



# *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.

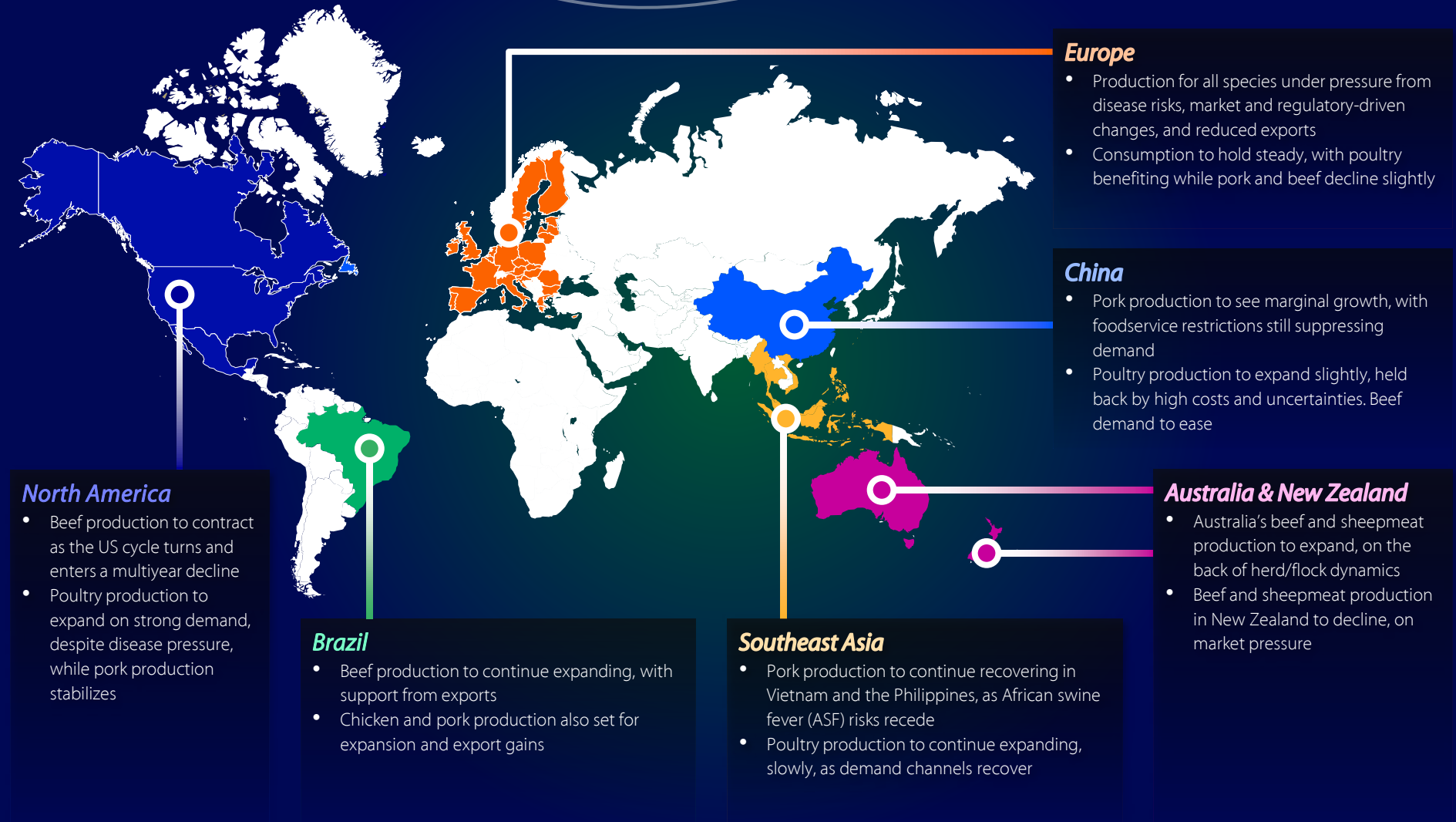
- As a result, **margins will be squeezed**, as buyers push back on higher production costs.
- Opportunities still exist but will be more restricted.

