

Chapter 9

Dairy

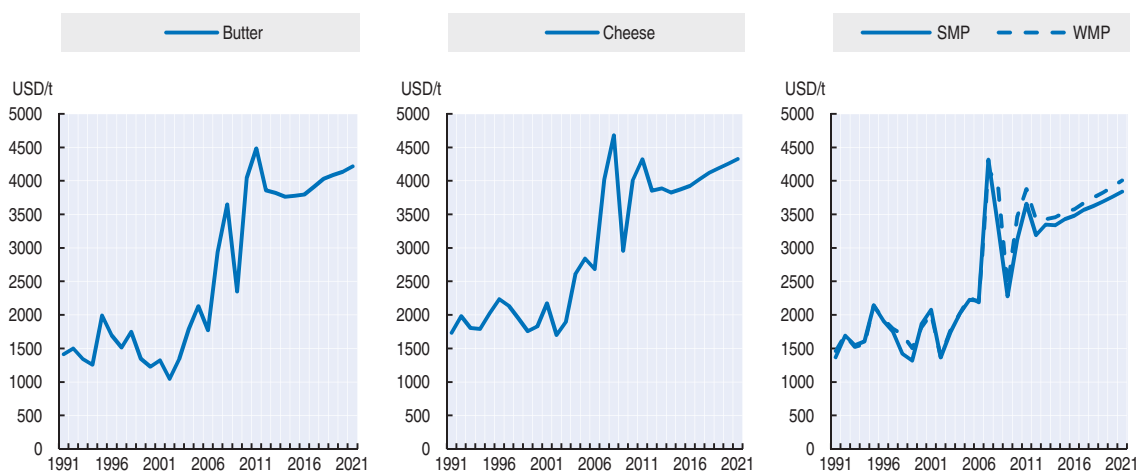
Market situation

After the dramatic fall in 2009 of international dairy prices, these rebounded in 2010 and significantly strengthened through to the first half of 2011. Sustained imports of milk powder by South East Asia, Mexico and North Africa (mainly Algeria) have been predominantly behind this price firmness. China, in particular, has continued to underpin the global dairy markets as the demand fuelled by a rapidly growing middle class with increased disposable income continued to outstrip the domestic supply, which continues to be confronted with milk safety issues. Global supply response, stimulated by high returns and excellent pasture conditions in Oceania and parts of Latin America, eventually caused prices to decline in the second half of 2011. The production gains were translated into increased exports, confirming the remarkable growth in dairy trade recorded since 2009. Export volumes increased mainly from New Zealand, Argentina, the United States, and the European Union. The decline in international dairy prices are expected to be nowhere near that experienced in 2009 as global markets continue to enjoy strong demand growth in developing countries.

Projection highlights

- The majority (70%) of global milk production gains over the outlook period is anticipated to come from developing countries, particularly India and China. The projections indicate that the total milk production of developing countries will overtake that of developed countries from 2013 onwards. The average growth rate of global milk production for the projection period is estimated at 2%, only slightly below the 2.1% level witnessed in the last decade. The dairy sector remains among the fastest growing sectors covered in the *Outlook*.
- After a downward correction from peak 2011 levels, prices in nominal terms are projected to increase by about 2% annually from 2014 onwards, reflecting increasing production costs and growing demand driven by rising population and incomes (Figures 9.1 and 9.2). In real terms, world market prices are expected to average 6% (cheese) to 30% (butter) higher over the projection period compared with the previous decade. Price volatility is likely to remain an issue for the outlook as dairy markets remain thin in volumes of milk traded and the small number of players that dominate export trade.
- The recent growth in trade is expected to continue, particularly for milk powder; the trade of SMP and WMP is expected to increase from the 2009-11 base period by 34% and 30%, while global cheese and butter trade is projected to increase by 27% and 20%, respectively. Butter markets will remain thin with volumes bypassing only 1 million tonnes by the end of the projection period.
- Dairy product consumption in developed countries may increase only modestly (with the exception of cheese), while in developing regions the consumption of all products is expected to increase vigorously at around 30% from the base period. This increase is driven by increasing population, income levels, and the growing influence of retail chains and multinational companies which facilitate improved consumer access to dairy products.

Figure 9.1. World dairy prices in nominal terms

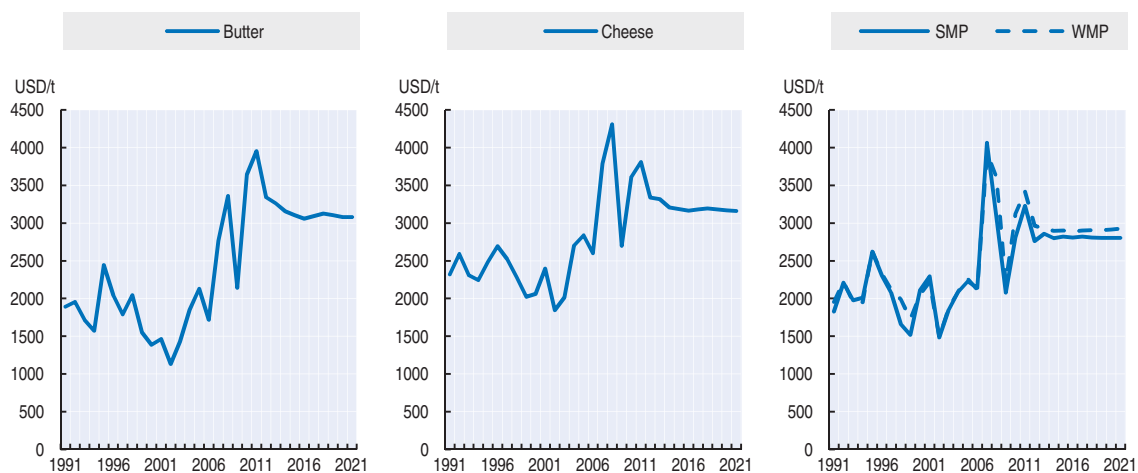


Note: Butter: f.o.b. export price, 82% butterfat, Oceania. Cheese: f.o.b. export price, cheddar cheese, 39% moisture, Oceania. SMP: f.o.b. export price, non fat dry milk, 1.25% butterfat, Oceania. WMP: f.o.b. export price, 26% butterfat, Oceania.

