



An industry infected

Animal agriculture in a post-COVID world



Foreword

The main effects of Covid-19 will be transient, but the added pressure it puts on factory farms, will be hard to swallow.

Factory farms including the recently industrialised wet markets of Asia, mass producing over *70 billion* animals a year for *7.8 billion* people, find themselves at the centre of the storm.

To date, we have seen over 20,000 workers in the US alone contracting COVID-19, with supply chain failures predicted to cost over [\\$13 billion](#) to the cattle industry. Livestock is now listed alongside oil as one of the two most precarious commodities for investors next year¹.

This timely report highlights for investors that factory farming is both vulnerable to zoonotic outbreaks, and guilty of creating them. It suggests COVID-19 is one of the straws that is breaking the meat industry's back.

Avoiding the next pandemic

The rise of factory farms over the last 70 years has brought with it an increasingly frequent string of zoonotic outbreaks from BSE (1989) to SARS (2002), H1N1 Swine Flu (2009), MERS (2012), Ebola (2014), Zika (2015), Dengue Fever (2016) and now COVID-19.

As this report finds, over 70% of the world's largest, listed meat, fish and dairy companies are shown to be at "High Risk" of fostering future zoonotic pandemics.

To arrest this trend, the global animal agriculture sector must tackle lax safety standards for food and workers alike, closely confined animals and overused antibiotics. This will disrupt a supply chain already cracking from fundamental land, water and emissions constraints.

Antibiotic resistance (AMR) in particular, is the most predictable next public health crisis. The world may have been surprised by how quick and devastating the spread of coronavirus has been, but it cannot say the same if antibiotic-resistant bacteria are allowed to spread. It's why investors have come together to make 2020 the [Investor Year of Action on AMR](#).

Overhaul required

Investors are forewarned by this research, that animal protein producers and processors will be forced to instigate a number of costly measures from biosecurity to antibiotic stewardship, to stop the outbreak of zoonotic pandemics becoming the new normal. The meat industry must become part of the solution, not part of the problem.

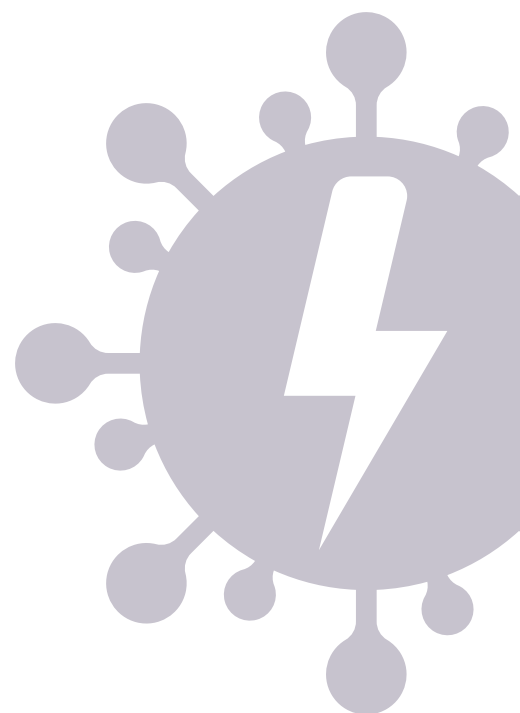
This report also underlines the importance of the [Coller FAIRR Protein Producer Index](#) as a tool for investors. The Index, shortlisted by the UN-supported Principles for Responsible Investment as ESG Research Report of the Year, analyses the performance of the world's largest, listed animal protein producers on issues from antibiotics to animal welfare, worker safety to food safety. As we emerge from the COVID-19 pandemic, that data is more critical to investors than ever.

Jeremy Collier
Founder of FAIRR and CIO of Collier Capital

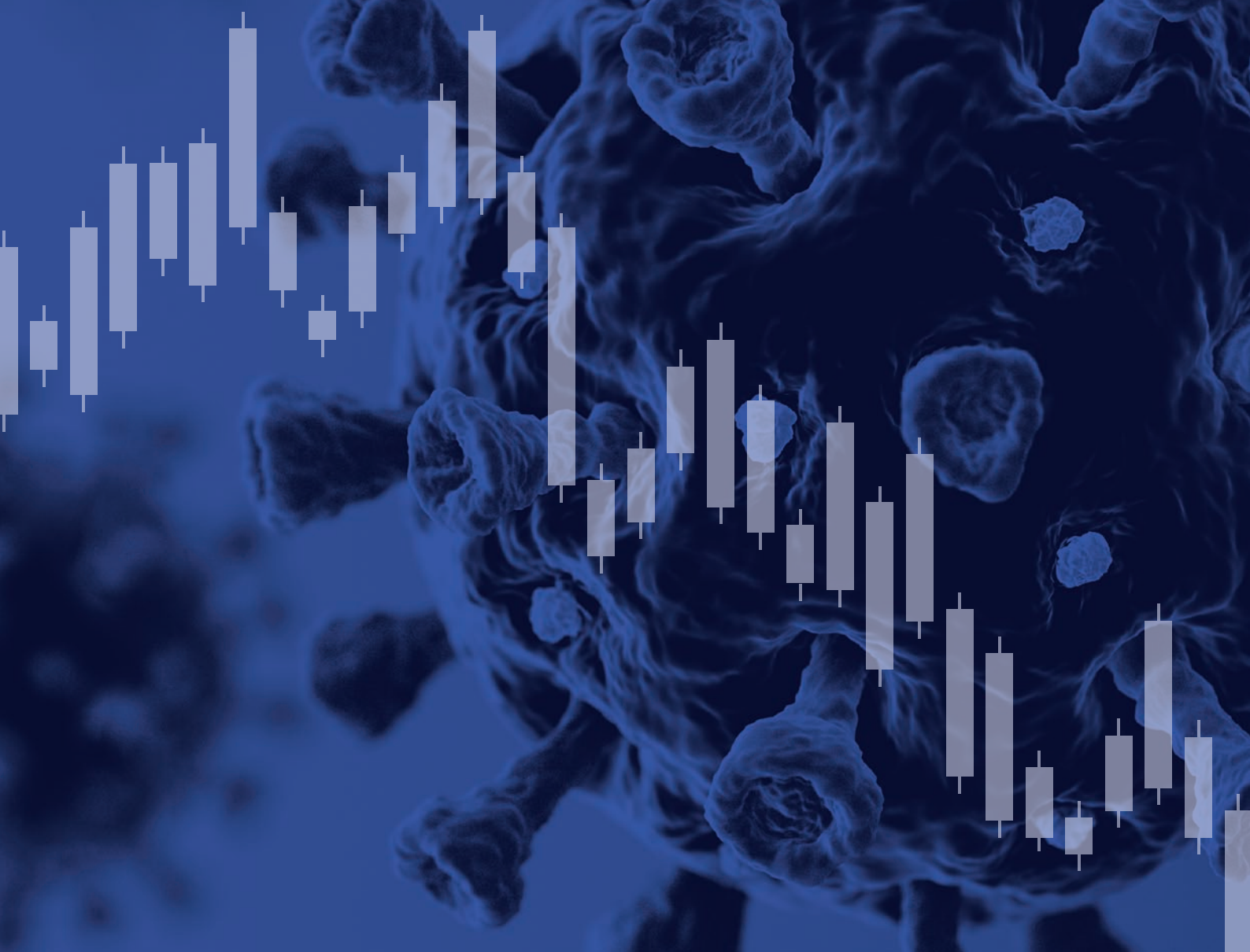
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3 June 2020



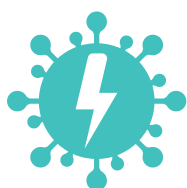
Executive summary



This FAIRR report aims to provide investors with insights into the financially material impacts of the current crisis on the animal protein sector, and highlights the risk the industry faces due to its potential to foster future pandemics.

As the COVID-19 pandemic unfolds globally, we are presented with a real time case study into the vulnerability of animal agriculture systems to external shocks. It has reminded us of the vulnerability of human health to disease risks stemming from both wild and domestic animals, and has served as a warning of the role modern animal production systems can play in increasing zoonotic disease risk.

In this report we have created a Pandemic Ranking, by adjusting our existing 2019 Collier FAIRR Protein Producer Index to consider only those ESG risk factors relevant to this topic. A summary of key findings at both an industry and company level are presented in Chapter 4 of this report.



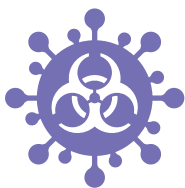
Animal agriculture's exposure to global shocks

Meat processing plants are at the centre of COVID-19 outbreaks worldwide. Meat industry workers across the world have been disproportionately impacted by COVID-19, with over 20,000 workers in the US alone contracting the virus to date. Slaughterhouses and processing facilities have been forced to close or reduce capacity in response to labour shortages and social distancing requirements. This pattern of disruption within animal protein supply chains has been repeated globally, revealing key bottlenecks within these systems and their inherent fragility to external shocks.

The industrialised model of animal production has been optimised to prioritise both cost and production efficiency, at the expense of multiple other factors including worker safety, biosecurity and ultimately, resilience. In many developed markets this has been exacerbated by decades of industry consolidation. Meat plant closures left US pork slaughtering capacity down 50% in early May. With access to the market reduced or even removed entirely, producers are left with few options. We are witnessing the mass culling of livestock by producers who cannot afford to maintain them, while some consumers and manufacturers are left facing shortages.

As a disease that affects humans, COVID-19 has impacted the animal protein industry predominantly through its reliance on labour. However, the industry is also vulnerable to disease risks within livestock. Producers are already battling several endemic and re-emerging infectious animal diseases, including African Swine Fever (ASF), Swine flu and Avian flu. A monumental and coordinated shift in biosecurity training, safety and surveillance is needed, especially in emerging markets.

