



*Global*



*Animal*



*Protein*

*RaboResearch*  
Food & Agribusiness  
December 2022



*Outlook*

*2023*

*Deciding How to Grow Amid  
Challenges and Opportunities*



# Global **Animal Protein** Outlook 2023

Deciding How to Grow Amid Challenges and Opportunities

## Our **Takeaway** Messages

- Even though we expect global animal protein **production to grow modestly** in 2023, it will be another year of change.

We will face high costs along the full supply chain, swings in consumption, and other areas of uncertainty for producers, such as elevated disease pressure and regulatory and market-driven changes.

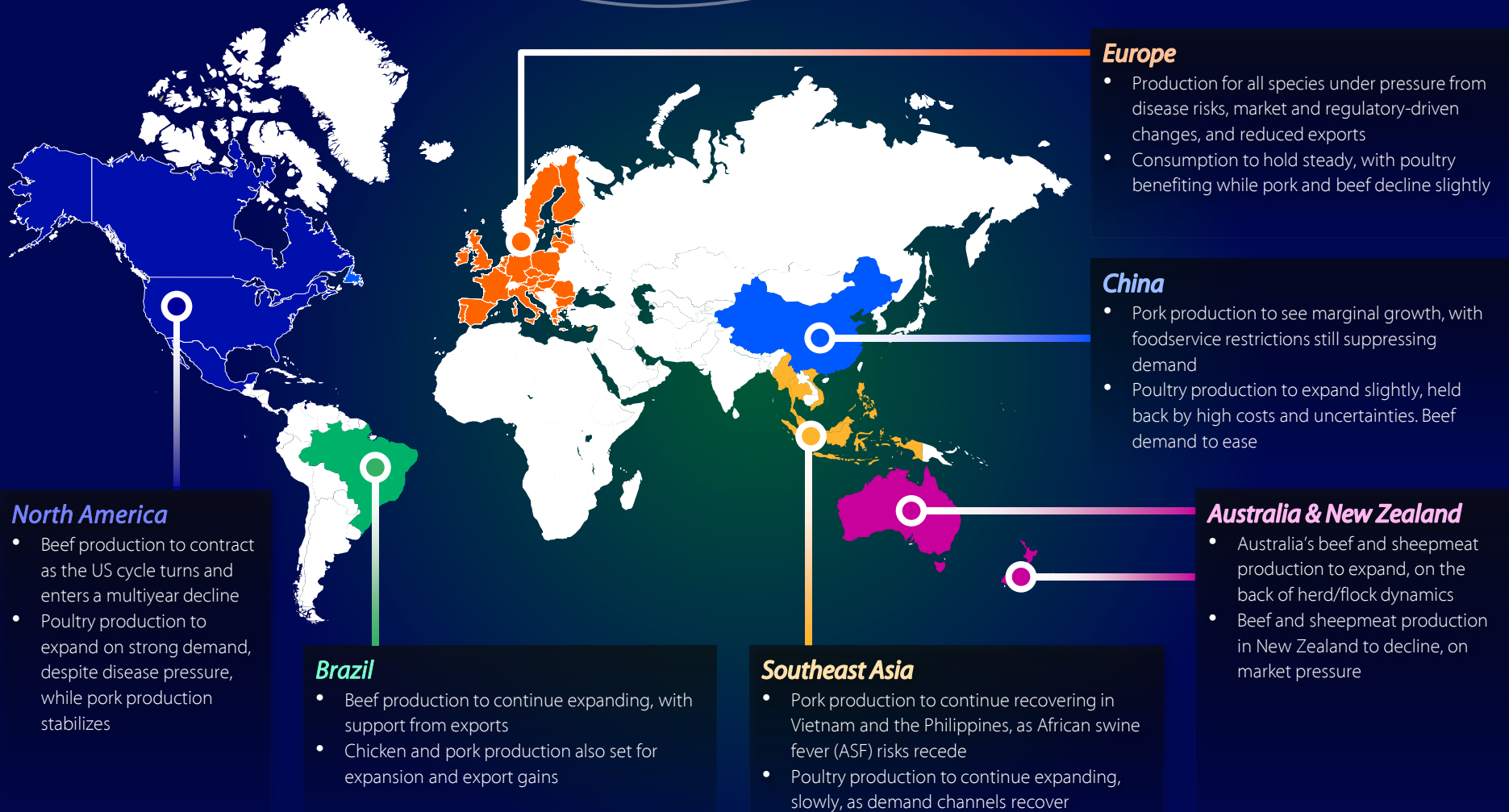
- As a result, **margins will be squeezed**, as buyers push back on higher production costs.
- Opportunities still exist but will be more restricted.

We see growth favoring value-for-money products, efficient producers and processors, agile companies, exporters advantaged by FX movements, and biosecure producers.

- Animal protein companies should see 2023 as a year to **recalibrate their growth expectations and plans**.

# Global Market Outlook

## A Year of Challenge (and Opportunity) in Global Animal Protein



## Growth is slowing down, with Asia a slight exception



- Slow growth expected in China across all species groups, with larger gains awaiting a full reopening of the economy.
- Ongoing growth expected in Brazil, across all species, supported by exports to Asia.
- Ongoing growth in Southeast Asia to continue, supported by better market conditions and fewer risks.
- Slight growth in Oceania to result from Australia's beef production gains.
- North American production expected to contract overall, driven by losses in beef.
- Contraction also expected in Europe, on headwinds for all species.

Source: ABPA, ABS, China MARA, European Commission, FAO, Stats Canada, Statistics New Zealand, USDA, Rabobank 2022



## Production Outlook for 2023 in Key Regions

Production growth for the main terrestrial species to slow further in 2023, with small gains in some regions but contraction in others.

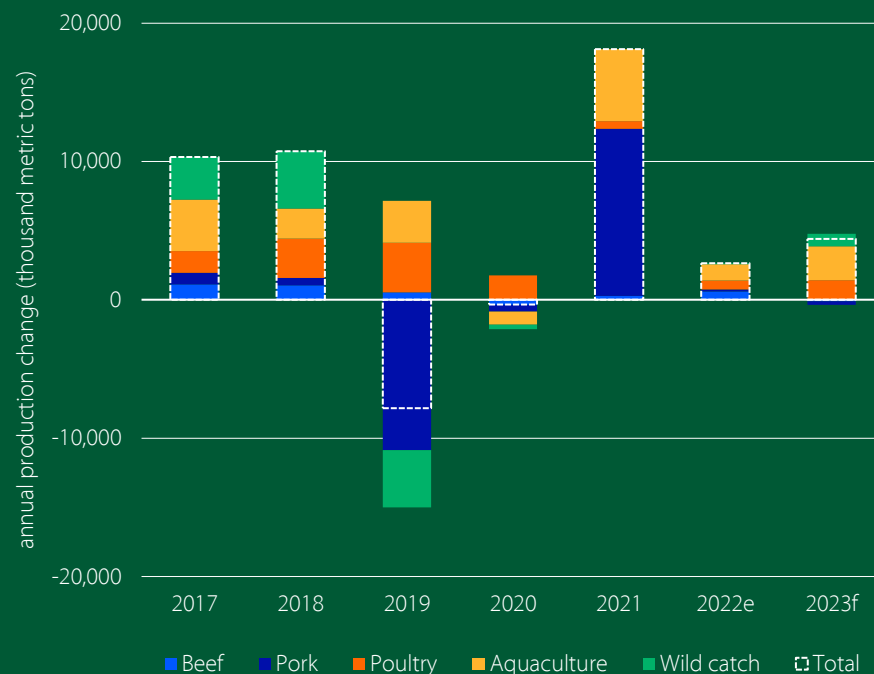


## Production Outlook for 2023 by Species

Steady growth in production will continue in 2023, despite various headwinds. Growth in aquaculture, poultry, and wild-catch seafood will outweigh minor contractions in beef and pork.

Source: ABPA, ABS, China MARA, European Commission, FAO, Stats Canada, Statistics New Zealand, USDA, Rabobank 2022

## Seafood and poultry lead growth



- Aquaculture leads global growth across the species groups, once again, and its continuing expansion is supported by its relative independence from agri commodity prices.
- Poultry is set to maintain its consistent growth pattern, although the expansion will be more modest given pressures on production.
- Wild catch is set to expand slightly, as high seafood prices balance higher fuel costs, although growth is largely controlled by quotas and regulations.
- Beef production is set to decline slightly, as contraction in the US will outweigh expansion in Brazil and Australia.
- Pork will see a decline, largely as a result of ongoing contraction in Europe, with little change elsewhere.

# Recalibrating Growth in Global Animal Protein

New approaches needed in 2023 to enable growth while managing ongoing production pressures

## Making choices about how to approach future growth in 2023

Global animal protein faces many pressures in 2023, some of which are cyclical while others are becoming more structural.

Given these ongoing pressures, animal protein companies need to choose how they approach future growth. Some will maintain a near-term focus and work to strengthen agility so they can ride the waves. Other companies will look further ahead and invest now for future success in dealing with the structural changes.

### Animal protein companies choosing to focus on managing near-term cyclical pressures should:

Stay the course with the lessons learned during the Covid pandemic about cost management, margin optimization, and meeting customer needs, possibly through the use of new technologies.

Invest to improve market intelligence, to further develop networks, and to better read market signals, and ensure partners can shift directions quickly when they find themselves in choppy waters.

### Animal protein companies choosing to focus on longer-term structural changes should:

Keep their eyes on the horizon by building supply chain resilience to strengthen access to inputs and customer connections, which will also enable the transition of production systems and the achievement of sustainability goals.

Adopt an innovation mindset to adapt to changing market requirements, adjust business models to steer toward opportunities, and use more data to plot their course.



Source: Rabobank 2022



## *Global feed outlook*

*Feed price relief will be limited in 2023, challenging producer margins*

## *High input costs to continue*

*Regional differences in input costs could have implications for competitiveness*

## *Changing consumption patterns*

*Price does matter, but it is just one factor shaping consumption*

## *Ongoing biosecurity risks*

*The industry steps up efforts to control risk given the high cost of loss*

## *Sustainability*

*The rubber starts hitting the road in 2023, starting with measurement and reporting*

# *What's on the Grill in 2023*

# Feed and Forage Price Relief Will Be Rare

Costs escalated throughout 2022, and stabilizing but higher prices could limit 2023 margins

## Prices to remain elevated throughout 2023

Global grain and oilseed prices nearly doubled (+94%) from May 2020 to May 2022 due to stronger demand, lingering supply concerns, and growing geopolitical uncertainty. These price challenges are not unprecedented. Similar headwinds created a 170% increase in global feedstuff prices from 2005 to 2008. As that rally matured, animal protein producer margins turned negative, and the same result is possible this time. Since the grain and oilseed price highs in Q2 2022, the market has trended more sideways. Rabobank expects prices in 2023 to remain relatively rangebound at these elevated levels, as the primary factors that led to the most recent rally remain intact.

[For more detail, see Rabobank's Agri Commodity Markets Outlook 2023: Tightening the Belt](#)

## Drought will limit growth in grain and oilseed balance sheets

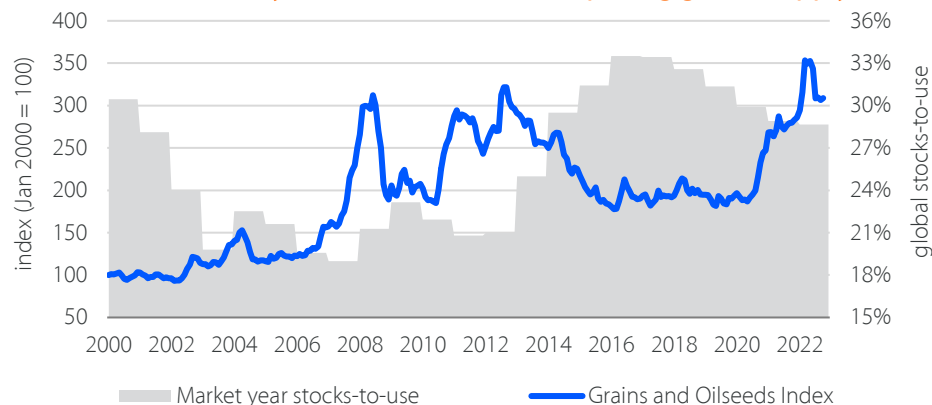
Three years of a La Niña weather pattern have capped the global production of wheat, corn, and soybeans. Drought has decimated major producing regions in the US, Europe, and India. Above-average growing conditions buoyed the soybean and corn crops in Brazil, boosted the grain harvest in Australia, and supported a record-large Russian wheat crop. However, challenges exist in getting these crop surpluses to areas of need, creating further volatility for market participants to navigate. Long-range weather forecasts predict a transition to a more neutral pattern by Q2 2023, but even so, a warmer and drier Q1 could still lead to drought in 2023 for the Northern Hemisphere.

## Outside factors continue to create additional chaos

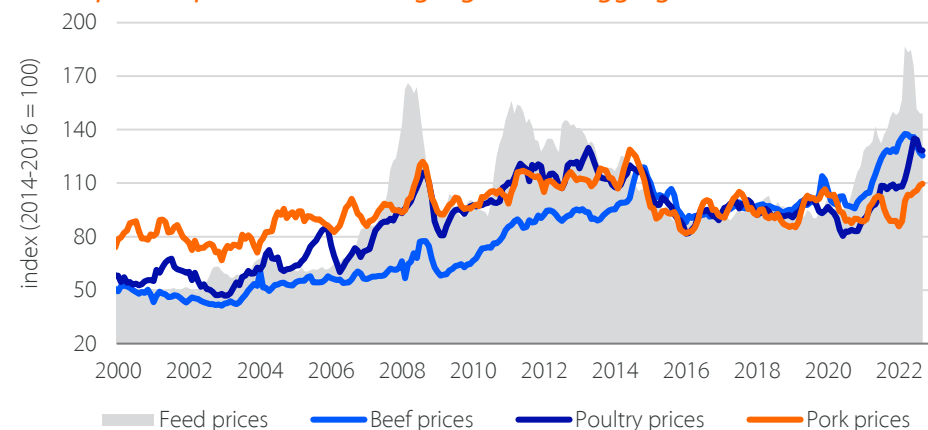
Unusual headwinds and uncertainties are also causing buyers to look beyond normal sources for feed and forage this year. Global demand for renewable diesel and biodiesel production has upended soybean and other oil market values. The war in Ukraine is still restricting Black Sea grain shipments. The EU is now allowing certain GM grains for human and animal consumption. Furthermore, freight and logistical challenges are slowing corn and soybean movement in the US and Brazil. Each of these issues is forcing wider-than-normal price spreads across countries and within them.