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

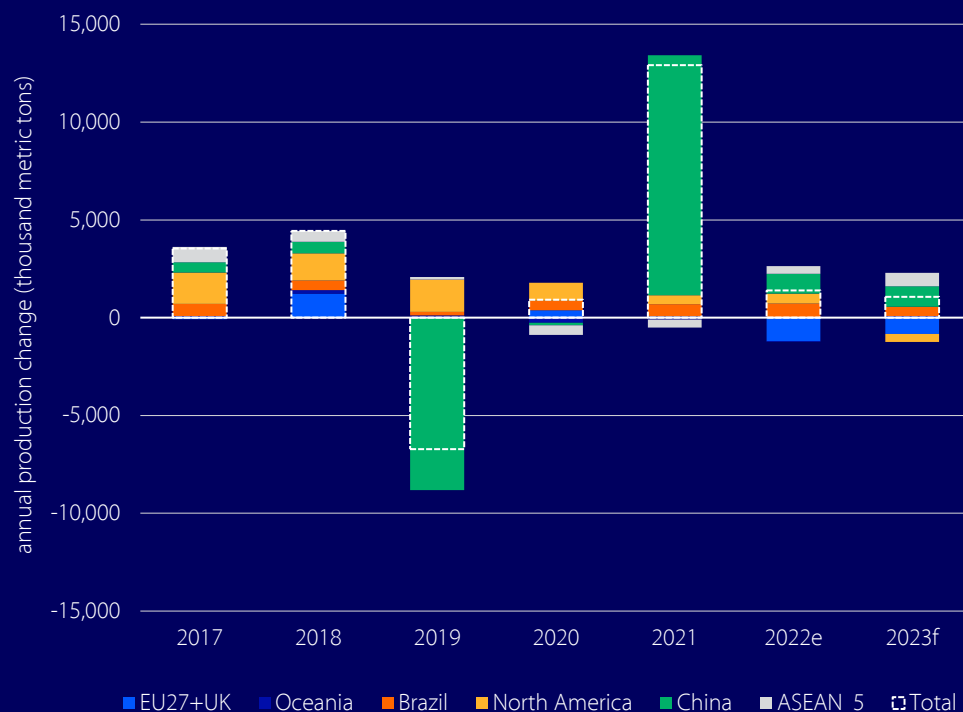
- Animal protein companies should see 2023 as a year to **recalibrate their growth expectations and plans**.

# 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.

# 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](#)

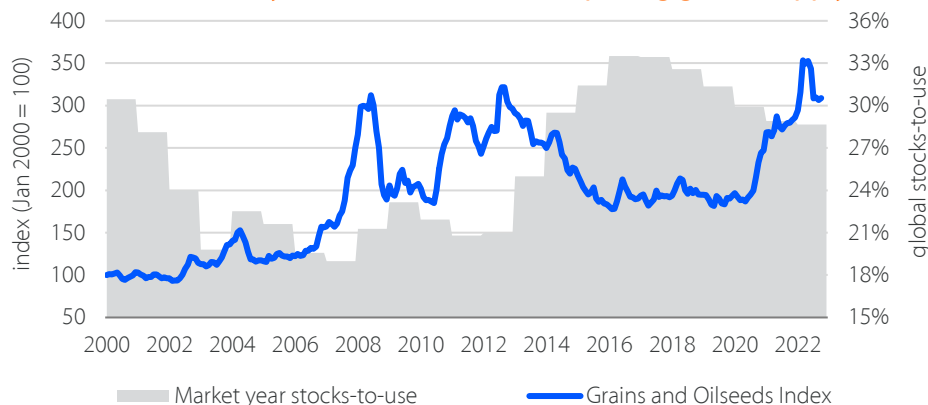
## Drought will limit growth in grain and oilseed balance sheets

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.

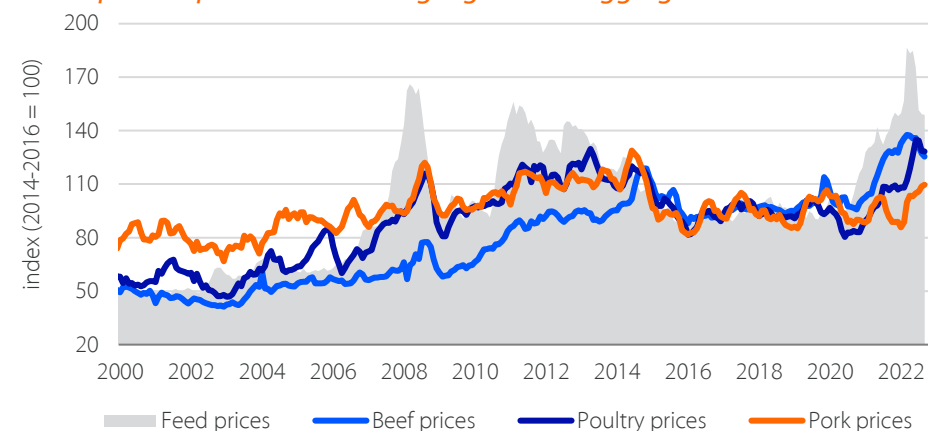
## Outside factors continue to create additional chaos

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.

