previous five crop years. For rice and peanuts, the trigger prices will be USD 286/t and USD 530/t, respectively.
- Capping of ARC payments to USD 50 000 per entity for covered commodities (separate USD 50 000 for peanuts) and tightening eligibility requirements by erasing the distinction between farm and non-farm Adjusted Gross Income (AGI), making producers with a three-year total AGI average of USD 750 000 ineligible for programme benefits.
- Continuation of the Marketing Loan Program (MLP) as a way to help provide farmers with operating capital for their farms.
- Introduction of a Supplemental Coverage Option (SCO) which will allow producers to purchase additional coverage on an area-wide yield or revenue loss basis. The coverage option establishes a trigger on coverage offered only if losses exceed 21% for producers enrolled in ARC and 10% for all other producers.

**Box 4.2. US farm bill proposals for grain producers: from direct to risk-based payments\*** (cont.)

On July 2012, the Federal Agriculture Reform and Risk Management Act of 2012 was approved by the US House Committee on Agriculture. The main difference to the provisions of the Senate bill is the producer option for Price Loss Coverage (PLC) or Revenue Loss Coverage (RLC) as an alternative to the ARC programme. Both PLC and RLC payments occur when prices or revenues, respectively, fall below a certain trigger level.

According to recent estimates by the University of Missouri (FAPRI, 2012), the two bills have much in common and the consequences of the two bills would be similar in many respects. Apart from the ACRE Program, both bills replace payments that are not tied to current prices or production levels with new programmes that offer support linked to current levels of production and prices. Average levels of federal farm programme spending are expected to be reduced under both bills, and most commodity market impacts are expected to be relatively small. Regarding the distributional effects, on the one side, the House Committee bill provides substantially more support than the Senate bill to producers of some grain commodities, including wheat, rice and barley, which may stimulate production. Alternatively, corn and soybean production would be greater under the Senate bill. It is important to stress that programme benefits will be very sensitive to market conditions and producer participation decisions, as the various programmes provide protection against different types of financial risk. Under each bill, average net farm income and agricultural real estate values are expected to decline slightly relative to what would happen under a simple continuation of current farm programmes.

\* Since the preparation of this box, the 2008 Farm Bill was extended through 2013 with only a few changes. Currently, new versions of a 2013 Farm Bill are under consideration in both the Senate and the House. A final version of the Bill is not expected before the summer.

Source: "Impact of Selected Provisions of the House Agricultural Committee and Senate Farm Bills", *FAPRI Report 05-12*, August 2012.

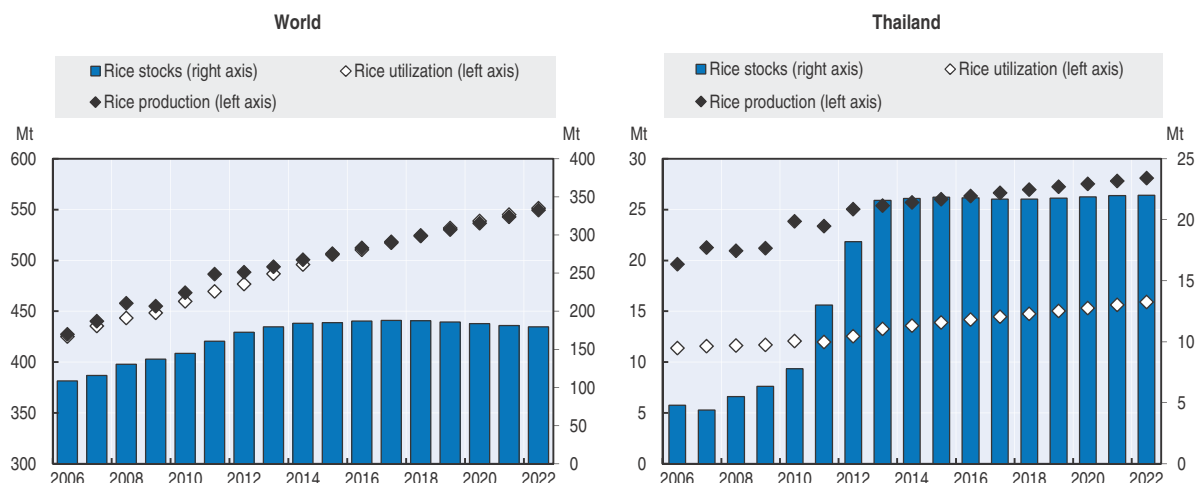
In 2012, global rice production growth stalled markedly, reflecting unfavourable monsoon rains in India and poor growing conditions in South America and parts of Africa. However, large production gains were recorded by China and Southeast Asian countries. Among developed countries, the season ended positively in Australia, Japan, and, especially, the United States where high temperatures propelled yields. By the end of the *Outlook*, world rice production is projected to increase to 549 Mt. Improvements of yields are projected to be the main factor underpinning world production gains, although new investments in the sector in Africa would contribute to a 3 Mha area expansion worldwide. Developing countries, which hold a dominant share of global rice production, would account for virtually all of the projected production increase. Significant contributions are to be made by India and Asian LDCs but also by African countries. Myanmar is a good example, as it engages in joint ventures to boost rice exports. China, the largest rice producer, is expected to cut output by 3 Mt to 137 Mt by 2022, to bring production closer into line with the long-term decline in domestic consumption. Developed countries as a whole are projected to step up rice production, with much of the increase concentrated in the United States.

