Working Party on Agricultural Policies and Markets

THE OECD-FAO AGRICULTURAL OUTLOOK, 2010-2019
PART II
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CHAPTER 3
MACROECONOMIC AND POLICY ASSUMPTIONS

Current situation

1. As this year’s Agricultural Outlook is being prepared, the macroeconomic situation has improved considerably compared with the same period last year. At that time, the world was undergoing its greatest economic downturn since World War II with persistent and frequent downward revisions to the short term economic outlook from continuing turmoil in the financial sector that spilled to the real economy. However, with policy interventions in major economies through massive fiscal stimulus to shore up domestic demand, loose monetary policies that kept interest rates at very low levels and massive infusion of liquidity to help shore up the balance sheets of the banking and manufacturing sectors, the worst fears from that time were averted.

2. This policy intervention has come with a cost. Government budgets in OECD countries have deteriorated significantly as a result of the unprecedented government expenditure while falling incomes reduced tax revenues. The OECD area-wide deficit is projected to peak at a post-war high of 8.25% of GDP in 2010. In 2011, underlying deficits are projected to remain at record high levels of 8% of GDP. For the OECD as a whole, gross government debt is projected to exceed GDP in 2011. The resulting ratio of gross debt to GDP will be about 30% higher than in 2007, the year before the crisis. The crisis also had a human dimension as 27 million people lost their jobs in 2009, taking the global unemployment rate to its highest level ever and the number of jobless to more than 200 million people.

3. Overall, 2009 was a dramatic year with negative growth in all major OECD countries, save Australia, which generated modest growth. Average income in OECD countries was some 4% below 2008 levels, while worldwide, average income was more than 1% below 2008 levels.

4. The interdependence of economies around the world through financial and trade linkages was manifested in 2009 as many non-OECD countries also experienced turmoil in 2009. For some economies such as China and India, the upheaval resulted in reductions in their respective growth rates whereas for others such as Argentina, Russia Federation and South Africa, their incomes contracted.

5. The global downturn in economic activity had coincided with a precipitous decline in international trade. World trade is estimated to have contracted by 12% in 2009, returning to its 2006 level. This decline has been the sharpest since World War II. This contraction in world trade has been broad based and has affected all regions. Estimates of the impact of the crisis on agricultural trade in 2009 are not yet available. However, if developments in the United States, a large trader of agricultural products are any indication, then agricultural trade also fell by a similar order of magnitude.

6. The end of 2009 has seen global trade resume with the start of the recovery in growth. World trade has now begun to recover, led by a marked rebound in trade volumes in the non-OECD Asian economies. This helped trade in those OECD countries with strong trading links with this region. The trade
rebound has now spread to all regions, even if global trade volumes remain considerably weaker than before the crisis. It is now estimated that trade will grow some 9% in 2010.

7. While many governments introduced fiscal stimulus in an attempt to revise their economies, monetary policy has also been accommodating. Policy interest rates in most OECD countries are at historically low levels in order to increase the money supply and stimulate the economy. Countries with fragile financial sectors have attempted to recapitalise the banks and add liquidity through different venues. These actions mitigated the downturn and returned many countries to growth in the later part of 2009. The issue for 2010 and beyond is to devise exit strategies as to when and how to reduce the liquidity and fiscal stimulus without reversing the nascent recovery.

Projection highlights

- Presently, the outlook for most OECD countries is more benign with all major economies expected to grow, albeit modestly, in 2010 and for many OECD countries, the medium-term prospects are somewhat muted compared to previous expectations.

- The recovery however, is fragile with reduced activity and high unemployment levels generating much uncertainty about the sustainability and vigor of the recovery as it faces substantial headwinds.

- The relatively tepid recovery is expected to prolong relatively high unemployment rates and there is uncertainty as to whether the recovery can be sustained with growing private demand once government support and liquidity is withdrawn.

- Prospects in the non-OECD area, however, are more positive as many major economies are projected to grow at least as fast as previous expectations continuing to fuel world income growth. Emerging and developing economies were generally less affected by the financial turmoil and are further ahead on the road to recovery, led by resurgence in Asia.

Macroeconomic developments

8. In what follows, the macroeconomic assumptions that underlie the Agricultural Outlook baseline are described along with a brief overview of the agricultural policy setting to give the reader a broad sense of the macroeconomic and policy environment influencing agricultural markets.

9. The Outlook baseline incorporates the macroeconomic projections from the latest available information. For OECD countries, these assumptions are from the OECD Economic Outlook n° 86 (December 2009), while the World Bank’s Global Economic Prospects (November 2009) is the source for non-OECD countries. For the countries within each grouping, these projections present a unified and consistent set of data on income growth and inflationary expectations.

Real Gross Domestic product (GDP)

10. In 2009, the financial and economic downturn affected almost all economies in the OECD area and much more than in the developing world. Within the OECD area, Mexico, Japan and Turkey are expected to have suffered, the largest declines with a decrease in GDP of 6.5% 6.0% and 6.0%, respectively. As illustrated in Figure 3.1, only Australia’s economy is expected to grow in 2009 with GDP expanding more than 2%.
11. Economic growth is expected to resume in the OECD area in 2010 continuing the trend that started in the third quarter of 2009 reflecting the demand growth of major non-OECD countries especially in Asia, the policy stimulus and improving financial conditions. For most countries, this growth is expected to continue or even accelerate for the remainder of the projections period to 2019 (Figure 3.1). However, growth rates are somewhat muted compared to past trends as there are substantial headwinds to the recovery as households, businesses and eventually governments have to repair their balance sheets.

12. In the US, labour was shed very quickly during the downturn resulting in high unemployment rate. But, employment is expected to respond quickly to economic activity and unemployment may peak in the first half of 2010. Employment in the euro area did not fall as quickly as in the US but the schemes in place that cushioned employment in the downturn may also weaken the employment intensity of growth going forward. Unemployment is not set to peak before the end of 2010 or the beginning of 2011 damping consumer confidence and sapping the strength of the recovery. Although Japan is well positioned to benefit from strong growth in the rest of Asia, continued domestic weakness will remain a drag on growth which is not expected to be sufficiently strong to materially reduce unemployment.

13. With some exceptions, the impact of the financial and economic crisis for most non-OECD countries was shallower and of shorter duration. Among the major non-OECD countries covered in this report, Russia suffered the biggest drop in GDP, with a 9.1% decline in 2009. The upturn in the major non-OECD countries, especially in Asia reflects both the limited direct exposure to the financial origins of the crisis and the strong policy stimulus these countries were in a position to apply.
14. China and India have recovered quickly with growth of 8.1% and 5.8%, respectively in 2009. Over the next ten years, China and India should continue to grow at an impressive rate of 7.9% and 6.6% per annum, respectively. These countries remain the leaders in the growth stakes, one based on continued growth in manufacturing and the other on services. In Argentina and Brazil, GDP growth is expected at 4.5% and 3.0% p.a. respectively over the medium term.

15. Nonetheless, some aftermath to the financial crisis is expected. According to the World Bank’s *Global Economic Prospects*, “…the crisis and the regulatory reaction to the financial excesses of the preceding several years may have lasting impacts on financial markets, raising borrowing costs and lowering levels of credit and international capital flows. As a result, the rate of growth of potential output in developing countries may be reduced by between 0.2 and 0.7 percentage points annually over the next five to seven years as economies adjust to tighter financial conditions. Overall, the level of potential output in developing countries could be reduced by between 3.4 and 8% over the long run, compared with its pre-crisis path.”

**Figure 3.2. Stronger growth prospects in non-OECD area**

<table>
<thead>
<tr>
<th>Country</th>
<th>Annual % growth 2009</th>
<th>Annual % growth 2010</th>
<th>Annual % growth 2011-2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>-2</td>
<td>0</td>
<td>-2</td>
</tr>
<tr>
<td>Brazil</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>China</td>
<td>4</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>India</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Russia</td>
<td>-2</td>
<td>0</td>
<td>-2</td>
</tr>
<tr>
<td>S. Africa</td>
<td>-2</td>
<td>-4</td>
<td>-6</td>
</tr>
</tbody>
</table>

*Source: OECD Economic Outlook No.86 (December 2009), World Bank Global Economic Prospects 2010 (November 2009).*

**Inflation**

16. With relatively high unemployment rates, pressure for wage increases is mitigated. Coupled with elevated excess capacity, inflation is expected to remain at low levels in most OECD countries enabling monetary authorities to continue accommodating monetary policy to support economic activity in the short term. Over the medium term, monetary authorities are expected to keep inflation under control (Figure 3.3).
17. Inflation, as measured by the Consumer Price Index (CPI) in most cases, for the OECD area as a whole over the next ten years is assumed to average 2% p.a.\textsuperscript{1} In contrast, inflation in Turkey is expected to average almost 6% a year. Inflation is expected to be problematic in many of the high growth emerging economies. In Argentina, India and South Africa, inflation is expected to be around 6% p.a. while in Russia inflation is expected to average more than 7% per annum. In contrast, China is expected to contain inflation to about 2% p.a.

\textbf{Figure 3.3. Inflation expected to remain under control}

\begin{center}
\begin{adjustwidth}{-30pt}{-30pt}
\begin{tikzpicture}
\begin{axis}[
    title={Annual percentage growth (CPI)},
    xlabel={Annual percentage growth},
    ylabel={Annual percentage growth},
    xmin=-2, xmax=15,
    ymin=0, ymax=15,
    xtick={-2,0,2,4,6,8,10,12,14},
    ytick={0,2,4,6,8,10,12,14},
    xticklabels={Turkey, Russia, Argentina, India, Brazil, South Africa, Mexico, USA, Australia, New Zealand, OECD (30), Korea, EU, China, Canada, Japan},
    xticklabel style={text width=1cm, align=center},
    yticklabel style={text width=1cm, align=center},
    legend pos=north east,
]
\addplot[red,fill=red!20] coordinates {(-2,14) (0,14) (2,14) (4,14) (6,14) (8,14) (10,14) (12,14) (14,14)};\addlegendentry{2007-2009}
\addplot[blue,fill=blue!20] coordinates {(-2,12) (0,12) (2,12) (4,12) (6,12) (8,12) (10,12) (12,12) (14,12)};\addlegendentry{2010-2019}
\end{axis}
\end{tikzpicture}
\end{adjustwidth}
\end{center}

Note: Average annual growth is the least-squares growth rate (see glossary).


\textbf{Exchange rates}

18. Exchange rates are essential to the baseline projections, as they can significantly influence relative competitiveness and hence agricultural trade between regions. The US dollar is the currency in which the majority of agricultural trade is denominated. World prices in the Agricultural Outlook are expressed in US dollars, thus exchange rates relative to the US dollar convert world prices into local prices.

19. Changes in the average nominal exchange rates of major economies included in the Agricultural Outlook relative to the US dollar are shown in Figure 3.4. For the 2006 to 2008 period, the US dollar depreciated against most currencies, while in 2009, the dollar appreciated against most currencies with the Japanese yen the notable exception.

\textsuperscript{1} This is a broader measure of inflation as it includes all expenditures by households in contrast to the food price index discussed in the overview chapter of this report.
20. Going forward for the projection period, the nominal exchange rates are adjusted under the assumption of constant real exchange rates. Thus, inflation differentials as measured by the GDP deflator of each country vis-à-vis the United States is the main determinant of the projections for exchange rates relative to the US dollar over the Outlook period. This implies a strengthening of the U.S. dollar against most currencies. The currencies of high inflation countries will depreciate most relative to the US dollar over the medium term, improving their prospects for agricultural exports while raising the cost of imports.

Figure 3.4. US dollar appreciated against most currencies

Local currency versus US dollar

Note: Average annual growth is the least-squares growth rate (see glossary).

World oil price

21. The oil price is an important factor in the Agricultural Outlook as it impacts energy, transport and fertiliser costs and on the competitiveness of biofuels as an alternative source of energy. Oil prices have increased dramatically since the start of this decade culminating in a price of around USD 150 per barrel in the summer of 2008 (Figure 3.5).

22. According to the OECD Economic Outlook, this was due to a much stronger than expected demand and a weaker than anticipated oil supply response to rising prices. Current projections have the oil price resuming an upward trend and by the end of the period will equal the previous peak in nominal terms. In real terms (deflated by the GDP deflator for the United States), however, the price rise is more modest and although substantially above historical levels, at the end of the period, it remains below the previous highs. Still, this suggests that the world oil price, even in real terms, will remain well above historical levels.

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Population growth

23. World population growth is expected to slow to just 1.06% p.a. in the next decade. The slowdown in the growth rate is manifested in all regions. Population growth prospects and dynamics are important determinants of the future global economic environment, affecting the demand for agricultural commodities.

24. Europe in general including non EU states continues to exhibit the lowest population growth rates. The growth rate is projected to decline to less than 0.1% per year from 2010 to 2019. Among OECD countries, the same scenario is projected for Korea while Japan’s population is expected to shrink faster during the next decade; with a negative growth rate of -0.25% p.a. Turkey, Mexico, Australia and the United States have the highest projected population growth rates within the OECD area.

25. Developing countries are expected to continue to experience the fastest population growth in the world, with Africa as a whole still growing at over 2% p.a. Although population growth in Africa is more than double the rate in any other region shown in Table 3.1, this growth rate is also slowing in comparison to the last decade. Population growth in China is assumed to remain on trend for the next decade, at close to 0.57% p.a. (adding between 7-8 million people each year). High population growth is predicted in India with an average growth rate of 1.2% p.a. adding some 14 to 16 million people per year. Overall, by 2019 some 77 million additional people per year will need to be fed.
Table 3.1. Slowdown in population growth

<table>
<thead>
<tr>
<th>Region</th>
<th>2000 - 2009</th>
<th>2010 - 2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>1.22</td>
<td>1.06</td>
</tr>
<tr>
<td>Africa</td>
<td>2.35</td>
<td>2.22</td>
</tr>
<tr>
<td>Latin America &amp; Caribbean</td>
<td>1.22</td>
<td>0.93</td>
</tr>
<tr>
<td>North America</td>
<td>0.99</td>
<td>0.87</td>
</tr>
<tr>
<td>Europe</td>
<td>0.27</td>
<td>0.06</td>
</tr>
<tr>
<td>Asia and Pacific</td>
<td>1.19</td>
<td>0.98</td>
</tr>
<tr>
<td>China</td>
<td>0.67</td>
<td>0.57</td>
</tr>
<tr>
<td>India</td>
<td>1.54</td>
<td>1.20</td>
</tr>
<tr>
<td>Oceania Developed</td>
<td>1.16</td>
<td>0.94</td>
</tr>
</tbody>
</table>

Note: Average annual growth is the least-squares growth rate (see glossary).


Agriculture policy developments

26. Agricultural and trade policies play an important role in both domestic and international markets for agricultural commodities and food products. OECD and emerging economies have gradually reformed their agriculture policies over the past two decades. Agricultural support levels in OECD countries have declined and governments have shifted to more decoupled programmes, although progress differs across countries. Key emerging economies have eliminated many policy distortions, but current low support levels disguise taxation of some sectors and protection of others. The recent food price fluctuations and economic crisis may become a challenge for further policy reform.

27. At the same time, non-agricultural policies, such as energy, environmental and rural development measures, have a growing impact on the agri-food sector. Policies change the composition and levels of both production and consumption, thereby creating (or sometimes correcting) market distortions and influencing prices.

28. The level of support to farmers in OECD countries has declined. As measured by the Producer Support Estimate (PSE), policy transfers fell from 37% of farmers’ total receipts in 1986-88 on average to 23% in 2006-08. In the most recent years, the reduction of support levels resulted more from high world prices than from explicit policy changes decided by governments. There is a tendency towards increased price responsiveness on the supply side with ongoing policy reform in some OECD countries. Also, relatively elastic supply and demand in a growing number of developing countries, coupled with an increasing participation of these countries in world trade, has assisted adjustments in agricultural markets.

29. Sustained growth in the 2000s has strengthened agricultural prices and increased fiscal resources available to governments. The levels of agricultural support in emerging economies monitored by the OECD have tended to rise, but they remain far below those observed in the majority of OECD countries, varying from 4% of producer receipts in Chile to 14% in Russia. Nevertheless, these aggregate low support levels disguise in many cases negative support to some sub-sectors and high protection to others. Since the
beginning of the current decade, the level of producer support has remained relatively stable in Chile, Brazil, and South Africa, increased in China and Russia and fluctuated in Ukraine.

30. For many non-OECD countries, the rising prices in 2007/08 led to tariff reductions, export restrictions, increased minimum prices and price controls, input subsidies sales of stocks and direct transfers to the most disadvantaged. Most of these measures were quickly removed once prices came back down. For the major emerging economies examined in the 2009 OECD Monitoring report (i.e. Brazil, Chile, China, India, Russia, South Africa and Ukraine), other common policy developments included expanded government-supported credit facilities and/or debt rescheduling, endeavours to improve the delivery and performance of agricultural policies, extended coverage of insurance programmes and further efforts in land reform.

Risks and uncertainties

31. The risks around the macroeconomic projections are substantial. A main risk on the downside relates to how rapidly consumers will choose to rebuild their balance sheets. Should households choose to increase their savings rates above those assumed and if the public sectors with large budget deficits implement exit strategies to restore fiscal balance and repair their balance sheets faster than assumed, then private demand may not be sufficient to sustain the recovery. Consumer expenditures will also reflect their confidence in the labour market and the recovery generating jobs. As mentioned above, the labour market conditions are expected to continue to weaken with unemployment rate that is projected to rise until end of 2010 or the beginning of 2011 but then job growth is expected.

32. International imbalances although narrowed somewhat from the crisis, are assumed to remain at levels unprecedented just a few years ago. The risk of disorderly exchange rate adjustment cannot be excluded. This underlines the importance of international efforts, recently given impetus in the context of the G20, to ensure a sustainable international growth pattern.

33. Although some countries have reacted to the economic crisis through increases in protectionist measures, such measures are not generally seen as the major driving force on plunging trade flows of 2009, rather it was primarily the result of falling demand. However, the WTO, the UN and the OECD continue to warn that protectionism may be a risk that could prevent trade from a sustainable rebound. Past experience shows that prolonged periods of job losses and unemployment are one of the main catalysts for more restrictive policymaking. The unemployment rates are expected to remain high as the recovery in its early stages is not expected to generate substantial job growth. Governments should remain vigilant and resist pressures for future protectionism and other measures with trade restrictive or distorting effects in response to the economic crisis.

34. No conjecture is included in the Outlook projections for the future outcome of negotiations in the WTO for the Doha Development Agenda. As a result, it is assumed that trade policies as agreed in the Uruguay Round Agreement on Agriculture (URAA) will hold for the entire Outlook period. Trade flows are increasingly influenced by policies that have been negotiated as part of regional trade agreements such as the North American Free Trade Agreement (NAFTA) and the Mercosur Agreement between Argentina, Brazil, Paraguay and Uruguay. The policy assumptions of the Outlook take into account the provisions of these agreements, as well as the European Union’s EBA initiative and existing bilateral preferential trade provisions covering specific agricultural commodities.

35. The Agricultural Outlook assumes normal weather patterns and a stable policy environment. In fact, production and price volatility will increase if extreme events such as droughts and floods occur more frequently. Because of their unpredictability, such events are not included in the projections but, to the extent that they occur, will greatly influence agricultural markets at that time. An additional factor that can
contribute to increased price volatility in the future is the closer link of agricultural prices to energy prices which have exhibited instability in recent years.

36. The Outlook also assumes a stable policy environment. No attempt is made to anticipate government policy reforms although there could be some significant policy developments in the coming decade. In February 2010, an Agriculture Ministerial meeting brought the 30 member countries of the OECD together with Argentina, Brazil, Chile, Estonia, Indonesia, Israel, Romania, the Russian Federation, Slovenia and South Africa to exchange views on the opportunities and discuss solutions to the challenges facing the farming and food system over the coming years. The resulting Communiqué acknowledged that the main priority is the need to provide an adequate supply of safe and nutritious food, on a sustainable basis, for the world’s growing population and recognised a number of policy principles (the Communiqué is available at: www.oecd.org/agriculture/ministerial).
CHAPTER 4

BIOFUELS

Market situation

37. The economic downturn had direct consequences on biofuel markets. From mid-2008 to mid-2009, weaker energy prices caused a reduction in profit margins of biofuel plants which together with the financial crisis and delayed private investments around the world. This, associated with reduced policy support for biofuels in some countries and concerns regarding the sustainability of biofuel production has contributed to slow down the pace of expansion of the industrial capacity of the sector in 2009. As a result, when compared to their peak 2008 levels, ethanol and biodiesel prices decreased, respectively, by 6% and 26% in 2009.

38. Since the second half of 2009, the renewed firmness in mineral oil prices has been associated with the enforcement of higher biofuel blending obligations in some countries. This has triggered acceleration in demand for ethanol and biodiesel and subsequently for feedstock used to produce biofuels. It contributed to the recent strengthening in world prices for ethanol, and biodiesel, cereals and vegetable oils.

Projection highlights

- The implementation of policies calling for growing ethanol use means that global ethanol production is projected to increase by more than 110% over the projection period and to reach some 159 bnl (Figure 4.1). Because of increasing mandates and consumption incentives, global biodiesel production is also expected to increase to almost 41 bnl by 2019 far above the average 2007-2009 level (Figure 4.2).

- The US is expected to remain the largest ethanol producer and consumer throughout the Outlook (Figure 4.3). Brazil with its sugar cane based ethanol industry should be the main exporter. Part of Brazilian ethanol exports are expected to be channelled through Caribbean countries into the US to take advantage of preferential import conditions.