## 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.

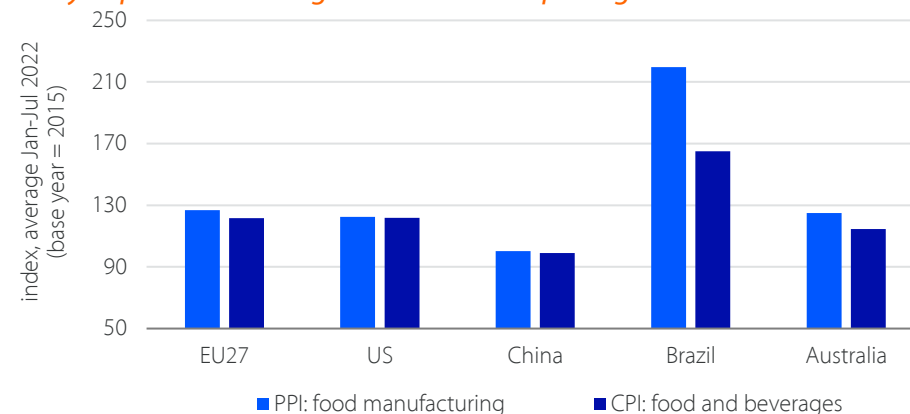
## Competitive landscape may shift, with implications for production

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.

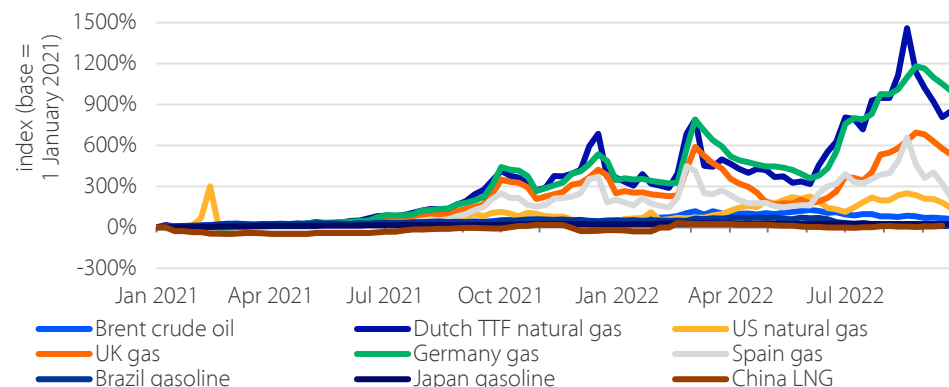
## Pressure on production and consumption will depend on:

- 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.

## 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



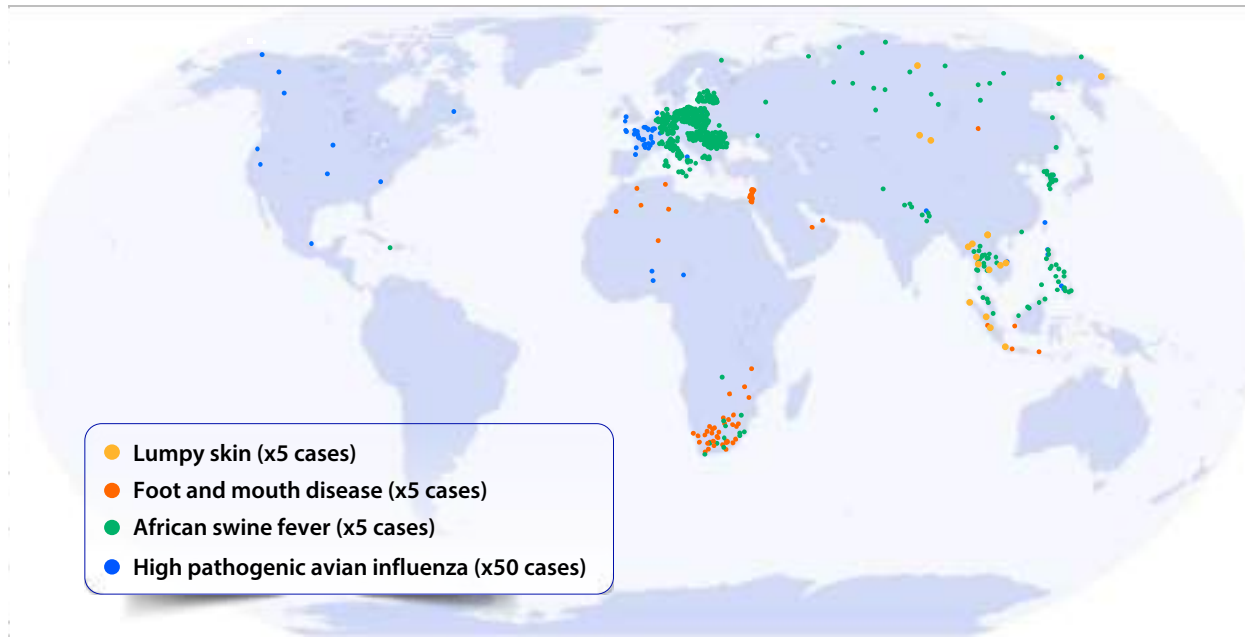
# Biosecurity Challenges Set to Persist in 2023