Source: International Grains Council, FAO, USDA, Rabobank 2022

## Demand for corn, soybeans, and wheat is outpacing global supply



## World protein prices are trending higher but lagging feed costs





# High Input Costs Will Continue to Pressure Production in 2023

Competitive landscape may shift, depending on responses from governments, supply chains, and consumers

## Input cost pressures are not expected to ease materially in 2023

Cost increases faced by animal protein supply chains in 2022, such as higher feed, energy, fertilizer, freight, finance, and labor costs, will likely remain with us through 2023. Feed costs will remain elevated, as will energy prices, particularly in Europe. High energy prices have effects spiraling through the chain and impacting fertilizer availability and prices, which has implications for grain and oilseed production in 2023. Crushers, feed mills, and animal producers are also directly impacted by the price hikes. Packers and processors will also feel the impact, as they face rising input prices and declining purchasing power. Geopolitical risk will continue to influence FX, prices, and trade flows.

## Competitive landscape may shift, with implications for production

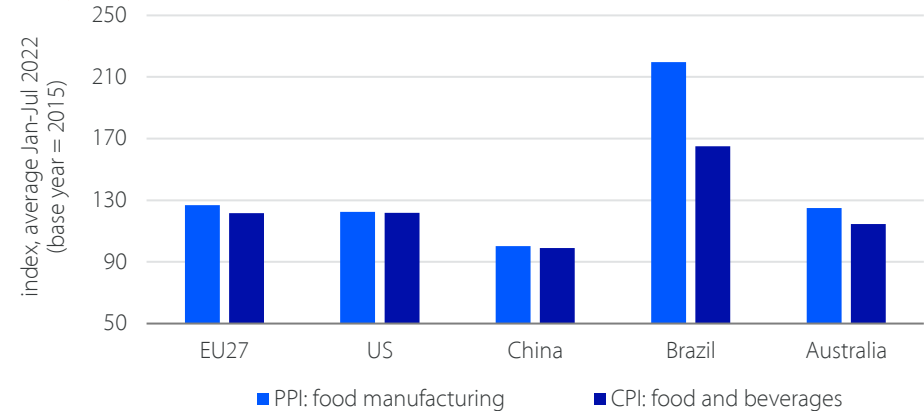
The impact of higher input costs varies by region and species, influencing competitiveness. Poultry and aquaculture, with efficient feeding and shorter cycles, are generally better at managing the impact, while pork and beef face greater challenges. Skyrocketing energy prices and a weakening euro are already affecting Europe's competitiveness, while the strength of the US dollar may affect US exports. Regulatory and market-driven changes, such as the Norwegian government's proposal to tax aquaculture, could also impact competitiveness.

## Pressure on production and consumption will depend on:

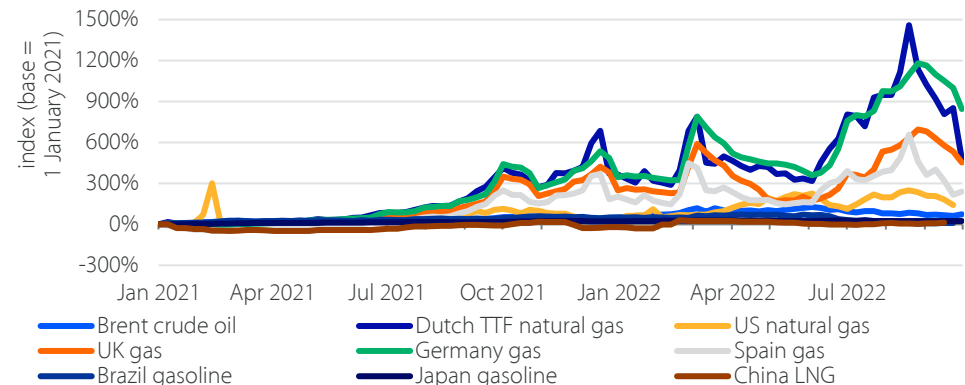
- Russia-Ukraine war: The situation in Ukraine and the way other countries restrict Russia will influence production, trade, and consumption.
- Macroeconomic environment: Headwinds, including higher interest rates and restrictions on passing on costs to consumers amid high inflation, will likely persist.
- Government interventions: Governments will likely continue to offer household-level support to manage rising costs and ease the pressure on consumption.
- Supply chain responses: Players along the supply chain will shift focus to cost reduction and efficiency improvements.

Source: Macrobond, Rabobank 2022

## Ability to pass costs along the chain differs per region



## Europe has been hit most by rising energy prices; ongoing impact on competitiveness expected through 2023



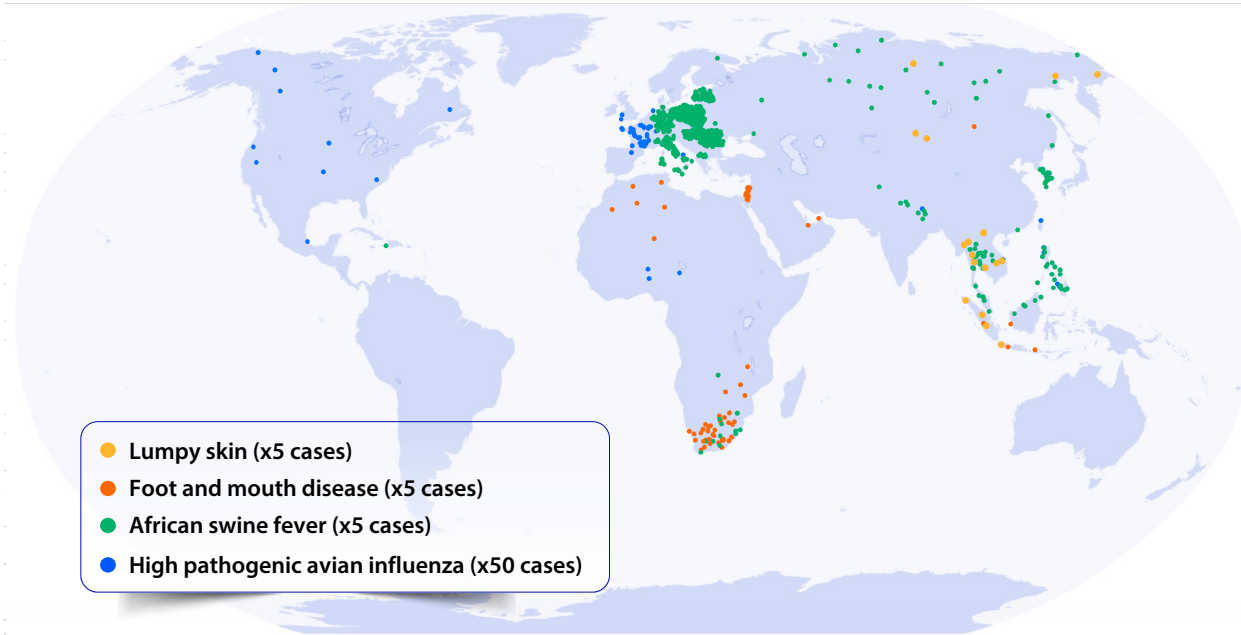
# Biosecurity Challenges Set to Persist in 2023

Industry steps up efforts to control risk given the high cost of loss

## Disease challenges linger despite heightened focus on biosecurity

African swine fever (ASF) and highly pathogenic avian influenza (HPAI) are headline-grabbing health challenges in global animal protein that continue to drive production loss and create uncertainty in key production regions. Incidence of foot-and-mouth disease, PRRS, and lumpy skin disease are more localized, but also jeopardize production and market access. Improved detection and global government alignment on monitoring and community education are helping to limit the spread and severity of outbreaks, while the industry is also learning to better manage existing vulnerabilities. Despite the added focus, many disruptive health events have come as a result of wild animal or human vectors – both of which remain difficult to control.

## Animal health challenges are global



## Industry moves from reactive to proactive disease management

Added measures restricting on-farm traffic and unnecessary animal movement between operations are being adopted, yet the rate of acceptance continues to vary by geography. An improved global understanding of effective mitigation strategies is being shared and backed by producer organizations and governments, which should speed acceptance. Sensors that track animals' feed and water consumption are increasingly being used to recognize unusual animal movement, a possible precursor to potential health challenges. Further investment in predictive technologies should help limit health-related herd loss.

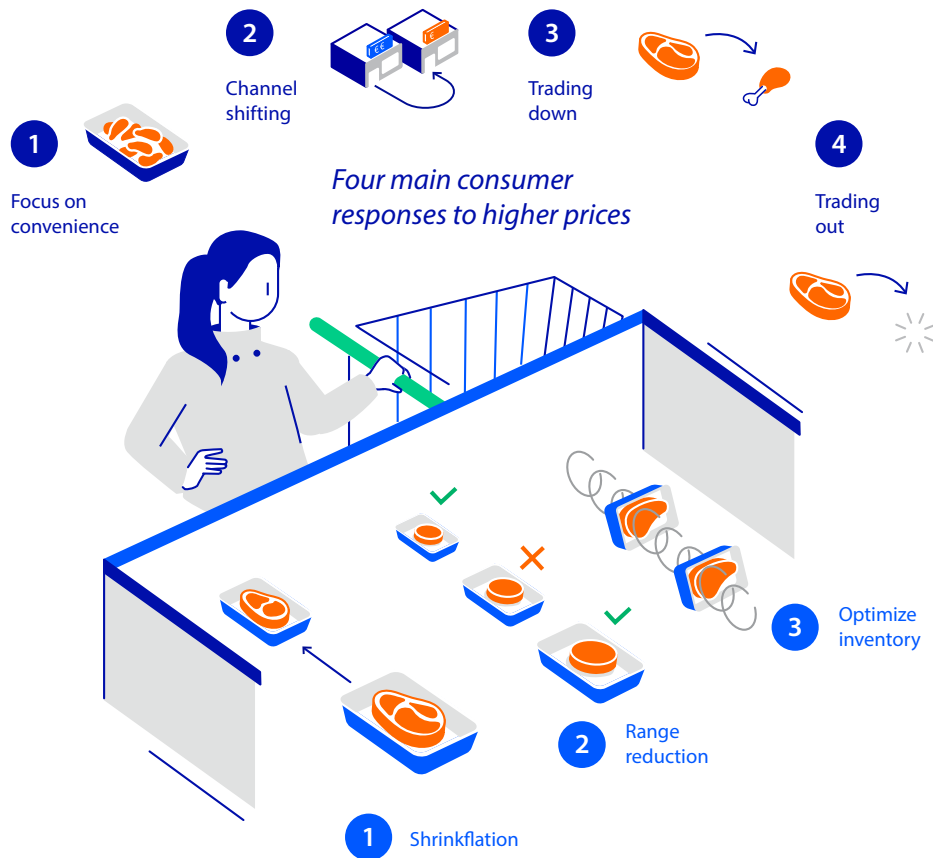
## Industry continuing to invest in animal protection despite higher costs

Cost inflation has raised not only the cost of preventative technology, but it is also increasing the financial burden of loss. Widespread culling as a tool to contain the impact of an outbreak is both managerially challenging and costly for all parties involved. The rising cost of disease response at a government level could be particularly challenging in developing countries that have limited resources for control. This constraint could force a re-examination of current methods and accelerate investment in preventative and predictive technologies in 2023.

# Consumption Patterns Set for Change as Prices Remain High

Consumers' responses to price are more complex than many assume

## Responses to high animal protein prices – what we generally expect



## Three main responses to higher prices in food retail and foodservice

Shrinkflation, Range reduction, Optimize inventory

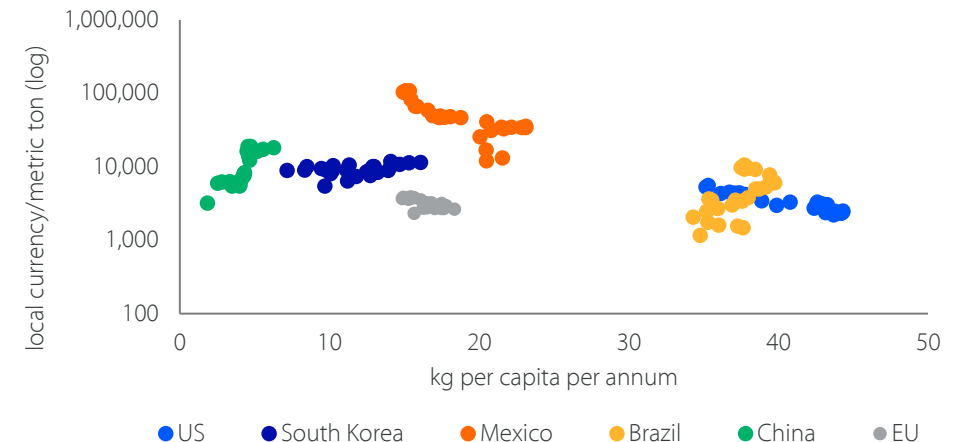
## Price is only one factor that shapes consumption patterns

The sensitivity of consumers to animal protein price is often misunderstood. A multidecade analysis of how beef consumption varies in different countries as the price of beef changes illustrates this point. In some countries, such as China and South Korea, beef consumption rises with price, while in others, such as Europe, Mexico, and the US, consumption falls with price increases, and in Brazil, consumption levels appear to have little relationship to price.

Animal protein consumption patterns are shaped by many factors, and price is just one of these. Consumer confidence, household income, employment, influence of government household-assistance packages, and prices of alternative foods are all relevant in shaping animal protein consumption patterns.

In 2023, we expect to see changes in animal protein consumption patterns, with some new dynamics, as well as typical responses, shaping these patterns. In this economic downturn, one specific feature we will focus on is the influence of relatively high household income.