Source: OECD and FAO Secretariats.

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Figure 9.2. World dairy prices in real terms (2005 USD)



Note: Butter: f.o.b. export price, 82% butterfat, Oceania. Cheese: f.o.b. export price, cheddar cheese, 39% moisture, Oceania. SMP: f.o.b. export price, non fat dry milk, 1.25% butterfat, Oceania. WMP: f.o.b. export price, 26% butterfat, Oceania.

Source: OECD and FAO Secretariats.

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Market trends and prospects

Prices

International dairy prices are expected to decrease from the elevated levels of 2011. The projected decline in international prices should be moderate as strong demand in developing countries, particularly in South East Asia, continues to underpin markets, despite a large supply response. As demand and supply adjust and markets rebalance at lower price levels, the international dairy quotations are projected to start increasing by about 2% annually from 2014 onwards, reflecting increasing production costs and growing demand driven by rising population and incomes (Figure 9.1)

Prices in real terms are anticipated to stay relatively flat over the next decade, although at levels well above those of the previous decade (Figure 9.2). Over the Outlook period, prices in real terms are expected to average between 6% (cheese) and 30% (butter) higher compared to the average levels of the last decade. Butter prices, for decades typically below other dairy price quotations, are expected to stay at an elevated level over the projection period, as milkfat prices are sustained by high energy prices and correspondingly strong prices of other fats and vegetable oils. Moreover, emerging exporters often concentrate on milk powders which may be partly explained by the more demanding logistical requirements of butter exports.

Cheese prices are likely to experience less strength, although are anticipated to remain above those of butter. Cheese has increasingly become a bulk commodity often used as an ingredient in fast food products and ready-to-eat-meals, although many producers are trying to re-valorise cheese (to get it out of the “commodity” segment) via increased innovation, and improved traditional varieties and speciality cheeses.

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 these trend projections. Nevertheless, following dramatic market swings over the period 2007-10, a strategy to mitigate the volatility and manage risk could be anticipated on the part of dairy companies, traders and dairy farmers, thus lowering the probability and the impacts of future instability.

Production

Milk production

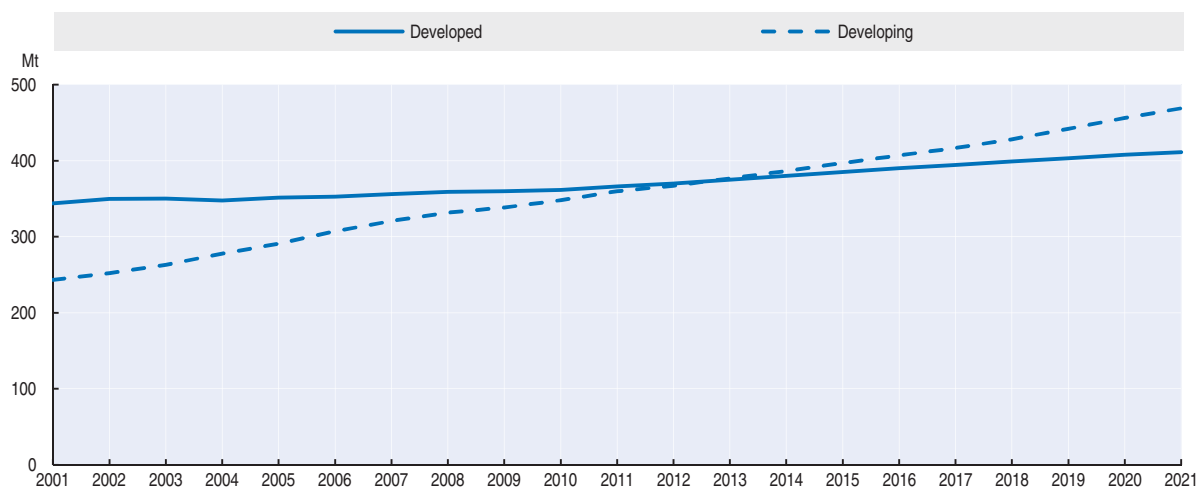
World milk production increased strongly in 2011 (estimated at 2.4%) as a result of good returns and excellent fodder and pasture conditions in many important producing countries. Lower prices in the next two years and the return to normal weather conditions (assumed in the Outlook) would moderate this growth in the short run. The average annual growth in milk production over the next ten years is projected at 2%, slightly lower compared to the 2.1% annual growth between 2002-11.

In volume terms, the global milk production is projected to increase by 154 Mt, the majority (70%) of which is anticipated to come from developing countries. India and China alone account for nearly 40% of global gains. Although the majority of milk has been traditionally produced in the developed world, the projections indicate that developing countries will bypass these levels in 2013 (Figure 9.3).

Regional differences in the growth of milk production are expected to persist. Growth levels are driven by market and policy context, the milk-feed price ratio, competition for feed and land, as well as water and other environmental constraints. In the context of higher energy and feed prices, pasture-based milk-producing systems, such as those in Oceania and Latin America, are expected to strengthen their comparative advantage (Figure 9.4). The growth in milking animal inventories is expected to slow down in developing countries, while the negative trend in developed countries of the last decade is expected to abate, mainly as herd declines in Europe moderate and stabilise in Australia.

