

Agri-Food Outlook | 2024



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Global Feed Production Down Slightly in 2023

Lower demand attributed in part to more efficient use of feed; poultry feed shows most significant growth

Alltech's Agri-Food Outlook estimates that global feed tonnage totaled 1.29 billion metric tons (BMT) in 2023, a modest decrease of 140,000 metric tons — or 0.01% — from 2022*.

The **marginally lower demand** for feed was due, in part, to the **more efficient use of feed** made possible by intensive production systems that focus on using animal nutrition, farm management and other technologies to lower feed intake while producing the same amount of protein, or more. **Slower production of animal protein**, in response to tight margins experienced by many feed and animal protein companies, also contributed to the small decrease in feed demand. The feed tonnage rate — defined as the amount of feed produced and distributed per unit of livestock or poultry — is influenced by multiple factors that affect the demand and supply of feed, as well as the efficiency and profitability of animal production.

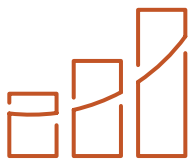
Changing consumption patterns caused by inflation and dietary trends, **higher production costs** and **geopolitical tensions** also influenced feed production in 2023.

Alltech's annual feed survey, now in its 13th year, includes data from 142 countries and more than 27,000 feed mills. It assessed compound feed production and prices by utilizing information collected by Alltech's global sales team and in partnership with local feed associations.

Select regional observations:

- **Latin America** has experienced continued growth for the past 10 years, demonstrating the strength of its monogastrics exports market and its growing aqua and pet markets. In 2023, feed tonnage increased by nearly 2.5 million metric tons (MMT), or 1.24%. That growth was led by the broiler sector, which had an increase of 2.6%, and the pig sector, with an additional 1 MMT. Aquaculture feed tonnage continued its strong growth trend, with an increase of 3.9%.
- **Asia-Pacific's** feed tonnage increased slightly in 2023, by 6.54 MMT, or 1.40%. The broiler, layer and

Trends making an impact on agri-food



The economy (high production costs)



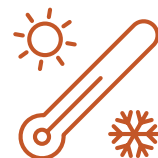
Changing consumption patterns (caused by inflation and dietary trends)



Geopolitical tensions



Animal disease risks



Weather-related challenges

*Last year's Agri-Food Outlook shared preliminary data that has since been adjusted to reflect final figures, putting total feed tonnage for 2022 at 1.29 BMT. We have refined our resources for retrieving data in several Middle Eastern and Central American countries, revealing higher and more accurate 2022 figures for Algeria, Egypt, Iraq, El Salvador, Panama, Guatemala and Honduras. Feed tonnage for India was also revised significantly. These revisions added tonnage for the layer sector (India and Iraq); broiler sector (El Salvador, Türkiye and Sudan); beef (Egypt and Türkiye); and pig (Panama). The 2023 numbers were last adjusted on April 15, 2024.

dairy sector tonnages grew steadily by 7.07 MMT, 1.34 MMT and 1.10 MMT, respectively. Changing consumer behaviors, high production costs and animal diseases are cited as the top factors affecting 2023 feed production. Asia-Pacific was the most affected by animal disease in 2023. There is optimism for poultry farming in Southeast Asia, especially as raw material costs stabilize in 2024. Layer feed tonnage continued to rise thanks to shifting consumer demand for affordable proteins.

- Feed production continues its downward trend in **Europe**, especially in the beef sector. Over the past two years, this region has experienced the most decline. Europe is dealing with continued political and market crisis management pressures — and a growing demand for providing

sustainable feed solutions to address market dynamics and regulatory considerations. This presents good growth opportunities for agri-food businesses in the sustainable/regenerative food sector.

- **North America** reports a reduced number of feed mills (5,647 in 2023 versus 5,800 reported in 2022) and slight increase in the number of pet food plants. Beef is North America's largest sector in terms of feed tonnage, and it continues to be challenged. Feed tonnage was down 1.1% in 2023. The lingering drought, which has decreased beef cow and calf numbers in the U.S. and Canada, combined with high production costs and aging cow/calf producers will likely lead to further herd reduction in 2024. In Canada, 2023 beef feed tonnage was down 10.15%.

Feed tonnage trends

The feed industry has seen **3%** average annual growth over the past 10 years and **3.7%** average growth over the past five years, according to an analysis of Alltech Agri-Food Outlook's historical data.



A closer look at the numbers

Feed production in 2023 increased in Asia-Pacific by 6.5 MMT (1.4%), Latin America by 2.457 MMT (1.22%), Africa by 1 MMT (1.9%) and Oceania by 0.4 MMT (3.7%), according to feed production data collected for Agri-Food Outlook. Feed production decreased in Europe (-2.8%) and in North America (-1.1%).

Globally, increases in feed tonnage were reported in the **broiler** and **pet** sectors, while decreases were reported in the **pig**, **dairy**, **beef**, **aqua** and **equine** sectors. Layer feed

production was flat.

Overall, **poultry feed tonnage continues to expand** but at a slower pace — a result of changing consumption behavior and lower purchasing power. **Beef** continues to decline in production, due to changing cattle cycles in the United States and the impact of sustainability regulations in Europe. **Aquaculture** feed tonnage dropped slightly due to a decline in supply in China.

China remains the largest feed-producing country in the world, followed by the United States and Brazil.

Top sector by region

Region	Sector	2023 feed tonnage total	Percentage of total feed
Africa	Broiler	17.330 MMT	33.70%
Asia-Pacific	Broiler	160.667 MMT	33.80%
Europe	Pig	74.846 MMT	28.58%
Latin America	Broiler	74.325 MMT	37%
Middle East	Broiler	12.545 MMT	34.90%
North America	Beef	63.248 MMT	24.40%
Oceania	Broiler	4.087 MMT	37.90%

A closer look at the trends affecting feed production

The major trends identified this year align with those highlighted in the Global Animal Protein Outlook 2024, a report by Rabobank, one of the world's largest agricultural banking institutions.

Economy and product prices

Globally, consumer behavior is most affected by the economy and product prices. Over 65% of Agri-Food Outlook respondents said inflation and the overall state of the economy in 2023 had the most impact on the feed tonnage rate. Dietary trends were rated the distant second-most important factor.