## Beef consumption is shaped by many factors in addition to price



Source: CEPEA, Eurostat, MARA, Macrobond, USDA, Rabobank 2022

# Sustainability: Targets Have Been Set, Action Is the Next Step

Progress will be made on sustainability measurement and reporting in 2023

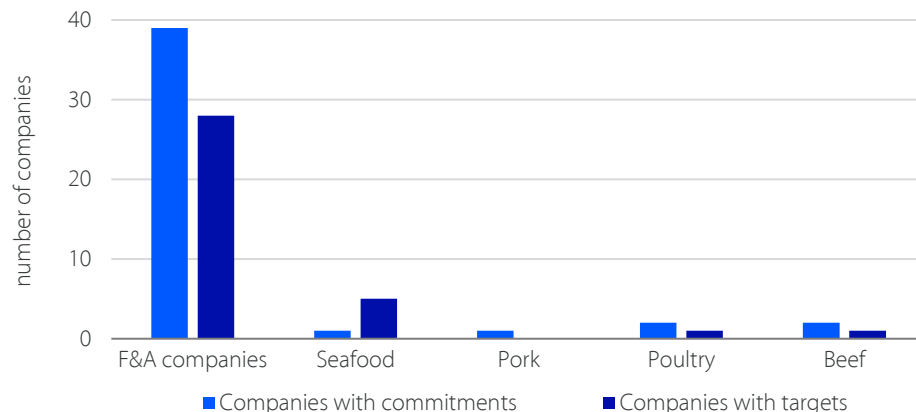
## Carbon measurement driving markets and the sustainability agenda

With greenhouse gas (GHG) emissions targets now established in major production regions, the focus is shifting to translating these targets into actions that can be measured and reported. This is happening as the global economy slows, so animal protein supply chains face the additional challenge of finding a return on investment in reducing emissions as consumer sentiment softens.

A growing number of animal protein companies have registered their GHG emissions goals with the Science-Based Targets initiative (SBTi). They initially register commitments to reduce emissions and then make these into SBTi-approved targets. Animal protein companies currently account for about one-third of F&A companies with approved targets, with seafood companies leading the charge.

In 2023, we expect emissions certification schemes to start broadening their focus from only considering supply chains to also establishing farm-level accreditation and product labeling. It will be important to align such accreditation and labeling with supply chain systems to ensure consistency, credibility, and consumer engagement.

## More animal protein companies likely to commit to SBTi in 2023



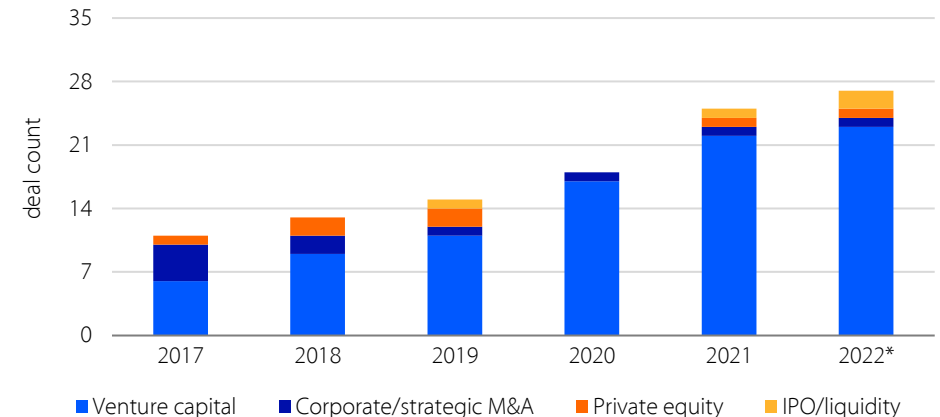
\*Partial data  
Source: PitchBook, Science Based Targets, Rabobank 2022

New Zealand is one of the first countries to develop farm-level carbon accreditation certification (Farm Carbon Certification). In Brazil, there is a significant opportunity to develop farm-level accreditation to support emissions reductions. Some estimate that 15% of the total supply potential of nature-based solutions in the global carbon credit market are in Brazil, and currently less than 1% of this potential has been developed.

## Investors are starting to recognize the opportunity in GHG reduction

Company emissions targets drive action and require measurement and reporting. We expect animal protein companies to keep stepping up on emissions commitments in 2023, which will require new technologies to help translate commitments into action. Investment into new technologies in global animal protein has attracted increasing levels of funding over the past five years, implying new tools will enter the market in the coming years. This could include, for example, tools and technologies that map emission sources at the farm level via satellite and farm management software systems that include emissions footprint analysis, as well as tools that reduce methane emissions from rumination and manure.

## Investment in animal protein technologies has been growing



## **North America**

*Poultry to expand, while pork stabilizes and beef contracts*

## **Europe**

*Mixed headwinds for pork, poultry, and beef*

## **Brazil**

*Exports to drive production expansion*

## **China**

*Softer demand creating uncertainty – production gains modest*

## **Southeast Asia**

*Steady production recovery continues*

## **Australia**

*Supply is improving, with prices to ease*

## **New Zealand**

*Structural changes to livestock numbers expected to begin in 2023*

# **Key *Animal Protein* Markets in 2023**

## **Salmon**

*Supply recovering on good demand, despite high costs*

## **Shrimp**

*Strong supply growth to continue*

## **Fish meal and fish oil**

*Stable supply may see prices ease*

## **Alternative proteins**

*Recent stellar growth is on hold*

# North America: The Beef Industry Hopes for Storm Clouds

Production declines are coming after three years of drought, consistent rain would bring rebuilding

## Drought continues to disrupt cattle and beef markets

Cattle prices continued to trend higher in 2022 from the pandemic-induced lows, although producer profitability has been threatened by near-record-high feed and forage prices and limited feedstuffs availability. With US cattle producers thinning beef cowherds – around 50% of operations are experiencing drought – and relatively small gains in Mexico’s cow numbers offsetting declines in Canada, the North American beef cowherd will be down nearly 2.5m head from its January 2019 highs, and the 2014 lows will be revisited by 2024. Expect beef production to decline in 2023 and to continue to decline as herd rebuilding keeps heifers and cows in pastures, away from processors.

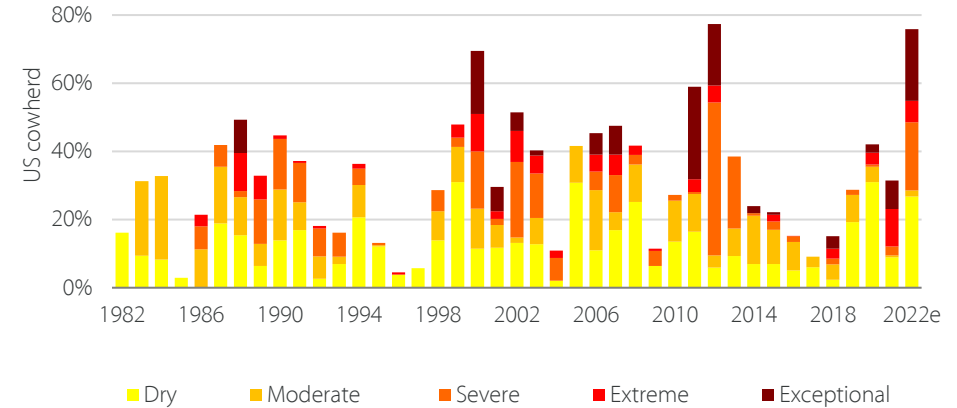
## Forecasting post-pandemic demand remains challenging

Navigating beef demand performance in this post-pandemic landscape presents plenty of considerations – including stagnating consumer income growth, 8% annualized inflation, rapidly rising interest rates, and supply chain disruptions. US retail beef prices remain within US\$ 25 of the all-time highs, and retailers have been slow to pass wholesale price discounts on to consumers, as they anticipate rising beef costs and tighter supplies. Consumption will decline by 2% in 2022, and a 5% decline is expected in 2023. Even with weaker demand, consumer beef prices will likely hold steady, and less demand destruction is possible if overall consumer spending does not deteriorate.

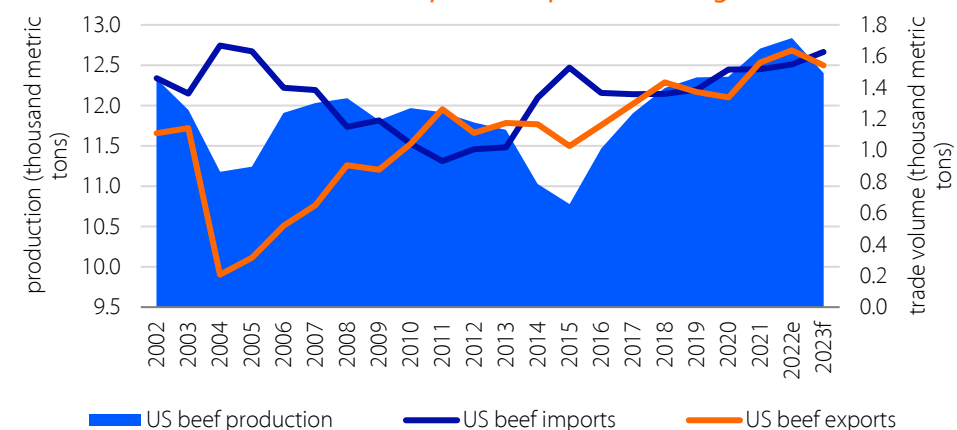
## Global trade will pivot to redistribute supplies

Expect the movement of beef throughout the global marketplace to shift as US beef production declines 3% in 2023 – and falls another 2% to 5% per year in the three years that follow. In the near term, growing beef production from key global exporters likely won’t fill the void left by the US, and, in all likelihood, lower US exports over the next several years will be compounded by stronger demand for imported beef by US consumers as domestic supply shrinks. US beef exports are expected to fall 91,000 metric tons (6%) in 2023. The potential exists for 130,000 metric ton declines annually over the next several years. Imports could grow on average 40,000 metric tons per year in that same time.

## Near-record beef cows under drought to shape 2023 production



## The US will become a net beef importer as production tightens



# North American Broiler Industry Moves Toward Expansion

Lingering HPAI outbreaks remain a constraint on US turkey and layer flocks

## Rebound in productivity and higher weights to help fill 2023 protein gap

Late 2022 gains in productivity and a shift toward larger bird weights will result in a 0.8% increase in US ready-to-cook broiler meat availability in 2023. Improvements in hatchability are driving a majority of the increase, allowing integrators to shrink the breeder flock to reduce costs. Average weights are expected to remain high in 2023 as integrators shift production to meet growing foodservice demand. Commodity chicken margins will remain under pressure in 1H 2023 due to elevated feed costs and increased RTC production. Production will slow in 2H 2023, although smaller competing meat supplies and shifting consumer needs should remain supportive to prices.

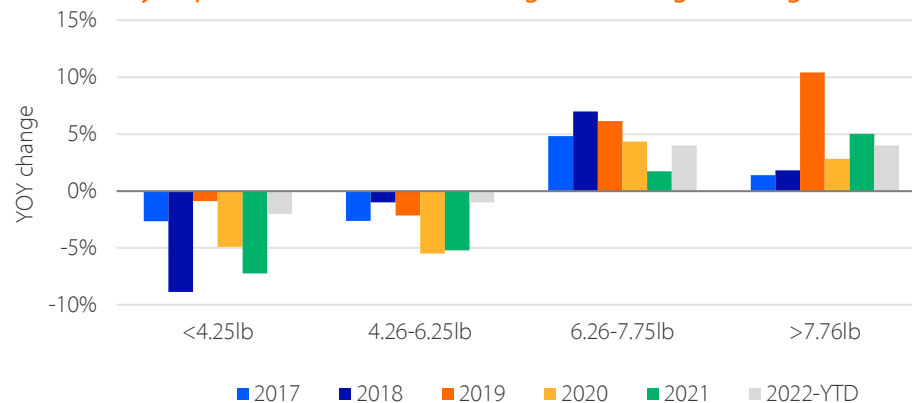
## HPAI to limit turkey and egg availability in 1H 2023, broilers less affected

Persistent outbreaks of HPAI in 2022 primarily impacted the turkey and egg-laying hen populations, while chicken producers have seen limited impact. The loss of 9.2% of the US turkey flock will constrain production through 1H 2023, with the industry slow to repopulate given ongoing risk. Egg supplies will also remain constrained through Q1 2023, although repopulation should accelerate as HPAI risks are contained. To date, broiler flocks in much of North America have seen limited impact from HPAI given shorter production cycles. Record losses to HPAI in 2022 and the high cost of culling are forcing a re-examination of biosecurity and potential vaccination measures.

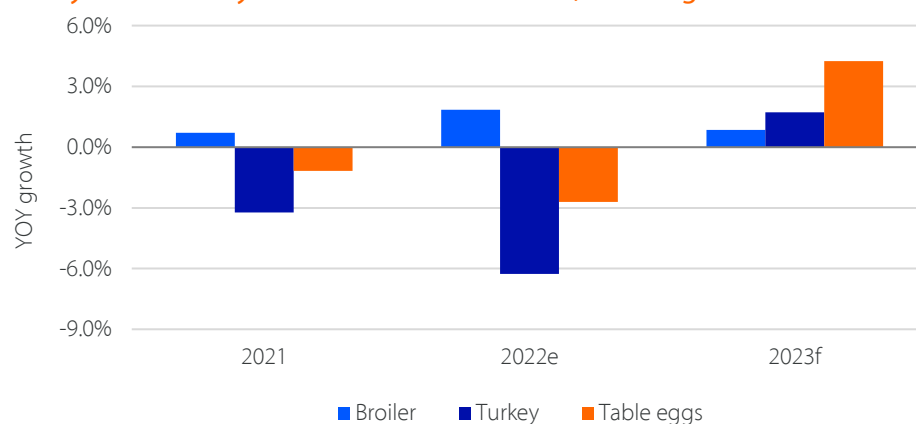
## Mexican poultry industry margins to stabilize, steady production in 2023

Margin pressure in Q4 2022, following the recovery in Mexican broiler production and increase in feed costs, should drive a market correction in early 2023. Domestic chicken demand remains strong, helping markets to stabilize. Government policies to control food cost inflation by importing lower-cost proteins at little or no tariff will extend into 2023, limiting the industry's ability to raise prices to offset the rising costs. The added risk of HPAI losses in 2023 may also slow industry growth.

## Productivity improvement and shift to larger bird weights fuel growth



## US layer and turkey flocks to rebound in 2023, limited growth in broilers



# North America: Hog Productivity Turning a Corner

High costs and trade uncertainty limit herd expansion

## Productivity gains and improved herd health to boost production

After roughly two years of challenging herd health, we expect some improvement in North American pork production in 2023. Stronger biosecurity protocols and increased herd immunity are likely to limit the impacts of disease, with reduced herd losses and better health to drive productivity growth by midyear. This anticipated recovery will drive North American production higher, despite little or no expected growth in the sow herd. We forecast 0.2% YOY growth in US production, driven by the uptick in productivity, as improved health is likely to be offset by slightly lower sow numbers in 2023. Mexican pork production is also expected to move 3% higher after months of productivity challenges, while Canadian production will remain flat on continued margin pressure.