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.

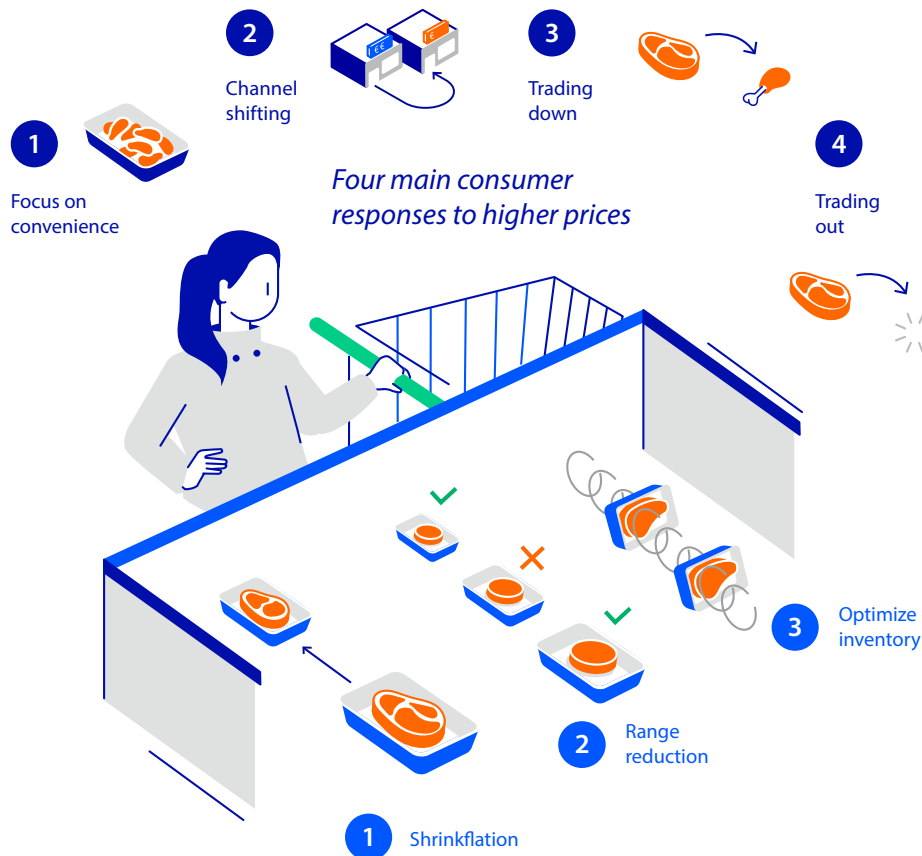
## *Industry continuing to invest in animal protection despite higher costs*

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

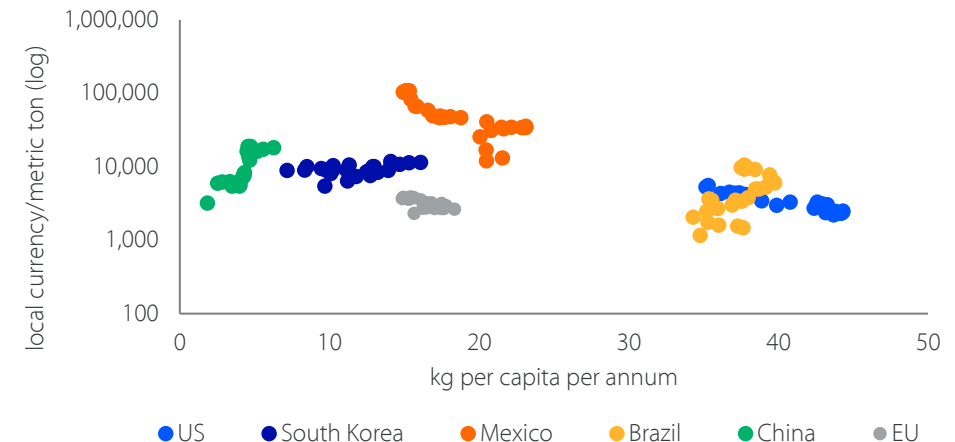
## Price is only one factor that shapes consumption patterns

