



MAPPING CORPORATE POWER IN BIG FOOD

FOOD BARONS 2022

Crisis Profiteering, Digitalization and Shifting Power

We are deeply grateful to Bread for the World, Misereor, the CS Fund, Wallace Global Fund, The AgroEcology Fund and Heinrich Böll Fundacion (Mexico and The Caribbean) for making this yearlong endeavour possible. This report draws on research supported by the Social Sciences and Humanities Research Council of Canada and Adasina Social Capital.

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References and footnotes: All links were live/working in July 2022.

20 September 2022



ETC Group is a small, international, research and action collective committed to social and environmental justice, human rights and the defence of just and ecological agri-food systems and the web of life. We focus on understanding and challenging corporate-controlled techno-industrial systems and exposing the dangers of the technological manipulation of life, especially in relation to climate justice and food security. We uphold peasant and indigenous ways of life and knowledge systems; food sovereignty; people's control of technology; and just economies and governance.

Food Barons 2022:

Crisis Profiteering, Digitalization and Shifting Power

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EXECUTIVE SUMMARY

ETC Group's 2022 update of corporate concentration offers a snapshot of the world's Food Barons – the biggest players up and down the industrial food and agriculture chain. We examine the leading corporations that control each of 11 key industrial “agrifood” sectors: seeds, agrochemicals, livestock genetics, synthetic fertilizers, farm machinery, animal pharmaceuticals, commodity traders, food processors, Big Meat, grocery retail and food delivery. Rankings are based on 2020 sales figures.

Our findings show that many agrifood sectors are now so “top heavy” they are controlled by just four to six dominant firms, enabling these companies to wield enormous influence over markets, agricultural research and policy-development, which undermines food sovereignty.

The year 2020 was a horrific year for food security and health—but a bonanza for Big Food and Big Ag. In the midst of a global pandemic—combined with climate shocks, supply chain gridlock, price spikes, increasing hunger, food and energy shortages, civil strife, racial violence and wars—these Food Barons made the most of the converging crises in order to tighten their grip on every link in the Industrial Food Chain. In doing so, they undermine the rights of peasants, smallholders, fishers and pastoralists to produce food for their own communities and many others. The Food Barons exploit workers, poison soil and water, diminish biodiversity, prevent climate justice and perpetuate a food system structured upon racial and economic injustice.

We identify seven key aspects of the global Industrial Food Chain, which we have conceptualized in terms of power: The Food Barons aim to hold on to, naturalize and expand their power, despite their many failings—failings that became especially obvious during the global pandemic.

We also bring attention to three critical, multi-sectoral trends that increase the ability of the Food Barons—Big Ag, together with Big Tech and Big Finance—to maintain control over the Industrial Food Chain. The first of these is the digitalization of food and agriculture across the chain. The second is the rising power of Asian (especially Chinese) Food Barons. The third is horizontal integration, including the increasing involvement of asset management companies in food and agriculture sectors— which creates the semblance of competition, but diminishes actual competition.

In contrast to the increasing concentration and power of the Food Barons it is important to remind ourselves who feeds the majority of the world: peasants. The Peasant Food Web feeds the equivalent of 70% of the world's people¹ using less than 30% of the world's land, water and agricultural resources. Proposals from the grassroots—such as the International Planning Committee for Food Sovereignty's Nyéléni Process²—aim to put farmers, growers, fishers, hunters and consumers back at the heart of the food system and undo the power being usurped by industrial agriculture.

As we confront climate change and its alarming consequences, we must recognize the voices, actions, solutions, and leadership of all peoples. The analysis in this report is based on understanding the relationship between racial justice and climate change and how extractive agriculture disproportionately impacts people of colour and Indigenous communities.³

It's time to divest from the Industrial Food Chain. Institutions under pressure from civil society have already succeeded in partly directing funds away from tobacco, arms and fossil fuels on moral grounds. Grassroots climate movements have successfully named fossil fuel companies as the obstruction to meaningful climate action. Food movements should follow suit: it is a logical next step to demand the elimination of all financial support to the Industrial Food Chain, exposing its high degree of transnational corporate control and its multiple abuses.

The participatory assessment of technologies based on precaution, as well as the development and support for the implementation of socially and ecologically useful technologies, should also be a top priority. In addition, anti-competition regulators must develop new mechanisms to understand and restrict the cross-chain powers of data giants and horizontal shareholders and require much greater transparency among private equity and other corporate actors.

This is a moment to see the Food Barons for what they are, to find their structural weaknesses and to take strategic collaborative action to take them on. This report provides some useful intelligence for food sovereignty movements and their allies in the battles ahead.

*Full research reports for each sector can be found here:
<https://www.etcgroup.org/content/food-barons-2022>*

INTRODUCTION

Power Failure: Covid-19 exposes Industrial Food Chain's inbuilt structural weaknesses

In 2020, as the Covid-19 pandemic unfolded, lockdowns, concentrated markets, logistics disruptions and the spreading health crisis combined to ramp up hunger and food insecurity, with nearly 12% of the global population – 928 million people – severely food insecure.⁴ Climate change grew more apocalyptic – wildfires in Australia; severe drought in the southern cone of Latin America; crippling floods and locust plagues in sub-Saharan Africa – and exacerbated acute hunger and misery.

Extreme volatility and staggering economic inequality have now become defining features of global food and agriculture markets, with asymmetrical impacts: even as global food insecurity, food prices and hunger soared, Big Food and Big Ag posted record breaking profits. At the same time, the Covid-19 pandemic brutally unmasked the extreme vulnerability of a highly centralized, industrialized food system that exploits workers and relies on “just-in-time” global supply chains that are non-transparent and susceptible to disruption and corruption. Corporate concentration is a fundamental driver of these and other failures – across every link of the Industrial Food Chain.

Power Surge: shoring up power and crisis profiteering

When a handful of giant companies are allowed to dominate in uncompetitive markets, with little regulatory oversight, they can and do use their market power to squeeze out competitors, raise prices, hijack the R&D agenda, monopolize technologies (even flawed and ineffective ones) and maximize profits.

Today, amid ever-increasing corporate concentration and anemic antitrust regulation, some of the world's largest companies are using pandemic-induced supply chain gridlock and inflation as an excuse to jack up prices: a practice known as “crisis profiteering.”

Merriam-Webster defines profiteering as “the act or activity of making an unreasonable profit on the sale of essential goods especially during times of emergency.”⁵

“Even as demand and profits rose post-vaccine, [executives] passed on most or all inflationary costs to customers via price increases, and some took the opportunity to add more on top.”¹¹

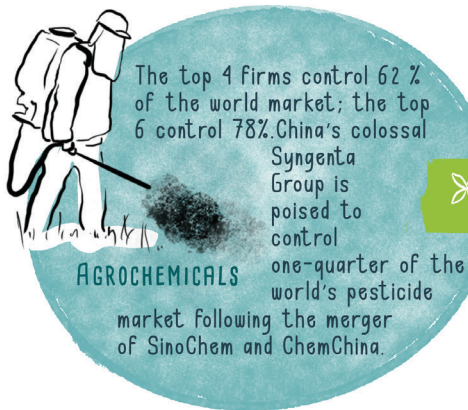
In 2020, most of the world’s largest food and agriculture giants saw sales and profits surge while almost a billion people went hungry and crops failed.⁶ In 2021, CNN reported that inflation was like a “gift” to the grocery sector, which “mark[s] up the full rate of inflation plus a little bit more.”⁷ But it’s not just the grocery sector: a wide range of sectors are taking advantage of the situation, benefiting from inflation, and sometimes even restricting supply to keep prices high, whilst blaming external circumstances such as the pandemic.⁸ A recent analysis of 100 U.S. corporations found a median increase in profits over the past two years of 49%.⁹ When it comes to food-price hikes in a crisis, it is difficult to discern what’s genuinely crisis-related and what’s rank profiteering. In other words, the problem isn’t just supply chain chaos or inflation; it’s corporate greed.¹⁰

From Top 10s to Top 4s

Our research reveals that, after decades of consolidation, many Industrial Food Chain sectors are so “top heavy” they are controlled by just four to six dominant firms. Economists typically consider a four-firm concentration ratio of 40% or higher reflective of a sector that operates as an oligopoly. Many of the sectors we monitor are already above that 40% threshold; others are on the verge of passing it.

“When you go from 15 to 10 companies, not much changes... When you go from 10 to six, a lot changes. But when you go from six to four – it’s a fix.”¹²

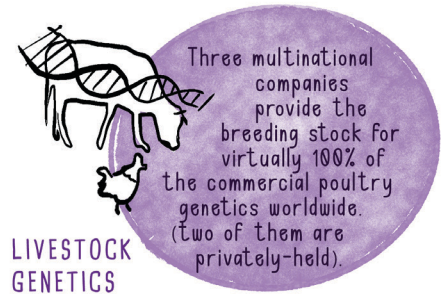
BASED ON 2020 SALES,
WE FIND EXTREME CONCENTRATION IN
THE FOLLOWING GLOBAL MARKETS:



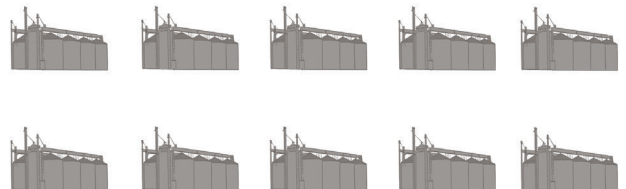
4 FIRMS
(SYNGENTA GROUP, BAYER, BASF, CORTEVA)
CONTROL HALF OF THE WORLD'S COMMERCIAL
SEEDS, AND 62% OF THE WORLD'S
PESTICIDE MARKET.



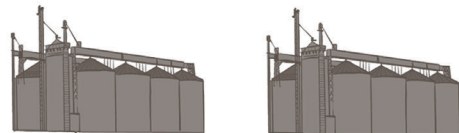
Four firms control 61% of the global animal pharmaceutical market; 6 firms control 72%. The largest company, Zoetis, holds 20% of the global market.



25 YEARS AGO WE REPORTED THAT THE TOP 10 SEED COMPANIES
CONTROLLED 40% OF THE GLOBAL COMMERCIAL SEED MARKET.



TODAY JUST TWO COMPANIES CONTROL 40% OF THE MARKET.