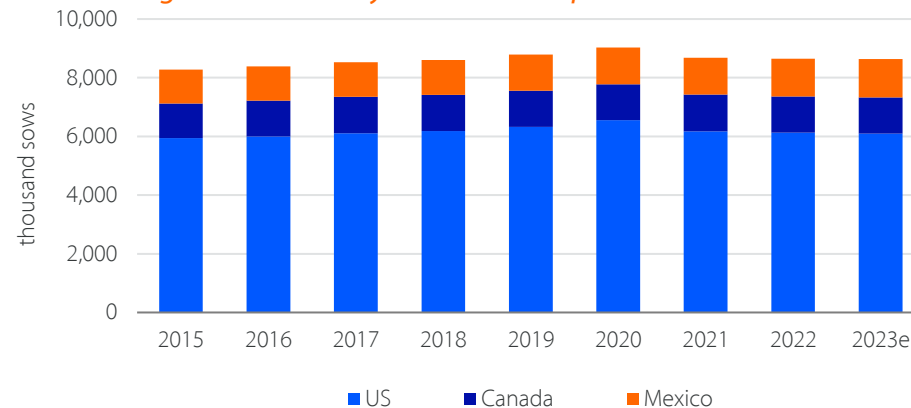
## Feed and labor costs weigh on returns, slowing expansion plans

North American hog producers are facing historically high costs of production, limiting interest in herd expansion. Feed has increased costs by USD 9 per head, or 17% YOY, with tight global inventories a concern. Higher financing costs are also limiting growth, although improved visibility on Proposition 12 housing regulations during Q1 2023 is expected to eliminate some near-term uncertainty. Challenging growth prospects could force packers to put additional resources toward securing hog supplies to improve throughput but are unlikely to alter planned expansion.

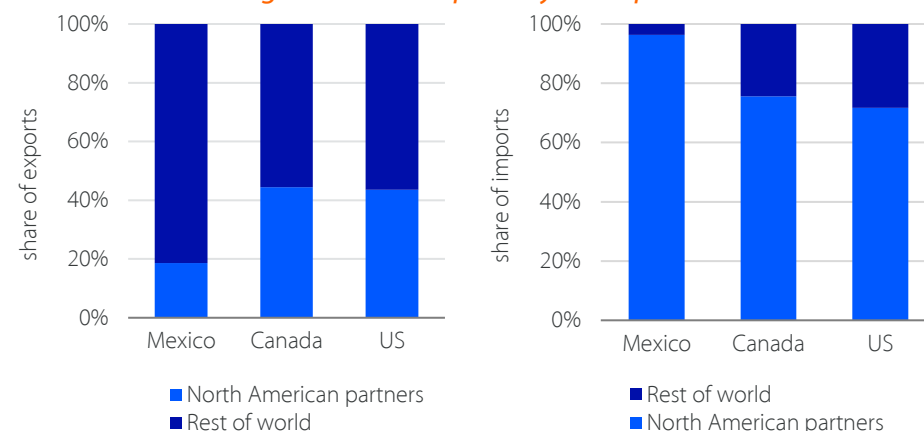
## North American trade to remain steady, economic headwinds a risk

Exports remain a critical driver of carcass valorization and are expected to remain challenging given weaker global economic trends. US and Canadian pork markets are most vulnerable to slowing growth, as trade makes up 22% and 61% of total annual consumption, respectively. Trade within North America is likely to remain steady, although policies to combat food inflation in Mexico by expanding tariff-free access could increase competition from Europe and Brazil. Stronger exports to China could dramatically enhance North American export potential and tighten domestic supplies, although current geopolitical tensions give this outcome a low probability.

## Production growth limited by lack of herd expansion



## North American neighbors remain primary trade partners





# Europe: Pork Markets Continue to Rebalance in 2023

Ongoing decline in exports warrants further contraction

## Pork production to decline, on a smaller herd

Another year of decline is expected for pork production in 2023, after a sharp 5% drop in 2022. Rabobank expects pork production in the EU27+UK to contract by about 3% YOY in 2023. Negative producer margins led the sow herd to contract during 2022, given high feed costs and low piglet prices in an oversupplied market. In June 2022, the sow herd was 5% smaller year-on-year in the eight major producing countries of the EU27, with the sharpest declines in Poland (-17%), Germany (-9%), and Denmark (-7%). England recorded a 17% reduction in its sow herd in the same period, which will lead to a 10% decline in UK pork production in 2023. Replenishment of Europe's pig herd is not likely in 2H 2022 due to ongoing cost pressures (high feed and energy costs, in particular), continued low export demand, and pressure on domestic consumption.

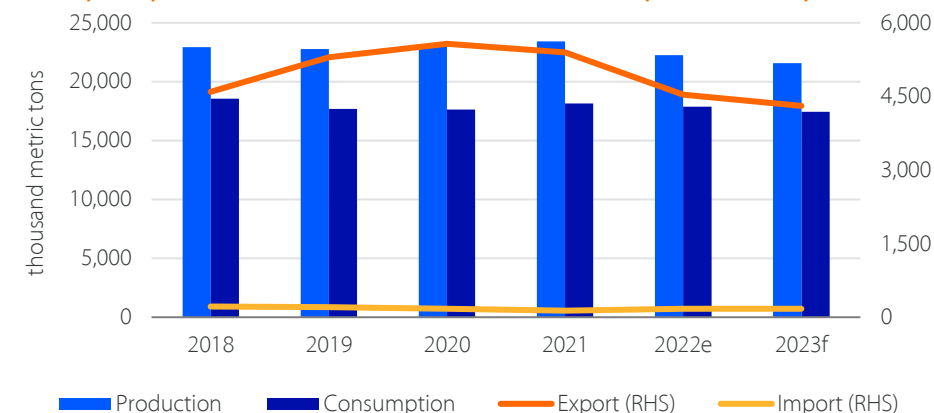
## Margin pressure to remain, on high costs and lower demand

Ongoing high inflation will continue squeezing consumer budgets in 2023, pressuring pork demand. Pork may, though, benefit from relatively high chicken prices, as chicken supply is expected to remain restricted due to avian influenza. Pork exports from the EU27 will continue to decline, but at a slowing rate (-5% YOY). In 1H 2023, Europe may see exports to China lift, as pork supply in China is expected to be tight.

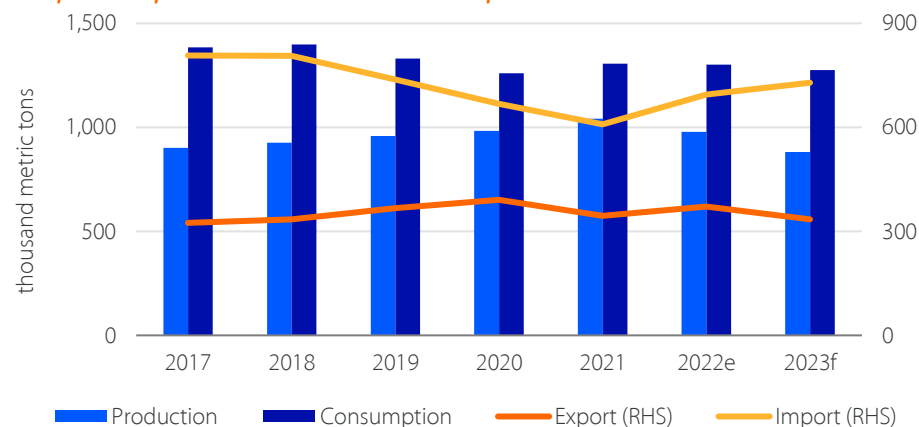
## ASF and social and environmental issues also driving change in Europe

In Belgium and the Netherlands, ambitions to reduce nitrogen emissions from livestock production are high on the political agenda. In both countries, reducing the pig herd through buyout schemes has been proposed by the government as a way to deal with the issue. However, the level of compensation, the timeline, and the impact on production of such schemes is not yet known. In Germany, tightening animal welfare regulations, coupled with export restrictions resulting from ASF and low returns, will lead to further contraction of the herd.

## EU27 pork production to decline on lower consumption and exports



## UK pork imports to increase on lower production



# Europe: Tight Poultry Market Context With Strong Prices

High costs, AI, and labor challenges are keeping markets tight, consumer demand to stay strong

## EU poultry production to stay tight in 2023, with strong prices

The key challenges for European poultry producers in 2022 have been on the operational side, with high feed and energy costs and big impacts from avian influenza (AI) throughout the year. This has resulted in low chicken supply during the year (average -0.5%). As consumer demand for poultry is strong – this is the cheapest animal protein in a period of historic high pressure on consumer spending – market conditions have been tight, keeping prices strong. This has also triggered rising imports (+8% in 2022), with Brazil and Ukraine in particular benefitting from significant increases in exports to the EU27.

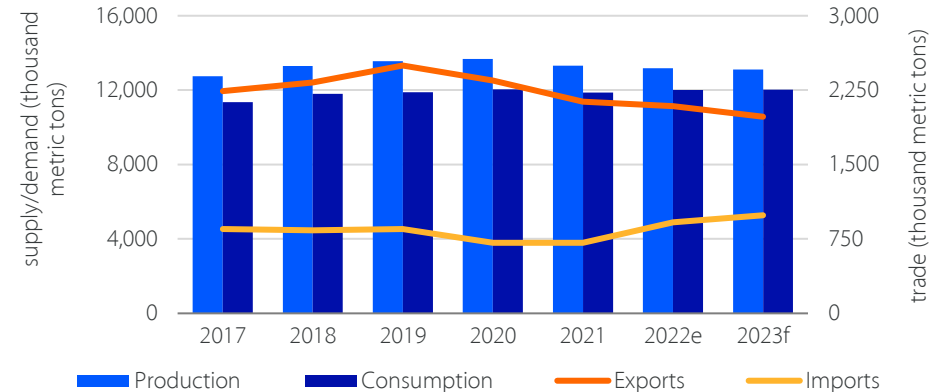
For 2023, we expect the market to stay tight given ongoing AI pressure and high input costs. We believe production will drop by about 0.5% despite ongoing strong demand. An additional influence is the shift to one-star Better Life chicken in the Netherlands and other environmental regulations elsewhere that will further limit production. The main region showing growth is central Europe, especially Poland, Hungary, and Romania.

## UK chicken industry at a turning point, with declining self-sufficiency

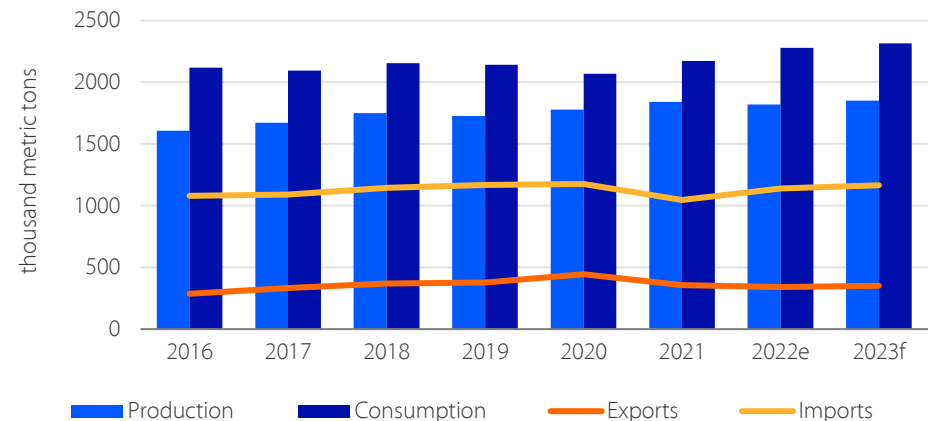
For UK poultry, 2022 has been a turning point. After the Brexit and Covid years, we saw a shift to 'buy British' in the UK driving higher self-sufficiency. In 2022, the industry couldn't meet the strong local demand for chicken after UK foodservice reopened. At the same time, consumption has grown by 5% while production has declined slightly by 1% on the impacts of Covid-19, tight labor supply, and high input costs. The difference has been met by a sharp increase in imports, with all key exporting partners – the Netherlands, Poland, and Thailand – benefiting from this increase in demand.

We expect this situation to continue in 2023, with a small rebound in production (+1.5%) and ongoing strong demand (+2%) as consumers continue to trade down into poultry.

## EU27 poultry supply to remain tight, supporting import growth



## UK chicken supply slowing after years of fast production growth



# Europe: Decline in Beef Production to Slow in 2023

Consumption to come under pressure as consumer budgets tighten

## Decline in beef production likely to slow in 2023

Rabobank expects that beef production in the EU27 will decline at a slowing rate in 2023, by about 0.5% YOY. Recent herd data suggests that by June 2022, the cow herd in the top ten beef producer countries, representing about 85% of the EU27's total herd, declined by 2.1% YOY. However, cow numbers remained stable in 1H 2022 (+0.1% compared to December 2021). Also, the total number of bovine animals was up by 1.3% in June 2022 compared to December 2021. France (-0.6%), Germany (-0.3%), Italy (-2.9%), and Poland (-1.8%) showed a decrease in cow numbers, while Spain (+1.8%), Ireland (+6.1%), and Romania (+1.7%) expanded their herds in the same period. This suggests cattle supply will be slightly higher in 2H 2022 and 1H 2023. Higher feed costs in the winter could result in higher slaughter numbers in 2H 2022, which would limit supplies later in 2023. In the UK, the structural decline of the herd is expected to continue, but higher availability of slaughter-ready animals will slightly increase production, by about 1%.

