



NOVEMBER 2023

Global Dairy UPDATE



- Australia and EU monthly production increased. New Zealand and US monthly production decreased.

- New partnership offers Fonterra farmers cheaper, cleaner refrigeration.



- New Zealand monthly exports increased. Australia EU and US monthly exports decreased.



- Asia and Middle East & Africa monthly imports increased. Latin America and China monthly imports decreased.

- National Chemistry Week.



- Fonterra New Zealand milk collections in October were 200.0 million kgMS, down 0.3% on the prior season.
- Fonterra Australia milk collections in October were 12.1 million kgMS, down 0.9% on the prior season.



- The next issue of the Global Dairy Update will be published on 31 January 2024.

Key Dates



7 December 2023
FY24 Q1 Business Update

March 2024
FY24 Interim Results Announcement



Australia and EU monthly production increased. New Zealand and US monthly production decreased

To view a chart that illustrates year-on-year changes in production –

NEW ZEALAND

0.3% ↓

Change for October 2023 compared to October 2022

0.6% ↑

Change for the 12 months to October 2023

New Zealand milk production was down 0.3% on a litres basis, (up 1.0% on milk solids basis) in October compared to the same period the year prior.

Rain in the North Island caused unfavourable pasture conditions.

New Zealand milk production for the 12 months to October was up 0.6% on the previous comparable period.

Fonterra New Zealand collections are reported for October, see page 5 for details.

AUSTRALIA

0.5% ↑

Change for September 2023 compared to September 2022

3.3% ↓

Change for the 12 months to September 2023

Australia milk production increased 0.5% in September compared to the same period the year prior.

The increase was driven by a recovery in pasture production despite lower-than-average rainfall in most regions.

Australia milk production for the 12 months to September was down 3.3% on the previous comparable period.

Fonterra collections in Australia are reported for October, see page 5 for details.

EUROPEAN UNION

0.1% ↑

Change for August 2023 compared to August 2022

0.9% ↑

Change for the 12 months to August 2023

EU milk production¹ increased 0.1% in August compared to the same period the year prior.

The increase was driven by Germany, Poland, and Belgium, and partially offset by decreases in France and Ireland.

EU milk production for the 12 months to August was up 0.9% on the previous comparable period.

The increase was driven primarily by Germany, the Netherlands and Poland, partially offset by decreases in France and Italy.

USA

0.5% ↓

Change for October 2023 compared to October 2022

0.3% ↑

Change for the 12 months to October 2023

US milk production decreased 0.5% in October compared to the same period the year prior.

Smaller herd numbers and marginally lower milk yield resulted in a decline in monthly production year-on-year.

Milk production for the 12 months to October increased 0.3% on the previous comparable period.

¹ Excludes UK.



New Zealand monthly exports increased. Australia, EU and US monthly exports decreased

To view a chart that illustrates year-on-year changes in exports –

NEW ZEALAND

12.1%↑

Change for October 2023 compared to October 2022

2.1%↑

Change for the 12 months to October 2023

Total New Zealand dairy exports increased 12.1%, or 33,534 MT, in October compared to the same period the year prior.

The increase was mainly due to higher exported volumes of WMP to Algeria and Southeast Asia, SMP to Thailand and cheese to China and Australia.

Exports for the 12 months to October were up 2.1%, or 71,414 MT, on the previous comparable period.

This was mainly due to increases in SMP, cheese, butter and AMF, partially offset by decreases in WMP and fluid milk products.

AUSTRALIA

12.2%↓

Change for September 2023 compared to September 2022

28.8%↓

Change for the 12 months to September 2023

Australia dairy exports decreased 12.2%, or 7,318 MT, in September compared to the same period the year prior.

The decrease in exports was mainly due to lower export volumes of fluid milk products and sweetened milk powder and Australia's higher milk prices making exports uncompetitive.

Exports for the 12 months to September were down 28.8%, or 261,689 MT, on the previous comparable period.

This was mainly due to lower export volumes of fluid milk products, SMP, and cheese, partially offset by increases in lactose and whey powder.

EUROPEAN UNION

6.2%↓

Change for September 2023 compared to September 2022

1.8%↓

Change for the 12 months to September 2023

EU dairy exports decreased 6.2%, or 33,984 MT, in September compared to the same period the year prior.