- With 60% of global biodiesel use in 2019 the EU remains the largest biodiesel market in the world. Other countries, notably India, the US and Brazil are set to reach substantial biodiesel use as well (Figure 4.4). Biodiesel is expected to be only little traded as most countries with consumption programs produce their biodiesel domestically. Argentina should remain the major exporter with exports reaching a plateau after 2015.
Figure 4.1. Global ethanol production to grow by more than 110%

Figure 4.2. Global biodiesel markets to continue to expand
Figure 4.3. Ethanol markets dominated by the US, Brazil and the EU

Regional distribution of world ethanol production and use in 2019

Production:
- USA: 43%
- Brazil: 35%
- China: 4%
- EU: 11%
- Other: 7%

Use:
- USA: 50%
- EU: 13%
- Brazil: 26%
- China: 3%
- Other: 8%

Figure 4.4. The European Union to dominate biodiesel supply and use

Regional distribution of world biodiesel production and use in 2019

Production:
- USA: 9%
- Brazil: 7%
- EU: 60%
- Argentina: 9%
- India: 3%
- Other: 21%

Use:
- USA: 9%
- EU: 60%
- Brazil: 7%
- Argentina: 2%
- India: 3%
- Other: 19%
Box 4.1. Agricultural commodities used for the production of biofuels at the global level

This box provides another angle on the projections presented for ethanol and biodiesel markets, by linking the cereal, oilseeds and sugar market projections to biofuel markets.

The evolution of ethanol production by feedstock over the projection period is presented below in Figure 4.5. It shows that the major feedstock for ethanol production should remain coarse grains all over the projection period. The use of coarse grains for ethanol production should grow relatively less after 2015 when the mandate for Conventional Renewable Fuels reaches its maximum in the US.

Figure 4.5. Ethanol to be produced mainly from coarse grains and sugar cane

Almost 40% of the increase in global ethanol production should be due to the increase in the production of ethanol based on sugar cane, mainly from Brazil, to meet both domestic and US demands. Biomass based second generation ethanol is only expected to develop in the latter years of the projection period, representing about 7% of total ethanol production. Roots and tubers and molasses are expected to be used as feedstocks for ethanol production in developing countries. Wheat, coarse grains and sugar beet should be used in the European Union to produce ethanol.

Figure 4.6 presents the evolution of biodiesel production by feedstock over the projection period. It shows that edible vegetable oil is expected to remain the major feedstock used to produce biodiesel. However its share in total biodiesel production should decrease from almost 90% over the base to about 75% by 2019. This is due to the development of the production of biodiesel based on jatropha mainly in India, to the increasing use of animal fats to produce biodiesel in the US and to the availability of biomass based second generation biodiesel in the latter years of the projection period. Biomass based biodiesel should represent almost 6.5% of total biodiesel production by 2019.
The importance of the biofuel use in agricultural commodity markets is illustrated in Figure 4.7. The shares of the different agricultural commodities used for ethanol and biodiesel production (molasses, vegetable oil, coarse grains, sugar beet, wheat and sugar cane) in global production is expected to increase strongly over the projection period.

By 2019, about 13% of the global production of coarse grains will be used to produce ethanol compared to 9% over the base. 16% of the global production of vegetable oil will be used to produce biodiesel compared to 9% over the base. The share of sugar cane to be used for ethanol production at the worldwide level is expected to remain small however it should more than double over the projection period reach almost 35% in 2019.
Market trends and prospects

Prices

39. The 2010-2019 OECD-FAO Agricultural Outlook assumes that crude oil prices will be strong and rising throughout the projection period, reaching almost USD 97/barrel by 2019. Biofuel markets are projected to be highly influenced by mandates and consumption incentives in countries all over the world, with the US and the EU playing major roles, respectively, on ethanol and biodiesel markets. The Outlook projects increasing world biofuel prices based on this situation.

40. The world ethanol price\(^3\) should follow an increasing trend to reach USD 54.4 per hl in 2019 because of strong demand in the United States to meet the RFS2 standards and in Brazil due to the development of the flexi-fuel industry. The world biodiesel price\(^4\) is projected to increase until 2017 and then to remain at a plateau of USD 144 per hl as it is assumed that second generation biodiesel will increasingly become available in the EU in the latter years of the Outlook period and thus will diminish the pressure on supply globally.

Production and use of ethanol

41. Driven by policy mandates, global ethanol production and consumption are projected to continue their rapid increases over the projection period and to reach some 159 bnl (Figure 4.1) by 2019. Box 4.1 presents a special focus on the feedstocks used to produce ethanol.

42. With the implementation of the new Renewable Fuels Standard (RFS2) Final Rule\(^5\), ethanol use for fuel in the United States is projected to increase continuously and to reach 77 bnl by 2019 (Figure 4.5) but below the 2019 standards of 102 bnl\(^6\). Fuel ethanol use should represent an average share of 8.4% in gasoline types for transport fuel by 2019.\(^7\)

43. The current blending wall of 10%\(^8\) of ethanol blended into regular gasoline is expected to be hit by 2015. However, the US Environment Protection Agency will provide a decision on expanding the blending permission to 15%\(^9\) in the course of 2010. The 15% threshold is not projected to be met over the projection period as it is assumed that by 2019 the average share of ethanol use in gasoline types for transport fuels should be of 12.1% expressed in volume terms.

44. The US is expected to remain the major ethanol producer and consumer throughout the projection period. Following the mandate for conventional renewable fuels fixed in the RFS2, ethanol production

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3. Brazil, São Paolo (ex-distillery).
4. Producer price Germany net of biodiesel tariff.
5. More information can be found on the RFS2 Final Rule on the following website: [http://www.epa.gov/otaq/renewablefuels/420f10007.htm](http://www.epa.gov/otaq/renewablefuels/420f10007.htm)
6. The 102 bnl figure represents the sum of the Conventional Renewable fuels mandate in 2019 (15 bn gallons, i.e. 57 bnl) which is expected to be met all over the projection period and of the mandate for total advanced biofuels except biomass-based diesel (12 bn gallons, i.e. 45 bnl).
7. All biofuel use shares are expressed on the basis of energy contained unless otherwise specified.
8. Expressed in volume terms.
derived from corn should increase strongly until 2015 and is projected to stabilise around the mandate level of 57 bnl thereafter. Cellulosic ethanol production mainly from crop residues, notably corn stover is only projected to expand significantly in the latter years of the projection period to reach almost 9 bnl in 2019 and to remain far from meeting the RFS2 32.2 bnl standard.

Figure 4.8. US ethanol market to expand because of RFS2

45. The Renewable Energy Directive (RED) implemented by the EU states that the share of renewable energy sources (including non-liquids) should increase to 10% of total transport fuel use by 2020. This should foster the increase in domestic ethanol production. Complementing wheat, coarse grains and sugar beet based ethanol, the production of second-generation ethanol is assumed to take-off in 2016 and to reach 1.8 bnl by 2019, i.e. 10% of domestic ethanol production. The contribution of second generation biofuels will be counted twice toward EU RED mitigation targets. Fuel ethanol use is projected to increase to reach 18.7 bnl in 2019 (Figure 4.9) representing an average share of 8.5% in gasoline types for transport fuels by 2019. The EU is expected to confirm its position as the third largest ethanol market behind the US and Brazil.
46. In Canada, a requirement for 5% (3.4% in energy terms) renewable content based on the volume of the gasoline supply is filled by 2010 and maintained throughout the projection period. Canadian ethanol consumption is thus projected to grow in line with fuel consumption. Domestic production is expected to rise over the projection period at a rate of 3.2% per year to reach almost 1.9 bnl in 2019. This growth will be fostered by direct support to ethanol producers until planned termination in 2016.

47. Over the early years of the projection period, domestic use of ethanol in Japan is expected to stay at around 0.6 bnl with most of the domestic use to remain for non-fuel purposes. Domestic production should remain marginal. From 2015, Japan is projected to start producing cellulosic ethanol to be used for fuel purposes. Domestic consumption should rise to reach 1.1 bnl by 2019.

48. In Australia, the ethanol share in gasoline type fuel use is expected to remain almost unchanged over the projection period at close to 1.3% after an important increase between 2006 and 2010. Most of the ethanol production should be based on coarse grains.

Latin America

49. Ethanol production derived from sugar cane in Brazil is expected to rapidly expand, growing by almost 7.5% per year over the projection period to meet both domestic and international demand. Brazil is projected to be the second largest ethanol producer, with a share of 35% of global production in 2019 (Figure 4.10). Due to relatively lower sugar prices relative to ethanol, a decreasing share of the growing sugar cane output is expected to be channelled to sugar production. Ethanol domestic use is expected to increase over the projection period to reach 41.7 bnl in 2019. This growth is mainly driven by the growing fleet of flexi-fuel vehicles.
50. Colombia achieved a sugar cane based ethanol production of over 400 million litres in 2009 mainly due to efficiency gains supported by pricing and fiscal incentives which is projected to grow on average at 7% per year to reach 880 million litres in 2019. This will allow domestic blending requirements of 10% in volume terms to be met by 2013 as gasoline consumption is expected to continue a declining trend. The subsequent expansion in export, reaching about half of the production by 2019, will be directed mainly towards the United States.

51. Argentine ethanol use is driven by mandates, supported by tax breaks. In 2007, Argentina decided to blend 5% of biofuels into gasoline and diesel from 2010 in volume terms, and this Outlook assumes that this would result in E5 blends. This should drive ethanol use to 0.5 bnl in 2019. It is assumed that the largely sugarcane-based ethanol industry will be able to marginally outpace domestic consumption over the course of the projection period.

52. Peruvian sugar cane yields per hectare are among the highest in the world. Domestic ethanol consumption is driven by a 7.8% blending mandate in volume terms effective in 2010. Based on a projected growth rate of 14% per year, the country’s ethanol production is expected to grow from a currently low base to 190 million litres in 2019. The surplus is expected to be exported to the United States and the European Union. Mexican domestic production, driven by domestic non-fuel use, is projected to grow to reach slightly more than 90 million litres in 2019.

Asia

53. In China, ethanol production should increase by 50% over the course of the projection period when compared to the 2007-09 base to reach almost 6 bnl in 2019. Most of the increase is assumed to be based on sweet sorghum, other low-quality cereals and sweet potatoes as official restrictions on the use of food commodities to produce biofuels apply. Ethanol share in gasoline type fuels is expected to reach 2.1% by 2019.

54. Ethanol production in India, from molasses, had a slight drop from 1.7 bln in 2008 to 1.6 bln in 2009 after a disappointing sugar harvest. The country had to temporarily import to fulfil the 5% blending
mandate in volume terms and non-fuel applications. Output is expected to recover and grow by 4.5% per year to reach almost 3 bnl by 2019.

55. In Thailand, the government promotes gasohol\(^{10}\) consumption through providing price cuts, tax incentives and marketing channels rather than compulsory phasing out of unblended gasoline sales. Ethanol production based on sugar cane, molasses and cassava is projected to grow at 11% per year and is closely matched by domestic consumption.

56. In the Philippines, the Biofuels Act passed in 2007 mandated a 5% ethanol blend in volume terms for gasoline within 2 years and 10% by 2011. To achieve the mandate, production based on sugar cane and molasses is expected to grow at an average rate of 15% per year over the projection period to reach 920 million litres in 2019.

57. Vietnam currently produces ethanol from sugar cane, molasses and cassava, generally for non-fuel purposes. Growth in production is projected to be significant at 11% per year as the government induces an E-5 blending mandate by 2016.

**Africa**

58. Most African countries have relatively small ethanol industries, if any. The myriads of ethanol plants’ project proposals have been put on hold which makes future prospects for a country such as South Africa very uncertain for the moment.

59. Tanzania and Mozambique are projected to produce 85 million litres and 40 million litres, respectively, by the end of the outlook period. Both countries produce ethanol from sugar cane and molasses. Non-fuel uses continue to dominate the domestic demand in these countries. There is some potential for export of fuel ethanol to the European Union, contingent upon meeting domestic target mandates (in volume terms) of 10% for Tanzania and 5% for Mozambique. Duty free access to the European Union ethanol market under the Everything But Arms (EBA) agreement for least developed countries competes with the same preferences for sugar.

**Production and use of biodiesel**

60. Because of increasing mandates, supplemented by tax concessions and other forms of support, global biodiesel use is expected to increase to almost 41 bnl by 2019 far above the average 2007-2009 level (Figure 4.2). Box 4.1 presents a special focus on the feedstocks used to produce biodiesel.

**OECD**

61. In the European Union, the major player on the biodiesel markets, total biodiesel use is expected to reach almost 24.4 bnl by 2019 given mandates and tax reductions by Member States and the RED (Figure 4.11). The share of biodiesel in diesel type fuels is projected to grow to 8% (almost 10% in volume terms) on average\(^{11}\) by 2019.

62. Domestic biodiesel production in the EU should increase to supply a large share of demand. From 2016, second generation biodiesel production is assumed to take-off reaching 2.6 bnl in 2019, following the mandates and tax reductions.

\(^{10}\) Mixture of ethanol and regular gasoline. The Thai Government provides price incentives through price subsidies and excise tax cuts for blends from E10 (mixture of 10% ethanol and 90% gasoline) through E85 (mixture of 85% ethanol and 15% gasoline), accordingly.

\(^{11}\) All biofuel use shares are expressed on the basis of energy contained unless otherwise specified.
i.e. almost 13% of domestic biodiesel production. As sustained profits thanks mainly to continued public support are expected, biodiesel production based on vegetable oil is expected to increase by 6.7% p.a. on average. This rate is lower in the latter years of the projection period when world biodiesel prices reach a plateau due to the anticipated increasing availability of second generation biodiesel.

Figure 4.11. EU biodiesel imports requirements to stabilise after 2016

63. In the US, the mandate defined in the RFS2 calls for 3.8 bnl of biodiesel to be used by 2012, driving the initial growth in US biodiesel use. The Outlook assumes biodiesel use to be held constant over the remaining years although no explicit mandate for biodiesel is legislated thereafter, the subsequent mandates referring only to advanced biofuel (Figure 4.12).

64. It is projected that US biodiesel production will target to meet but not to exceed domestic use. US biodiesel production from tallow or other animal fat is expected to develop to reach 2.6 bnl in 2019 or two-thirds of total output. Increasing rate of returns means that biodiesel production based on vegetable oil is expected to grow until 2015. Afterwards, international biodiesel prices will reach a plateau as second generation biodiesel becomes available; hence, the price incentive to produce biodiesel from vegetable oil diminishes subsequently.
65. In Canada, biodiesel use is projected to grow in line with the biodiesel blending mandate of 1.6% (2% in volume terms) for all transport diesel as well as heating oil by 2012-2011, or earlier, subject to technical feasibility. Biodiesel use is projected to reach 765 million litres by 2019. Domestic biodiesel production continues to be mainly based on other feedstocks such as tallow and other animal fat. It is projected to grow continuously over the projection period.

66. In Australia, the biodiesel share in diesel type fuel use to remain close to 2.5% all over the projection period. Most of biodiesel production should be based on animal tallow.

**Latin America**

67. Biodiesel production in Argentina is expected to increase rapidly until 2015 because of growing demand from international markets, especially in the European Union. The take-off of second generation biodiesel production in the EU lowers the need for soya-based biodiesel imports in the latter years of the projection period. Biodiesel production is thus expected to stabilise at 3.6 bnl in 2019 (Figure 4.13). Mandates and tax breaks drive domestic biodiesel use. In 2010 Argentina is expected to blend 5% of biodiesel into diesel in volume terms. The blending mandate should increase over the coming years. Domestic biodiesel use is assumed to remain at follow the mandated levels.
Figure 4.13. Argentine to export most of its biodiesel production

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68. In Brazil, the government’s mandate calls for an average share of 5% in diesel types for transport fuel from 2010 expressed in volume terms. Domestic production based mainly on soybean oil should meet domestic mandate use. It should reach 3 bnl biodiesel in 2019.

69. In Colombia, palm oil based biodiesel production is expected to increase from currently 330 million litres to 875 million litres by 2019, an average annual growth rate of 10%. The country currently has a blending requirement of 5% in volume terms. Based on the mandate, domestic demand remains relatively flat over the Outlook period leaving an increasing exportable surplus.

Asia

70. The government of India promotes the use of non-food sources for production of biofuels. Edible oilseeds are not eligible for the production of biodiesel. Plans to boost the cultivation of *jatropha* from current experimental stage are a key component behind the biodiesel outlook. Based on ambitious government targets, biodiesel production could reach 3 billion litres by 2019 all of which is destined to domestic usage.

71. Indonesian production and consumption of palm oil based biodiesel is projected to grow rapidly to comply with the 3% blending mandate expressed in volume terms which is to rise to 7% in 2015. Production should reach over 1 bnl in 2019. Malaysian output is expected to reach close to 1 bnl up from a current level of 600 million litres with an average annual growth of just 4.6%. Currently, about half of the production is exported mainly to the EU and North America, and the share moving into exports should remain unchanged during the Outlook period. The two countries continue to allocate a low proportion of palm oil production for biodiesel production as they attract higher premiums in the palm oil export markets.

Africa

72. Africa is a net importer of vegetable oils making their use as feedstock for biodiesel unlikely. Modest expansion of biodiesel production in Africa will derive mainly from *jatropha curcas* production.
Numerous projects have been announced, but actual commercial production has been very small. Mozambique and Tanzania are projected to collectively produce 100 million litres of biodiesel in 2019. More than half of the production is destined for export to European Union markets.

**Trade in ethanol and biodiesel**

**Ethanol**

73. Trade in ethanol\(^{12}\) is expected to almost triple over the projection period to reach 9% of global production. It is driven, in particular, by large US import demand. To keep pace with demand, net imports from the US should reach 10.9 bnl in 2019 (Figure 4.8). Part of this are expected to be Brazilian ethanol dehydrated in the Caribbean, imported with duty-free access under the Caribbean Basin Initiative. At the global level, growth in trade comes almost entirely by expanding export supplies from Brazil. They are expected to reach 13.3 bnl by 2019 (Figure 4.9).

74. In the EU, ethanol imports should initially grow to meet increasing ethanol demand to reach 4.3 bnl in 2017. With the increasing availability of second-generation in the latter years of the Outlook period, ethanol imports are expected to decrease to 3.2 bnl in 2019 (Figure 4.10). In Canada, net imports should remain close to 0.7 bnl over the projection period, while 0.8 bnl of ethanol are expected to be exported to the United States. Ethanol net imports by Japan are expected to stay around 0.5 bnl.

**Biodiesel**

75. Biodiesel is expected to be only little traded as most countries with binding mandates tend to produce biodiesel domestically. Biodiesel exports from Argentina are projected to increase rapidly up to 2015 because of growing demand in the European Union. The anticipated take-off of second generation biodiesel production in the EU lowers the need for biodiesel imports in the latter years of the projection period, which should stabilize at 3.8 bnl.

76. A countervailing measure has been put in place in spring 2009 by the EU to prevent the US imports of biodiesel benefitting from a blenders’ tax credit. All exports from the US to the EU are now subject to an import tariff. As a consequence, the Outlook assumes that the US will not develop its exports of biodiesel. Canada’s biodiesel imports should level off around 300 million litres once domestic mandate is met in 2011, or earlier, provided technical feasibility is demonstrated\(^{2012}\).

**Key issues and uncertainties**

77. Since the early 2000s, biofuel markets have experienced a considerable expansion following the implementation of policy packages aiming to foster the use of renewable fuels in transportation fuel in a number of countries. Future developments are subject to many uncertainties which are described in this section: the evolution of policies and of the economic environment, the set-up of environmental criteria, the development of second-generation biofuels and the competition between producing food or fuels from agricultural resources.

**Evolution of policies and macroeconomic environment**

78. Policies promoting the use of bioenergy are obviously a key factor behind the development of biofuels markets. However, they are not the only driver. The recent economic downturn has shown how

\(^{12}\) Note that trade projections for ethanol, in addition to pure fuel alcohol, also include ethanol for other purposes as well as the ethanol share in gasoline blends.
crude oil prices and private investors’ involvement interplay to shape the biofuel economy and, as a result, the economy of feedstocks used for biofuel production. Any change in the economic environment can potentially have a strong impact on biofuel markets as this may lead to changes in policy packages, raw material prices and modify the profitability of the industry and thus delay investors’ decisions or spending on R&D.

79. National biofuel policies may well change over time and neither the future course of crude oil prices nor the response of private investors to price and policy changes can be foretold. In the Outlook, the assumption is made that the current policy set remains in place. In reality, over the medium term, national biofuel policies will likely be subject to continuous reviews and modifications. National targets for bioenergy utilisation are revised frequently and may be subject to further rescheduling, while government subsidies and other budget-sensitive measures in support of biofuel production or consumption could be subject to gradual cuts as the industry matures.

**Greenhouse gas (GHG) emissions**

80. The RFS2 Final Rule in the United States requires specific GHG emission reductions for the various biofuels included in the policy. Conventional renewable fuels must reduce GHG by 20% when compared to gasoline, advanced biomass-based diesel and non-cellulosic advanced biofuels by 50% and cellulosic biofuels by 60%. Existing conventional ethanol production facilities are exempt from this requirement, but new plants will have to comply. Similarly, imported biofuels will need to meet the requirement in the coming years.

81. The RED in the European Union specifies that a given biofuel has to achieve a saving of at least 35% in GHG. This 35% threshold should rise to 50% in 2017 for existing plants and 60% for new production facilities. Indirect effects of biofuel production commonly referred to as indirect land use changes (ILUC) effects have been discussed in OECD (2008). The European Commission is required by December 2010 to submit a report that addresses ways to minimize the impact of ILUC on GHG.

82. The measures taken and to be taken by the major countries consuming biofuels might affect international trade in biofuels and feedstocks. in the coming years as imports of ethanol and biodiesel may increasingly be subject to restrictions because of environmental reasons. Internationally recognised standards are in the process of being developed. Their potential impacts on trade flows are not yet known.

**Development of second generation biofuels and other sources of renewable energy**

83. Considerable uncertainty remains regarding the future transition to second generation biofuels as bioenergy market developments are expected to increasingly depend on technological advances. The take-off of second generation biofuels produced from lignocellulosic biomass in the form of wood or miscanthus grass for example, waste material from food crops or residues from forestry or other non-food plants is expected in the latter years of the projection period. This potential development will obviously depend on capital availability and the advancement of R&D over the next few years.

84. Research is leading to new ways to make use of biomass for the production of liquid fuels are currently on the way, but production facilities are not yet operational at any commercial scale. However as most of current biofuel policy packages have set up ambitious mandates for the production of second-generation biofuels, commercial production is not dependant on full economic viability, at least in the United States and in the European Union.

