DAIRY

Market situation

Chinese milk production declined by 5.7% in 2013 leading to strong import demand for dairy products and to higher world prices. Additionally, during the first half of 2013, major players on the world dairy market – the United States, the European Union, New Zealand and Australia – produced less milk than a year ago. The main reasons were high feed cost and adverse weather conditions in Oceania and parts of Europe. Prices for skim milk powder (SMP) and whole milk powder (WMP) reached a new peak in April 2013, above the 2007-08 commodity boom level.

Production in the major dairy exporting countries started to increase in mid-2013, as feed prices declined and milk margins improved. Nevertheless, due to continued strong demand on the world market, dairy prices remained high into early 2014.

Prices of dairy products started declining in the beginning of 2014. This price decline accelerated in August with China's declining demand for WMP and the Russian Federation's import ban, for among other products, cheeses from the European Union, the United States, Australia and other origins. Since late 2014, the EU production is less dynamic especially because of binding milk quotas until March 2015, while the seasonal decline in Oceania is stronger than a year ago. On the other hand, the devaluation of the Euro makes EU exports more competitive and results in increasing EU exports of dairy products, and US milk production remains considerably above the year ago level.

Projection highlights

International prices of several dairy products declined in 2014 following new highs attained in 2013. Nominal prices over the medium term are expected to firm. Real prices are projected to decline slightly in the next decade, albeit remaining considerably above the pre-2007 levels.

World milk production is projected to increase by 175 Mt (23%) by 2024 when compared to the base years (2012-14), the majority of which (75%) is anticipated to come from developing countries, especially from Asia. The growth rate for milk production over the projection period is expected to average 1.8% p.a. which is below the 1.9% p.a. witnessed in the last decade. Dairy cow numbers are expected to decline in developed countries, whereas herd expansion in developing countries is projected to slow down. In terms of yield per dairy cow, faster increases are expected than in the previous decade, mainly in developing countries.

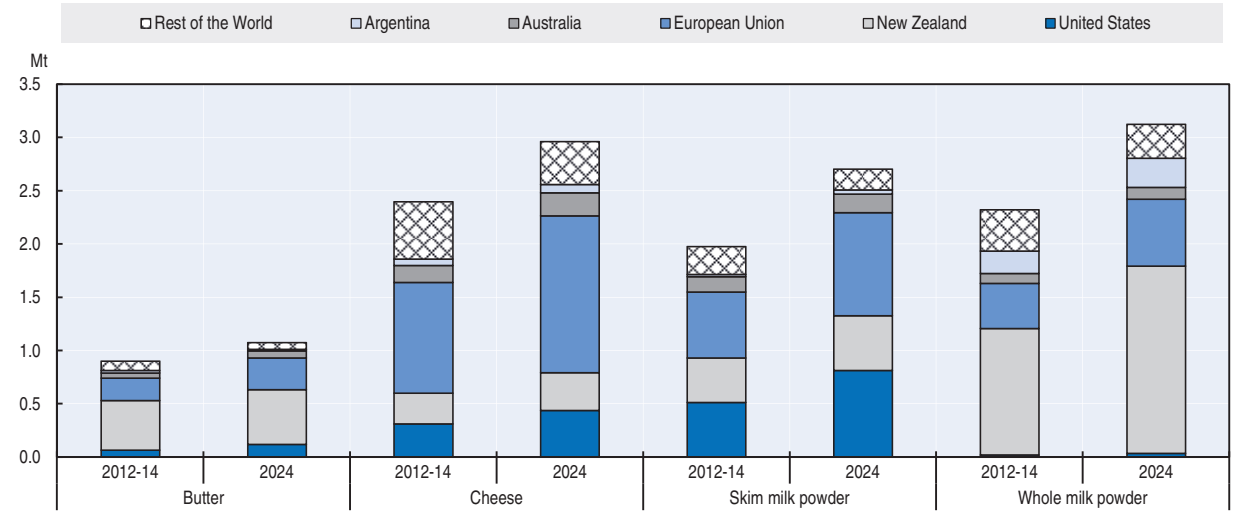
Production growth of the main dairy products (butter, cheese, SMP and WMP) is increasing at the world level at similar pace as milk production. Resulting in a slightly faster increase in the production of fresh dairy products especially in developing countries by 3.0% p.a. where the majority of consumption is in the form of milk or other fresh dairy products.