The decrease was mainly due to lower export volumes of fluid milk products and infant formula to China. This was partially offset higher export volumes of SMP to Algeria and Vietnam.

Exports for the 12 months to September were down 1.8%, or 121,397 MT, on the previous comparable period.

This was mainly due to lower volumes of fluid milk products to China, and partially offset by higher export volumes of SMP to Algeria and Vietnam and whey to Southeast Asia.

USA

8.7%↓

Change for September 2023 compared to September 2022

3.7%↓

Change for the 12 months to September 2023

US dairy exports decreased 8.7%, or 20,759 MT, in September compared to the same period the year prior.

The decrease was mainly due to lower export volumes of SMP to Mexico and Southeast Asia as US domestic SMP production decreased.

Exports for the 12 months to September were down 3.7%, or 103,491 MT, on the previous comparable period.

This was mainly due to lower exports of whey and fluid milk products, and partially offset by higher volumes of lactose.



To view a chart that illustrates year-on-year changes in imports –

Asia and Middle East & Africa monthly imports increased. Latin America and China monthly imports decreased

LATIN AMERICA

8.2% ↓

Change for September 2023 compared to September 2022

9.0% ↑

Change for the 12 months to September 2023

Latin America dairy import volumes¹

decreased 8.2%, or 16,884 MT, in September compared to the same period the year prior.

The decrease was mainly due to lower volumes of SMP to Mexico and WMP to Brazil following increased imports in prior months.

Imports for the 12 months to September were up 9.0%, or 200,553 MT, on the previous comparable period.

This was mainly due to higher WMP volume to Brazil as domestic milk production weakens. And Mexico's SMP imports increased due to economic improvement and a stronger Peso.

ASIA

1.2% ↑

Change for September 2023 compared to September 2022

5.8% ↓

Change for the 12 months to September 2023

Asia (excluding China) dairy import volumes¹

increased 1.2%, or 4,862 MT, in September compared to the same period the year prior.

The increase was mainly due to higher SMP volumes to Vietnam, catching up from lower volumes in prior months, and increased whey imports to Malaysia and India.

Imports for the 12 months to September were down 5.8%, or 299,977 MT, on the previous comparable period.

This was mainly due to lower volumes of SMP, fluid milk products, cheese, infant formula and WMP.

MIDDLE EAST & AFRICA

0.7% ↑

Change for September 2023 compared to September 2022

4.2% ↑

Change for the 12 months to September 2023

Middle East and Africa dairy import volumes¹

increased 0.7%, or 3,169 MT, in September compared to the same period the year prior.

The increase was mainly due to higher volumes of SMP to United Arab Emirates.

Imports for the 12 months to September were up 4.2%, or 228,592 MT, on the previous comparable period.

This was mainly due to higher volumes of SMP to Algeria, Saudi Arabia and the United Arab Emirates and WMP to Algeria. This was partially offset by lower volume of fluid milk product to Iraq and Kuwait.

CHINA

4.1% ↓

Change for October 2023 compared to October 2022

9.8% ↓

Change for the 12 months to October 2023

China dairy import volumes

decreased by 4.1%, or 9,946 MT, in October compared to the same period the year prior.

The decrease was driven by lower import volumes of WMP, infant formula and whey. This was partially offset by an increase in demand for lactose and cheese.

Imports for the 12 months to October were down 9.8%, or 343,566 MT, on the previous comparable period.