CHANGING CONCENTRATION IN THE SEED SECTOR

Power Play: Spinning false narratives

To sustain their market dominance, the Industrial Food Chain's big players actively work to deflect attention from their power grabs by promoting a distorted picture of global food and agricultural systems. This

was evident at the UN's controversial 2021 Food Systems Summit, where Big Food executives and their trade groups wrung their hands over a food system "broken" by climate change and pandemic; then they assured us they were the only ones who could fix it, with a ready-made agenda for "food system transformation".¹⁴

*"Those who have market power can raise prices above what's considered fair market value... We're at a point in our market concentrations that we haven't seen ever before."*¹³

Big Food consistently seeks to undermine the fact that the world's three billion indigenous and peasant producers – rural and urban, fishers and pastoralists – not only feed a majority of the world's people and most of the world's malnourished, but that they also create and conserve most of the world's biodiversity making indigenous and peasant producers humanity's best defence against climate change.¹⁵

Power Up: Techno-fixes to lock-in corporate control

The Food Barons are introducing a suite of new technologies and "techno-fixes" that are conceived and designed to entrench corporate control over food and agriculture even further. They have already wrested control of the agricultural research and development (R&D) agenda to suit their own interests, whilst continuing to concentrate power and influence trade, aid and agricultural policies to fuel their growth and profit.¹⁶

"Techno-fix" refers to the development of a technology product or intervention to address a social or environmental problem – often a problem created by an earlier technological failure.

Up and down the industrial food chain, the digitalization of food and agriculture emerges as the new techno-fix of the day. Our ongoing research reveals that every sector of the Industrial Food Chain is in the process of transforming into a digital enterprise. At the same time, Big Tech is becoming tightly entangled with industrial food production. Data extracted via digital technologies is now itself a commodity: The Industrial Food Chain relies on Big Data to grow, process, trade, track, sell and transport its products.

Digitalizing food and agriculture from farm to front door

The vista of new digital initiatives in food and ag is dizzying. On the farm, it includes concerted attempts to impose digital agriculture, weaving in drone sprayers, Artificial Intelligence-driven robotic planters and automated animal-feeding operations tricked out with facial recognition for livestock. Big Ag giants such as Bayer, Deere & Company, Corteva, Syngenta and Nutrien are restructuring their entire businesses around Big Data platforms. Bayer's 'Field View' digital platform, for example, extracts 87.5 billion datapoints from 180 million acres (78.2 million hectares) of farmland in 23 countries and funnels it into the cloud servers of Microsoft and Amazon.¹⁷ Deere, the world's largest farm machinery company, now employs more software engineers than mechanical engineers.¹⁸ On the route to retail, the global grain trading system is getting a digital overhaul as it becomes increasingly automated and products are tracked via blockchain. At the same time online grocery platforms and food delivery apps (such as DoorDash, Zomato and Deliveroo) surged during pandemic lockdowns and are growing into a whole new 'last mile'/ last link of the Industrial Food Chain.

Power Shifts: Big Food and Big Ag in China, Brazil, India and East Asia

In decades past, industrial agriculture was overwhelmingly dominated by corporations based in North America and Europe, and focused primarily on meeting market demand in those regions. Today, corporate players in the global South, especially China, Brazil and India are reordering the Industrial Food Chain, while adopting the same extractive model as their Northern counterparts.¹⁹ The pace and scale of China's hyper-industrializing agrifood system is without precedent. Chinese Food Barons are catering to colossal domestic as well as global markets: China's state-owned Syngenta Group is now the world's largest agrochemical input firm (seeds, pesticides, fertilizers); and China's newly consolidated COFCO is second only to Cargill as the world's largest agriculture commodity trader.

Power Trip: Asset managers and venture capitalists driving "financialization"

Recent decades have seen a massive increase in land grabbing and venture capital speculation in food and agriculture assets worldwide, with the latter trend exemplifying the "financialization" of the Industrial Food Chain. In this way the driving purpose of food systems moves ever further away from feeding people to feeding profits. More recently private equity and asset management firms are flocking to global food and agribusiness.²⁰ At the close of 2020, the private equity industry managed more than US\$7.5 trillion in capital,²¹ with increasing influence over the levers of corporate power in food and

agriculture. For example, just three of the world's largest asset management firms collectively control more than one quarter of all institutional shares of some leading agribusiness corporations.

Selected holdings of “Big Three” asset management firms – State Street, Vanguard, Blackrock – in publicly-traded companies in the AgriFood Chain

Food & Ag Company / Sector	% of Shares held by State Street Corp	% of Shares held by The Vanguard Group	% of Shares held by Blackrock, Inc.	% of Shares held collectively by the Big Three	% of Shares held by Institutions	Rank of Big Three out of all institutional shareholders
Food & Bev Processors						
Pepsico	4.23	7.41	8.87	20.51	73.93	Top 3
Tyson	4.99	12.75	7.39	25.13	87.40	Top 3
ADM	5.62	10.87	7.43	23.92	83.63	Among Top 5
Farm Machinery						
Deere & Co.	3.70	7.09	5.97	16.76	80.00	Among Top 5
Agrochemical / Seed						
Corteva	5.10	11.16	8.46	24.72	83.02	Top 3
Fertilizer						
Mosaic	4.82	11.49	8.15	24.46	91.46	Among Top 4
Grocery Retail						
Walmart	2.21	4.58	3.37	10.16	33.14	Top 3
Kroger	5.28	11.33	10.19	26.80	82.85	Among Top 4

Source: Yahoo Finance, <https://finance.yahoo.com/>
Date holdings reported: 30 March 2022

ETC Group first reported on the largely invisible practice of horizontal shareholding by giant institutional investors in 2019. “Horizontal shareholding” is the practice of owning assets in multiple corporations that are supposed to be competing with each other, but are unlikely to compete if they have common owners. A small number of giant investor firms, often asset managers, hold significant “horizontal shareholdings” – in and across many sectors of the Industrial Food Chain, creating interlocking oligopolies.

There is mounting evidence that horizontal shareholding in concentrated markets is promoting anti-competitive practices that fly below the radar of antitrust regulators.²² In the global grocery sector, for instance, market concentration is relatively low, and competition may appear healthy, but competition is illusory because the influence of horizontal shareholders is largely invisible.

The bottom line is that policymakers and antitrust regulators haven't developed the tools or the teeth to clamp down on 21st century oligopoly power – including the opaque power of financial actors such as private equity and asset management firms.

Hidden Power: Closing down information flows

Many of the Food Barons are relative unknowns, and that's because they are privately-held or state-owned companies. For example, the colossal firms that control agricultural commodity trading are among the most powerful and least-transparent companies. Three of the world's top-ranking ag commodity traders are privately held, and one is state-owned, and thus not obliged to publicly disclose information about their finances. The lack of transparency means that, in the absence of regulatory oversight, we can't fully track assets or determine corporate market share.

As corporate concentration increases, companies are becoming more guarded with their information. In a world where "market intelligence" is proprietary – accessible only to those who can pay for it – it is becoming much more difficult for civil society, social movements and even some governments to know the level of food-system control exercised by a handful of multinational enterprises. Access to such information is critical for democracy.

Even firms that are in the business of selling "corporate intelligence" are themselves consolidating and building steeper paywalls.²³

Notes

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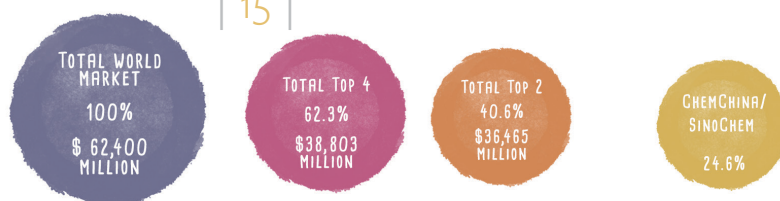
Agrochemicals & commercial seeds

– IN A NUTSHELL –



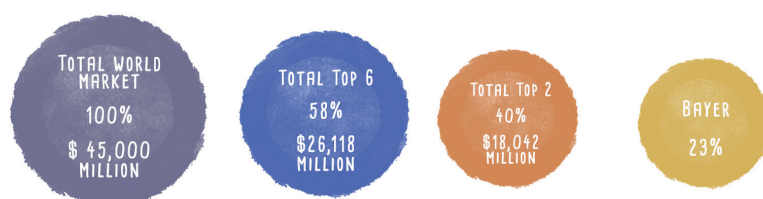
Agrochemicals/Pesticides: Companies in the agrochemical sector manufacture and sell pesticides used in agriculture. ETC Group uses the word “pesticide” as a synonym for “agrochemical.” The words “herbicide,” “insecticide” and “fungicide” refer to different types of agrochemical products (weed killers, insect killers and chemicals used to destroy fungus, respectively). In the wake of recent mega-mergers, at least five of the leading pesticide companies also dominate the world market for commercial seeds and traits. With the commercialisation of molecular biotechnologies in the mid-1990s (e.g., herbicide-tolerant genetically modified plants), the pesticide and seed sectors became inextricably linked. Today they are being further linked by Big Data strategies.

Commercial Seeds & Traits: The seed sector refers to crop seeds (primarily proprietary field crop and vegetable seeds) sold via the commercial market and genetically modified crop traits. However, ETC Group’s definition excludes farmer-saved seed and seed supplied by governments/public institutions. Despite the astonishing level of corporate concentration in the global commercial seed sector, the vast majority of the world’s farmers are self-provisioning in seeds, and farmer-controlled seed networks still account for an estimated 80-90% of seeds and planting material globally. Over the past 40 years, the world’s largest agrochemical firms have used intellectual property laws, mergers and acquisitions (M&As) and new technologies to take control of the commercial seed sector.