Respondents also noted that:

- **Production costs** — feed, labor, energy, transportation, etc. — contributed to the drop in feed production.
- **Economic factors** and **dietary trends** resulted in changes in consumer behavior that ultimately affected protein demand. Millennials, who now have the most purchasing power, tend to focus on nutrition, quality and convenience when making food purchases, which may influence their animal product preferences and the feed

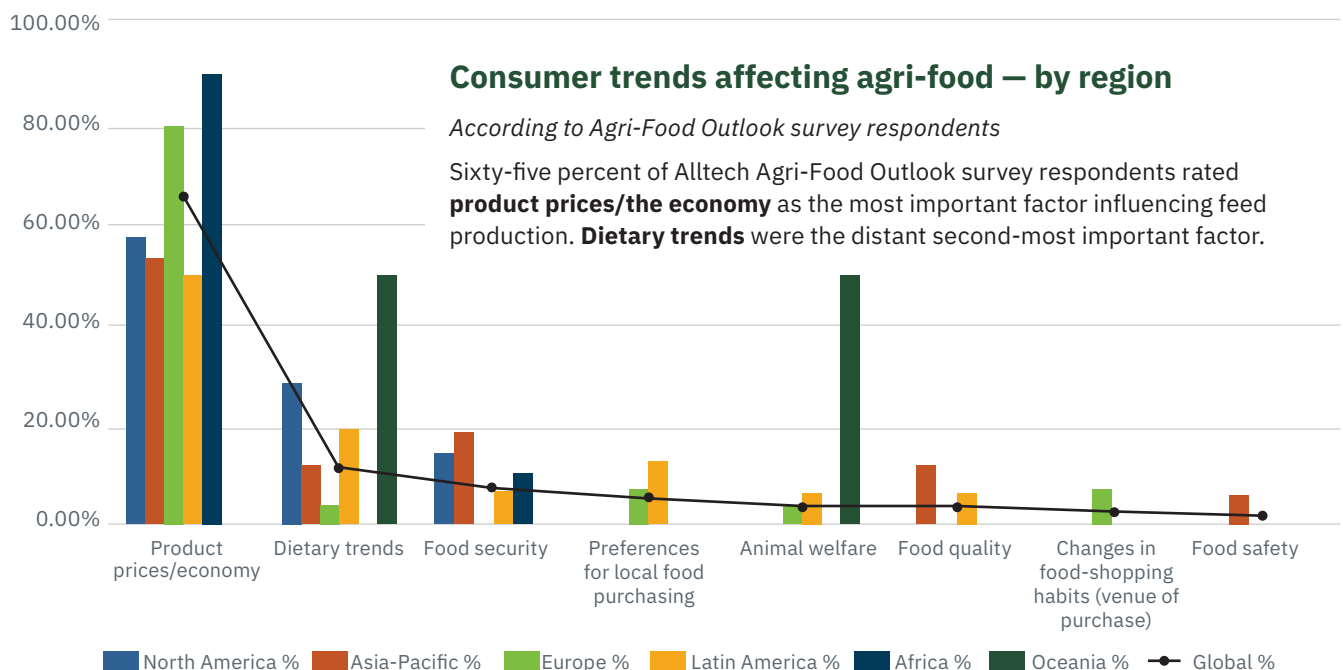
ingredients used to produce them.

- **Health factors** affected dietary trends in most regions, but they were most heavily demonstrated in Asia-Pacific and Latin America.
- In Oceania, Africa and Asia-Pacific, dietary trends were also strongly influenced by **cultural or religious preferences**, survey respondents said. Food choices were more affected by **environmentalism** in Oceania and Europe than other regions.

The occurrence and spread of animal diseases

Animal diseases, such as **African swine fever (ASF)** and **highly pathogenic avian influenza (HPAI)**, affect the health and productivity of animals and pose a significant challenge to the feed industry. Disease outbreaks can disrupt supply chains, impact production efficiency and prompt changes in feed formulations. This year's respondents said disease risk remained a top factor in 2023, but they noted that risk is decreasing thanks to improved control efforts, such as better tools for biosecurity and traceability, vaccines and advanced genetic technologies.

HPAI affected the most countries around the world (40). Respondents reported that ASF had affected agricultural production in 24 countries in Europe and Asia.



Foot and mouth disease (FMD) was reported in several African and Asian countries.

- **Asia-Pacific:** Control of ASF is an ongoing challenge in China and Southeast Asia. HPAI and other diseases have significantly affected the broiler sector. Disease challenges persist in the aquaculture sector, but to a lesser degree than those faced in the poultry and pig sectors.
- **Europe:** Spain has been challenged with **persistent porcine reproductive and respiratory syndrome (PRRS)** outbreaks. ASF continues to impact Europe, creating uncertainty and disrupting trade. European markets recovered from the impact of avian influenza (AI), but Denmark, Hungary and Portugal faced further production declines due to reduced broiler output. Salmon and trout diseases led to increased mortality, lower performance and compromised animal welfare, which impacted Norway heavily.
- **Latin America:** HPAI has been a major factor in Latin America. The risk of it affecting commercial poultry farms in Brazil, the world’s largest poultry producer, adds uncertainty to the global supply chain.
- **North America:** Animal disease had a notable impact on poultry production and a limited impact on the pig and aquaculture sectors.

Geopolitical tensions

Eight percent of respondents noted the measurable impact of geopolitical tensions on production costs and supply chain consistency. Trade restrictions, geopolitical instability and changes in international relations tend to push production costs even higher.

Weather-related challenges

Adverse weather events caused by climate change — droughts, floods, frosts, heat waves and an increased amount of pests — also played a role, affecting production and the availability, cost, digestibility and nutritional value of feed crops and forages. Large swaths of Europe, for example, have suffered from water scarcity, which is exacerbated by the increased competition for water and more frequent water-use restrictions.