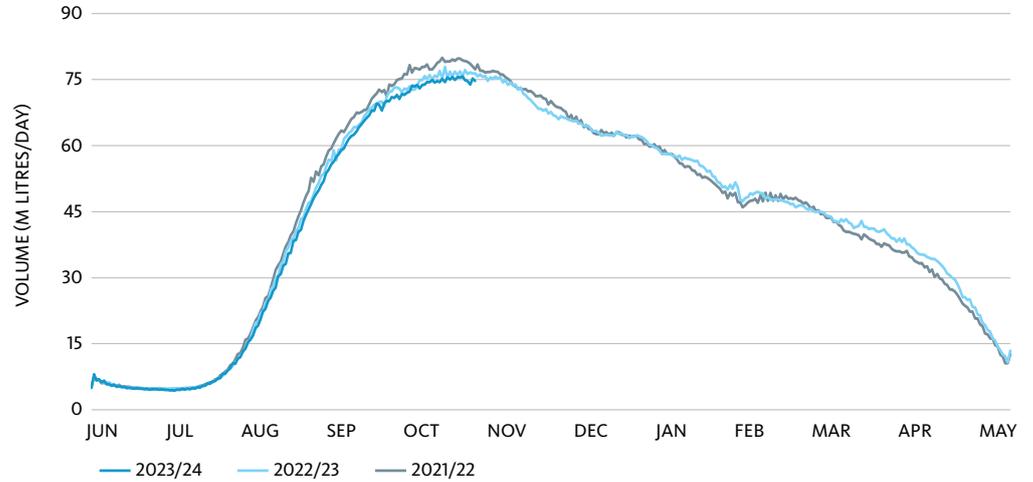
This was due to a decline in import demand for fluid milk products and WMP reflecting excess domestic supply.

¹ Estimates are included for those countries that have not reported data.



To view a table that shows detailed milk collections in New Zealand and Australia compared to the previous season –

New Zealand Milk Collections



NEW ZEALAND

0.3% ↓

Change for October 2023 compared to October 2022

0.7% ↓

Season-to-date 1 June to 31 October

Fonterra's New Zealand collections for October were 200.0 million kgMS, 0.3% behind October last season.

The decrease was due to lower collections in the North Island partially offset by stronger milk collections in the South Island.

Season-to-date collections were 489.4 million kgMS, 0.7% behind last season.

Forecast Milk Price pressures and farm working expenses remaining high are seeing some farmers reduce spending and potentially lowering overall productivity on farm.

NORTH ISLAND

2.2% ↓

Change for October 2023 compared to October 2022

2.8% ↓

Season-to-date 1 June to 31 October

North Island milk collection in October was 113.8 million kgMS, 2.2% behind October last season.

Season-to-date collections were 306.3 million kgMS, 2.8% behind last season.

October weather in the North Island has continued to be unfavourable for pasture quality.

SOUTH ISLAND

2.4% ↑

Change for October 2023 compared to October 2022

3.1% ↑

Season-to-date 1 June to 31 October

South Island milk collection in October was 86.2 million kgMS, 2.4% ahead of October last season.

Season-to-date collections were 183.1 million kgMS, 3.1% ahead of last season.

South Island has performed well despite a brief cold snap in the lower south. A good run of favourable weather conditions has resulted in strong milk flows in the central south.

AUSTRALIA

0.9% ↓

Change for October 2023 compared to October 2022

0.4% ↓

Season-to-date 1 July to 31 October

Fonterra's Australia collections in October were 12.1 million kgMS, 0.9% behind October last season.

Collections decreased in October mainly due third-party collections.

Season-to-date collections were 34.2 million kgMS, 0.4% behind last season.

Collections decreased mainly due to a return to drier weather patterns.

For the period 1 June 2023 to 31 October 2023, off-GDT sales have contributed approximately 3 cents per kgMS to the Farmgate Milk Price for the 2023/24 season.

Outlook for Fonterra in New Zealand

NZD per kgMS **6.50-8.00**

Forecast Farmgate Milk Price for the 2023/24 season

1,465M kgMS

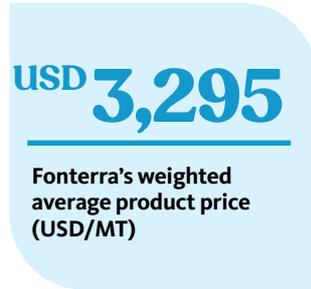
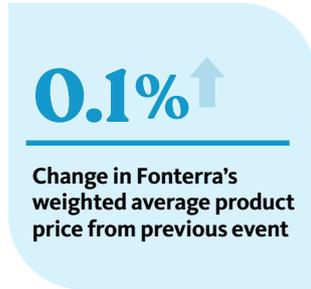
Forecast milk collection for the 2023/24 season