85. Other sources of renewable energy could play a larger role in future years. The RED explicitly allows for renewable electricity used in the transport sector to count towards the 10% energy share in transport fuels. The development of the electrical or hybrid vehicles remains unknown for the time being.
but could potentially reduce the need for biofuels derived from agricultural products to meet the mandate set up by European States.

86. For more information on the development of second generation biofuels, The IEA (2010) has issued a report describing the potential and perspectives of sustainable production of second generation biofuels in major economies and developing countries.

**Food versus fuel**

87. The continued growth of the biofuel sector as a demand factor in agricultural commodity markets over the previous years has given rise to concerns about their impact on food security. Analysing the nexus between fuel and food is complex. Although there is a consensus that the demand for biofuel feedstocks affects food prices no consensus exists on the magnitude of the impact, which may also vary across countries, the impact varies across countries and may not be quantifiable with certainty. The degree of competition among food, feed and fuel uses of biomass will hinge on a variety of factors, including crop selection, farming practices, agricultural yields and the pace at which next-generation biofuel technologies develop.

88. Higher food price levels as well as increased volatility can cause substantial problems to low income net food consumers including agricultural labourers, the urban poor and the large proportion of rural poor without sufficient productive assets. Competition for resource inputs places upward pressure on food prices, even if the feedstock itself is a non-food crop or is grown on previously unused land. On the other hand, farmers who are net food suppliers are likely to benefit from higher prices. Bioenergy growth can boost incomes by revitalizing agriculture, providing new employment opportunities and increasing access to modern energy, which can stimulate rural development. The food supply may be positively affected if the market for biofuel feedstock leads to new investments in agricultural research, infrastructure development and increased production.
REFERENCES


CHAPTER 5
CEREALS

Market situation

89. The year 2009 marked a slow return to a more balanced situation in cereal markets. International prices, which in the previous year climbed to unusually high levels, driven by tight market conditions, fell following a significant improvement in global supply. The above-average cereal production in 2009 and large world inventories, especially among major exporters, weighed to depress international cereal prices, a trend that is continuing in 2010. The FAO Cereal Price Index averaged 174 points in 2009, down 27% from the all-time high average (in nominal terms) of 239 points in 2008.

88. Global cereal production in 2009 fell slightly below the previous year’s record. Wheat production remained unchanged, but outputs of coarse grains and rice were smaller. Cereal production rose sharply in North Africa, following a strong recovery from the previous season’s drought. In Asia, aggregate cereal production remained unchanged, with declines in China and India offsetting significant increases in several other countries. In India, a sharp drop in rice output, caused by an erratic monsoon and a recurring El Nino, more than offset a bumper wheat crop. However, in most other regions, cereal production declined in 2009. In Latin America, it fell significantly, driven largely by a poor wheat crop in Argentina, as a result of reductions in planted area and drought-driven low yields. In Europe, production dropped below the record in 2008 but was still high compared to previous seasons.

89. In spite of generally satisfactory production results in 2009, growth in world cereal utilisation remained sluggish for the second consecutive season. The main reasons were weaker growth in demand for feed grains, resulting from limited increases in 2009 world meat production, and a relatively slow expansion in industrial utilisation of cereals, especially of maize for production of ethanol. Against this background, world cereal stocks expanded for the third consecutive year, lifting the ratio of world cereal stocks-to-utilisation, an important indicator of global food security, above its five-year average.

90. Another major feature has been the sharp contraction of over 5% in world cereal trade in the 2009/10 marketing season, from the previous season’s record. A fall in wheat trade, resulting from lower imports by several countries in Africa and Asia that harvested larger crops, accounted for most of the reduction in the international trade of cereals. Slightly lower imports were also anticipated for coarse grains against a modest rise in imports of rice.

Projection highlights

- Over the next decade, international prices of major cereals are projected to remain steady or decline slightly, but still exceed the levels of the previous decade. A noteworthy feature is the

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13. All dates are on a marketing year basis (e.g. 2009 represents the 2009/10 marketing year and 2019 represents 2019/20) unless stated otherwise.
drop in wheat to maize price ratio, which is projected at between 1.1 and 1.2, well below 1.3-1.6 registered in the previous decade. This apparent decline in the ratio is mainly explained by the anticipated expansion in the supply of lower (cheaper) quality wheat and the increasing new demand for maize from the expanding ethanol sector. Rice prices are projected to decline significantly compared to 2009, falling to USD 422 per tonne by 2019. However, in contrast with other cereals, international rice prices in 2009 were still particularly high, only 16% less than the record reached in 2008.

- World cereal production is likely to increase by 1.3% p.a. over the projection period to reach 2 579 Mt by 2019. This compares to 2.3% annual growth observed in the previous decade.

- World cereal utilisation is projected to expand at 1.4% p.a. between 2009 and 2019, to reach 2 564 Mt. This compares to 1.8% growth per year observed in the previous decade. The share of biofuel use of coarse grains will continue to increase until about 2015, reaching 13.1% of the total use of coarse grains, before declining slightly thereafter, dropping to 12.6% by 2019. World feed use is projected to increase by about 1.4% annually. Total food consumption of cereals is projected to reach 1 194 Mt by 2019, up 154 Mt, or 15%, from the base period. Food consumption of wheat is set to reach 514 Mt, growing at about 1.1% annually. Rice food consumption is projected at 449 Mt, growing by roughly 1.3% a year, which is slightly faster than observed in the past decade.

- World cereal stocks are projected to increase to 582 Mt by 2019, exceeding the very low levels in 2006 and 2007 by 153 Mt, or 26%. The world cereal stock-to-use ratio is projected at around 23% which is close to the comfortable levels observed in 2009 but well below the levels of the previous decade.

- World trade in cereals is projected to reach 313 Mt by 2019, up some 50 Mt, or 21% from the 2009/10 marketing season. Imports by the developing countries are projected to rise by around 2.3% p.a., or at about the same rate as in the previous decade, to 256 Mt. Largest increases in imports are projected for the Near East, followed by Africa, Latin America and the Caribbean and Asia.

Market trends and prospects: Wheat and Coarse Grains

Production

91. World wheat output is expected to rise by 1.1% p.a. during the projected period, to 746 Mt by 2019, up 90 Mt, or 14% from the base period (2007-09 average) (Figure 5.1). After several years of relatively fast growth, driven by high prices in international markets, the annual world wheat production is likely to expand at a slower rate; although sufficient to match the projected annual growth in world consumption. World wheat output is likely to grow at a slower pace than in the previous decade, marked by a slow-down in area expansion, which is projected to increase by 0.3% annually against 0.4% in the previous decade, and more subdued average yield growth, which is projected at only 0.8% compared to 1.3% in the previous decade. The high yields in major production countries in the base period reduce the potential yield growth as well as the faster area expansion in low-yielding regions. Having already reached high yields in many of the major wheat producing countries, the potential of further advancements in yields in those countries is more limited.

92. In the OECD countries, the rate of growth in wheat production is expected to remain muted, at only 0.8% per year, and its rebound restrained by equally sluggish growth in overall demand. Although the growth rate is higher in developing countries as potential for productivity gains are much stronger, wheat
production in non-OECD countries may still not rise more than 1.3% per year, considerably below the rate in the previous decade.

Figure 5.1. Wheat production and prices

93. Wheat production is expected to increase most significantly in those countries which suffered from exceptionally low yields in the base period, such as Argentina and Australia, while fast growth is also projected for a number of countries such as Pakistan and the Russian Federation. By contrast, production is likely to contract further in Saudi Arabia where the Government decided to phase out support to wheat farmers in the face of severe water scarcity problems. In China, the world’s second largest wheat producer after the EU, a standstill is projected driven mostly by a diminishing consumption on annual per caput basis. In India, another leading producer, growth in wheat production is expected to decelerate while continuing to keep pace with the projected increase in demand. Among the OECD exporting countries, slower growth is projected for Canada and even a slight decline for the United States.

94. World production of coarse grains is projected to reach 1 311 Mt by 2019, some 19% higher than the base period (Figure 5.2). In aggregate, global coarse grains production is expected to expand by 1.6% annually during the projection period, which would be almost half as fast as in the previous decade. This slower growth is largely in response to weaker feed demand, reflecting the continued fallout from a recession during the early years of the projection period, and a slower rate of expansion in maize-based ethanol production, primarily in the United States. Overall, the deceleration in yields is more significant than the declining rate of expansion in planting area. Average yields are projected to increase by just 1.0% annually during the projection period, well below a relatively fast growth rate of 2.1% per year observed in the previous decade. In the case of area, the projected expansion is put at 0.6% per year, which is slightly below the rate recorded in the previous decade. A considerable part is on account of the expected coarse grain production development in the United States which accounts in 2019 for 30% of the world total; the area is expected to remain unchanged during the projection period compared to a growth by 0.9% annually the decade before, and yield to increase annually by 1.1% compared to 2.4% in the decade before.
The bulk of the increase in world production of coarse grains is expected to come from non-OECD countries and that mostly because of the more rapid expansion in their planting area compared to the OECD countries. Productivity gains in non-OECD countries are also projected higher than in the OECD countries, especially in Asia where the increase in the land base is more restrained because of mounting water constraints and continuing urbanisation.

Among leading producers, maize production in the United States is projected to exceed the base period by roughly 54 Mt and that of coarse grains by 45 Mt in China. Substantial increases are also projected for Argentina, reflecting not only a recovery in its maize production from the drought-reduced yields witnessed in the base period, but also higher plantings as compared to less profitable wheat. In addition, Brazil, the EU, the Ukraine and the Russian Federation are projected to produce notably higher volumes of coarse grains (maize and barley) than in the past. However, an emerging new feature during the projection period is likely to be in Africa where the production of coarse grains is expected to continue increasing rapidly in several countries, especially in Nigeria (maize, millet and sorghum) and in Ethiopia (maize and sorghum), driven by good potential for both land expansion as well as further gains in yields.

Utilisation

World wheat utilisation is projected to rise by around 1.2% annually in the next decade, to reach 740 Mt (Figure 5.3). The increase is mostly on account of the rise in direct food consumption in the developing countries, driven by growing population, income and continued urbanisation.
World food consumption of wheat is projected to reach 514 Mt by 2019, representing 69% of the total projected utilisation. This translates into a world average of roughly 68 kg per person per annum, very close to the base period. Algeria (210 kg), Egypt (202 kg), Turkey (199 kg), and the Islamic Republic of Iran (167 kg) will continue to top the list of the highest consumers of wheat. On the other hand, the average per caput in Sub-Saharan Africa is projected to reach 19 kg by 2019; remaining the lowest compared to other regions in spite of relatively significant increases projected for several countries in the region, in particular for Tanzania and Mozambique. Annual per caput wheat consumption levels in Brazil and South Africa are projected to increase the fastest, to 64 kg and 67 kg respectively.

The other major use of wheat is for animal feed, which is expected to grow by 1.2% annually, or more than twice as fast as in the previous decade, to 140 Mt. Especially, the tight season 2007/08 reduces the average of the reference period considerably. In addition, more ample wheat supplies and more favourable prices than in recent years are among the main factors behind this increase. In the EU, the largest user of wheat for animal feed in the world (41% of global feed wheat use in 2019), total feed use of wheat is projected to show a slight increase during the projection period, after a contraction in the previous decade, to finally round out at 57 Mt.

Among the other main utilisation categories, the industrial usage of wheat for production of biofuels is projected to increase the fastest, mainly driven by the anticipated increase in production of ethanol in the EU, which accounts for about 90% of the total use of wheat for biofuels. The Renewable Energy Directive (RED) requires to reach, by 2020, a share of 10% of renewable fuels in EU transport fuel use.

World utilisation of coarse grains is projected to increase by 1.5% p.a., to 1 303 Mt by 2019 (Figure 5.4). The projected expansion is below the pace observed over the past decade and that mostly on account of much slower growth in the use of coarse grains for production of biofuels in the United States, the world’s largest producer of maize-based ethanol. The share of biofuels in total use of coarse grains is projected to increase until about 2015, reaching 13%, before declining during the latter years of the projection period. This development is largely on account of a slower increase in the use of ethanol for fuel (to 82 bnl by 2019 and thus below the mandate of 102 bnl set by the new Renewable Fuels Standard...
(RFS2) in the United States) and increasing production of second generation cellulosic ethanol towards the end of the projection period.

Figure 5.4. Coarse grains consumption in OECD and developing countries

102. As in the previous decade, growth in the consumption of coarse grains as food is likely to slow, mostly keeping pace with population growth. Globally, direct food consumption of coarse grains accounts for only 17% of its total utilisation and this share is expected to remain largely unchanged during the next decade.

103. Total use of coarse grains for animal feed is projected to increase at a slightly faster pace than in the previous decade, by 1.5% p.a., to 741 Mt by 2019. A continuing rapid increase in the developing countries, driven by strong economic growth and changes in dietary preferences toward protein-based diets, is responsible for most of the projected expansion in world feed utilisation of coarse grains. China alone accounts for 40% of the world increase in coarse grains feed use over the projection period. In the developed countries, despite a reversal from a small contraction observed in the previous decade, the recovery will be small, reflecting a slow anticipated growth from the livestock sector and large supplies, hence utilisation, of distillers dried grains (DDGs), co-products from grain-based ethanol production used in feed rations.

Stocks and prices

104. The gradual recovery in the level of world wheat stocks which started in 2008 is projected to continue throughout the first years of the projection period before inventories stabilize at around 242 Mt by 2019, up 49 Mt, or 25%, from the base period (Figure 5.5).

105. Most of the increase in world wheat stocks would be in non-OECD countries, in particular in China where inventories could increase by as much as 36 Mt compared to the base period. Besides China, significantly higher stocks in the Russian Federation and Ukraine are also expected to boost world stock levels.
106. Aggregate stocks held by the major exporters, traditionally considered as the main buffer against unexpected production shortfalls, are projected to reach 54 Mt, which would be only 5 Mt above the relatively low average registered in the base period. This development makes world price stability more conditioned on the size and stock holding policies in other countries. As wheat production in many of those countries are often prone to sudden, or unexpected, changes because of erratic yields, this may give rise to even higher price variability compared to the historical trend. This, coupled with the fact that the global stocks-to-use ratio for wheat is projected to reach only 33%, which would be below the ratios registered in the 1990s (although higher than the low of 2006), suggests that prices may not only become more unstable in the future but also higher than in the past, at least in nominal terms. The price of the benchmark US wheat (No. 2 Hard Red Winter, f.o.b. Gulf) is projected to increase to USD 225 per tonne by 2019, up 3% from the average in 2009. In real terms, however, wheat prices are likely to continue their long-term decline, albeit falling less rapidly and from higher levels.

107. World stocks of coarse grains are also anticipated to increase during the projection period but the build-up is likely to be smaller than that of wheat and, contrary to the wheat situation, most of the increase is projected to occur during the latter years when the growth in utilisation is expected to slowdown. By 2019, world stocks of coarse grains are projected to reach 223 Mt, some 25 Mt, or 13%, above the relatively low level of the base period (Figure 5.6). However, as in the case of wheat, higher inventories in China account for most of the increase (some 70%) of the projected rise in world stocks. In addition, the stocks-to-use ratio may not exceed 17% by the end of the projection period. This could be considered as
relatively low when compared to the previous decade, especially in light of the fact that aggregate stocks held by the traditional exporters are projected to reach 86 Mt, only 2% above the base period.

108. Current projections for stocks and utilisation point to a somewhat tighter supply and demand balance during the early years of the projection period resulting in prices rising the fastest until 2016. The situation is likely to improve thereafter with utilisation growing at a slower pace and keeping up with production growth. By 2019, the price of the benchmark US maize (No. 2 Yellow, Gulf) is projected to reach USD 187 per tonne, almost unchanged from the average in 2009. However, even at this price, the wheat to maize price ratio would drop to a notably low ratio of 1.1-1.2, compared to 1.3-1.6 in the past, indicating a stronger upside potential for maize prices than for wheat. One reason for this apparent decline in the ratio is the anticipated expansion in the supply of lower (cheaper) quality wheat, increasingly taking larger share of world wheat markets and hence putting downward pressure on world average prices of wheat. Another reason is the increasing new demand for maize from the expanding ethanol sector, which is supportive to maize markets and push up world prices of maize.

Trade

109. World wheat trade (including wheat flour in grain equivalent) is projected to reach 142 Mt by 2019, expanding at a slower pace than in the previous decade, especially when compared to the base period (Figure 5.7). Global trade in wheat peaked in 2008/09 marketing season when it registered an all time high of 135 Mt primarily due to significantly larger imports by several drought-hit countries in Asia and Africa. This sudden sharp jump was followed by an equally significant dive in the following season, reflecting a recovery in production in many countries and a gradual return of confidence to markets as inventories replenished.

110. Trade in wheat is projected to resume an upward trend from 2010/11, increasing by about 1.8% annually, almost entirely on projected expansions in imports by the developing countries. Demand for wheat continues to be driven mostly by population growth, especially in several countries in Asia and North Africa where wheat is a leading staple. Aggregate wheat imports by the non-OECD countries are projected to reach 117 Mt in 2019, representing 82% of projected world trade. Compared to the base period, the biggest increases in terms of volume are projected for Egypt, which will retain its position as the world’s largest importer, followed by Pakistan, Brazil, Nigeria, and Algeria. Imports by Saudi Arabia will continue to increase following the government’s policy to phase out support to domestic producers. By 2019 Saudi Arabia is likely to source almost 90% of its needs through imports. Wheat imports are also projected to increase with relative strength in India, Mexico, South Africa, and Vietnam. Wheat purchase by the Islamic Republic of Iran are likely to fall below the exceptionally high imports seen during the base period.
period when the country was hit by a severe drought, but still remain large in spite of the country’s drive for self-sufficiency.

111. On the export side, a select few exporters are expected to dominate the wheat market. Aside from the traditional five major exporters, namely Argentina, Australia, Canada, the EU, and the United States, shipments from the Russian Federation could surge by 63% from the base period to reach around 26 Mt by 2019. In fact, based on the projection, the Russian Federation will be slightly ahead of the United States, currently the world’s largest wheat exporter, by 2019.

112. Global trade in coarse grains is projected to reach 132 Mt, up 12% from the base period largely on account of a continuing expansion in feed demand especially among faster growing developing countries (Figure 5.8). Similar to the wheat situation, trade in coarse grains experienced a significant increase during the base period, particularly in 2007/08 when it climbed to a record 131 Mt. The surge in imports (maize and sorghum) by the EU, due to shortages of feed wheat, was one of the main drivers for the sudden jump in world trade in 2007/08 but, in the subsequent seasons, world trade returned to more normal levels as the situation in the EU improved. Given the fact that the increase foreseen during the outlook period starts from a relatively high volume, trade expansion is likely to remain subdued during the early years before accelerating towards the latter years.

113. Aggregate imports of coarse grains by non-OECD countries are projected to increase by 2.7% p.a. to 79 Mt; representing 60% of the world’s total imports by 2019. In terms of volume and compared to the base period as well, the fastest increases are projected for Saudi Arabia, Egypt, Mexico, Chile, most countries in North Africa, Ethiopia, the Islamic Republic of Iran, Peru, Malaysia and the Philippines. While Mexico will retain its position as the world’s largest importer of sorghum and second largest maize importer, Saudi Arabia will remain the leading importer of barley. China is expected to become a net maize importer from the early years of the projection period, driven by fast growth in domestic demand, but imports by China will not exceed even on-half of its tariff-rate-quota (TRQ) of 7.2 Mt Among the OECD countries, lower imports are expected in Japan, where higher meat imports dampen demand for coarse grains, and in Canada, mostly on lower feed demand and larger use of DDGs.

114. The traditional major exporters are likely to increase their overall market share slightly during the projection period with total exports of nearly 98 Mt by 2019, or 71%. The United States is expected to retain its position as the world largest exporter, and be able to ship more maize and sorghum, compared to the base period, despite its own growing domestic utilisation. Having suffered from the severe drought during the base period, Argentina is projected to return to the export market as a major exporter starting in 2010 given the good prospects for a strong recovery in its maize production. Australia, Canada, and the EU
will also increase their exports of barley, meeting most of the demand in North Africa and countries in the Middle East. In addition, the projection points to larger exportable supplies of maize and barley in Ukraine. While Paraguay and India are projected to increase their maize exports, exports from South Africa, a traditional supplier of maize in southern Africa, may change little compared to the base period mainly due to its own growing domestic demand.

**Market trends and prospects: Rice**

**Production**

115. Following the 2008 price surge, many governments revisited their medium and long run development strategies. Fears that resources could become scarce in Asia, the principal source of rice trade, fostered the launching of new ambitious rice self-sufficiency programmes in major importing countries or, where they existed, to their intensification. This supportive stance is expected to prevail also in the next decade for the sake of gaining more control over food supplies, as food security prevails over economic efficiency concerns. Much of the resources necessary to boost the sector in the least developed countries are expected to come from large investments from institutional and private investors, who have been actively buying or leasing land for rice cultivation in their own or foreign countries in recent years. Besides their economic implications, these new tendencies may have substantial impacts on small farmers and international relations.

116. As a result, a brisk expansion of rice cultivation is anticipated in Africa and in a few Asian countries, such as Cambodia and Myanmar, where large swaths of suitable land and water are still available. However, at the world level, the area under rice is expected to grow little, given an expected retreat in various Asian countries, notwithstanding existing regulations that limit the conversion of agricultural land into other end-uses. Emblematic is the case of China, where the size of rice fields is projected to shrink by 1.3% per year over the next decade, or 3 Mha between 2009 and 2019. At the world level, the area under rice is projected to remain around 163 Mha over the next ten years. Nonetheless, a process of consolidation of small farms into large concerns is likely to prevail alongside.