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

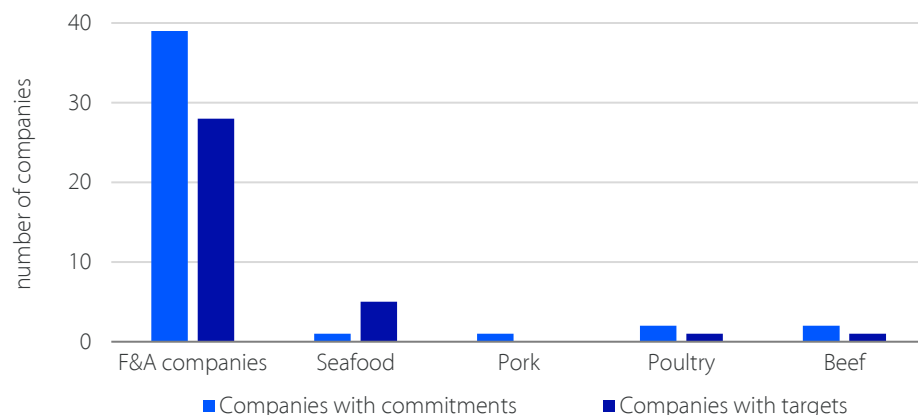
## Carbon measurement driving markets and the sustainability agenda

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



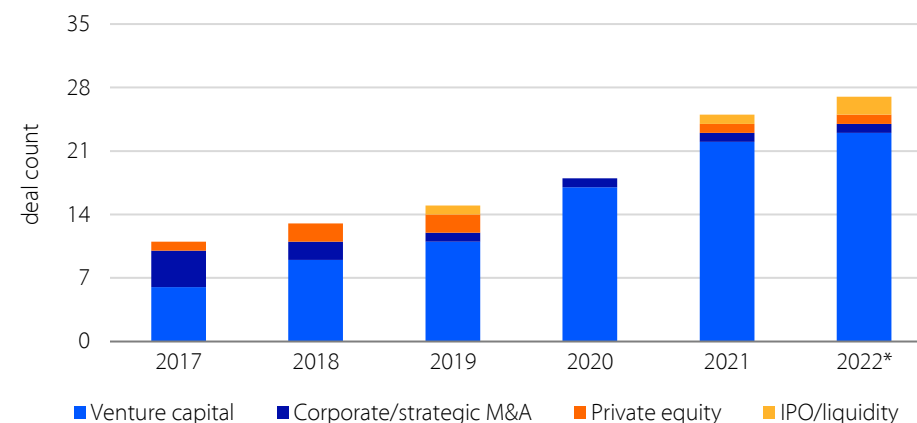
\*Partial data  
Source: PitchBook, Science Based Targets, Rabobank 2022

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: 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.

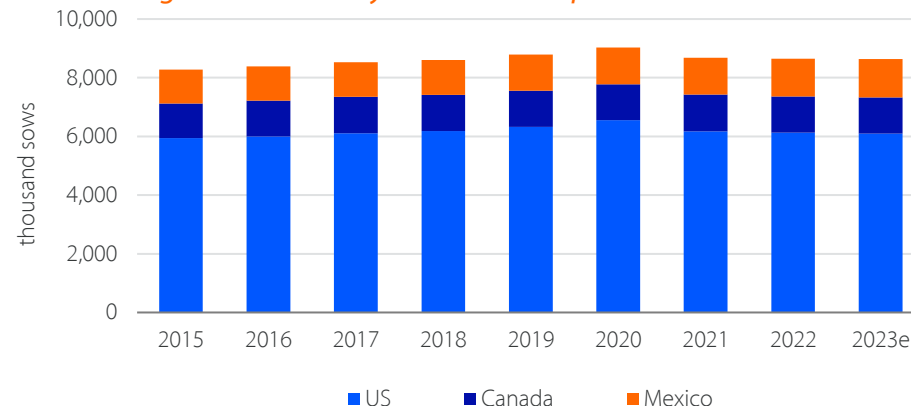
## Feed and labor costs weigh on returns, slowing expansion plans

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.