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Driving future pandemics

Modern animal production is not only vulnerable to pandemics, it can create them. While the COVID-19 pandemic did not come from livestock, the next one may. Three in four emerging infectious diseases in humans are passed on from animals (termed zoonotic diseases). Increasingly these are coming from livestock, including strains of swine flu, avian flu and Nipah virus. Intensive animal production systems involve high stocking density, indoor confinement, chronic stress, lowered immunity and live transport. Together these factors create the perfect environment for deadly diseases to mutate and spread rapidly. Zoonotic diseases can spread to humans through direct contact with infected animals or indirectly through animal waste or animal products. If a highly deadly strain of avian or swine flu were to become highly transmissible between humans, we would be facing the next pandemic.

Looking beyond the disease risks stemming from livestock, animal agriculture also increases the risk of zoonotic diseases spreading to humans from wild animals. As we replace wild habitats with cities and farms, we come into contact with wild animals harbouring previously unknown viruses. Globally, animal agriculture is responsible for 70–80% of deforestation.

Finally, our overuse of antibiotics within animal agriculture threatens our ability to treat infectious and non-infectious diseases. The rise of antimicrobial resistance (AMR) is predicted to kill 10 million people annually by 2050 if left unchecked.

Three in four emerging infectious diseases in humans are passed on from animals



Looking ahead

While it is difficult to predict the longer-term impacts of the current crisis on the animal agriculture industry, we expect to see material regulatory and market changes occur. From a regulatory perspective, we are seeing an unusual policy window opening in response to the pandemic, as regulators consider how best to prevent and/or mitigate the next crisis.

Regulatory conversations are already taking place across Europe and the US, focussed on several core themes including breaking up industry consolidation, implementing moratoriums on factory farms, banning live export, limiting antibiotic use, and overhauling biosecurity containment and surveillance practices.

In the medium term, a shift to more sustainable plant-based proteins offers resilience where animal protein production has failed. Plant-based proteins are more efficient to produce, can be scaled up or down to meet market demand in a matter of days and don't have the disease risks associated with livestock. Taken together these factors result in an industry that is more resilient to external shocks. Consumers are increasingly open to plant-based alternatives, with sales sky-rocketing across many markets including the US and China. As COVID-19 continues to disrupt the animal protein supply chain, many plant-based alternatives have been able to compete directly on price for the first time. Additionally, as seen in previous outbreaks, we expect to see retailers and manufacturers increase their use of plant-based proteins to reduce supply chain risks.



FAIRR Pandemic Ranking key findings

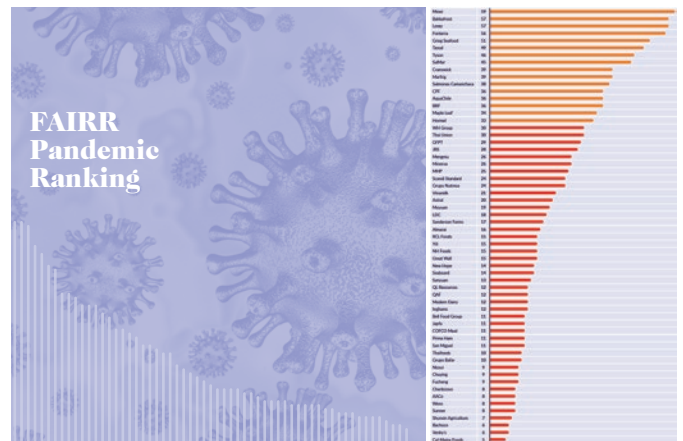
For the purposes of better understanding the pandemic risks faced by protein producers globally, we have created a Pandemic Ranking, using data and insights from our 2019 Collier FAIRR Protein Producer Index. The results of our analysis are summarised here.

The Pandemic Ranking combines the six risk factors in the 2019 Index most relevant to the topic of pandemic risk. These include deforestation & biodiversity loss, antibiotics, waste and pollution, working conditions, food safety and animal welfare. We have included the opportunity factor of sustainable proteins in the Pandemic Ranking as well.

Our results show that across all seven ESG risk and opportunity factors, companies are doing far too little to measure and manage pandemic risk. Forty-four (out of 60) companies, valued at \$224 billion, are deemed high risk (worst performers) by the Pandemic Ranking. The remaining sixteen companies are rated as medium risk and significantly, none of the companies considered are low risk.

Looking across the full Pandemic Ranking, we see company performance differing substantially by both region and protein type.

- Protein type:** On average, aquaculture companies are categorised as medium risk, while pork and poultry and egg companies are categorised as high risk. Four out of the bottom five producers in the Pandemic Ranking (i.e. those facing the highest level of overall pandemic risk) are poultry and egg companies. Conversely, four out of the top five producers in the ranking are aquaculture companies.
- Region:** Similarly, European and Oceanic companies on average are categorised as medium risk, while emerging market companies are categorised as high risk, particularly Asia. Twenty-seven (96%) of Asian companies were deemed high risk.



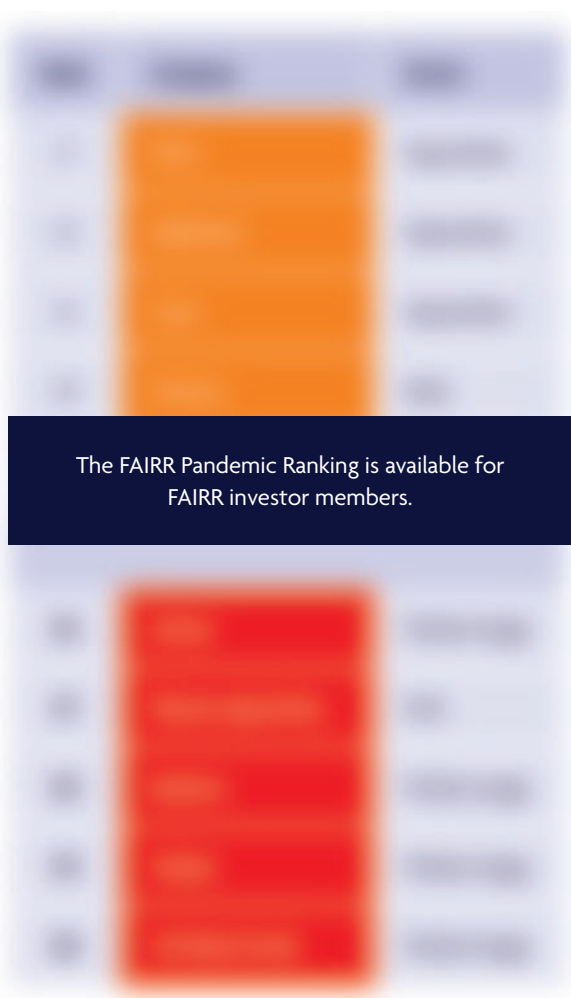
See full Ranking on p.29

Across all ESG risk and opportunity factors, the majority of companies are categorised as high risk. However, for three risk factors in particular, over three quarters of companies are categorised as high risk: first, waste and pollution (94% of companies), followed by deforestation and biodiversity (88%) and then antibiotics (77%). A contributing driver of this result is a lack of public disclosure relating to performance and management of these topics by companies. Without this information, investors are unable to accurately assess the level of pandemic risk these companies face.

The 2019 Collier FAIRR Protein Producer Index is a valuable tool to evaluate pandemic risks. We encourage investors to use the information in the Index as a resource to understand and assess these potential financially material issues, as well as to engage in dialogue with companies on the risks associated with the current, and possible future, pandemic risk events. Detailed information about the ESG risk factors, the FAIRR Index report, and additional company analysis are available to FAIRR members via our [website](#).



Figure 3: Top and bottom five ranked companies in FAIRR's Pandemic Ranking



The FAIRR Pandemic Ranking is available for FAIRR investor members.

The Collier FAIRR Protein Producer Index

Evaluates 60 of the largest public protein producers around the world.

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Qualitative and quantitative analysis across 9 risk and opportunity factors and 30 KPIs. Built from over 30,000 datapoints.

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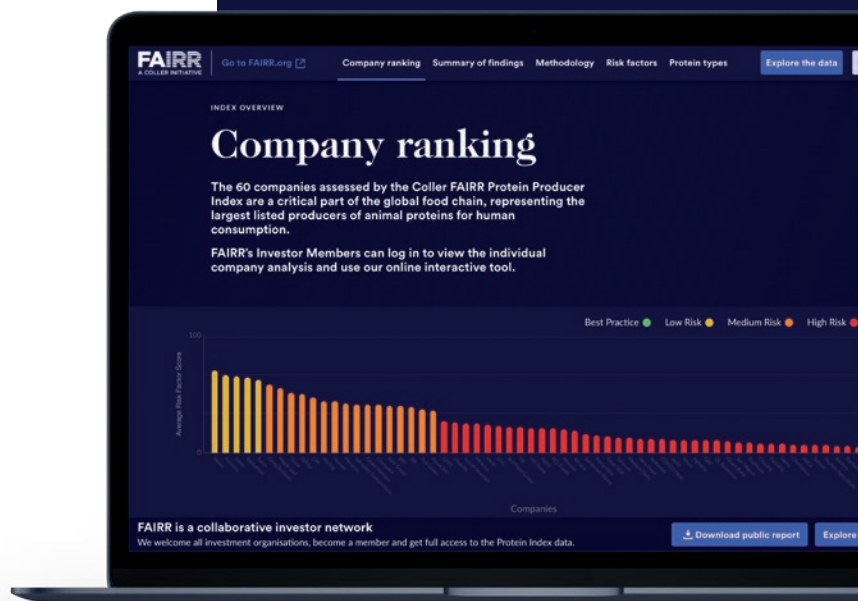
Covers 5 proteins; beef, poultry and eggs, pork, dairy and aquaculture.

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Rates companies as high, medium or low risk according to their overall score.

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More information including methodology and results can be found via our [Index site](#).





