
THE CASE FOR
CONVERSION-FREE FOOD
WWF
accenture

CONTENTS

Attributions

World Wildlife Fund (WWF) is one of the world's leading conservation organizations. WWF works in more than 100 countries, collaborating with people around the world to develop and deliver innovative solutions that protect communities, wildlife, and the places in which they live.

WWF commissioned **Accenture**, a leading global professional services and consulting firm, to explore the conceivable future of conversion-free food production. This report describes the current state of global food production, its effects on natural ecosystem conversion, and potential solutions for a conversion-free future.

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All companies named in this report are illustrative examples. Use of company names does not represent an explicit endorsement from Accenture or World Wildlife Fund.
All monetary figures are presented in US dollars unless otherwise indicated.
All tons are metric tons unless otherwise indicated.
All shrimp estimates refer to wild-caught and farmed shrimp unless otherwise indicated.

GLOSSARY

Acidification
The gradual decline in the pH of the oceans due to pollution that is particularly, directly, or indirectly, caused by human action

Aquaculture
The farming of aquatic organisms including fish, mollusks, crustaceans and aquatic plants in both inland (freshwater) and coastal (brackish water, seawater) areas

Biodiversity
All the different kinds of life found in one area, encompassing the animals, plants, fungi, bacteria, habitats, and genetic material that work together in ecosystems to maintain balance and support life

Carbon dioxide equivalents
Abbreviated as CO_2-eq, it is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global warming potential (GWP) by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential

Conscious Consumption
A movement whereby consumers vote with their dollar by buying ethical products or boycotting unethical companies

Controlled Intensification
A type of aquaculture that uses more precise methods to produce shrimp at higher levels of input and output per unit of land area

Conversion
Change of a natural ecosystem (e.g., forests, grasslands, or peatlands) to another land use or profound change in a natural ecosystem's species composition, structure, or function usually resulting in a significant reduction in the ability to provide ecosystem services (e.g., carbon sequestration, water purification, or extreme weather mitigation)

Conversion Free
Commodity production, sourcing, or financial investments that do not cause or contribute to the conversion of natural ecosystems (synonym: no-conversion)

Deforestation
Loss of natural forest as a result of: i) conversion to agriculture or other non-forest land use; ii) conversion to a tree plantation; or iii) severe and sustained degradation

Deforestation Free
commodity production, sourcing, or financial investments that do not cause or contribute to deforestation (synonym: no-deforestation)

Degradation
The process by which something is made worse, especially the quality of land

Desertification
Permanent degradation of previously arable dryland ecosystems caused by human activity

Eutrophication
Excessive richness of nutrients in a lake or other body of water, frequently due to runoff from the land, causing a dense growth of plant life and animal death from lack of oxygen

Fast moving consumer goods companies (FMCGs)
Companies that sell products quickly and at a relatively low cost. Examples include non-durable household goods such as packaged foods, beverages, toiletries, over-the-counter drugs, and other consumables

Greenhouse Gas (GHG) emissions
Any gas in the atmosphere that absorbs and re-emits heat, keeping the planet's atmosphere warmer than it otherwise would be

Intact habitat
An ecosystem that substantially resembles the species composition, structure, and ecological function of an ecosystem that is or would be found in a given area, absent major human impact

Natural ecosystem
A community of living and non-living organisms not influenced by human activity where each component interacts together as a unit through biological, physical, and chemical processes

Scope 1-3 emissions
Scope 1 covers direct emissions from owned or controlled sources; Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating, and cooling consumed by the reporting company; Scope 3 includes all other indirect emissions that occur in a company's value chain

Smallholder farmer
Those in small farm households working on land plots smaller than 2 hectares; these small farms primarily depend on family labor

Subsistence farming
Form of farming in which nearly all crops or livestock are used to maintain the farmer and the farmer's family, leaving little, if any, surplus for sale or trade; pre-industrial agricultural people throughout the world have traditionally practiced subsistence farming

Systemic issues
A problem due to issues inherent in the overall system, rather than a specific, individual, isolated factor; a change to the structure, organization, or policies in that system could alleviate the systemic problem

EXECUTIVE SUMMARY

Today, global food production comes at a massive cost to both people and planet. We depend on natural ecosystems to produce, provide, and adapt for our health and nutrition as well as to spur economic growth.

There are more than 570 million farmers worldwide cultivating about half of Earth's habitable land to feed more than 7 billion people—and counting. However, only a few hundred companies control the world's food production, trade, and consumption.

Year after year, global food production carves away at the remaining natural ecosystems and habitat on the planet and stresses the food system's ability to withstand shocks—all while greenhouse gas emissions rise, water becomes scarcer, species fade into extinction, and people continue to live at the margins In particular, commodity markets pose unique challenges as smallholder farmers bear all the risk of production and reap little benefit. Commodity-dependence often negatively impacts a farmer's economic advancement and the country's economic development. Both individual and national growth is minimal compared to the dramatic environmental expense.

Companies that recognize the paradox of expanding footprints beyond the planet's ability to recover are beginning to shift the trajectory of the food system, pledging to achieve results like deforestation-free supply chains and carbon-neutral footprints in response to global initiatives. But this change is not happening fast enough. In the last 20 years, the pace of land conversion, which includes deforestation, has steadily increased. We are continuing to put an impossible strain on our planet, causing uncertainty about our ability to meet future demands and failing to form resilient supply chains capable of withstanding disruptions yet to come.

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Commitments alone will not be enough to reinvent age-old business models for the future. Radical changes in leadership have been taken by some pioneering CEOs that feel the fragility of our food system and recognize our dependency on the planet and its services to maintain business. Consumers are looking to businesses to lead the way when it comes to sustainability. Businesses that fail to react to this paradigm shift will continue to see declining market shares. The first step to reversing this unsustainable course is to halt the conversion of natural ecosystems or produce "conversion-free" food.

The time for journeys, transitions, and other efforts to "buy time" is over; the learning curve occurred over the last five decades. This report explores the dawning of conversion-free supply chains, makes the business case for conversion-free food, stresses the importance of breaking systemic bonds to land expansion, and explores potential solutions in commodity supply chains. Ultimately, we present **immediate opportunities** to foster individual and collective action which, if acted on with urgency, would begin the rebuilding of our planet's resiliency. The concepts proposed are meant to stimulate ideation and collaboration amongst company executives and between companies in pre-competitive fashion.