With global production surpluses, world rice stocks have been increasing strongly since 2008, boosted by positive production outcomes and the desire of a few governments to maintain increased rice reserves for their public distribution systems or to support farmers' incomes. The example of Thailand projects excessive stocks caused by its pledging scheme (Figure 4.6).




Figure 4.6. **World rice stocks have been gradually increasing, indirectly affected by the Thai pledging programme**

Evolution of rice supply, demand and stocks; World and Thailand



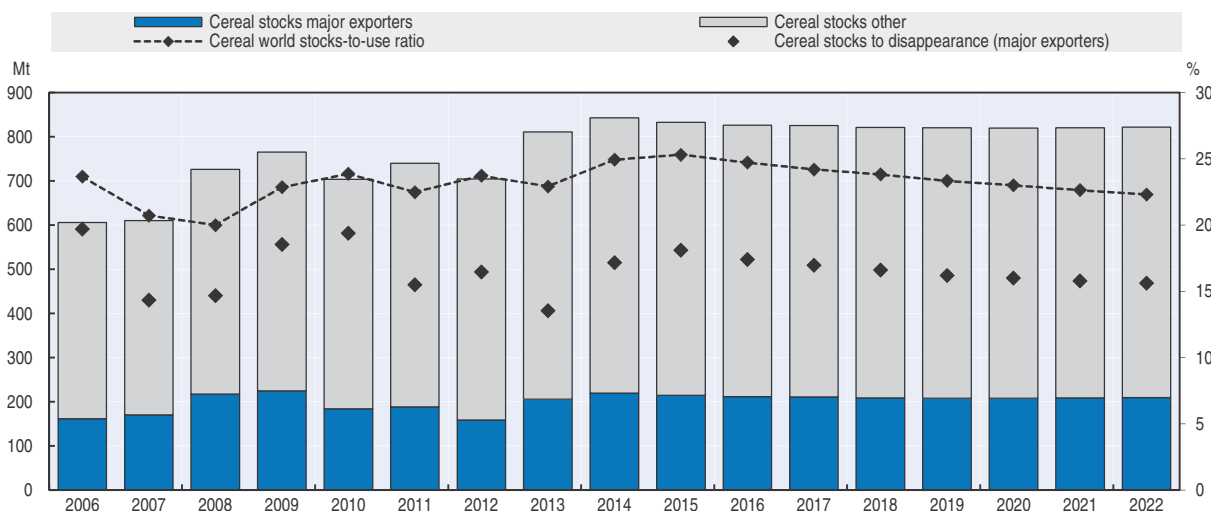
Source: OECD and FAO Secretariats.

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The ratio of world cereal stocks to its utilisation will approach 22% in 2022 (Figure 4.7) which is one percentage point below the base period but two percentage points higher than in the 2007-08 food crisis period. Similarly, the ratio of major exporters' wheat stocks-to-disappearance (i.e. defined as domestic utilisation plus exports in the eight major grains exporting countries) is projected to approach 16%.

Figure 4.7. **Cereal stock-to-use remain at low levels, rebuilding of stocks takes time**

Evolution of cereals stocks (wheat, coarse grains and rice), stock-to-use and stock-to-disappearance ratios