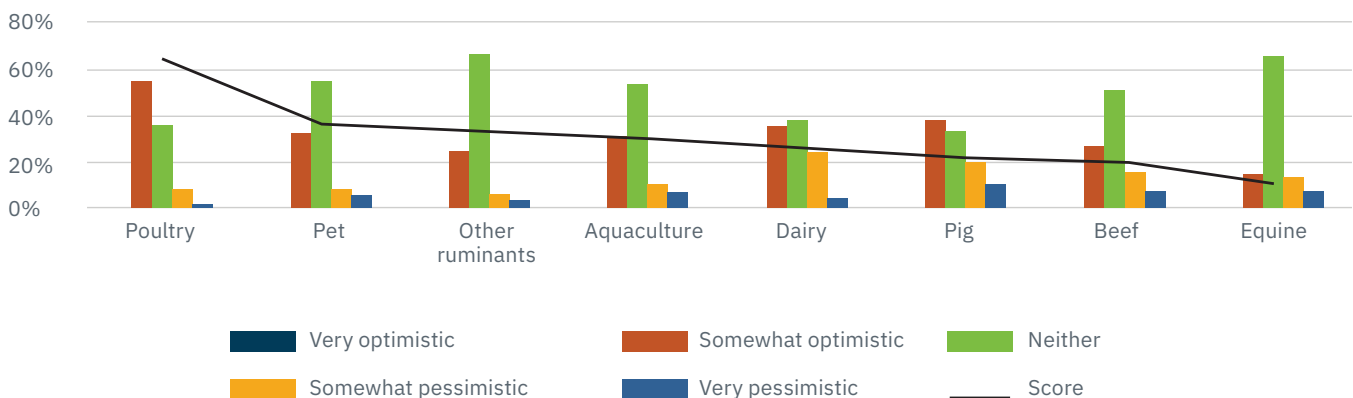
Outlook for 2024

The Alltech Agri-Food Outlook also offers a holistic look at the state of the industry, using answers from our corresponding qualitative survey to uncover the trends and technologies that are impacting the agri-food industry, highlight opportunities for growth and gauge expectations for 2024.

Over half of survey respondents (54.8%) said they were somewhat optimistic about continued growth in the poultry sector. Other protein sectors have been challenged by disease, economic uncertainties that affect purchasing power, and changing consumer dietary trends. About 37% said they were somewhat optimistic about growth in pig feed production in 2024, slightly higher than the second-most-chosen option of the neither optimistic nor pessimistic (32%).

Regarding feed production in pet, other ruminants, aquaculture, beef and equine, most respondents said they were neither optimistic nor pessimistic about growth in 2024.

Optimism by sector about future growth



Feed production is expected to grow in 2024, with some market conditions improving as input costs ease and consumers adapt to uncertainties. Production growth is likely to remain robust in Brazil and accelerate in Southeast Asia, with marginal increases expected in China and Oceania.

Latin America is expected to lead production growth in 2024 but at a slower rate than in 2023. Reduced livestock inventories are expected to continue in the United States, lowering feed demand.

Ag-related challenges

High raw materials prices still dominate the list of challenges faced in agriculture around the world, along with low returns for producers and animal diseases. In Europe, labor costs, policies and standards, and geopolitical events featured prominently as well. In Latin America, geopolitical

events and supply chain disruptions were noted. In North America, labor costs presented the biggest obstacle, while Oceania struggled with high interest rates.

Sustainability efforts

Respondents noted major differences in who is driving environmental sustainability efforts in their regions. In Europe and, to a lesser extent, Asia-Pacific, government efforts appear to be the leader, while consumers seem to be the main drivers in North America. In Latin America, farmers are leading the charge, respondents said.

Overall, the food service industry, media and non-governmental organizations were not rated as primary drivers of efforts to improve sustainability.

Among sustainability measures, **water pollution reduction methods are most widely being implemented**, according

Outlook by species*

- **Poultry:** The poultry sector is poised for continued strength, driven by a blend of regional successes and global market dynamics. The **broiler** forecast remains optimistic thanks to lower input costs, increased industrial margins and shifting consumer behaviors. For **layers**, challenges persist, but there are pockets of resilience and growth.
- **Pig:** The trends highlight the complex relationship between economic factors, supply dynamics and disease management in the global pig feed industry. Addressing these challenges will be crucial for sustaining animal agriculture and ensuring food security.
- **Dairy:** Globally, the compound feed produced in the dairy sector decreased by approximately 1.12%. This shift reflects the delicate balance between economic factors and the need to sustain dairy production. Lower feed costs and higher milk prices would help right the ship.
- **Beef:** The beef industry navigates a complex landscape, balancing environmental concerns, economic realities and regional dynamics. Its decline of 3.78% (4.70 MMT) was the most pronounced among all sectors. Growth is expected in China, Brazil and Australia; continued decreases are anticipated in

Broiler feed now accounts for **29.8%** of the world's feed tonnage.

the U.S. and Canada and in European countries.

- **Aquaculture:** The sector's feed tonnage decline of 4.4% (2.40 MMT) in 2023 represents the first such decline observed in recent years. However, 30% of survey respondents said they were somewhat optimistic that the sector will grow in 2024. Latin America had a 3.9% increase in aquaculture feed tonnage in 2023; its strong market demand and competitiveness in the export market is expected to continue in 2024, and Ecuador is expected to maintain its position as the top shrimp producer.
- **Pet:** The global pet sector continues to expand, and Latin America and Europe were among the primary drivers of this growth. The surge in pet ownership, especially post-pandemic, is contributing to the rising demand for high-quality pet products and services.
- **Equine:** Equine feeds are expected to decrease both in price and in volume in the coming year. More than 14% of survey respondents said they were somewhat optimistic that feed tonnage would grow in 2024; 13% said they were somewhat pessimistic; 7.2% said they were very pessimistic.

**Find detailed information about each sector starting on page 12.*



to survey respondents, followed by efforts to improve feed efficiency, create renewable energy, reduce antibiotic usage/combat antimicrobial resistance, produce food more efficiently and improve animal welfare. Respondents said some of these measures are being initiated by governments while others are spearheaded by the private sector.

Technologies making an impact on agri-food

Nutritional solutions were once again the technology most frequently cited as making a big impact on the agri-food industry. Genetics was the second-most-chosen answer, followed by data collection/analysis.

The types of nutritional solutions most pertinent to feed production, respondents said, were those that **improve feed efficiency**, followed by solutions that manage **gut health, mycotoxins, enzymes** and **minerals**. In Europe and Oceania, **methane reduction technologies** were cited as one of the biggest growth opportunities.