Per capita consumption of dairy products in developing countries is expected to increase by 1.4% to 2.0% p.a. The expansion in demand reflects continuing albeit more modest income growth and further globalisation of diets. By contrast, per capita consumption in the developed world, reflecting the already relatively high per capita

consumption of these products, is projected to increase between 0.2% and 1.0% p.a., with the lower figure for butter, which competes with vegetable oil, and the higher figure for cheese. Nevertheless, butter recovers from declining consumption in developed countries observed in the last decade.

A general expansion of trade in dairy products is expected over the coming decade. Strong growth is expected for whey, WMP and SMP, at more than 2% p.a. Lower growth is expected for cheese and butter, at 2.0% p.a. and 1.5% p.a., respectively. The bulk of this growth will be satisfied by expanded exports from the United States, the European Union, New Zealand, Australia and Argentina (Figure 3.5). In the recent past, the international dairy market has been supplied by a few countries. This concentration is expected to increase over the next decade. New Zealand is the lead exporter for butter and WMP, whereas the European Union is the main exporter of cheese and SMP.

Figure 3.5. **Exports of dairy products by origin**



Source: OECD/FAO (2015), "OECD-FAO Agricultural Outlook", *OECD Agriculture Statistics* (database), *http://dx.doi.org/10.1787/agr-outl-data-en*.

StatLink *http://dx.doi.org/10.1787/888933229218*

Development of the dairy market remains uncertain, potentially altering market outcomes as described. Major impacts can come from disease outbreaks, trade restrictions, weather developments and policy changes. World demand will remain strong, especially from China. Nevertheless, the development of Chinese self-sufficiency ratios in milk and dairy products is a main determinant of the future price development on world dairy markets. The *Outlook* assumes a slight increase in China's import dependency. The largest supplier of dairy exports, New Zealand, is weather dependent due to the predominantly pasture-based production, and environmental constraints could curb the projected production growth.

The expanded dairy chapter is available at
http://dx.doi.org/10.1787/agr_outlook-2015-11-en

Prices

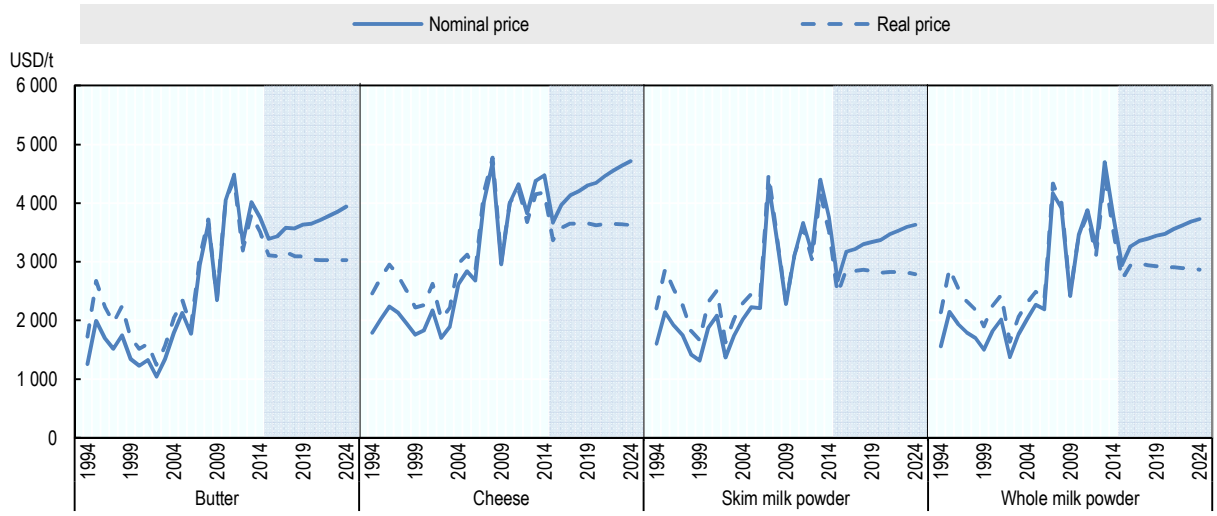
Milk and dairy product prices declined rapidly in the second half of 2014 due to a supply response to the high prices in 2013, a recovery of milk production in the People's Republic of China (hereafter "China") and the import embargo of the Russian Federation for several dairy products from major exporting countries. The price decline was the sharpest for WMP due to stock accumulation in China which led to a progressive but sharp decrease in WMP imports during 2014.