Introduction

COVID-19 has highlighted the ever-present risk of a pandemic outbreak. This report aims to provide insights into how the current crisis has impacted the animal protein industry, the vulnerability of the industry to future shocks and the role that the sector plays in creating future pandemic risk.

We look forward to discussing our flagship 2019 Collier FAIRR Protein Producer Index throughout this report in the context of pandemic risk. Where an ESG risk factor within the Index is tied to pandemic risk, we have highlighted this at the beginning of each section, with additional information in text boxes throughout the report.

We support further research into this topic both at a sector and company level through the creation of a Pandemic Ranking, using insights from the 2019 Protein Producer Index. The Pandemic Ranking takes relevant data and aggregates it into an overall pandemic score. This report presents our key findings at a sector and company level. Members can find more detailed company analysis on our [Pandemic Risk webpage](#).

The report is structured as follows:



Part 1: Exposure to global shocks

Looks in detail at the vulnerabilities of the industry to the risks resulting from a pandemic such as COVID-19, as well as other global shocks.



Part 2: Driving future pandemics

Outlines the significant role of animal agriculture in driving future pandemic risk.

Part 3: Looking ahead

Provides key insights on the anticipated market responses in the wake of COVID-19, including potential forthcoming regulations and the role of plant-based proteins.

Part 4: FAIRR Pandemic Ranking

Summarises company and sector level insights using data from our 2019 Protein Producer Index to inform analysis of pandemic risk.

Part 1
.....

Exposure to global shocks



Working conditions



Animal welfare



Food safety



Waste and water pollution



Sustainable proteins

ESG risk factors that leave companies exposed to global shocks

“ The US meat industry is the source of most new COVID-19 hotspots

.....
Economist Ian Shepherdson

It is becoming increasingly clear that the current pandemic does not impact all sectors equally. The industrialised model of animal production has been optimised to prioritise efficiency, at the expense of worker safety, biosecurity and ultimately resilience to shocks. The fragile nature of the animal protein supply chain has been laid bare, as key bottlenecks in the system close due to the virus. Some consumers and manufacturers face sudden shortages of meat, while upstream, producers realise the losses from culls and spoilage. This section looks at the impact of global shocks such as COVID-19 on industrial animal protein production. We analyse in detail the numerous operational, regulatory and reputational risks that result.

Supply chain shocks



FAIRR Index: Animal welfare, Food safety

COVID-19 has exposed the fragility of the industrial animal protein sector to supply chain shocks. Exacerbated by a ‘just-in-time’ operating model, the underlying weakness of the system is due to an interplay between inflexibility, scale and the challenges of live animals. While the current crisis is a human health pandemic, the inherent vulnerability of the supply chain is relevant to all external shocks, whether they be financial, geopolitical or climate related in nature. We look here in more detail at the critical role slaughterhouses play in the supply chain, how the current pandemic has affected consumer demand and the impact of shocks on export-oriented businesses.

Industry consolidation has increased the vulnerability of the supply chain to bottlenecks. In the US, due to decades of industry consolidation, the number of meat plants has halved in 45 years. As a result, despite there being more than 800 federally inspected slaughterhouses in the US, the top few companies in the sector control the majority of processing capacity. In 2017, these companies controlled more than 83% of the beef packing industry, 66% of pork packing and 51% of broiler chicken processing². In 2015, more than 50% of beef processing, – or roughly one million animals – were slaughtered in the top 13 plants alone, equating to 2,800 head of cattle per day³.

As a result, despite there being more than 800 federally inspected slaughterhouses in the US, the top few companies in the sector control the majority of processing capacity.

Meat and animal product processors are facing disruptions as COVID-19 impacts workers. As the pandemic unfolds globally, slaughterhouses and processing facilities have been forced to close or reduce capacity due to outbreaks, social distancing requirements and labour shortages. As at May 20th in the US alone, over 20,000 meat workers across 216 plants have become ill with COVID-19 and 70 meat industry workers have died.⁴ Large industry processors Tyson, JBS and Smithfield have together closed 15 plants.⁵ In the case of the pork industry, plant closures account for fully one-quarter of the United States' hog-slaughtering capacity.⁶ Yet this problem is not specific to the US, COVID-19 outbreaks have occurred across meat plants in Ireland, Spain, Australia, Germany, Brazil and Canada.⁷

Dairy farmers dump milk as processing plants close due to COVID-19. A tight regulatory environment means that raw milk must be pasteurized before it can be sold to market. Most dairy farmers do not have the infrastructure to pasteurize and therefore cannot legally sell their milk directly to consumers. In the absence of access to this infrastructure, farmers across the US and Europe have reported pouring millions of litres of milk down the drain as a result^{8,9}.

COVID-19 is also impacting producers indirectly, via reduced consumer demand. Any unexpected changes to demand results in oversupply and wastage in the system. This is particularly true for producers who rely on demand from the food service industry. COVID-19 has caused the closure of food service businesses, restaurants and schools globally. For example, much more milk is consumed at restaurants and schools than at home. The dairy industry is seeing severe wastage as a result, as cows need to be milked multiple times a day, regardless of whether there is demand.^{10,11} In the UK alone, an estimated one million litres of milk are being dumped every day as a result of lockdown, in particular coffee shop closures¹². Similarly, within the seafood industry, the closure of restaurants and wet fish counters at supermarkets may force gridlocked producers to cull thousands of fish.¹³

With processing capacity down, producers must absorb costs. Taking the pork industry as an example, if pigs are unable to be slaughtered, no capacity is created on farms for piglets, which are still being born continually. Producers are left with no space for pigs, leading to mass culling or 'depopulation'. Not only is it costly, but it also raises animal welfare concerns, creating reputational risk. Poultry depopulation includes foam suffocation, and 'ventilation shutdown' where animals die of organ failure due to planned overheating or maceration and grinding, where live birds are sucked through an industrial grinder using a vacuum¹⁴.




As at May 20th in the US alone, over 20,000 meat workers across 216 plants have become ill with COVID-19 and 70 meat industry workers have died.



Live animal export businesses face heightened risks.

Export models are more vulnerable to external shocks than domestic producers as they face the additional risk of changes to international market access. Disease related shocks like COVID-19 may lead to more stringent export protocols or increased biosecurity regulations as countries look to manage biosecurity risks. For example, the Australian live export industry has been hit by government regulations preventing foreign ships from docking during the COVID-19 crisis, leaving the industry unable to load livestock.¹⁵ Within Europe, more than 40 members of the European Parliament have joined with a coalition of NGOs calling for a ban on long-distance animal transport during the COVID-19 crisis.¹⁶

Figure 5
COVID-19 related wastage

 Poultry	 Beef/Dairy	 Pork
Sanderson Farms destroys 750,000 unhatched eggs , or 5.5% of its total production, sold instead as pet food ¹⁷ .	Dairy Farmers of America, estimates that farmers are dumping as many as 3.7 million gallons of milk each day . ¹⁹	13,000 pigs a day will be killed at a JBS SA slaughterhouse in Minnesota, with carcasses dumped in landfills or sent to rendering plants. ²¹
A large US chicken processing company was forced to kill 2 million of its chickens due to workforce shortages ¹⁸ .	In the UK an estimated 1 million litres of milk a day is being dumped. ²⁰	Iowa expects producers to be forced to cull 700,000 pigs per week . ²²

Biosecurity



FAIRR Index: Animal welfare, Food safety, Waste and water pollution




Globally, animal agriculture faces multiple disease risks. While the current pandemic has disrupted meat supply chains globally; the industry is no stranger to outbreaks. Producers are already battling several endemic and re-emerging infectious animal diseases, including African Swine Fever (ASF), Swine flu and Avian flu, see Figure 6 below. Effectively mitigating disease threats relies on the adoption of strict biosecurity protocols to reduce the risk to both individual producers and the entire supply chain.



Biosecurity is defined as any practice or system that prevents the spread of infectious agents from infected to susceptible animals.



Figure 6
Endemic animal diseases
fact box

 African Swine Fever	 Avian Influenza	 Swine Influenza
<p>It is incurable, has no vaccine and causes an almost 100% mortality rate in pigs.</p>	<p>Avian flu, a variant of swine flu, is highly contagious and deadly to poultry.</p>	<p>Swine flu is a respiratory disease characterized by nearly 100% morbidity in pigs.</p>
<p>It is difficult to identify and track. Infected animals spread the virus for 1-2 days before symptoms appear.</p>	<p>Avian flu has been detected in over 50 countries and is considered to be endemic within the poultry populations of 6, including China and India.</p>	<p>Pigs are considered to be the 'mixing vessel' for the influenza virus as they can be infected by swine, human and avian flu.</p>
<p>It spreads through direct contact with infected animals, body fluids and meat, or through contact with contaminated objects.</p>	<p>Avian flu vaccines for poultry must be regularly updated to keep pace with circulating strains.</p>	<p>Each time the virus is transmitted between species, the variation of the strain increases.</p>
<p>It has been found to survive up to 6 years in some conditions.</p>		<p>Vaccines exist and must keep pace with the evolving virus.</p>

ASF is one of the most prevalent diseases facing pork producers.

In 2019, ASF resulted in one quarter of the world's domestic pigs dying from disease or being culled.²³ China, a country with half the world's pigs (440 million), has seen its pig herd cut in half from the disease, with 2020 supply expected to slump to a 27-year low as a result.²⁴ In Q1 2020, pork production fell by 29%, keeping pressure on already inflated prices. Pork production was also hit in February 2020 by COVID-19 related slaughterhouses closures.²⁵ The economic costs of ASF globally are running well into the hundreds of billions of dollars, with a recent study estimating the cost of an ASF outbreak in the US at \$50 billion.²⁶ Pig producers in Western Europe are now on high alert after an ASF outbreak was reported in April on a commercial pig farm in Poland close to the German border.





Pigs are also susceptible to strains of swine flu. First identified in the US, the once seasonal disease has become a year-round issue caused by an ever-evolving virus.²⁷ Two subtypes of swine flu (H1N1 and H3N2) are now considered endemic among pig populations in the US.²⁸ A swine flu outbreak can cost pig producers more than US\$10 per pig in vaccination, medication costs and performance losses²⁹.