In New Zealand, milk production increased in 2011 (year ending 30 May) by 6.5% after a poor 2010, with excellent autumn pasture conditions balancing the impact of a dry spring. Pasture conditions in 2012 are likely to be the best in a decade, driving a further increase in production. The projection assumes a return to normal weather conditions hence the future

Figure 9.3. Evolution of milk production in developing and developed countries



Source: OECD and FAO Secretariats.


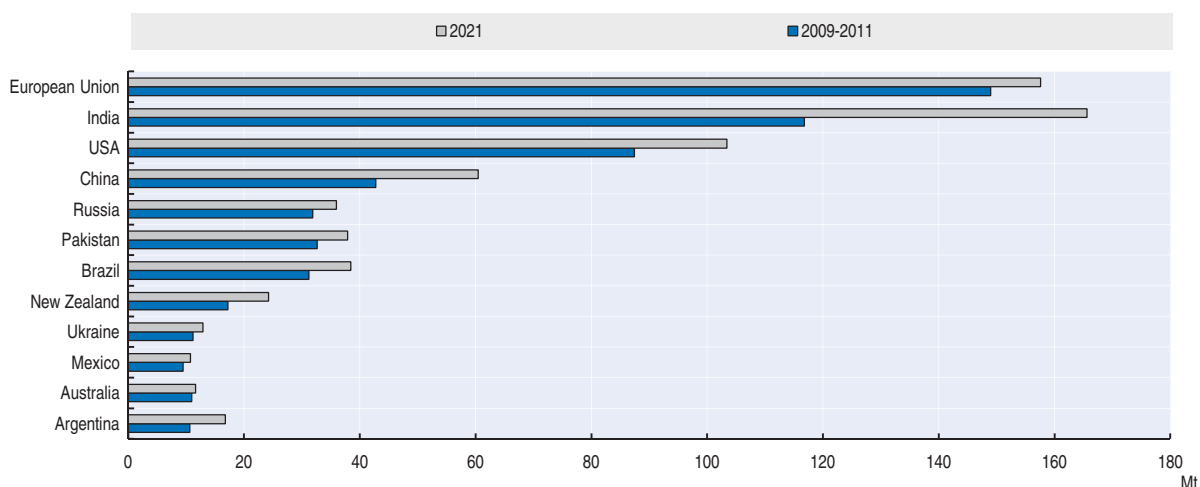

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Figure 9.4. Outlook for milk production growth



Source: OECD and FAO Secretariats.

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growth would return to lower levels and average 2.4% p.a. which is slightly below the percentage growth recorded in the last decade. Installations of new dairy farms (often via conversions from beef or sheep farms), continued cow inventory growth, and per cow and per hectare productivity growth trends are behind the steady milk production increases.

After several years of drought conditions, milk producers in Australia have enjoyed much improved pasture growth, particularly in the south-eastern dairy regions. The last decade trend of declining cow inventories was reversed last year and numbers increased by 0.5%. A higher increase in cow inventories in the next few years, reflecting a good hydrologic situation, will be hindered by a shortage of replacement heifers and competition for land. As a result, only a modest growth in herd numbers is projected. Nevertheless, with productivity gains assumed on trend, milk production is expected to increase by 1.2% p.a. over the projection period.

Despite the drought in many parts of Europe in early 2011, stimulated by favourable returns, milk output in the European Union recovered and, after years of decline, increased significantly to nearly 151 Mt. Although in some countries milk quotas have become binding, production levels in others remain well below the available delivery quotas. The large disparity in quota fill is expected to persist and the EU12 quota is projected to be under-filled by more than 20% in 2014/15 when the quota regime is scheduled to end. Driven by continuous increases in milk yield both in EU15 and EU12, milk production is projected to grow by 0.5% annually on average. Milk deliveries may grow even faster as on-farm consumption declines particularly in the EU12 (a reduction of 11% by 2021). The steady trend in herd contraction is expected to moderate after 2015.

In the United States, the favourable milk price margins resulted in a 1.7% milk output expansion in 2011. Despite the recent increase in cow numbers, the projection anticipates a return to a modest continuous decline in herd number over the medium term. Milk yield per cow, however, is expected to more than compensate for this, leading to a 1.6% annual production increase, a growth rate only slightly lower than that achieved in the previous decade. Milk production gains will be largely driven by new investment, increased economies of scale, and improved management.

In the 1990s, milk and dairy product production and consumption in the Russian Federation contracted by more than 60%. Driven by increased incomes over the last decade, consumption started to rise but dairy production lagged behind, resulting in higher imports. Encouraged by better returns and government efforts to revive milk production aimed primarily at improving the quality of cattle breeding (i.e. subsidies for the purchase of pedigree bulls), the decline in milk production was halted. Although poor feed supplies due to severe drought moderated production in the first half of 2011, the *Outlook* anticipates a return to production growth of 1.6% p.a. on average, stimulated by improved yields and a slowdown in the reduction of cow inventories. Following the accession of the Russian Federation to the WTO, it is expected that the dairy sector will be transformed and modernised as a result of increased investments and accelerated dairy industry integration with global markets (Box 9.1).

In Latin America, high prices and very good weather during 2011 boosted production in Argentina by more than 10%, breaking domestic output records. Improved returns, investment, increased economies of scale, and management efficiency are anticipated to drive milk production gains in the future. Milk production is expected to grow by more than 3.4% p.a. over the *Outlook* period. Brazil's milk production is projected to grow by 1.7% annually, stimulated by firm prices and domestic demand, but also by development programmes aimed at increasing productivity through animal breeding and pasture improvements. In Mexico, farmers had to cope with reduced forage supplies due to dry weather which led to stagnating milk output in 2011. The dairy sector is expected to be modernised with investments in infrastructure and genetics, supported by government, and it is projected that milk production will increase annually by 0.5% on average.