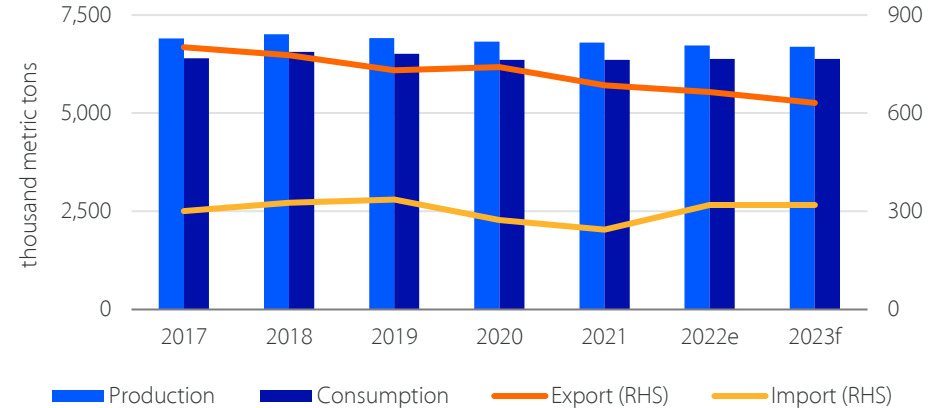
## Beef demand to come under pressure

Downward pressure on beef consumption is expected amid sustained high inflationary pressures in 2023. This, coupled with lower availability, will also continue to limit exports. Although, the price point will also be important. During 2022, beef carcass prices have been very strong compared with the five-year average.

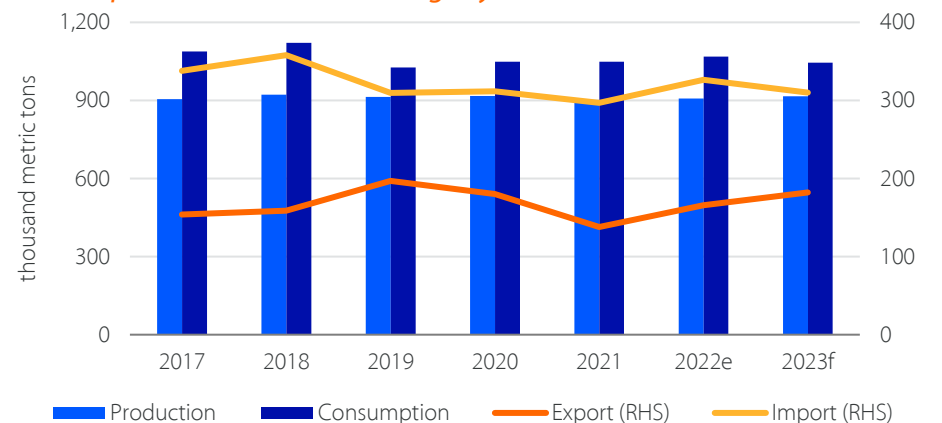
## Structural issues will continue to pressure beef production

In 2023, the decline in beef production may slow. However, structural issues will keep influencing the herd dynamics over the long run, such as the aging producer base, low profitability, and environmental issues. Although producer margins improved slightly during 2022, it is unlikely that this trend can be maintained considering the increasing investments that will be needed to address environmental issues in beef production (e.g. to reduce GHG emissions in the EU and decrease nitrogen emissions in the Netherlands), which will likely impact cost-price and profitability of beef producers.

## EU27 beef exports to decline on continued lower availability



## UK beef production to increase slightly



# Brazil and Argentina: New Challenges for Beef Exports

A slowdown in the Chinese economy may impact beef shipments, but opportunities may also appear

## Expectation of higher cattle supply in Brazil should favor exports

Recent data shows that Brazil's cattle herd maintained its growth pace for the third year in a row in 2021, increasing by 3.1% YOY. This added to the increase in stocks of calves in 2022 and provided a greater supply of cattle ready for slaughter in 2023. With the expectation of greater supply, prices both in the domestic and foreign markets should ease. Rabobank projects production growth of 2% YOY in 2023.

Despite the expected slowdown in Chinese beef import demand, Brazilian beef may see an opportunity in increased demand for cheaper cuts – the main feature of Brazilian beef exports – in place of China's imports of premium cuts for out-of-home consumption. Other destinations, such as the US, Egypt, UAE, and EU27+UK, should continue to bring opportunities in the short/medium term.

Domestic consumption is likely to be the biggest challenge in 2023. This represents about 70% of total demand, and after two years of decline, purchasing power remains soft. The competitiveness of beef relative to chicken and pork should favor the recovery of local demand, as the difference in prices is smaller than usual, on high feed costs.

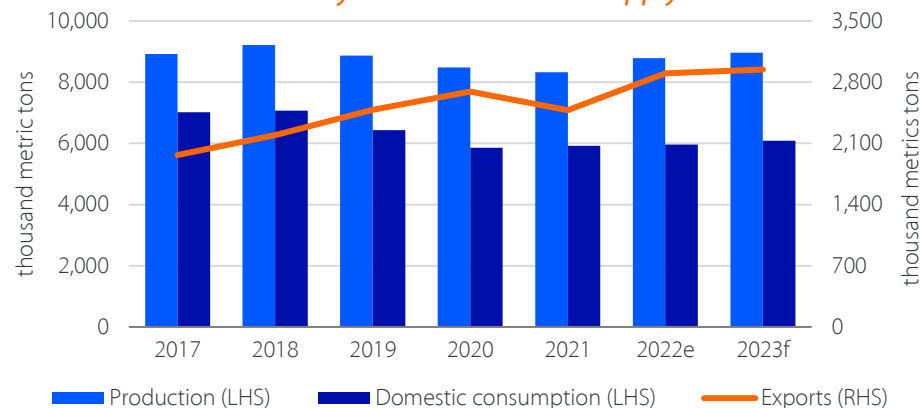
## Argentina's exports support supply, while local consumption falls

Despite exports to China recovering in 2022, it will be difficult to expand these further in 2023, as China's economic slowdown cools beef demand. Despite this, China's imports from Argentina are unlikely to drop significantly, as Argentina tends to export low-value cuts that will likely be favored in China. China is the only country that Argentina does not restrict shipments to – for other markets, exports are limited by a monthly quota of 30,000 metric tons until the end of 2023, on top of a 9% tariff, which will restrict exports in 2023.

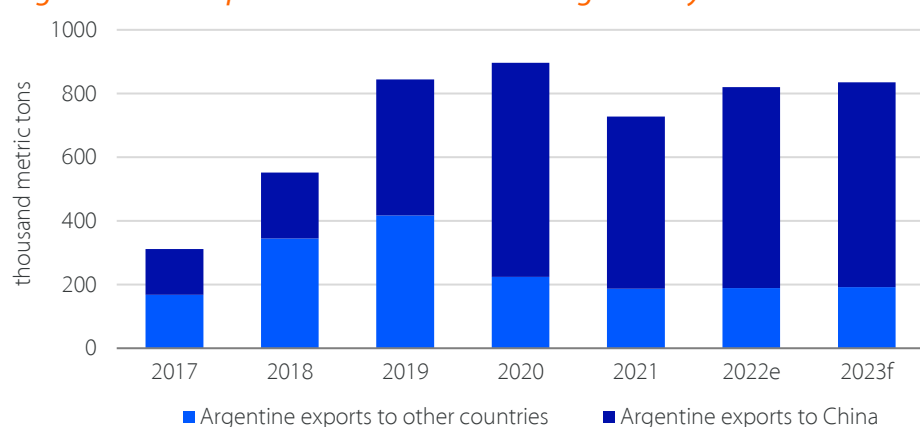
Argentina's local market should remain the main challenge in 2023, with rising inflation restricting purchasing power (inflation for 2022 is projected at 95% YOY and about 60% YOY for 2023). According to IPCVA, per capita beef consumption in 1H 2022 was 46.2kg per inhabitant, about 2.5% lower than the 2021 average.

Rabobank projects a slight increase of 0.5% in production in 2023, lifted by exports.

## Inversion of the livestock cycle should increase supply in 2023



## Argentina beef exports should continue to be guided by China



# Brazil: Broiler and Pork Exports Could Grow Further

An increase in China's pork imports and growth in demand for Brazilian broilers could create opportunities

## Broiler exports should grow, driven by competitive advantages

Brazilian broiler exports have grown in 2022, despite lower purchases from China and Saudi Arabia, which have been the two biggest markets in recent years. The combination of slowing global growth, AI-related production restrictions, and the competitiveness of Brazilian chicken meat increased international demand – Brazil's chicken meat was shipped to a record of over 160 countries in 2022. Rabobank expects Brazil's competitiveness to continue in 2023, with the expected record grain harvest also favoring feed costs and supporting competitiveness.

Maintaining domestic consumption will be a challenge in 2023. Chicken consumption has grown strongly since 2018 but has already shown signs of saturation in 2022. On a per capita basis, chicken consumption is higher than other proteins, and reached about 50kg per person in 2021.

Rabobank projects production to grow by 1.5% YOY in 2023, mainly driven by exports, which should increase by 2% to 3%. The confirmation of two HPAI outbreaks in Colombia in Q4 2022 has raised health alert levels in South America.

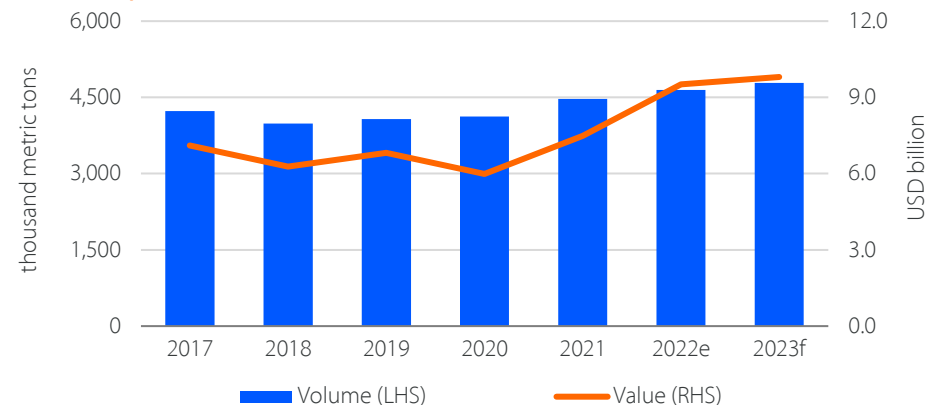
## Pork exports to China should support Brazil's pork industry in 2023

Brazil's export data shows that August 2022 set a new monthly record in volume and revenue for pork shipments to China. Tight supply and firm prices in China's pork market bring an expectation of ongoing demand for imports from Brazil in 2023, based on competitive pricing. Opportunities also exist in 2023 for ongoing exports to the Philippines, which should become Brazil's second-largest destination market, surpassing Hong Kong, Singapore, and South America (Chile, Uruguay, and Argentina).

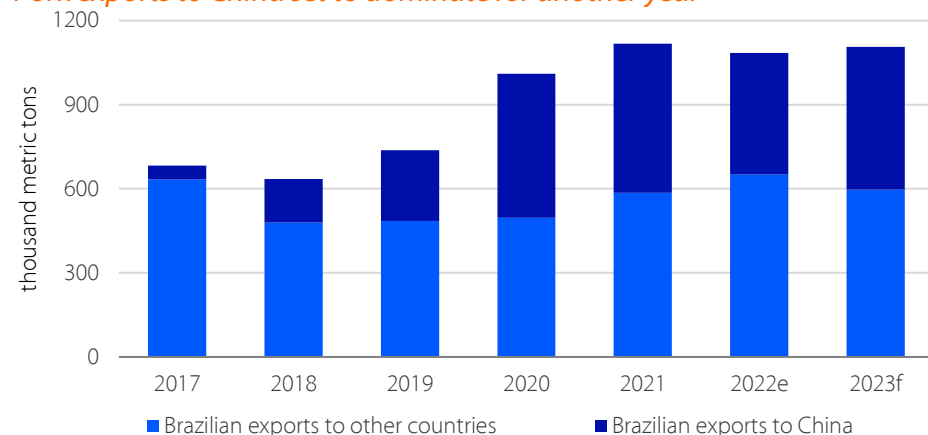
In the domestic market, an increase in sausage consumption by the population most exposed to food price risk should raise local demand. However, it will be a challenge for pork to maintain its competitiveness against beef, which should offer lower prices on better supply and has a greater cultural appeal than pork.

Rabobank's forecast for 2023 is for a 1% YOY increase in pork production.

## Broiler exports should show record levels in volume and value in 2023



## Pork exports to China set to dominate for another year



# China: Pork Supply Expected to Remain Tight Entering 2023

Market volatility will continue, reflecting changes in supply

## Pork supply will remain tight in 1H, supporting prices at high levels

China's hog market embarked on a new upward cycle in mid-2022. Live hog prices moved to a range of CNY 24 to CNY 27 per kilogram between July and October 2022, up 50% to 60% YOY. Strong prices drastically changed farming margins, which turned from deep losses in Q1 to high profits in Q3 2022. While the sow herd has been building in 2H 2022, the replenishment pace has been slow due to uncertainties and weak balance sheets. Strong prices will likely continue into 2023, as supply remains tight. Yield is expected to increase in 2023, on improvements in sow quality. Rabobank expects tight supply in 1H 2023, with price volatility on supply shocks. Supply should gradually increase in 2H 2023, with prices softening.

Pork market demand will likely see moderate growth in 2023, as Covid restrictions are expected to ease. Further ahead, there is limited upside potential for pork consumption, and Rabobank expects more processors to focus on processed and value-added products. Ready-to-eat, ready-to-heat, and ready-to-cook products are expected to keep growing rapidly in 2023.

## Pork supply chain trends toward industrialization in 2023

The industry structure will continue moving toward scale and modernization. With the latest policy guideline set by the Party Congress, agriculture has become a pillar for economic growth, with a focus on modernization and high-quality development. Rabobank expects regional governments to put more emphasis on efficiency and better quality and to support industrialization, with large-scale companies playing a more important role in coordinating the supply chain.

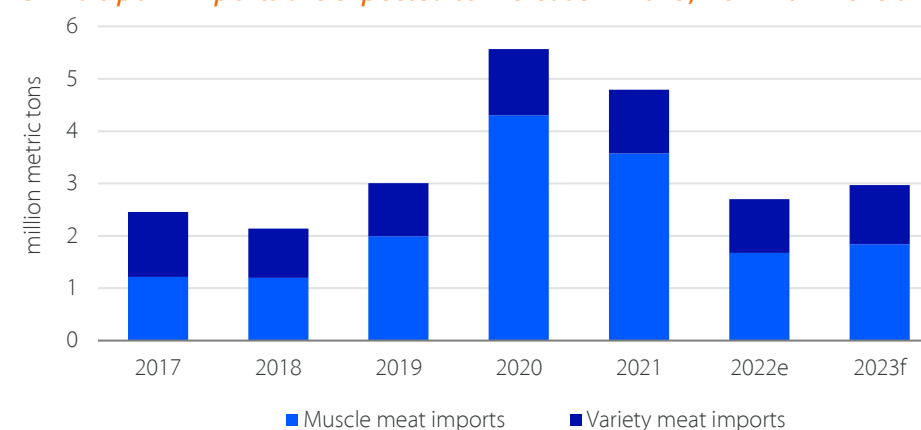
## Imports expected to pick up growth in 2023

While domestic production will likely expand, Rabobank expects pork imports will also grow in 2023. Although international prices are expected to stay strong in 2023, due to expected elevated feed costs, they will be competitive relative to China's local prices. Rabobank expects imports to grow by 5% to 10% from 2022 levels.