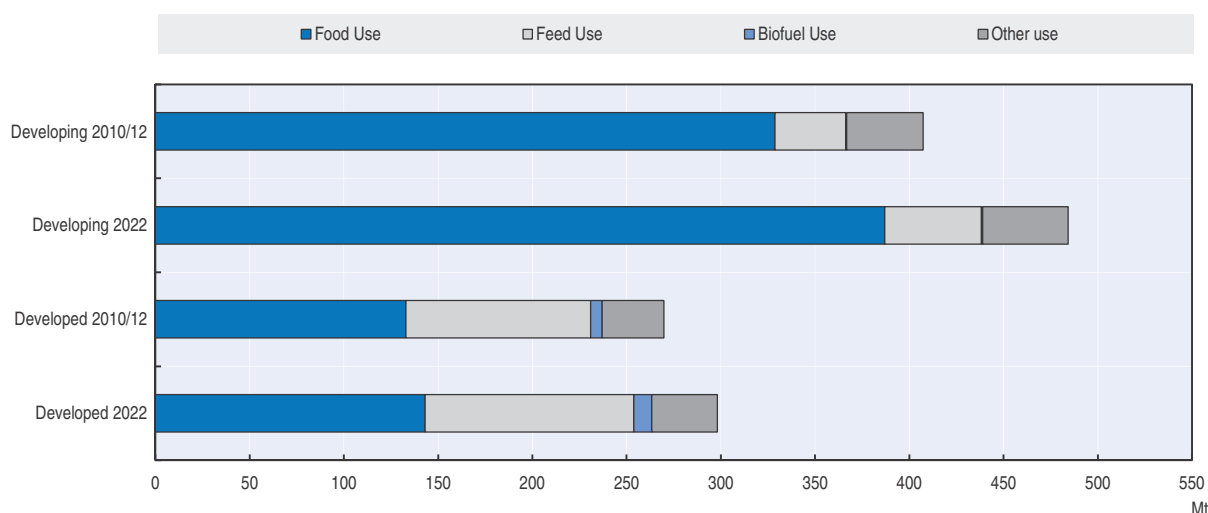
Source: OECD and FAO Secretariats.

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### Use of cereals


Total wheat utilisation is projected to reach nearly 782 Mt by 2022, 298 Mt in developed countries and 484 Mt in developing countries (Figure 4.8). Food consumption remains as the main use, with direct human consumption at around 68% of total utilisation over the Outlook period. At this level, per capita food consumption is projected at around 66 kg per capita p.a. World feed utilisation of wheat is expected to reach 162 Mt by 2022, growing at a slightly slower pace than in the past, and still representing about 21% of total use (37% in developed countries and 11% in developing countries). Wheat use for biofuels in developed countries increases from 2.3% in the base period to 3.2% of utilisation by 2022. The projected increase will be driven largely by growth in EU wheat-based ethanol production.

Figure 4.8. **Increasing food and feed demand for wheat in developing countries**  
Evolution of wheat utilisation shares in developed and developing countries between the base year and 2022



Note: Under "other use," we include other non-disaggregated industrial demand sources (e.g. processing of starch or straw).

Source: OECD and FAO Secretariats.

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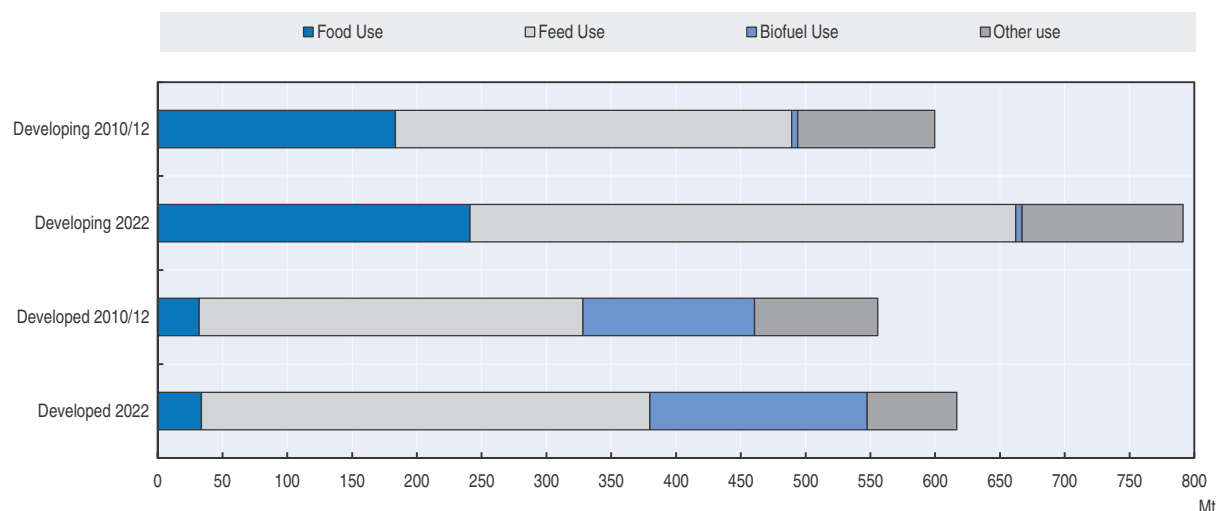
World utilisation of coarse grains is projected to increase 19% by 2022 compared to the 2010-12 base period and reach 1 408 Mt, driven largely by expansions in demand for feed, which accounts for the largest share of total utilisation (Figure 4.9). Considerable increases in demand for biofuels in developed countries and food in developing countries are also expected, the latter following population growth. The projected annual growth of coarse grains consumption (1.7%) is lower than in the previous decade (2.4%).