The milk farming base in China has been very fragmented and the rapid growth of the dairy industry allowed profit-seeking intermediaries (often with no background in dairy) to enter the supply chain. The 2009 melamine milk adulteration cases brought dramatic changes with the government stepping up efforts to restructure the domestic dairy industry, and to improve milk quality and confidence in domestically-produced products. Milk production is expected to grow by less than 3% annually on average. This is much

Box 9.1. Russian Federation WTO membership implies lower dairy tariffs, but the impacts on global dairy markets are likely to be modest

After many years of negotiations, the terms of the WTO Russian Federation membership were agreed and a protocol for the country's accession signed on 16 December 2011. The country has until 15 June 2012 to ratify its accession package and will become a full member 30 days after notification to the WTO of the ratification. As a WTO member, a position assumed in the baseline, the Russian Federation would undertake a series of commitments to further open its trade regime.

The Russian Federation is an important importer of butter and cheese, and the baseline applied tariffs assumptions for those two products are already at 15%, which is the level of agreed bound WTO tariffs to be operational after the accession implementation period. These tariffs were already lowered from 20% under the Custom Union Agreement between Russia, Kazakhstan and Belarus which came into effect on 1 January 2010 – all customs borders were removed on 1 July 2011. Nevertheless, Custom Union tariffs for milk powders are higher than those of the WTO agreement. The baseline assumes that milk powder tariffs will be reduced from 20% to 15% following the agreed WTO schedule from 2012 until 2015. The baseline also assumes that, as a result of WTO accession, subsidy payments on milk production will be halved after 2017.

The results of a counterfactual scenario, in which milk powder tariffs and subsidy levels are not lowered, illustrates that the impact of WTO accession on dairy markets can be expected to be relatively modest. In this scenario, milk production in the Russian Federation will be 1% higher by 2021 as compared to the baseline, while butter and cheese imports will be reduced by 2-4%. SMP and WMP imports would decrease more dramatically, by 7-14%, but given the relatively small importance of these powder imports on the global markets, the impact on world dairy prices would be minor and amount to a reduction of less than 1%. It should be noted that the terms of accession related to trade do not only include tariffs but other policies that affect trade. For example, Sanitary and Phytosanitary (SPS) Measures and the Agreement on Technical Barriers to Trade (TBT), which are not explicitly treated in this scenario, can be expected to have an impact on trade.

WTO membership is expected to accelerate integration in global dairy markets and stimulate the flow of investments, and hence benefit the Russian Federation dairy industry in the long-term. For example, under WTO membership, foreign-owned dairy companies would be allowed to operate in the wholesale, retail and franchise sectors of the Russian Federation.

slower growth than seen in the last decade as it is assumed that restructuring and the withdrawal of backyard operations will moderate domestic output expansion.

Growth in milk production in other developing countries continues to be strong, particularly in India, Pakistan and other central Asian countries where dairying has a strong traditional base. India will further consolidate its position as the world's largest producing country, growing at 3.4% p.a., while Pakistan will grow more slowly at 1.9%. Milk production will also continue to grow strongly in other developing areas in South East and East Asia, where, for example, milk production in Thailand, Indonesia, Malaysia, and the Philippines will respond to recent high returns, albeit from a lower base. In North Africa and the Middle East, local milk production systems have responded to high domestic demand growth. The milk sectors in Egypt, Algeria and Saudi Arabia are projected to grow in the 1.5-2.5% range over the Outlook period. This region will nevertheless increase its reliance on dairy product imports given strong domestic demand in these countries.

Milk production plays an important role in the rural fabric of Sub-Saharan Africa. More than in other regions, milk production is derived from milk cows, buffalos, sheep and

goats. Productivity levels are very low and unchanging, with high animal numbers. Milk output may grow in the 3.3% range, more than in step with population growth in the region. As commodity prices have risen, so have average incomes, creating higher demand for milk and milk products in urban environments. In some countries, higher prices in the last ten years have encouraged greater participation in the formal milk sector, thereby increasing milk pooling and milk quality needed for commercial sector growth.

Dairy products production

Global whole milk powder (WMP) production continued to grow strongly in 2011 as China recovered from the melamine-related problems and New Zealand continued its recent strong growth trend of nearly 20% p.a. Over the projection period, WMP is expected to be the fastest growing product followed by Fresh Dairy Products (FDP), which is by far the largest user of raw milk. The market for FDP remains dynamic, sustained by expansion in the production of fermented products. As compared to the base period, 2009-11, WMP output is expected to grow by 32%, while FDP, butter and SMP gain 26%, 24% and 23% respectively by 2021. Cheese output is expected to grow by 19% over the outlook period.

China and New Zealand are projected to cover nearly two-thirds of all WMP production expansion. Brazil and Argentina may account for 17% of the expansion. New Zealand WMP production is expected to continue to expand as a result of good WMP returns and strong demand for New Zealand WMP in South East Asia. New Zealand is expected to outpace China as the leading world WMP producer.

India and Pakistan are expected to provide 70% of all butter production gains, the majority of which is in the form of ghee. The United States is expected to step up its butter production, which will account for 8% of global output, while an additional 5% would come from New Zealand. The SMP production was recently discouraged by large overhanging stocks from 2009, but growth recovered in 2011 in response to steady global demand. Most of the additional global production of SMP is expected from the United States (39%) with New Zealand contributing 21%. Boosting its SMP production, the United States is projected to surpass the European Union by 2018 to become the world's largest producer.