Over the medium-term, increasing incomes and globalisation of diets are expected to raise the demand for milk and dairy products in developing countries. Most of the growth will be satisfied by domestic production via increasing dairy herds and rising yields. The increasing import demand will support prices of dairy products during the next decade (Figure 3.5.2). Cheese prices in nominal terms are expected to rise the fastest over the outlook period and to maintain a considerable premium over the other dairy products. The strong demand increase compared with other dairy products in especially developed countries support an increasing premium but the extent remains uncertain. Except for the price of cheese, nominal prices are not expected to reach the highs of last few years.

Over the next ten years, it is expected that real dairy product prices will decline slightly. This is partly due to the current higher price levels but also to the expected continued productivity growth in the dairy sector (Figure 3.5.2). Nevertheless, real prices will be substantially higher than in the period before 2007.

The price projections reflect the usual assumptions of stability in weather and in economic and policy conditions. Under these "normal" conditions, prices are not expected to reach the peak levels of 2007-08, 2011 or 2013. However, actual price outcomes are likely to exhibit significant variations around the projection trend.

Figure 3.5.2. Dairy product prices



Note: Butter, Skim Milk Powder, F.o.b. export price, non-fat dry milk, 1.25% butterfat, Oceania; Whole Milk Powder, F.o.b. export price, 26% butterfat, Oceania; Cheese, , F.o.b. export price, cheddar cheese, 39% moisture, Oceania. Real prices are nominal world prices deflated by the US GDP deflator (2010=1).

Source: OECD/FAO (2015), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

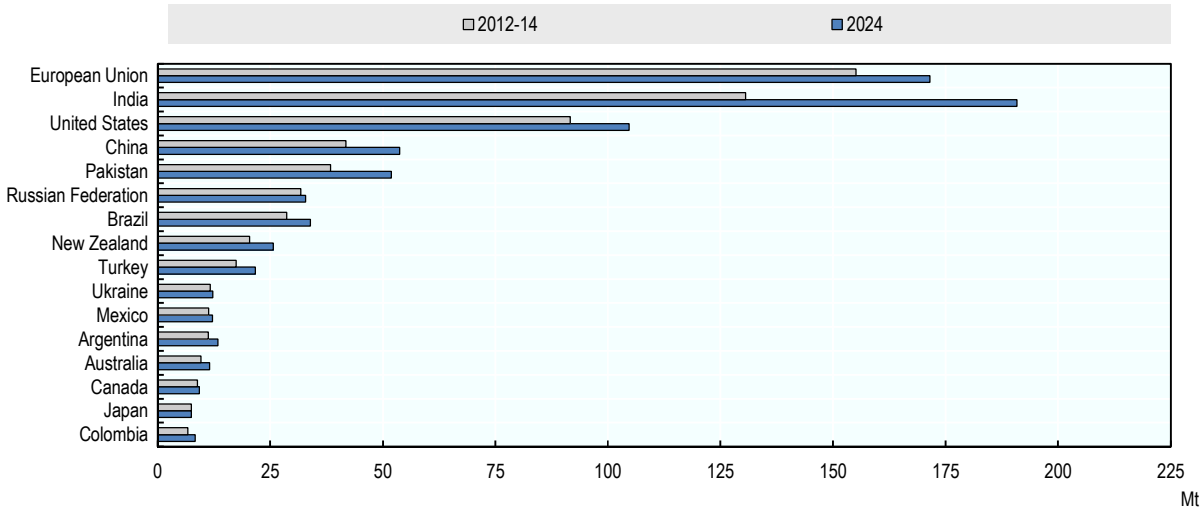
StatLink http://dx.doi.org/10.1787/888933229523

Production

Growth in world milk production is expected to decrease slightly over the next decade, from 1.9% to 1.8% p.a. Even with growth rates slowing down from 3.0% p.a. in the previous decade to 2.7% p.a. in the next ten years, 75% of the additional supply will come from developing countries. In developing countries, additional production will come from yield growth (1.4% p.a.) and an increasing dairy herd (1.3% p.a.). This is a change from the last decade when production grew mostly from expanding dairy herds by 2.5% p.a. while yield increased only by 0.5% p.a. reflecting improved productivity but also limitations for herd expansion due to constraints in water and land availability especially in Asia.