The strong developments in feed use are mostly driven by strong growth in China (54 Mt compared to the base period), United States (28 Mt) and Brazil (20 Mt). Looking at industrial usages, maize-based ethanol production in the United States is projected to continue expanding after reaching the target of the Energy Independence and Security Act of 2007, with a considerable increase in ethanol exports. World use of coarse grains for production of biofuels are projected to reach 173 Mt, representing 12% of total world coarse grains production. Within the United States, the share of maize used for ethanol production rises to 48% of total domestic production.

World rice utilisation is projected to increase from 469 Mt in 2010-12 to 551 Mt in 2022. Growth is predicted to slow down to 1.4% p.a. over the projection period, compared with


**Figure 4.9. Increasing biofuel and feed demand for coarse grains**

Evolution of coarse grains utilisation shares in developed and developing countries between the base year and 2022



Note: Under "other use," we include other non-disaggregated industrial demand sources (e.g. processing of starch or straw).

Source: OECD and FAO Secretariats.

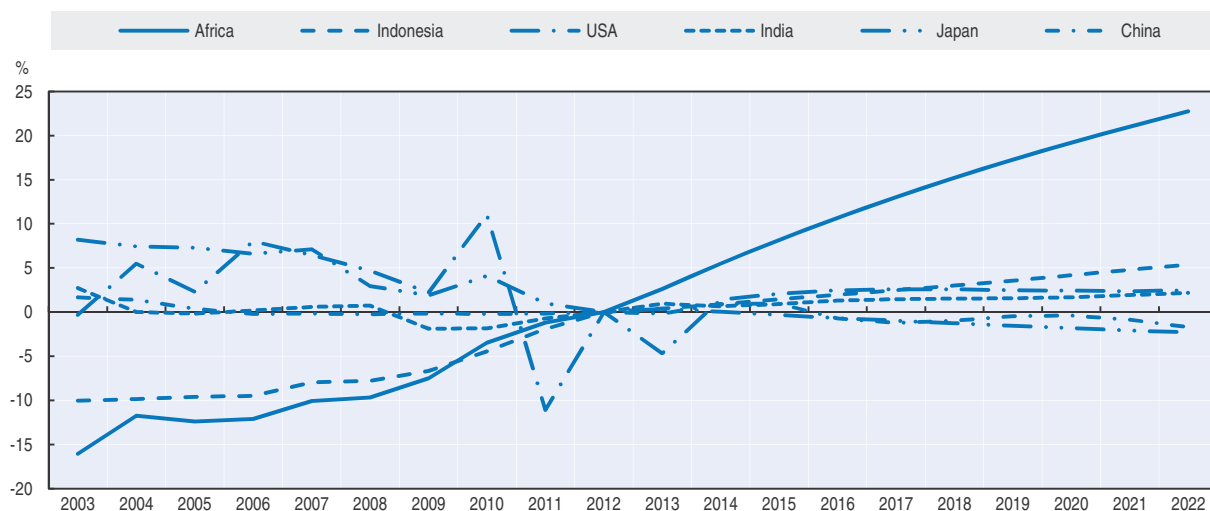
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1.8% p.a. in the past ten years. Rice is consumed chiefly as food (84%), thus the increase is driven mainly by demand for human consumption.

Although population remains the main driver of demand growth in the next ten years, per capita consumption (for food and other uses) is also anticipated to increase, albeit by a modest 0.4% p.a., to 71 kg. Underpinned by dynamic economic growth and urbanisation, particularly noteworthy is the fast shift of African diets in favour of rice over other traditional grains, which is expected to boost the region's average per capita intake from 24 kg in the base year 2010-12 to 30 kg p.a. in 2022 (Figure 4.10). The trend is distinctive since for wheat, another imported

**Figure 4.10. Per capita consumption of rice follows divergent trends, becoming the important food crop in Africa and other developing countries**

Evolution of rice food per capita consumption, % changes versus 2012



Source: OECD and FAO Secretariats.


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Table 4.1. **Rice food per capita consumption**

Evolution (kg)

	2010-12	2022
Africa	24	30
China	78	77
Japan	59	57
Indonesia	161	173
India	71	74
United States	12	13

Source: OECD and FAO Secretariats.