IMMEDIATE OPPORTUNITIES FOR ACTORS IN FOOD PRODUCTION

- ☑ **BUILD TRANSPARENCY BETWEEN UP AND DOWNSTREAM SUPPLY CHAIN ACTOR**
  Retailers, FMCGs, Traders & Processors, Feed Companies, Farmers

- ☑ **ESTABLISH STRATEGIC PARTNERSHIPS AND TARGETED INTERVENTIONS**
  Retailers, FMGCs, Traders & Processors, Feed Companies, Governments, Civil Society, Farmers

- ☑ **SHIFT ATTITUDES FROM CASUAL COMMITMENTS TO MEASURABLE ACTIONS**
  Retailers, FMGCs, Traders & Processors, Feed Companies, Governments, Civil Society, Farmers

- ☑ **PROMOTE CONTROLLED INTENSIFICATION AND REGENERATIVE AGRICULTURE**
  Feed Companies, Farmers, Investors

- ☑ **INCREASE FINANCIAL VIABILITY OF SMALLHOLDERS THROUGH CONNECTIVITY TO GLOBAL SYSTEMS**
  Retailers, FMCGs, Traders & Processors, Governments, Civil Society, Farmers

- ☑ **SUPPORT COMPREHENSIVE LAND USE PLANNING**
  Governments, Civil Society, Farmers

KEY ● ··· Companies directly sourcing commodities ● ··· Broader network of partners

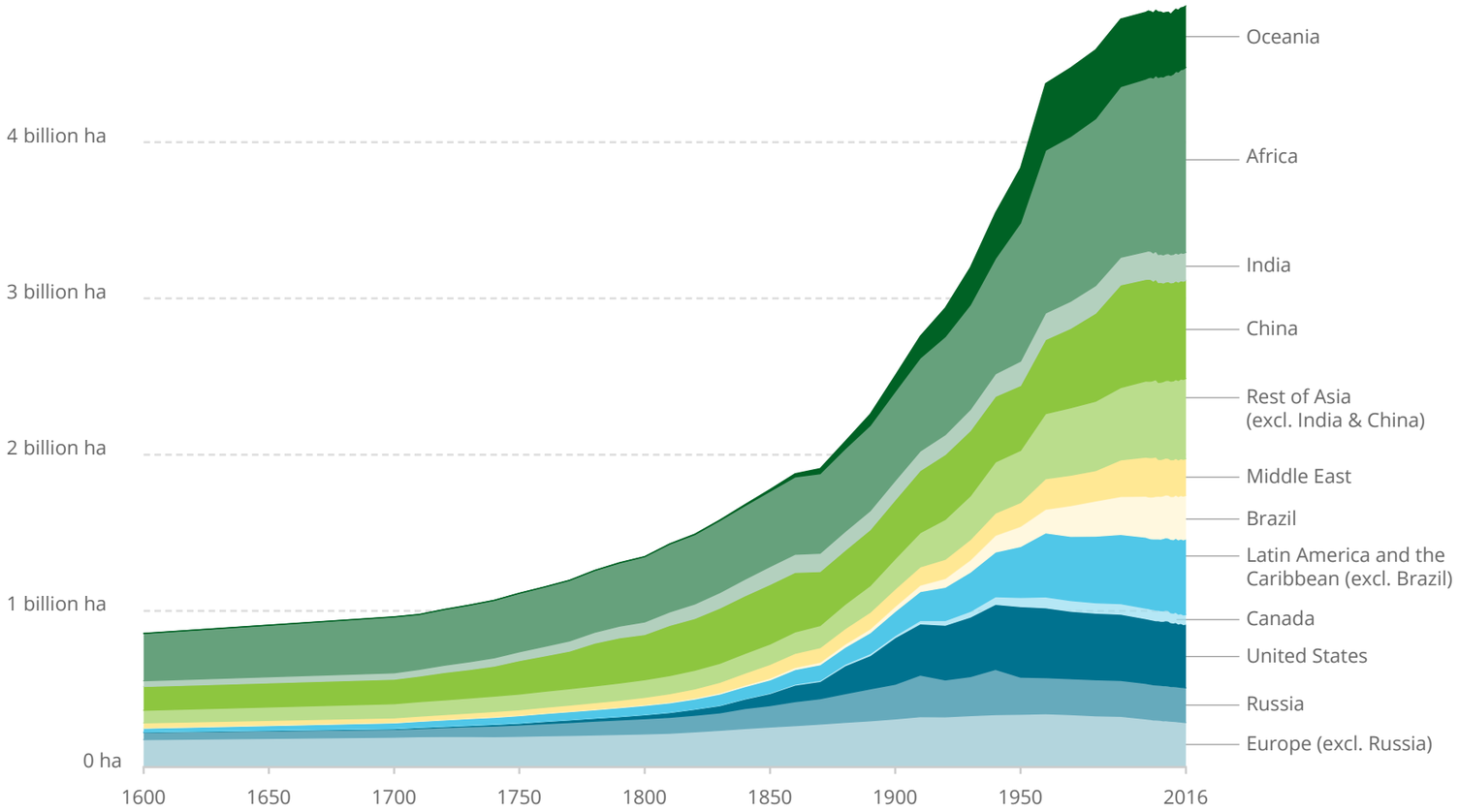
THE ISSUE IN PLAIN SIGHT

The current impacts of global food production are massive and escalating at an alarming rate. About half of the world's habitable land is currently used to produce food—more than double what was used at the start of the twentieth century .[1]

© Marcel Keurntjes / WWF-Netherlands

Figure 1: Agricultural area over the long-term, 1600 to 2016

Total areal land use for agriculture, measured as the combination of land for arable farming (cropland) and grazing in hectares.