OUR MARKETS

Fonterra Global Dairy Trade Results



Fonterra GDT results at trading event 344
21 November 2023:



WMP



AMF



BUTTER



SMP



CHEDDAR

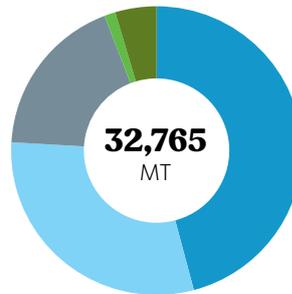


Fonterra GDT sales by destination:

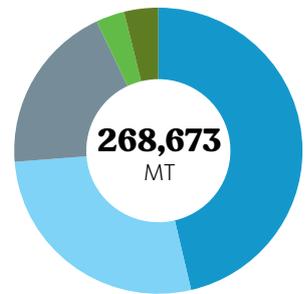


To view more information, including a snapshot of the rolling year-to-date results –

LATEST AUCTION



FINANCIAL YEAR-TO-DATE



▶ The next trading event will be held on 5 December 2023. Visit www.globaldairytrade.info for more information.

Dairy commodity prices and New Zealand dollar trend

The US Federal Reserve's mantra that interest rates in the US will remain high for some time yet is being challenged by financial markets as early signs of weakness in the labour market, and inflation, have resulted in the assessment that interest rates have likely peaked and will require lowering within the next year. In response, the USD declined allowing the NZD/USD exchange rate to recover from below 58 US cents to above 60 US cents.





New partnership offers Fonterra farmers cheaper, cleaner refrigeration

An innovative new project dubbed Pay-As-You-Save (PAUS) launched on 7 November 2023 to make it easier for Fonterra farmers to access next generation milk chilling technology and enjoy the many benefits that come with it.

Milk chilling systems are critical in ensuring milk gets to the required temperature of 6°C or below within two hours of milking, but the units represent a significant capital investment for farmers and can become increasingly costly as they age. Older units also use hydrofluorocarbons (HFCs), which is a coolant gas that is being phased down in New Zealand and across the globe and are much more limited in terms of their technology and features.

The PAUS initiative offers Fonterra farmers the option to lease new cutting-edge systems rather than having to purchase them as they've typically done in the past.

There are a number of benefits for farmers as well as the environment, including:

- **Hassle-free maintenance:** full servicing of the chilling units overseen by Cool Group as part of the lease agreement.
- **Cost effective:** farmers have lease payments deducted from their monthly milk cheque from Fonterra, with the option to extend the lease when it rolls over or buy the unit at any point.
- **Electricity savings:** the units generate hot water, unlike most existing systems where heat is wasted. Farmers can use this for cleaning the milking shed

and make significant savings on their electricity bill. This feature, combined with how efficiently the system itself runs, mean that Dairy Shed power consumption can be reduced by up to 30% on average.

- **Reduced emissions:** the leased units use what's known as fourth generation refrigerants instead of HFCs. They have shown a reduction in CO₂e of up to 80% compared to older systems.
- **Milk quality benefits:** milk snap chilling to 6°C or below to comply with milk chilling regulations. Older systems can struggle to achieve this, particularly as they age.
- **Improved technology:** the units deliver transparent data and allow real-time remote monitoring.

"After years of wrestling with rising repair costs and aging chilling systems, the PAUS initiative will be a game-changer for Fonterra suppliers like me," says Timaru farmer Bruce Murphy, who has been an early adopter of the technology.

"The hassle-free nature of the scheme means I have more time to do other things on the farm and its leasing model eases the financial burden. The benefits of extra hot water, lower power bills and the environmental aspects really help sustainable farming and improve milk quality."

Anne Douglas, Group Director of Fonterra Farm Source, says the Co-operative was keen to be involved given the project brings both short and long-term benefits.

"We're delighted to be part of this collaboration because it delivers value to Fonterra farmers through things like improved efficiencies while also helping lower on-farm emissions. It's an exclusive deal

that we can offer in large part because of the scale of our Co-operative and strength of our partnerships."

PAUS has been set up as a subsidiary of Cool Group, a New Zealand-owned and operated company whose other subsidiary Coolsense is an Original Equipment Manufacturer (OEM) specialising in commercial and industrial chilling systems. "This initiative is more than just a product offering," says Allan Steele, Cool Group CEO.