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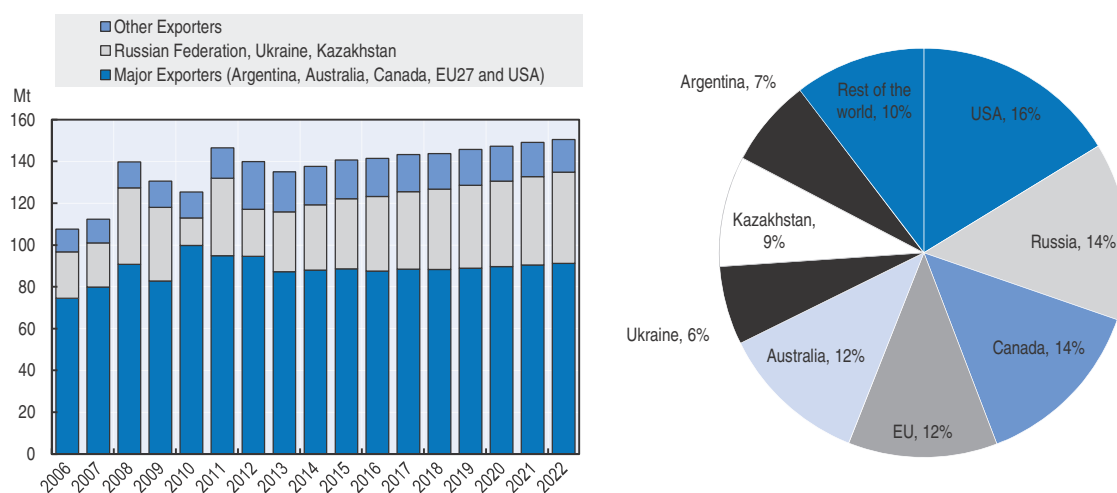
grain, the per capita food consumption in Africa will stay around 50 kg p.a. Although declines in per capita rice food consumption have occurred in China for several years, it is projected to keep rising for Asia as a whole. Likewise, developed countries are anticipated to increase their consumption of rice from 12.6 kg in the base year to 13.3 kg in 2022.

### Trade of cereals

World wheat exports are expected to contract quite significantly in 2012 due to poor harvests in Kazakhstan, the Russian Federation and Ukraine. After this, they are projected to recover steadily, reaching 150 Mt in 2022 or 10% higher than the base period. The Russian Federation almost doubles its wheat exports over the Outlook period with an additional 9.8 Mt with respect to the base year (Figure 4.11). Conversely, wheat exports from India are expected to decrease over the same period, after reaching a record volume in 2012. It is important to note that the projections for India are quite uncertain, since the country is currently holding large wheat stocks (16 Mt in 2013) and it is not clear if and when they will be released. The largest increases in wheat imports are expected in Egypt, Turkey, Indonesia and the Islamic Republic of Iran. Imports in Egypt, the world's leading wheat importer, need to increase given its high population growth and stretched irrigated land.

Figure 4.11. **Wheat exports in CIS countries show the largest share gain over the medium term**

Evolution of wheat exports for major exporters, CIS countries and others (left) and export shares in 2022 (right)



Source: OECD and FAO Secretariats.

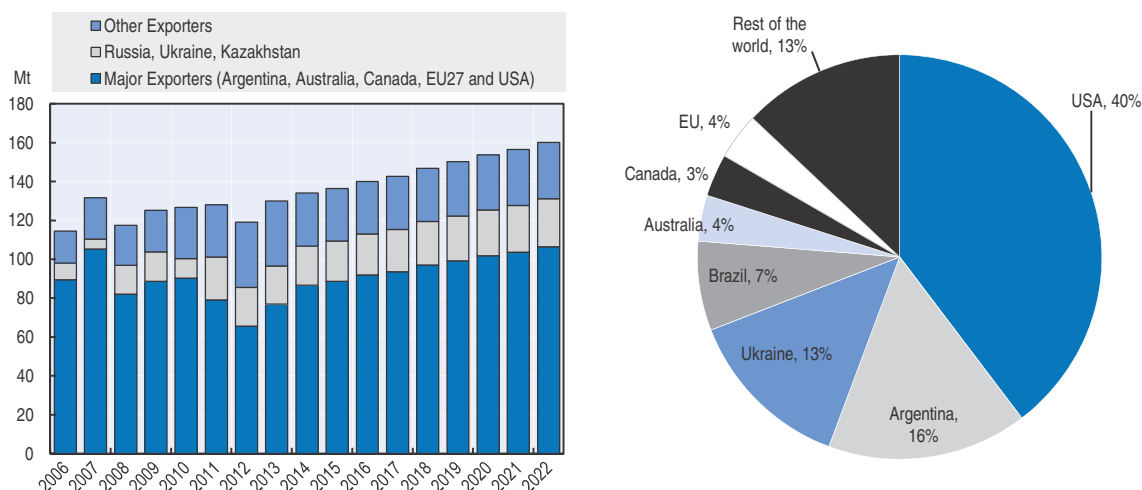
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World coarse grains trade prospects are very dynamic, with exports rapidly increasing from 2013, reaching 160 Mt by 2022. This represents a 29% increase with respect to the 2010-12 base period and a 2.3% annual increase, almost one percentage point higher than in the previous decade. The United States leads this expansion with an additional 25 Mt of maize exports, assuming normal weather conditions (Figure 4.12).