Avian flu (H5N1) regularly decimates poultry flocks around the world. Sporadic human infections have also been reported across Asia, Africa, Europe and the Middle East. Canada reported the first human infection in the Americas in 2014.³⁰ In 1997-98, an outbreak in Hong Kong amongst chickens spread to humans resulting in six deaths. The entire population of chickens in Hong Kong (1.4 million) were slaughtered as a result. Subsequent outbreaks occurred in 2001 and 2002, resulting in additional chicken depopulations.³¹ In 2003, a highly pathogenic strain of Avian flu (H7N7) appeared in the Netherlands, resulting in the depopulation of 23 million chickens.³²

The industrialisation of animal production does not reduce disease outbreaks. Global surveys of biosecurity practices find widespread flaws, even in countries with industrialised systems, where compliance is expected to be higher (such as the US and Australia).³³ Studies cite a number of potential reasons for this, including a lack of standardised information and the fact that many industry biosecurity codes remain voluntary.³⁴ Biosecurity is also expensive, involving infrastructure development, training, regular review and upkeep, as well as opportunity costs. Producers must weigh these costs against the perceived risks of contracting disease. This is challenging because the effectiveness of biosecurity strategies differ by disease, depends on the actions of fellow producers, and only pays off when an outbreak occurs.³⁵ Taken together, existing literature suggests a material gap between the reported implementation of biosecurity measures, versus actual practice.

Once an outbreak reaches a farm, intensive systems fare worse.

The design and operational requirements of large-scale pig and poultry houses often results in compromised biosecurity. Once a pathogen is introduced into a concentrated production facility, it has the potential to multiply rapidly, creating large quantities of infectious organisms that risk being released to other sites. Studies found that the 2004 H5N1 avian flu outbreak was more likely to spread to large scale commercial poultry operations in both Thailand³⁶ and Canada.³⁷ In Canada, the rapid spread of H5N1 was found to be partly attributed to air exchanges between poultry barns spaced hundreds of meters apart, assisted by industrial ventilation systems. The fans generate and emit aerosolized dust, with one study finding particle concentrations in an air samples from broiler houses a million times higher than samples from semirural areas.³⁸

Taken together, existing literature suggests a material gap between the reported implementation of biosecurity measures, versus actual practice.

Managing disease risk requires an understanding of which pathogens pose a threat and how they spread. Practical implementation of biosecurity requires knowledge of both the disease pathogens that constitute a risk, as well as the ability of those pathogens to multiply and disseminate.³⁹ ASF, for example, does not require the transport of live pigs to spread. Studies of 68 outbreaks of ASF in China revealed that the virus is transmitted through three main channels; contaminated objects – such as farm vehicles, clothing and shoes (46%); feeding pigs contaminated feed (34%); and lastly, the transportation of live pigs and pig products (19%).⁴⁰ A recent outbreak of ASF on a commercial pig farm in Poland has been traced to ASF-positive piglets that the farm owner, **Smithfield Foods'** subsidiary Agri Plus, purchased in mid-March.⁴¹ In the event of a disease outbreak, measures need to be put in place quickly to reduce on-site pathogen proliferation and transmission to other areas.

The rapid culling and safe disposal of infected animals is critical to the successful containment of an outbreak. While the most efficient way to kill pigs at scale is at a slaughterhouse, during a disease outbreak, the capacity of local rendering plants and landfills is often exceeded by the large number of mortalities. This makes the safe disposal of infected animals more difficult to achieve. The most common on-farm disposal methods for depopulated livestock include burial, landfilling, incineration, and composting. Numerous case studies have highlighted the biosecurity concerns of these options.⁴² ASF is highly infectious and is spread through blood. A single drop of blood from an acutely infected pig can contain 50 million ASF virus particles, with just one particle contaminating water potentially enough to transfer the disease. The depopulation of 47,000 pigs due to ASF in South Korea led to the Imjin River turning bright red from the blood of culled pigs.⁴³ Similarly, in Romania, the contamination of the Danube River by carcasses spread the ASF virus to a nearby pig farm.⁴⁴

Human health risks



FAIRR Index: Working conditions, Food safety

The farmed animal industry is fundamentally linked to human health. As described throughout this report, livestock can host a wide range of diseases and infections. As a result, exposure to zoonotic diseases such as swine or avian flu are an occupational hazard for animal industry workers.⁴⁵ When workers come into contact with infected animals, not only is their health compromised, but they become vectors for the disease. This is relevant not only for the workforce, but for the health of their communities and the population at large.

Safety measures to protect workers against COVID-19 are nearly impossible to implement. In addition to the threat of contracting zoonotic disease, workers are often left unprotected during a human health crisis. Difficulties implementing safety measures such as physical distancing has been identified as a key factor affecting the risk of infection from COVID-19 amongst meat and poultry processing facility workers. Due to the quantity of animals being processed and the speed of production lines, meat processing workers are required to work side by side, often shouting in each other's ears to be heard over the noise.⁴⁶ Social distancing is impossible when production is running at full speed. One solution would be to slow down the speed of processing, with obvious trade-offs being to the bottom line and downstream supply. However, the USDA continues to increase line speed through the COVID-19 pandemic, leading to further concerns for workers during the current pandemic due to more crowded working conditions.⁴⁷



Meat industry workers across the world have been disproportionately impacted by COVID-19. By May 18, outbreaks at plants have been reported in the US, UK, Ireland, Spain, Australia, Germany, Brazil and Canada. In some cases, processors have faced criticism due to their slow response to the outbreak. In the US, six weeks before Smithfield closed its South Dakota pork plant, workers had requested the implementation of safety measures such as temperature checks and staggered breaks, which were denied. By the time Smithfield closed the site indefinitely, more than 200 of the plant's total 3,700 employees were sick. This number has since risen to more than 700, one of the country's largest coronavirus clusters.⁴⁸ In Ireland, the country's largest pork processor reported 34% of workers infected by the virus, while Dawn Meats, a beef processor that supplies McDonalds with 400 million burgers per year temporarily closed down.⁴⁹

Meat industry workers across the world have been disproportionately impacted by COVID-19

Part 2
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Driving future pandemics



Waste and
water pollution



Antibiotics



Working
conditions



Animal
welfare



Food
safety



Deforestation &
biodiversity loss



Sustainable
proteins

ESG risk factors that drive risk of future pandemics/outbreaks

“ If you actually want to
create global pandemics,
then build factory farms

.....
Dr Michael Greger⁵⁰

Beyond the current crisis, COVID-19 has reminded us of the role that modern animal production systems play in driving pandemic risk. Three in four new human infectious diseases are zoonotic (originating from animals)⁵¹. Moreover, of all known zoonotic viruses, 50% are found in domesticated animals (concentrated in just 12 species) due to their abundance.⁵² Scientists have long warned of the likelihood of a pandemic emerging from intensive livestock farming. Regulators globally are facing mounting pressure to address disease risks inherent in the sector, including zoonotic pandemics, food safety outbreaks, and antimicrobial resistance, with producers likely to face additional compliance costs as a result. This section aims to detail the numerous and complex drivers behind these risk factors.

Creating novel pathogens



FAIRR Index: Animal welfare, Antibiotics

Infectious disease outbreaks are increasing, the majority of which originate in livestock. The lethal virus that causes COVID-19 (SARS-CoV-2) is the most destructive of a string of zoonotic diseases to emerge in recent decades that include; SARS (2002), H1N1 Swine Flu (2009), MERS (2012), Ebola (2014), Zika (2015) and Dengue Fever (2016). The human fatality rate of the H5N1 bird flu in 1997 was 53%,

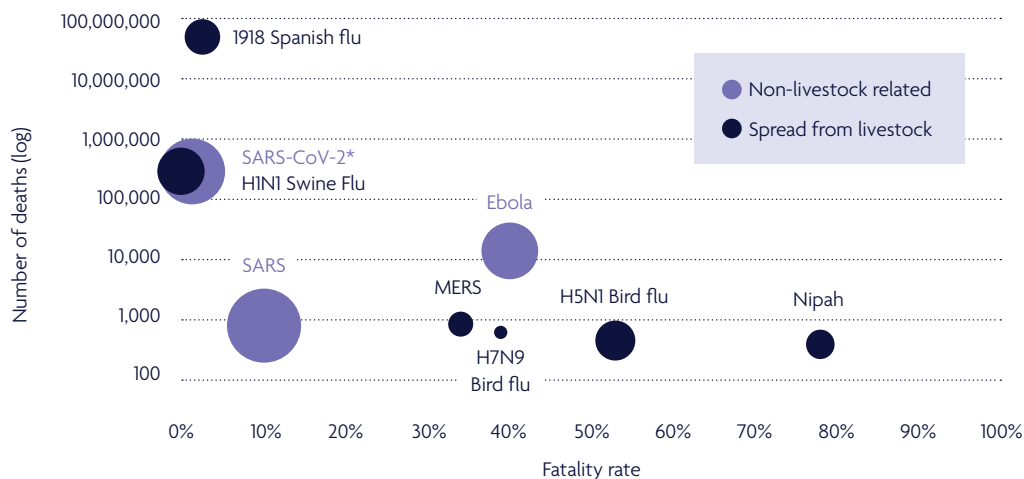
and the H7N9 bird flu in 2013 was 40%. The World Health Organization is concerned that if these or other highly pathogenic viruses mutate to increase human-to-human transmissibility, the consequences would be devastating far beyond the current crisis (see Figure 7).³³ Modern animal agriculture creates unique conditions that allow pathogens to become more deadly, contagious, and spread quickly.