India is expected to outpace the European Union and will become the largest milk producer in the world. Almost the entire Indian production, with a very high share of buffalo milk, is consumed fresh, and only very small amounts are further processed (Figure 3.5.3).

Figure 3.5.3. Outlook for milk production



Source: OECD/FAO (2015), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

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China, although a much smaller producer and consumer of milk and dairy products than India, is more important for international dairy markets. China's imports of dairy products have increased substantially in recent years, which was partly fuelled by slow growth in domestic milk production in the last five years, following food safety problems related to milk adulterated with melamine in 2008, and a substantial decline in 2013. It is expected that the Chinese dairy sector can overcome its challenges in the coming decade and China's import demand will grow at a considerably lower rate.

In developed countries, milk yield growth (1.1% p.a.) is projected at a higher rate than total production growth (0.8% p.a.), which implies a continuation of the trend in the last decade of falling dairy herd size. Nevertheless, there are considerable differences between major milk producing countries and regions.

Milk output growth is expected to be constrained in New Zealand, the largest milk exporter, compared to the previous decade, from 5.1% to 1.9% p.a., because of increasing production costs and environmental factors. Most of the growth will come from a further increase in the dairy herd, as the mainly pasture-based, extensive milk production system, implies a continuation of low yield per dairy cow. A limitation of the dairy cow

herd growth is due to a more stable sheep herd projected for the next decade, which is competing for pasture.

Milk production in the United States is expected to increase by 0.9% p.a. during the next decade, implying a slightly declining dairy herd (-0.1% p.a.) and a continued growth in milk yields by 1.0% p.a. A similar development is projected for Australia with strong yield growth at 1.8% p.a. This strong growth is based on the assumption of a further shift of dairy production to be compound feed based.

Slow growth in European Union milk production is projected over the coming decade (0.7% p.a.) in response to slow growth in domestic demand. Growing world demand is the main driver behind the European Union's output expansion with the EU benefiting from an improved competitiveness due to the weaker Euro. The end of the EU milk quota in 2015 is likely to have a small impact on overall milk production in the European Union, but it may lead to a further concentration of milk production in some regions. In addition, environmental constraints in these regions might limit further growth.

The processing of milk into the four main dairy products – butter, cheese, SMP and WMP – is increasing at the world level at a similar pace to milk production. In the outlook period it is expected that butter (2.2% p.a.), and WMP (2.7% p.a.) increase faster than world milk production (1.8% p.a.), whereas cheese (1.5% p.a.), and SMP (1.8% p.a.) grow slower. The differential growth rates also reflect that for butter and WMP the majority of the production occurs in developing countries with a faster growth in milk production, whereas cheese and SMP production is mostly in developed countries.

Consumption

The largest share of milk and dairy product consumption is in the form of fresh dairy products, taking up about 70% of the world's total milk production. This share continues to increase in the next ten years due to raising milk production in developing countries. The total consumption of fresh dairy products in developing countries is expected to increase by 3.0% p.a. over the projection period, exceeding the growth of milk production by 2.7% p.a.