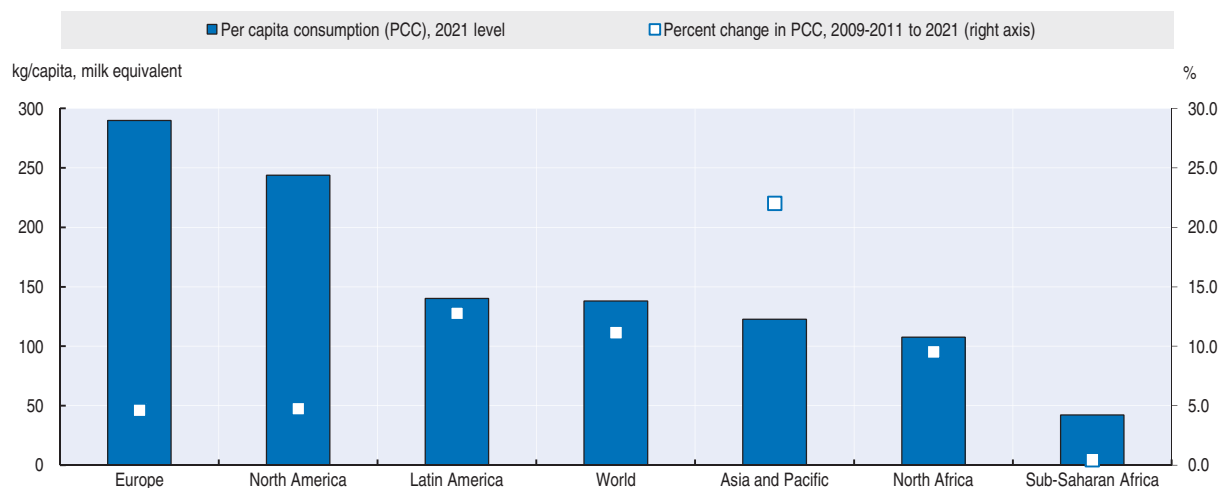
Cheese production is dominated by the European Union (44%) and the United States (23%), which supply two-thirds of the global output. Together they will account for 59% of the additional global cheese output produced over the projection period. Brazil and Argentina, the largest cheese producers after the European Union and the United States, together contribute less than 7% of global cheese production. Their production is expected to record a steady 1.8% annual growth over the projection period.

Consumption


Dairy product consumption in developed countries may increase only modestly with the exception of cheese, which is expected to be 15% higher compared to the base period. In developing regions, the consumption of all products may increase markedly at around 30% from the base period. Dairy products remain among the agricultural commodities for which production and consumption exhibit the highest growth rates.

However, the rate of growth and *per capita* consumption of milk and milk products significantly differs among regions (Figure 9.5). Europe and North America *per capita* consumption levels are twice those of other countries, but are projected to grow by less than 5% over the projection period. Asia and Pacific and Latin America are expected to

Figure 9.5. **Despite strong growth in per capita consumption (in milk equivalent), an important gap among regions remains**



Source: OECD and FAO Secretariats.

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narrow the gap and increase the *per capita* consumption by 22% and 13%, respectively. The *per capita* consumption of milk and dairy products is also expected to remain strong in North Africa and the Middle East. Least Developed Countries and countries in the Sub-Saharan region remain a notable exception with very low *per capita* consumption levels. The consumption growth only marginally exceeds the population growth, which results in small increases in *per capita* consumption over the outlook period.

The large differences are expected to remain not only in total consumption (in milk equivalent) but also across individual products. This gap is driven by income, product attributes and differences in diets. The developed countries continue to dominate cheese consumption, maintaining a 75% share of the world total. The *per capita* consumption of cheese in the European Union or the United States is above 15 kg per person, while in developing countries it is often negligible and reaches only 0.9 kg per person on average in 2021. However, developing countries are expected to consume more than 85% of global WMP consumption and account for nearly all additional WMP consumption over the outlook period.

Increasing population and income, together with the growing popularity of dairy products, particularly among consumers in developing countries, is a key factor behind strong demand in the medium term. Demand continues to be encouraged by the growing influence of retail chains and multinational companies in these countries, which is facilitating improved consumer access to dairy products. In many countries consumption is enhanced by government programmes (*i.e.* school milk). Finally, among the important factors affecting the consumption of dairy products is the increasing trend towards a greater variety in the choice of food and increased health, nutrition and diet concerns, as well as higher awareness of animal welfare and environmental issues.

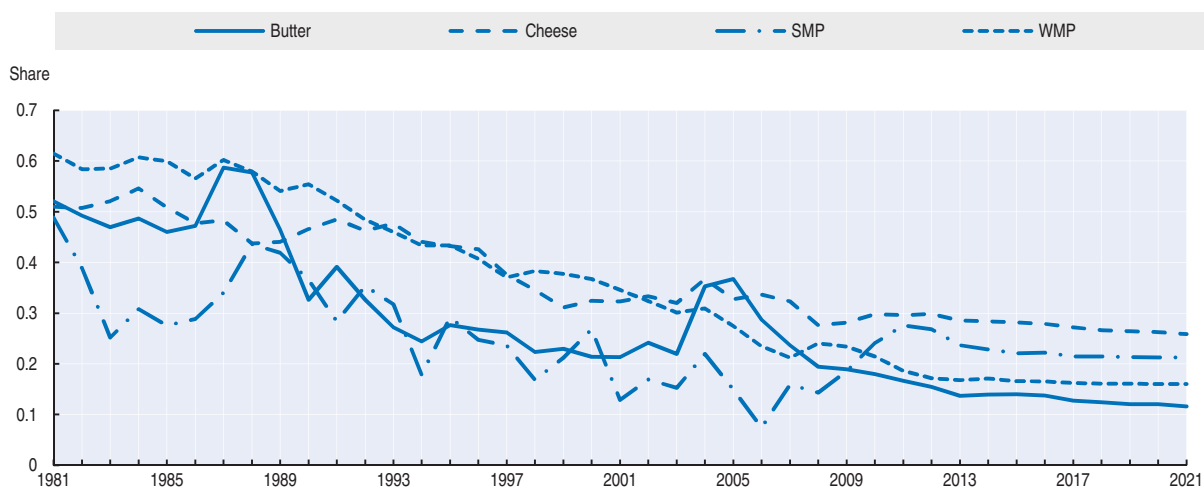
Trade

The landscape of international trade has changed tremendously in the last decade, with the reduction in intervention buying and withdrawal of export measures. Trade has become more influenced by regional developments and strategic decisions of large