Figure 7

Zoonotic outbreaks:
Fatality rate, contagiousness
& number of deaths

Bubble size =
Contagiousness (R0)

*As of May 25, 2020



Intensive farming creates favourable conditions for deadly pathogens to mutate and spread. Intensive pig or poultry farms have the potential to serve as local amplifiers for new strains of influenza, increasing the risks of human transmission and pandemics.⁵⁴ Animals can be housed in large populations with high stocking density; 20 birds per square metre means up to 70,000 chickens can live in a single shed. In such crowded conditions, highly deadly pathogens easily spread from sick or dead animals to healthy ones. In addition, many viruses are rapidly inactivated by sunlight, whereas viruses can thrive in poorly ventilated indoor systems.

The fear of infections becoming untreatable by antibiotics is very real. China and India both use high amounts of antibiotics in their livestock sectors, are already seeing AMR worsen in both animals and humans.

“There are several drivers of spreading diseases, but live animals are the largest source of infection”, says Professor Jeroen Dewulf.⁵⁵ In addition to changing the economics of the industry in the short-term through dramatic price crashes, the longer-term risk is that the business model itself is deemed to be too risky, resulting in complete export bans. Risks are particularly high in emerging markets, where disease surveillance is low, and demand for meat is growing. Within Europe, more than 40 members of the European Parliament have joined with a coalition of NGOs calling for a ban on long-distance animal transport during the COVID-19 crisis.⁵⁶

AMR is increasing the risk of untreatable diseases or ‘superbugs’. Global antibiotic consumption is predicted to grow 67% by 2030, fuelled by the growth in intensive livestock farming. In 2015, 70–80% of antibiotic use globally was within the livestock industry.⁵⁷ The fear of infections becoming untreatable by antibiotics is very real. China and India, which both use high amounts of antibiotics in their livestock sectors⁵⁸, are already seeing AMR worsen in both animals and humans.⁵⁹ The human and economic impact of uncontrolled drug-resistant infections or superbugs would be catastrophic.⁶⁰ In the absence of any intervention, by 2050 AMR would kill an estimated 10 million people annually, more than are killed by cancer today, at a cost to the global economy of \$60–\$100 trillion.⁶¹

Animal-human spillover



FAIRR Index: Waste and pollution, Working conditions, Food safety

Spillover events are common; 3 in 4 of all emerging human infectious diseases are zoonotic.⁶² As a general rule, pathogens are more easily able to jump to another organism that is closer in evolutionary terms. This is one of the main reasons why human diseases predominantly originate in animals.⁶³ There are many ways in which a pathogen carried by an animal can spread to humans, known as a spillover event. Common spillover routes within animal agriculture include: inadequate worker protection, manure mismanagement, wastewater, and live transport. Historically, zoonotic diseases such as Foot and Mouth disease and ‘mad-cow’ disease have also spread directly through eating animal products.⁶⁴



Manure is a key infection route for pathogens and is produced in abundance. Intensive livestock production generates 314 million metric tons of waste per year in the US alone. Despite this figure representing greater than 100 times the volume of human waste created, livestock waste is far less regulated and is much more concentrated geographically. There are many ways pathogens can spread from animal waste, as it can harbour pathogens for 2-12 months if left untreated. Manure is often used as fertiliser, increasing the likelihood of pathogens being spread by wild animals, such as birds as well as compounding the incidence of contamination of local water bodies. In 2017, an outbreak of E. coli infections that killed two children and sickened 10 others in Utah and adjoining Arizona communities were traced back to contact with livestock manure.⁶⁵

Livestock workers are a key route for zoonotic spillover events.

A review of livestock-related zoonotic diseases found that 43 of the 75 events considered were linked to workers, including vets, farmers and slaughterhouse workers. In one outbreak, workers were 1,500 times more likely to be infected than the general population.⁶⁶ Inadequate training, handling and personal protective equipment are often to blame, exacerbated by line speeds that make safe handling of animals more difficult.

Wildlife, zoonosis, and deforestation



FAIRR Index: Deforestation and biodiversity loss

Animal agriculture is responsible for 70-80% of deforestation around the world, which in turn increases the risk of new pandemics.⁶⁷ Nearly one in three outbreaks and emerging diseases are linked to deforestation.⁶⁸ Deforestation causes land change, leads to the encroachment of humans and livestock into wildlife habitats, and reduces biodiversity, all of which increase opportunities for zoonotic spillover events.⁶⁹

Deforestation brings humans and livestock into contact with new wildlife. Scientists estimate that animals carry more than 600,000 unknown viruses with the potential to jump to humans. As we replace forests with cattle, crops and cities, we encounter these new viruses. The 1998 Nipah virus outbreak (originating in Malaysia and characterised by a 53% mortality rate amongst humans) was indirectly caused by deforestation.⁷⁰ The loss of native fruit trees through deforestation encouraged bats to resettle at commercial fruit orchards located near pig farms, causing a string of recurrent outbreaks of the virus across Southeast Asia.



Biodiversity loss may increase zoonotic risk. There is concern that biodiversity disruption and habitat loss increase the risk of zoonotic spillover. For example, both West Nile Virus and Lyme disease, were found to spread to a greater degree in areas with biodiversity loss.⁷¹ While there are varied opinions about the extent to which biodiversity loss increases zoonotic risk,⁷² with increased attention on the causes of wildlife zoonosis, we expect this area to receive significant attention.

Part 3
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Looking ahead



Sustainable
proteins

Upcoming regulation and best practice in a post-COVID world

Alongside the rest of the world, investors are taking notice of which companies are at risk, how consumers will reshape the market, what regulations might change, and what future corporate social responsibility should look like in the protein sector. One thing is sure, the industry and the markets will have to respond. While it is difficult to anticipate the outcome from within the eye of the storm, we believe we can expect the following responses from the market.

Plant-based proteins will be better positioned



FAIRR Index: Sustainable proteins

Plant-based proteins are more resilient to external shocks.

Compared to animal protein producers, the plant-based protein industry enjoys both production and market efficiencies. From a production perspective, not only is it faster and cheaper to produce plant-based proteins, there is no ‘carcass balancing’ problem. This refers to the problem whereby demand for finished products, or ‘cuts’ never equates exactly to what is available from an animal carcass. From a market perspective, manufacturing plants are extremely flexible, able to alter their production mix to meet short-term spikes or dips in demand. Removing live animals from the production system also eliminates the risk of animal disease outbreaks entirely. Plant-based proteins are produced in a clean and controlled manufacturing environment, with companies such as Beyond Meat and Impossible Foods enjoying reduced operational risks as a result.

Manufacturers are turning to plant-based proteins to manage supply chain risk. At present, in the US, 87% of birds infected by avian flu are layer hens, causing major food companies and restaurants to brace for egg shortages. McDonalds has reported an avian flu outbreak at one of its egg suppliers, despite appropriate biosecurity precautions being taken.⁷³ Similarly, China has been facing ongoing supply shortages of its staple protein, pork, due to ASF. Additional disruptions due to COVID-19 have increased the urgency by which large food manufacturers, some state-backed, are actively seeking plant-based replacements for animal products.⁷⁴ US plant-based egg producer, JUST, has reported record sales in China since the COVID-19 outbreak.⁷⁵ JUST eggs are also poised to reach 1.6 million US students this year, as university catering firm Sodexo looks to manage its supply chain risks by using plant-based eggs.⁷⁶



US plant-based egg producer, JUST, has reported record sales in China since the COVID-19 outbreak.

As COVID-19 impacts the cost of meat, consumers are increasingly open to plant-based proteins. The relatively high price of plant-based meat substitutes has been identified as one of the core barriers to consumer uptake. However, as COVID-19 disrupts the meat supply chain, companies like Beyond Meat are preparing to compete directly with beef in terms of price for the first time.⁷⁷ In the US, sales of plant-based meat alternatives were up 200% year on year in the week ending April 18th.⁷⁸ Shares of Beyond Meat rose by more than 40% in one week in April, in response to concerns of COVID-19 related meat shortages in the US⁷⁹. Meanwhile Green Monday, a plant-based protein producer itself, is in a strong position to meet growing demand for sustainable pork products in China. Its flagship product Omnipork is increasing its penetration across the country, most recently partnering with fast food chain Taco Bell in Shanghai.⁸⁰



A marked change in regulatory discourse

Breaking up industry consolidation

In response to COVID-19, two US senators have asked the Federal Trade Commission to investigate consolidation in the American meatpacking and processing industry, citing the impact on the stability of America's meat supply.⁸¹ The Obama administration had previously committed to reform the sector for this very reason.⁸²

Moratorium on factory farms

In recent years there have been political shifts in both the US and EU in favour of imposing more regulations on the intensive livestock sector. Janusz Wojciechowski, the EU's agriculture commissioner, has said he wants to introduce tougher regulation on the intensive livestock sector⁸³. In the US, Senator Cory Booker's Farm System Reform Act of 2019 proposed a ban on Concentrated Animal Feeding Operations (CAFOs), defined as livestock farms with more 1,000 cattle, 2,500 pigs or 125,000 chickens, by 2040⁸⁴. In May 2020, Senator Elizabeth Warren co-sponsored the bill.⁸⁵ In the UK, in 2019 the UK Labour Party said it supported a 'move away from highly intensive farming methods' and was committed to ban the use of cages on farms by 2025⁸⁶.

Banning live transport

The European Food Safety Authority has said the live export trade is a potential risk to public health, with MEPs recently (late March 2020) calling for a ban on live exports to reduce the risk of future pandemics.⁸⁷ Pre-existing breakdowns in cross-border trust between countries over disease outbreaks are likely to be exacerbated due to COVID-19 and this has the potential to impact the livestock and meat export trade.