On the import side, a sharp rise in imports by China as well as higher imports by Japan, Mexico and Saudi Arabia are expected to be offset by reductions in imports by the European Union and the Republic of Korea. Japan is the world's largest importer of maize, and more than 90% of its imports have been from the United States. However, it should be noted that Japan has been trying to stabilise and diversify food imports, while improving the environment for agricultural investment. With poor harvests in the United States in 2012, one-quarter of Japan's maize imports came from countries such as Argentine, Brazil and Ukraine.

**Figure 4.12. Rapid expansion of coarse grains exports**

Evolution of coarse grains exports for major exporters, CIS countries and others (left) and export shares in 2022 (right)



Source: OECD and FAO Secretariats.

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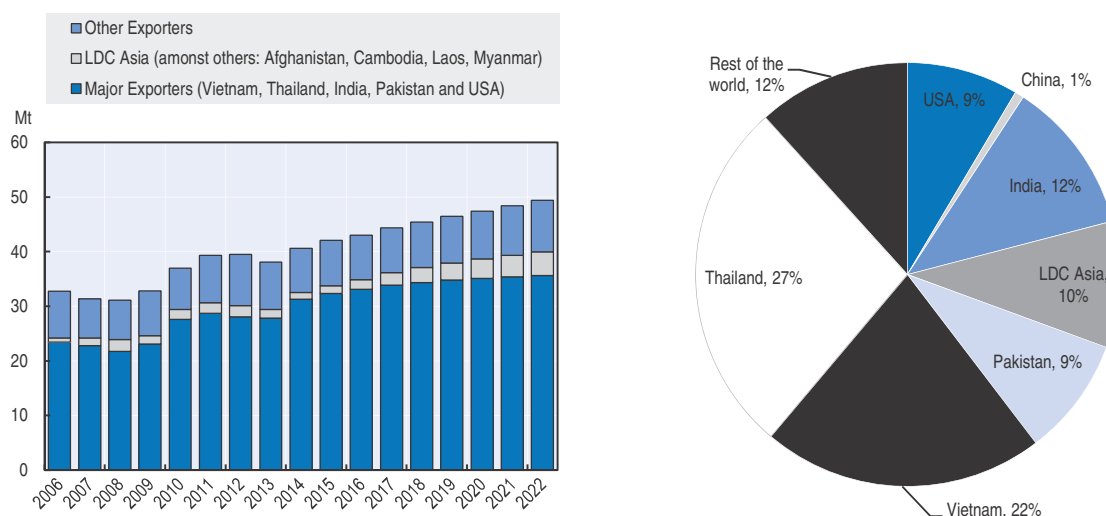
Although rice is largely consumed where it is produced, in recent years the reliance on the international market has been growing, with trade now representing around 8% of total production. Between 2013 and 2022, rice trade is projected to increase by 2% p.a., passing from 37 Mt to 45 Mt. Despite the large gains in production expected in Africa, even stronger increases in consumption are projected to consolidate the region as the major destination for rice trade, absorbing more than half of the volume traded. Imports to sub-Saharan Africa, in particular Nigeria, are expected to surge, notwithstanding the fact that many countries have launched rice self-sufficiency initiatives.

Whereas Viet Nam was previously expected to become the largest rice exporter, the current Outlook foresees a return of Thailand to its traditional leading exporter position through the baseline (Figure 4.13). The Thai government appears less committed to buying all domestically produced paddy rice at high prices, a policy that has severely depressed the country's exports in 2011 and 2012. In addition, the need to generate funds for the official purchasing programme and to free space for the procurement of the new

crop are anticipated to prompt the government to sell large volumes from public rice inventories in 2013.

Other Asian countries, in particular Myanmar and Cambodia, are expected to make major inroads in the international rice market. LDC Asia in total is expected to expand exports by 16% p.a. over the Outlook period to reach 4 Mt in 2022. By contrast, exports by India, which emerged as the top exporter in 2011 with over 9 Mt, are projected to decline in the medium term, as domestic food requirements rise faster than production.

**Figure 4.13. New Asian rice exporters make major inroads in the rice market**  
Evolution of rice exports for major exporters, LDC Asia and others (left) and export shares in 2022 (right)



Source: OECD and FAO Secretariats.

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## Main issues and uncertainties

Weather events, including climate change, continue being the main source of uncertainty in agriculture. Droughts and floods cause considerable declines in grain yields. This year we have observed the effects on grains markets of an almost “perfect storm”, with extreme droughts in both the United States and CIS countries. With stocks at very low levels, the weather conditions for the crop year in the Southern Hemisphere become much more relevant.