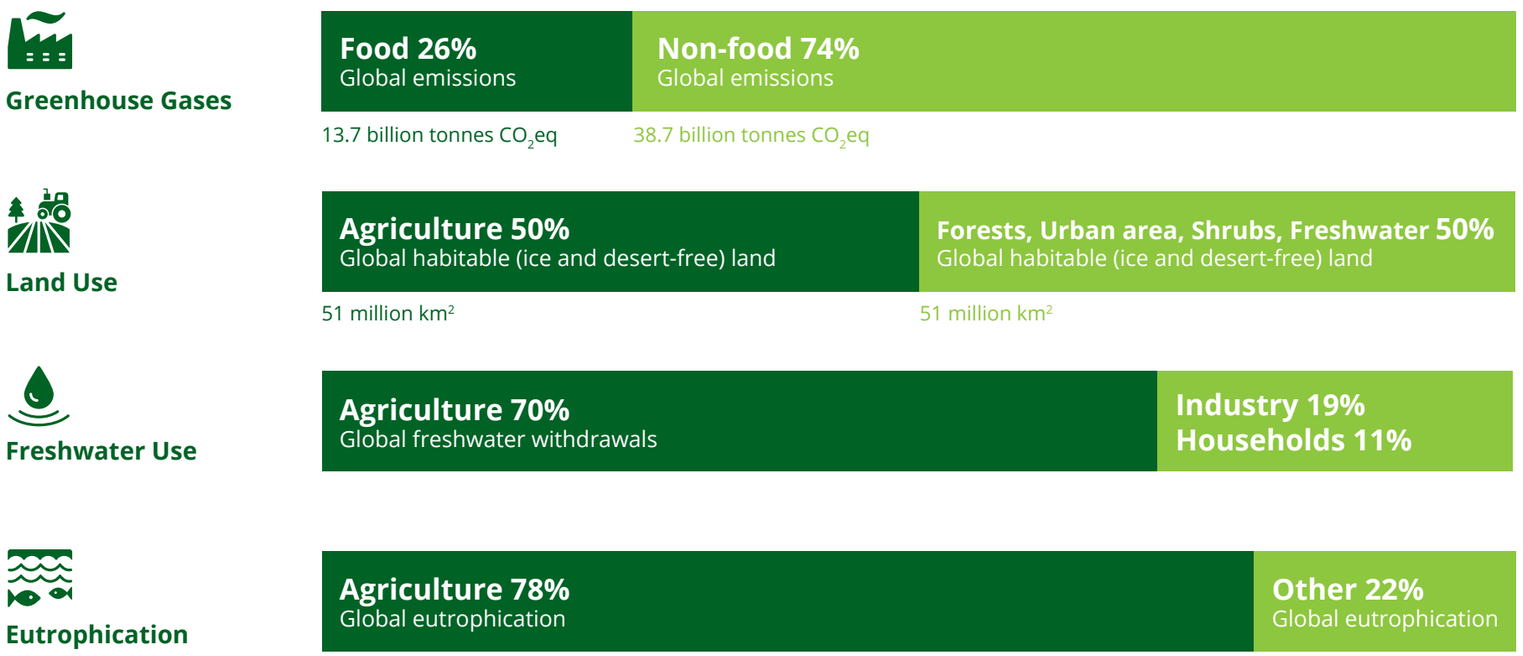


Source: History Database of the Global Environment (2017), Our World in Data

The United Nations Food and Agricultural Organization (FAO) estimates that agriculture causes almost 80% of global deforestation—33% due to subsistence agriculture, such as smallholder farming in developing countries, and 40% due to livestock.[2] In every region in the world, nature's capacity to support human life is being degraded, reduced, and lost.

Humanity's race to clear land for food production results in exacerbated production of greenhouse gas (GHG) emissions, the inability to assimilate and sequester GHGs, habitat and biodiversity loss, disruption of water cycles (flooding and drought), increased soil erosion, and the marginalization of communities that know no other way to survive. Specifically, food supply chains account for 26% of global GHGs, which is about 13.7 billion metric tons of carbon dioxide equivalents (CO_2eq) each year. This emission contributes to atmospheric warming and increased incidences and severity of extreme weather events. The farm stage of the value chain produces the most at 81% of food's GHG emissions (61% excluding deforestation-related emissions), 95% of eutrophication, and 79% of acidification.[3]

Figure 2: The environmental impacts of food and agriculture



Source : Environmental impacts of food production, Our World in Data

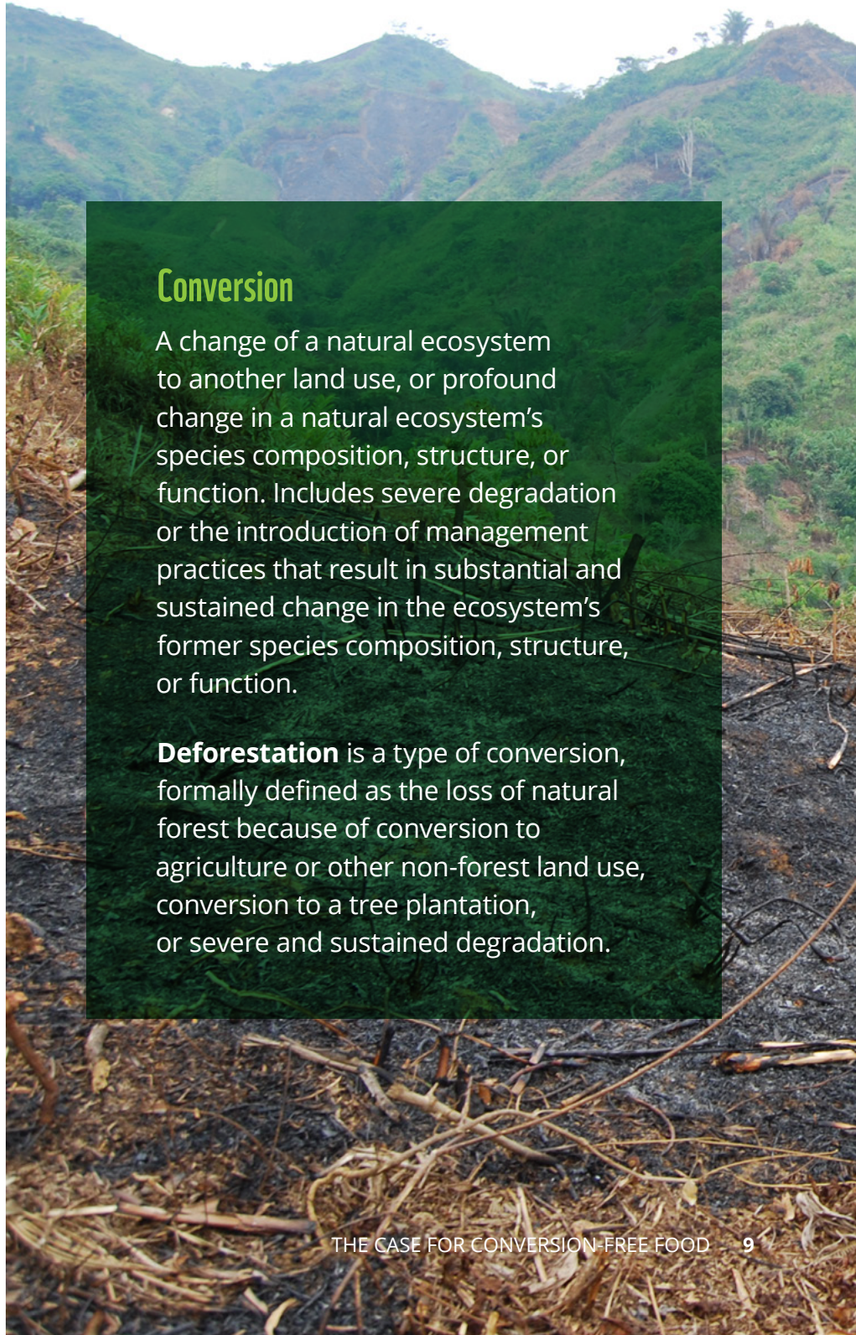
©Simon Rawles

The loss of biodiversity due to food production is particularly severe, as today's farming practices threaten 24,000 of the 28,000 species already at-risk for extinction.[4] Biodiversity, often described as the infrastructure that supports all life on Earth, is fundamental to our existence. It is essential for our health and well-being as well as for the stability of economic and political systems, because all economic activity ultimately depends on the planet's ecosystem services. Currently, it is estimated that nature provides global ecosystem services worth about $125 trillion each year.[5] And yet, we continue to extract and degrade the value of these services through lack of leadership and willingness to upend the norm and demonstrate appreciation for the planet that sustains us.

Not only would conversion-free food production at scale secure the planet's remaining ecosystem services, it would also provide a buffer for human-wildlife interactions and may mitigate the emergence of zoonotic infectious diseases, which have increased in recent years. Spillovers from both wild and domestic animals are causing novel pathogens to infect, harm, and kill humans and animals in pandemic proportions, and it is estimated that nearly one in three outbreaks of new and emerging diseases are linked to land-use change such as deforestation.[6] Since 1960, approximately three to four new infectious diseases have emerged each year, the majority of these being zoonotic and originating from wildlife.[7] Lyme disease in North America, Nipah virus in Southeast Asia, and malaria in the Amazon show the link between the destruction of natural habitat and deadly pathogens that humanity is ill prepared to face.