Some of the technologies deemed the most impactful include:

- Aerial imagery, geospatial insights, drone technologies (Europe and Oceania)
- Artificial intelligence/machine learning (Asia-Pacific)
- Automation of labor/robotics (Latin America)
- Biosecurity (Africa and North America)



Opportunities for growth

An open-ended question regarding the biggest ag-related opportunities for agri-food businesses in the region yielded an array of responses as varied as the regions represented.

- In **Africa**, respondents suggested that the top opportunities lie in improvements in feed efficiency; low-cost production solutions suited to easy local adaptation; the mechanization of crop production, beef processing and packaging; growing the aquafeed market; and producing their own raw materials for use in feed instead of having to import them.
- In **Asia-Pacific**, the poultry market and genetically modified crop production offer the biggest opportunities, respondents said. They also mentioned smart-farm technologies, methane emissions reduction measures, and growth in the aquaculture and pet sectors.
- In **Europe**, carbon dioxide and methane emissions reductions were mentioned frequently. Feed efficiency, soil health, research and development, and animal mortality reductions were also noted.

- In **Latin America**, feed optimization, mycotoxin control and gut health management were top entries. Sustainable farming practices were also noted multiple times as top opportunities.
- In **North America**, the importance of partnerships and collaboration were highlighted, along with methane reduction technologies, regenerative agriculture and improving feed costs.
- In **Oceania**, respondents said improving the greenhouse-gas impact of ruminant animal production represents the biggest opportunity.



The Role of Technology

Survey respondents said the **top 5 technologies** making the most impact on agri-food are:

Nutritional solutions, **84%**

Genetics, **74%**

Data collection/analysis, **56%**

Renewable energy technologies, **54%**

Biosecurity, **54%**

2023 Feed Tonnage by Region

This year's global feed survey estimated that the total global feed tonnage decreased slightly over last year, a .01% decrease of 140,000 metric tons (MT) to approximately 1.295 billion metric tons.

Asia-Pacific led feed production growth in 2023, with an increase of 6.54 MMT (1.4%). Feed production growth in the region's ruminant sectors offset a setback in the aqua sector.

Latin America's feed production grew by 2.46 MMT (1.24%) in 2023. Despite high production costs, geopolitical tensions and changing consumer behavior (economic reasons), the region continues to be among the

global growth leaders, mainly because of its export-driven aquaculture, poultry and pork markets.

Africa showed continued but slower growth, with an increase of 1.94% or nearly 1 MMT. **Oceania** had the third-highest growth, 3.71% or 0.39 MMT.

Feed production in **Europe** continued its downward trend, especially in the beef sector. Feed tonnage dropped by 2.82%.

North America saw a decrease of 2.8 MMT (1.1%), with beef feed tonnage down significantly. The pig and dairy sectors also slipped slightly, but the broiler, layer and pet sectors more than made up the difference. Feed tonnage in the broiler sector was up nearly 2.9%.

Region	2023 feed tonnage (MMT)	2022 feed tonnage (MMT)	Growth (MMT)	Growth (%)
Asia-Pacific	475.33	468.79	6.54	1.40%
Europe	261.89	269.48	-7.59	2.82%
North America	259.26	262.06	-2.80	-1.07%
Latin America	200.67	198.21	2.457	1.24%
Africa	51.42	50.44	0.98	1.94%
Middle East	35.93	36.05	-0.12	-0.32%
Oceania	10.78	10.40	0.39	3.71%
Total	1,295.28	1,295.42	-0.14	-0.01%

Feed Tonnage by Sector

Volume growth in feed tonnage came predominantly from the broiler feed sector.

Sector	2023 feed tonnage (MMT*)	2022 feed tonnage (MMT)	Growth (MMT)	Growth (%)
Broiler	386.33	373.52	12.81	3.4%
Pig	323.04	327.17	-4.14	-1.3%
Layer	171.293	171.292	0.01	0.0%
Dairy	127.92	129.38	-1.45	-1.1%
Beef	119.56	124.26	-4.70	-3.8%
Aqua	52.09	54.49	-2.40	-4.4%
Pet	35.44	34.52	0.92	2.7%
Equine	7.98	8.37	-0.39	-4.69%
Totals*	1,295.276	1,295.416	-0.14	-0.01%

*Includes other ruminants, other poultry, turkey and calf sector data.

Feed Mills by Region

The multiyear fall of the total number of feed mills in the world was halted in 2023 thanks, in large part, to India, where hundreds of additional feed mills were added over the past year. Still, while the total feed mill count is up by 0.3% (or 86 mills), the general trend from the past few years — of larger and, as a result, fewer feed mills — continued in many countries. The number of feed mills declined most significantly in China, Chile, the U.S. and Spain.

Region	Number of mills, 2023	Number of mills, 2022	Difference
Africa	2,188	2,038	150
Asia-Pacific	7,627	7,146	481
Europe	6,288	6,553	-265
Latin America	4,080	4,266	-186
Middle East	872	813	59
North America	6,147	6,300	-153
Oceania	195	195	-
Total	27,397	27,311	86

Top 10 Countries

The Top 10 countries in terms of feed tonnage did not change significantly. Türkiye slipped one place, from No. 9 to No. 10, trading places with Japan. Despite significant fluctuations, the other Top 10 countries remained in the same positions.

Altogether, the Top 10 countries used 63.1% of the world's 2023 feed production, and they can be viewed as an indicator of the trends in agriculture. About 49% of global feed production is concentrated in four countries: China, the U.S., Brazil and India.

Top countries	2023 feed tonnage (MMT)	2022 feed tonnage (MMT)	Growth (MMT)	Growth %	Rank, 2023	Rank, 2022
China	262.71	260.74	1.97	0.76%	1	1
USA	238.09	240.82	-2.73	-1.13%	2	2
Brazil	83.32	81.81	1.51	1.84%	3	3
India	52.83	46.58	6.26	13.43%	4	4
Mexico	40.42	40.41	0.01	0.02%	5	5
Spain	36.22	37.45	-1.23	-3.28%	6	6
Russia	35.46	34.15	1.31	3.83%	7	7
Vietnam	24.15	26.72	-2.57	-9.63%	8	8
Japan	23.94	24.21	-0.28%	-1.15%	9	10
Türkiye	23.37	26.41	-3.03	-11.48%	10	9

A Closer Look at the Top 3 Countries

China

China remained in first place. Its feed tonnage was up 0.76% in 2023, an increase of nearly 2 MMT, driven by increases in broiler and layer feed tonnage.