international dairy companies. Marked changes in the EU market shares illustrate the important shift on the international markets. The EU dairy export shares amounted to 11% for butter, 28% for cheese, 18% for SMP and 21% for WMP in 2011 (data for EU15 member states prior to 2004), falling from 50-60% levels in the 1980s. The decline in the EU shares has moderated from early 2000 and is projected to slow further over the outlook period (Figure 9.6).

Figure 9.6. **The EU world dairy export market shares decline to moderate over the Outlook**

Data for EU15 member states prior to 2004



Source: OECD and FAO Secretariats.

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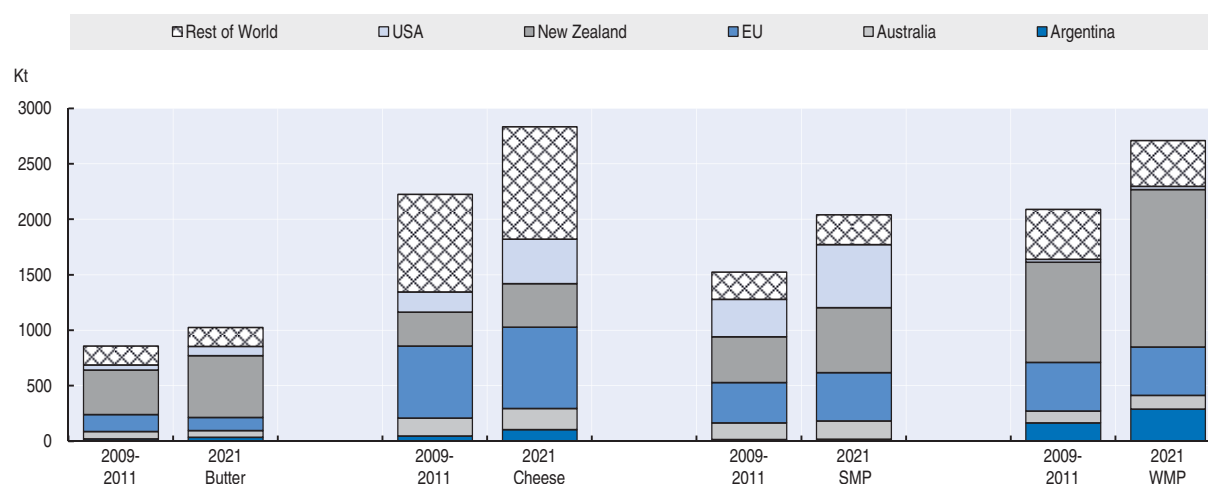
Global trade consistently outpaced milk production growth in the last decade and recorded remarkable gains in the last two years. All major global players increased exports. The European Union strengthened its position as the leading cheese exporter. The United States and the European Union boosted SMP exports while New Zealand concentrated mainly on WMP, thus limiting export expansion of other dairy products.

The strong growth in exports is expected to continue, particularly for powders (Figure 9.7). The trade of SMP is expected to increase by 34% while that of WMP by 30% from the 2009-11 base period. The United States is expected to increase significantly volumes on the SMP export market, up 70% from the base period. New Zealand is expected to consolidate its dominant WMP exporter position with volumes growing by more than 50% from the base period. By the end of the outlook period, New Zealand is estimated to account for more than half of the global WMP trade.

Global cheese trade is projected to increase by 27% over the projection period. A strong growth in cheese exports is expected from the United States which is to more than double its export volumes. The majority of the additional US exports is destined for Mexico. Exports from Australia and New Zealand, other important traders, are anticipated to grow over the outlook period by 20% and 28%, respectively. The recent growth in exports is expected to continue for emerging exporters, most notably Argentina, Uruguay, Ukraine and other Eastern European countries (i.e. Belarus).

Butter exports have stagnated over much of the last decade but increased recently, and the volume growth is expected to continue. Global butter exports are projected to increase by nearly 20% from the base period. The butter markets will remain among the thinnest

Figure 9.7. Major dairy product exporters



Source: OECD and FAO Secretariats.