Beyond damaging environmental impacts, food production in its present form also intensifies global inequality. Calorically, the world produces enough food to feed its entire population, but the persistence of food insecurity in lower middle-income countries leaves 10.7% of the population suffering from chronic undernourishment each year[8]—a situation made worse when considering that approximately 30% of food produced for human consumption is either lost or wasted each year.[9] Though food production continues to be a main source of employment, livelihood, and income for 50 to 90% of people in developing countries,[10] 64% of developing countries are currently commodity-dependent, meaning more than 60% of their total merchandise exports are composed of commodities returning minimal profit.[11]

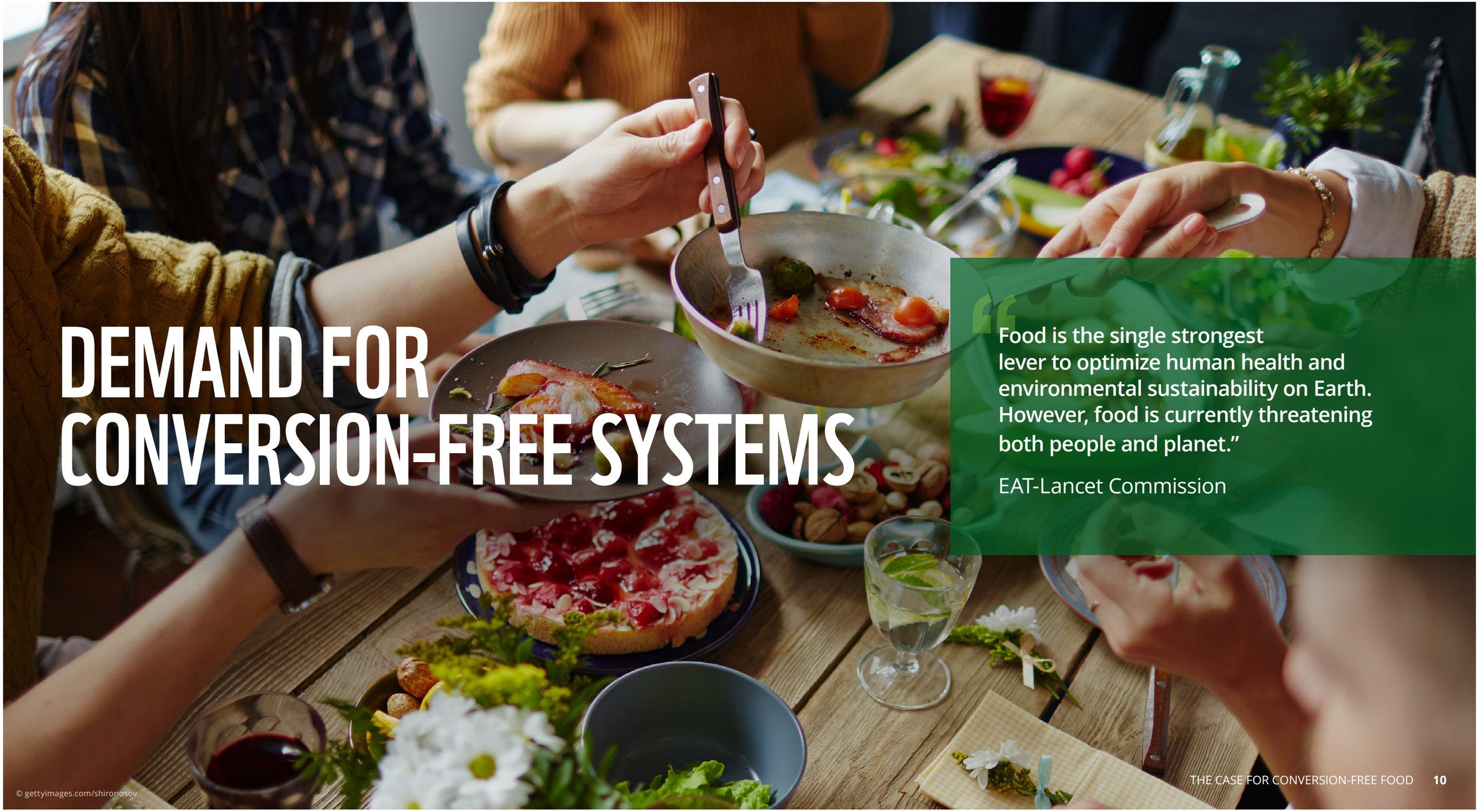
Not only does commodity dependence often negatively impact a country's economic development, it is also a primary driver of natural ecosystem conversion because economies of scale demand greater volumes in commodity markets. Recent estimates from Global Forest Watch (GFW) show that 27% of global forest loss between 2001 and 2015 can be attributed to commodity-driven conversion, mainly in Central and South America, Africa, and Southeast Asia. Top commodity exports linked to conversion (in the form of deforestation) from these regions include palm oil, soy, and livestock. GFW estimates that an annual average of five million hectares of deforestation comes from commodity supply chains. Once converted, these land areas are not likely to be reforested.[12]



Conversion

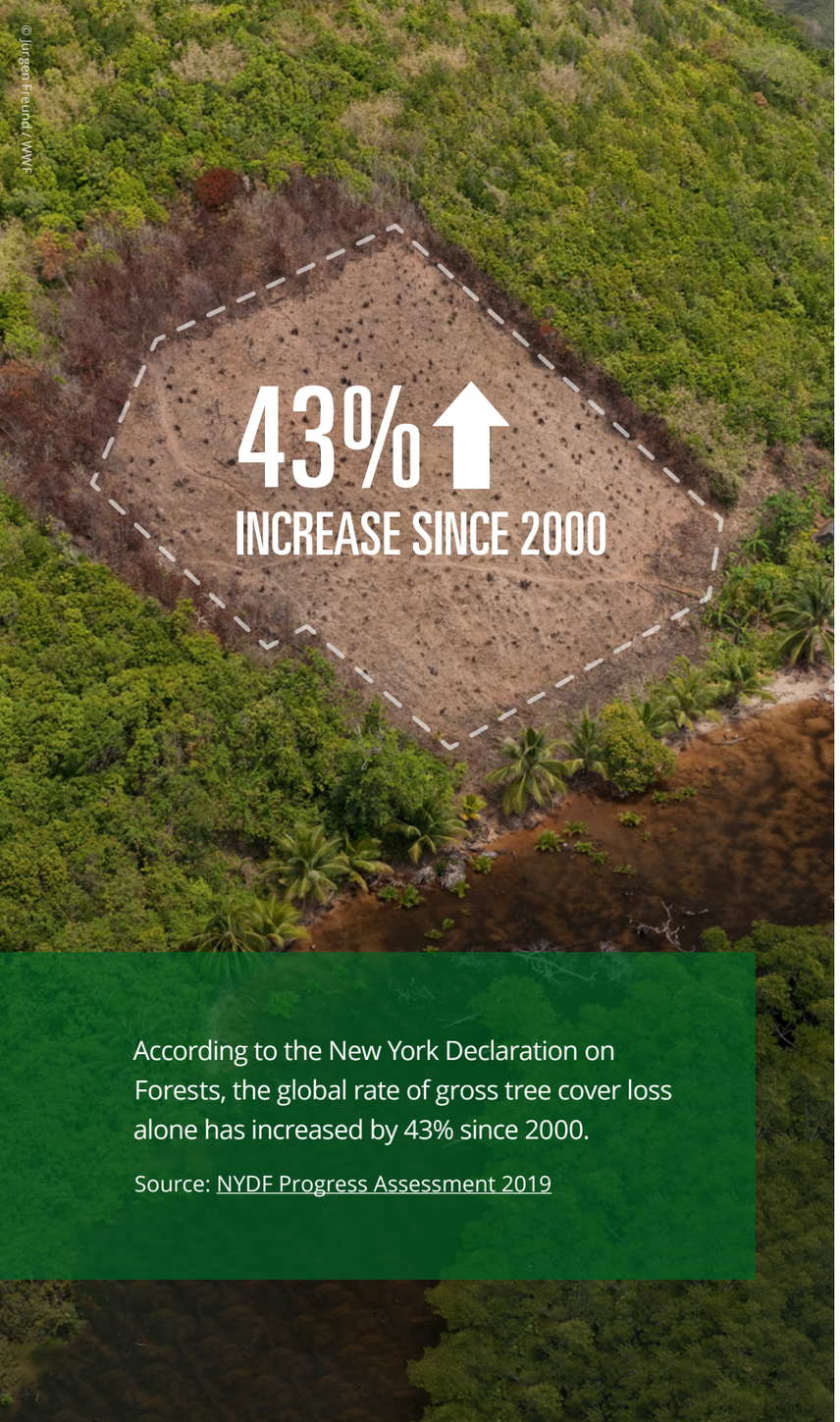
A change of a natural ecosystem to another land use, or profound change in a natural ecosystem's species composition, structure, or function. Includes severe degradation or the introduction of management practices that result in substantial and sustained change in the ecosystem's former species composition, structure, or function.