Natural resources are likely to be a major bottleneck in the medium-term. Even if not modeled explicitly, water availability and land degradation constraints are implicit in the Outlook projections. This is a known issue in highly populated regions such as China (Box 4.3) and fast growing regional agricultural markets. Productivity growth is mostly achieved by moving the technological frontier, i.e. by innovating and applying more efficient technologies to agriculture.

Biofuel policies in developed countries have sizeable effects on markets (e.g. the US, Brazilian and EU biofuel policies). Lately, biofuel policies are being revised in pioneer countries such as the European Union and the United States. It is still uncertain how those policies will develop in the medium-term (e.g. waiving of cellulosic mandate in the United States) and what role sustainability criteria for the production of biofuels will play in the future. These policy

### Box 4.3. Implications of opening coarse grain markets in China


Largely as a result of rapid urbanisation, arable area has fallen in China. The government has instituted a “redline” at 120 Mha to prevent any further exit of land from agriculture in order to support its policy objectives of food security and rural development.<sup>1</sup> Competition for land has nevertheless been intense. Higher crop output has been achieved through growth in yields, as well as increased multiple cropping. Multiple cropping refers to the number of crop cycles that are undertaken on a given land base over the course of a year. Estimates vary, but from FAO data sources, evidence shows that on average over 1.4 crops are harvested per hectare of arable area. Higher yields, often achieved through high fertilizer inputs and high rates of irrigation, in addition to intensive land use through multiple cropping, are thought to be factors contributing to land degradation and ground water depletion.

The 12th Five Year Plan specifies the target that “cultivated” area of wheat, rice, coarse grain, soybeans and tubers should exceed 106.7 Mha. The *Outlook* affirms that these targets should be met or exceeded in the next decade. However, the question arises as to what would happen if higher imports of grain were encouraged as a means of reducing pressure on the resource base. For example, since 2000 oilseed imports have surged, accounting for the equivalent of some 28 Mha of land. Had trade not been encouraged, the growth in China’s livestock output could not have been achieved, and the impact on its resource base would have been considerably greater.

The scenario undertaken here explores the further opening of the coarse grain market in China, to better understand the potential impacts on domestic and international markets. To affect the scenario, the assumption was made to set domestic coarse grains prices at a fixed rate above world reference prices (No. 2 yellow corn US f.o.b. Gulf Ports) based on the average historical differences in 2011 and 2012 and allow imports to enter such that the domestic market clears. The results of the scenario suggest that in an open market, imports of coarse grain would rise to 41 Mt by 2022, compared to the baseline projection of 13 Mt, and domestic coarse grains prices would decrease by 17% (Table 4.2). As a result, coarse grain area in China would remain around 2012 levels, thereby containing future resource pressure, instead of increasing at a 0.7% rate p.a. as the *Outlook* portrays. Lower prices for feed would induce higher livestock output, with domestic pig meat production rising by 1%, poultry by 1.62%, bovine meat by 0.2% and milk production by 0.9%. The impact on international markets sees world maize prices increase at the end of the baseline by 8%. World rice and wheat prices also increase by 1.3% and 2.8% respectively.

Table 4.2. **Domestic and international effects of open coarse grain markets in China**  
Changes in 2022 between the counterfactual scenario and the baseline

		China			World		
		Coarse grains	Rice	Wheat	Coarse Grains	Rice	Wheat
Supply	%	-5.1%	0.2%	-0.4%	0.20%	0.1%	
Demand	%	5.0%	0.1%	-0.8%	0.19%	0.1%	0.1%
Domestic price	%	-17.3%	-2.8%	-2.7%	-	-	-
International price	%	-	-	-	8.2%	1.3%	2.8%
Net Trade	Mt	-27.3	0.1	0.6	-	-	-

StatLink  <http://dx.doi.org/10.1787/888932860769>

It should be borne in mind that in this counterfactual case, much depends on the nature of the baseline projection, which portrays a tight coarse grain market over the next decade: maize prices rising relative to other crops, given high demand for feed from the livestock sector, and the need to assure supplies of wheat and rice preventing land reallocation to greater production of coarse grain. As such, the scenario illustrates the growing tension of meeting the feedstock needs of China’s growing livestock base, and at the same time achieving food security in basic food crops. Higher productivity, in terms of crop yields, will be required if China is to succeed in meeting these goals.

1. Morton K. (2012) *Learning by Doing: China’s Role in the Global Governance of Food Security*, RCCP Working paper #30, Research at the College of Asia And the Pacific and Senior Fellow In the Department of International Relations.

decisions have very large effects on coarse grains markets in developed economies, which feed through to developing countries and can raise food security concerns.

Consumption patterns are uncertain and may shift away from long-term trends. The move towards healthier diets in developed countries, in some cases reinforced by new policies (e.g. taxes on fat content), might imply important changes to the consumption of saturated fats and, in turn, affect feed grain markets. Conversely, per capita meat consumption in fast growing developing countries can increase rapidly from very low levels.