RANK	% MARKET SHARE	COMPANY (HEADQUARTERS)	AGROCHEM SALES \$US MILLIONS
1	24.6 %	CHEMCHINA + SINOCHEN (CHINA) PRO FORMA (SYNGENTA GROUP)	\$ 15,336
2	16.0 %	BAYER (GERMANY)	\$ 9,976
3	11.3 %	BASF (GERMANY)	\$ 7,030
4	10.4 %	CORTEVA (USA)	\$ 6,461
5	7.9 %	UPL (INDIA)	\$ 4,900
6	7.4 %	FMC (USA)	\$ 4,642
7	6.4 %	SUMITOMO CHEMICALS (JAPAN)	\$ 4,010
8	5.6 %	NUFARM (AUSTRALIA)	\$ 3,491
9	2.3 %	JIANGSU YANGNONG CHEMICAL Co., LTD. (CHINA)	\$ 1,413
10	1.7 %	SHANDONG WEIFANG RAINBOW CHEMICALS Co., LTD. (CHINA)	\$ 1,048

LEADING COMPANIES BY AGROCHEMICAL SALES, 2020



RANK	% MARKET SHARE	COMPANY (HEADQUARTERS)	SEEDS & TRAIT SALES \$US MILLIONS
1	23 %	BAYER (GERMANY)	\$ 10,286
2	17 %	CORTEVA AGRISCIENCE (USA)	\$ 7,756
3	7 %	CHEMCHINA/ SYNGENTA (CHINA)	\$ 3,193
4	4 %	BASF (GERMANY)	\$ 1,705
5	4 %	GROUPE LIMAGRAIN/ VILMORIN & CIE (FRANCE)	\$ 1,684
6	3 %	KWS (GERMANY)	\$ 1,494
7	3 %	DLF SEEDS (DENMARK)	\$ 1,153
8	1.0 %	SAKATA SEEDS (JAPAN)	\$ 648
9	1.0 %	KANEKO SEEDS (JAPAN)	\$ 570

LEADING COMPANIES BY SEEDS & TRAIT SALES, 2020

Right now pesticides and commercial seeds are no longer distinct links of the industrial food chain. However, ETC Group continues to provide corporate rankings and market share for seeds and agrochemicals as *separate* sectors, even though focusing primarily on seeds is a rarity among the leading companies - Vilmorin (#5) and KWS (#6) are exceptions.

Highlights from the full reports:

The colossal SinoChem and ChemChina merger creates not only the world's largest chemical conglomerate, but also the leading industrial farm input business (seeds, pesticides and fertilisers) – all under the umbrella of the newly formed Syngenta Group.

Over the past 25 years, as patents on blockbuster agrochemicals began to expire, generic pesticide manufacturers, especially in China and India, have created huge markets by churning out cheaper formulations of post-patent products. With the explosive growth of generic pesticides, agriculture has become even more dependent on toxic agrochemicals, especially in the global South.

The world's largest agrochemical/seed firms have fortified their market control via consolidation and mega-mergers. Now they are feverishly investing in high-tech and digital technologies to further expand their already-solid oligopoly. That's why the world's biggest data companies – Apple, Alibaba, Amazon, IBM, Google, Baidu and Microsoft, among others – are now tightly entangled with industrial food production.

Big Ag companies seek to profit, not just from the sale of traditional inputs, but also from the sale of digital tools and app subscriptions and data-driven farm management services – while collecting valuable on-farm data.

The reach of digital food and ag is rapidly expanding to peasant and small-holder agriculture in the global South. Digital technologies offer new forms of control and value extraction that threaten to further usurp farmer autonomy and decision making while facilitating a new era of land grabbing.

Under the umbrella of digital ag services, carbon credit schemes for farmers have proliferated in the last half-decade, particularly in Europe and the US.

Chew on this

Agrochemical/seed giants are looking to fortify their oligopoly power with the rollout of novel, proprietary genetic technologies. Our report examines: 1) Gene editing and 2) RNA-based pesticide sprays.

The ag biotech industry is scrambling to win monopoly patents on gene-editing tools like CRISPR. Recent studies indicate that, far from being “precise and predictable,” genome edits may often result in unwanted changes and unpredictable outcomes.

RNAi is biotech’s newest techno-fix for agriculture. Despite major gaps in knowledge about the environmental, health and safety impacts, RNAi-based insecticidal sprays are already being field tested in the US.

Synthetic fertilizers

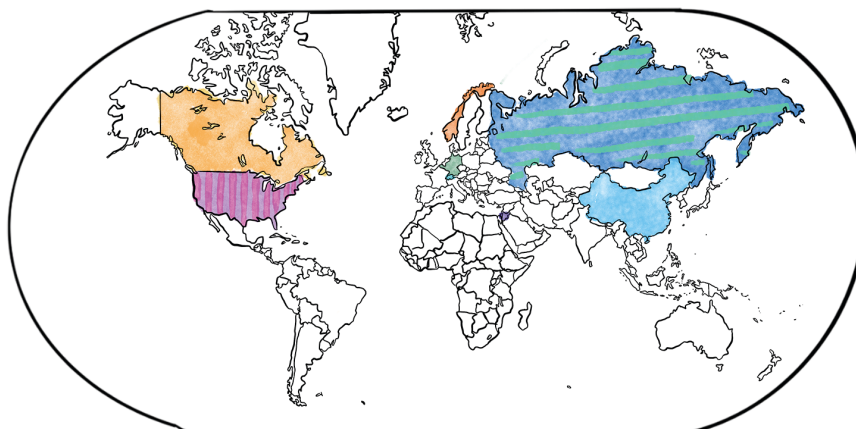
– IN A NUTSHELL –



Synthetic Fertilizer companies sell inorganic plant nutrients manufactured via chemical processes. The three main macronutrients used in agriculture are nitrogen (N), phosphorous (P) and potassium (K). Nitrogen is the most frequently applied nutrient, mostly in the form of urea derived from ammonia produced from petrochemicals via an energy-intensive process. Next is phosphorus in the form of phosphates and then potassium via potash.

The global fertilizer industry is fragmented but has historically operated in export cartels organised by fertilizer type (sometimes government-sanctioned and involving state-owned companies). State ownership and/or investment in fertilizer production and trade is still common. Currently, fertilizer companies are expanding to include so-called specialty fertilizers (e.g., containing micro-nutrients and/or microbe-based formulations) and also digital agriculture.





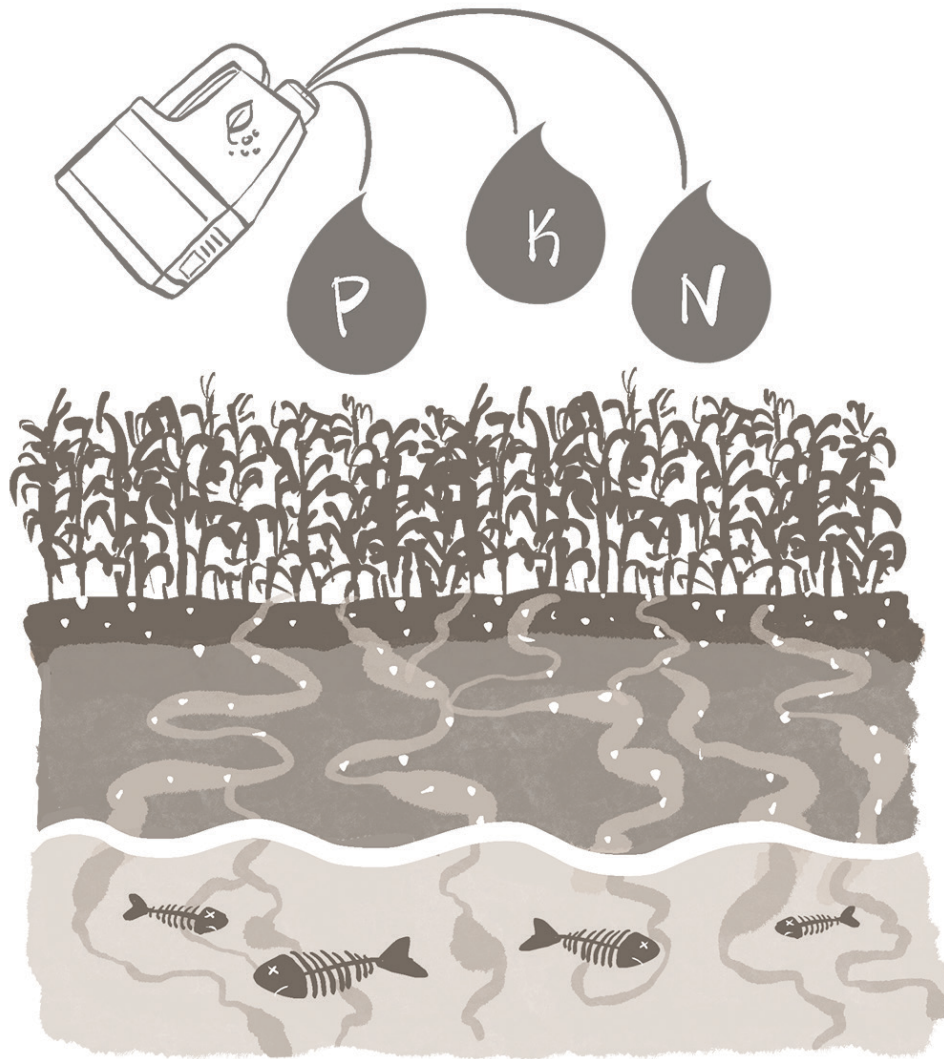
RANK	COMPANY (HEADQUARTERS)	FERTILIZER REVENUE \$US MILLIONS
1	NUTRIEN (CANADA)	\$ 9,484
2	YARA (NORWAY)	\$ 9,423
3	THE MOSAIC COMPANY (USA)	\$ 8,014
4	CF INDUSTRIES HOLDINGS, INC. (USA)	\$ 4,124
5	ICL GROUP LTD. (ISRAEL)	\$ 3,769
6	PHOSAGRO (RUSSIA)	\$ 3,351
7	SINOFERT (CHINA)	\$ 3,099
8	EUROCHEM (SWITZERLAND, NOMINALLY)	\$ 2,945
9	URALKALI (RUSSIA)	\$ 2,387
10	K+S GROUP (GERMANY)	\$ 1,940

SYNTHETIC FERTILIZER SALES OF THE LEADING COMPANIES, 2020

Highlights from the full report:

Concentration in the global fertilizer industry is difficult to quantify as it overlaps related industries such as mining, shipping and industrial chemical production. The industry also has a history of collusive behaviour. Fertilizer producers are central to their local economies and because they are often intertwined with national governments, geopolitics can play a significant role in trade. For example:

- The Chinese state-owned enterprise Sinochem controls Sinofert, China's biggest fertilizer company. China is one of the world's biggest fertilizer producers, with 31% global share of urea and 42% of Diammonium Phosphate (DAP) capacity.
- Morocco controls 72% of global phosphate reserves (including phosphate rock it mines from occupied Western Sahara) and owns OCP, a major phosphate fertilizer producer and Morocco's largest company.