Deforestation is a type of conversion, formally defined as the loss of natural forest because of conversion to agriculture or other non-forest land use, conversion to a tree plantation, or severe and sustained degradation.



DEMAND FOR CONVERSION-FREE SYSTEMS

> **Food is the single strongest lever to optimize human health and environmental sustainability on Earth. However, food is currently threatening both people and planet."**
>
> EAT-Lancet Commission



According to the New York Declaration on Forests, the global rate of gross tree cover loss alone has increased by 43% since 2000.

Source: NYDF Progress Assessment 2019

In 2020, FAO estimated that large-scale commercial agriculture (primarily cattle ranching and cultivation of soy and palm) accounted for 40% of tropical deforestation between 2000 and 2010, and local subsistence agriculture for another 33%.[13]

Globally, the animal protein production sector is a significant driver of this deforestation due to the vast amounts of land cleared to graze livestock and grow the soy needed to feed animals. In fact, the bulk of soy produced is not for human consumption. Of the 346 million tons of soy grown annually, about 80% is procured by feed companies for livestock feed.[14] The impacts of animal protein on habitat conversion show no signs of slowing. The World Health Organization claims that for the livestock sector to meet the growing demand for high-value animal protein, annual meat production will need to increase from 218 million tons between 1997-1999, to 376 million tons by 2030. Increasing affluence and urbanization are the major forces influencing this striking 72% increase in consumption.[15]

Standards and Commitments

Despite growing awareness of the environmental issues surrounding food production, conversion of remaining intact habitats is unfortunately on the rise. Pristine forests, grasslands, and wetlands are being cleared and degraded at a rapid rate, causing a loss of carbon and carbon sinks as well as negative impacts on ecosystem services. Initially, demands for conversion-free systems spawned from regionally specific crises and advocacy campaigns like forest fires in the Amazon or extensive mangrove degradation in Southeast Asia. Today, calls for conversion-free go beyond well-known ecosystems and, instead, are becoming a fundamental objective of sustainability requests by the conservation community. Given the myriad ways companies can implement sustainability into supply chains, achieving conversion-free production should serve as a universal underpinning to realize climate and sustainable development commitments. Embedding conversion-free into corporate commitments, certification schemes, and public policies, would address the main driver of unsustainable food production directly at the source.

In the past decade, several notable standards and commitments have emerged to try and slow or halt intact natural habitat conversion. In 2016, for example, a group of nonprofit organizations, non-governmental organizations (NGOs) including WWF, and independent experts formed a coalition called the Accountability Framework Initiative (AFi). Its mission is to make ethical supply chains the new normal for producers and traders in agriculture and forestry.

Their goals are to respond to company commitments regarding ethical supply chains that are not consistent, credible, or actionable at scale, and to provide guidance and universal standards for a path forward. In the three years after its formation, the AFi led a consultative process to develop the ***Accountability Framework***, a set of common definitions, norms, and guidelines for delivering on private sector, civil society, and government commitments.

According to the Accountability Framework, **conversion is a change of a natural ecosystem to another land use, or profound change in a natural ecosystem's species composition, structure, or function**. Conversion includes severe degradation or the introduction of management practices that result in substantial and sustained change in the ecosystem's former species composition, structure, or function.[16] The better-known term deforestation[17] is one specific type of conversion. Deforestation is formally defined as the loss of natural forest because of conversion to agriculture or other non-forest land use, conversion to a tree plantation, or severe and sustained degradation.[18] The Accountability Framework defines **conversion-free**, or no conversion, as commodity production, sourcing, or financial investment that does not cause or contribute to the conversion of natural ecosystems.[19] The AFi recommends that companies adopt conversion-free commitments to maximize positive outcomes and minimize risk related to GHG emissions, biodiversity, and the social and cultural values of natural ecosystems. To date, the AFi has engaged 65 companies who are using the guidance to establish, implement, and demonstrate progress on commitments.

AFi is not alone in its attempt to set goals to halt conversion of natural ecosystems. Within the United Nations Sustainable Development Goals, ***SDG 15*** **sets out to protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation**, and **halt biodiversity loss** by 2020. But in its 2019 Progress Update, the United Nations regrettably noted a significant increase in land degradation because of human processes, including desertification, cropland expansion, and urbanization. This degradation has also led to significant productivity declines in natural land cover.[20] Those responsible for continued degradation include all 193 Member States of the United Nations and more than 14,000 companies that have adopted the Sustainable Development Goals.[21]

A third and final noteworthy effort is the ***New York Declaration on Forests*** (NYDF), a broad coalition of governments, companies, civil society, and indigenous peoples driven by the shared understanding that halting deforestation is essential to keep temperature increases below two degrees Celsius above pre-industrial levels. Through this alliance, more than 200 endorsers adopted ambitious targets that include halving tropical deforestation by 2020 and ending it by 2030. The NYDF also calls for the restoration of 150 million hectares of degraded landscapes and forestlands by 2020, and 350 million hectares by 2030. Even with the seemingly high level of endorsement, the NYDF reported in 2019, there is little evidence that these goals are on track. Therefore, achieving the 2020 targets is likely impossible.[22]

REGIONAL COMMITMENTS

In 2008, the EU pledged to at least halve tropical deforestation by 2020, compared to 2008 levels.

In the Amazon, Colombia aims to achieve zero net deforestation by 2020, and Brazil pledges to eliminate illegal deforestation by 2030.

In addition, more than 45 tropical countries are developing jurisdictional programs to reduce emissions from deforestation and forest degradation (REDD+).