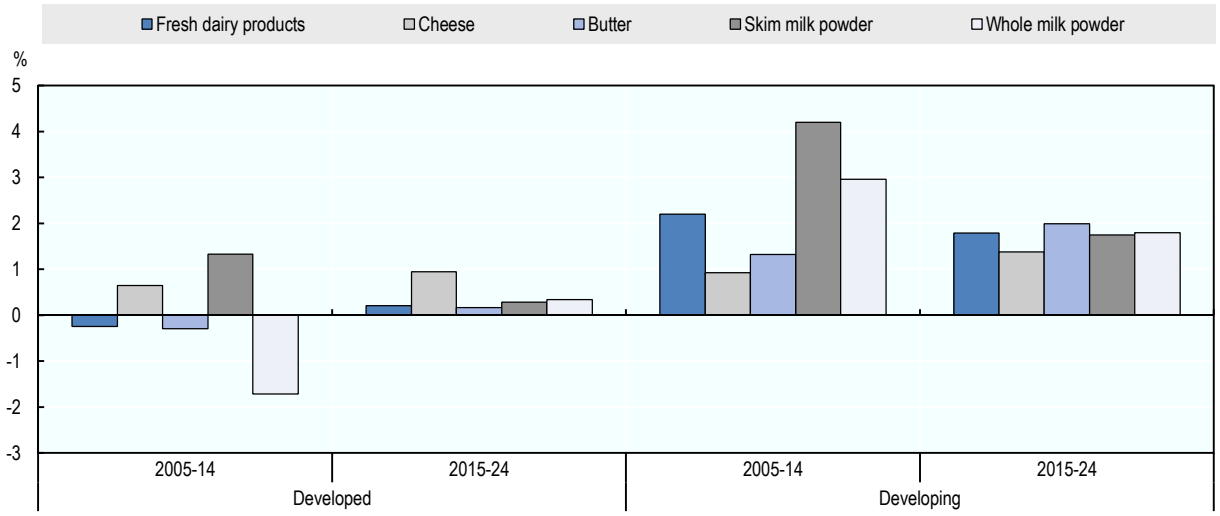
Per capita consumption of dairy products in developing countries is expected to increase on average by 2.0% p.a. for butter, 1.8% p.a. for WMP, 1.7% p.a. for SMP and 1.4% p.a. for cheese (Figure 3.5.4). In the case of SMP and WMP these rates are a considerable slowdown from last decade, whereas for butter and cheese they show an accelerating growth for the coming decade.

By 2024, per capita consumption of fresh dairy products in India is expected to increase to around 160 kg per capita, compared to per capita consumption of around 107 kg in Australia, 94 kg in the European Union, 91 kg in New Zealand, 76 kg in Canada, 75 kg in the United States and 27 kg in China. Per-capita consumption of fresh dairy products in developing countries is expected to grow by 1.8% p.a. comparable to most dairy products but slightly slower than before.

Per capita demand is projected to grow in developed countries, the strongest growth rates are for cheese at 1% p.a. In the case of butter and fresh dairy products small increases are projected in contrast with declines during the last decade. This reflects the observation of increasing demand for dairy fat especially in the form of cream, and butter in spreads and industrial use.

The high butter to vegetable oil price ratio is assumed to constrain demand for butter and milk fat. The increasing replacement of milk fat by vegetable oils occurs in food preparations, fat-filled powders, table spreads and cooking oil, exerting downward pressure on butter consumption and prices.

Figure 3.5.4. Development of annual growth rates for per capita consumption of dairy products



Source: OECD/FAO (2015), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

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Trade

A general expansion in dairy trade is expected over the coming decade. The growth rates differ among dairy products at 1.6% annually for butter, cheese (2.2% p.a.), SMP (2.8% p.a.) and WMP (2.4% p.a.). The bulk of this growth will be met by increased exports from the United States, European Union, New Zealand and Australia. These four countries jointly account for 73% of world cheese, 80% of world WMP, 85% of world butter and 87% of world SMP exports in 2024 (Figure 3.5).

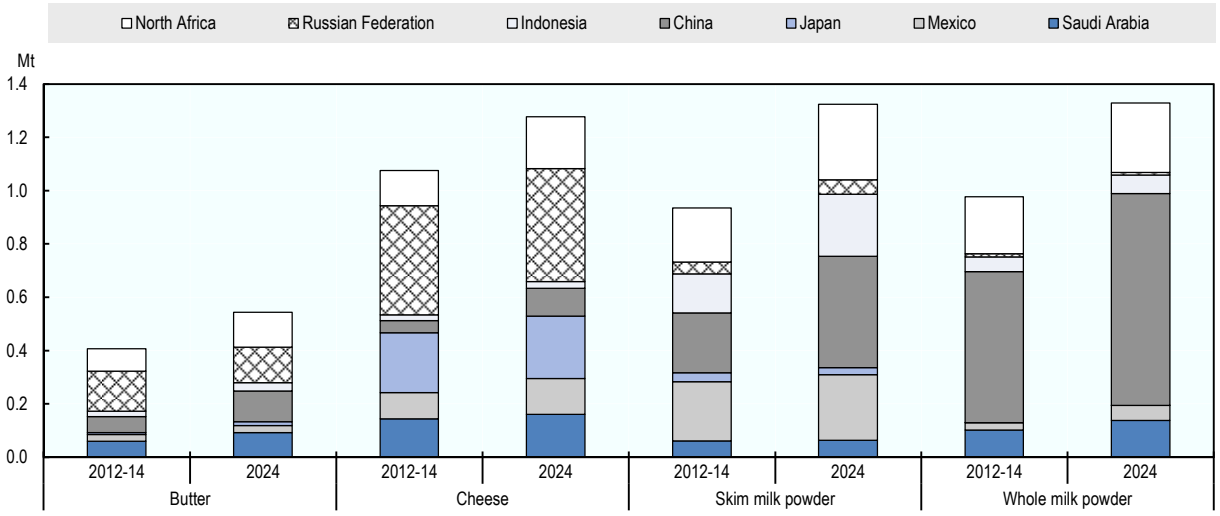
The European Union will remain the main cheese exporter (accounting for 38% of world exports in 2024), growing at a faster pace of 4.0% p.a. than the other major cheese exporters, i.e. New Zealand (2.4% p.a.), the United States (3.5% p.a.) and Australia (3.4% p.a.). Several other countries like Saudi Arabia, Belarus, Ukraine, Egypt, Turkey and Argentina export considerable amounts of cheese predominantly to neighbouring markets. Nevertheless, only about 12% of world cheese production is traded internationally. New Zealand remains the primary source for butter on the international market, with a 48% market share, although losing some share to the other major exporters.