- Norway owns more than 40% of Yara.
- Just four countries (Canada, Russia, Belarus, China) produce about 80% of the world's traded potash.
- The Eastern European fertilizer manufacturers (PhosAgro, Uralkali and EuroChem) are largely controlled by a cadre of oligarchs.

In 2021, prices of some synthetic fertilizers rose to their highest level since the food-price crisis of 2008. This hurt farmers and caused food prices to skyrocket again.

Chew on this

After decades of destroying soil health and polluting the atmosphere and waterways, fertilizer manufacturers are now devising ways to monetize the climate crisis and demonstrate their contributions to “clean and green” solutions. This means focusing on new fertilizer offerings – such as organic farming, microbe-based products, digital agriculture and alternative methods of ammonia production (e.g., “green” and “blue” ammonia, for nitrogen fertilizer manufacturing).

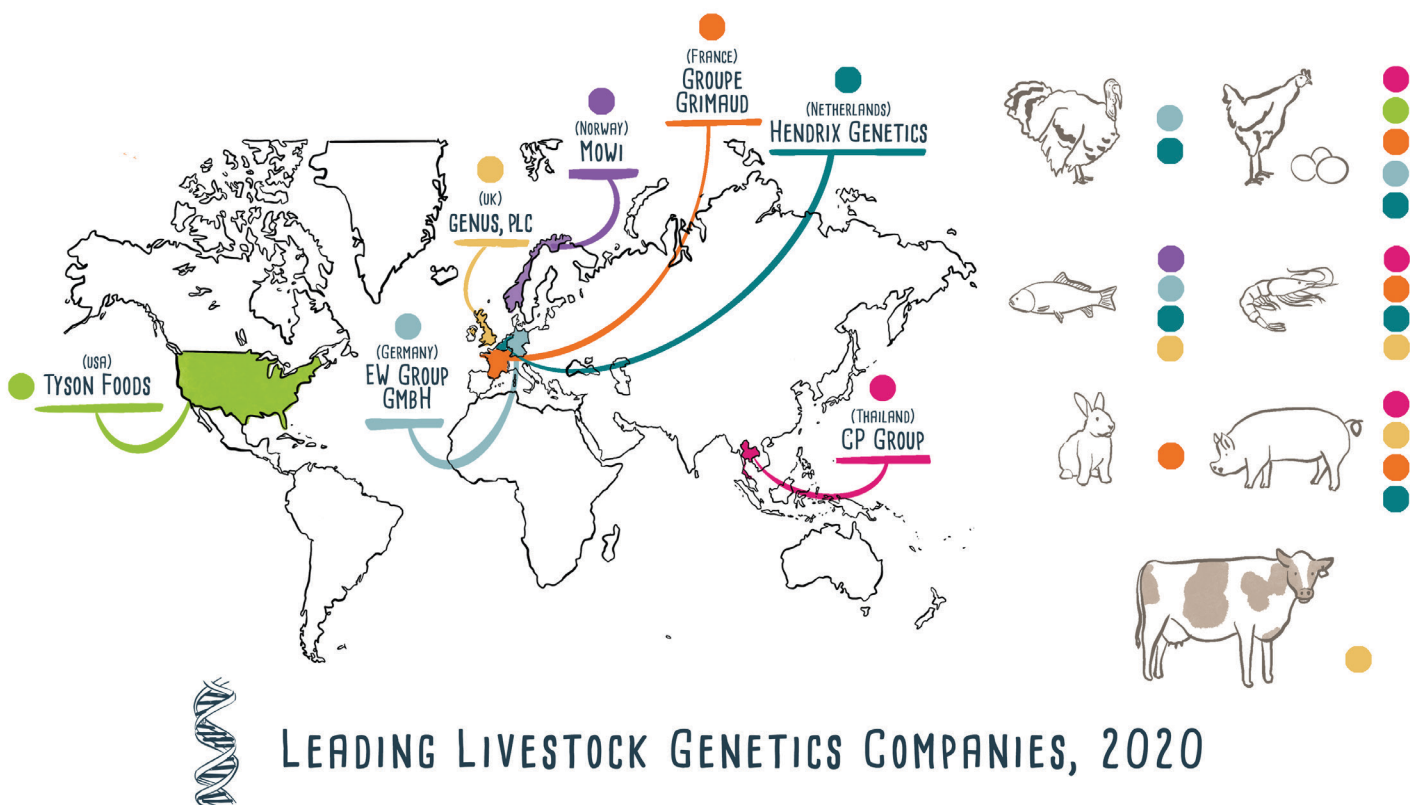
Digital-ag proponents claim that app-based tools can provide precise, field-specific (or even plant-specific) fertilizer-dosage recommendations that will reduce overall waste and protect the environment. The same tools give these companies access to massive amounts of data on profitable and unprofitable farmland, information about on-farm practices, as well as evidence of farmers’ compliance (or noncompliance) with technology user agreements.

Using microbes to deliver nutrients and to protect from plant-pests is increasingly seen as a green alternative/supplement to synthetic fertilizers and agrochemicals. However, microbial products are largely unregulated and raise biosafety questions.

Livestock genetics – IN A NUTSHELL –



The **Livestock Breeding** or **Livestock Genetics** sector focuses on breeding material (e.g., live animals, semen, embryos) and reproductive technologies for industrial production. The dominant species include chickens, turkeys, pigs, cattle, and high-value farmed fish and seafood (salmon, tilapia, trout and shrimp). The industry typically selects for genetic traits to maximize production (i.e., rapid growth and high yields) and to facilitate production, processing and transport of uniform animal protein products on a massive scale. Industrial breeds can't survive without high-protein feeds, expensive medications and climate-controlled housing. This report focuses on three sub-sectors of industrial livestock genetics – poultry, swine and aquaculture.



Highlights from the full report:

The value of the livestock genetics sector is relatively tiny (at less than one-fifth the size of the global seed industry), but its proprietary genetic stock underpins a massive animal protein industry that has far-reaching impacts on greenhouse gas emissions, the environment, animal welfare and more.

The widespread adoption of industrial livestock genetics is the primary driver of the loss of farm animal genetic diversity worldwide.

Globally, just three companies control the vast majority of poultry genetics, making it the most concentrated sector in the industrial food chain. Entire continents and many countries depend on just two industrial breeders to provide the genetic stock for the world's chicken broiler industry.

Before the turn of this century, China was home to more pig diversity than any other country (with 72 breeds). By 2005, more than two-thirds of China's pigs (74%) were raised in industrial systems that rely on just one hybrid breed.

From 2018 to 2020, the deadly African Swine Fever virus wiped out up to 60% of China's pig herd. At a cost of some US\$60 billion, China responded to the crisis by importing pig meat for domestic consumption and replacing industrial breeding stock. Thousands of sows and boars were airlifted into China via private charter jets. In 2020, China opened the world's largest industrial pig farm, housing 84,000 sows with capacity for two million pigs a year.

Industrial livestock breeders, as well as private equity investors, are flocking to fish farming and genetics because aquaculture is booming worldwide; and the potential to apply genetic selection and genomics to high-value species is relatively untapped.

Similar to land-based factory farms, industrial salmon operations have become massive breeding grounds for environmental pollution, diseases and parasites.

Chew on this

Regrettably – following-on from the Terminator seed technology (a.k.a. suicide seeds) – researchers in Norway are using gene-editing to develop salmon that are engineered to be sterile. The aim is to prevent escapees from interbreeding with wild salmon, but it is also to protect proprietary fish stock. However, the prospect of commercialising gene-edited salmon with engineered sterility genes is a potential nightmare because engineered sterility is reversible and cannot function as a reliable biocontainment tool.

Machinery

for big ag

– IN A NUTSHELL –



MACHINERY FOR BIG AG refers to manufactured equipment used for agriculture. This includes tractors, haying and harvesting machinery as well as equipment used for planting, fertilizing, ploughing, cultivating, irrigating and spraying. Now the world's largest farm equipment companies are gearing up to control digital ag technologies and farm data as their number one strategy for expanding market share. Digitalized agriculture implies other machinery used on the farm, including drones, sensors and devices that run apps, as well as internet connectivity.



SALES OF THE LEADING FARM MACHINERY COMPANIES, 2020

Highlights from the full report:

In the US just three companies – Deere, CNH and AGCO – account for more than 90% of high-horsepower tractor sales. In India, Mahindra & Mahindra controls more than 40% of the country’s farm equipment market.

Digitalization is driving the growth strategies of all major farm machinery companies. IHS Markit estimates that the global digital farming market was worth US\$5-7 billion in 2020 – less than 5% of the total farm equipment market – but it is forecast to increase to US\$15 billion by 2027. Ag machinery companies claim that precision agriculture is the key to productivity, sustainability and climate resilience. Multiple software companies sell programs that analyse agricultural data to provide input recommendations to farmers.

Lockdowns and restriction on cross-border movement during the pandemic led to farm labour shortages, which turbo-charged the sector’s move towards automation. Contrary to companies’ claims, the push to automate threatens to amplify farmworker exploitation.

Some Big Ag companies, many national governments, and philanthro-capitalists have embraced the drive to digitalize the global South and peasant agriculture. This ability to “harvest new data sources” from peasant farmers looks set to amplify the global land grab.

Deere has argued that when a farmer buys one of the company’s tractors, they receive a “license to operate the vehicle” but they are not the owner of the equipment or the embedded software, or the data it generates. “Right to Repair” movements across the world are fighting to ensure that farmers can control the equipment they’ve bought.

Chew on this

Rising partnerships between the big agrochemical/seed companies and farm equipment manufacturers involve the sale or exchange of data, which are analysed in order to deliver prescriptions to the farmer. Ultimately these will lead to usurping farmer autonomy and decision making and create technology lock-ins.

Big Tech is getting entangled in digital agriculture by providing cloud services to Big Ag companies for data storage and processing for their digital ag platforms and internet connectivity. Telecom companies are also championing the role of 5G in the future of farming. China, with more than 500 million 5G users, has the world’s largest 5G network and is promoting “smart farms” running on the 5G network.