Source: European Tropical Forest Research Network

STRONGER INCENTIVES

Despite the apparent consensus about the role of food production in converting natural ecosystems and the detrimental impacts of conversion on the environment, the global food system remains on an unsustainable path. Within the private sector—which arguably holds the most purchasing power and is most able to drive change in commodity markets—experts attribute limited progress to a lack of dedicated financial and human capital resources to achieve public commitments.

On the demand side, consumers are taking heightened interest in the ethical and sustainable practices of the products and brands they choose and increasingly asking for transparency. This movement, aptly named the rise of **conscious consumption**, is expected to influence aggregate social behavior and corresponding shifts in private sector practices. When it comes to purchasing behavior, Nielsen reported that in 2019, 73% of global consumers said they would "definitely" or "probably" change their consumption habits to reduce their impact on the environment.[23] The marketing research firm also found that almost 66% of global consumers are willing to pay a premium for products and services that come from companies committed to positive social and environmental impact.[24]

Companies are taking notice of this rising trend and making choices accordingly. Recent investment shifts can be attributed not only to the expected desires of consumers, but also to enhanced business longevity based on the sustainability of sourced materials and the products they sell.

> **"Unless we change direction, models show that the profit of the entire consumer goods sector could be wiped out by 2050. We cannot choose between growth and sustainability—we must have both."**
>
> Paul Polman, CEO, Unilever

Unilever, the fourth largest fast-moving consumer goods company in terms of sales,[25] and the largest single buyer of palm oil,[26] recently announced a €1 billion investment in a new Climate & Nature Fund to act on landscape restoration, reforestation, carbon sequestration, wildlife protection, and water preservation. The company is also committed to achieving net zero emissions from all of its products by 2039, and to halve the GHG footprint of its products across the value chain by 2030.[27]

> **"Given the groundwork we have already laid and the growing investment risks surrounding sustainability, we will be increasingly disposed to vote against management when companies have not made sufficient progress"**
>
> Larry Fink, CEO, BlackRock

In his 2020 letter to CEOs, Larry Fink of **BlackRock**, the investment management company with $1.8 trillion in assets, declared sustainability as the company's new standard for investing. He noted the increasing impact of sustainability on investment returns and the belief that it will be a critical foundation for client portfolios now and in the future.

> **"It's increasingly clear that companies involved in deforestation, directly or through their supply chains, are a major liability to investors."**
>
> Vemund Olsen, Senior Policy Adviser, Rainforest Foundation Norway, commenting on GDFG's commitment

Norway's Government Pension Fund Global (GPFG), the largest sovereign wealth fund in the world with $1 trillion, recently pulled out of more than 33 palm oil companies over deforestation risks.[28] Since 2012, the Fund has become a more active shareholder and now promotes sustainability and ethics among its investments, dropping firms that fail to meet its standards.

These sizable companies are not alone. A 2017 survey by the Carbon Disclosure Project (CDP) found that within 272 of the largest global companies,

87% recognized at least one environmental or social risk related to conversion

87% identified opportunities related to sustainable production, marketing, or sourcing of at least one commodity*

73% committed to reducing or removing deforestation from their supply chains

32% were impacted by the production or consumption of forest-risk commodities

*Palm oil, soy, cattle products, and timber
Source: Carbon Disclosure Project

Given these current trends in executive commitments, consumer demands, shifting government regulations, and unpredictable impacts of climate change, it is strategically advantageous for companies to think about **staying ahead of the conversion-free curve now**. Ensuring a conversion-free supply chain would not only reduce reputational risk and differentiate products in the market, it might also increase value creation and resilience during times of uncertainty. The Environmental, Social, and Governance (ESG) proposition, for example, provides good reason for companies to invest in environmental issues, social impacts, and ethical governance. Doing so crowds in additional investment and affords ample returns. Researchers at Harvard Business School proved this fact when they found a positive relationship between high performance on relevant ESG issues and superior financial performance.[29]

The causal relationship appears true even in trying times. A recent Bloomberg article reports that during the COVID-19 pandemic, ESG leaders outperformed companies with poor ESG ratings by almost seven percentage points in global equities. In the United States, this difference was eleven points higher, leaders: laggards.[30] It seems that demonstrating ESG commitments is a growing trend that could become the norm where investors, governments, consumers, and employees will stop tolerating companies who do not integrate ESG commitments into their business strategies, insisting that those who do not will lose their license to operate.

KEY ACTORS IN FOOD PRODUCTION

Agile and innovative businesses may have an advantage in incorporating sustainability commitments, because it is likely easier to design improvements to a regularly evolving value chain than it is to pivot a multi-billion-dollar, multinational business that has been operating for decades.* However, regardless of size or scale, companies linked to habitat conversion—both directly and indirectly—must modernize their strategies and processes to prevent conversion altogether. Within the food industry, the following actors have a significant role in positively changing food production and mitigating its environmental impacts. Doing so would enable them to address their Scope 3 emissions, defined by the Greenhouse Gas Protocol as all indirect emissions not included in Scope 2, occurring both upstream and downstream in the value chain.[31] Responsible companies aiming to act on their full range of corporate value chain and product emissions need to adopt conversion-free standards when engaging suppliers in GHG management and sustainability.

This report calls on specific food industry actors to translate their conversion-free commitments into strategic action in the immediate future. While the thoughts and ideas presented in this report are meant to encourage private sector stakeholders to act on their commitments, corporate action alone will not be enough to drive and sustain change. Given the systemic nature of the environmental issues in food production, there is an obvious need for collaboration between the private sector, civil society, and governments. The onus should be on these key actors to engage with governments and civil society, where possible, to discuss, collaborate, learn faster, and partner for a conversion-free future.

* E.g. ADM ($54 billion, established 1902), Bunge ($46 billion, established 1818), Cargill ($59 billion, established 1865), Louis Dreyfus ($37 billion, established 1851). Revenue estimates are from 2018. Source: Wikipedia

Scope 1-3 Emissions

Scope 1 covers direct emissions from owned or controlled sources; Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating and cooling consumed by the reporting company; Scope 3 includes all other indirect emissions that occur in a company's value chain.

Source: www.ghgprotocol.org

FOOD INDUSTRY ACTORS

Retailers & Fast-Moving Consumer Goods Companies (FMCGs) want to protect their brands by minimizing reputational risks and ensuring consistent supply to meet customer demand. It is the interest of retailers and FMCGs to lead the conversion-free movement to drive demand and prepare for growing sustainability demands from consumers. Those who champion this movement will create differentiated products and increase their competitive advantage.

Traders & Processors are the gatekeepers to market access for farmers. They set expectations and standards for product quantity and quality from farmers based on buyer preferences and government regulation. Because of their proximity to farmers, demand for sustainable products from traders and processors sends strong, direct market signals that accelerate behavior change upstream.

Feed Companies provide the most critical, highly demanded input for terrestrial and aquatic animal production. They typically have the closest relationships with farmers if they provide technical assistance about the animal feed in addition to the product. The ingredients feed companies source account for large expanses of conversion,** presenting an opportunity for feed companies to differentiate themselves by sourcing from conversion-free producers.