Domestic policies in grains are unpredictable. For instance, it is uncertain how the US farm bill will affect grain markets in the near future. Moreover, rice policies and management of stocks in Asia have proven to be volatile. Despite the expanding trade, rice is still thinly traded and mainly used to satisfy domestic demand. While a few food security measures through regional co-operation are unfolding (Box 4.4), policy interventions and regional population growth may influence the world trade and prices. For example, Viet Nam will compete with Thailand for the leading exporter towards 2022, but it will be difficult to meet domestic growth in consumption and at the same time increase exports since production is already close to capacity (i.e. relatively high yields).

The stability of food grain prices is politically important, especially for major importing countries. Following the recommendation by G20 Agricultural Ministers, the Agricultural Market Information System (AMIS) was launched in 2011 to share information about production, stocks and markets for major grains, with regular market monitoring reports and analyses. The collaboration of international organisations such as the FAO, OECD, World Bank and the International Grains Council, with major producing and importing countries to respond to future food grain crises is expected to play a role in relieving market pressures and reducing price volatility. Extensive collaboration during the 2011-12 price spikes helped to avoid unilateral actions that might have exacerbated the situation.

#### Box 4.4. Regional food reserve initiatives

The policy and practice of maintaining national food reserves (especially of rice) has been widely practiced. Large government stocks primarily serve domestic objectives and do not add much liquidity to international markets. Moreover, maintaining large domestic reserves can be an expensive, and not necessarily effective, food security strategy. There is a growing interest in regional co-operation on emergency food reserves, as some developing countries may not have the capacity to operate national emergency reserves. Unlike buffer stocks of the various international commodity agreements that attempt to dampen price movements,<sup>1</sup> emergency food reserves can make food available to vulnerable groups in times of crisis. In addition, emergency reserves of relatively small quantities of staple foods will not disrupt normal private sector market development which is important for long term food security.<sup>2</sup>

In 1979, South East Asian countries established the ASEAN Emergency Rice Reserve (AERR) consisting of national food security stocks voluntarily designated or earmarked to address food emergencies, but the reserve stocks were small and no releases were reported. This initiative was followed in 2003 by a pilot project launched by the ASEAN countries plus China, Japan, and Korea, known as the East Asia Emergency Rice Reserve (EAERR), which has provided emergency assistance on several occasions for floods and cyclones. Building on these two initiatives, the ASEAN Plus Three Emergency Rice Reserve (APTERR) came into force in July 2012.



#### Box 4.4. Regional food reserve initiatives (cont.)

In the Sahel and West Africa, a regional food reserve strategy has been set up to provide the overall framework for an all West African solidarity initiative to tackle food crisis. The activities include the establishment of a regional food reserve (feasibility study adopted in September 2012) as well as the creation of a regional network of national agencies in charge of food stock management. An agreement to establish the Regional Co-operation Framework of National Food Stock agencies, known as RESOGEST, was signed in March 2012. The Sahel and West Africa Club Secretariat (SWAC), housed at the OECD, supported the feasibility study by conducting a mapping survey of regional stock infrastructure and capabilities. These humanitarian initiatives are not intended to influence international prices but they can play an important role in improving the availability and accessibility of food grains during a regional food emergency.

APTERR consists of the earmarked and stockpiled emergency rice reserve, as well as a reserve of funds such as future contracts or donations in cash or in kind. These cash alternatives can be used to purchase rice when a natural disaster occurs. The initial amount earmarked by the countries totaled 787 000 t, while the first emergency assistance (a cash advance of USD 200 000 voluntarily contributed by Japan) was extended to the victims of typhoon Pablo in the Philippines in January 2013. Work is underway at the APTERR Secretariat in Thailand to establish a permanent scheme with rules and procedures for the release of emergency rice reserves and replenishment of the earmarked rice.

1. Gilbert, C. (2011), "International Agreements for Commodity Price Stabilisation: An Assessment", *OECD Food, Agriculture and Fisheries Papers*, No. 53, OECD Publishing. <http://dx.doi.org/10.1787/5kg0ps7ds0jl-en>.
2. FAO et al. (2011), *Price Volatility in Food and Agricultural Markets: Policy Responses*, Policy Report including contributions by FAO, IFAD, IMF, OECD, UNCTAD, WFP, the World Bank, the WTO, IFPRI and the UN HLTF.

#### Notes

1. See the glossary for the definition of crop marketing years for wheat, coarse grains and rice in various countries.
2. The Vietnamese rice price is considered to be more suitable as an international reference price since it is not only compatible with the prices of India, Pakistan and other major exporters, but also because its historical movements are consistent with the Thai price.

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