"It's a commitment to supporting sustainable dairy farming, reducing our collective carbon footprint, and enhancing the efficiency of milk production. The environmental and economic advantages of the PAUS project have been field-proven, marking a significant stride in the journey to more sustainable milk production. And we are excited to be working with all our partners in making a difference."

New Zealand Green Investment Finance (NZGIF) is providing the necessary financing for the leasing of these chilling systems.

"By financing this initiative, we're championing a transformative step in sustainable farming practices," says Jason Patrick, Chief Investment Officer, NZGIF.

"The \$10 million asset finance facility from NZGIF should assist Cool Group to offer low emission chilling infrastructure to 200+ farms in the next three years,"

Another important aspect is the destruction of HFC refrigerants from the legacy equipment which is being undertaken in partnership with Cool-Safe, New Zealand's product stewardship scheme for handling the very high global warming potential gases being recovered from

many of the older refrigeration systems. Its involvement ensures HFCs are appropriately collected and destroyed using state of the art technology, eliminating the harm these synthetic refrigerants have on the environment.

"We are delighted to be involved and play a part in this scheme assisting the dairy sector in its efforts to reduce energy use and improve environmental impacts," says Richard Lauder, Chair of the trust running Cool-Safe.

Furthermore, Purpose Capital, New Zealand's largest private sector impact investment fund, has entered into a strategic alliance with Cool Group by investing equity to foster business growth.

Bill Murphy, Executive Director, expressed: "Collaborating with Cool Group Limited and being part of the PAUS project is an exciting venture for us. Traditional refrigerants are a considerable contributor to global warming, and their proper management and substitution represents one of the most effective climate solutions available. We're committed to investments that drive positive change with measurable positive impacts, and this initiative is a testament to that commitment. We're thrilled to be working alongside all the partners in this venture."



National Chemistry Week

This year for Chemistry Week, we wanted to introduce some of our team from the Fonterra Research & Development Centre (FRDC) where chemistry is a fundamental part of their roles.

Alice Smialowska

Senior Research Scientist – Food Chemistry Team



What recent breakthroughs or innovations in functional foods have you been involved in, and how do they promote better health?

I have been working on developing novel MPC (Milk Protein Concentrate) ingredients that could open up the ability for our customers

to make innovative, high protein foods that support the multiple benefits related to higher protein intake.

Andrew Fletcher

Programme Leader – Sustainable Food Systems



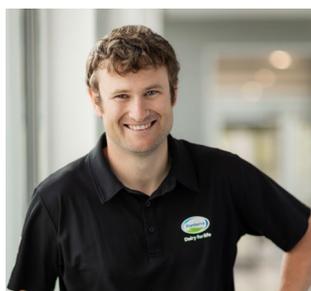
Can you explain the significance of chemistry in achieving sustainability in food production and reducing the environmental impact of dairy production?

Chemistry is fundamental to our ability to successfully reduce rumen methane emissions. Methanogens provide a service to the cow

by converting excess hydrogen created in the rumen into methane, which is from the cow's perspective harmless. Chemistry helps in identifying compounds that can interfere with the methane production process and providing an alternate use for the surplus hydrogen, to prevent this affecting the animal. It is also critical that we understand the breakdown processes and eventual fate of any novel compounds we look to introduce into the diets of food producing animals.

Brad White

Research Scientist – Analytical Science Team



FRDC's engagement with the community and schools is important. Can you share stories or initiatives that demonstrate the significance of promoting an understanding of chemistry in food science and health?

I've had the opportunity to engage with the community to promote science as a career.

My colleagues and I have run many science shows at the local museum where we perform a number of exciting experiments to engage younger kids. We have a real need to grow interest in science careers, so I feel very privileged to be able to share my passion for science with so many people and hope to see many take up a career in science.

Daisy Wilkie

Technical Officer – Analytical Science Team



In your view, what are some of the most exciting contributions that chemistry can make to improving the world through food innovation and health?