Animal pharma

- IN A NUTSHELL -



Animal Pharma is also known as the animal health industry. The industry sells commercial products for livestock productivity/health and companion animal (pet) health, including medicines and vaccines, diagnostics, medical devices, nutritional supplements, veterinary and other related services. This sector does not include livestock feed and pet food products (although in some cases it may include medicated feed additives).



LEADING COMPANIES BY ANIMAL PHARMACEUTICAL SALES, 2020

Highlights from the full report:

Globally, the animal pharma industry derives an estimated 59% of its market from the food animal sector and 41% from companion animal products/services. The “humanisation of pets” is driving the largest share of growth in the animal pharma industry.

The global market for the animal pharma industry was almost US\$34 billion in 2020, but US pet owners alone spent nearly three times that amount – a record US\$104 billion – on pet-related expenses in 2020. In China, pet ownership increased by 300% from 2013 to 2019, and the pet economy shot up 400% during the same period. That’s why the animal pharmaceutical industry is rapidly diversifying beyond its traditional boundaries of drugs and medical vet services.

Chew on this

Mars, Inc., the world’s sixth largest Food & Beverage processor, now makes more revenue from pet food and veterinary clinics/hospitals than it does from its chocolate candy bars and human food products.

Big data and digital services are the targets of recent mergers and acquisitions. A suite of proprietary, high-tech, digital tools that analyse and diagnose animal health, as well as technologies to remotely monitor, identify and track industrial livestock, are rapidly consolidating in the claws of Animal Pharma giants.



Agricultural commodity trading – IN A NUTSHELL –



TOP 10 COMMODITY TRADERS



TOP 10 COMMODITY TRADERS
\$528,307 MILLION

GLOBAL MARKETS



SEEDS
\$45,000 MILLION



SYNTHETIC FERTILIZER
\$127,570 MILLION



AG MACHINERY
\$127,800 MILLION

Agricultural Commodity Traders are diversified firms that produce, procure, process, transport, finance and trade grains, food, fibre, meat, livestock, sugar, etc. on a global scale. They are involved in all phases of production and trade, from origination to processing, marketing, financial instruments, risk management and distribution.

The total value of global agricultural commodity markets is difficult to estimate because much of the information is proprietary and supply chains are opaque.

RANK	COMPANY (HEADQUARTERS)	2020 SALES US\$ MILLION
1	CARGILL (USA) PRIVATE	\$ 134,000
2	COFCO CORP (CHINA) STATE-OWNED	\$ 105,000 PRO FORMA
3	ARCHER DANIELS MIDLAND (ADM) (USA) PUBLIC	\$ 64,000
4	WILMAR (SINGAPORE) PUBLIC	\$ 50,530
5	BUNGE (USA) PUBLIC	\$ 41,400
6	ITOCHU (JAPAN) PUBLIC	\$ 35,908
7	LOUIS DREYFUS (NETHERLANDS) PRIVATE	\$ 33,600
8	VITERRA GROUP (NETHERLANDS) PRIVATE	\$ 28,114
9	OLAM INTERNATIONAL (SINGAPORE) PUBLIC	\$ 24,701
10	CONAGRA (USA) PUBLIC	\$ 11,054

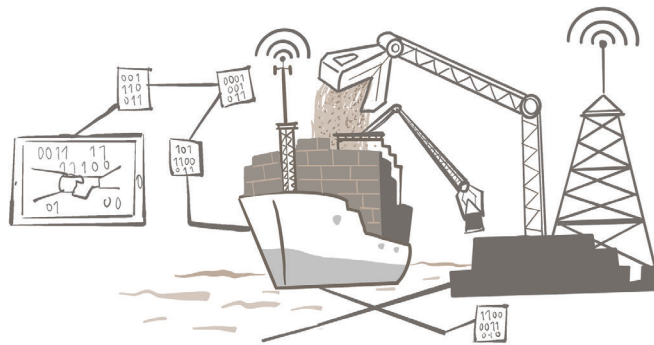
AGRICULTURAL COMMODITY TRADERS

Highlights from the full report:

Together, the leading global food & ag commodity traders piled up more than one-half trillion dollars in 2020 revenues. Global trade in all agricultural products reached an estimated US\$1.33 trillion in 2019. The top ten ag commodity traders account for at least 40% of the global market.

The colossal firms that control global commodity trading are among the most powerful and least-transparent companies in the industrial food chain. Three of the world's top-ranking ag commodity traders are privately held, and one is state-owned.

The plan to merge China's COFCO Corp with its international trading division, COFCO International, creates a behemoth that will be second only to Cargill in global agricultural commodity sales, approaching over US\$100 billion in revenue per annum.



Chew on this

In 2020, the sale of 45% of one of the world's largest commodity firms, Louis Dreyfus, to a state-owned holding company in the oil-rich United Arab Emirates signals that cash-rich countries are positioning to climate-proof food security via offshore food production with little consideration for sustainability or the notion of regional food self-reliance.

In March 2021 six of the world's largest ag commodity firms joined forces to launch a private blockchain (digital ledger system) called Covantis that aims to digitize and automate global agricultural shipping transactions. Legal experts point out that, in oligopolistic markets, private blockchain technology could be used to engage in anticompetitive practices.

Big meat & protein – IN A NUTSHELL –



Big Meat/Protein The corporate meatpacking industry involves the slaughtering, processing, packaging and distribution of animal protein from cows, pigs, sheep, chickens, fish and other livestock. Increasingly, the industrial meat sector is also linked to the production of “alternative proteins” – i.e., high protein foods processed from plants, insects, fungi, or via cell-culture or fermentation (synthetic biology) techniques – aimed at replacing or co-existing with conventional animal- and fish-based proteins on the market.

RANK	COMPANY (HEADQUARTERS)	2020 FOOD SALES, US\$ MILLIONS	2019 FOOD SALES, US\$ MILLIONS
1	JBS (BRAZIL)	\$ 50,690	\$ 48,795 (DEC. 2019)
2	TYSON FOODS (USA)	\$ 43,185	\$ 42,405 (DEC. 2019)
3	CARGILL (USA)	\$ 32,375	\$ 31,700 (MAY 2019)
4	SMITHFIELD FOODS / WH GROUP (CHINA)	\$ 24,463	\$ 23,346 (DEC. 2019)
5	MARFRIG (BRAZIL)	\$ 13,107	\$ 12,658 (DEC. 2019)
6	NH FOODS (JAPAN)	\$ 10,655	\$ 10,878 (MAR. 2020)
7	HORMEL FOODS GROUP (USA)	\$ 9,608	\$ 9,497 (OCT. 2019)
8	DANISH CROWN (NETHERLANDS)	\$ 9,294	\$ 8,472 (SEP. 2019)
9	BRF (BRAZIL)	\$ 7,664	\$ 8,490 (DEC. 2019)
10	VION (NETHERLANDS)	\$ 5,588	\$ 5,629 (DEC. 2019)

WORLD'S LEADING MEAT COMPANIES, 2020

Highlights from the full report:

Big Meat is still a dirty business. Instances of contamination (e.g., pathogens in meat products, groundwater contamination), corruption and worker illness, injury and death persist. Drought in North America, avian flu outbreaks across the globe, African Swine Fever in Asia, slaughterhouse backlogs, and a high-profile ransomware hack are just some of the sector's recent challenges.

Despite the pandemic, the biggest meat-exporting countries – Brazil, USA, Canada, Russia, the European Union countries and Mexico – shipped more meat in 2020 than they had in 2019.



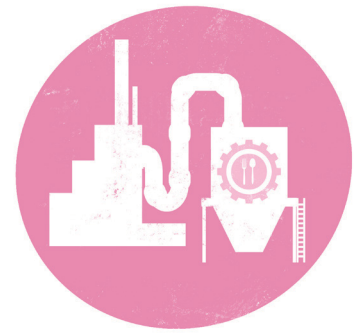
Chew on this

Big Meat companies are generally open to the growing global interest in plant-based and other alternative proteins: if there is money to be made, they're in. Each of the top 10 meat companies has its own line of alternative protein products, and they are optimistic that alt-protein investment could contribute to "net zero" climate credibility and provide an additional revenue stream.

But the explosion of alt-protein products on the market isn't making a dent in the demand for animal protein, which means the environmental, health and climate costs of plentiful and cheap industrial meat aren't going away. FAO predicts global consumption of animal protein will continue to increase, estimating 14% growth by 2030.

Food & beverage processing

– IN A NUTSHELL –



The **Food & Beverage Processing** industry focuses on the post-harvest processing of raw agricultural commodities into consumer products – both foodstuffs and feedstuffs for human and animal consumption.



RANK	COMPANY (HEADQUARTERS)	F&B SALES, 2020 US\$ MILLIONS
1	PEPSICO (USA)	\$ 70,372
2	NESTLÉ (SWITZERLAND)	\$ 67,708
3	JBS (BRAZIL)	\$ 50,690
4	ANHEUSER-BUSCH INBEV (BELGIUM)	\$ 46,881
5	TYSON FOODS (USA)	\$ 43,185
6	MARS (USA)	\$ 37,000
7	ARCHER DANIELS MIDLAND Co (USA)	\$ 35,395
8	THE COCA-COLA Co (USA)	\$ 34,300
9	CARGILL (USA)	\$ 32,375
10	DANONE (FRANCE)	\$ 26,927

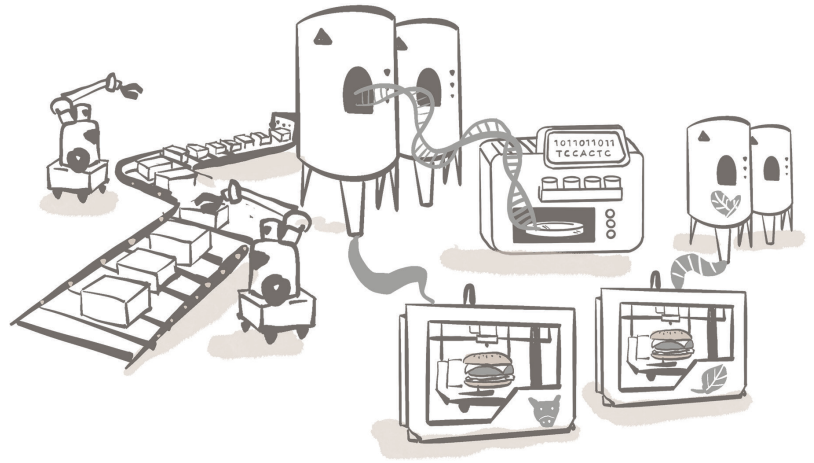
LEADING COMPANIES BY FOOD & BEVERAGE (F&B) SALES, 2020

Highlights from the full report:

The global pandemic hasn't diminished the Food & Beverage sector's appetite for mergers and acquisitions. 2020 saw a 36% increase in the number of these M&A deals – totaling US\$110 billion.