## China's pork production will see marginal growth in 2023



## China's pork imports are expected to increase in 2023, from 2022 levels



# China: Poultry to Recover, While Beef Faces Challenges

Slower economic growth will eventually impact beef consumption in 2023

## Poultry production may slowly increase in 2023

Production of poultry species will show a mixed performance in 2023. White feathered broiler production will likely ease, or increase only slightly, due to the low breeding stock. Production of other species, particularly yellow-feathered broilers and waterfowls, will likely recover, as producers started to build up breeding herds in 2022. Unlike pork, poultry is quite vulnerable to rising feed costs, as the profit margin is not high enough to accommodate extra input costs. Feed costs increased by about 10% YOY in 2022, mainly driven by corn and soymeal, and are expected to stay strong in 2023. Average farmgate prices for white-feathered broilers increased only 6% YOY in the first three quarters of 2022, meaning profit margins fluctuated around the breakeven point. Rabobank expects broiler supply chains to continue facing pressure from strong input costs in 2023, which will restrict production growth.

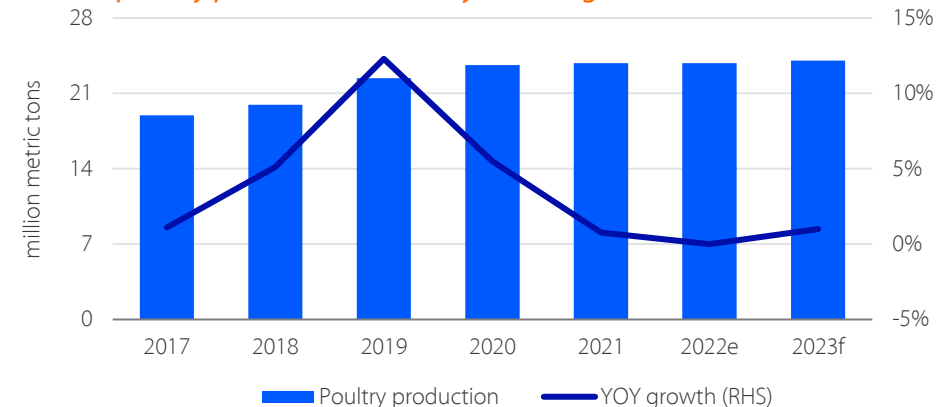
The upside might be demand, as foodservice is expected to improve in 2023. In addition, Rabobank believes convenience foods will continue to grow, and poultry meat is a major ingredient for this category. Rabobank expects poultry overall will benefit from demand recovery and consumers seeking value-for-money products.

## Beef demand may start to feel headwinds in 2023

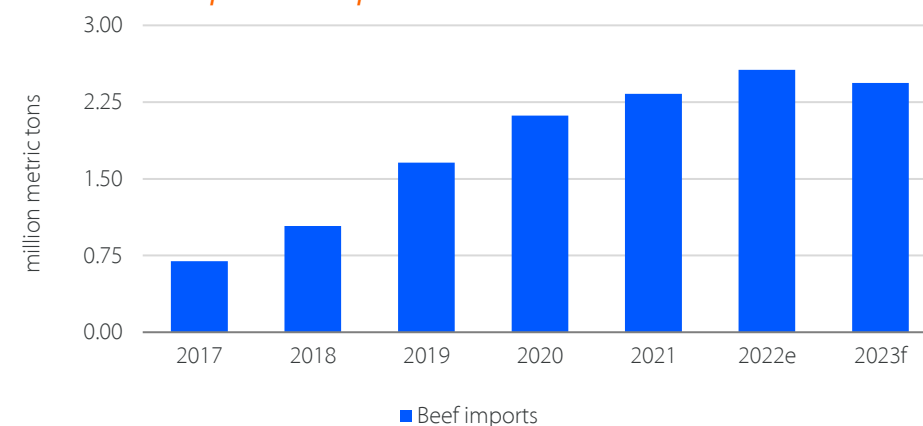
The beef market had a resilient year in 2022. Consumption has seen a continuous shift from foodservice to home cooking under Covid restrictions, as consumers reduced spending on outdoor activities, leaving more money for quality foods. In 2023, with economic growth expected to slow, consumers' purchasing power will be impacted, and they may trade down in animal protein. Beef prices in retail markets are currently 2.4 times above pork and 3.5 times above poultry. The price difference will make some consumers turn to these cheaper proteins. We expect beef demand to soften in 2023.

As a result, beef imports will likely slow down in 2023, following a decade of strong growth. Lower-priced beef will continue to dominate imports, offering opportunities to South American countries.

## China's poultry production will likely resume growth in 2023



## China's beef imports are expected to slow down in 2023



# Southeast Asia: Pork Production on Track for Recovery

## Input costs will continue to challenge margins in 2023

### Vietnam's pork production expected to recover to pre-ASF levels by 2023

Strong prices in Vietnam encouraged sow replenishment in 2022, which will support hog production in 2023. However, farming margins will remain under pressure given high input costs, as Vietnam depends on imported inputs. The ASF situation has improved but remains a big risk for producers. Together, high input costs and disease risks are limiting replenishment. Rabobank expects pork production growth to moderate in 2023. Agricultural policies focus on preventing the spread of disease and improving meat yield and quality, with more support to large-scale farming.

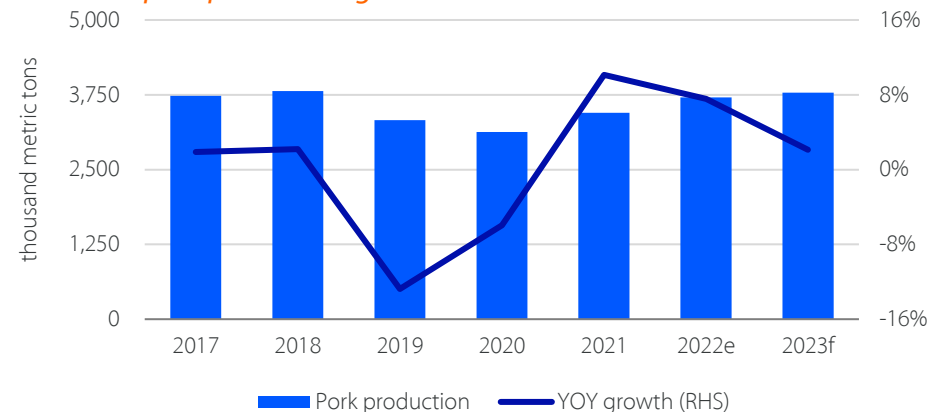
Demand shows positive signs, due to strong economic growth – GDP growth in Q3 2022 was 13.7% YOY. Rapid economic growth will continue in 2023, on foreign investment and robust exports of industrial products. Rapid industrial development will see rising employment and urbanization, which will support animal protein consumption, with pork still the dominant protein.

### Philippine pork production will see further recovery

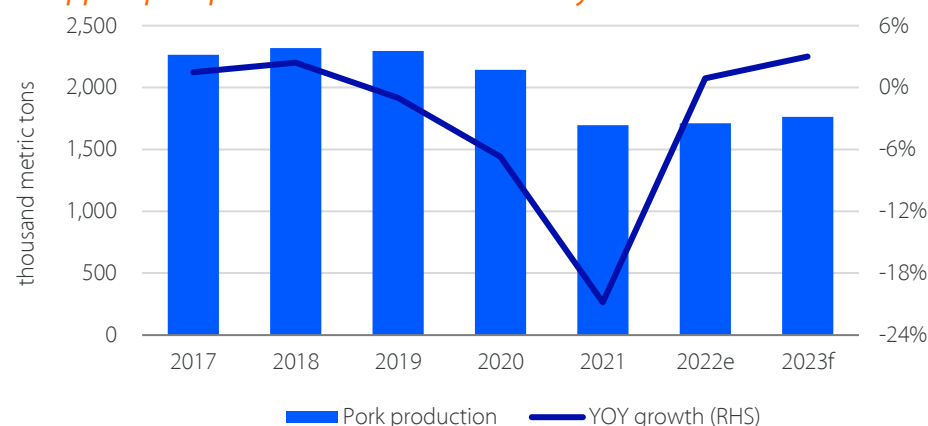
Philippine pork production continues to be impacted by ASF, though the scale of the impact has declined in 2022. Pork production in 2022 improved but remained well below pre-ASF levels. With strong measures by the government to prevent disease spreading, Rabobank expects pork production in 2023 to further recover, despite high feed costs that pressure farming margins. While hog prices increased by over 15% in many regions during 2022, producers continued to struggle with expansion, given the uncertainties of both strong feed prices and disease outbreaks. Large-scale farming has built more confidence than smallholders in replenishing farms, but the industry structure remains fragmented, with smallholders dominating the market.

Philippine pork import policy is flexible and responds to market changes. This makes it difficult to estimate import requirements for 2023, as it is more policy-driven than market-driven. We believe a moderate decline might occur in 2023, due to the supply increase in the domestic market.

### Vietnam's pork production growth to moderate in 2023



### Philippine pork production on a slow recovery track





# Southeast Asia Poultry: Ongoing Recovery, but Growth Is Slow

Slow production growth driven by high costs, DOC supply, and intervention; chicken prices to stay strong

## Thai poultry to keep operating under tight supply conditions

The Thai poultry industry has had a strong 2022. The industry has benefited from tight pork supply due to ASF and low DOC supply with very high prices. These factors, along with high input costs, kept production growth low, at only 2% YOY, allowing most companies to operate above breakeven levels.

The outlook remains strong for 2023, with ongoing tight local meat supply and strong global markets. Chicken exports could reach the historic 1m metric ton level. Exports to the UK and EU are expected to be strong, while exports to Japan will gradually recover. The domestic Thai market will also remain strong, as consumers continue to substitute chicken for pork on supply issues. To some extent, this substitution can replace lost demand from tourism, as visitor numbers in 2023 are only expected to be 50% of 2019 levels. In this context, we expect the Thai chicken industry to grow only 3% in 2023.

## Southeast Asian chicken production shows ongoing growth

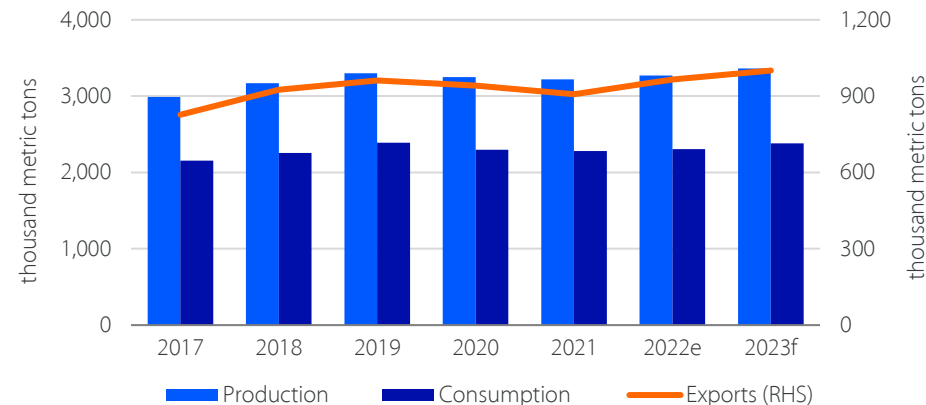
Southeast Asian poultry production has been recovering in 2022, with regional growth at 3.8% after a 3.3% decline in 2021. The reopening of foodservice, a gradual (but not full) recovery of tourism, a strong economy, and the substitution of chicken for pork (due to ASF and high feed costs) were the major reasons for the industry's strong rebound.

For 2023, production is expected to rise 4.3%, in line with the growth experienced in the pre-Covid years. The best conditions are currently in Vietnam, where the chicken industry is benefitting from strong economic growth (Vietnam's GDP has increased 8% in 2022). Ongoing investments in the chicken industry support exports.

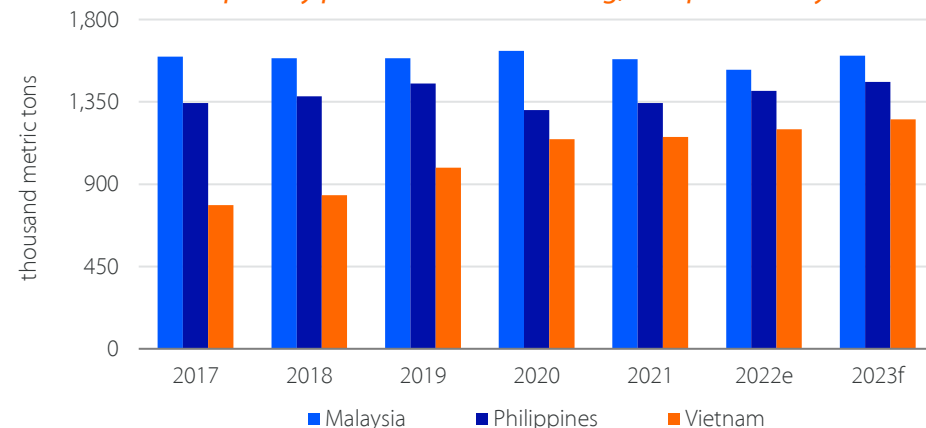
The Philippines has seen a very tight market for protein in 2022, given ASF outbreaks in the pork industry and restrictions on EU chicken meat trade. Although imports from Brazil and the US have been high, local prices have also been high. Production is expected to grow by 4% in 2023, as tight supply triggers producers to expand.

Malaysia has been an exception. The government banned chicken exports to Singapore, which usually accounts for about one-third of total production. Production is expected to drop by 4% in 2022 but rebound by 5% in 2023, after a resumption of exports.