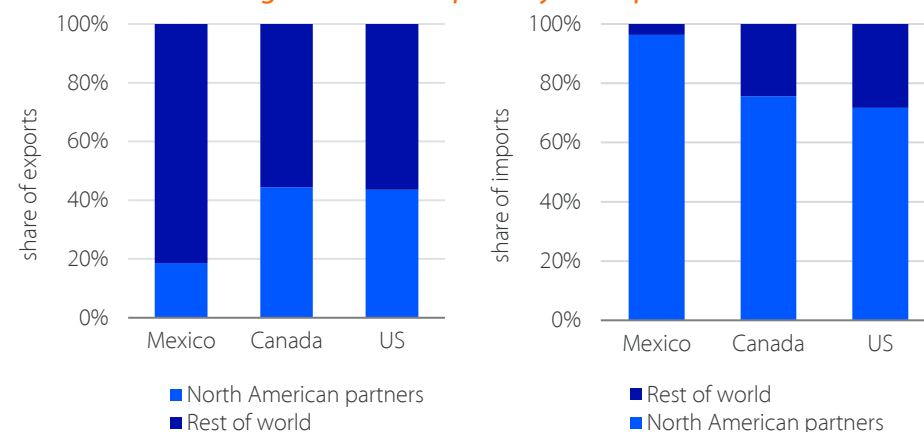
## North American trade to remain steady, economic headwinds a risk

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.

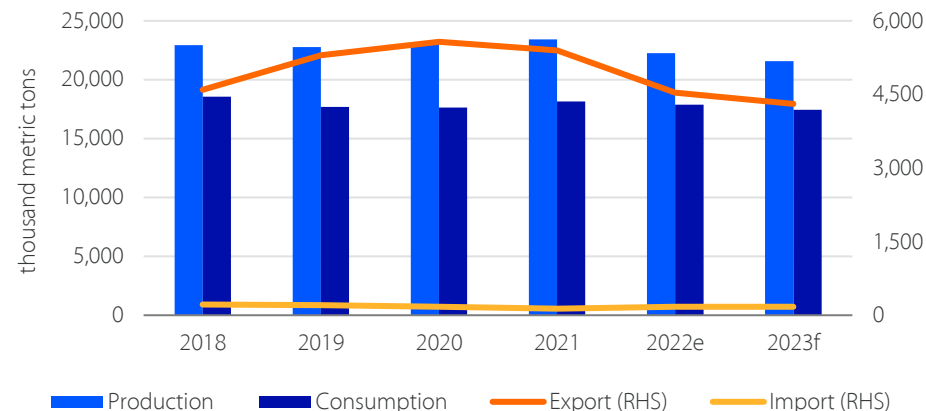
## Margin pressure to remain, on high costs and lower demand

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.

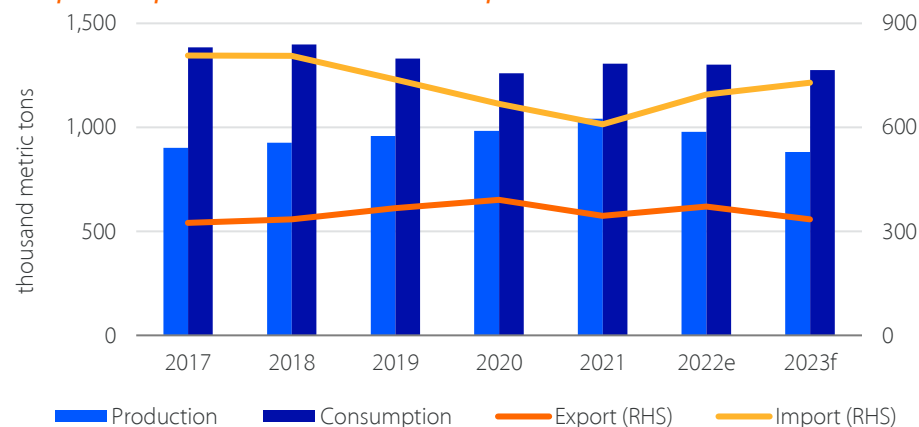
## ASF and social and environmental issues also driving change in Europe