Big Food is no longer content to see its big brands sit passively on the grocer's shelf. Now these Food & Beverage giants are investing in digital tech and mining customer data to nudge sales.

In hot pursuit of “green haloes,” industrial food giants are rolling out ambitious sustainability pledges to “decarbonise” their business models in myriad ways – from embracing “regenerative agriculture” and “carbon-footprint” product labels, to genetic tinkering and geo-engineering.



Chew on this

Lofty pledges to slash greenhouse gas emissions often exclude supply chains and consumer waste, and involve murky accounting. A 2021 list of the world's top 10 corporate plastic polluters includes six companies that are also on our list of the top 15 largest Food & Beverage firms.

Nestlé is forging direct links to consumers by expanding its portfolios in “dietary management” and “personalised nutrition.” Acquisitions of a peanut-allergy treatment maker and a “healthy” meal delivery company are two recent efforts.

JBS, which pledged to invest US\$100 million by 2030 in so-called “regenerative farming,” including carbon sequestration and on-farm emission mitigation technologies, actually increased its emissions by a staggering 51% between 2016 and 2021.

Big Food's quest for cheaper raw materials and input substitution is nothing new, but investment in climate-driven techno-fixes is heating up too. For example, with climate chaos threatening the sustainability of future coffee harvests, the food industry is betting on synthetic biology research to coax engineered microbes and coffee plant cells to brew in bioreactors.

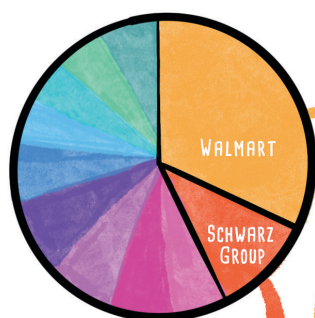
Grocery retail



– IN A NUTSHELL –

Companies in the **Grocery Retail** sector sell perishable and non-perishable foods (“edible grocery”) to consumers via retail outlets (including membership-only retail stores or online). The world’s largest grocery retailers sell both non-food products (“non-edible grocery”) and food. According to retail industry analyst Edge by Ascential, worldwide consumer spending on retail food and beverage totaled US\$8,271 billion (US\$8.3 trillion) in 2020.

TOP 10



RANK

% MARKET
SHARE

COMPANY
(HEADQUARTERS)

EDIBLE GROCERY SALES 2020
US \$ MILLIONS

1
2
3
4
5
6
7
8
9
10

1	29.70 %	WALMART (USA)	\$ 271,937
2	13.21 %	SCHWARZ GROUP (GERMANY)	\$ 121,155
3	8.9 %	KROGER (USA)	\$ 81,497
4	8.7 %	COSTCO (USA)	\$ 79,910
5	6.9 %	CARREFOUR (FRANCE)	\$ 63,205
6	6.8 %	ALDI SÜD (GERMANY)	\$ 62,164
7	6.6 %	TESCO (UK)	\$ 60,389
8	6.6 %	SEVEN & I HOLDINGS (JAPAN)	\$ 60,374
9	6.4 %	AHOLD DELHAIZE (NETHERLANDS)	\$ 58,669
10	6.3 %	REWE GROUP (GERMANY)	\$ 57,477

TOTAL GLOBAL
CONSUMER SPENDING
ON GROCERY, 2020

\$8,270,580
MILLION

SALES OF LEADING GROCERY RETAILERS, 2020

Highlights from the full report:

Even with the surge in online grocery shopping due to the pandemic, supermarkets and neighbourhood stores still dominate worldwide food and beverage sales, accounting for about 40% of the total. That dominance is predicted to diminish going forward, with e-commerce seeing the highest growth among retail channels.

While the world's biggest online retailers, Alibaba and Amazon, aren't among the Top 10 grocery sellers, their e-expertise gave them an edge when the pandemic hit. Everyone else played catch-up.

Chew on this

The world's largest asset management firms – Blackrock, Vanguard, State Street, etc. – are among the largest institutional shareholders in grocery retailing giants Walmart (USA), Kroger (USA), Costco (USA), Ahold Delhaize (Germany), Carrefour (France) and Tesco (UK). High levels of horizontal shareholding – investing in rival companies within a market sector – flies below the radar and dilutes competition.

In India's national grocery retail sector, Tata Group acquired a majority stake (64.3%) in BigBasket, the country's biggest e-grocery player, buying out Alibaba's 30% stake; Facebook invested US\$5.7 billion in Jio Platforms in 2020, focusing on JioMart-WhatsApp interoperability for grocery e-commerce; and Google and Reliance are backing Dunzo, the country's newest ultra-fast grocery delivery darling.

In China, the pandemic spurred major grocery investment as Alibaba bought a controlling stake (72%) in big box/supermarket chain Sun Art for US\$3.6 billion; Meituan, China's leading food delivery app, launched its grocery group-buying app in mid-2020. Pinduoduo, which incorporates gaming to attract users (it's "both Costco and Disneyland," according to its founder and CEO) and gets almost all of its revenue from ad sales (sellers on the platform buy ads to attract buyers), raised US\$6 billion in 2020 for grocery operations.

In late 2020, China's antitrust regulator began investigating the country's big tech companies for potential harms to competition, consumers and workers, resulting in fines totaling billions of dollars with Meituan paying US\$530 million in fines.

Food delivery

– IN A NUTSHELL –

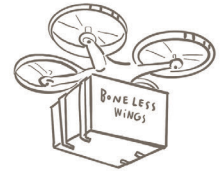
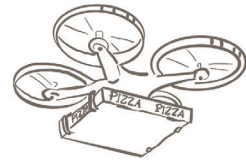


The **Food Delivery** sector refers to digital, on-demand platforms for ordering and paying for prepared food and, increasingly, groceries and other retail items.

Restaurants and retailers fill the orders, then couriers deliver them to customers within a prescribed timeframe.

RANK	COMPANY (HEADQUARTERS)	2020 REVENUES, US\$ MILLIONS	DECLARED LOSSES, US\$ MILLIONS
1	MEITUAN (CHINA)	\$ 9,604	UNKNOWN
2	DELIVEROO (UK)	\$ 5,263	\$ 309
3	UBER EATS (SUBSIDIARY OF UBER) / POSTMATES (USA)	\$ 3,904	OPERATING LOSS
4	ELE.ME (CHINA) <small>"CONSOLIDATED SUBSIDIARY" OF ALIBABA GROUP (ACQUIRED 2018)</small>	\$ 3,593	UNKNOWN
5	DOORDASH (USA)	\$ 2,886	\$ 461
6	JUST EAT TAKEAWAY / GRUBHUB (NETHERLANDS)	\$ 2,850 <small>(EXCLUDES GRUBHUB'S 2020 REVENUE OF \$1,800 MILLIONS)</small>	\$ 168
7	DELIVERY HERO (GERMANY)	\$ 2,819	\$ 1,020
8	IFOOD (BRAZIL)	\$ 494	UNKNOWN
9	SWIGGY (INDIA)	\$ 375	\$ 508
10	ZOMATO (INDIA) <small>(UBER HAS 9.99% OWNERSHIP STAKE)</small>	\$ 370	\$ 322

WORLD'S BIGGEST E-COMMERCE FOOD-DELIVERY COMPANIES



Highlights from the full report:

The food delivery sector is rapidly consolidating, but ownership is a moving target. As companies jostle for regional hegemony, they are buying, selling and swapping stakes in competitors.

From the beginning, the food-delivery business model has been about logistics and e-commerce (including customer data-collection), not about food service.

Venture capital and Big Tech investment has fueled the sector, but companies have yet to deliver profits, even in the sector-friendly circumstances of the global pandemic when delivery became more necessity than convenience. Tweaking the business model to move toward profitability – most prominently by adding grocery and pharmacy delivery – is underway.

Chew on this

While gig work is supposed to allow people to choose how much and when they work, the reality is that the platforms are in control. India's Zomato, for example, can disable the account of any courier who refuses three delivery jobs in one day. Couriers in China can be fined US\$300 – about a week's wages – if a dissatisfied customer sends an email complaint to the platform.

In most places in the world, delivery workers have been considered independent contractors instead of employees. They are therefore ineligible for social security, injury compensation or other benefits. There are indications that some governments may be ready to enact labour reforms to try to end the platforms' free ride. In the USA, New York City became the first city to pass legislation to regulate the food delivery sector, establishing minimum pay and other worker protections.

Other problems the sector has created include “dasher-dodging” on overcrowded city sidewalks, significant increases in trash from take-away packaging, and the deskilling of an overburdened workforce that is constantly controlled (directed and surveilled) by the platforms.

The (bio)digital takeover of food and agriculture

ETC's ongoing research shines a critical light on the world's looming dependence on Big Tech across the Industrial Food Chain. It also looks at the impact that the digitalization of agriculture is already having on corporate consolidation, as well as the wellbeing, autonomy and knowledge of small farmers and peasants across the world and thus on food sovereignty. Here are a few tasters showing what's currently on the worrying menu.

From Food Chains to Blockchains

Cross-sectoral convergence and digital dependence are emerging in parallel, and this is especially evident in the attempt to impose digital blockchains along the entire industrial agrifood chain, with the stated aim of transparent and secure tracking.

Blockchains are digital ledgers that are capable of tracking a contract or an activity with the use of computers via the internet in such a way as to reassure the parties involved that the contract or procedure has been carried out. Blockchains can be used by bankers and drug cartels alike (among many others) to reduce transaction costs and increase confidence that the arrangement has been completed.

Virtually all of Big Ag – in particular the largest grain and food commodity traders – have signed on to Covantis, the most advanced of these new blockchain pacts. Even more ambitious is the TraceHarvest Network, developed in collaboration with Bayer, which emphasizes traceability – from seed to stomach. In this case, traceability is explicitly seen as a way to thwart “buy local” trends.¹ With blockchain tracing, you can supposedly “know your farmer” from half a world away – food miles be damned. TraceHarvest also builds in the possibility for “smart contracts” – self-executing, automated

agreements that govern food market transactions, taking autonomy away from farmers and consumers and handing it over to those who write and structure the code for these digital agreements.