## Thailand: Strong local and export demand, limited supply



## Southeast Asian poultry production rebounding, except in Malaysia



# Australia: Supply and Demand on Different Trajectories in 2023

As livestock numbers increase and producer demand drops, livestock prices are expected to ease

## Favorable seasons continue to support increased livestock numbers

With La Niña persisting and the Indian Ocean Dipole remaining negative, most areas of Australia are forecast to have average to above-average rainfall into 2023. Such favorable conditions will support ongoing growth in livestock inventory levels. Sheep numbers are expected to have recovered from drought. This higher inventory will support increased lamb production (between 4% and 6%) in 2023. On the other hand, Rabobank believes cattle numbers have not recovered as quickly, and with good pasture availability, particularly in northern areas, producers will still be looking to grow their numbers. However, despite increased inventory, labor constraints and tight margins likely mean beef production will show no growth in 2022 before lifting by 5% in 2023.

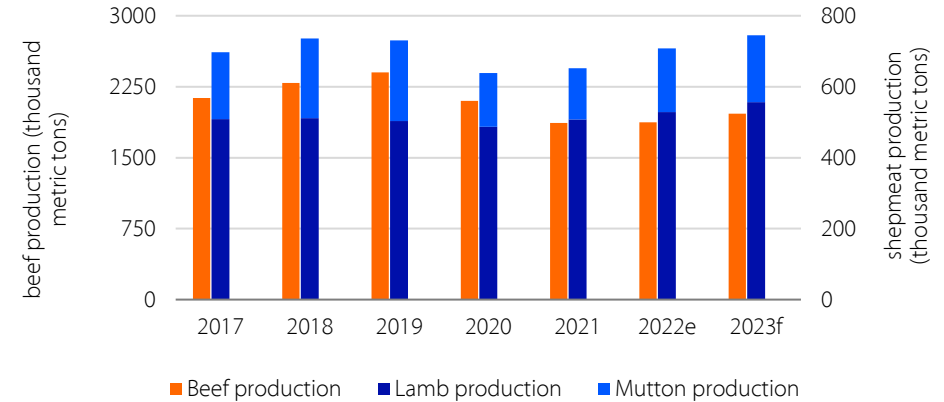
## When two worlds (production and consumption) collide

While favorable seasons and low livestock numbers are supporting producer demand and keeping livestock prices elevated (note, lamb prices returned to five-year average levels in late 2022), demand is softening. Import prices for Australian beef into key markets, while still historically high, have declined since early 2022, and order volumes appear to be dropping on softer consumer demand. This is cutting margins for the post-farmgate operators in the supply chain. In addition to the challenges of accessing labor, thin margins provide no incentive to increase volumes or pay high prices for cattle. At some point, these two markets will collide – most likely driven by a change in season or oversupply of livestock – and livestock prices will correct downward.

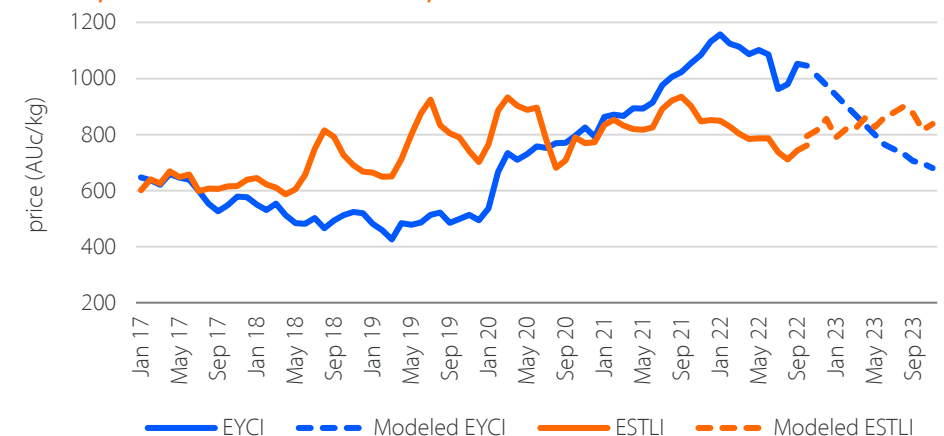
## Livestock prices to remain historically high, but softer, in 2023

Good availability of lambs and softer economic conditions are expected to result in lamb prices remaining relatively stable through 2023, although softer economic conditions pose a downside risk. Cattle prices are expected to ease in light of increased cattle numbers and decreased producer demand.

## Lamb and beef production to grow in 2023



## Cattle prices to ease, while lamb prices should hold



# New Zealand: Sheep and Beef Sectors Face Structural Changes

Afforestation and climate regulations are expected to drive changes starting in 2023

## Sheep and beef numbers are forecast to decline from 2023

Sheep and beef in New Zealand are facing increased pressures that are likely to lead to structural changes in livestock numbers and production to meet the 2030 climate targets. These pressures include land-use change from grazing to forestry and the pricing of GHG emissions from agriculture. While these changes have not yet had a significant negative impact on livestock numbers, Rabobank forecasts afforestation will drive a decline in breeding ewe and beef cow numbers of 1% in 2023. The pricing of agricultural emissions from 2025 is expected to further the decline in livestock numbers and production. The price of emissions is yet to be finalized.

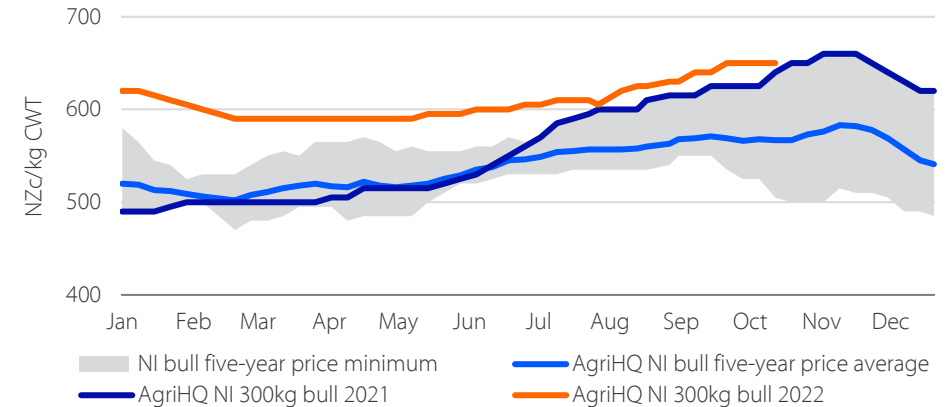
## Beef prices likely to soften slightly in 2023

While the beef price has remained resilient through 2022, we anticipate some softening in 2023, as Chinese consumers face ongoing Covid lockdowns and tighter economic conditions, forcing some consumers to trade down to lower-priced proteins. A lift in US demand for lean trimmings imports as US production enters negative territory should provide price support for New Zealand beef. Processing challenges and logistics are also expected to negatively impact the farmgate beef price. A weaker NZD/USD outlook is expected to support returns for exporters and farmers. Rabobank forecasts the NZD/USD to sit around 0.58 in mid-2023. Farmgate beef prices are expected to remain elevated above the five-year price average in 2023.

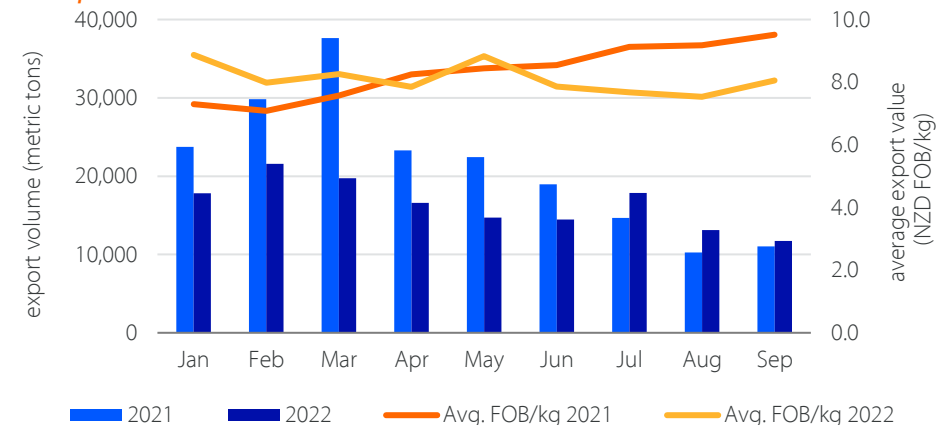
## Sheepmeat demand also facing some challenges

New Zealand's main sheepmeat markets – China, Europe, and the US – will face significant economic challenges in 2023 that will likely reduce demand for New Zealand's exports, leading to softer prices. Lockdowns in China reduced demand for New Zealand sheepmeat exports in 2022. Demand from China is expected to remain soft while the zero-Covid policy remains in place. Rabobank also anticipates reduced demand for lamb through foodservice in Europe and the US – foodservice is the main channel for New Zealand lamb in these regions. Furthermore, the recovery of lamb production in Australia is likely to increase competition in these destination markets.

## Cattle prices likely to soften, but remain elevated in 2023



## Sheepmeat demand from China to soften in 2023



# Salmon: Good Demand and Prices to Remain

Salmon's strong retail presence will support prices in 2023, despite weakening macroeconomic fundamentals

## Supply growth normalization after a weak 2022

Weak salmon supply has marked 2022, especially in 1H, and coincided with strong demand, causing new price records. More normal supply, as well as some demand weakness due to recessionary behavior among some consumers, has characterized 2H 2022 and caused prices to correct. Nevertheless, prices have remained well above pre-pandemic levels. In 2023, supply is likely to be in a more normal range. Both Norway and Chile have limited growth options with existing licenses and thus need new technology, such as deploying post-smolt, to create incremental supply growth. Consequently, the expectation for 2023 as well as 2024 is supply growth close to 4%.

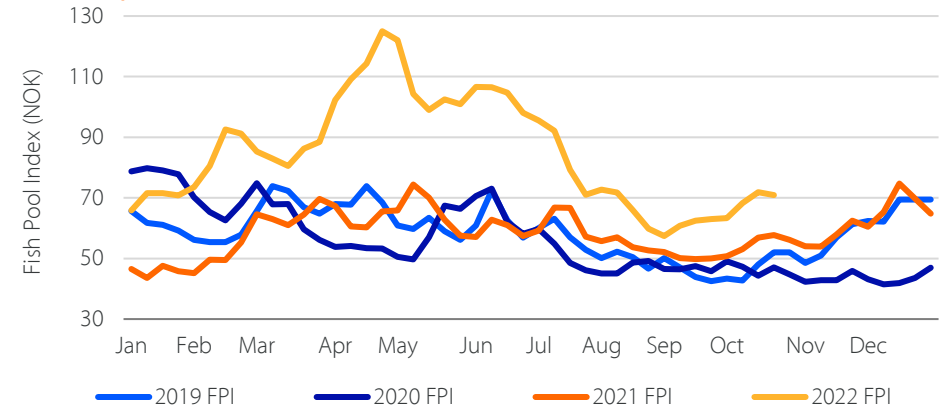
## Salmon demand and prices will remain good, even in a recession

During 2021 and 2022, salmon further underlined its position as the leading seafood species at retail. Many convenient products were developed, such as ready-to-eat meal options, and were matched with healthy-food messaging, which allowed home cooking of salmon to maintain the total demand levels achieved in 2020, despite the reopening of foodservice. Rabobank believes another switch in salmon consumption from foodservice to retail is possible in 2023. However, salmon is now among the seafood species that is most hedged from a demand decline. Weak supply growth will provide further support to prices.

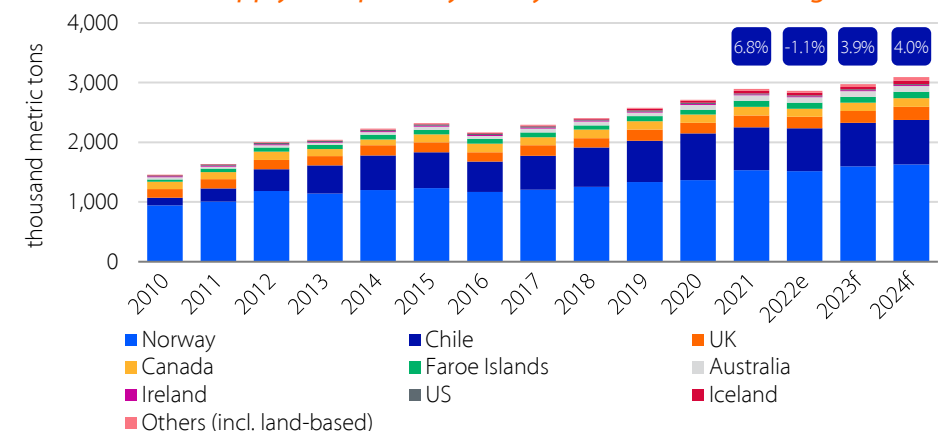
## Norwegian tax proposal shakes the industry

In 2022, the Norwegian government proposed a new resource tax, which, if legislated, would effectively add an additional 40% tax on top of the 22% existing corporate tax rate paid by salmon farmers. While this proposal could well be altered before being introduced in the Norwegian parliament in January 2023, it has already caused nearly all major investment plans by the large Norwegian players to be postponed. While Rabobank can only speculate what exactly parliament may introduce in early 2023, if a significant additional tax is imposed on salmon farmers, it would have a long-term negative effect on growth and innovation in the industry.

## Salmon prices have corrected but remain at elevated levels



## Global salmon supply to expand by nearly 4% in 2023, after a tight 2022



# Shrimp Supply Is Strong Despite Lower Prices and Higher Costs

Ecuador and Latin America expected to continue driving farmed shrimp supply in 2023

## Price correction, on cooling demand and good supply

As with salmon, shrimp also enjoyed a strong post-pandemic period, with both good retail demand and recovering foodservice demand. With shrimp, this was matched by booming supply growth, especially in Ecuador. In 2021, despite the record supply growth, high prices were maintained. However, in 2022, demand started to cool as consumers reduced foodservice spending and opted for cheaper options at retail.