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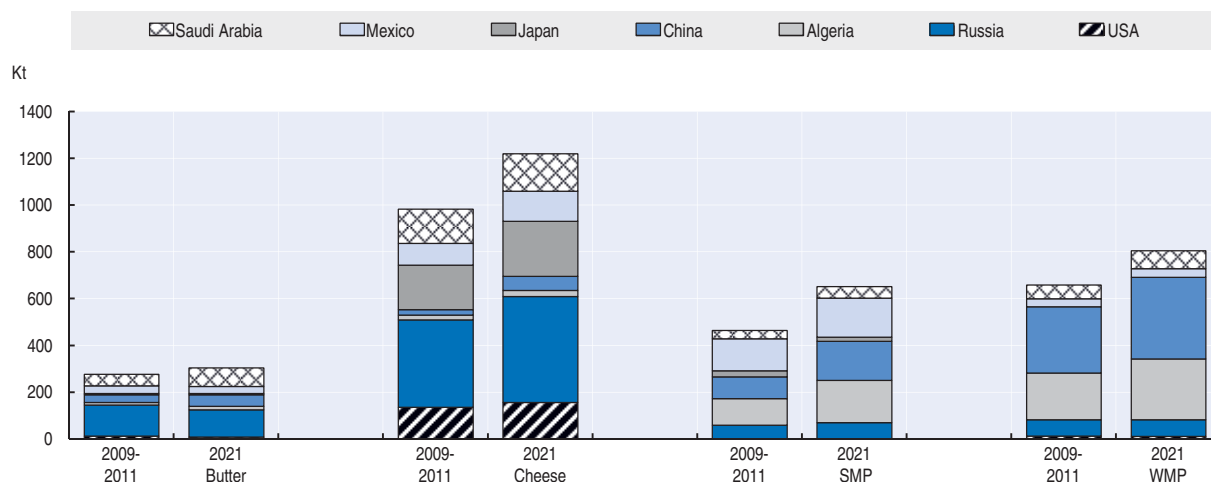
dairy markets, with the fewest global exporters and volumes bypassing 1 million tonnes only at the end of the projection period. New Zealand remains by far the dominant country servicing more than 50% of the market. The Outlook anticipates the United States to reverse its net butter importer position – often attained in the last decade – and become an increasingly more important butter exporter.

The import markets are fragmented compared to the more consolidated export situation, where the largest importers of dairy products continue to account for less than 50% of the global trade (Figure 9.8). The Russian Federation is to remain the key importer of cheese. Japan, Saudi Arabia and US cheese import demand is also anticipated to remain strong over the outlook period (despite being a significant cheese exporter, the United States imports large volumes of cheese mainly from the European Union). Other countries, such as Mexico, Korea and parts of North Africa are slowly increasing their presence on cheese import markets. Cheese imports are aided by relatively lower cheese prices and “commoditising” of cheese which is increasingly consumed as an ingredient in fast food type products.

Although the Russian Federation was traditionally the most important butter importer, such imports have declined and are projected to decline further over the projection period. Middle East countries are increasingly more important in butter import markets, and given thin butter markets, any political instability in this region may result in strong uncertainties for the butter market over the outlook period.

The recent sharp increase in imports of WMP by China has slowed but annual growth of 7% in 2011, implied volumes reaching 350 000 tonnes, making China the most important importer, with a 16% global import share, ahead of Algeria which has about a 10% share. China has also recently boosted its SMP imports that are destined for domestic infant formulas. Increasing incomes, a growing appetite for dairy products, concerns for food safety and quality but also urbanisation and higher participation of women at work, are expected to keep milk powder imports at elevated levels over the projection period. Whey powder imports by China are used as a cheaper alternative to powders and as an important

Figure 9.8. Major dairy product importers



Source: OECD and FAO Secretariats.

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source of protein. They form the backbone of whey trade and are expected to increase over the projection period on average by nearly 6% annually.

Market issues and uncertainties

The dairy outlook, as in previous years, is conditioned by weather, the economic situation, and evolution in policies. For example, a severe drought in an important dairy producing region could have an important impact on the projections in any one year, strengthening prices. Slower economic growth compared to that assumed in this Outlook would moderate international prices. Developments in energy prices (such as crude oil prices, gas, etc.) can be expected to influence trade patterns and the comparative advantage of market players. The oil price affects livestock markets through both higher cost of energy use, especially for energy and capital intensive production systems, and through the impact on feed ingredient costs. Higher energy and feed costs affect the competitiveness of pasture *versus* intensive feed based systems, and may encourage the growth in market shares of countries with relatively abundant pasture and water. However, in the future, higher costs of feedstuffs may, to a certain extent, be mitigated by the increased availability of distilled dry grains (DDGs), a by-product of bioethanol production.

In the context of prevailing border measures on dairy markets, a key uncertainty for future dairy trade is the potential outcome of the Doha Development Agenda (DDA) negotiations. However, with little progress on the Doha Round negotiations, many countries have opted for regional (or bilateral) arrangements. Although traditional trade barriers such as tariffs and TRQs remain important determinants of dairy trade flows, attention has increasingly shifted towards non-tariff measures and to regulatory mechanisms often linked through the Agreement on the Application of Sanitary and Phytosanitary (SPS) Measures and the Agreement on Technical Barriers to Trade (TBT). Moreover, the growth of private standards, adopted by the agri-food chain can be also expected to exert an impact on dairy markets. Although private voluntary standards schemes can contribute to improving food system efficiency, so as to deliver and ensure specific product and process attributes at a reasonable cost to consumers, the increasing

use of private standards also raises the issue of effective market access both for developed and developing country suppliers. Compliance with private voluntary standards schemes may exclude those producers who, due to lack of potential scale economies or otherwise, cannot easily meet the standards' requirements and remain economically viable.

Over the outlook period, the shape of dairy markets will continue to be influenced by the spread of multinational dairy companies, retail chains and international investment which would lead to further narrowing of production and consumption differences across regions. Research and technological development can be expected to have a key role, although progress remains uncertain. New initiatives and innovations are likely to emerge in the fight for new and existing consumers. For example, increased use of dairy product fortification with minerals and vitamins to add "health" values to cheese and butter via probiotic cultures, extension of the shelf-life of dairy products, improvements of texture and flavour, and an increase in the absorption and bio-availability of nutrients are some potential avenues. Technological development and the spread of existing production technologies will also play an important role in narrowing the productivity gap (Box 9.2).