117. Thus, yield increases are likely to remain the principal factor sustaining production in the coming decade. However, on average, the pace of their growth is expected to slow down from 1.3% between 2000 and 2009 to 1.0% per year in the coming decade, to reach 3.2 tonnes per hectare by 2019, in milled rice equivalent. Indeed, technological and varietal improvements, for instance through the adoption of hybrids or transgenic rice, or improved agronomics, are expected to focus less on yield enhancement and target instead other traits, such as nutritional characteristics (Golden Rice), or tolerance to abiotic stresses, such as drought. Despite fast progress, yields in Africa are projected to remain some 40% short of the world average and well below those reaped in the other regions. On the other hand, continued brisk productivity gains are anticipated in OECD countries.
118. At the world level, rice production is projected to expand by about 1.0% per year to reach 522 Mt in 2019 (Figure 5.9). Production by OECD countries, which followed a declining trend in recent years, is set to rebound somewhat by 2019. The recovery is projected to be sustained by a recovery in Australia, on the assumption of a return to a favourable rainfall pattern, and continued gains in the United States. However, the OECD share in the total will remain marginal, at less than 5%. Virtually all of the anticipated growth in production is expected to materialise in non-OECD countries, especially in Asia and Africa. However, China stands as an exception; as the country is foreseen to cut production in the next ten years, amid falling domestic demand and shrinking land and water resources.

Consumption

119. Rice continues to be predominantly a food commodity, as only 14% of overall utilisation is used for feed and other ends, the latter consisting mainly of post-harvest losses. Over the next decade, the status of rice as major staple food is not expected to be challenged, although the utilisation of rice as feed will continue to be promoted and expand in countries such as Japan or the Republic of Korea. Utilisation of rice as feedstock for biofuel still does not appear a plausible alternative.

120. World overall rice utilisation is projected to reach 522 Mt in 2019, rising at the annual rate of 1.1% over the ten year period, virtually matching the increase in population. Indeed, on a per caput basis, consumption (all uses included) is set to expand at a marginal rate to 59.2 kg per year in 2019. However, per caput consumption is expected to follow diverging directions, either stabilising or even falling in Asia, while rising in Africa and part of Latin America and the Caribbean, where rice is increasingly vying with wheat to become the main staple. The fall of rice consumption in China, on the other hand, appears to replicate the historical pattern already witnessed in Japan and the Republic of Korea, whereby growingly affluent populations cut rice consumption to shift to higher protein-based diets. Nonetheless, Asia is to remain the major growth market for rice, given the sheer size of its population.

121. Because important countries, such as China, India, the Philippines, Bangladesh or the Islamic Republic of Iran are soon to engage in the commercial production of genetically modified rice, the
questions of product segregation and labelling are anticipated to gain prominence in the commercialisation of rice in domestic and export markets.

**Stocks and prices**

122. Following the poor 2009 season production results, the size of world rice reserves had to be reduced in 2010, a situation that is foreseen to be redressed in the next decade. By 2019, world rice inventories are projected to reach 117 Mt, up from some 100 Mt in 2009. Much of the build-up is foreseen to be concentrated in China, where stocks would come to represent 44% of domestic requirements, a level of security much higher than the 30-34% coverage in recent years. At the world level, rice inventories would cover 22.5% of global rice consumption, slightly up from a stock-to-use ratio of 21.6% in 2009.

123. World rice prices continue to be high in 2010, averaging USD 570 per tonne in the first three months of the year, which compares with USD 335 per tonne in 2007, prior to the price surge event. Amid weak import demand, the market strength largely reflects policies in the major exporting countries, including export restrictions and the retention of large supplies in public stocks. World prices are expected to weaken in the coming years, ending in 2019 at USD 422 per tonne. At that level, rice would be almost 1.9 times the price of wheat, which compares with a ratio of 2.7 in 2009.

**Trade**

124. Trade in rice (Figure 5.10) is forecast to expand at 2.1% per year over 2010-19, slightly slower than in the past decade, and reach some 38 Mt by 2019. Despite the 7 Mt expansions, trade would continue to account for a small share of world production of about 7%.

125. Within the OECD group, the EU is projected to import substantially more in ten years time, but sizeable increases are also anticipated for the United States and South Africa. Imports by Japan and the Republic of Korea are foreseen to change little, as they are assumed to depend largely on the WTO minimum quota provisions. However, non-OECD countries are expected to continue driving import growth in the next decade. In particular, Near East countries are expected to boost their purchases, including Egypt, which has passed more stringent limitation on rice cultivation, the Islamic Republic of Iran and Saudi Arabia. While still rising, deliveries to African countries are projected to grow at half the rate of the past ten years, a consequence of the expansionary production strategy currently pursued in the region. However, Africa is not foreseen to emerge as a major source of supplies for the rest of the world, as much of the region’s production gains will be needed to cover expanding domestic consumption.
Among traditional rice exporters, Thailand, Vietnam and Pakistan are anticipated to increase deliveries over the decade. By contrast, India is now forecast to limit sales abroad to the high quality basmati rice, while Egypt may turn into a net importer position under its restrictive production policy. China’s exports may also shrink. On the other hand, new countries appear ready to emerge as important suppliers to the world market, namely Cambodia, Laos and Myanmar, where large investments to expand rice cultivation are undergoing. The process would likely be facilitated by the newly implemented ASEAN free trade agreement, which has abated most restrictions on rice movements within the block. Among OECD countries, the United States is expected to export substantially more in 2019.

As already experienced in the past few years, trade in rice may well undergo frequent upheavals associated with changes in government policies. The presence of genetically modified rice in a number of markets could further expose trade to potential disruptions. Based on the current status of research and development, about 15 varieties of GM rice could be grown commercially by 2015, compared with none as of today (Stein and Rodriguez-Cerezo (2009)).

Key issues and uncertainties

Links to energy markets

Cereals are one of the main feedstocks used in the production of ethanol (e.g. maize in the United States and wheat, maize, barley and others in the European Union) but the shift towards second generation biofuels might curb or even reduced the demand for cereals as ethanol feedstock. The biofuel demand of cereals have been included in this Outlook to the available knowledge but the introduction of new biofuel policies or the changing of existing ones can have a considerable impact on the world demand for cereals. In addition, some biofuel policies use tax incentives rather than mandates and thus, link the production of cereal-based ethanol on the price difference to mineral fuels. This increases the price link between cereal
and energy. This adds to the existing link via input costs, especially energy use in agricultural production and fertiliser costs.

129. A new development which could develop rapidly over the projection period is the use of biomass for energy purposes. This could be the production of biofuels (second generation biofuels) but also the use for the production of bio-gas, heat and electricity. The question arises how the biomass is produced, especially in the case of dedicated crops like switch-grass, short-rotation crop rice or green maize it may reduce the availability of land for the production of cereals.

Production uncertainties

130. The values presented here assume normal weather conditions and average yields. Recent experience and expectation result in the question: “What are normal weather conditions?” The high number of droughts in large parts of Australia does question whether this needs to be expected on more regular terms in the future. The impacts of climate change on agriculture (Box 1.4) could change also the medium term outlook, but how and especially in which magnitude remains largely uncertain.

131. The spreading of plant diseases may have adverse effects on cereal production. In recent time the spreading of the stem rust Ug99 from East Africa towards Asia affecting wheat causes concern. It is uncertain, how large the effect on world wheat will be as most of the currently planted wheat has little or no protection against Ug99. On the other hand, plant breeding and plant protection could limit the effects before it has a global impact.

132. The development in plant breeding (Box 5.1) can positively influence the evolution of yields in the coming decade but the propagation of new varieties to a wide spread use in agricultural production takes some years. Through closer interaction and faster information transfer this time could be more reduced in the coming decade. Other technical developments like precision farming can enhance the side-specific optimisation of agricultural production but impacts on world-wide cereal production depend on the speed of the knowledge transfer and availability of investments.

133. Governments, especially in those nations that rely heavily on food imports, reacted to the 2008 price hikes by launching or intensifying food self-sufficiency programmes, a move that was especially manifest in rice-dependent countries. Efforts to promote rice cultivation were facilitated in 2008 and 2009 by the permanence of relatively high world prices. However, there is concern that many rice self-sufficiency programmes could be put in jeopardy in the longer run should world prices fall.

134. The recent price hike also stirred interest of domestic or foreign investors in agriculture in land and water rich countries including Brazil, Cambodia, Ethiopia, Indonesia, Guyana, Madagascar, Myanmar, Nigeria, Sudan, etc. While potentially positive for agricultural production, it may be disruptive for the local economies and harm small farmers and their historical rights on land. Tensions could also arise between the host country and the foreign investors, should the produce be exported, depriving indigenous populations from locally produced food supplies.

Market integration

135. Asynchronous approval of genetically modified (GM) crops and other sanitary and phyto-sanitary border measures could result in trade diversions between regions and also substitutable crops. Especially on the short term this could have large effects although on the medium term new trade equilibriums would establish. Being such an important food staple, the advent of GM rice on markets will pose a series of critical consumer-related issues, but may have also potentially disruptive effects on world trade. Marketing of GM rice may require the segregation by the industry of traditional rice versus GM rice and clear label indications on their GM content.
136. Several important bilateral trade agreements are under negotiation e.g. European Union-India, Canada-European Union. These agreements could enhance trade in cereals between the parties but also divert trade flows. The situation regarding an agreement in the World Trade Organisation (WTO) negotiation remains uncertain and an agreement will affect also world trade in cereals.

**Box 5.1. New crop varieties and high quality seed - keys to enhanced productivity**

In September 2009, the FAO, OECD Seed Scheme, International Union for the Protection of New Varieties of Plants (UPOV), International Seed Association (ISA) and International Seed Federation (ISF) jointly organised the second World Seed Conference in Rome with the key focus on the role of new plant varieties and high quality seed in responding to the challenges facing agriculture in a changing world. The main message emanating from the Conference was that “urgent government measures and increased public and private investment in the seed sector are required if agriculture is to meet the challenge of food security in the context of population growth and climate change.”

Plant breeding is a major factor contributing to increased food security whilst reducing input costs, greenhouse gas emissions and deforestation. Long run data for various crops across different countries suggest that about half the yield increase of around 2% per year has come from plant improvements and half from improved husbandry practices such as better irrigation, use of fertilisers and crop protection. In some cases, the contribution of plant breeding to production growth has been higher. For example, a UK study found that half the yield increase in wheat, barley and oats over the 1947-86 period was due to new varieties, and attributed 90% of the yield increase over the 1986-2006 period to new varieties.

Future developments in new plant varieties are expected to maintain and enhance this trend in yield improvements, thereby helping to mitigate the effects of population growth, climate change and other social and physical challenges. For example, maize was not grown in temperate climates above the 46th parallel before the 1960s; however, with the development of early maturing varieties it is now grown in the south of Sweden. Temperate crops can also be adapted to tropical climates. Sugar beets, which have lower water requirements, higher drought tolerance and shorter growing periods compared with cane sugar, can now be grown in tropical regions such as India.

Concerns have been expressed that global plant breeding capacity has been declining. A recent study by the FAO in cooperation with CGIAR found that plant breeding capacity in most developing countries is not adequate, or sufficiently integrated, to achieve the stated national production goals, leading to a lack of effective access to germplasm and technologies. Participants at the 2009 World Seed Conference recognised the importance of research on genetic enhancement while noting that other technologies, such as quality seed production and seed treatments, contribute substantially to improved yields and capacity building in all these areas is urgently needed in developing countries. It was also noted that plant breeding depends heavily on the conservation of genetic resources and that a multilateral system of access and benefit sharing of plant genetic resources for food and agriculture is necessary to support the global plant breeding process. Moreover, the development of new varieties alone is not enough to enhance agricultural output. Governments need to develop and maintain a regulatory environment that encourages the production and marketing of high quality seed. In developing countries, most threatened by food insecurity, farmers do not have access to improved varieties. In Eastern and Southern Africa, for example, this was attributed to a number of bottlenecks including a lack of market infrastructure and information, poor extension services, seed supply shortages and inadequate credit markets. Several institutional weaknesses were also identified. Few developing countries have well-defined seed development guidelines, the variety release process can be too long, state-controlled seed markets can hinder trade, and a failure to establish accreditation can limit access to international markets.

Notwithstanding, the global seed market continues to grow rapidly and is currently estimated at about USD 37 billion, a threefold increase over the last 30 years. There have been even higher growth rates in many developing countries such as China (with seven fold increase over 30 years), Argentina, Turkey and India. The development of reliable and internationally acceptable certification standards, contributes substantially to the strong growth in international trade and development of seed markets. For 2007, international seed trade was valued at USD 6.4 billion, with Europe, North America and Asia accounting for almost 80% of the total.

More specifically, the adoption of international standards has encouraged the growth of the seed trade by reducing technical barriers to trade, increasing transparency, lowering transaction costs and increasing access to high quality seed. The OECD Seed Scheme is the most widely used global certification system for the export and import of high quality seed, with some 58 participating countries from Europe, North and South America, Africa, the Middle East, Asia and Oceania.

Source: www.worldseedconference.org/en/worldseedconference/home.html
REFERENCES

CHAPTER 6

OILSEEDS AND OILSEED PRODUCTS

Market situation

137. In the last few years, considerable movement has interrupted the historically flat price trend for oilseeds, oils and meals, especially when prices for all three product groups rose dramatically in mid 2008. The price surge was caused by an unusually tight supply and demand situation, spill-over effects from related grain markets as well as a growing importance of biofuel demand and of macroeconomic factors. Even though the rise was followed by a sharp fall in prices towards the end of 2008, values for oilseeds and derived products have since moved at levels above those prevailing prior to the general increase.

138. In early 2009, prices embarked on a new upward trend, mainly reflecting concerns about the progressive tightening of global supplies following the weather related decimation of South America’s soybean crop. Furthermore, demand growth had returned to normal levels (compared to the slowdown at the onset of the global economic crisis), with main importing countries showing robust buying interest. Eventually, the shortage of supplies relative to demand led to record-low stock levels.

139. The ensuing strengthening in oilseed prices lasted until mid-2009, when ample crops from the Northern hemisphere (notably soybeans) started entering the market. With global oilseed production poised to resume growth, prices for oilseeds started to weaken gradually, although those of oils and fats and in particular of oilmeals remained firm. Sustained oilmeal values are explained by sustained Asian and European import demand and the market’s strong reliance on a single type of meal (soymeal) and only one few suppliers (the US). By December 2009, meal prices almost matched the level recorded during the 2008 price peak. More recently, however, due to the prospect of a full recovery in South American soybean production in 2010, meal prices started to ease again.

140. Also, the market for edible oils and fats was characterised by a tight supply and demand situation: in the second half of 2009, limited export supplies and reduced output of high oil-yielding oilseeds coincided with revived growth in global demand for oils from both the food as well as the energy sector. The renewed firmness in crude oil prices contributed to the gradual strengthening in oils and fats values. Unlike meal values, oil and fat prices continued to be firm in early 2010, reflecting the prospect of limited growth in the production and export of palm oil during the remainder of the year, while oil utilization for food purposes was poised to rise further and demand from the biodiesel industry started accelerating in countries enforcing higher domestic biofuel blending rates.

141. The medium-term market projections for oilseeds and derived products presented in this chapter are subject to assumptions of average weather conditions, the continuation of current policy packages (concerning agriculture and bioenergy) and an evolution of the macroeconomic environment that has been described in Chapter 3.
Projection highlights

- Given steady demand growth and strong crude oil prices, prices for oilseeds and oilseed products should remain above long term levels in both nominal and real terms. Given biofuel mandates and sustained food demand in developing countries, vegetable oil prices are expected to increase in nominal terms and be fairly flat in real terms over the Outlook period (Figure 6.1).

- Compared to the 2007-09 average, world oilseeds acreage and production are expected to be 10% and almost 30% higher, respectively, by 2019, based on sustained profitability and yield improvements (Figure 6.2). Global oilseed area expansion is limited compared to the previous decade due to higher marginal costs of area expansion and new constraints coming from environmental regulations in developing countries, as well as sustained profitability of competing crops, mainly maize, in the US.

- At the world level, vegetable oil production should increase by almost 40% over the projection period when compared to the base. The share of vegetable oil consumption used for biodiesel production is expected to increase from 9% for 2007-09 to 15% in 2019, driven by biofuel mandates and consumption incentives in many countries. In non-OECD economies, because of increasing population and income, food use accounts for 90% of the 3% annual growth in vegetable oil demand (Figure 6.3).

- During the Outlook period, annual growth in protein meal consumption is projected at 1% in OECD economies, compared with 3.2% in non-OECD economies based on sustained growth and intensification of livestock production around the world.

- In continuation of past trends, world trade in oilseeds and derived product will be increasingly dominated by a small number of countries, with no more than four nations accounting for about 85% of global oilseed exports in 2019. Vegetable oil imports by China, India and the EU are expected to represent 55% of total world imports. By 2019, palm oil producers Malaysia and Indonesia are projected to represent two-thirds of total vegetable oil exports (Figure 6.4).

Figure 6.1. Oilseeds and oilseed products prices to remain well above long term levels

Source: OECD and FAO Secretariats.
Figure 6.2. Oilseed production to expand

Evolution of global oilseed production over the projection period

Source: OECD and FAO Secretariats.

Figure 6.3. Food use to drive vegetable oil consumption in non-OECD economies, biofuel use to drive consumption in OECD economies

Comparison of average annual growth rates of vegetable oil consumption

Source: OECD and FAO Secretariats.
Market trends and prospects

Prices

142. World prices for vegetable oils should remain well above levels prior to the food crisis in both nominal and real terms (Figure 6.1). Sustained food demand growth in developing countries and ambitious targets for biodiesel consumption, together with strong and increasing crude oil prices throughout the Outlook period are expected to lead to a sustained increase of prices in nominal terms. The pace of increase should be slower in the later years of the Outlook period as the pressure on biodiesel markets becomes lower because of the assumption of second generation biofuels slowly becoming available in the European Union. World vegetable oil prices expressed in real terms should remain fairly flat over the projection period.

143. Compared to the levels prior to the food crisis, also oilseeds and protein meal prices are projected to remain strong over the projection period as global stock-to-use ratios are expected to stay at low levels. In a context of sustained crush demand and increasing production, oilseeds prices are expected to remain about unchanged in nominal terms and to decrease in real terms all over the course of the projection period. In line with other feed commodities, protein meal prices are expected to decrease in the early years of the Outlook period before marginally increasing over the rest of the projection period.

Oilseed production and crush

144. Compared to the 2007-09 average, world oilseeds acreage and production are expected to be 10% and almost 30% higher, respectively, by 2019, based on sustained profitability and yield improvements (Figure 6.2 and 6.5). Global oilseed area expansion is limited compared to the previous decade due to higher marginal costs of area expansion and new constraints coming from environmental regulations in
developing countries, as well as sustained profitability of competing crops, mainly maize, in the US. The yield gap between OECD and non-OECD countries is expected to diminish over the Outlook period. The US should remain the major oilseed producer over the projection period (Figure 6.2) with oilseed acreage remaining constant at about 35.2 Mha as US domestic producer prices for soybean and maize are expected to move together over the projection period.

145. Brazil and Argentina should strengthen their role in oilseeds supply with a combined share of global oilseed production of more than 30% in 2019, compared to about 27% in the base period. Brazil is projected to be the main contributor to area expansion in non-OECD economies although due to increasing environmental limitations plantings should expand at a much slower pace than over the previous decade. Paraguay has been emerging as the third South American oilseeds producer. Driven by sustained high profitability, the country’s area under soybeans is expected to expand to more than 3.2 Mha producing over 8.3 Mt by 2019.

146. China’s agricultural policy doctrine is expected to continue to focus on domestic production of coarse grains. As a result, oilseeds production growth is limited as yields and area are not projected to improve significantly. India is expected to continue its expansion of edible oilseeds production (i.e. this does not take into account the expansion in jatropha cultivation) by adding about 2.7 Mha over the projection period to reach 36 Mha in 2019. Improved yields also contribute to production growth. However, the anticipated annual growth rate of 2.2% over the projection period compares to almost 6% in the past decade, reflecting a comparable slow down in both, yield improvements and area expansion, indicating that investments and public support for and returns from oil crops tend to remain behind those of alternative crops. Oilseed production in other parts of Asia is expected to expand by less than 2% per year.

147. Oilseeds production should increase by almost 30% in the EU over the projection period with yield gains contributing strongly to this increase. Driven by strong prices, oilseed area - mainly rapeseed - is projected to continue to grow over the projection period at a rate of 0.5% per year. The growth should however be slower than over the previous decade where the rapeseed sector developed quickly in response to strong demand from the expanding biodiesel sector. Within the OECD, oilseed production expansion is expected to also occur in Canada and Australia to satisfy both domestic crushing industries and export markets.

148. Driven by strong demand for protein meals from the livestock industry, oilseed plantings and production in the Russian Federation should expand, respectively, at a rate of 1% and 2.7% per year. As export opportunities within Europe have developed over recent years, Ukraine has become a significant sunflower seed producer with compound annual growth close to 15% during 2000-09 and total output exceeding 10 Mt in 2008. Further consolidation and modernization in oilseed production should allow production to continue growing at more than 5% per year reaching more than 15 Mt by 2019.
Figure 6.5. Potential for oilseed area expansion is limited

Comparison of average annual growth rates of oilseed production, acreage and yield

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Source: OECD and FAO Secretariats.

149. With growing demand for oilseeds products, global oilseed crush is projected to continue expanding. It should grow at an average growth rate of 2% compared to 3.8% over the previous decade. This is due to the slowdown in protein meal and vegetable oil demand growth rates compared to the previous decade. Countries oriented towards the export of oilseed products or of biodiesel like Brazil and Argentina are expected to continue to develop their crushing industries with annual growth rates close to 2.5% over the projection period. Oilseed processing in Paraguay has been expanding along with seed production and is expected to grow further, with about 30% of domestic production being crushed in the country.

150. China is expected to continue to favour the imports of oilseeds to capture the value added from processing oilseeds into protein meals and vegetable oils. Its crushing capacity is expected to continue to grow at a rate of 2.2% per year which, however, is significantly below the previous decade. In India, about 80% of the domestic production is crushed; the remainder is consumed directly as food. Direct consumption is expected to fall slightly as the mix of oil crops shifts slowly towards seeds with higher crushing rates. The crushing sector in Ukraine has not quite kept up with seed production and is expected to maintain a growth rate just below seed production, processing 8.2 Mt in 2019.