Biodigital Barons

Faced with expiring patents, herbicide-resistant weeds and efforts by some governments to rein in chemical toxins and climate-changing greenhouse gases (GHG), Big Ag and Big Tech giants are developing supposedly “green” products based on new proprietary genetic and digital technologies. These include RNA-based pesticide sprays, “CRISPR” crops and animals, alt-proteins and new microbial pesticides and fertilizers that rely on genetic manipulations – including gene editing. To win consumer acceptance and escape regulatory oversight, industry insists that gene-edited plants and animals are not GMOs (genetically modified organisms) arguing they may not involve the integration of foreign DNA. But gene editing can still be used to introduce new genetic sequences, and even the deletion or change of a single base point can have uncertain impacts on how an organism functions.

RNA interference (RNAi) pesticides are designed to kill certain plants or insects by switching off or “silencing” genes essential for the organism’s survival.

Gene editing or genome editing techniques are a form of genetic engineering (GE) used to alter the genetic material of an organism, plant or animal by inserting, deleting or changing the DNA at a specific target site in the genome. This may cause a series of unexpected changes in the chromosomes. **CRISPR** is the most well-known among today’s gene editing techniques (CRISPR stands for Clustered Regularly Interspaced Short Palindromic Repeats).

Taking advantage of the climate crisis

The energy-guzzling and GHG-belching fertilizer industry is joining the seed and pesticide firms in devising ways to monetize the climate crisis, burnishing their so-called Environmental, Social and Corporate Governance (ESG) credentials along the way. Under the umbrella of digital ag services, Big Ag and Big Tech giants are developing carbon credit schemes for farmers – and all of the verification methods depend on Big Data, of course. Participation in these schemes helps ensure technological “lock-ins” – that is, farmers and

end-users are obliged to surrender their own data in order to gain access to an expanded menu of proprietary ag inputs and digital services, potentially through multi-year contracts and for guaranteed prices and carbon payments.

The world's largest fertilizer corporations are also touting so-called sustainable ammonias for nitrogen fertilizer production (using renewable energy sources or relying on carbon-capture technologies during production). However, promotion of these “green” fertilizers conveniently ignores the resulting environmental damage when they are applied to farmland, including nitrous oxide (N₂O) emissions.

Big Tech meets Telecom meets Big Ag

Agricultural drones, sensors and automated farm machinery are as useful as rocks unless they are connected to the Internet. So, for example, Deere & Company, the largest player in Machinery for Big Ag, has expressed interest in expanding rural Internet connectivity by partnering with telecom giant AT&T in North America,² while other telecom service providers like Verizon and T-Mobile have championed the role of 5G (fifth generation broadband cellular networks) in the future of farming.^{3,4} China, with more than 500 million 5G users, has the largest 5G network in the world and is promoting “smart farms” running on the 5G network.⁵

Satellites are touted as being doubly useful: not only do they enable digital agriculture, but they will also, purportedly, bring Internet connectivity to rural areas across the globe. Big Tech is therefore investing in Low Earth Orbit satellite constellations to “connect the unconnected” and close “the rural broadband gap.”⁶

These operational satellites (especially Low Earth Orbits) also require ground stations that are costly to build and maintain.⁷ Data processing and storage add to the cost of satellite operation. Cloud-computing service providers have jumped at the opportunity to land a piece of the market and now offer satellite operators the option to use ground stations on a “pay-per-use” or subscription basis, reducing their capital expenditure.⁸

Big Tech's forays further out into space have similar critical implications for the future of food and agriculture systems. In 2020, Morgan Stanley estimated that the global space industry could generate revenue of more than US\$1 trillion or more in 2040, up from US\$350 billion in 2020; satellite broadband will account for half of the projected growth.⁹

Data crunching driving new space race

According to estimates by the Union of Concerned Scientists, there were about 6,000 satellites circling Earth's orbit in April 2020, of which less than half were operational¹⁰ (the rest are space junk!). More than half of the working satellites were launched for commercial purposes:¹¹ 61% for communications (like satellite TV, Internet of Things connectivity and Internet) and 27% for Earth observation.¹² Low-cost (or free) satellite imagery is usually low- or medium-resolution; higher-resolution images – key to digital agriculture – are costly, and such large-scale data-crunching relies on Big Tech's AI algorithms and cloud-computing capacity.¹³

Amazon runs the “Earth on AWS” programme through which it hosts numerous satellite data sets, while Google hosts more than 600 public satellite, weather, population and other data sets through its Earth Engine platform.¹⁴ Planet Labs, an Earth imaging company based in San Francisco, calls itself the “Bloomberg Terminal for Earth data”¹⁵ and owns approximately 15% of commercial satellites, collecting ~25 terabytes of data every day.¹⁶ About one quarter of Planet Lab's revenue comes from data related to agriculture and the company expects that contribution to grow in the coming years.¹⁷

In September 2021, Corteva Agriscience signed a three-year agreement to use Planet Labs' satellite imaging products, with which it was already monitoring about 600,000 fields.¹⁸ Other major Big Ag players such as Bayer, BASF and Syngenta are also using Planet Labs' technology, as is the U.S. Department of Agriculture.¹⁹ Planet Labs is also part of The European Carbon+ Farming Coalition, a World Economic Forum-led coterie of Big Ag players pushing “climate-smart” agriculture practices, along with BASF, Bayer, COPA-COGECA, CropIn, European Conservation Agriculture Federation (ECAAF), Yara International ASA, Zurich Insurance Group and others.²⁰ In 2021, Planet Labs started trading on the New York Stock Exchange after a SPAC merger²¹ backed by Google and BlackRock, among other investors.²²

Both Microsoft (via Azure Orbital) and Amazon have entered the “GSaaS” (Ground Station as a Service) market, enabling satellite operators to communicate and control their satellites and process the data with their AI services.²³

Elon Musk's SpaceX plans to send 42,000 satellites into space in the next few decades and, as of early January 2022, it had already launched more than 1,900 Starlink satellites.²⁴ In October 2020, Microsoft partnered with SpaceX to connect its Azure cloud computing network to the Starlink satellite Internet service.²⁵ Competing with SpaceX is Amazon, which plans to launch 3,236 satellites under its “Project Kuiper.”²⁶ Amazon acquired Facebook's satellite Internet team in 2021.²⁷ Similarly, China's state-owned telecommunications carriers plan to launch about 10,000 low-Earth orbit satellites in the next few years.²⁸ India's telecom giant Bharti Group and the government of the United Kingdom invested in OneWeb, another satellite Internet company, which has already signed agreements with US telecom giant AT&T.²⁹

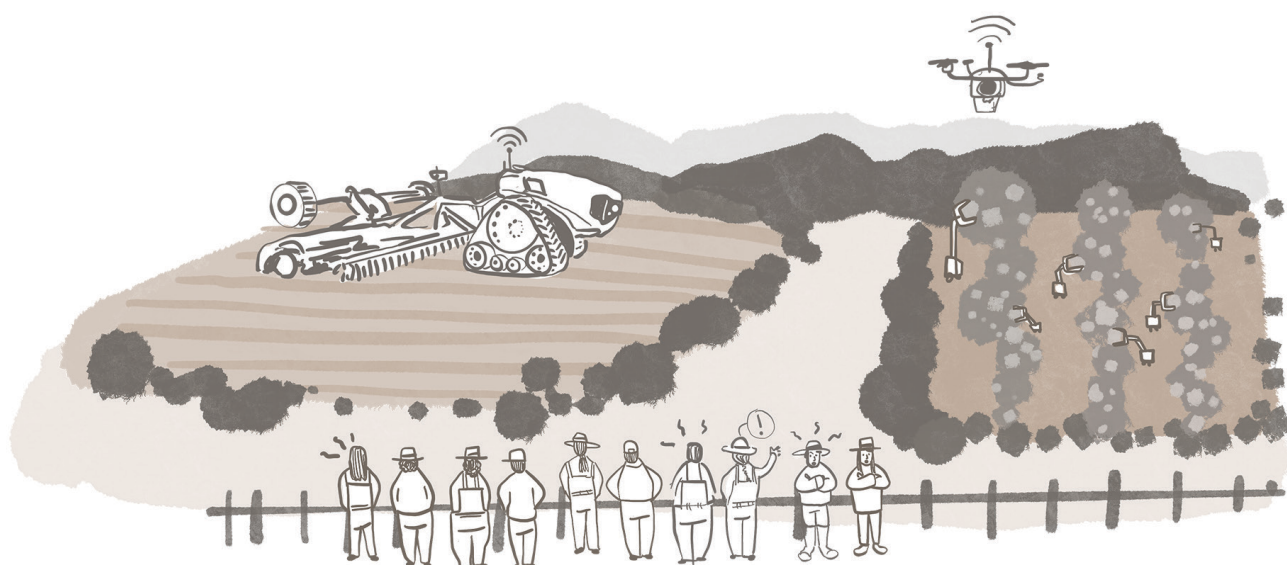
Deep Sea Cable Cartels

Despite these leaps into space, Internet infrastructure is still largely made possible by underwater cables criss-crossing the oceans: Big Tech is consolidating its power and influence in both the clouds and the seas.

“People think that data is in the cloud, but it’s not... it’s in the ocean.” – Jayne Stowell, Strategic Negotiator, Global Infrastructure at Google³⁰

Submarine cable culture

As of 2019, Microsoft, Google, Facebook and Amazon owned or leased more than half of the undersea bandwidth, earlier the domain of pure-play telecom companies.³¹ In June 2021, Google announced a plan to build a new subsea cable, dubbed Firmina, which would connect the east coast of the U.S. and Las Toninas in Argentina, with landings in Brazil and Uruguay.³² Earlier in 2021, Google and Facebook had announced they would jointly fund two new undersea Internet cables, running from the US West Coast to Indonesia and Singapore.³³ In a move seen as countering Western and Indian dominance in telecommunications infrastructure, China is also installing massive networks of submarine cables for its “Digital Silk Road” project that aims to connect the country to its “BRI” (Belt and Road Initiative) partners – 140+ countries across the globe, including more than 40 in Sub Saharan Africa.³⁴



Notes

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Conclusions

Reclaiming Power to the People: Recognizing and challenging corporate hegemony

ETC Group has traditionally monitored the “Top 10” corporations wielding power in different sectors of the Industrial Food Chain. However, our most recent research, as outlined in this report – a “2020 snapshot” looking at eleven key industrial agrifood sectors – shows that many of these Big Ag sectors are now so “top heavy” that this is no longer possible. Some are now controlled by just four to six dominant firms, enabling these companies to wield enormous influence over markets, agricultural research and policy-development, and undermining food sovereignty.