The share of world WMP and SMP production that is exported in 2024 is high at a projected 47% and 57%, respectively. Although demand for fresh dairy products is much greater, trade is limited partly due to transportability constraints. In recent years, trade in fresh dairy products increased rapidly from a very low base, especially from Oceania and the European Union to China. In the case of WMP, it is expected that New Zealand can increase its share of world trade over the next decade to 56% in 2024 from 51% in 2012-14. Other important exporters are the European Union, Argentina and Australia. The United States and the European Union are the two main exporters of SMP at 32% and 30% of world exports in 2024, respectively. The main trade flow of SMP accounting for more than 90% trade is from developed to developing countries.

In contrast to dairy exports, imports are much wider spread and generally the dominant destinations for dairy products are developing countries, especially in Asia and Africa. Only for cheese do considerable imports occur in developed countries, especially by the Russian Federation and Japan (Figure 3.5.5).

Cheese imports in developed countries are currently higher than in developing countries, but it is expected that cheese imports in developing countries will grow at a much faster rate (3.6% p.a.) than in developed countries(0.4% p.a.) and cheese imports in developing countries will exceed those of developed countries by 2024. The Russian Federation remains the primary importer followed by Japan, Saudi Arabia and the United States. The Russian Federation remains the main destination of butter, but domestic production increases faster than consumption and imports continue to decline. Increases in butter imports are expected in developing countries, the main destinations are China, Saudi Arabia and Egypt.

Figure 3.5.5. Major dairy product importers



Source: OECD/FAO (2015), "OECD-FAO Agricultural Outlook", OECD Agriculture statistics (database), http://dx.doi.org/10.1787/agr-outl-data-en.

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WMP imports skyrocketed in recent years in China, and a further continuation is expected but at a slower rate (1.9% p.a.) compared to the 37% p.a. in the last decade. Other important destinations remain Algeria, Nigeria and Saudi Arabia. In the case of SMP, China will become the world's major importer. Mexico, Indonesia, Algeria, Malaysia, Philippines and Korea are other major importers; all with continued growth but at a considerably slower pace than in the previous decade, mainly due to a higher base level and a limited demand growth for SMP due to growing preference for fresh dairy products.

Main issues and uncertainties

The development of Chinese imports of milk and dairy products is a main determinant of the future price development on world dairy markets. Milk production increased strongly in 2014 but the future path remains uncertain especially as the Chinese dairy industry is in a phase of restructuring. Substantial investments in Chinese dairy might result in a faster growth whereas environmental limitations especially for water curb the growth potential.

In April 2015, the European Union system of milk quotas ended. The *Outlook* projects a smooth transition, because historically, output remained well below EU quota levels for most EU member states and during several years the milk quota was increased by 1% p.a. to allow for some growth in member states limited by quota levels. Nevertheless the adjustment to the new policy environment may cause higher volatility of milk production and dairy product supply from the European Union.