151. In the US, strong soybean oil prices should be behind higher average annual growth rates of oilseed crush over the projection period than over the previous decade. In the EU, after the strong increase in crushing facilities between 2003 and 2009 due to the emerging biodiesel industry, crush is expected to continue to develop but at a slower pace of 1.3% per year.
**Products production and consumption**

*Vegetable oil*

152. At the world level, vegetable oil production should increase by almost 40% over the projection period. Global production of palm oil remains very concentrated. Malaysia and Indonesia are expected to produce almost 70 Mt in 2019, *i.e.* about 40% of global vegetable oil production. Because of environmental concerns and area restrictions the growth rates are projected below recent trends.

153. In line with the development of their crush industries, the main non-OECD oilseed oil producers, Argentina, Brazil and China, are expected to reduce the increase in their outputs to about 2.5% per year. When compared to the base, the increasing EU oilseeds production and crush capacity are expected to lead to a rise in oilseed oil production of 25% over the Outlook period. Vegetable oil is also produced from other tropical oilseeds as described in Box 6.1.

**Figure 6.6. Vegetable oil use for biodiesel production to increase because of mandates**

Share of vegetable oil consumption used for biodiesel production in selected countries

![Bar chart](chart.png)

*Source: OECD and FAO Secretariats.*

154. Rising *per capita* income and population growth combined with continued growth in non-food uses of vegetable oil are behind the solid vegetable oil demand expected worldwide over the projection period. *Per capita* food consumption is expected to level off in more and more countries due to saturation effects. Overall, the average annual growth rate of global consumption is expected to weaken compared to the past decade, reflecting relatively slower growth in demand from the biofuel industry.

155. The share of vegetable oil consumption used for biodiesel production is expected to increase from 9% during the base to 15% in 2019, driven by biofuel mandates and consumption incentives in many countries, *i.e.* almost 16 Mt of vegetable oil will be additionally used to produce biodiesel over the Outlook period, a third of the global use increase. The biofuel chapter describes in details the evolution of biodiesel markets projected over the Outlook.

156. In the EU, vegetable oil used for biodiesel production is expected to represent 9% of worldwide and 53% of domestic vegetable oil consumption by 2019 (Figure 6.6). Vegetable oil use for biodiesel production is expected to increase by 130% over the course of the outlook period compared to the base.
The strong annual growth rate should slow-down a little toward the end of the Outlook period when second generation biofuels (based on feedstock other than edible crops) are assumed to take-off. The availability of second-generation biofuels is expected to calm down the pressure on edible feedstock-based biodiesel prices and thus on vegetable oil prices.

157. Biodiesel consumption in the US should increase to the mandate set by the Renewable Fuels Standard in 2012. Vegetable oil use for biodiesel production should represent about 9% of total vegetable use after 2012. Argentina is expected to continue developing an export-oriented biodiesel industry. Vegetable oil for biodiesel production is expected to reach 3.5 Mt by 2019. Government targets for domestic biodiesel use are projected to encourage the use of vegetable oil for biodiesel production in Brazil which should account for more than 30% of domestic consumption by 2019. The soybean oil based biofuel industries in Argentina and Brazil account for 60% of the expansion in biofuel use of vegetable oils in non-OECD economies.

158. Malaysia and Indonesia have invested into flexible production structures that will allow channelling more palm oil towards biodiesel production if economically profitable. Currently, biodiesel output is very low, but production is expected to increase over the projection period, mainly to satisfy domestic consumption mandates. Actual outcomes will depend on economic and political conditions. Malaysia also maintains a flourishing oleo-chemical industry that is projected to utilise over 4 Mt per year by the end of the coming decade.

159. Because of increasing population and income, food use accounts for 90% of the 3.1% annual growth in vegetable oil demand in non-OECD economies (Figure 6.3). Growth is strongly concentrated in Asia, with China expected to remain the world leading vegetable oil consumer with an annual growth rate of 3.2% p.a. Vegetable oil market in India is dominated by the food demand for vegetable oils. Despite expansion efforts, vegetable oil production from locally grown crops covers only about 45% of domestic requirements with a declining tendency. In countries where production is strongly driven by the export market, such as the Ukraine or Paraguay, the weight of domestic vegetable oil consumption is expected to fall further in the future.
Box 6.1. Tropical oilseeds and oilseed products

The 2010-19 Outlook covers a wider range of oilseeds and products than previous editions. Traditionally, temperate climate oilseeds, soybean, rapeseed, and sunflower plus tropical palm oil were covered in the Aglink-Cosimo model. Starting with the current edition, the oilseeds complex also includes groundnut, cottonseed, coconut and palm kernel. While the quantities of all of these products are small in a global context they have significance for certain regions, especially tropical island nations. The inclusion of these additional products enhances the coverage of the OECD-FAO commodity aggregate for oil bearing commodities and their processed products especially for tropical countries and regions. Groundnuts are mainly grown in the US, Argentina, West Africa and East Asia. The oil is of high value, mostly used for special cooking applications. Confectionary groundnuts are an important source of fat and protein in many parts of Africa and Asia.

Cottonseeds are a by-product of the cotton harvest, where lint represents the main product. Cotton cultivation is concentrated in developing countries, notably in the higher latitudes of the Asian continent, but is also present in North and South America and Africa. Cottonseeds are crushed as any other oilseed, primarily to obtain oil.

Coconut palms are grown throughout the tropics. The dried flesh of the coconut (copra) is processed for oil and meal. The oil has industrial and human consumption uses and, together with palm kernel oil, stands out for its high melting point. The meal is fed to animals. Coconuts play an important role in the culture and economy of coastal areas in many tropical countries.

The Philippines are by far the largest producer of copra and its products. It is projected to produce 1.6 Mt in 2019, up from 1.4 Mt currently. Coconut oil accounts for more than 90% of the country’s vegetable oil production. Furthermore, the oil is expected to play an increasingly important role as biofuel feedstock. Other notable producers are Indonesia and India. Coconuts are processed all around the tropics where they play an important role in the rural economy. In the least developed countries of the Oceania region, coconut oil accounts for about one third of local oil production, copra meal for over 80% of total protein meal production. At the global level, the share of global coconut oil production in total vegetable oil production is currently about 2.4% and the share of copra meal in total protein meals production stands at 0.8%.

Palm oil is one of the world’s leading vegetable oils, produced from the fruits of the oil palm. These fruits contain a kernel which is also processed into an oil and a protein-rich meal. The oil is mostly used for industrial applications; the meal is fed to animals. Indonesia and Malaysia are the dominant producers. Palm kernel oil and meal are exported to Europe and Asia. Malaysia also maintains a specialised chemical industry for further processing of palm kernel oil.

Palm kernel meal and oil are co-products of palm oil, Malaysia and Indonesia are the leading producers. Combined they currently produce about 4.5 Mt of palm kernel oil, which is expected to grow to 6.3 Mt. Palm kernel oil production currently represents almost 4% of total vegetable oil production. Palm kernel meal has also currently a share of 4% in total protein meals production.

Protein meal

160. The global livestock industry is expected to develop over the course of the projection period leading to a 25% growth of global demand for protein over this period when compared to the base. As OECD livestock industries are mature and the share of protein meals in animal feed rations is not expected to move significantly in most OECD countries over the projection period, the average annual growth rate of protein meals use should remain lower than over the previous decade.

161. However, in the US, after a drop between 2006 and 2008 due to high meal prices relative to other feed grains and the increasing availability of dried distillers’ grains, protein meal use is expected to increase at a rate of 1.6% per year. By 2016 meal consumption in the US will return to the level of 2006. Dried distillers grains, are expected to replace almost 8% of protein meal consumption in the US towards the end of the projection period.
162. As livestock industries continue to intensify but at a slower pace than over the previous years, annual growth in meal consumption is expected to average 3.2% in non-OECD countries, about half the previous decade’s growth rate. Surpassing the EU in 2012, China is expected to become the leading protein meal consumer. Brazil is also projected to see an increase in protein meal use of more than 30% over the projection period compared to the base. In Paraguay, more than half of local meal output is exported; the cattle oriented domestic livestock industry consumes the remaining amount.

163. In India, protein meal output should be more than sufficient to cover the domestic feed market, leaving about 5.5 Mt for the more lucrative export market. Oilseeds’ processing in Ukraine has turned into an export oriented industry. Local consumption of meal accounts for only about 25% of domestic output. With feed demand and production growing at similar rates, that share is expected to remain unchanged during the outlook.

**Trade in oilseeds and products**

**Oilseeds**

164. Oilseed trade is expected to grow by more than 26.5 Mt over the outlook. World oilseed trade should continue to be dominated by few major market players: the US, Brazil, Argentina, Canada and increasingly Paraguay. US exports are determined by the relative development of crushing facilities and oilseed production. Their comparable development is anticipated to lead to stable oilseed exports over the projection period at about 38 Mt on average. Despite the rapid development of its crushing industry, Brazil is expected to affirm its position as the global trade growth leader. Over the Outlook period, almost 70% of the total growth in oilseed exports is projected to originate from Brazil, growing from 26% of global exports over the base to 35% in 2019. Brazil should become the largest oilseeds exporter surpassing the US in 2018.

165. The differential export tax system in Argentina continues to favour domestic processing of seeds and exporting oilseed products rather than exporting oilseeds. It favours even more exports of biodiesel. As a consequence, total oilseed exports are expected to diminish over the projection period at a rate of 3.5% per year. Paraguay is an emerging exporter of oilseeds and products. Its seed exports are projected to reach over 5.5 Mt in 2019. The processing industry is mostly export oriented, but is small in size and is not yet a major player on the global scale. Traditionally, India does not trade in oilseeds. Prohibitive tariffs prevent imports and the domestic market absorbs all domestic production.

166. Within the OECD, Canada remains the second largest oilseed exporter. Exports are projected to remain stable over the projection period because of the development of the Canadian crushing industry in line with increasing oilseed production. The fast growth of the Ukrainian seed production is projected to provide the country with a growing export potential of almost 5 Mt over the Outlook period.

167. China and the European Union are the major oilseed importers. Because of the expansion of the Chinese crushing industry over the projection period, Chinese oilseed imports are expected to increase by 13 Mt accounting for most of the global increase in imports over the projection period when compared to the base. Despite the expansion of domestic oilseed production, mainly rapeseed, the European Union should remain a strong and stable importer of oilseeds over the outlook period.

**Vegetable oil**

168. World vegetable oil trade is projected to increase over the projection period as production in the main consumption regions is not anticipated to keep up with demand. Trade is projected to increase to reach 77 Mt in 2019, 40% higher than the base level. World vegetable oil exports are very concentrated with Indonesia and Malaysia providing two-thirds of shipments. Strong demand in India, China and
Europe support their expansion in trade to over 50 Mt by 2019. By 2019, Argentina is expected to produce almost 6% of the global vegetable oil and to be the third largest exporter with a share of 8.5% of total exports. Its differential export tax system favours exports of biodiesel and oilseed products rather than oilseeds exports. In Ukraine, vegetable oil production continues to grow leading to exports of 3 Mt over the coming decade.

Due to biofuel consumption incentives and mandates being in place in many countries, vegetable oil trade will be increasingly influenced by biodiesel markets on both the exporting and the importing side. To meet both industrial and traditional vegetable oil demand, EU imports are expected to increase by almost 75%, becoming the leading vegetable oil importer after 2011. Income and population growth support a strongly expanding vegetable oils market in India which has to import more than 11 Mt in 2019. Imports by the three dominant trading countries (EU, China and India) are expected to represent 55% of total world imports.

Protein meal

Over the Outlook period, because of the slowing of global protein meal use, the protein meal trade growth rate is expected to fall to about 2% per year, significantly lower than over the previous decade. Argentina is expected to strengthen its position as the largest protein meal exporter in the world because of its well developed, efficient crushing industry and small domestic market. The differential export tax system affects the exports adversely in general, but provides a relative advantage to the exports of processed products. Argentina should account for more than 40% of global exports by 2019.

Brazil is expected to remain the second largest protein meal exporter. Exports originating from Brazil are expected to increase by almost 20% over the course of the outlook period despite an increasing domestic consumption. As their domestic crush industry develops US protein meal exports are projected to expand over the projection period at a similar rate as over the previous decade.

The expansion of the Indian livestock industry will keep pace with the production of protein meals, limiting the country’s annual meal exports to nearby destinations in South East Asia (where it enjoys a competitive advantage) to about 5.7 Mt. Annual protein meal exports from the Ukraine are projected to grow from 1.7 to 2.7 Mt by 2019 because the processing industry outpaces feed demand and the country is well placed as a supplier for the growing feed markets in the Middle East and Western Europe.

The European Union is projected to keep its position of principal protein meal importer over the Outlook period. Because of increasing domestic rapeseed production and the development of new crushing facilities, oilseed meal imports are expected to remain stable over the course of the projection period. In China, meal demand should be mostly satisfied by domestically produced meal, as well as through an expansion in meal imports. They should reach 7 Mt by 2019.

Key issues and uncertainties

A number of issues and uncertainties that are embedded in the projections presented in the OECD-FAO Agricultural Outlook are discussed in this section. Obviously all these uncertainties are inter-related and changes may also arise in light of developments in other sectors of the economy.

Development of the biodiesel sector

Since the early 2000s, vegetable oil-based biodiesel production experienced a considerable expansion. Increased demand for oils and fats from biodiesel producers became one of the driving forces of the global vegetable oil market - with repercussions for the oilseed complex as a whole as well as marked
cross-sectoral linkages (notably in the form of competition for land with maize, another highly demanded biofuel feedstock).

176. Any deviation from current national bioenergy policies and investors decisions may affect the biofuel demand for vegetable oil and thus the global oilseeds and oilseed products market. This was evident from mid-2008 onward when weaker energy prices together with weaker policy support for biofuels and sluggish private investment, caused a slow-down in the expansion of biofuel production, which contributed to the sharp drop in world prices for vegetable oils and fats. Conversely, the renewed firmness in mineral oil prices during the second half of 2009, along with the implementation of higher biofuel blending rates in 2010 triggered acceleration in oil and fat demand from the biodiesel industry. Both factors were contributing to the recent strengthening in world prices for oils and fats. For a more extensive treatment of the major issues and uncertainties associated with the expansion of biofuel markets please refer to the “Biofuels” chapter of this publication.

Supply and demand concentration

177. The global market for oilseeds and derived products is characterised by a high degree of concentration. Today, soybeans account for well over half of global oilseed output, with production concentrated in just three countries. Similarly, palm oil occupies a key role in global vegetable oil production, with the bulk of output stemming from two countries. The potential for further expansion in the production of oilseeds and oil also remains strongly concentrated in a few regions: the global market will depend heavily on South America and Southeast Asia for additional supplies of respectively, soybean and palm oil. At the same time, the growth potential in these areas could be increasingly constrained by resource limitations and environmental concerns, a prospect that introduces considerable uncertainty into the global market.

178. Furthermore, as far as international trade is concerned, exports of the worlds’ most widely shipped oilseeds, oils and meals tend to be dominated by no more than two or three nations. Given the size of production and exports by the countries in question, any weather anomalies, important shocks to their economies or radical policy decisions would have huge consequences on markets and world prices for oilseeds and oilseed products. Also on the demand side, consumption growth tends to be heavily concentrated in a few, import dependent countries, in particular China and India, which can again lead to increased market instability as any unexpected developments in these countries would strongly affect the global market.

Sustainability issues

179. Concerns about the environmental and/or social sustainability of current crop production methods are voiced by society in many countries and involve annual and perennial oilseeds in developing and developed nations. Large scale palm oil plantations in Asia and extensive soybean cultivation in South America, for example, are increasingly facing challenges in this regard.

180. Environmental issues also started playing a prominent role in the discussion on how agriculture should contribute to mitigating climate change and on ways of adapting to it. Policy makers and the private industry in many countries - including producers as well as consumers of oilseeds and derived products - started paying more attention to the problem and efforts to identify appropriate responses are increasing. An array of measures can be conceived: from bans on deforestation in high conservation value areas, to voluntary or compulsory production restrictions in environmentally sensitive areas, to general requirements regarding the application of good agricultural and social practices in production and processing, to the certification and preferential treatment of sustainably produced products. When
introduced on a larger scale, such measures could lead to gradual shifts in oilseed production patterns as well as global trade flows.

181. In recent years, a number of initiatives have been launched by the private sector for application on a voluntary basis. In particular, commercial production and global marketing of palm oil produced in South East Asia following specific sustainability standards is slowly taking hold and the soybean industry in parts of South America is about to embark on a similar path. The speed and direction, and thus the likely market impact of on-going and future initiatives in this field remain difficult to predict.

**Rising demand for new oils with special properties**

182. In recent years, the production of oilseeds and oils featuring particular traits required by the industry for special food and non-food uses started growing in a number of mainly developed countries - a development supported by new genetic engineering techniques that allow cost-effective modification of planting materials. The trend applies in particular to vegetable oils with special nutritional profiles, notably regarding the trans-fat content and fatty acid composition, which have become increasingly important to health conscious consumers. Relatively small but lucrative markets for such products are beginning to emerge, especially among developed countries.

183. The further evolvement of the market for specialty oils depends on a variety of country specific factors of a technical, economic, regulatory and social nature, which implies considerable uncertainty in any projections. A continuation or intensification of recently emerged trends could eventually lead to adjustments in the global pattern of oil and oilseed production and trade, especially if the health concerns currently present in developed countries should start spreading to the developing world.
CHAPTER 7  
SUGAR

Market situation

184. The world sugar market is experiencing considerable turbulence and stress at the start of the Outlook. The sugar market is currently facing a second year of global deficit with a wide gap remaining between world consumption and production (that has reduced stocks to very low levels). World sugar prices have rallied strongly in response to tightening supplies, and rising imports, to reach 29 year highs in February 2010 (Figure 7.1). Prices have since fallen back to around the pre-peak levels of mid-2009 on expectations of improved supply prospects, particularly in Brazil. The past several months have also witnessed considerable volatility in the white sugar premium. The premium advanced rapidly in the second half of 2009 on fears of low stocks and tightness of export supplies of white sugar to reach over USD 146/t in January 2010, the highest nominal margin between raw and white sugar prices since July 1995.

185. While part of the cause of the global supply shortage can be assigned to bad weather in key producing countries, such as Brazil and India, reduced poor incentives for producers were also partly to blame. World prices of sugar, historically one of the most volatile of all commodity markets, have been out of sync of late with those of the major temperate zone crop commodities. For instance, world sugar prices were low in 2007/08 when other commodity prices surged to historical peaks and then reached historical highs in December 2009, while the others declined. The fact that sugar prices did not rally with other crops in 2007/08 sent a clear signal to farmers at the time to switch out of sugar into other production. This contributed to a collapse in production and the world shifted to a global deficit between production and consumption in 2008/09. Initially stocks were drawn down to buffer the production shortfalls and this tightening of supplies set the stage for the eventual surge in prices. However, the rise in prices in late 2009 came too late to affect many planting decisions in the 2009/10 crop year (1 October to 30 September), slowing the global production response. As a result, it is now unlikely that production will be able to respond fully to the current high prices before 2010/11 (Figure 7.1). Consecutive sugar deficits over the past two years have lead to sharply lower global stocks at the commencement of the Outlook and a sharply lower global stocks-to-use ratio, which should continue to be supportive of market continuation of relatively high prices, at least in the near term.
Figure 7.1. Consecutive sugar deficits set stage for price surge in 2009

![Graph showing consecutive sugar deficits set stage for price surge in 2009.]

Balance is annual surplus or deficit for crop year Oct/Sep.

*Source: OECD and FAO Secretariats.*

**Projection highlights**

- World sugar prices are expected to remain volatile over the coming decade and to be shaped by policy driven market and trade adjustments in Europe and North America, the continuing sugar production cycle in countries of Asia (primarily India and some neighbouring countries), and the extent to which Brazil’s large sugarcane crop is allocated into ethanol production, influencing sugar export availabilities. World sugar consumption continues to grow but is dampened at the start of the Outlook by the current high prices and the lingering effects of the global recession. Demand then strengthens in following years with economic recovery leading to some rundown in sugar stocks by the end of the projection period that help to lift prices by 2019/20.

- Projected sugar prices to 2019/20 are, nevertheless, lower than the near record levels attained at the start of Outlook, but still exceed the levels of the previous decade. The world indicator price in nominal terms for raw sugar in nominal terms (Intercontinental Commodities Exchange Contract No. 11, spot, fob Caribbean ports) and white sugar price (White Sugar Futures Contract No. 407 price, London Euronext, Liffes market, London Contract No. 407, Europe), are projected at USD 372 per tonne and USD 439 per tonne, respectively, in 2019/20, a decline of around 5-7%, when compared to the average for 2007-09 (base period) (Figure 7.2). World sugar prices in real terms (once adjusted for inflation) are expected to continue their long term decline, but at a slower pace (Figure 7.3).

- The margin between raw and white sugar prices, or the white sugar premium, should narrow in the near term, as export availabilities and the trade balance for white sugar improves. The premium is expected to average nearly USD 67/t over the projection period.
Figure 7.2. Nominal sugar prices remain variable and average higher than the last decade

![Nominal sugar prices graph]

USD/t


White sugar (b)

Raw sugar (a)

White premium

a) Raw sugar world price, ICE Inc. No 11, f.o.b., bulk spot price, October/September.
Source: OECD and FAO Secretariats.

- Larger sugarcane production should account for the bulk of the growth in sugar output. The world sugarcane crop is projected to expand by 32%, whereas that for sugar beets actually contracts slightly by around 7% by 2019/20, when compared to the base period. World sugar production is projected to increase to by some 39 Mt or 24% in 2019 above the average level for the base period. The longstanding production cycle in some countries of Asia, an important dynamic in the world market, will influence the growth in, and pattern of global production in particular years.