Limiting antibiotic use

Even before COVID-19, regulators were tightening the rules. An EU-wide ban on the pre-emptive use of antibiotics in farming comes into force in 2022, and other jurisdictions may follow. In the US, it was estimated that the meat industry would face additional costs of more than \$700 million if antibiotic rules similar to those in some parts of Europe were introduced.⁸⁸ The UK's health minister Matt Hancock told business leaders in Davos that he could "not look his children in the eyes" unless he knew he was doing all he could to tackle the rise of antimicrobial resistance (AMR), including reducing antibiotic use by the livestock industry.⁸⁹ His main advisor on AMR has said the UK should not import meat from countries that are not properly restricting antibiotic use in their farming sectors.⁹⁰

Biosecurity as a global priority

A concerted focus on improving biosecurity is certainly necessary and may become mandatory. Effective manure, nutrient and wastewater management, as well as worker protection, all fall under biosecurity which allows for a variety of different entry points in terms of improvement.

An announcement in Germany in May 2020 showed that regulators are already taking action, with new laws proposed to demand higher hygiene standards and an improved inspections regime, as-well as fines on meat processors for labour rights violations.⁹¹

For years, zoonotic biosecurity experts have lamented that the animal agriculture industry has been absent from best practice collaboration- this is also a key takeaway from the Collier FAIRR Index assessments.⁹² 'Best practice' definitions may well change after this crisis, but at minimum we expect more formalised health monitoring, standard vaccinations and assurance checks – all of which apply to both animals and farm/processing workers. Given the difference in regulatory requirements across jurisdictions, the management of waste and nutrient practices will need a holistic approach in order for multinational companies to implement assurances to safeguard global supply chains. These are complex issues which undoubtedly raise complicated trade-offs across the agriculture value chain in terms of productivity, efficiency, biodiversity and climate impacts.

A concerted focus on improving biosecurity is certainly necessary and may become mandatory.



Food safety as a proxy for biosecurity

- Biosecurity is the set of practices that prevents the spread or introduction of pathogens from sick to healthy animals/humans. Several ESG risk factors overlap with biosecurity, including waste and pollution, deforestation and working conditions.
- We would suggest that food safety risk mitigation is a strong proxy for biosecurity management. In the Collier FAIRR Protein Producer Index, we assess companies on two major components: food recall policy/suspensions/restrictions and the company's participation in- and adherence to- Global Food Safety Initiative (GFSI) recognised certifications. GFSI-recognised certification is a global standard of food safety utilised and recognised by companies across the food value chain. It is comprehensive and includes third-party auditing on microbiological, chemical and physical contamination.
- Within the 60 companies that we assess in the 2019 Collier FAIRR Index, forty companies (67%), have some food safety management certifications recognised by the Global Food Safety Initiative (GFSI). However, it is clear that more is needed. For example, just over half of the companies in Asia and Oceania, where a significant portion of animal producers and processors are headquartered, have a recognised certification. Importantly, only two of the four Chinese dairy companies communicate their adherence to international safety standards.
- Only 12 companies in the Collier FAIRR Index are scored as 'low risk' across the food safety KPIs, and none of them yet exhibit 'best practice'. [Read more](#)



Take action: ICCR Working conditions during COVID-19

To address the issues workers face in the current crisis, investors can take action by signing on to an Investor Statement co-ordinated by the ICCR, which proposes companies take the following steps; paid leave available to all employees, enhanced health and safety protections, retention of workers, maintenance of supplier and customer relationships and financial prudence.

Sign on: <https://bit.ly/Investor-Covid-19>

Part 4
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FAIRR Pandemic Ranking



In this section, we present the results of the FAIRR Pandemic Ranking, created using data and insights from our 2019 Collier FAIRR Protein Producer Index. We aim to highlight how individual companies and the sector as a whole perform across ESG risks relevant to pandemics, in order to further inform company analysis and engagement.

The Pandemic Ranking evaluates the performance of companies across seven ESG risk factors and opportunity covered in the 2019 Index. These are:



Deforestation and biodiversity loss: Deforestation brings humans and livestock into contact with new wildlife and unknown viruses, increasing zoonotic risk.



Antibiotics: Antibiotic resistance is already responsible for 700,000 deaths worldwide, and is on track to become an endemic health crisis.



Waste and pollution: Insufficiently treated manure and wastewater harbours zoonotic diseases, infecting humans via workers, contaminated crops, and water.



Animal welfare: Close confinement and chronic stress for animals create ideal conditions for zoonotic diseases to mutate into more deadly strains and spread rapidly.



Working conditions: Crowded working conditions catalyse the spread of diseases and put the global food supply chain at risk. Workers who are inadequately trained or protected are also at risk of being 'patient zero' in the next outbreak.



Food safety: Strong food safety management practices are vital to biosecurity, preventing and monitoring the spread of diseases.



Sustainable proteins: Investment in alternative proteins, such as plant-based products, increases a supply chain's resilience to global shocks, and is itself less vulnerable to outbreaks.

FAIRR members can access further detailed insights from the Pandemic Ranking, including company specific data at our [website](#).

Methodology

The 2019 Index evaluates 60 livestock and aquaculture producers across 9 ESG risk and opportunity factors and 30 KPIs and is available at our [website](#). The original 2019 Index company rankings are based on two individual scores:

Average Risk Factor Score: A simple average of scores across the eight individual risk factors (GHGs; deforestation and biodiversity; water scarcity; water pollution; antibiotics; animal welfare; working conditions; food safety).

Opportunity Factor Score: This captures the company's performance on the opportunity factor of sustainable proteins. Growing exposure to alternative non-animal proteins reduces a company's exposure to risks.

Adjusting the 2019 Index to create a Pandemic Ranking

The Pandemic Ranking combines the six risk factors in the 2019 Index most relevant to the topic of pandemic risk, as listed left, and the opportunity factor of 'sustainable proteins' in the Pandemic Ranking as well. The Pandemic Ranking score is a simple average of the six risk factors and one opportunity factor relevant to pandemic risk.

Companies are assigned a risk category using the same methodology as the 2019 Index. Companies are placed into a risk category according to their overall score, which ranges between 0 (high risk) to 100 (best practice). An overall score between 0–30 represents 'high risk', between 31–60 is 'medium risk', 61–90 is 'low risk' and any scores above 90 are considered 'best practice'.



Results

Sector analysis

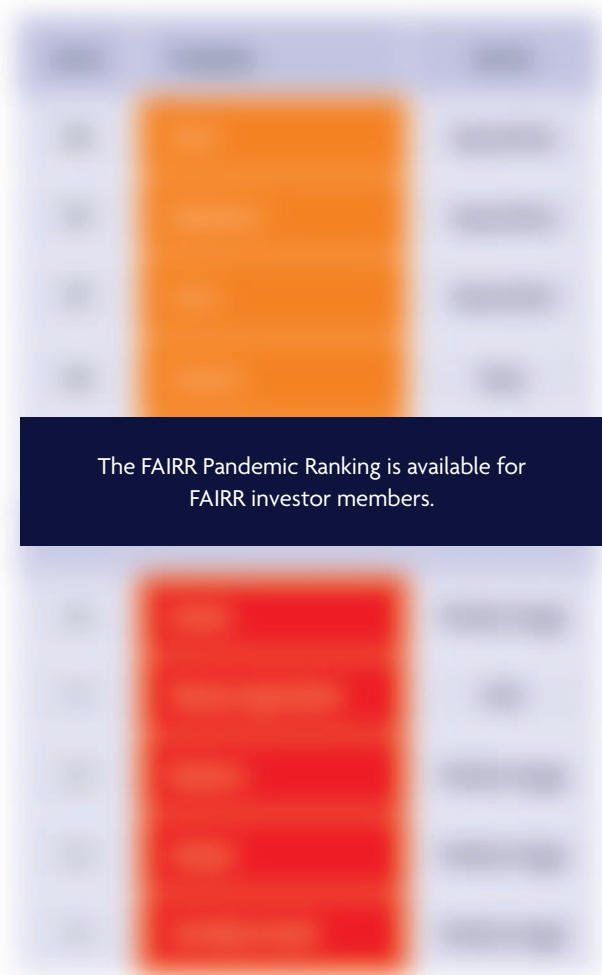
The Pandemic Ranking (Figure 8 below) ranks the 60 protein producers by their pandemic score and demonstrates that the vast majority of companies have yet to meaningfully address pandemic risk.

Forty-four (of 60) companies, valued at \$224 billion and with combined revenues of over \$207 billion, are deemed high risk (worst performers) by the Pandemic Ranking. The remaining sixteen companies are rated as medium risk and significantly, none of the companies considered are low risk.

We believe that the Pandemic Ranking can inform investor conversations with portfolio companies during and post COVID-19. The scores point to a clear lack of best practice across ESG risk factors, many of which will be critical to mitigating volatility and building resilience against possible future external shocks, such as the next pandemic.

Comparing the Pandemic Ranking against current reality, we see even the producers ranked favourably have found risk mitigation and response challenging in the COVID-19 crisis (see Figure 9 below). We believe this performance warrants further discussion with industry players and direct dialogue with companies.