By breaking food down into its basic components, we are better able to understand how it can be beneficial to human health, as well as how we can

alter some of these components to make it even more nutritious. By successfully fortifying milk products such as baby formula with compounds like human milk oligosaccharides that make it more like breast milk, we are able to ensure that the next generation is getting the nutrients they need to grow up healthy and strong.

Gaile Dombroski

Research Scientist – Analytical Science Team



How does chemistry help in achieving the creation of highest quality products without compromising taste?

Flavour chemistry is very complex – the way we perceive sweetness can be swayed. It is possible to modify levels of different sugars, to a point where a product still tastes

great, has the health benefits of dairy but with much improved sugar levels. We also use chemistry to separate and analyse the amount in products – this information allows consumers to make informed dietary choices.

Grant Abernethy

Principal Scientist – Food Assurance Science Team



How does chemistry play a pivotal role in fortifying milk and dairy products with essential vitamins and minerals, making them more nutritious and supportive of global health initiatives?

FRDC chemists help to ensure the quality and marketability of all our products by

understanding how to consistently integrate essential vitamins and minerals in a stable fashion, especially for new ingredients and in novel products, and provide internationally recognised test methods to support customer needs and labelling claims.



Hunter Chen Senior Research Technologist



Could you share a specific project or innovation that highlights the role of chemistry in improving the nutritional content of dairy products?

At FRDC, we take great pride in leading the charge in leveraging the power of chemistry to enrich the nutritional content of dairy products.

Traditionally, high-protein nutritional sports beverages rely on various chemical additives (e.g., gums, stabilising salts) to ensure their stability on supermarket shelves. These additives can sound overly chemical, often evoking negative perceptions in consumers' minds, suggesting the product may be artificial.

We've leveraged the chemistry of dairy proteins to make our nutritional product significantly more natural, healthier, and cleaner. More importantly, this approach eliminates concerns related to 'chemical' additives and preservatives, perfectly catering to consumers' growing demand for transparent and uncomplicated products.

John Clements Associate Research Scientist



In terms of food safety, how does chemistry play a vital role in ensuring the quality and safety of dairy products?

Chemicals make up the world around us and how they behave is at the core of chemistry. In dairy systems, chemistry determines product flavour, stability, health benefits, and

supports their manufacture.

Confidence in Food Safety comes from knowing that a process is under control; chemical testing provides data driven support and verification that any chemical risks are being managed, to meet consumer expectations, international standards, and regulations.

Paul Plieger Analytical Science Manager



How does your background (area of work) in chemistry contribute to the goal of making the world a better place through your work at FRDC?

Good nutritional food is of utmost importance to a healthy mind and body. At the heart of all food is chemistry! The various fats,

vitamins, carbohydrates and proteins are all chemical molecules of various sizes and functions. As manager of the Analytical Sciences team, I support the team to achieve the dual goal of measuring

the chemical properties of new innovative nutrition and health solutions under development at FRDC and also to search out new chemical compounds that have recognisable health benefits.

Sheelagh Hewitt Principal Research Scientist



The chemistry of milk is a fascinating topic. Could you provide an overview of how understanding milk's chemistry leads to the development of better dairy products for consumers' health?

Understanding the chemistry of the two major proteins in milk – casein and whey – has

led to technologies to isolate and concentrate them from milk to provide a wide range of dairy protein ingredients. Protein is an essential dietary component and milk is an excellent source of high quality protein. These protein ingredients - caseinates, total milk proteins, milk protein concentrates, whey protein concentrates, whey protein isolates – are used in a wide variety of nutritional beverages and foods such as infant formula, yoghurt, sports and medical beverages, protein bars, and processed cheese.

Timothy Ponrathnam Senior Packaging Research Technologist



The chemistry behind sustainable packaging is intriguing. How does it help reduce the environmental impact of dairy products, and what innovative solutions have you worked on in this area?

At Fonterra, we understand that packaging plays a pivotal role in ensuring the safe

delivery of our products to consumers. We aim to enhance the properties of existing materials, including mechanical, thermal, and barrier characteristics, ultimately crafting materials that remain recyclable at the end of their life while continuing to safeguard our products throughout their intended shelf life.

I'm currently working on a couple of key packaging innovation programmes that aim to address the shortfalls on the existing packages on end of life.