Figure 7.3. World prices to trend lower in real terms

![World prices graph]

USD/t


Raw sugar (a)

White sugar (b)

USD/t


a) Raw sugar world price, ICE Inc. No 11, f.o.b., bulk spot price, October/September.
Source: OECD and FAO Secretariats
World consumption is expected to grow relatively fast, averaging 1.8% p.a., to 2019 to reach about 198 Mt in 2019/20. The fastest growth in use is expected in the developing countries, whereas OECD countries experience only slow growth in sugar disappearances to 2019/20.

Low global stocks in 2009/10 are rebuilt in the early years of the Outlook period as world production outpaces the growth in consumption in response to the current higher prices. The global stocks-to-consumption ratio rises from a low 39% in 2009/10 to 44% by 2012/13, and then gradually declines to 38% by 2019/20 (and below the average of 45% for the last decade), as steady consumption growth eats into the surplus and as additional sugarcane (and beet in some countries) is allocated to ethanol production (Figure 7.4).

The non-OECD region’s dominant share of global production, consumption, and exports increases further by 2019/20 to reach new records of 81%, 77% and 89%, respectively (Figure 7.5). Brazil is the world’s largest producer and exporter with trade projected to increases by 41% to 2019/20, when compared to the base period, and accounting for 50% of global trade. Brazil together with Thailand, Australia and South Africa, collectively account for most of the growth in world exports (Figure 7.6). Imports remain more diversified over a larger group of countries, but with much of the growth accounted for by the EU, the United States and countries in Asia, particularly India and China. India’s imports are the largest over the projection period, but remain periodic and are essentially driven by its longstanding production cycle. Imports by the Russian Federation continue to decline in favour of domestic production (Figure 7.7).

Figure 7.4. The global stocks-to-use ratio to rise in near term and then decline

Source: OECD and FAO Secretariats.
Market trends and prospects

Prices

186. Raw and white sugar prices are expected to continue to be variable over the projection period and this situation will also be reflected in the white sugar premium. This arises from the fact that global production continues to fluctuate due to weather and changes in relative prices, while demand grows steadily and remains fairly inflexible. World prices of both sugars are at historical highs at the start of the Outlook with consecutive years of a large global sugar deficit. The price rally that started in late 2009 is being underpinned by strong import demand from India after a sharp fall in production and from a number of smaller importers as well in a general context of lower export availabilities from Brazil and Thailand, the two largest exporters. The current high prices can be expected to lead to a supply response at some point. As the high prices occurred too late to allow most growers to adjust production for the 2009/10 crop year, a more complete supply response is not expected to occur before 2010/11. Once production adjusts, the world sugar market is likely to switch from a deficit to an overall surplus situation, increasing export availabilities and relieving some of the current price pressures.

187. Notwithstanding a sharp decline in world prices from the initial high starting levels, and their continuing variability in response to changes in the market balance and other influences, prices are expected to average higher over the next ten years than the depressed levels of much of the last decade. Steady growth in global sugar consumption along with expanding demand over time for alternative products of sugar crops such as biofuels along with rising costs in major supplying countries are expected to maintain sugar prices at elevated levels or on a higher plateau, in nominal terms, relative to those at the turn of this century.
188. The sugar price projections are also predicated on certain developments taking place in Brazil. Brazil’s role in the world sugar economy has grown rapidly over the last twenty years and it has now attained the status of a “price setter” on the world market. Brazil’s sugarcane crop is split between the co-production of sugar and ethanol based on sugarcane juice. As most sugar mills in Brazil can produce both products, this gives the country considerable flexibility to switch production between the two end uses depending on relative prices and mill profitability. The world price projections assume that Brazilian sugarcane production, sugar output and exports will all expand strongly over the medium term increasing Brazil’s share and dominance of the world sugar market. However, it is also anticipated that relative profitability will favour ethanol production over sugar, on average, in the decade ahead. As a result, the share of the larger cane crop that is allocated to sugar production, currently less than 50%, is expected to continue to contract over the period as ethanol production increase to 55 bnl, for domestic use and export by 2019-20. However this development is not expected to constrain sugar production and exports in coming years.

189. The margin between raw and white sugar - the white premium - is expected to narrow over the near term as additional white sugar supplies become available from traditional exporters and from an increasing number of destination and toll refineries in North Africa and the Middle East. These refineries are filling the gap left by the withdrawal of large EU white sugar exports from the world market with the CAP sugar reforms of 2006, and can be expected to have a growing demand for raw sugar for further refining into white sugar for domestic use and export. The white sugar premium is expected to reflect mainly the cost of additional processing and refining of raw sugar and transport cost in moving sugar from origins to destinations.

![Figure 7.6. Sugar exports remain highly concentrated and dominated by Brazil](image)

Source: OECD and FAO Secretariats.

**Production**

190. Sugar crops in most of the world’s leading producing countries are projected to expand in 2010/11 in response to the historically high prices switching the world market balance from a deficit to a surplus and lowering world prices. Further growth in production to just over 200 Mt is projected for
2019/20 to meet the strong increase in demand for sugar and other uses. Nearly all the increase in sugar production will come from larger sugarcane harvests, rather than sugar beets, expanding the share of cane sugar in the world total (Figure 7.8). Amongst the world’s sugar producers, developing countries will account for essentially all of the growth in output, and with a major share coming from Brazil. Brazil’s dominant role in the world sugar economy is expected to increase with production expanding by an additional 11 Mt or 31% to 2019/20, when compared with the base period. Despite the higher output from Brazil and other leading producer such as Thailand, Australia and South Africa, the pattern of global growth and production in particular years will likely remain highly variable. The main reason for this is the production cycle in certain countries of Asia, particularly in India. Sugar production in India is subject to violent swings every 4-5 years as a result of cyclical factors and along with similar, albeit less pronounced, cycles in China and Pakistan, these contribute to periodic sugar market imbalances, trade adjustments and world price turbulence, as was the case in late 2009. These cycles are expected to continue to influence world markets and result in price variability over the coming decade. India’s production, although variable, is projected to increase over time to reach nearly 32 Mt in 2019/20, or 52% higher when compared to the low production in the base period. Chinese sugar production has grown rapidly in recent years under the stimulus of high support prices and strong domestic demand. However, the rate of growth of sugar crops is expected to slow in coming years and to rely mainly on yield growth rather than area expansion. China’s sugar production is expected to reach 18 Mt in 2019, some 28% above the average level for 2007-09. Sugar production in Pakistan is projected to increase by over 21% between 2007-09 and 2019/20, but to display continuing variability over the period.

Figure 7.7. Imports are more diversified and lead by India, EU and US

In terms of other countries, production in the EU is projected to stabilise at around 14.4 Mt to 2019/20 as production quotas have been reduced by over 5 Mt to equilibrate the domestic market in a context of stable consumption, fixed exports and rising imports. Sugar production in Australia is also expected to show little change from current levels due to continuing pressure on land availability for cane production. Despite some increase in sugar support prices and a guaranteed share of the US market, US farmers are not expected to expand the area harvested of sugar crops to keep pace with the anticipated increase in domestic demand due to high returns from competitive crops. Rather, they should focus on maximising higher margins and production remains below the 85% minimum allotment level of domestic
consumption in the FCE Act of 2008, over the projection period. Similarly, production in Mexico is expected to grow only slowly despite further investment in the sector and the prospects of higher and more certain returns from sales to the US market, following full market integration under NAFTA.

**Figure 7.8. Larger sugarcane production accounts for most of the higher sugar output**

![Graph showing sugarcane production trends](image)

Source: OECD and FAO Secretariats.

192. Production in Mexico is projected to rise by about 4% above the base period to 5.7 Mt in 2019/20. In the case of Thailand, sugar production has shown considerable volatility over the last decade, as a result of variable weather, changing support policies and competition for resources from other crops such as cassava, fruits and vegetables. Projected growth in the bio-ethanol is not expected to limit sugar output, as it is based on molasses, a by-product of sugar processing, as the main feedstock. Sugar production is projected to increase by 14% to 9 Mt in 2019/20, compared to the base period, in order to meet rising domestic and regional demand.

**Consumption**

193. While consumption growth has been slowed at the start of the Outlook, faster growth is expected in following years once the recession recedes and economic recovery becomes well established around the world. In contrast to more variable production, consumption has exhibited steady, year-on-year growth and remains the main driver of the world sugar market. Global sugar consumption is projected to increase by 23% or 38 Mt by 2019/20. The developing countries account for the major share and growth in world sugar use, due to a combination of faster population growth, changing diets and rising incomes; albeit with considerable variation between individual countries. The global share of sugar off take in this group of countries is projected to increase from 73% in 2007-09 to 77% in 2019/20 and with growth in use to average over 2.2% p.a. The fastest growth in consumption is expected in the growing sugar deficit region of Asia. In contrast to these demand trends, sugar consumption in the OECD area is expected to remain relatively stable to 2019/20 as population growth declines and with dietary shifts away from sugar due to increasing health awareness and concerns with obesity and related issues.
Trade

Exports

194. World sugar exports remain highly concentrated in a few countries and are increasingly dominated by a single emerging economy. Brazil’s sugar exports which have grown markedly since the beginning of this century have outpaced those of all other exporters to become the leading world exporter of raw and white sugar. Brazil is expected to boost exports in the near term as it responds to the high prices at the beginning of the Outlook. In following years exports are projected to increase to 32 Mt in total, and comprising 20 Mt of raw sugar (up 32% from 2007-09) and 12 Mt of white or refined sugar (up 70% from 2007-09), respectively, by 2019/20 (Figure 7.9). At the same time Brazil’s dominant share of world exports are projected to grow from 413%, on average, over the base period to 50% in 2019/20. The growing concentration of sugar exports is not without risks for sugar users and may be another factor contributing to future market volatility as world supplies depends increasingly on the growing conditions of a single country. One possible counterweight is that a majority of Brazil’s sugar cane is now used for ethanol production and many mills have the capacity to produce both sugar and ethanol. This capacity to switch between end uses of sugarcane should help assure sugar production and export availabilities when relative prices favour sugar over ethanol.

195. The other major sugar exporters of Thailand, Australia and South Africa and several smaller suppliers such as Argentina, Guatemala are also expected to follow suite and expand their shipments to the world market over the medium term. Thailand’s sugar export should reach nearly 6 Mt, mainly in the form of raw sugar, with the bulk of the shipments likely to be directed to higher priced regional markets. With average seasonal conditions, Australian sugar exports, also mainly of raw sugar, are projected at between 3.5 to 4.2 Mt in 2019/20. Despite rising consumption, increased sugar production in Argentina leads to higher sugar exports that reach over 0.6 Mt in 2019/20. The EU sugar industry has been transformed since 2006 from a major into a minor player in the white sugar export trade, due to the imposed limit on subsidised exports of 1.3 Mt.
Following the reform of its sugar sector over four years from 2006, the EU’s role in the world sugar economy has changed dramatically as it has emerged as a large, price insensitive, importer of essentially raw sugar to meet domestic food requirements (Figure 7.10). Sugar imports may slow somewhat in 2009/10 in the context of high world prices that make the Community a less attractive destination for exports and with a bumper domestic harvest of sugar beets available to boost local production. Excess domestic production and high world prices encouraged the EU to increase exports of out-of-quota sugar in 2009/10. Once world prices retreat from current levels, the relatively high prices in the EU, even after a 36% price cut as part of the sugar reforms, will make it an attractive destination once more. EU imports from all origins, including under preferential access agreements, such as those with the EBA, EPA and the Balkan countries, and other arrangements are projected to reach 5 Mt by 2019/20, making the European Union a large sugar importer.

Source: OECD and FAO Secretariats.
Figure 7.11. Rising sugar consumption in the United States fed by import from Mexico

![Graph showing rising sugar consumption in the United States fed by import from Mexico.](image)

Source: OECD and FAO Secretariats.

197. With the full unification of the United States and Mexican sugar markets under NAFTA and the adoption of the higher sugar price provisions of the FCE Farm Act in 2008, the US has become an attractive destination for Mexican sugar exports (Figure 7.11). At the same time, the US market remains heavily insulated from the world market by prohibitive over quota tariffs and safeguard measures with imports restricted to the minimum tariff rate quota (TRQ) under the WTO and Central American Free Trade Agreement (CAFTA) to around 1.2 Mt p.a. Total US sugar imports are projected to reach 3.4 Mt in 2019/20, but with little growth in domestic production, these imports do not trigger the Feedstock Flexibility Program (FFP - a sugar to ethanol programme) under the FCE Act. This program is intended to remove surplus sugar imports from the market to ensure US market prices remain above higher support levels, without accumulating stocks. Within NAFTA, Mexico represents the logical source to supply of additional sugar to the US market. Mexican exports to the US market are projected to expand in response to the higher US market price and as high fructose syrups (HFCS), sourced from US imports and domestic production displace sugar in domestic beverage and food manufacture. Backfilling from the world market is used periodically by Mexico to assure domestic requirements in periods of reduced production. The other member of NAFTA, Canada remains open to raw sugar imports to supplement low domestic production for further processing into white sugar and for mainly domestic use.

198. In terms of sugar importers outside the OECD, the Russian Federation occupied the position of the world’s largest sugar importer until 2007 when it was surpassed by the EU. Russia was initially an importer of white sugar but switched in the early 1990s to imports of raw sugar for refining by local mills when the domestic sugar beet processing season is over. Russia’s domestic sugar beet production has been increasing in recent years with tariff protection ensuing higher prices and this has led to steady import replacement in a context of slow growth in already high per capita consumption. These trends are expected to continue over the coming decade with raw sugar imports declining to a level of around 2 Mt in 2019/20 (Figure 7.12).
Within Asia, China has been experiencing strong demand for sugar for direct food use, albeit from relatively low per capita consumption levels, and for use in food processing and the manufacture of food preparations. Tightening government controls on the production and use of artificial sweeteners is expected to boost sugar consumption further in China with sugar use growing by nearly 2% per year to reach over 20 Mt in 2019/20. This level of use would imply rising imports that will exceed the tariff rate quota of 1.95 Mt established when China joined the WTO. With substantial year to year swings in production as a result of its sugarcane production cycle, India is required to periodically turn to the world market to dispose of surplus sugar or to make large scale imports. The latter was the case for 2009/10, when annual production fell for a second year and stocks were unavailable to buffer the shortfall, leading to estimated imports of 6-7 Mt. With a continuation of the production cycle, large, but irregular, imports are anticipated on a periodic basis over the projection period. These are projected to reach around 6 Mt in 2019/20, making India the largest sugar importer. In Indonesia demand is expected to continue to outpace the growth in domestic production, leading to additional imports that rise to 2.2 Mt, or by over 51%, by 2019 when compared to the base period.

**Key issues and uncertainties**

The sugar projections discussed in this chapter are a conditional scenario based on a number of assumptions regarding the evolution of the macroeconomic environment and exchange rates, a continuation of existing agricultural policies, average weather conditions, longer term productivity trends and the absence of market shocks. Should any of these assumptions change, the resulting set of sugar projections would also be different. A number of major uncertainties remain. At the beginning of the Outlook, the lingering effects of the global financial market turmoil and the deep economic recession are intermingled with the onset of a strong recovery in the large developing countries and a more hesitant or fragile turnaround in much of the OECD area. At some stage, many OECD countries will need to implement exit strategies to address excessive budget deficits and restore fiscal balance and unless offset by growth in private demand this can be expected to impact the national economies and agriculture as well. These developments are likely to slow growth in consumption and trade, while other external factors such as oil and energy prices, freight rates, inflation, interest rates and access to credit and exchange rate changes can also have profound impacts on the competitive positions of national sugar industries and their
trade performance. Among other uncertainties are future changes in sugar policies and the eventual outcome of the current Doha Round of international trade negotiations. All of these factors play an ever increasing role in sugar price formation. The sugar market, therefore, can be expected to face a period of continuing price instability and uncertainty given a growing number of price determinants in addition to traditional market fundamentals.

**When and where will the supply respond to high prices?**

201. World sugar prices reached historical highs in later 2009. History suggests that a sustained period of high prices at the beginning of the Outlook can be expected to trigger a supply response at some point in time and this will force prices down from current levels. One question is, when and where will this take place? As noted, the high prices of late 2009 are thought to have come too late to affect many producers planting decisions for the 2009/10 season. Most commentators now expect sugar supplies to respond at the earliest in 2010/11 (Figure 7.1). Having answered “when?” the other part of the question is “where” will the response come from? In essence, the supply response should take place in those countries where local sugar prices have been influenced by the high prices on the world market. This suggests that a supply response will occur not only in exporting countries open to world markets, but also in the importing countries that operate behind trade barriers such as tariffs that allow some pass through of high world prices to domestic producers to increase production incentives. With sugar prices currently out performing most other crops, there will be a strong incentive to plant sugar crops in 2010/11.

202. In terms of the major exporters, Brazil can be expected to have additional production available, as in past years, although the credit crunch has slowed investment in new mills and plantings. On the other hand, if high sugar prices are sustained they will offer greater return to Brazilian mills than ethanol leading to some switching of cane use in favour of sugar production. Another exporting country with large scale expansion potential, although not of the same order of magnitude as Brazil is Thailand, provided returns from sugar remain more attractive than other crops. With both the Australian and South African sugar industries facing constraints on expansion, higher prices will provide some temporary relief and enhanced profitability. However, neither of these industries is likely to be a major source of additional global sugar supplies. Although the EU could expand production as was the case in 2009/10, exports are technically constrained by a WTO ruling.

203. On the importers side, a number of relatively small producers such as Indonesia and Vietnam could also expand production to some extent in the face of high world sugar prices. Similarly China has seen a rapid increase in output in recent years and could see some rebound in production, along with Pakistan, if producers have the right price incentives. However, of all the importers, the country with the greatest potential to boost production without additional investment is India. It suffered a major downswing in production in 2008/09 to around 16 Mt and has shown in the past it has the capacity to produce around 30 Mt. However, whether Indian farmers exploit this potential to its fullest will depend on good weather and high relative returns for cane versus competing crops such as rice. If India’s response is only average, overall supply response may be sufficient to tilt the world into a small global surplus which would not be sufficient to fully rebuild depleted stocks. In this situation, high prices will need to be maintained to bring demand into line with the available supply. Should the response be even lower, prices can be expected to remain at elevated levels until 2011.

**Is there a counterweight to Asia’s sugar production cycle?**

204. There exists an important dynamic that lies at the heart of the world sugar economy: the longstanding production cycle in some countries of Asia (India, China and Pakistan), but predominately in India. These regular cycles are a leading cause of world market imbalances and along with widespread policy distortions, result in the price turbulence that is a periodic feature of the world sugar market, as
witnessed again in 2009 (Figure 7.13). There are two main reasons for India’s widely fluctuating production - weather conditions or the timing of the arrival of the monsoon season and government sugar pricing policies. While little can be done to influence the weather, government policies could be made more effective.

205. The Indian government intervenes heavily in the domestic sugar market in many ways, including the setting of sugarcane prices. Administered sugarcane prices set to guaranteed farmers’ income are often in conflict with market determined sugar prices. This situation, in periods of large domestic crops and low sugar prices, can squeeze sugar mills profitability and their capacity to pay growers for the sugarcane they deliver (leading to large cane payment arrears or IOUs by the mills), that triggers an exodus from sugarcane production to more profitable alternative crops. This action then signals the next round of the sugar production cycle. Similar, although less pronounced, production cycles are a feature in China and Pakistan as well. Because of the large scale of India’s production and consumption, there is a clear link between the sugar production cycle in Asia and the global supply and demand balance, with the former accounting for most of the global swings or market imbalances. These cycles, which appear to have increased in amplitude over the historic period, are projected to continue to influence trade volumes and world markets over the coming decade.

206. Initially importing countries can use accumulated stocks to limit their recourse to imports to address any emerging imbalance from a production shortfall, and exporters can do the same to increase export availabilities within a crop year. Brazil, unlike other exporters, has an additional weapon in its arsenal to draw on to increase its sugar output significantly in a short period of time. It can do this by changing the mix of sugar and ethanol production from sugarcane. The main requirement for this to occur is that world sugar prices must offer mills a more attractive return than ethanol. At present more than 50% of Brazil’s enormous sugarcane crop is used for ethanol production and some of this cane could be redirected to sugar production within a crop year and, thus, become available for export. In theory, this flexibility can provide a counterbalance to the Asian production cycle and associated market volatility by allowing Brazil to align its export availabilities with the periodic changes in Asian import demand. While the extent of this flexibility is necessarily limited and depends on the number of mills with both sugar and ethanol production capacity, it can be expected to increase as the industry expands further with increased investment in mill processing capacity in future years. The potential exists in Brazil, therefore, to provide a counterweight to production and price volatility arising from regular production cycles in Asia.

![Figure 7.13. India’s production cycle influences world sugar prices](image-url)
What were the policy responses to high sugar prices?

With the price spikes of 2007/08 in the world cereal and rice markets, many governments responded with a range of trade measures in importing and exporting countries to either safeguard or encourage additional supplies and protect domestic consumers from the high prices. By and large, measures taken by exporters encouraged the hoarding of cereals, reducing available supplies and further inflaming already volatile markets. To some extent, similar emergency measures have also been implemented by governments in response to the sugar price surge to 29 year highs in 2009. However, there was one major difference in that the response was mainly by importing countries to reduce the level of import protection by cutting tariffs and duties to counter high prices and encourage import demand. In contrast to cereals, no major sugar exporter took measures to restrict exports to increase domestic supplies and lower local prices. It would appear that government interventions in domestic sugar markets may have learnt a lesson from the experience of the cereal price spikes by implementing measures that do not exacerbate price volatility on world markets. To what extent the measures that were taken have managed to insulate domestic consumers from the volatility of world sugar prices in this period is, however, less clear.
CHAPTER 8
MEAT

Market situation

208. The economic downturn triggered by the financial crisis severely impacted the meat sector. Falling purchasing power and difficult access to credit affected both demand and supply. All meats were affected, although beef suffered the most compared to others, as consumers preferred cheap beef cuts and cheaper alternative sources of animal proteins. The economic crisis also accelerated structural changes in the meat industry, as evidenced by the numerous mergers and acquisitions recorded last year, of which the most notable was Perdigao and Saida that formed the world’s largest poultry processor by market value. The structure that results from this crisis, characterised by increasing economies of scale, is expected to speed the globalisation of meat trade, as large scale operations both in production and marketing are better suited to exploit global agribusiness growth opportunities, through a larger portfolio of meat origins and meat types. In addition, economies of scale are anticipated to increase the ability of the industry to manage risk through spatial and meat product diversification, as well as through hedging on futures markets.