Dairy demand and export opportunities could also be affected by the outcome of various free trade agreements (FTA) and regional trade agreements (RTA) currently under discussion. These agreements could increase international dairy trade through specific market access changes and also by simplifying bilateral sanitary requirements. On the other hand, the current Russian Federation embargo on several dairy products from major exporting countries is expected to end in 2015; any continuation could affect trade flows and international dairy prices.

As seen in recent years, unusual weather events can have a major impact on dairy markets through their impact on feed grains or pasture conditions. The *Outlook* assumes normal weather conditions from 2015 onwards. However, as climate change models increasingly predict an increase in the incidence and severity of extreme weather events, the probability of abnormal conditions may be increasing. The largest supplier of dairy exports, New Zealand, is weather dependent due to its predominantly pasture-based production.

Environmental legislation can have strong impacts on the future development of dairy production. The greenhouse-gas emissions from dairy activities make up a considerable share of the total emissions in some countries, and any changes in related policies could affect dairy production. Water access and manure management are additional areas where policy changes could have an impact on the dairy industry. It is also assumed that no major outbreaks of animal diseases occur during the outlook period, which could rapidly alter the setting.

Table 3.A1.5. **World dairy projections: Butter and cheese**

Calendar year

		Average 2012-14est	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
BUTTER												
World												
Production	kt pw	9 972	10 357	10 537	10 760	11 021	11 266	11 520	11 759	12 013	12 272	12 522
Consumption	kt pw	9 890	10 279	10 528	10 746	11 002	11 233	11 487	11 727	11 983	12 241	12 491
Stock changes	kt pw	1	16	5	2	1	0	0	-1	-2	-2	-2
Price[1]	USD/t	3 695	3 387	3 433	3 578	3 571	3 635	3 648	3 711	3 784	3 852	3 937
Developed countries												
Production	kt pw	4 442	4 581	4 577	4 617	4 665	4 702	4 749	4 780	4 814	4 847	4 879
Consumption	kt pw	3 916	3 993	4 036	4 052	4 075	4 081	4 107	4 121	4 138	4 155	4 173
Developing countries												
Production	kt pw	5 530	5 777	5 960	6 143	6 356	6 564	6 771	6 979	7 200	7 425	7 643
Consumption	kt pw	5 974	6 286	6 493	6 694	6 927	7 152	7 380	7 607	7 845	8 086	8 318
OECD[2]												
Production	kt pw	4 131	4 263	4 273	4 323	4 377	4 421	4 477	4 516	4 560	4 602	4 643
Consumption	kt pw	3 535	3 643	3 676	3 702	3 731	3 745	3 781	3 804	3 831	3 858	3 887
Stock changes	kt pw	1	16	5	2	1	0	0	-1	-2	-2	-2
CHEESE												
World												
Production	kt pw	21 501	22 284	22 483	22 874	23 273	23 651	24 037	24 367	24 717	25 078	25 466
Consumption	kt pw	21 251	21 997	22 277	22 626	23 005	23 387	23 775	24 107	24 460	24 824	25 211
Stock changes	kt pw	23	32	-49	-7	13	9	8	5	2	0	1
Price[3]	USD/t	4 226	3 667	3 974	4 130	4 201	4 299	4 346	4 457	4 558	4 640	4 714
Developed countries												
Production	kt pw	17 311	17 865	18 057	18 397	18 705	19 003	19 319	19 575	19 834	20 098	20 387
Consumption	kt pw	16 576	17 042	17 206	17 434	17 669	17 919	18 166	18 357	18 560	18 768	18 996
Developing countries												
Production	kt pw	4 190	4 419	4 425	4 478	4 568	4 648	4 718	4 792	4 882	4 980	5 079
Consumption	kt pw	4 674	4 956	5 071	5 193	5 336	5 469	5 608	5 751	5 900	6 056	6 216
OECD[2]												
Production	kt pw	16 714	17 338	17 478	17 770	18 054	18 336	18 628	18 862	19 102	19 351	19 629
Consumption	kt pw	15 879	16 374	16 506	16 729	16 958	17 200	17 443	17 626	17 823	18 025	18 247
Stock changes	kt pw	23	32	-49	-7	13	9	8	5	2	0	1

Note: Calendar year: Year ending 30 June for Australia and 31 May for New Zealand in OECD aggregate.
Average 2012-14est: Data for 2014 are estimated.