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



# 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.

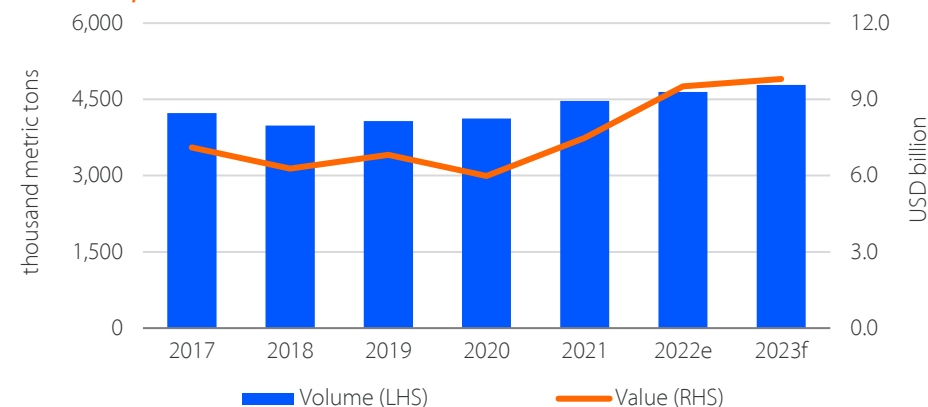
## Pork exports to China should support Brazil's pork industry in 2023

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).

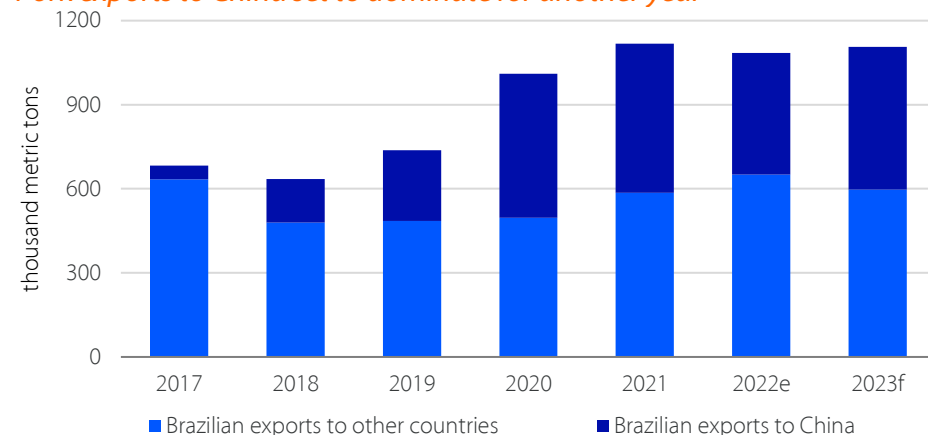
In the domestic market, an increase in sausage consumption by the population most exposed to food price risk should raise local demand. However, it will be a challenge for pork to maintain its competitiveness against beef, which should offer lower prices on better supply and has a greater cultural appeal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

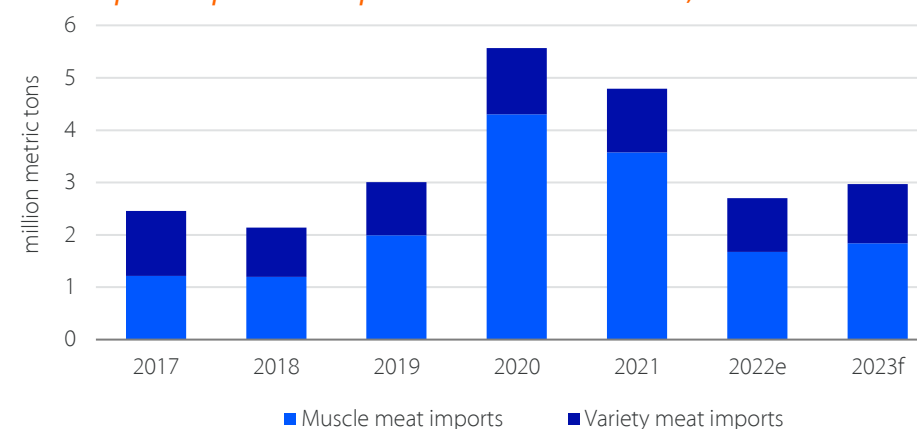
## Imports expected to pick up growth in 2023