Supplementary Information

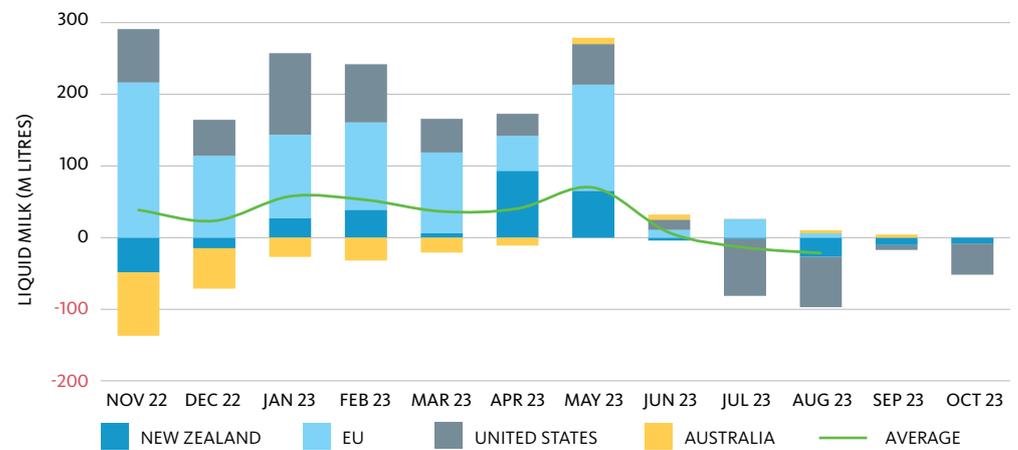
Global Dairy Market

The charts on the right illustrate the year-on-year changes in imports, exports and production for a range of countries that are important players in global dairy trade.

The absolute size of the bars represents the change in imports, exports or production, relative to the same period the previous year.

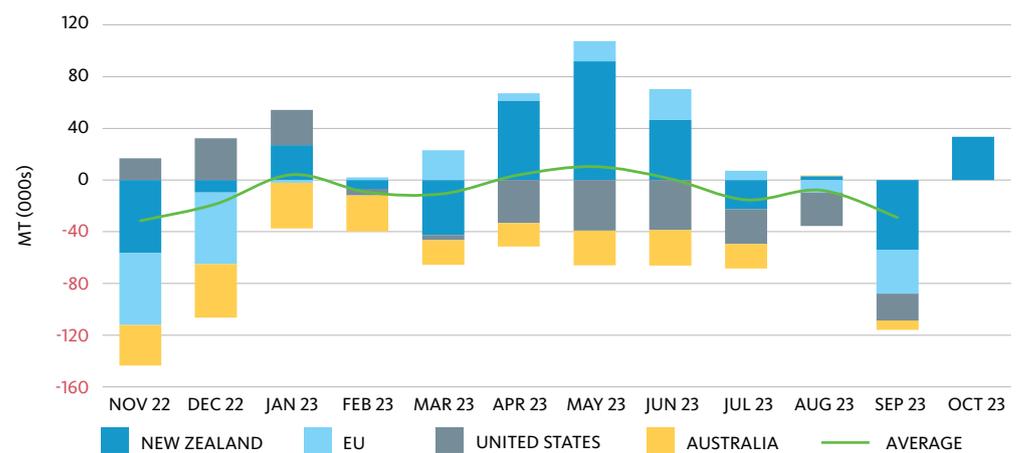
Averages are shown where data is complete for the regions presented.