1. F.o.b. export price, butter, 82% butterfat, Oceania.
2. Excludes Iceland but includes all EU28 member countries.
3. F.o.b. export price, cheddar cheese, 39% moisture, Oceania.

Source: OECD/FAO (2015), "OECD-FAO Agricultural Outlook", *OECD Agriculture Statistics* (database). doi: http://dx.doi.org/10.1787/agr-outl-data-en

StatLink http://dx.doi.org/10.1787/888933229796

Table 3.A1.6. **World dairy projections: Powders and casein**

Calendar year

		Average 2012-14est	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
SKIM MILK POWDER												
World												
Production	kt pw	3 804	4 081	4 121	4 196	4 286	4 369	4 447	4 528	4 606	4 687	4 776
Consumption	kt pw	3 826	4 057	4 125	4 197	4 287	4 369	4 447	4 526	4 604	4 686	4 775
Stock changes	kt pw	2	1	-2	-2	-2	0	1	2	1	1	0
Price[1]	USD/t	3 771	2 678	3 172	3 213	3 301	3 337	3 371	3 463	3 524	3 592	3 630
Developed countries												
Production	kt pw	3 356	3 623	3 662	3 726	3 821	3 907	3 982	4 059	4 138	4 210	4 284
Consumption	kt pw	1 825	1 871	1 888	1 888	1 909	1 918	1 922	1 931	1 936	1 946	1 959
Developing countries												
Production	kt pw	448	458	458	470	465	462	465	469	468	477	492
Consumption	kt pw	2 001	2 186	2 236	2 309	2 378	2 451	2 524	2 595	2 668	2 741	2 817
OECD[2]												
Production	kt pw	3 191	3 457	3 496	3 559	3 652	3 737	3 809	3 885	3 962	4 035	4 115
Consumption	kt pw	1 982	2 052	2 071	2 071	2 092	2 100	2 106	2 116	2 122	2 133	2 148
Stock changes	kt pw	2	1	-2	-2	-2	0	1	2	1	1	0
WHOLE MILK POWDER												
World												
Production	kt pw	4 843	5 224	5 382	5 534	5 691	5 871	6 017	6 176	6 333	6 499	6 657
Consumption	kt pw	4 854	5 224	5 382	5 534	5 691	5 871	6 017	6 176	6 333	6 499	6 657
Stock changes	kt pw	1	0	0	0	0	0	0	0	0	0	0
Price[3]	USD/t	3 900	2 941	3 263	3 357	3 395	3 444	3 473	3 560	3 616	3 682	3 728
Developed countries												
Production	kt pw	2 237	2 519	2 562	2 630	2 703	2 781	2 845	2 917	2 985	3 051	3 117
Consumption	kt pw	563	620	597	602	608	612	618	623	630	635	641
Developing countries												
Production	kt pw	2 606	2 705	2 820	2 904	2 988	3 091	3 172	3 258	3 348	3 448	3 540
Consumption	kt pw	4 291	4 604	4 784	4 932	5 083	5 260	5 398	5 552	5 703	5 864	6 016
OECD[2]												
Production	kt pw	2 472	2 752	2 801	2 873	2 950	3 030	3 097	3 173	3 246	3 316	3 387
Consumption	kt pw	837	903	888	901	914	926	941	954	968	982	997
Stock changes	kt pw	1	0	0	0	0	0	0	0	0	0	0
WHEY POWDER												
Wholesale price, United States[4]	USD/t	1 296	1 221	1 278	1 244	1 296	1 290	1 287	1 316	1 313	1 324	1 318
CASEIN												
Price[5]	USD/t	8 924	8 683	9 215	9 121	9 306	9 207	9 213	9 338	9 332	9 434	9 338

Note: Calendar year: Year ending 30 June for Australia and 31 May for New Zealand in OECD aggregate.
Average 2012-14est: Data for 2014 are estimated.

1. F.o.b. export price, non-fat dry milk, 1.25% butterfat,Oceania.
2. Excludes Iceland but includes all EU28 member countries.
3. F.o.b. export price, WMP 26% butterfat, Oceania.
4. Dry whey, West Region, United States.
5. Export price, New Zealand.

Source: OECD/FAO (2015), "OECD-FAO Agricultural Outlook", *OECD Agriculture Statistics* (database). doi: http://dx.doi.org/10.1787/agr-outl-data-en

StatLink http://dx.doi.org/10.1787/888933229804