209. Key meat markets are set to recover quickly in the first years of the projection period, and an understanding of this phenomenon requires a review of recent markets events. Over the past two years, meat market prices failed to show the exceptional developments of many other agricultural commodity prices. Their relative stability can be partially explained by the fact that meat plays a more limited role as a staple food, which combined with limited storage capacities makes panic buying for stockpiling unlikely. In addition, price movements were also buffered by changes in meat trade. On the supply side, falling profit margins resulting from inflated feed costs pushed beef farmers to liquidate herds, increasing meat supplies and putting a downward pressure on world market prices at the time when other agricultural commodity prices were increasing. Feed is a key input cost of production systems, not only in pig and poultry sectors but also in the bovine meat sectors in certain OECD countries where animals are finished to higher weights for slaughtering with a heavy use of processed feed concentrates: faced with sudden increases in feed costs producers responded as usual, through herd liquidation. After this episode of herd liquidation, supply became tighter but prices failed to increase because of the contraction in demand induced by falling incomes/purchasing power around the world. All meat sectors were affected, as consumers, confronted with declining budgets, opted for reducing their intake. Indeed, preliminary data for OECD countries in 2009 suggests that aggregate meat production was lower after decades of continuous growth.

210. The global meat market grew by 1% in 2009, i.e. a slightly lower rate than the 2.4% observed in 2008. Animal health and sanitation issues (excluding A-H1N1) did not affect the meat market in 2009 as much as in recent years and should this continue, prospects for the meat sector in 2010 appear brighter as major economies return to a positive growth path, especially in the Southern Hemisphere.
Projection highlights

- All Major meat prices expressed in nominal terms are anticipated to be firm the first years of the projection. Nominal prices for beef and pork increase by 22% by 2019 relative to the base 2007-2009, whereas poultry prices are expected to be on average 34% higher while lamb prices will rise by 68% (Figure 8.1).

- World meat consumption continues to experience one of the highest rates of growth among the major agricultural commodities, and mostly in the faster growing non-OECD countries. Virtually all of the world growth in meat consumption is projected to occur in developing countries, notably for poultry that grows at 2.8% p.a., and pig meat at 2.3% p.a. Beef consumption may grow the least at 2.0% p.a. Per capita annual consumption growth in the developed area remains low throughout the projection period (Figure 8.2).

- While demand pressure builds, the meat sector is increasingly constrained by higher feed prices and the availability of natural resources. World meat production growth is projected at 1.9% p.a. This growth is expected to originate predominantly outside the OECD area, which will account for 89% of additional sectoral output (Figure 8.2). Driven mostly by an expansion of poultry and beef shipments, world meat exports by 2019 are projected to increase by 22% relative to 2007-09 base period. OECD country exports increase by 7%, while those of non-OECD countries increase by 40% by 2019 relative to the base period (Figure 8.3).

Market trends and prospects

Prices

Most prices to increase at the beginning of the outlook

211. Real prices for meat are projected to be higher than those observed during the previous decade, as higher costs constrain the expansion of output in the face of increasing demand. Beef prices are anticipated to be firm for the first half of the projections, mainly due to a tight supply following reduced cattle herds. However, an expansion of output in the second half, coupled with a reduction of import demand by the Russian Federation, are anticipated to exert a downward pressure on prices. Pigmeat prices in both the Atlantic and Pacific area are not anticipated to increase much beyond 2015 Pigmeat prices are not anticipated to increase much beyond 2014 due to an increase in supply from Brazil, USA and China, both of which are experiencing high productivity gains. Sheepmeat prices are anticipated to be weak during the early years, but a reduction of sheep flocks in New Zealand may exert upward pressure on world sheep and lamb prices later in the projection period. Poultry prices expressed in nominal terms are to remain relatively firm throughout, largely reflecting higher feed costs and increased demand.
212. Higher producer prices are anticipated to boost global meat output. In the short term pig and poultry sectors with shorter production cycle, may respond more rapidly to renewed demand after the recession, while reduced cattle inventories will constrain beef production in the short term. As import demand in all the different meats recover, global meat trade is also set to rebound over the projection period. Accordingly, per capita meat consumption will rise following its marginal decrease of 2009, consistent with improved income prospects.

**Production**

*Growth in production originates mostly from the non OECD area*

213. On average, annual world meat production growth is projected to slow down to 1.9% during the Outlook period from 2.1% in the previous decade, as the sector is increasingly constrained by higher feed costs and the availability of natural resources. This growth is expected to originate predominantly outside the OECD area, which will be responsible for about 89% of the additional output, while a more stable path of development is observed in OECD countries. Meat production growth in non-OECD countries is anticipated to be dominated by Brazil and China, although Russia is also anticipated to play an increasing role. Russia, a major meat importer, is implementing strategy to support public and private investments in the meat sector to bring meat self-sufficiency more than 80% by the end of the projection period (Box 8.1).
214. Following an initial recovery phase, the meat Outlook is characterised by moderate increases in production. In the emerging economies, renewed investment, improved infrastructures and the introduction of modern, intensive and integrated production, processing and transport technologies, are the main factors that may spur higher productivity growth. This is especially true for China, Brazil, China, India and Russia India, and to some extent in the CIS group of countries. Meat production in other non-OECD countries and regions of the world are also anticipated to grow, including Sub Saharan Africa where the inflow of foreign private investments is on the increase from the so called “land grab” phenomenon, i.e. increased animal feed production. However, the global economic crisis might have had somehow impinged on the investment capacity. Meat production in the OECD area is anticipated to expand less than 1% p.a., as most farmers already benefit from existing technological advances, and face increasingly stringent animal welfare and food safety regulations.

215. Except for Sub-Saharan Africa, productivity gains of non-ruminants animals are anticipated to be high in all countries and regions, while for ruminants, OECD countries are expected to have higher productivity gains. The contribution of technical change and efficiency to total productivity growth is expected to vary according to the labour/land ratio of the prevailing production systems, with higher land productivity gains in China, and higher labour productivity gains in Brazil.

Environmental constraints as well as higher standards slow production growth

216. In many OECD countries, animal production systems are already highly intensive, leaving little scope for growth through additional input supply. Changes in feed costs have a significant effect on farm performance, but in addition to these, increasingly stringent public and private food safety and animal health regulation and standards, including animal welfare, and environmental constraints are anticipated to contribute to higher production costs. Nutrition and its impact on health has become a major concern of the meat industries in OECD economies. Consumer conscious on food safety has left governments with an enormous objective of regulating food quality in every step of the food chain. For example major changes are being applied to guidelines for the prevention, inspection and control of outbreaks of pests and diseases, including traceability standards which are already a priority in major meat producing and trading countries. In the US, the recent FCE Farm Act of 2008, the Country of Origin Labeling (COOL) initiative is expected to increase costs on different segments of the supply chain (Box 8.2). A similar labelling policy is also envisaged by the EU.

217. Output in the European Union will also be affected by the decoupling of production premiums, following the path that was already established last decade as intervention prices were lowered. Moreover, increased market access granted by the application of new TRQ’s following the enlargement of the
European Union as well as the Memorandum on beef hormones dispute signed with the United States, should also intensify competition in the domestic market, with an impact on domestic production.

Consumption

Non-OECD consumers renew their appetite for meats

218. A renewed expansion of the meat sector is expected for non-OECD countries during the projection period, where most of the growth in world consumption originates. Meat products are among the most sensitive to economic and population growth changes. Combined with greater urbanization, they represent the main drivers of per capita consumption growth. Conversely, the meat sector of OECD countries is expected to grow at a much slower pace due to escalating production costs and a combination of dietary changes and population demographics leading to a slowing down of growth of animal protein consumption (Table 8.1).

Table 8.1. Mature developed countries meat market record little per capita consumption growth

<table>
<thead>
<tr>
<th>Per annum increase of per capita meat consumption between the 2007-2009 base period 2019 and 2019the 2007-2009 base period</th>
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</thead>
<tbody>
<tr>
<td>Global</td>
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<tr>
<td>Beef</td>
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<tr>
<td>Pork</td>
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<tr>
<td>Poultry</td>
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<tr>
<td>Sheep</td>
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<tr>
<td>Total Meat</td>
</tr>
</tbody>
</table>

219. Worldwide, the economic recovery will strengthen the intake of animal proteins at the expense of foods of vegetal origin. Non-OECD countries are expected to consume around 86% of the projected global growth in meat production. Much of this expansion will take place in Asia and the Pacific region, especially in China, although some growth is also seen in Latin America, which has traditionally been consuming meat, led by Brazil. Such growth will reflect in particular the rise in consumption of cheaper sources of animal protein, mainly poultry and pigmeat. Import dependency in meat products is likewise expected to grow in many dynamic developing countries, as demand surpasses the domestic capacity for meat production throughout the duration of the Outlook.

220. It is already two decades since the volume of total meat consumed in developing countries overtook that of developed countries, and the gap between them has not ceased to expand. Today, 60% of the meat consumed worldwide is eaten in the developing world, and the projection for this decade is that its increasing share shows no signs of relenting. Meat maintains one of the fastest rates of growth in consumption among all agricultural commodities.

221. Virtually all of the world growth in meat consumption projected takes place in developing countries, notably in Asia. World poultry consumption increased by an additional 26 Mt r.t.c. by 2019 compared to the base period, increasing per capita consumption by nearly 2 kg per capita r.t.c by 2019. Developing countries will consume nearly 83% of this increase, i.e. of which more than 70% originate from Asian countries. Interestingly, poultry consumption will surpass pigmeat consumption in the second half of the projection in the OECD countries.

222. World pig meat consumption grows from 103 Mt c.w.e. in the base period to 126 Mt c.w.e. in 2019. Again, developing countries will consume the bulk of the increase, or 22 Mt c.w.e., virtually all from
Asian countries. Conversely, beef consumption grows at a more moderate rate, 1.5% p.a., and the vast majority of these additional 9.3 Mt c.w.e. will be more evenly distributed among the various developing regions of the world. Although the patterns of consumption are anticipated to be slightly different across countries depending on habit, there seems to be a universal preference for poultry over the other meats (Figure 8.3). Even in OECD countries, where the growth of per capita meat consumption is marginal, the share of poultry increases through the years at the expense of other meats. This trend is expected to continue this decade across the world, although in countries where beef meat production is important and international prices have little impact on domestic production, such as East Africa and Asia (Uzbekistan, Tajikistan, Kyrgyzstan, etc.), beef and goat sheepmeat will remain the preferred types of meat consumed.

Figure 8.3. World consumer preference for poultry meat.

Increase of per capita meat consumption between 2019 and the 2007-2009 base period

Trade

Brazil to dominate non-OECD meat trade

223. Driven mostly by an expansion of poultry shipments, world meat exports by 2019 are projected to increase by 22% relative to the 2007-09 base period. OECD country exports increase by 7%, while those of non-OECD countries increase by 40%. The bulk of growth in meat trade is expected to originate largely from outside the OECD area, in particular from Brazil which will single-handedly account for over 63% of all the meat exported from non-OECD countries in 2019, and for one-third of world meat exports (Figure 8.4). Alongside Brazil, a handful of major exporters will continue to govern the supply of world meat markets, including the United States, Canada, Argentina and Australia.

224. Trade prospects are favourable in Southeast Asia, as the creation of a free trade area between China and the ASEAN in January 2010 is anticipated to result in lower mutual trade barriers between countries in the region. This event should stimulate production and trade, as intra-trade duties are below those applied to countries outside the Free Trade Area. Nevertheless, the structure of trade in the region
(small scale operations), and its limited infrastructure (limited cold-storage facilities), are unlikely to challenge in the medium term the leading role of traditional suppliers of meat and their by-products, such as the United States, the European Union and Brazil.

**Figure 8.4. Meat exports growth is predominately coming from non OECD region**

Development of meat exports between 1999 and 2019

225. In the OECD area, beef exports from North America are expected to increase, as import restrictions imposed on the grounds of bovine spongiform encephalopathy (BSE) are progressively eased. Meat exports from the EU are anticipated to decline over the decade due to reduced domestic output following policy reforms, coupled with a growing domestic consumption. The US will continue to lead as the largest meat importing country by 2019 with 2.2 Mt, closely followed by the EU which will import nearly 2.92 Mt, US with 2.2 Mt, followed and by Japan with 2.1 Mt. On a net import basis, Japan, Mexico, Korea remains the major importing countries. Russia, until recently the largest net meat importer, is expected to decrease its imports for the Outlook period by more than 1 Mt c.w.e., subject to its strategy to expand domestic production to achieve higher self-sufficiency by the end of the decade (Figure 8.5).
Agricultural policies, in particular product and process standards, are to become an important driver shaping not only production but also trade. Climate change and the environmental impact of livestock production are rapidly moving up the political agenda. Environmental and animal welfare legislation, and standards at large, add to production costs and constrain the expansion of the sector despite efforts made by the industry to respond to these concerns via research and development. The impact of standards, including those related to production processes, will be increasingly felt in international trade, as OECD countries progressively request these very same standards from imported products. Their impact will likely take the form of increased market segmentation, which will add complexity to the future analysis of global meat markets.

Key issues and uncertainties

The Outlook presented in these chapters is conditional on a number of assumptions. Among these are the continuation of agricultural policies and declared policy reforms, and the macroeconomic environment. Changes in any of these assumptions would lead to a different set of projections for the various meat markets.

An important uncertainty always looming in meat trade relates to sanitary and food safety concerns stemming from outbreaks of animal diseases. In the past decade, such outbreaks have considerably impacted the growth in trade for all the meat. The possibility of future animal disease outbreaks, their duration, intensity, potential consumer reactions and new trade restrictions, is an important uncertainty into the present Outlook. However, as trade has grown, and with greater experience in handling disease outbreaks, the impact of certain disease outbreaks has been considerably reduced. For example, the World Organization for Animal Health (OIE) has developed a system of protocols to allow zoning or compartmentalisation of production which, if followed by a country, enables it to assure sanitary safety of exports from an unaffected zone. This practice has helped minimise the impact of foot and mouth disease outbreaks in Brazil. Similarly, Thailand continues to pressure major importing countries to accept the practice, which would allow exports of uncooked chicken regardless of the Avian Influenza country status.
229. The rapid growth of the biofuel sectors, particularly in the United States and Europe, is anticipated to affect the availability of feedstuffs used in livestock production, as ethanol and livestock industries compete for grains. Though cereal prices have come down from the record highs in 2008, they are projected to remain above historic levels. At the same time, however, the increasing availability of co-products from the ethanol and biodiesel production, in particular of DDGs, pulps and oilseeds meals, will help to contain the impact on meat production. The net impact varies by biofuel chain as well as by type of meat, and requires detailed monitoring.

230. Domestic and trade policies remain an important determinant of meat markets. Some countries still have high tariffs on meat products, often including tariff rate quotas (TRQ’s) or export taxes. At the same time, domestic policies that directly benefit animal husbandry remain in place in some OECD countries. Outcomes of the WTO negotiations that may commit member countries to lower tariffs on meat, or to decrease their support to animal production, are likely to alter the outlook. The same holds true for agricultural products that are input to the livestock sector like grains, where changes in prices triggered by policy changes would affect animal production. The Outlook has assumed that the implementation of Country of Origin and Labeling Legislation by the US will give an incentive to US processors to switch from importing live animals from Canada to imports of meat, leading to increased trade of meat and a decreased trade of live animals between these two countries. Due to the recent implementation of the regulation, the degree to which this may take place remains uncertain. In Russia, the rapid growth of domestic production in Russia following the government decision to achieve higher self sufficiency (Box 8.1) is expected to have a strong impact on meat markets in the Outlook. Finally, China’s policy on Strategic Meat Reserves from Frozen Meat (which requested provincial frozen meat level reserves high enough to supply China’s urban residents for seven days) as well as the new market intervention scheme called the National Swine Price Alert System (which is a price monitoring scheme geared to ensuring sufficient farmers returns) may have an impact in stabilising the price volatility domestically and abroad.

231. Production of livestock and feedstuffs is responsible for some 80% of all agricultural greenhouse gas (GHG) emissions from sources that include enteric fermentation, manure management, land use change (deforestation and land clearing and burning), soil and the burning of carbon-based fuel. Emissions are expected to increase substantially in the coming decades, as population and income growth increase global demand for meat, dairy and other high value products. It is projected that much of the increase in agriculture-related emissions will take place in Latin America, Asia and Africa. It remains uncertain, but possible that in the medium to long term, livestock production may be subject to carbon mitigation constraints in some countries. There are large differences between regions and meat type in GHG emissions per unit of output. Pricing emissions from livestock production could potentially result in substantial shifts in production, consumption and trade. At the global level, shifts in production would change the relative price of meat and promote the consumption of meat with lower associated GHG emissions such as poultry.
Box 8.1. Evolution of Russia Tariffs Quotas (TRQ’s) for meat

Russian meat production declined rapidly following the collapse of the Soviet Union. As a result, meat imports increase rapidly to sustain domestic demand. In 2002, Russia implemented meat TRQ’s for beef, pigmeat and poultry. The life span of the initial TRQs expired by the end of 2009. The quota and related tariffs can be found in Table 8.1. Starting in 2006 the Russian Government amended the initial TRQ’s as shown in Table 8.2. However, in order to promote domestic production, by restricting over quota imports, the Russian government introduce prohibitive out of quota tariffs for pigmeat and poultry.

Table 8.2. Russia: Meat TRQs for 2002-09, kt, ad valorem

<table>
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<tr>
<th></th>
<th>2002-2009</th>
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<tr>
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<td>458</td>
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<tr>
<td>Pigmeat import tariff quota, fresh, cooled and frozen (0203)</td>
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<td></td>
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<tr>
<td>Poultry import tariff quota, fresh, cooled and frozen (0105 + 0207 )</td>
<td>1050</td>
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<td>- in quota tariff</td>
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<td>- out of quota tariff</td>
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<td>Pigmeat:</td>
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<td>- in quota tariff</td>
<td>15</td>
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<td>- out of quota tariff</td>
<td>80</td>
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<td>Poultry:</td>
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<td>- out of quota tariff</td>
<td>No out of quota possible</td>
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Table 8.3. Russia: Meat TRQs for 2006-09, kt, ad valorem

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<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
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<tr>
<td>Beef and veal import tariff quota, fresh, cooled and frozen (0201+ 0202)</td>
<td>461</td>
<td>468</td>
<td>474</td>
<td>480</td>
</tr>
<tr>
<td>Pigmeat import tariff quota, fresh, cooled and frozen (0203)</td>
<td>476</td>
<td>485</td>
<td>494</td>
<td>532</td>
</tr>
<tr>
<td>Poultry import tariff quota, fresh, cooled and frozen (0105 + 0207 )</td>
<td>1131</td>
<td>1171</td>
<td>1211</td>
<td>952</td>
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<td>Beef and veal:</td>
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<td>- in quota tariff</td>
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<tr>
<td>- out of quota tariff</td>
<td>55</td>
<td>53</td>
<td>50</td>
<td>40</td>
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<tr>
<td>Pigmeat:</td>
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<td>- in quota tariff</td>
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<td>- out of quota tariff</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>75</td>
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<td>Poultry:</td>
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<td>- in quota tariff</td>
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<tr>
<td>- out of quota tariff</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>95</td>
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</table>
In December 2009, the Russian government approved a decree that will regulate meat imports to Russia in 2010-2012. According to the law, the quota on poultry imports will almost be halved - from 952 kt in 2009, the quota for pork will gradually decline, while for beef it will rise (Table 8.3). These TRQs have been developed taking into consideration the different trend of the various meat sectors. For poultry the TRQ has significantly been reduced to reflect the desire of the Russian government to promote the development of the industry which has grown, in the recent past, by 10% to 15% per year. It is expected with the current level of protection that Russian producer will be able to mostly meet domestic demand for poultry products after 2015. In the case of pigmeat, the reduction in the quota reflects the slower growth in demand combine with an inadequate supply level from the domestic market. Nevertheless, it is not expected that Russian producers will catch up on the current gap between supply and demand. Finally, for beef an increase in imports is expected to occur has beef production in Russia is closely linked to the dairy herd. It is likely that the dairy herd will continue its long term decline leading to a reduction of domestic slaughtering.

In accordance with the new trade regulation for 2010 to 2012, new tariffs have been adopted for all meat products (Table 9.3). The allocation of quotas among countries has been worked out by the Russian authorities (Decree N 1021 of 16 Dec 2009).

Table 8.4. Russia: Meat TRQs for the period 2010-2012

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
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<tbody>
<tr>
<td>Beef and veal import tariff quota, fresh, cooled and frozen (0201+ 0202)</td>
<td>560</td>
<td>560</td>
<td>560</td>
</tr>
<tr>
<td>Pigmeat import tariff quota, fresh, cooled and frozen (0203)</td>
<td>490</td>
<td>490</td>
<td>450</td>
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<tr>
<td>Poultry import tariff quota , fresh, cooled and frozen (0105 + 0207 )</td>
<td>780</td>
<td>600</td>
<td>550</td>
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<td><strong>Beef and veal:</strong></td>
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<td><strong>Pigmeat:</strong></td>
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<td>- in quota tariff</td>
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<td>- out of quota tariff</td>
<td>75</td>
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<td>75</td>
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<tr>
<td><strong>Poultry:</strong></td>
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<td>- in quota tariff</td>
<td>25</td>
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<tr>
<td>- out of quota tariff</td>
<td>80</td>
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<td>80</td>
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Box 8.2. US Country of Origin Labelling

The 2002 and 2008 US Farm Bills amended the Agricultural Marketing Act of 1946 to require certain retailers\(^1\) to notify their customers of the country of origin of covered agricultural commodities (“COOL”).\(^2\) The COOL legislation went into effect in April 2005 for fish and shellfish and on September 30, 2008 for all other covered commodities with the interim final rule. USDA issued the final rule for mandatory COOL for all covered commodities on January 15, 2009.