PRODUCTION



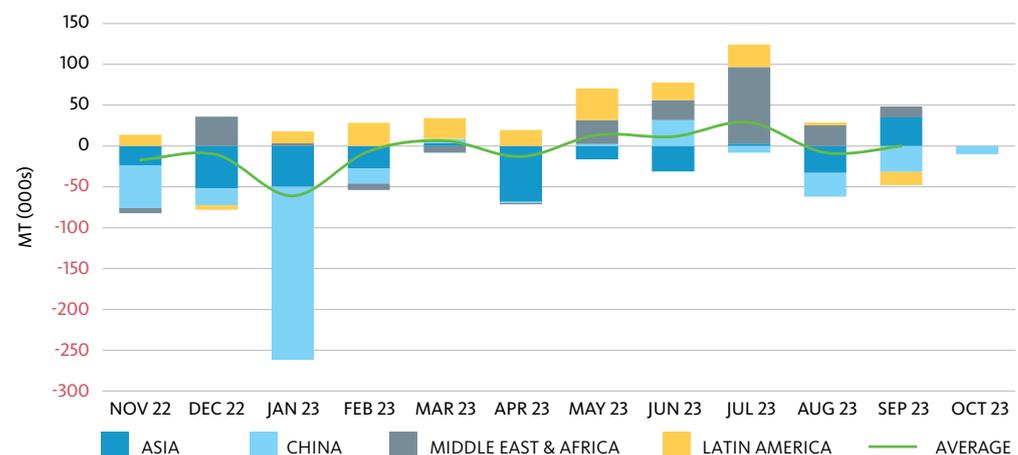
NOTE: Data for EU to August; Australia to September; New Zealand and US to October.

EXPORTS



NOTE: Data for EU, US and Australia to September; New Zealand to October.

IMPORTS



NOTE: Data for Asia, Middle East & Africa, Latin America to September; and China to October.

SOURCES: Government milk production statistics (DCANZ, Dairy Australia, Eurostat, USDA)/GTA trade data/Fonterra analysis.

Supplementary Information

Fonterra milk production

The table on the right shows Fonterra milk solids collected in New Zealand and Australia compared to the previous season.

MILK COLLECTION (MILLION KGMS)	OCTOBER 2023	OCTOBER 2022	MONTHLY CHANGE	SEASON-TO-DATE 2023/24	SEASON-TO-DATE 2022/23	SEASON-TO-DATE CHANGE
Total Fonterra New Zealand	200.0	200.6	(0.3%)	489.4	492.7	(0.7%)
North Island	113.8	116.4	(2.2%)	306.3	315.1	(2.8%)
South Island	86.2	84.1	2.4%	183.1	177.6	3.1%
Australia	12.1	12.2	(0.9%)	34.2	34.3	(0.4%)

Fonterra GDT results

This table provides more information on the latest results, including a snapshot of the year-to-date results.

	LAST TRADING EVENT (21 NOVEMBER 2023)	YEAR-TO-DATE (FROM 1 AUGUST 2023)
Quantity Sold on GDT (Winning MT)	32,765	268,673
Change in Quantity Sold on GDT over same period last year	22.4%	22.5%
Weighted Average Product Price (USD/MT)	3,295	3,112
Change in Weighted Average Product Price over same period last year	(10.7%)	(18.9%)
Change in Weighted Average Product Price from previous event	0.1%	-

Fonterra GDT results

This chart shows Fonterra GDT prices and volumes over the past 12 months.



Glossary

AMF

Anhydrous Milk Fat.

BMP

Butter Milk Powder.

Cultured Products

Fermented milks that are prepared by using starter cultures and controlled fermentation including yoghurt, yoghurt drinks, sour cream, crème fraîche.

DIRA

Dairy Industry Restructuring Act 2001 (New Zealand).

Farmgate Milk Price

The price for milk supplied in New Zealand to Fonterra by farmer shareholders.

Fluid Products

The Fonterra grouping of fluid milk products (skim milk, whole milk and cream – pasteurised or UHT processed), concentrated milk products (evaporated milk and sweetened condensed milk) and yoghurt.

GDT

Global Dairy Trade, the online provider of the twice monthly global auctions of dairy ingredients.

kgMS

Kilogram of milk solids, the measure of the amount of fat and protein in the milk supplied to Fonterra.

MPC

Milk Protein Concentrate.

Non-Reference Products

All dairy products, except for Reference Products, produced by the New Zealand Ingredients business.

Reference Products

The dairy products used in the calculation of the Farmgate Milk Price, which are currently WMP, SMP, BMP, butter and AMF.

Season

New Zealand: A period of 12 months to 31 May in each year.

Australia: A period of 12 months to 30 June in each year.

SMP

Skim Milk Powder.

WMP

Whole Milk Powder.

WPC

Whey Protein Concentrate.

WPI

Whey Protein Isolate.