** Animal feed ingredients linked to deforestation: soy, palm, wheat, and corn

CONVERSION IN COMMODITY MARKETS

> **In 20 years, we won't have the ecosystem to sustain our sustainability."**
>
> Jean-Francois Timmers, WWF Brazil

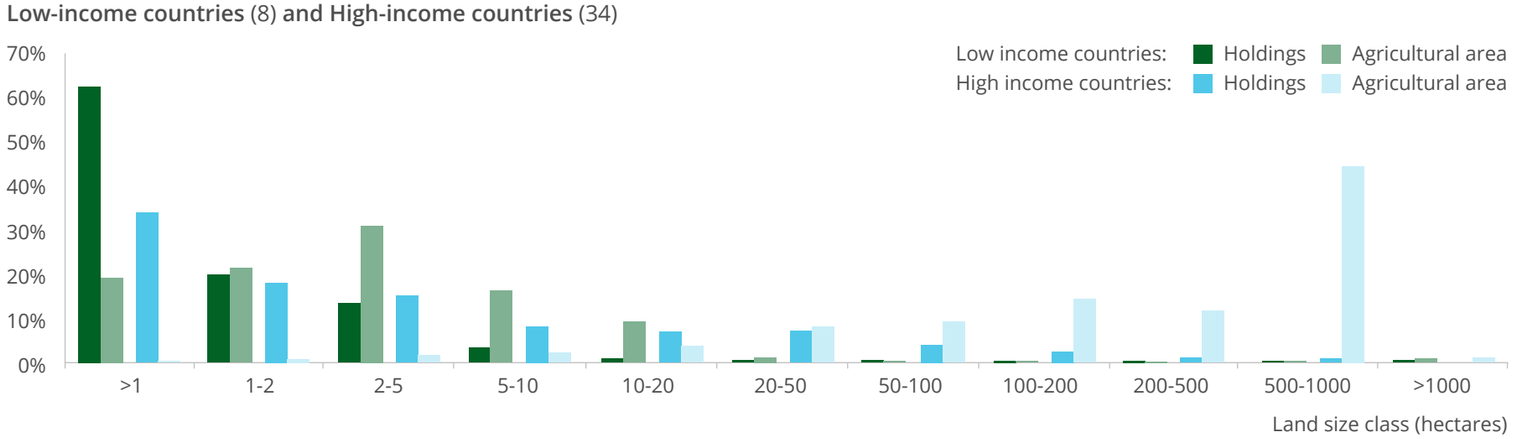
Agriculture has long been lauded as an effective means of poverty alleviation for rural populations in developing countries. Indeed, the majority of development-oriented theories place agriculture at the center of the economic growth.

There is also widespread agreement that as the economies of nations mature, their reliance on agriculture as an economic engine declines. Although there remains an absolute increase in agricultural output, the economy overall becomes less agriculturally oriented, shifting towards secondary and tertiary industries, which for GDP growth are typically service-oriented.

This trend can be observed in a comparison of land holdings to agricultural area on a spectrum of high- and low-income countries. As shown in Figure 3, the more profitable a country becomes, the smaller percentage of the population works in agriculture and the more consolidated the industry finds itself.

Highly commodified goods are the default for countries looking to promote agriculture as a livelihood for rural populations and an engine for economic development. Investments in infrastructure to transport and process raw materials produced by farmers make commodity markets easily accessible. Easy access means commodity products are liquid. Mature and stable markets assure governments and farmers that when it comes time to harvest, there will be demand for their products.

Figure 3: Distribution of farms and farmland area by land size classes and income group



Source: The Number, Size, and Distribution of Farms, Smallholder Farms, and Family Farms Worldwide, ScienceDirect

Market access, liquidity, and reliability are all important aspects of an efficient market. The challenge with commodities is that, by nature, they are undifferentiated goods that do not command a price premium, which places an intense focus on margins. This encourages low cost business models for farmers, forcing them to adjust their production practices to ensure maximum output with minimal input. In the short term, an intense reliance on least-cost operations results in practices like monocultures, soil tilling, and the use of chemicals (e.g., pesticides, herbicides, and fungicides) to promote higher yields without sustainability concerns for the surrounding ecosystem upon which it relies. The current incentive structure of commodity markets results in supply chain actors placing much more value on agriculturally productive land instead of naturally productive land.

Commodification and a narrow focus on short-term economic development continue to threaten valuable ecosystems around the world. In Brazil, the Cerrado grassland, which covers more than 20% of the country, is systematically exploited for soy cultivation. To the North, the Choco-Darien, one of the most biologically diverse forests in the world, has been reduced by over 33% as road building and other developmental projects take hold. And, across the world on the large island of Borneo, over half of the entire forested area has been cleared to make way for palm oil, pulp, and paper plantations.

The structure of commodity markets and the commodity-dependence of many developing economies highlights the acute risks presented by continued business as usual. However, there are also deeper systemic risks associated with this dependence in rural populations, namely access to food.

THE SYSTEMIC NATURE OF CONVERSION

Although large scale corporate commodity production is the main driver of global habitat conversion, there is also significant land use change caused by subsistence farming. Together, these two forces form the basis of agricultural expansion, accounting for 80% of conversion globally. In subsistence farming, or family farming, nearly all the crops or livestock raised are used to feed the farmer's family, leaving little, if any, surplus for sale or trade.[32]

Whereas the logic for land conversion in the context of corporate farming is based on the current incentive structures of global business and regulation, the reasons for subsistence farming are much more complicated and motivated by a web of indirect drivers. Indirect drivers are complex interactions of social, economic, political, cultural, and technological processes that affect the proximate drivers causing conversion or forest degradation. These drivers act on multiple levels: international (markets and commodity prices), national (population growth, national policies, and governance) and local circumstances (poverty).[33]

According to a recent synthesis report for REDD+ policymakers, the intense focus on economic growth through the export of commodities, paired with increasing demand for agricultural products in a globalized economy, indirectly drive conversion by giving rural populations little alternative to subsistence farming. The scaled solution of commodity agriculture for poverty alleviation has inadvertently created an exploitative system where a vast population of farmers in developing nations provide the raw materials to fuel the lifestyles of developed nations, while they themselves do not reap the benefits of convenience, abundance, or nutrition. The goods they produce are often not directly consumable and their share only commands a small slice of the full economic pie.

The deliberate position of farmers as low-margin risk-takers within food production value chains is not by coincidence. Global agribusinesses have chosen to integrate virtually every part of the value chain, except for farming, which places farmers and rural populations at the epicenter of a global web of economic pressure. Governments of developing nations rely on them as an engine for economic growth, though their productivity could be better allocated. Within supply chains, traders, processors, and retailers depend on the timely arrival of raw materials to manufacture and then sell finished goods. Farm input suppliers count on farmers to purchase specialty items like fertilizer, data analytics platforms, and irrigation systems each year. These relationships highlight the complex system farmers must navigate to make a profit while also balancing their family's well-being and, in the best cases, considering the global environmental impacts of their actions.

Left unchecked, current production practices of subsistence and commodity farming will continue to exacerbate inequality, encouraging conversion of natural ecosystems and the interconnected issues that stem from it, including biodiversity loss and climate change. If the systemic nature of conversion is not addressed in the immediate term, the value degraded ecosystems provide will be rendered unrecoverable for future generations.

Understanding the systems that perpetuate direct and indirect drivers of conversion at the farm level is necessary to form solutions that comprehensively address the extensive and ingrained challenges within the animal protein production industry. Creating sustainable change depends on the degree to which solutions can elevate smallholder farmers and decouple economic growth from habitat conversion. To be implemented, solutions must recognize the unique challenges faced by rural populations while appealing to jurisdictional nuances, cultural preferences, and constraints.