COOL is a retail labelling law that provides additional information to consumers at the time of purchase for certain covered commodities, including but not limited to, covered meat products. COOL excludes processed foods, that is, covered commodities that have a change in character resulting from cooking, curing, smoking, or restructuring, or when combined with another food component.

COOL declarations must be specific and accurate. It is ultimately the retailer’s responsibility to provide country of origin information to consumers; however, in order for retailers to accurately label covered commodities for COOL, direct and indirect suppliers to retailers must convey country of origin information. Packers and processors rely upon producers to provide country of origin information to initiate country of origin designations. The legislation and regulations specify the criteria that must be met in order to meet the four different types of labels - product of the United States, product from animals of multiple countries of origin, product from animals imported directly for slaughter, product imported directly from a foreign country. For ground meat, all countries from where the meat could reasonably have been derived must be listed. Accurate labelling for imported animals and meat products will have to be segregated, which will likely increase costs in the animal-meat supply chain. The USDA Agricultural Marketing Service has estimated that total first-year implementation costs for all affected US industries would be USD 2.6 billion (USDA/AMS, 2009).

Canada and Mexico have challenged mandatory COOL at the WTO. At their request, a Dispute Settlement Panel was established at the World Trade Organization in November 2009 to determine if the COOL measure is consistent with the United States’ international trade obligations.

The precise extent to which COOL is impacting US, Canadian and Mexican livestock and meat markets is unknown, but in this Outlook it is one of the factors contributing to lower projections of Canadian and Mexican live cattle and Canadian live hog exports to the US.

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1\) Retailers for which the invoice costs of all purchases of perishable agricultural commodities exceed USD 230 000 during a calendar year.

2\) For further information on COOL and covered commodities, please see http://www.ams.usda.gov/AMSv1.0/Cool.
CHAPTER 9

DAIRY

Market situation

232. International dairy markets have experienced a dramatic rise and fall boom and bust in recent years. After a strong run-up in prices, the market situation reversed in the course of 2008. Demand retreated while supply increased in reaction to strong price incentives. This coincided with the commencement of the global economic crises and by early 2009 prices fell by half from mid 2008 levels. As a result, dairy product stocks started to accumulate, most importantly in the United States and the European Union. The dramatic fall in prices from the peaks of 2008 has shaken the global dairy sector. In many countries the relatively stronger market situation witnessed in previous years led to a rethinking and mobilisation of the sector’s longer term strategy (for example, the European Commission has established the High Level Expert’s Group on milk to discuss look into the medium and longer term arrangements for future of the dairy sector, given the abolition of the current quota system in 2015).

233. The depressed situation of early 2009, linked to the global economic crisis, should nevertheless be viewed as a short term phenomena rather than longer term equilibrium. In the course of 2009, international prices started to strengthen, rebounding rapidly at the end of the year. The strong recovery in prices was triggered by increased demand mainly from China and oil exporting countries but also by China and by lower supplies that contracted in some regions in response responding to low profitability in the previous year and weather impacts on production in the Southern hemisphere producing countries. The European Union also has been restrained in the export of dairy products from higher intervention stocks. In 2010, dairy markets appear to have entered into calmer waters where fundamentals indicate a recovery in demand as markets stabilise with improved economic prospects and market confidence.

Projection highlights

- Over the Outlook to 2019, international dairy prices are expected to grow in nominal terms while remaining relatively flat in real terms (Figures 9.1 and 9.2). On average, world market prices in real terms are expected to stay 15-40% higher compared to the decade preceding the 2007/08 peak. Real butter prices are expected to register the highest gains supported by high vegetable oil prices.

- The dairy sector remains one of the fastest growing sectors covered in the Outlook. By 2019 world milk production is expected to increase by 170 Mt from the 2007-09 base period. The annual growth rate for the projection period is estimated at 2.1%.

- The overwhelming majority (more than 80%) of additional milk is projected to be produced outside the OECD area. World production of WMP, butter, cheese and SMP is expected to grow from the base period by 31%, 28%, 20% and 9% respectively (Figure 9.3).
OECD continues to dominate global cheese consumption (nearly three-quarters of the total consumption) which is expected to increase by 20% over the Outlook period. In non-OECD countries demand growth is expected for all dairy products with WMP and butter consumption growing the strongest (38%), followed by cheese (33%) (Figure 9.4).

Trade in dairy products, as a ratio to milk production, is expected to continue to decline towards 6%. This is due to the developing countries’ growth of production and consumption of fresh dairy products, which are not traded. Compared to the base period world exports are expected to grow for cheese and WMP (both 14%), SMP (6%) but to decline for butter (-4%) (Figure 9.5). The six largest importers of dairy products continue to cover less than 50% of the world market. (Figure 9.6).
Figure 9.3. Global production of WMP growing rapidly

Figure 9.4. Consumption affected by income and product attributes
Figure 9.5. Trade increases mainly for cheese and WMP

Figure 9.6. Russia a major importer of butter and cheese
Market trends and prospects

Prices

234. The anticipated return to global economic growth and rising population are expected to underpin the international dairy markets and prices over the Outlook. In the short run, dairy product prices are expected to be tempered by the downsizing of stocks mainly in the US and the EU. Prices are expected to rise steadily from 2012 in nominal terms, by more than 2% per year on average driven by rising demand but also increasing production costs. In real terms, the declining trend in prices is expected to abate, with world prices remaining relatively flat over the projection period (Figures 9.1 and 9.2).

235. Averaging over the Outlook period, world market prices in nominal but also in real terms are expected to stay firm and well above the levels seen in the decade preceding the 2007/08 peak. Milk powder and cheese prices in real terms are anticipated to reach levels about 15% and 23% higher on average respectively. The prices of milk fat components are expected to strengthen the most; average real butter prices may attain levels 40% higher compared to the decade before the price peak. The relative strength of butter prices is partly linked to sustained high energy and vegetable oil prices and to the fact that considerably less butter will be exported from countries such as the European Union or the United States. Emerging exporters concentrate more on milk powder exports which may also be explained by the more demanding logistic requirements of butter exports.

236. The Outlook price projections reflect the usual assumptions of stability in weather and in economic and policy conditions. It follows that actual price outcomes are likely to exhibit significant annual variations about their average trend than the projection shows. However, after the price rollercoaster of recent years the international prices are expected to stay relatively more stable.

Production

Milk production

237. Globally, milk production is growing more rapidly than for other key commodity sectors covered in this Outlook, with the exception of poultry meat production. After stagnating in 2009, growth in milk production in the short run will be supported by an increase in milk yields which may be expected after recent cow culling and emergence of younger, more productive herds globally. Over the medium term, projected higher dairy prices are expected to stimulate supply response and steady milk production gains (Figure 9.7). Most of the additional milk is projected to be produced outside the OECD area. China, India, Pakistan, Argentina and Brazil account for more than half of the global milk production gains. Of the 170 Mt of additional milk produced in 2019 as compared to the average level of 2007-09, more than 80%, will come from developing countries.

238. Large regional differences in milk production growth are expected to remain a feature of the Outlook. Higher international milk product prices in recent years have created the incentive for expansion in many developing countries. The location of future growth in production depends on the market and policy context in various producing countries, the milk-feed price ratio and competition for land. The milk production decision would also be increasingly influenced by water and environmental concerns, and domestic and climate change policies. The shift in milk production is expected mainly from North to South, and more specifically from Europe and North America to Asia, Latin America and Oceania.

239. The dairy sector in New Zealand is expected to remain one of the country’s key export industries. Milk production is expected to reach nearly 20 Mt increasing from the base period level of 16 Mt. Although the conversion of sheep and beef farms to dairy farms is expected to continue, production gains are expected to come progressively from yield gains as opposed to increased cow inventories. Growing
environmental and water constraints, and climate change policy, currently agreed to include agriculture from 2015, will be factors increasingly influencing farm production decisions. After the 5% fall in 2009/10, milk production in Australia is expected to recover gradually mainly in response to improved milk to feed price ratios. Due to drought and reduced milk production margins, the dairy herd has contracted by 25% since 2002. A return to strong growth in the dairy herd, anticipated in previous years, now seems unlikely and the projected modest growth remains sensitive to water availability.

Figure 9.7. Large differences in milk production growth

240. Following the drop in domestic prices, European Union milk deliveries fell in 2009. Deliveries are expected to stabilise in the EU-15 in 2010 but fall by a further 1.6% in the EU-12. Over the Outlook period, milk supply will not follow the annual 1% quota increases, but grow gradually at about 0.3% per year. Quota abolition in 2015 is expected to have only a limited impact on milk supply. While EU-12 milk deliveries are projected to increase by nearly 5%, milk production is projected to fall by more than 5% due to steady decreases in subsistence production and on farm milk consumption over the Outlook period.

241. In the United States, cow numbers in 2009 fell after several years of expansion. This expansion had reversed a long term trend of declining cow numbers. This long term decline is expected to resume over the medium term but stabilising at the end of the projection period as a result of improved price to feed ratio. Production is expected to grow by more than 1% annually as yield gains more than offset the cow number reduction. Canadian milk deliveries are assumed to follow demand driven milk quota levels growing modestly over the Outlook.

242. India and Pakistan, two of the largest “traditional” dairy producing countries, are anticipated to continue to expand milk production at trend rates of 3% and 4% respectively over the next decade, driven by expansion in both cow numbers and yields. Such growth has persisted for several decades and an important question is how long it will persist. Dairy products are very much part of the culture of these countries and as incomes grow, particularly in India, milk product demand continues to keep pace. These
sectors remain dominated by very small producers, serving local and usually informal markets. In other developing countries of Asia, milk production is less prevalent, but it is also growing at a fast pace, particularly in Thailand, Indonesia, Malaysia and Vietnam. Milk production should advance in the 3-4% range annually over the decade in these countries. Growth reflects increasing demand with growing urbanisation, but from a small production base. Markets are open to imported powdered milk that, when blended with local supply, satisfies growing demand.

Box 9.1. China dairy industry growth expected to continue but subject to uncertainty

After years of rapid growth, the increase in milk production in China tumbled in 2009, hit by the aftermath of the melamine crisis. Production is expected to rebound strongly in 2010, by 10%, but then growth is projected to average around 4-5% per year over the period. The Outlook milk and dairy product projections for China are subject to considerable uncertainties and one of the key issues is the speed of the dairy industry restructuring.

The milk farming base in China is very fragmented and the rapid growth of the dairy industry allowed profit seeking intermediaries (often without any background in dairy) to enter the supply chain. The Chinese Government has unveiled a plan to address these structural problems, emphasizing modernisation and increased regulations of the dairy industry. The "China Dairy Industry Policy" announced on 26 June 2009 obliges new dairy processing facilities to source at least 40% of its raw milk from its own herd. The guidelines also require that companies expanding existing facilities must control at least 75% of its raw milk source sent to the improved plants. The government is also revising China’s dairy product standards to ensure safety and quality, and regain consumer confidence.

It is expected that small-holders would exit milk farming or combine into larger more efficient operations. The Outlook assumes that the modernisation will also be effective in rectifying the milk quality problem. This is an important assumption which has repercussions on global dairy markets. China is by far the largest producer and consumer of WMP accounting for around 30% of global volumes. Although China was gradually reducing dependence on WMP imports, the melamine crises sparked large WMP imports in 2009. In early 2010, the reports of further sales of contaminated product (from old stocks) aggravated the situation. The Outlook expects that as quality improves, the increase in imports of WMP would ease over the short run and imports would return to historical levels. But, the actual level of the Chinese imports of dairy products is also subject to the uncertainty surrounding exchange rate developments. A hypothetical scenario, run with the OECD-FAO Aglink-Cosimo model, illustrates that a 10% appreciation of the CNY (Yuan) vis-à-vis the US dollar (assumed over the entire projection period) would result in additional imports of dairy products and especially of WMP (Figure 10.8). As a result global dairy prices would be lifted by 1-2% on average. A further source of uncertainty for China’s dairy imports is the Chinese government recent decision to impose import license requirements on several types of dairy products (fresh milk, milk powders and whey).

Figure 9.8. Impact of the 10% stronger CNY (Yuan) on the WMP imports to China

243. In Latin America, countries have responded to higher incentives with increased production, either decreasing milk deficits or emerging as exporters. Milk production in Argentina is expected to grow
strongly over the Outlook at more than 3% annually on average, pushed by increased efficiency on farms and improved profitability of milk vis-à-vis arable crops. Brazil’s milk production is projected to grow by 2.3% annually, primarily due to increased productivity but also government measures that target continued growth and focus on investment and marketing. Production in countries such as Columbia, Peru and Chile may see production advance above the world average growth rate, but below the growth rate for developing countries as a group. Uruguay, which has increased prominence as an emerging exporter of milk products, may see production growth at 1.7% per year.

244. The dairy sector in Africa continues to grow above 2% per year, but in per capita terms growth is anticipated to be weak. Countries in North Africa, including Algeria and Egypt are projected to sustain relatively high rates of growth, encouraged by programmes to stimulate production. In Sub-Saharan Africa, where the milk market is by far dominated by the informal sector, growth is projected to advance about 1% annually in per capita terms.

Dairy product production

245. After the slowdown in production growth in 2009, global production of dairy products is to continue increasing following longer term trends with world production of WMP growing most rapidly. WMP production is expected to record 31% growth, albeit from a lower base level as compared to other products (Figure 9.3). China is expected to remain the most important WMP producer. Despite a significant production drop (16.5%) in 2009, China is expected to contribute more than 40% of additional global supplies over the projection. Brazil and New Zealand are expected to add 25% and 12% to global WMP gains respectively. The main driving force for whole milk powder production is its use for reconstitution in milk production deficit areas and in low-production seasons.

246. Almost three-quarters of all additional global butter supplies are expected to come from India, with Pakistan and New Zealand adding 10 and 5%, respectively. Nearly 50% of additional cheese output over the projection period is expected to come from the EU and the US who continue to dominate global production accounting for two-thirds of the total. Most of the additional global production of SMP is expected from India (33%), New Zealand (29%), but also Ukraine (21%) and Brazil (20%).

247. About two-thirds of additional global milk production is to be left in fluid form or to be processed into fresh dairy products since the majority of milk production gains is in the developing world where milk processing remains limited. However, even in developed countries the fresh dairy product market is to remain dynamic with rapid growth of probiotic products, most notably probiotic cultured drinks and yoghurts.

Consumption

248. Growing demand, especially in developing countries, has underpinned firm international prices. The steady growth in demand was thought to be a permanent feature of the markets. The 2008 international dairy product price spike and global economic crisis were important reminders of the high price and income elasticities of dairy product demand. However, in a symmetric way, lured back by lower prices in 2009 and improved economic conditions, the demand for dairy products started to gradually strengthen.

249. Increasing population and income, together with the growing popularity of dairy products, particularly among developing country consumers - and boosted by the expansion and penetration of western retail chains - suggests a return to steady growth over the Outlook. The growth in demand will be strongest in China and India. A large increase in consumption is also expected in countries of Latin America - mainly Brazil and Mexico - partly in response to various government food assistance programmes. OEECD countries continue to dominate cheese consumption, accounting for three-quarters of
the world total. Developing countries now consume about 80% of global WMP consumption and this share is expected to grow to 83% by 2019 (Figure 9.4).

250. The westernisation of diets and changes in lifestyle are important drivers, particularly for cheese, which has seen rapid growth in demand as an ingredient in fast food products, mainly in pizzas, hamburgers and sandwiches. However, a consequence of the increasing link of cheese demand to the food service industry is that in times when consumer purchasing power declines the negative impact on cheese consumption may intensify. This, to some extent, also holds for butter, especially in developed countries, as demand from restaurants and hotels becomes increasingly important.

251. Despite substantial per-capita growth in non-OECD economies, consumption per person remains at relatively low levels in absolute terms, with significant potential for growth. Focusing on cheese, one of the fastest growing segments of dairy consumption, the highest per capita consumption is found in the EU (16.7 kg per person) and the US (14.8 kg). In Japan, an important cheese importer, the per capita consumption of only 2 kg is comparatively low but still considerably higher than per capita consumption in many developing counties (Figure 9.9). The developing country region per capita cheese consumption reaches only 0.8 kg per person on average.

Figure 9.9. Significant growth of cheese consumption in developing regions, albeit from low base

![Chart showing cheese consumption in various countries](chart.png)

Trade

252. After contracting during the global recession, trade is expected to increase mainly for cheese and WMP fuelled by re-emerging demand in developing countries (Figure 9.5). New Zealand will remain the most significant exporter, with around 35% of global export market share. It is also expected to increase its exports by nearly 30% as compared to the base period. Nevertheless, despite its robust production and export growth New Zealand’s long term potential to satisfy growing import demand is limited as the country share in global milk output remains only 2.3%.

253. Brazil, traditionally regarded as a dairy importing country, is expected to further increase its presence on export markets especially for WMP. Exports from Brazil but also from Argentina are expected to grow by 70-80% over the projection period. On the other hand, EU exports of butter and SMP are expected to fall significantly throughout the Outlook. Although EU export of cheese and WMP would remain relatively stable, compared to base period, the export market share is expected to decline over the Outlook, from 32% to 27% for cheese and from 24% to 19% in the case of WMP.
254. Russia and Egypt remain the most important importing countries of butter, although imports to Russia are anticipated to decline over the Outlook as a result of increased domestic production. The increase in domestic production in Russia however rest on the assumption of a continuation of government measures aimed at milk production growth. Russia remains the most important importer of cheese and imports are expected to grow in the next decade by 2% annually. Russia together with Japan, Mexico and the United States continue to account for 40% of global cheese imports. Mexico, Indonesia and Malaysia are projected to increase their SMP imports, and the Middle East and North Africa regions are to remain key importers of WMP. Algeria, together with Saudi Arabia, is projected to account for around 15% of global WMP imports by 2019 (Figure 9.6).

255. The share of world milk production traded (intra-EU trade excluded) has been at around 6-7% and international dairy markets are expected to remain thin. In contrast, international trade in dairy products over the base period accounted for about 43% of the production of WMP, 34% of SMP, 9% of cheese and 8.5% of butter. Over the projection period the share of trade to global production is expected to remain relatively stable for cheese (due to trade growth) and SMP (due to production stagnation) but decline for butter to 6.5% (mainly due to the increase in butter production and consumption in India) and for WMP to 37% (due to the increase in production in many developing countries).

Key issues and uncertainties

256. The key issue in the Outlook for international dairy markets centres around the sustainability of the trend toward higher prices, and their variability around that trend. For a sector which has long been characterised as highly protected, and for which international markets have long been exposed to surplus disposal policies, markets are slowly adjusting to a new market environment. The strong rise in international market prices in 2006-08 sparked interest in dairy market development in many developing countries. The roller-coaster experience in international markets since the beginning of the century has witnessed more ups than downs, and higher prices for imports of milk powders for re-constitution are providing a stimulus to growth of domestic production. In this context, a key uncertainty for the Outlook will be the developments in domestic dairy policies, and above all the outcome of the Doha Development Agenda negotiations. Tariffs and tariff quotas remain highly restrictive, particularly in industrialised countries. Reduced border protection would likely raise dairy prices considerably, stimulating further production growth in developing countries, and also higher trade volumes.

257. Prospects for the variability of dairy product prices are unclear. The decline/elimination of surplus disposals on international markets may contribute to greater price stability. On the other hand, if an increasing proportion of exports are supplied by regions where pasture conditions vary substantially, increased price variability may result. As noted earlier, the growth of milk production globally is dominated by the growth in developing countries, and international dairy product markets are shrinking relative to global production. Weather conditions remain among the key uncertainties for milk markets, but they may become even more important in the future.

258. An increasingly important factor also likely to bear on the Outlook is the deterioration of natural grasslands, limited water resources and water pollution. This can be important in many developing countries, particularly in some Asian countries where milk product consumption growth has also been high. Increasing constraints on production growth in this region may stimulate higher trade. Many countries are increasingly concerned about methane-gas emissions and are establishing policies to deal with them. The latter development applies more to developed countries, where milk-producing livestock numbers are also expected to fall 0.3% annually over the Outlook. However, the growth of milk production in developing countries is driven to an important degree by growth in the dairy herd, which is projected to grow 1.6% in developing countries. In these countries, small-holder dairy farms dominate production in the context of informal markets in which producers meet subsistence requirements and local market needs,
providing important support to household and rural income and food security. Increasing resource pressures may limit their growth in future, and require large changes in market structures and technologies, implying that adaptation will be slow and require large investments.

259. On the demand side, macroeconomic developments represent an important uncertainty for the Outlook. Dairy products are among the most sensitive to income fluctuations, and this is particularly so in many rapidly growing developing countries. A slowdown in global economic growth would moderate import demand and reduce prices. Furthermore, the processes of economic growth, urbanisation, and technology transfer will continue to further change the nature of the dairy industry worldwide. Continued, but slow, convergence in consumption patterns will have a considerable impact on both domestic and international markets. Consumers, not only in developed countries, are increasingly concerned about health and nutrition. As a result, that the dairy sector will have to continuously adapt to growing consumers concerns over factors such as products nutrient definition, organic status, health concerns, animal welfare, environmental consideration and management practices. The impact of the melamine crisis in China was a good example of how sensitive dairy product demand can be to food safety concerns. The ability to maintain an image of dairy products as being healthy and safe is a key challenge for the dairy industry in the future.

260. The tendency to shift manufacturing towards value-added products is expected to rapidly intensify. The evolution of milk pasteurisation, microfiltration and de and re-hydration of milk could have wide reaching impacts on dairy trade and consumption. Different perceptions among countries regarding what qualifies as “fresh” milk remain, but with improved technology, consumers may become increasingly willing, within the limits of remaining quality differences, to replace fresh fluid milk with reconstituted milk and/or UHT. A battle could intensify among products vis-à-vis nutrition and health claims and related settings of nutrient profiles and corresponding threshold levels (such as the level of saturated fatty acid). For example, increase dairy product fortification with minerals and vitamins, adding probiotic cultures and development of milk based probiotic dietary supplements might be among some alternative avenues.