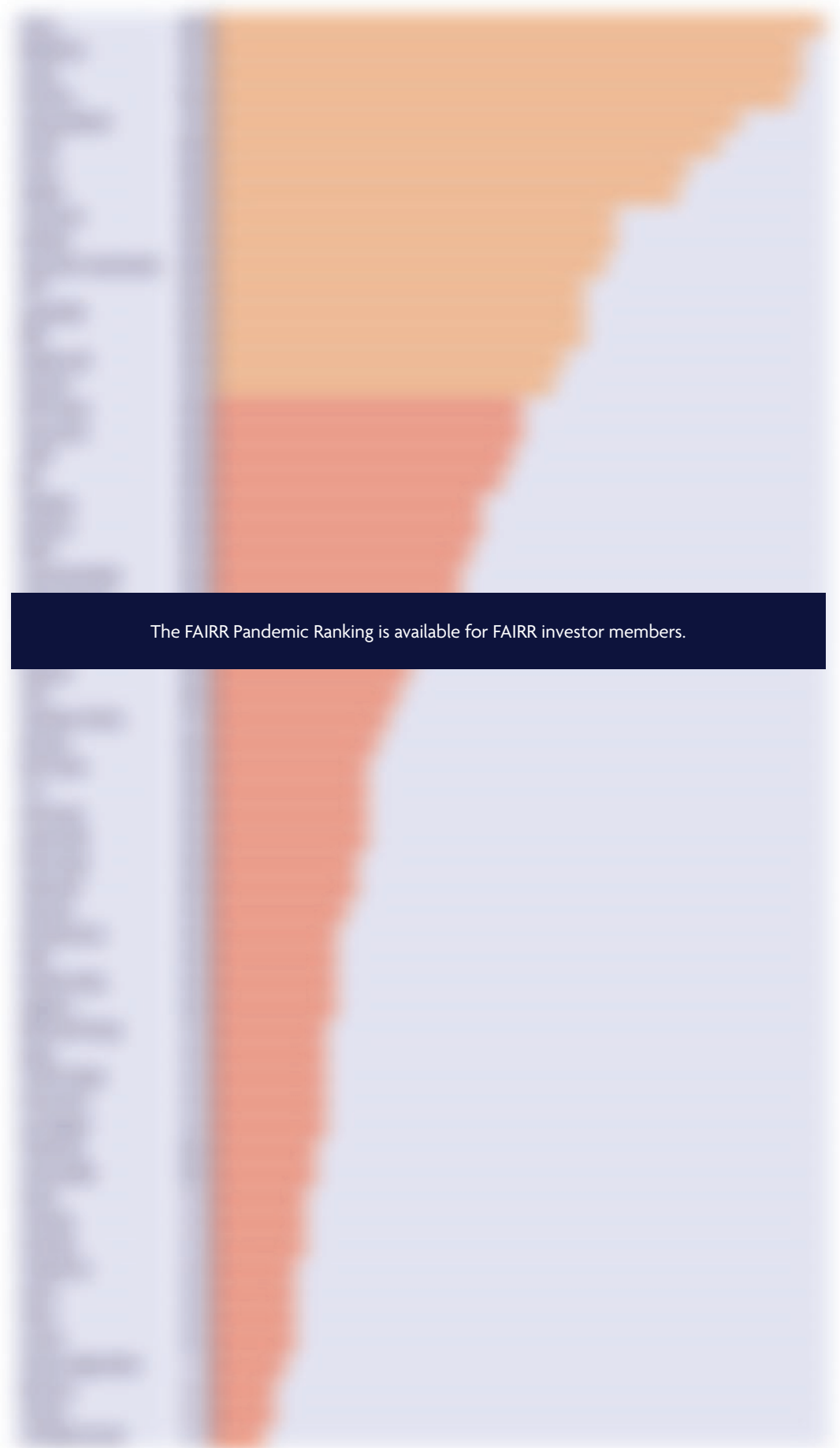
Thus far, the crisis has showed us the importance of seeking out clear signs of resilience in companies' business models and governance structures. Better disclosure across key ESG metrics has not guaranteed better performance. This is partly due to the backwards looking nature of ESG data. At times ESG data it is simply unsuitable to accurately capture risks materialising in real time. Therefore, we believe that this disconnect between our Index assessment score and the current market reality warrants further discussion with industry players and more direct dialogue with companies.



The FAIRR Pandemic Ranking is available for FAIRR investor members.

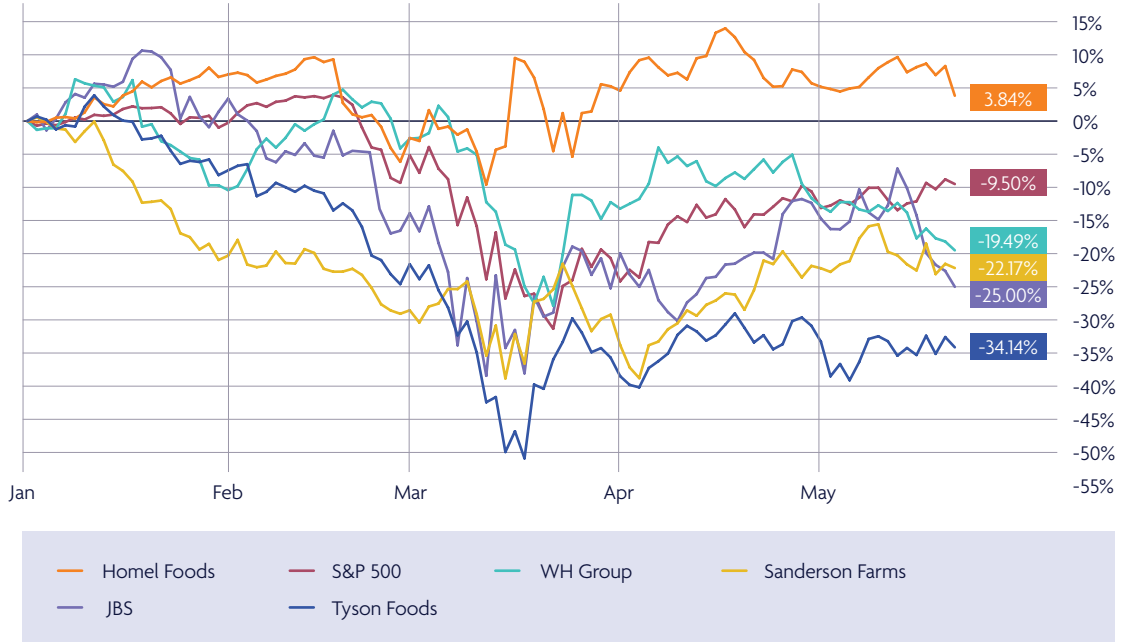
Pandemic Ranking

Figure 8
Company ranking by
pandemic score
(out of 100)



The FAIRR Pandemic Ranking is available for FAIRR investor members.

Figure 9
Company performance relative to S&P500, January 1 to May 26.



Snapshot: Protein perspective

As Figure 10 shows, the Pandemic Ranking covers six classifications of proteins: beef, poultry & eggs, pork, dairy, aquaculture and multiple (a combination of proteins). Taking an average of pandemic scores by protein category as depicted in Figure 10, we can see that the poultry and pork producer companies score lower compared to other protein sectors. This is due to lower scores across all risk factors, particularly working conditions and deforestation and biodiversity loss. Conversely, aquaculture companies scored significantly higher on average (lower risk) due to stronger performance across all risk factors considered, particularly low risk on antibiotic use, deforestation and biodiversity loss. The relative performance of protein sectors differs materially in the Pandemic Ranking when compared to the 2019 Index. This is due to the removal of GHG and water risk topics, both of which are high risk for many proteins.

It is worthy of note that zoonotic risks impact each protein differently depending on the source of the disease, the disease hosts, cross-species contaminations, production methods and the emergence of new variants – all of which affect how and to what extent new zoonotic diseases spread.

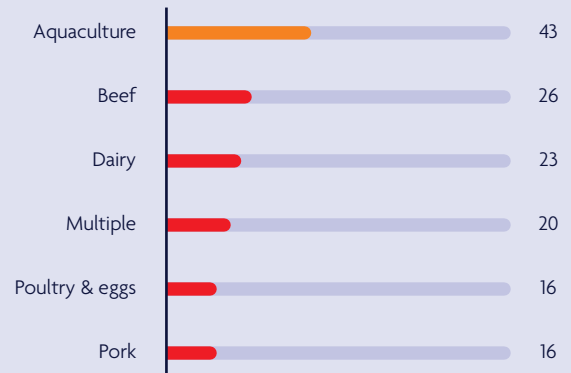


Figure 10
Average company score (out of 100) by main protein category

Snapshot: Regional perspective

Looking at pandemic scores by region, we find that on average, companies headquartered in Europe and Oceania scored the highest (with scores of 36/100 and 31/100 respectively), while Asian companies scored lowest (16/100). Companies in jurisdictions which encourage and/or mandate corporate disclosures and transparency such as Europe, score better on the Pandemic Ranking, given the assessment is based on data and information in the public domain. Asian-based companies tend to lag behind with respect to public disclosure and transparency.

Investors rely on good quality, robust data to conduct risk assessments to incorporate into their own portfolio analysis. Without access to critical information on companies' operational risk management, the evaluation and analysis of the industry's potential resilience will be challenging and may be discounted by the financial markets.

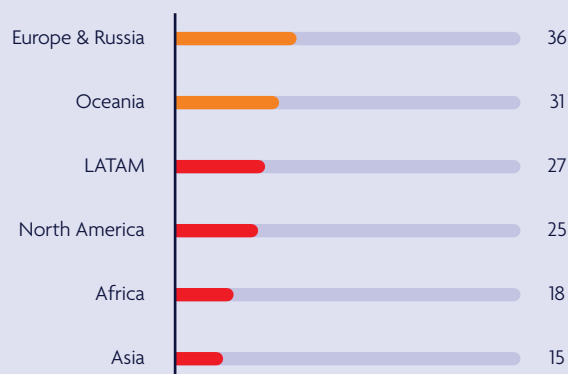


Figure 11
Average company score (out of 100)
by geographic region

Risk factor analysis

Table 1 depicts the risk classification of all 60 producers across each risk factor. Looking at food safety for example, we can see that 32 producers are rated as high risk, 20 are medium risk and 8 are low risk.

From the below chart, we can see that on average, companies score most poorly (higher risk) within waste and pollution, followed by animal welfare, deforestation and biodiversity loss, and antibiotics. Risk management in these areas is still fairly nascent in emerging markets, where many of the poorly scoring companies reside. The case for financial materiality has either been largely disregarded, or the consequences for non-compliance have been weak.

Although there has been an increase in corporate attention on these risks due to investor engagement and NGO advocacy, we are not yet seeing a large improvement in company disclosure. In the 2019 Index, companies scored relatively higher (lower risk) within animal welfare and food safety. These factors directly contribute to preserving the companies' core assets from farm to market. Therefore, adhering to more progressive standards in relation to disease prevention, control and proliferation directly contributes to a company's bottom line.