Despite tight margins and disease challenges, there is still a strong demand in China, thanks to its fast-growing middle class and shifting preferences for more affordable proteins.

Broiler feed accounts for 37% of the country's overall feed tonnage.



United States

The United States remained in second place, even with a decrease of 1.13%. The most significant reduction took place in the beef sector. A drought that has continued over the past three years has decreased beef cow numbers as well as calf numbers. Optimism for aquaculture reigns due to the increase in the demand for locally grown seafood and sustainability.

The pig sector is reducing its sow herd, and porcine reproductive and respiratory syndrome (PRRS) is starting to increase across the U.S.

Dairy cow numbers are continuing to hold at around 9.36 million, a decrease of only about 0.3%. The dairy industry continues to consolidate. Demand for goat milk and meat is increasing, creating optimism in the "other ruminants" sector. In the pet care sector, functional nutrition and feeding for specific health concerns are at the top of the trends.



Total feed tonnage: 262.71 MMT (an increase of 0.76%)

Feed production increases in:

- Other ruminants – 15.56%
- Dairy – 5.81%
- Layer – 4.89%
- Pet – 6.00%
- Beef – 4.47%



Technology making the most impact: Automation of labor/robotics

Nutritional solution that represents the biggest opportunity: Methane reduction technologies



Biggest factors impacting feed production: Production costs and animal disease

Total feed tonnage: 238.09 MMT (a decrease of 1.13%)

Feed production increases in:

- Broiler – 3.00%
- Pet – 1.31%
- Aqua – 2.63%
- Layer – 1.01%



Technologies making the most impact: Biosecurity, genetics, data collection/analysis, smart farm applications

Nutritional solutions that represent the biggest opportunity: Enzyme management, gut health management, methane reduction technologies

Biggest factors impacting feed production: Consumer behavior, production costs, supply chain disruptions, adverse weather

Brazil



Brazil leads feed production growth in Latin America, with a tonnage increase of 1.51 MMT in 2023 (1.84%). Beef feed production is expected to grow in Brazil in 2024. The country is at the end of a drawdown in beef prices, primarily because of the livestock cycle. Producers expect prices to rise in the second half of the year.

The aquaculture sector is experiencing vast growth as large cooperatives and independent farmers have increased exports — especially of tambaqui and tilapia — while also increasing sales to the domestic market thanks to accessible prices and the nutritional value of tilapia.

In the dairy sector, there's optimism for the coming months. Consumption is expected to return to normal, and prices paid to farmers are expected to increase.

The global health challenge of avian influenza has influenced Brazilian broiler production in a positive way: through growing exports. The layer sector has experienced unusually high rates of egg exports, compensating for the global production losses caused by avian influenza. The domestic market has also experienced at least 1% growth. Because eggs are a cheaper animal protein, egg consumption tends to increase when purchasing power drops.

Total feed tonnage: 83.32 MMT (an increase of 1.84%)

Feed production increases in:

- Pet — 6.18%
- Pig — 2.53%
- Broiler — 3.00%
- Layer — 0.99%
- Aqua — 2.55%
- Equine — 0.78%



Technology making the most impact: Biosecurity

Nutritional solutions that represent the biggest opportunity: Gut health management, methane reduction technologies



Biggest factors impacting feed production: Production costs, geopolitical tensions, dietary trends, adverse weather

Other notable trends

- **India (No. 4):** Major increases were seen in feed tonnage in India. Dairy growth was expected due to a rise in milk and milk product consumption and the growth of cooperatives feed production. Broiler feed tonnage was up by 24.55% and layer feed was up 7.00%. New farms have been set up in northern and eastern India. Because of their small sizes, those farms are buying feed from commercial feed manufacturers to be more cost effective. Increasing disposable income and awareness about animal protein in urban populations allowed big integrators to produce more chicken, which contributed to the increases in layer and broiler feed volumes.



- **Spain (No. 6):** Spain held its place in the Top 10, even with a decrease of 3.28%. The broiler and pig sectors dropped the most in terms of commercial feed tonnage. There was reduced tonnage due to increased animal slaughters, a consistent yearly decrease in census numbers, and no generational change despite the rising average age of the country's livestock farmers. Additional factors specific to the pig sector include changing consumer preferences (driven in part by food price inflation), a decrease in export markets and health issues.



- **Türkiye (No. 10):** Decreases in feed production in Türkiye are due to economic uncertainty, inflation and increasing production costs. Purchasing power — especially for the working class — has decreased significantly because of adverse economic conditions. The most significant declines in feed tonnages were seen in the dairy, beef, layer and broiler sectors.





Broilers

Broiler feed now accounts for 29.83% of the total feed tonnage in the world thanks to a 3.43% increase in overall tonnage in 2023. While this growth was not uniform across all regions, the poultry sector is poised to keep holding strong in 2024 thanks to a combination of regional successes and global market dynamics. Some of the biggest factors that will contribute to the resilience of the broiler sector include reduced costs for inputs, such as feed and energy, and increases in margins and profitability. Shifting consumer preferences will also benefit broiler producers, as inflation and other economic changes often prompt an inclination toward more affordable protein options, and poultry traditionally serves as the preferred choice in those circumstances.

A closer look

Africa and the Middle East: These regions reported a substantial 12.22% growth in feed production for broilers in 2023, reflecting the resilience and adaptability of the agri-food industry there.

Asia-Pacific: Broiler feed tonnage was up 4.6%, an increase of 7.07 MMT. The region has been challenged by animal disease, including highly pathogenic avian influenza (HPAI), and the soaring costs of raw materials and profits falling below expectations, which has led many smaller operations to go out of business. Still, optimism for 2024 remains — particularly in Southern Asia, where India saw a 24.57%

increase in broiler feed tonnage. The cost of raw materials is also expected to stabilize for broiler producers in Asia-Pacific in 2024.

Europe: Broiler feed production was down by 1.17 MMT in 2023, a decrease of 2.06%. Broiler feed accounts for 21.20% of feed production in Europe. Many markets were recovering from the impact of avian influenza, while others — including Denmark, Hungary and Portugal — struggled due to a decline in broiler production that led to challenges for local slaughterhouses. Poultry consumption is, however, expected to increase over the next year due to its relatively low price and poultry's allure as a healthier protein option, and the industry will also benefit from more amenable prices and a rise in imports.