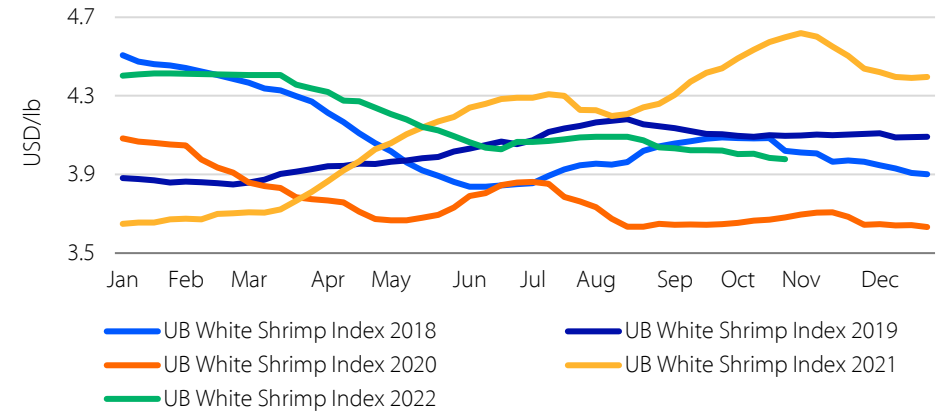
The lower price levels, high feed costs, and biological challenges resulted in contracting supply in Asia, especially among the largest producers, India and China. However, Ecuador and a few other smaller Latin American producers continued the record supply growth, capturing global market share. Ecuador became the world's largest exporter and producer of shrimp in 2022, overtaking India as an exporter and China as a producer. With a perfect climate, a low-intensity model, and large, vertically integrated farmers, the Ecuadorian industry has a unique advantage that will last for the foreseeable future.

## Bullish supply expectations for 2023

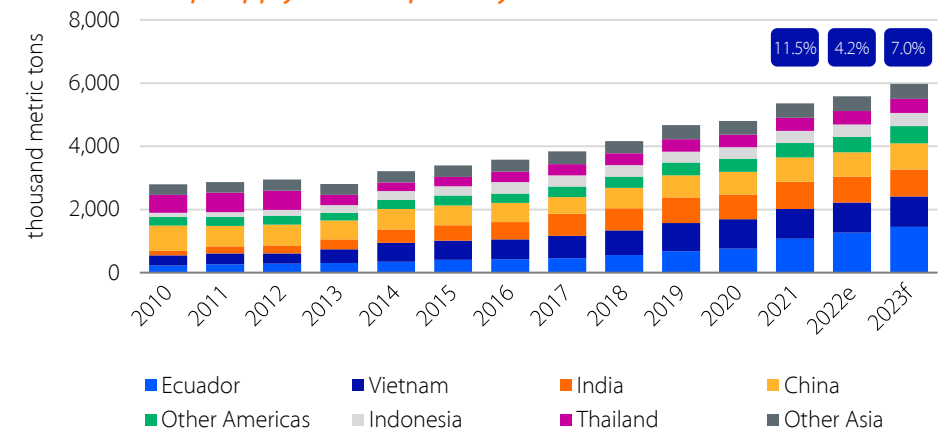
Forecasting shrimp supply is very difficult, as it has a short cycle and an elastic supply curve. However, the GSA-GOAL survey respondents were positive about production expectations for 2023, expecting growth of 7%. In part, this is based on the likely continuation of supply growth from Ecuador and other Latin American producers, which are profitable even at current prices and feed costs, making them incentivized and able to increase supply.

In addition, China is expected to see production recover from 2022 levels, as both the local supply and demand of shrimp should improve. The flooding that occurred in key shrimp-growing regions in southern China in 2022 will hopefully not repeat in 2023, and the strict Covid restrictions that reduced demand are also likely to be lifted at some point, once again boosting Chinese demand for shrimp.

## Shrimp prices have corrected to pre-pandemic levels



## Farmed shrimp supply could expand by 7% in 2023



# Fish Meal and Fish Oil to See Ongoing Price Support

High prices of competing commodities support prices, which may ease slightly in 2023

## Price support due to high prices of alternative feed commodities

Despite the fact that fish meal and fish oil supplies have been stable in 2022, and virtually unchanged compared to 2021, prices have been well supported. The high price levels of all terrestrial feed commodities, proteins, and especially the oils are the main reason for this price support.

Fish meal prices in 2022 reached USD 1,600 per metric ton (FOB Peru), which is well above recent levels. Fish oil prices surpassed the USD 3,000 per metric ton mark for the first time and reached levels that are virtually double compared to the price levels of late 2020 and early 2021.

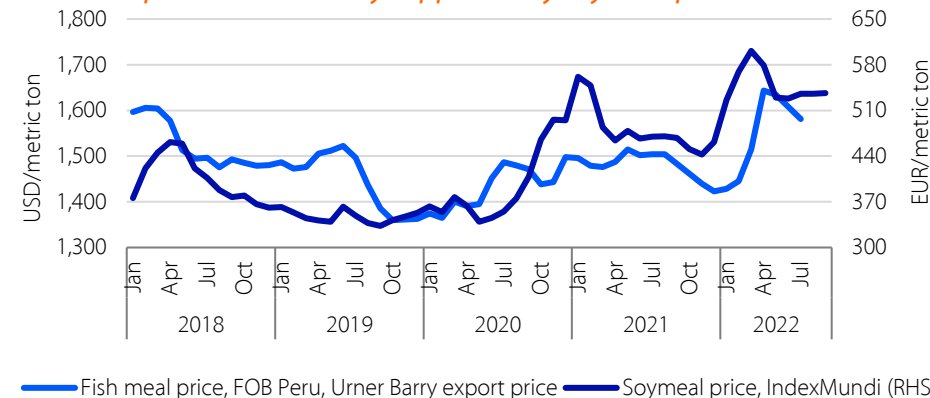
## Supply in 2023 likely to grow, which would lead to price normalization

The Peruvian Ministry for Produce announced a 2.283m metric ton quota for the winter season (December to March). This is 11.5% higher than last winter's quota, when a 100% quota utilization was achieved. Therefore, fishing will need to be good in order for supply to improve. In addition, improving quotas in Europe contribute to a positive supply outlook.

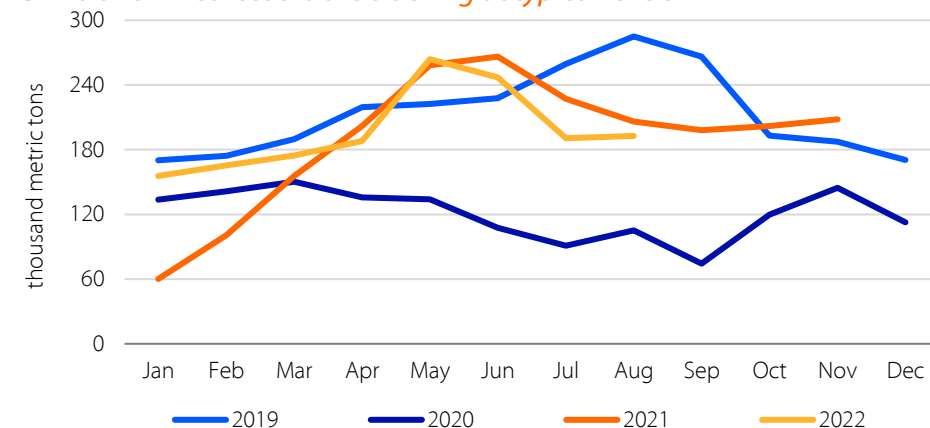
However, with soymeal and soy oil prices having reached a peak in 1H 2022 and now starting to ease, Rabobank expects this to also influence fish meal and especially fish oil prices. This price correction should not be overstated, however, as terrestrial feed commodities remain in tight supply and high prices are only marginally declining. Any unforeseen issues in the supply of either terrestrial or marine commodities would provide renewed price support.

Lastly, China's fish meal stocks in Q3 2022 seemed to be quite good, albeit slightly below last year's level, suggesting Chinese buyers may not be willing to commit to much higher price levels once Peruvian supply from the 2022 winter quota comes to the market in Q4 2022 and Q1 2023.

## Fish meal prices are currently supported by soymeal prices



## China's fish meal stocks are tracking at typical levels



# Alternative Proteins: A Year of Consolidation in 2023

Recent stellar growth of plant-based products is on hold, and investors are shifting focus

## Difficult market environment for plant-based products to remain in 2023

Growth of plant-based meat substitutes has stalled in 2022, on declining consumer interest, a very busy category space, and inflationary pressures. This is despite the shrinking price gap for consumers between substitutes and animal protein products. Conventional meat products have seen remarkable price increases during 2022, as input costs have jumped, while prices of meat substitutes have remained more or less stable.

There are other signs that the market has shifted in 2022. Some plants have closed. Workforces were reduced. And stocks of listed plant-based companies have fallen. However, these are signs of consolidation rather than the end of the plant-based era – some companies are stepping in, eyeing consolidation, and launching new lines to target flexitarians.

## Need for rationalization of product base and reformulation of products

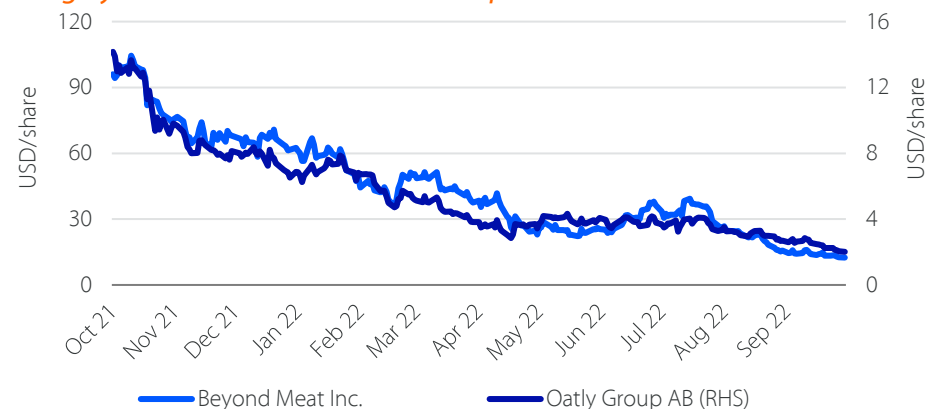
It seems the US market became saturated following an explosion of brands. European markets have performed better, although growth has also slowed. Likely, there is a need to rationalize the range of brands and products and to reformulate products to see market growth revive. Improving taste, texture, flavor, and nutritional status, as well as reducing prices, are potential ways to reignite consumer interest. While these changes should be possible, the reality of getting them right has clearly been a challenge for plant-based companies, with nutritional status and health claims a particular test for some companies and products.

## Growing interest in cell-based, but a long way to go to scale

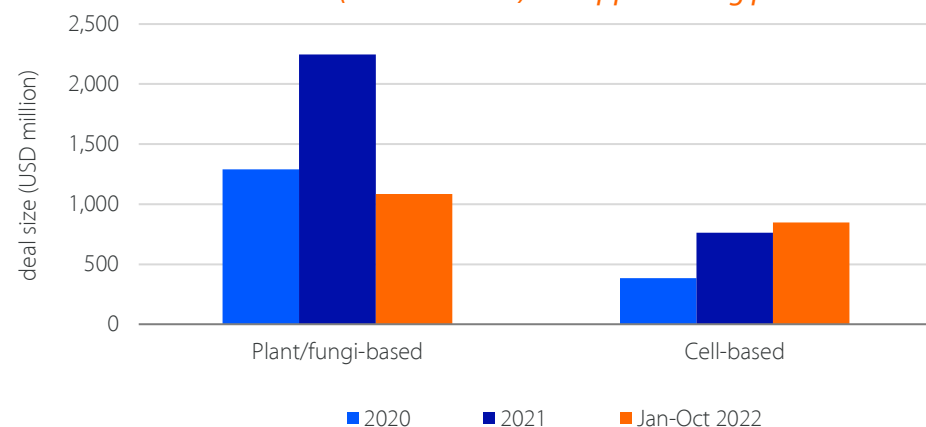
Investor interest in cell-based technologies has increased, while investments in plant-based have eased. Cell-based meat products are not expected to achieve scale for quite some years, as the technology is mostly still in its infancy. Companies are working hard on improving the efficiency of their production processes, making production truly animal-free, and getting regulatory approvals, among other things. Although we are some years from scaled commercialization, we expect cell-based technologies to remain of interest in 2023.

Source: Yahoo Finance, PitchBook, Rabobank 2022

## Tough year for listed alternatives companies in 2022



## Investments in cell-based (Oct 2022 YTD) are approaching plant-based



# Rabobank's Global Coverage of Animal Protein

## Rabobank Wholesale and Rural

RaboResearch Food & Agribusiness

### Utrecht office:

Croeselaan 18  
3521 CB Utrecht  
The Netherlands

### New York office:

36<sup>th</sup> floor, 245 Park Ave  
New York, NY 10167  
United States



**Rabobank**



**Rabobank**

**Justin Sherrard**

**Global Strategist**

**Animal Protein**

**RaboResearch Food & Agribusiness**

**Email**

[justin.sherrard@rabobank.com](mailto:justin.sherrard@rabobank.com)

## Global Animal Protein Sector Team

Nan-Dirk Mulder – Europe  
[nan-dirk.mulder@rabobank.com](mailto:nan-dirk.mulder@rabobank.com)

Gorjan Nikoljk – Europe  
[gorjan.nikoljk@rabobank.com](mailto:gorjan.nikoljk@rabobank.com)

Éva Gocsik – Europe  
[eva.gocsik@rabobank.com](mailto:eva.gocsik@rabobank.com)

Chenjun Pan – China  
[chenjun.pan@rabobank.com](mailto:chenjun.pan@rabobank.com)

Novel Sharma - Europe  
[novel.sharma@rabobank.com](mailto:novel.sharma@rabobank.com)

Matz Beuchel – Europe  
[matz.beuchel@rabobank.com](mailto:matz.beuchel@rabobank.com)

Christine McCracken – North America  
[christine.mccracken@rabobank.com](mailto:christine.mccracken@rabobank.com)

Lance Zimmerman – North America  
[lance.zimmerman@rabobank.com](mailto:lance.zimmerman@rabobank.com)

Wagner Yanaguizawa – Brazil  
[wagner.yanaguizawa@rabobank.com](mailto:wagner.yanaguizawa@rabobank.com)

Angus Gidley-Baird – Australia  
[angus.gidley-baird@rabobank.com](mailto:angus.gidley-baird@rabobank.com)

Genevieve Steven – New Zealand  
[genevieve.steven@rabobank.com](mailto:genevieve.steven@rabobank.com)

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