Performance by risk factor

Table 1

Company risk rating by ESG risk factor.

Number of companies classified as high, medium, or low risk	Insights & analysis
 <p>Deforestation & biodiversity loss</p> <p>46 5 9</p> 	<p>Despite growing investment from companies, there is a lack of progress on halting deforestation due to rapidly growing demand for soy and beef. 88% of Asian companies, which are the buyers of the majority of Brazil's soy exports, have no discussion on deforestation risks. This includes eight of the largest Chinese conglomerates, market leaders in pork production.</p>
 <p>Waste and pollution</p> <p>47 2 1</p> 	<p>Manure can be a nutrient, but the scale of production today makes it a pollutant. Excessive application of manure not only harms local ecosystems and water sources, it also leads to poor health outcomes for communities that live next to these facilities due to poor air quality and groundwater contamination. The average score for meat and dairy companies on managing water pollution was 13/100. 66% of all the companies demonstrate little to no awareness of the need to manage manure sustainably. Zero companies meet SASB's standards for the sector, which requires disclosure of the amount of manure generated.</p>
 <p>Antibiotics</p> <p>46 5 8 1</p> 	<p>Routine overuse of antibiotics in the intensive livestock sector contributes to bacterial resistance to antibiotics which reduces the efficacy of antibiotics in human medicine. The 60 companies in the ranking scored an average of 20/100 on their antibiotic risks response, indicating a continued lack of engagement on this important issue. Only four companies – Bakkafrost, GFPT, Lerøy Seafood, Marfrig Global Foods – have committed to ending routine use of all antibiotics in farm animals.</p>
 <p>Animal welfare</p> <p>42 14 4</p> 	<p>Animal welfare considerations include factors such as close-confinement and stocking densities – two important factors in the consideration of disease transmission. The Index assesses meat and dairy companies on the strength of their welfare commitments, the quality of external auditing and assurance and their performance on confinement. 38 companies are categorised as 'high risk', and 60% of meat and dairy companies do not report on any internal or external welfare auditing and 50% of fish farming companies do not mention animal welfare at all.</p>
 <p>Working conditions</p> <p>32 20 8</p> 	<p>Labour conditions in the livestock value chain are localised and market specific. In emerging markets such as Brazil and Thailand, slavery and human rights abuses are widely prevalent in meat and aquaculture sectors respectively. In the US, the predominant concerns are around worker health and safety: serious injuries that require days away from work (or work restrictions) are three times higher in the meatpacking industry than in other industries. Twenty companies in the Ranking are categorised as 'high risk' on safe working conditions, which includes whether staff receive health and safety training, adequate protective equipment, and a worker antimicrobial resistance policy.</p>
 <p>Food safety</p> <p>12 36 12</p> 	<p>Food safety is important not only to maintain integrity of food products and prevent foodborne illnesses, but it builds trust through the value chain. Food recall events can cause serious illness and market disruption. Insufficient biosecurity measures can contribute to the spread of deadly bacteria and viruses within the system. Only 12 companies in the Ranking are categorised as 'high risk' across food safety, and none as 'best practice'.</p>
 <p>Sustainable proteins</p> <p>45 15</p> 	<p>Animal protein producers are vulnerable to external shocks impacting their production and delivery to market. For meat, dairy and fish producers, diversifying to produce animal and alternative proteins presents an opportunity to mitigate risks while preparing for market and technological disruption. In the ranking, 25% of companies show evidence of movement to increase their access to and supply of more sustainable plant-based protein sources.</p>
<p> ■ High risk (0–30) ■ Medium risk (31–60) ■ Low risk (61–90) ■ Best practice (>90) ■ No information </p>	

Snapshot: Working Conditions

Of the six risk factors assessed, working conditions in the meat processing sector have been under intense scrutiny due to the quantity of COVID-19 infections, deaths amongst slaughter line staff, and impact on their wider communities.

As we have mentioned, our Working Conditions KPIs evaluate each company's publicly available policies and procedures on key working conditions practices. In Table 2, we highlight the five major US producers/processors which have been adversely affected by COVID-19 and their Pandemic Ranking and Working Conditions scores. In this

example, the relatively positive scores on working conditions do not reflect some of the companies' performance during this crisis time. Many of these firms have faced public criticism and investor pressure for failing to enforce social distancing or provide adequate personal protective equipment. We hope that investors will acknowledge this disconnect and engage with companies about the relationship and significance between public commitments to policies/standards on paper versus what is expected and demonstrated in practice, especially during times of current or potential crisis.

Table 2

Scores for five largest meat processing plants in the US as covered by the Coller FAIRR Index

The FAIRR Pandemic Ranking is available for FAIRR investor members.

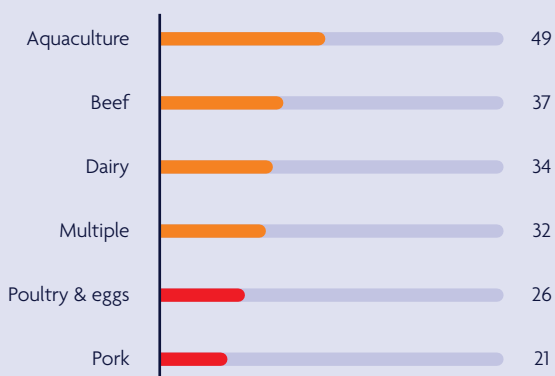


Figure 12
Average company working conditions score (out of 100) by main protein category

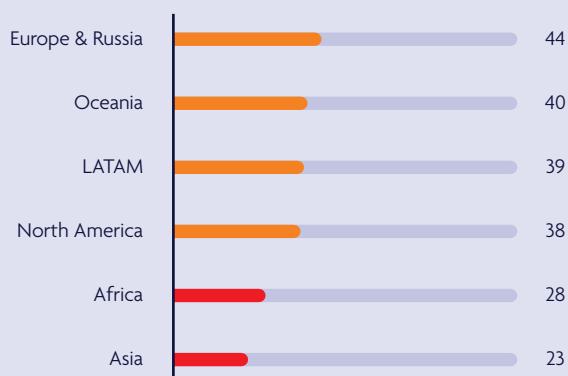


Figure 13
Average company working conditions score (out of 100) by region

Investor action



Deforestation & Biodiversity Loss – Cerrado Manifesto Statement of Support

Join over 100 global FMCG companies and 56 investors, to “commit to working with local and international stakeholders to halt deforestation and native vegetation loss in the Cerrado”. Sign on [here](#).



Antibiotics – Upcoming Animal Pharma Thematic Report

Later this year we will address antibiotics stewardship in animal pharma, looking at antimicrobials use throughout the supply chain, and how this impacts antimicrobial resistance.



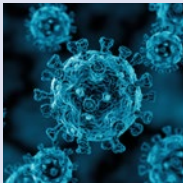
Antibiotics – Investor Year of Action on Antimicrobial Resistance

Join the FAIRR Initiative, the Access to Medicine Foundation, the Principles for Responsible Investment, and the UK Government to galvanise investor efforts to address global antimicrobial resistance. Subscribe/read more [here](#).



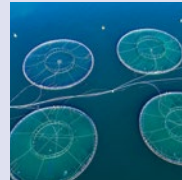
Climate and Water Scarcity – Global Investor Engagement on Meat Sourcing

Track phase 2 of the engagement, asking six quick-service restaurant brands to de-risk their meat and dairy supply chains by conducting climate risk scenario analysis, developing stronger supplier policies on climate and water, set science-based targets, and publicly report on progress. Read more [here](#).



Working Conditions – ICCR Investor Statement on Corporate Coronavirus Response

Join 322 institutional investors, calling on companies to do their part to support workers during the coronavirus crisis. Sign on [here](#).



Aquaculture – Upcoming Collaborative Engagement

FAIRR will be developing a new collaborative engagement to improve ESG disclosure and performance in the salmon aquaculture sector in late 2020. For more information please contact [Faazi Adam](#).



Sustainable Proteins – FAIRR Engagement

Track phase 4 of the engagement, asking 25 global food companies to diversify their protein sources to drive growth, increase profitability, reduce risk exposure, and improve their ability to compete and innovate in a resource-constrained world. Read more [here](#).

Appendix 1

FAIRR Pandemic Ranking – company scores

The below table details producers scores across the 7 Risk and Opportunity factors considered in the Pandemic Ranking. Scores range from 0 (high risk) to 100 (best practice). Further information, including detailed KPI scores and qualitative analysis is available for download for members at the [Pandemic Risk webpage](#).

Company Name	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7
Company A	85	90	75	80	95	88	70
Company B	70	85	65	75	80	90	60
Company C	90	95	85	90	100	92	80
Company D	60	75	55	65	70	85	50
Company E	80	85	70	75	85	90	75
Company F	75	80	65	70	80	85	65
Company G	95	100	90	95	100	98	85
Company H	65	70	55	60	65	75	55
Company I	85	90	75	80	90	95	80
Company J	70	75	60	65	75	80	60
Company K	90	95	85	90	100	92	80
Company L	60	65	50	55	60	70	50
Company M	80	85	70	75	85	90	75
Company N	75	80	65	70	80	85	65
Company O	95	100	90	95	100	98	85
Company P	65	70	55	60	65	75	55
Company Q	85	90	75	80	90	95	80
Company R	70	75	60	65	75	80	60
Company S	90	95	85	90	100	92	80
Company T	60	65	50	55	60	70	50
Company U	80	85	70	75	85	90	75
Company V	75	80	65	70	80	85	65
Company W	95	100	90	95	100	98	85
Company X	65	70	55	60	65	75	55
Company Y	85	90	75	80	90	95	80
Company Z	70	75	60	65	75	80	60

The FAIRR Pandemic Ranking is available for FAIRR investor members.

The FAIRR Pandemic Ranking is available for FAIRR investor members.

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