We find that the Food Barons – including giant traders, food processors, grocers, technologists and financiers – are continuing to (re)design and refine the Industrial Food Chain so that they can control it ever more effectively and leach ever more value away from producers and the natural environment. They are swelling their own coffers, whilst providing poor quality and mostly unhealthy food to people and animals, destroying soils and biodiversity along the way.

Today’s Industrial Food Chain enables the world’s biggest Food Barons to hold more economic power than the world’s 3.6 billion farm families, fishers and producers put together.¹ This is deeply inefficient, perverse and extractive. Even World Bank economists acknowledge that the industrial global food system’s US\$8 trillion value is largely cancelled out by its negative externalities – costs that are conservatively estimated, by them, at over US\$6 trillion (including the costs associated with malnutrition, food loss and waste, insufficient food safety, environmental degradation and greenhouse gas emissions).²

Our report also points to three developing multi-sectoral critical trends that are enabling increased control along the Industrial Food Chain by Big Ag, Big Data and Big Finance.

1. New technologies are enabling the Food Barons to further consolidate their wealth and control, especially via the digitalization of agriculture: they are busily promoting digitally-based and genetic technologies and schemes, including as planet-saving techno-fixes, to maximize investment.
2. We observe the rising power of Asian (especially Chinese) Big Ag food giants.
3. Finally, we find that the increasing involvement of asset management companies in food and agriculture creates the semblance of competition, but diminishes actual competition.

With the help of philanthrocapitalists such as The Bill & Melinda Gates Foundation, the reach of Big Tech food and agriculture is now expanding to peasant and smallholder agriculture in the global South, from rural markets through to urban mega-cities. Yet the new forms of control and value extraction that these technologies bring with them threaten to further usurp farmer autonomy and decision making, while potentially facilitating and expediting a new era of land grabbing and new forms of control over small farmers.

Reclaiming Power for peasants, communities and food sovereignty: recognising and challenging corporate hegemony

In contrast to the increasing concentration and power of these giant Food Barons, as detailed in this report, it is important to remember who feeds the majority of the world. The Peasant Food Web still feeds the equivalent of 70% of the world's people³ with less than 30% of the world's land, water and agricultural resources, even though the Food Barons are trying to extend their tentacles through further land- and water-grabs and technological appropriation of the commons. The Peasant Food Web provides an essential counterweight to the grim tale of concentration and profiteering that we detail in this report, through its inspiring diversification and proliferating territorial food initiatives that re-distribute and share the inherent power of sun, soil, seed and animals amongst people – providing food to billions.⁴

Food activists often focus themselves on intervening in certain sectors along the chain. We decry Big Meat, Big Food and Big Biotech, denounce the big grocery retailers' unscrupulous treatment of workers, expose food processors' unscrupulous manipulation of consumers, and demand an end to the use and abuse of the planet's resources. Our findings indicate that if we are to advance towards challenging the Industrial Food Chain in its entirety, we also need stronger collective reactions from civil society, that go beyond sector-specific campaigns, as well as enhancing solidarity between different

food and agriculture-related struggles and other movements, such as those fighting for climate justice or critical of digitalization. We need to support and collaborate to expand the Peasant Food Web, both to nourish the world and to mount an effective challenge, returning power (and food) to peasants, rural and urban communities.

Here are ETC's key proposals for action:

1 Support food sovereignty

It is urgent to recognize the vital importance of non-industrial food systems in this time of food, health and environmental crises. Food Barons are not feeding the world and it is not in their interest to do so. The Industrial Food Chain – and every one of its links – function only if “food” is good financial business. In direct contrast, feeding people is recognised as a real need and is the core concern of the Peasant Web and food movements.

La Vía Campesina, the biggest organization of peasants, landless workers, indigenous people, pastoralists, fishers, migrant farmworkers, small and medium-size farmers, rural women and peasant youth from around the world, sets a very clear path to be able to feed the world and rebuild the planet: food sovereignty and agroecology. Proposals from the grassroots – such as the International Planning Committee for Food Sovereignty's Nyéléni Process⁵ – aim to put farmers, growers, fishers, hunters and consumers back at the heart of the food system and undo the power usurped by Food Barons promoting industrial agriculture. Establishing new movements and civil society-led technology assessment spaces is also emerging as a cross-movement demand.

2 Divest from the chain

Institutions under pressure from civil society have already succeeded in partly directing funds away from tobacco, arms and fossil fuels on moral grounds. Grassroots climate movements have successfully named fossil fuel majors as the obstruction to meaningful climate action. Food movements should follow suit: it is a logical next step to demand divestment from the Industrial Food Chain.

With our research we aim to provide the information needed to understand where corporate power lies and where critical divestment is most needed. We hope that it will provide a useful roadmap for a new wave of campaigns to divest from the Industrial Food Chain. Schools, universities, pension funds, local authorities and other public institutions holding investments in the identified companies should consider withdrawing their funds from specific Food Barons and even from the entire destructive Industrial Food

Chain, making a strategic switch to transparent and unconditional long-term support for agroecology and food sovereignty. A pioneering example of such action is the Extractive Agriculture Investor Dataset developed by Adasina Social Capital. Adasina uses ETC's data from this report, to identify the most harmful publicly traded companies for divestment from their portfolios.⁶

3 Technology horizon scanning, assessment, governance and sovereignty

Just as the threats posed by “Gene Giants” and pesticide companies were apparent to peoples’ movements in earlier decades, it is now obvious that the Food Barons – Big Data, Big Tech and Big Biotech firms – are increasingly exercising a major cross-chain stranglehold on food systems as they deploy a suite of powerful new technologies including blockchains, drones, ag robots, AI platforms, RNAi, alt-proteins, designer microbes and gene drives.

The participatory assessment of technologies based on precaution, as well as the development and support for the implementation of socially and ecologically useful technologies, should be a top priority for governments, multilateral communities or fora, and civil society. Food governance bodies such as the Committee on World Food Security and its High Level Panel of Experts should prioritize horizon scanning, technology assessment and monitoring of new technologies that impact food systems.

The creation of bottom-up participatory technology assessment is especially crucial. Civil society Technology Assessment Platforms such as RED TECLA⁷ in Latin America or AfriTAP⁸ on the African continent are working to understand the ways in which agrifood and digital technologies are used to strengthen corporate power. In particular we need a cross-sectoral technology assessment process to analyse and propose policies to confront the rapid digitalization of the food system. A civil society-led Food, Data and Justice (FDJ) Dialogue is helping to set the stage to ensure that digital and biodigital technologies are subject to precautionary and rights-based oversight as a counter to the vast power of the Food Barons. The Food, Data and Justice Dialogue is a step towards bringing together the food sovereignty movement and technology equity activism, to assess the ongoing deployment of digital technologies throughout food systems, understand the threats to food sovereignty, and identify principles for the governance of digitalization in agriculture.

Anti-monopoly action and competition treaties

Most states maintain at least nominal tools to limit overbearing and unfair power in the marketplace, even if they are rarely (and imperfectly) applied. Competition offices and justice departments can investigate, and rule and levy fines against mega-mergers and unfair business behaviours in the name of maintaining ‘competition’. They also have the power, at the national and regional levels, to break up overly-large companies in the name of competition. That restraint does not exist at the international level, even though the companies highlighted in this report are mostly operating transnationally.

However, some major national economies are taking modest steps to restrain corporate power and promote competition, especially in relation to Big Tech. For example, in China, tech titans such as Alibaba have received substantial fines, and the European Parliament has attempted to censure Facebook. The EU is also beginning to grapple with the problems created by the data-dependent “gig economy”. In addition, under the Biden Administration new rules are being written on the “right to repair” to prevent manufacturers of devices (including cell phones and tractors) from imposing restrictions on consumers’ right to fix equipment they own.

In 2021, finance ministers from nearly 140 countries reached agreement on a 15% global minimum tax on large, profitable multinational corporations (based on where their products/services are sold, rather than where they operate).⁹ The global pact aims to end corporate tax havens that siphon much-needed corporate tax revenues away from governments. The agreement has many shortcomings and its fate is uncertain, but it signals that governments can take collective action to reform policies and rein in corporate excess. With applied pressure from citizen action, the scope could be expanded.

Anti-competition regulators must develop new mechanisms to understand and restrict the cross-chain powers of data giants and horizontal shareholders and require much greater transparency among private equity and other corporate actors. At a global level, an International Treaty on Competition with teeth could enable international oversight of corporate power (including the Food Barons).¹⁰ Food movements, consumers and civil society should have legal standing to intervene in reference to corporate mergers. Given the overwhelming Northern character of the Food Barons that dominate the Industrial Food Chain, Southern governments, in particular, should actively engage in the creation of a multilateral instrument to protect local/territorial food systems, instead of the World Trade Organization’s trade rules which work in the opposite direction. The development and implementation of these instruments should be undertaken in consultation with civil society, peasant farmers’ and indigenous peoples’ organizations.

Last word

In conclusion, it can be daunting to imagine taking on the Food Barons, but their power is not inevitable – it is a historical oddity that is barely a century old and still only feeds less than a third of people on the planet, and badly at that. They may be backed by the titans of capital, have their claws in around 10% percent of the global economy and be ruthlessly proactive in buttressing the Industrial Food Chain with new technologies and slick false promises – but as more and more of the food chain comes under the control of fewer and fewer entities these companies also become more exposed and vulnerable to being toppled.

Agribusiness is also in a moment of significant transformation, as it is challenged by new players and seeks to regain legitimacy amidst the climate crisis and biodiversity collapse that it has itself caused.

This is a moment to see the Food Barons for what they are, to find their structural weaknesses and to take strategic collaborative action to take them on. This report provides some useful intelligence for food sovereignty movements and their allies in the battles ahead.

Notes

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