Latin America: Latin America's poultry industry is thriving, with 2.62% growth (representing 1.89 MMT) in broiler feed production there in 2023. An export-driven market, the Latin American broiler industry has benefited from its highly efficient production and the reduced costs of feeding birds there, which strengthen the region's competitiveness amongst other poultry-exporting regions around the world.

North America: The North American broiler sector also grew by a respectable 2.85% in 2023. This success was driven by the region's growing poultry flock, efficient production practices and favorable market conditions, as well as changing consumer preferences.

Oceania: The broiler sector is by far the largest in both Australia's and New Zealand's commercial feed industry, comprising nearly 38% of the region's total feed tonnage. Thanks to this dominance and other factors, the broiler sector grew by more than 1.19%.

Region	2023 feed tonnage (MMT*)	2022 feed tonnage (MMT)	Growth (MMT)	Growth (%)
North America	61.85	60.13	1.71	2.85%
Asia-Pacific	160.67	153.59	7.07	4.60%
Latin America	74.33	72.43	1.90	2.62%
Europe	55.53	56.702	-1.17	-2.06%
Oceania	4.09	4.04	0.05	1.19%
Middle East	12.54	12.29	0.25	2.06%
Africa	17.33	14.33	3.00	20.93%
Total	386.33	373.52	12.81	3.43%

*Million metric tons



Layers

Globally, the poultry feed industry continues to expand, albeit at a slower pace than has been seen at other times. Layer feed tonnage remained unchanged in 2023. There are industry-wide efforts to optimize feed efficiency and to keep pace with changing dietary trends and new purchasing power. Some markets around the globe were significantly impacted by macroeconomic challenges and disease outbreaks, which can disrupt production cycles. Still, the general outlook for the layer industry remains positive thanks to its resilience in the face of difficult circumstances, when other protein sectors often struggle to adapt.

A closer look

Africa and the Middle East: The layer sector grew marginally in the Middle East but shrunk significantly in Africa in 2023. This decline was connected to disease outbreaks — particularly those related to avian influenza, which can set producers back financially while also impacting the overall bird supply.

Asia-Pacific: Despite the previous year's downward trend, the layer sector rebounded in Asia-Pacific in 2023. Layer feed tonnage grew steadily there, by 1.34 MMT, thanks in part to major increases in countries like India. New layer

farms continue to open across the region as consumers turn to poultry as a more affordable protein choice.

Europe: The European layer sector was negatively impacted by the outbreak of avian influenza and other challenges, but with vaccines being field-tested in various countries, producers are hopeful about the year ahead. The region's layer sector was down 1.11%.

Latin America: Layer feed tonnage was down slightly (0.17 MMT, or 0.62%) in Latin America due, in large part, to the effects of highly pathogenic avian influenza (HPAI), which has decimated the region's bird inventory. Much attention is being paid in particular to Brazil, the world's largest exporter of poultry, as the presence of HPAI in that country's commercial layer farms could have ripple effects across the global supply chain.

North America: The North American layer sector saw a 1% increase in feed tonnage this year, which correlated to a similar rise in the number of layer birds in the region. Both of these increases are attributed to changing consumer tastes and preferences.

Oceania: The layer sector grew by 5% in Australia but was down slightly (by 2.86%) in New Zealand.

Region	2023 feed tonnage (MMT*)	2022 feed tonnage (MMT)	Growth (MMT)	Growth (%)
North America	15.70	15.53	0.17	1.09%
Asia-Pacific	80.40	79.06	1.34	1.70%
Latin America	27.16	27.33	-0.17	-0.62%
Europe	31.40	31.75	-0.35	-1.11%
Oceania	1.04	1.00	0.03	3.50%
Middle East	6.94	6.92	0.03	0.40%
Africa	8.65	9.70	-1.05	-10.82%
Total	171.293	171.292	0.001	0.00%

*Million metric tons



Pigs

The global pig sector faced many challenges in 2023, which led to an overall decrease in pig feed production of 1.26%. Latin America stood out as the only region that achieved an increase in pig feed production in 2023, while Europe, Asia-Pacific and North America – which have traditionally been the top pig feed-producing regions in the world – all faced challenges. African swine fever (ASF) continues to wreak havoc on pig production in China and Southeast Asia, where repopulation efforts are slowly underway. Moving forward, proper disease management and increased food safety will be crucial for achieving growth in the pig sector, along with a dynamic supply chain and the ability to adapt to economic changes.

A closer look

Africa and the Middle East: The pig sector saw a slight downturn in Africa over the past year but held fairly steady in the Middle East.

Asia-Pacific: The total pig feed tonnage decreased slightly (by 1.80 MMT) in the Asia-Pacific region for the second year in a row as the result of the over-expansion of the sector in 2020-21, disease disruptions and diminished demand for pork products. Looking ahead, however, the pig industry is expected to bounce back there in 2024 thanks to a changing economic climate, which is expected to help stabilize feed prices.

Europe: Pig feed tonnage declined (by 3.37%) in Europe for the fourth consecutive year, with production down by 2.61 MMT in 2023 compared to 2022. This trend was due in part to stricter enforcement of environmental laws in various countries and declining export opportunities. For instance, production in Spain, the largest pig feed producer in the EU, dropped 1.08 MMT due to shifting consumer preferences and the loss of export markets. Looking ahead, with the European sow herd expected to shrink, compound pig feed production is also expected to continue its downward trend.

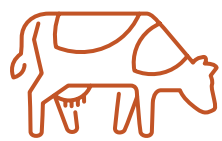
Latin America: Pork feed tonnage continued its upward trend in Latin America, with an increase of 2.42% in 2023. The Latin American pig sector remains highly competitive compared to other regions thanks to the lower cost of feeding animals there and its efficient production standards.

North America: For the second consecutive year, compound pig feed production declined 0.95% (or 0.60 MMT) in North America. This continued decline can be attributed to the smaller size of the region's sow herd as a result of negative profit margins, oversupply and increased productivity.