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



# 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.

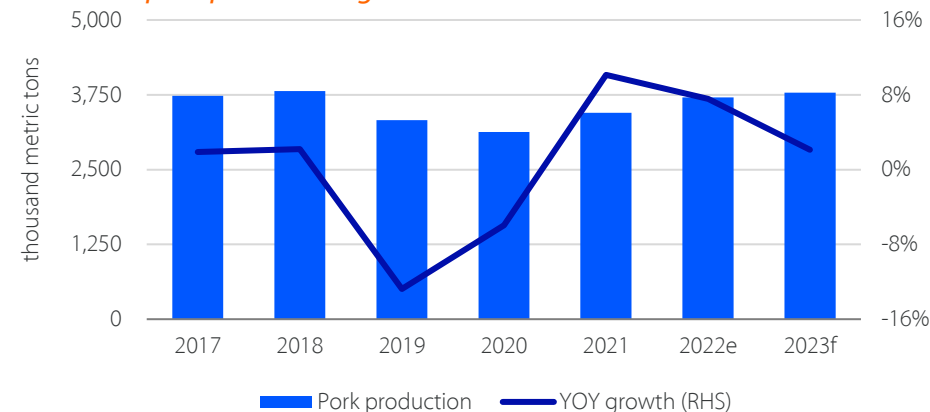
Demand shows positive signs, due to strong economic growth – GDP growth in Q3 2022 was 13.7% YOY. Rapid economic growth will continue in 2023, on foreign investment and robust exports of industrial products. Rapid industrial development will see rising employment and urbanization, which will support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

## Philippine pork production will see further recovery

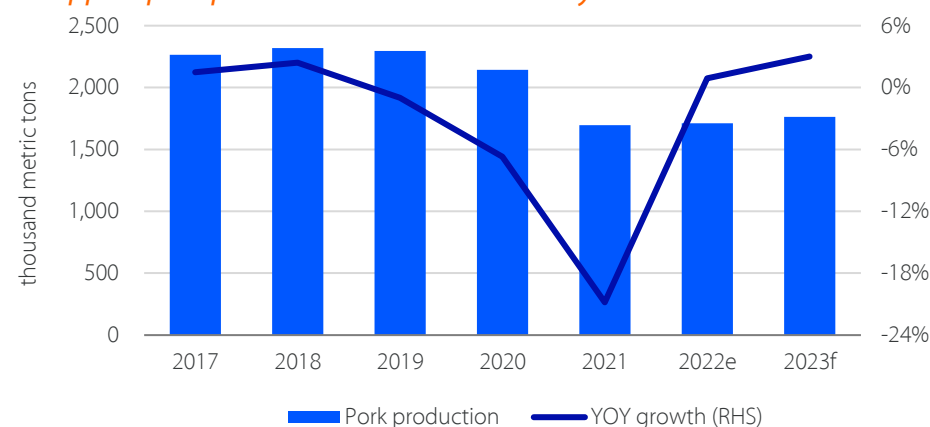
Philippine pork production continues to be impacted by ASF, though the scale of the impact has declined in 2022. Pork production in 2022 improved but remained well below pre-ASF levels. With strong measures by the government to prevent disease spreading, Rabobank expects pork production in 2023 to further 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



# 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

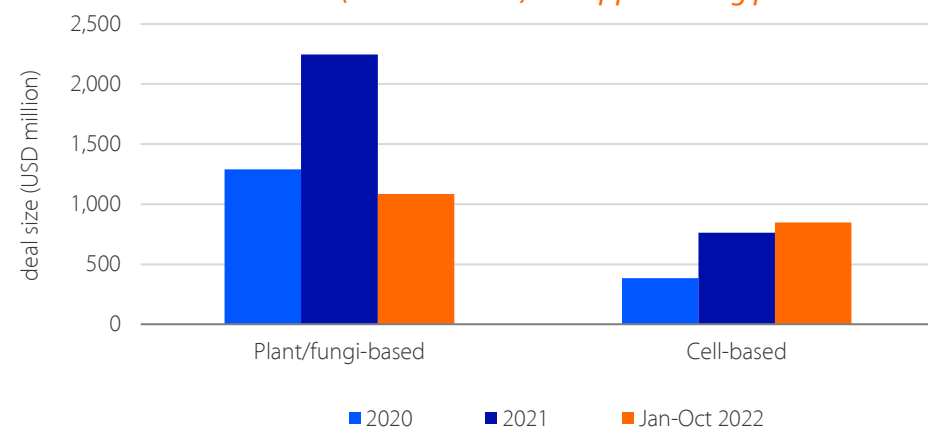
Investor interest in cell-based technologies has increased, while investments in plant-based have eased. Cell-based meat products are not expected to achieve scale for quite some years, as the technology is mostly still in its infancy. Companies are working hard on improving the efficiency of their production 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  
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