Box 9.2. Productivity change in the dairy sector

It is estimated that world milk production increased by about 100% over the last 50 years. With global population growth at 123%, average milk output *per capita* has fallen over this same period. While this fall can be somewhat attributed to a large decline in milk output in the transition countries of the former USSR, it also reflects population growth in regions where milk production has not been significant in *per capita* terms, particularly in Asia. In the last decade or so, however, milk production *per capita* has started to increase significantly, and this trend is anticipated to continue over the outlook period at a rate of about 1% p.a. to 2021. Milk and dairy products are anticipated to be one of the fastest growing sectors, placing larger demands on agricultural resources. Changing productivity, particularly as measured by milk yields, has considerable implication for resource use by the sector. Milking animals represent an important value of total farm capital and producer wealth.

In 2011, global milk production was produced by some 626 million milking animals, about 83% of which were milk cows, 13% buffalo cows, 2% goats, 1% sheep, and the remainder camels. The distribution of animal types varies significantly by country and region with developed regions using almost exclusively cow milk, while developing regions in South Asia rely more on buffalo animals and many African countries milk both sheep and goats. For example, whereas virtually 100% of milk production in the United States is derived from milk cows (and about 97% in the European Union), milk cows account for only 82% in Ethiopia, 78% in Algeria, and 40% in India (FAOSTAT, 2010). From a productivity perspective, milk yields have not grown significantly for goat and sheep milk, compared to buffalo and cow milk (Table 9.1).

Based on productivity estimates for milk cows, it would appear that growth in milk cow yields for many developed countries have slowed in recent years. However, in transition countries and many developing countries, growth in cow yields has accelerated considerably, albeit from a low base. As shown in Figure 9.9, there is substantial scope to increase cow yields given the large gaps. It is important to note, however, that technologies for milk production vary substantially and high yield does not necessarily mean low cost. Intensive grain-fed milk operations may be most efficient in some areas, particularly those where land is scarce and population density is higher, whereas pasture fed operations may be most efficient where land is in ample supply and there are no cropping alternatives. For example, from a unit cost perspective, New Zealand is considered one of the most efficient competitive suppliers to world markets, but its average milk yield is well below those sectors based on grain feeding regimes. Given the prospects for growth in demand for milk and milk products, future growth in milk yields, no matter what the animal type or feeding regime, may have considerable implications for resource use, particularly for land, water and labour inputs.

Box 9.2. Productivity change in the dairy sector (cont.)

Table 9.1. Growth in milk yields, selected countries and animal types

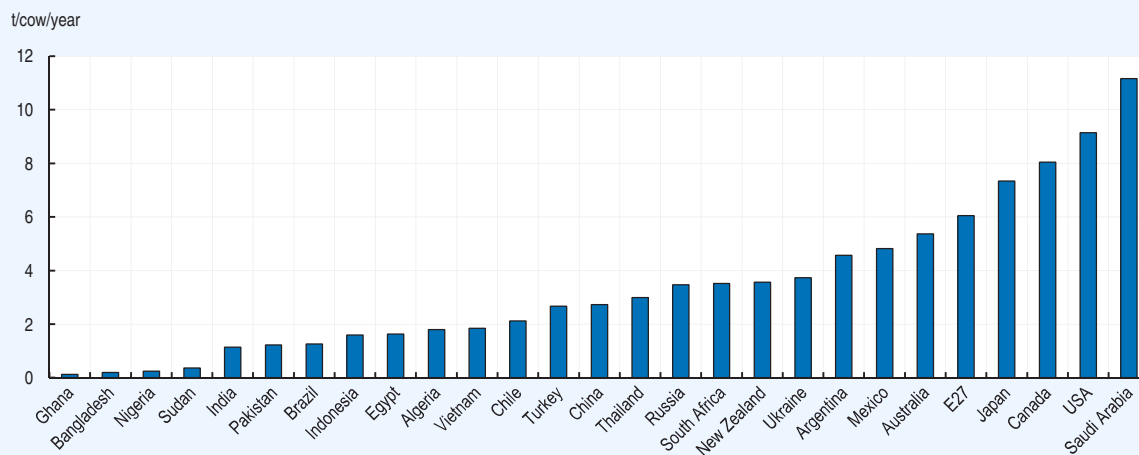
	Mean yield	Growth rate	Growth rate	Growth rate
	2005-09	1961-79	1980-99	2000-09
	Milk/yr	%/yr	%/yr	%/yr
Algeria	1.8	2.8	1.3	5.6
Argentina	4.6	0.3	5.5	1.7
Australia	5.4	1.9	2.8	1.2
Brazil	1.3	0.1	2.4	1.4
China	2.7	1.5	-1.3	4.8
E27	6.1	1.6	1.9	1.5
Egypt	1.6	0	2.1	5.7
India (milk cow)	1.1	1.2	2.9	2.2
India (buffalo cow)	1.6	0.3	1.7	1
Indonesia	1.6	-1.8	2.9	2.1
Japan	7.3	0.8	2.2	1.2
Mexico	4.8	4.7	0.9	1.1
New Zealand	3.6	0.8	0.5	-0.7
Nigeria	0.2	0	0.2	-0.3
The Russian Federation	3.5		1.1	4.4
South Africa	3.5	0.2	1.3	2.8
USA	9.1	2.5	2.1	1.6
Ukraine	3.7		0.2	5.6
World – cows	2.3	0.5	0.8	0.5
World – buffalo	1.5		1.6	0.9
World – sheep	0.04		0.1	0.4
World – goats	0.08		0.1	0.1

Note: For Russian Federation, Ukraine and world numbers, yield growth estimates in the 1980-99 column are based on years 1992-2000 only.

Source: OECD and FAO Secretariats.

StatLink  <http://dx.doi.org/10.1787/888932642516>

Figure 9.9. Cow milk yields, selected countries



Source: OECD and FAO Secretariats.

StatLink  <http://dx.doi.org/10.1787/888932640445>



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