Oceania: Among all agri-food sectors in Oceania, the pig sector was the only major one to experience a decrease in terms of feed tonnage in 2023. Pig feed production was down 4.8% in Australia and 14.6% in New Zealand, the latter of which is the result of many farms closing because of stiff competition from imports.

Region	2023 feed tonnage (MMT*)	2022 feed tonnage (MMT)	Growth (MMT)	Growth (%)
North America	62.39	62.98	-0.60	-0.95%
Asia-Pacific	138.72	140.52	-1.80	-1.28%
Latin America	41.88	40.89	0.99	2.42%
Europe	74.85	77.46	-2.61	-3.37%
Oceania	1.33	1.41	-0.08	-5.94%
Middle East	0.01	0.01	0.00	0.00%
Africa	3.88	3.91	-0.03	-0.84%
Grand Total	323.04	327.17	-4.14	-1.26%

*Million metric tons



Dairy

Globally, the compound feed produced in the dairy sector decreased by 1.12% over the past year. For many countries and regions, the primary culprits behind this decline were high feed costs and low milk prices, which led farmers to make strategic adjustments that included reducing their cow numbers or relying more on non-commercial feed sources. In Europe, dairy producers will need to continue grappling with stricter environmental policies in the years ahead and find new ways to continue growing. Asia-Pacific managed to buck the downward trend and emerged as the only region that increased its dairy feed tonnage in 2023. This growth was fueled by a continued increase in the consumption of milk products there, as well as an expansion of feed production in co-operatives.

A closer look

Africa and the Middle East: Dairy feed tonnage was down both in Africa (by 10.67%) and the Middle East (by 2.69%) in 2023.

Asia-Pacific: Commercial dairy feed production continued its exciting growth in Asia-Pacific at an even faster pace in 2023, rising by 4.52% YOY (and a 1.6% CAGR since 2014). India and China stood out as the two markets that increased the most – by 8.7% and 5.8%, respectively – thanks in part to consumer interest in milk and dairy products.

Europe: The production of dairy feed was down in Europe (by 1.27 MMT, or 3.05%) in 2023. Challenges with lower

milk prices and cattle diseases continue to impact the industry, and water-scarcity issues in countries like Spain and Portugal have led some farms to close down. On the other hand, cattle farmers in Central and Southeastern Europe only experienced a reduced demand for industrial cattle feed because they achieved sufficient grass growth, meaning the numbers skewed down there for positive reasons. Sustainability drivers will continue to shape the European dairy industry as national environmental policies force the herd to shrink, resulting in the continued decline of compound dairy feed production.

Latin America: Commercial dairy feed production was down less than 1% in Latin America in 2023. This decrease was the result of the high cost of production and lower milk prices, which have led farmers to reduce their inputs.

North America: The dairy industry in North America has remained relatively stagnant over the past year, with both the number of dairy cows and the amount of feed tonnage consumed staying fairly consistent. Milk yields per cow increased slightly, but lower milk prices led to higher rates of culling. While calf numbers are up an impressive 15%, this is the result of more calves being raised to be sold for beef, which has become a profitable practice for many dairy farms.

Oceania: Overall dairy feed tonnage was up 1.04% in 2023. Commercial dairy feed production was down 23.97% in New Zealand due to the high cost of production – but a 3.85% increase in Australia more than offset the setbacks experienced elsewhere in the region. While other dairy producers around the world have been struggling with rising costs relative to milk prices, dairy farmers in Oceania have still been able to remain profitable, making the dairy industry there highly competitive.

Region	2023 feed tonnage (MMT*)	2022 feed tonnage (MMT)	Growth (MMT)	Growth (%)
North America	28.20	28.50	-0.30	-1.10%
Asia-Pacific	25.23	24.14	1.09	4.52%
Latin America	20.63	20.79	-0.17	-0.80%
Europe	40.46	41.73	-1.27	-3.05%
Oceania	1.46	1.45	0.02	-1.04%
Middle East	6.62	6.80	-0.18	-2.69%
Africa	5.33	5.97	-0.64	-10.67%
Total	127.92	129.38	-1.45	-1.12%

*Million metric tons



Beef

The global decline in the production of beef feed continued in 2023, with an overall decrease of 3.78%. Changes in cattle cycles in the United States and stricter sustainability policies in Europe had major impacts, with the Asia-Pacific beef sector notably surpassing Europe's in 2023. The substantial decline in North America was the result of lingering droughts and high production costs, among other issues. Nevertheless, while the European and North American beef industries are expected to continue declining in 2024, growth is expected in China, Brazil and Australia – highlighting the complex dynamics and landscape of beef feed production around the world.

A closer look

Africa and the Middle East: The beef sector experienced growth in both Africa (2.48%) and the Middle East (3.76%).

Asia-Pacific: Beef feed tonnage was up by 0.30 MMT (or 1.90%) in Asia-Pacific, driven mainly by growth in the Chinese market following a period of expansion in the domestic beef herd. Looking ahead, the beef sector in Asia-Pacific is expected to remain relatively flat in 2024 due to stagnating beef consumption in China and an increase in imports from Latin America.

Europe: The decline of beef feed tonnage in Europe continued with a reduction of 6.84%, or 1.29 MMT. This drop can be explained in large part by low profitability and stricter environmental policies about greenhouse gas and nitrate emissions.

Latin America: For the first time in a decade, beef feed tonnage was down in Latin America, but only by 0.03 MMT (or 0.19%). A number of local circumstances impacted this trend; for instance, a high supply of beef led to a record devaluation of live cattle in Brazil. On the other hand, Latin America is expected to remain competitive in export markets, paving the way for a potential increase in beef feed tonnage in 2024.

North America: While beef has traditionally been the largest sector in North America in terms of feed tonnage, the industry continues to face challenges, and feed tonnage was down by 5.88% (3.95 MMT) across the region in 2023. A three-year-long drought in the U.S. has had lasting impacts on both cow and calf numbers, and producers have also been grappling with high feed prices and decreased weights at harvest. In Canada, beef feed tonnage was down 10.15%, and the industry continues to reckon with shifting demographics as older producers sell off their farms. For now, the beef herd is expected to continue to thin, and a decrease in beef feed tonnage is expected in 2024 as a result.

Oceania: Beef feed tonnage was up 10.77% in Oceania, making it the region's main growth sector. Australia has been rebuilding its herd, leading to growing production and exports.

Region	2023 feed tonnage (MMT*)	2022 feed tonnage (MMT)	Growth (MMT)	Growth (%)
North America	63.25	67.20	-3.95	-5.88%
Asia-Pacific	16.08	15.78	0.30	1.91%
Latin America	14.72	14.75	-0.03	0.19%
Europe	17.54	18.83	-1.29	-6.84%
Oceania	0.72	0.65	0.07	10.77%
Middle East	2.12	2.04	0.08	3.76%
Africa	5.13	5.01	0.12	2.48%
Total	119.56	124.26	-4.70	-3.78%

*Million metric tons



Aquaculture

For the first time in recent memory, the global aquaculture sector experienced a decrease in feed tonnage (of 4.41%) over the past year. This decline was driven in part by a significant drop in China's supply of aqua feed due to lower fish prices, which had a far-reaching impact. Latin America grew by 0.27 MMT (3.87%). Despite adverse weather conditions in that region, the demand for aqua products is still strong in Latin America, which helped aqua producers there remain resilient.

A closer look

Africa and the Middle East: The total aqua feed tonnage of both Africa and the Middle East increased slightly in 2023.

Asia-Pacific: Aqua feed tonnage decreased in Asia-Pacific by 7.08% (or 2.72 MMT). This was driven by lower fish prices, which led farmers to reduce their stocking density; difficult weather conditions, which impacted fish performance; and economic challenges that decreased consumer demand for fish products.

Europe: As was seen in many other areas, Europe's total aqua feed tonnage was down in 2023 (by 0.12 MMT, or 2.58%) for the first time in recent years. Diseases in salmon

and trout had an especially devastating impact on Norway's aqua production and also led to increased mortality rates, lower performance and compromised animal welfare across the region.

Latin America: Despite widespread declines in the aquaculture sector elsewhere in the world, Latin America continued its growth with an increase of 3.9% in 2023. The region's export-driven market remained strong, even in the face of geopolitical tensions and challenging weather conditions, thanks to high demand for aqua products there. Ecuador maintained its top spot as the number-one shrimp producer, while Chile became the second-largest producer of salmon last year.

North America: Aqua feed production increased, but only marginally, in Canada and the United States in 2023.

Oceania: Aquaculture feed tonnage in 2023 grew by 7.5%, or 0.02 MMT.

Region	2023 feed tonnage (MMT*)	2022 feed tonnage (MMT)	Growth (MMT)	Growth (%)
North America	1.78	1.75	0.03	1.43%
Asia-Pacific	35.70	38.42	-2.72	-7.08%
Latin America	7.17	6.91	0.27	3.87%
Europe	4.63	4.75	-0.12	-2.58%
Oceania	0.22	0.20	0.02	7.50%
Middle East	1.02	0.97	0.05	5.43%
Africa	1.58	1.50	0.08	5.53%
Total	52.09	54.49	-2.40	-4.41%

*Million metric tons



Pets

Even now, four years since the onset of the COVID-19 pandemic — which led to exponential growth in the pet sector — the global pet industry continues to grow, 2.66% in 2023. Demand for high-quality pet products and services remains high from pet owners who want only the best for their animal companions. Latin America and Europe were among the primary drivers of this growth.

A closer look

Africa and the Middle East: Total pet food tonnage increased marginally in Africa in 2023, while no noticeable change was recorded in the Middle East.

Asia-Pacific: The pet food sector continued its upward trend in Asia-Pacific in 2023 with 2.41% growth, mainly due to an increase in the number of households that include a pet there.

Europe: Despite supply chain disruptions and inflationary pressures, Europe's pet feed tonnage grew by about 354,600 metric tons in 2023, an increase of 3.2%.

Latin America: The total tonnage of ingredients used in pet foods increased by 0.32 MMT (or 3.85%) in Latin America over the past year. This increase reflects the demand for only the highest-quality products from Latin American pet owners.

North America: Thanks to shifting production dynamics, North America's pet food production totaled 11.34 million tons of ingredients in 2023. While the total number of feed mills in the region decreased over the past year, the number of pet food plants went up. The rise of the North American pet industry underscores the changing landscape of the global pet sector.

Oceania: Pet feed tonnage grew by 0.04 MMT in 2023, a 7.57% increase.

Region	2023 feed tonnage (MMT*)	2022 feed tonnage (MMT)	Growth (MMT)	Growth (%)
North America	11.34	11.20	0.14	1.21%
Asia-Pacific	2.51	2.45	0.06	2.41%
Latin America	8.67	8.34	0.32	3.85%
Europe	11.45	11.10	0.35	3.20%
Oceania	0.54	0.50	0.04	7.57%
Middle East	0.11	0.11	0.00	0.00%
Africa	0.82	0.81	0.01	1.02%
Total	35.44	34.52	0.92	2.66%

*Million metric tons



Equine

The equine industry has remained strong over the past year, with much of the interest and industry remaining focused in North America. The population of “pleasure breed” horses decreased slightly there in 2023, while the “professional breed” population remained stable but is trending lower. On the other hand, interest in quarter horses continues to rise thanks to the meteoric popularity of “Yellowstone,” a TV show that has gained a massive following since it first came on the air in 2018.

Economic stagnation and inflation are the top reasons for a significant decline in equine feed production, as consumers have less disposable income for pleasure horse ownership. Feed for professional horses hasn’t changed.

The top challenges in the equine sector include high labor and material prices. The top technologies impacting the sector are biosecurity, microchipping, genetics and nutritional solutions. Survey respondents said the biggest opportunities for nutritional solutions are gut health management and feed efficiency.

Looking ahead, equine feeds are expected to decrease both in price and in volume in the coming year.

Region	2023 feed tonnage (MMT*)	2022 feed tonnage (MMT)	Growth (MMT)	Growth (%)
North America	3.77	3.80	-0.03	-0.79%
Asia-Pacific	0.38	0.51	-0.13	-25.59%
Latin America	0.76	0.96	-0.19	-20.08%
Europe	2.07	2.12	0.06	-2.62%
Oceania	0.43	0.41	0.02	4.88%
Middle East	0.12	0.14	-0.02	-13.06%
Africa	0.44	0.43	0.01	3.23%
Total	7.98	8.37	-0.39	-4.69%

*Million metric tons