Overcoming ecosystem conversion entrenched in animal protein value chains like poultry, beef, or pork is a challenging endeavor that requires more than verbal or written commitments. Meaningful change will require a significant markets-based force. Whether progressive executives create competition for change, consumer behavior demands it on a massive scale; government regulations mandate it locally; or climate change causes vast disruption and the need for adaptation. The force that knocks down the first domino will eventually strike.

CONVERSION-FREE SHRIMP

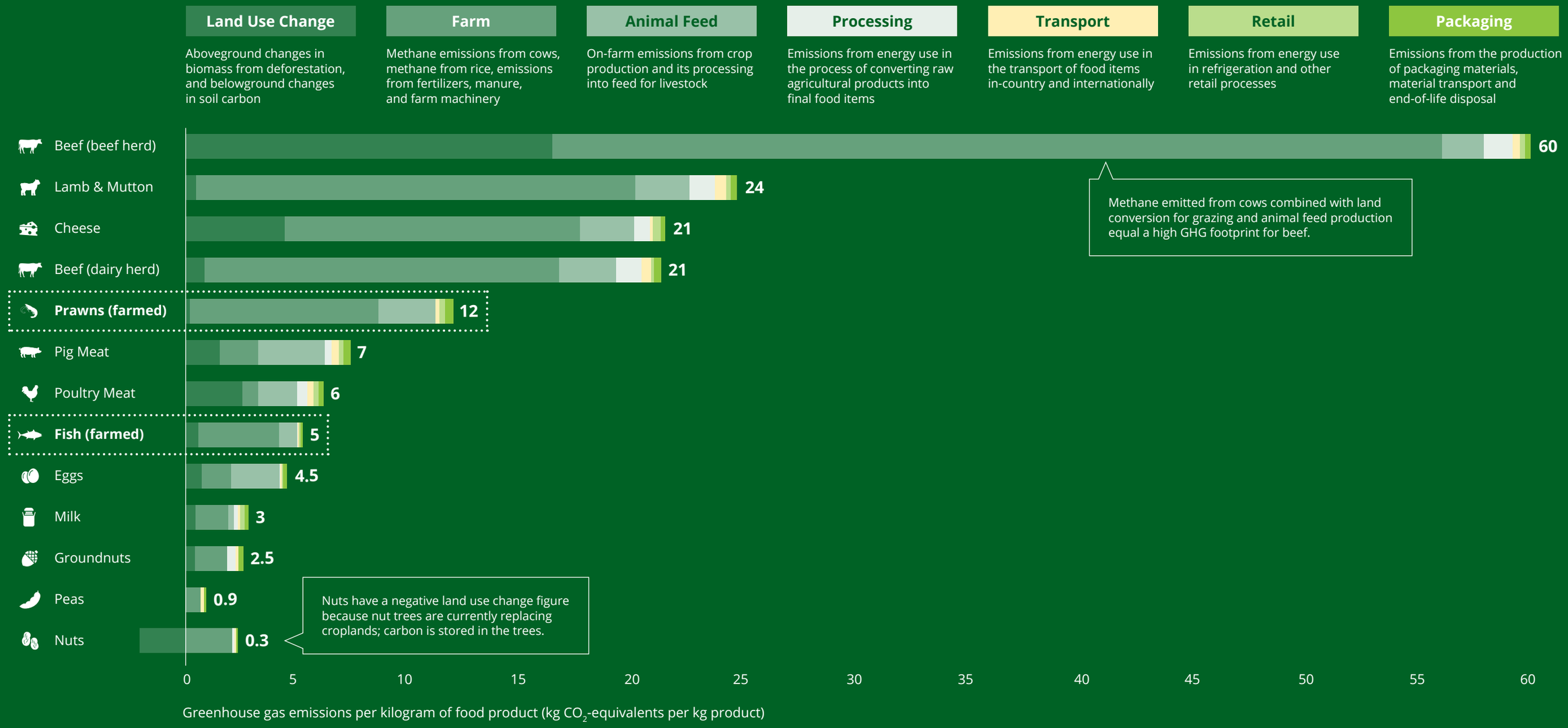
Focusing on a single industry whose production model favors a future without habitat conversion can help highlight enablers for change and the opportunities that should be pursued more broadly across commoditized animal proteins, and the agricultural inputs they rely upon for feed, in support of a more resilient and sustainable future. In some industries, positive change is already underway, leading to a more encouraging discussion about conversion-free food production at scale. Among animal proteins, shrimp farming provides a compelling example because it is the most valuably traded seafood commodity in the world by volume and can be produced without converting significant amounts of land through **controlled intensification**. In terms of direct land use, shrimp produced in this way are comparable with common plant-based proteins, which are often offered as more sustainable alternatives to animal proteins.[34]

There are many different methods of food production, and some offer more straightforward routes towards conversion-free production. Aquaculture is particularly appealing, in part because the typical species under cultivation—finfish, crustaceans, algae—tend to be much more efficient at translating energy into consumable mass (e.g. proteins and fats) than terrestrial counterparts. However, the other more notable advantage to aquaculture over terrestrial production methods is the dimensionality of the systems.

Terrestrial livestock, in most situations, must be raised on a two-dimension plane, while aquaculture (maritime cages or inland ponds) can be grown on three-dimensional planes, offering additional area for cultivation while maintaining the same terrestrial footprint.[35]

Assuming shrimp aquaculture systems are set up as closed-loop intensified systems and sited correctly—a topic explored in further detail in the report *Future Proofing Shrimp Production: Transition to Controlled Intensification*—the limiting factor on zero impact aquaculture production are the inputs to the systems via energy (electricity, diesel fuel), feed (grain by-products, plant oil-seed meals, animal byproduct meals and fats), and water. From an environmental sustainability perspective, it is critical to produce all inputs in a sustainable manner. However, from the lens of habitat conversion, the terrestrial agriculture products that are included in feeds are the most opaque and most destructive. In absolute terms, the commercial aquaculture feed sector has grown over three-fold, from 13.84 in 2000 to 51.23 million tons in 2017. This increase represents an average percentage rate of 8.0% per year since 2000 and is expected to reach 58.85 million tons by 2020, and 73.15 million tons by 2025.[36]

Figure 4: Food: Greenhouse Gas Emissions Across the Supply Chain



Note: Greenhouse gas emissions are given as global average values based on data across 38,700 commercially viable farms in 119 countries.
Source: Poore and Nemecek (2018). Reducing food's environmental impacts through producers and consumers. Science. Our World in Data.

A 2017 study titled "*Resource Use Assessment of Shrimp, Litopenaeus vannamei and Penaeus monodon, Production in Thailand and Vietnam*", which appeared in the *Journal of The World Aquaculture Society* further explores the land use relationship of shrimp aquaculture. The authors discovered that once production intensities exceed 10-15 mt/ha/year, the more detrimental land burden shifts from pond production area to the farmland embodied in shrimp feed ingredients.[37] An example of shrimp production in Southeast Asia illustrates this point:

> Putting this on a large scale, suppose in the future L. vannamei production in Thailand and Vietnam combined increases 500,000 m.t. to meet future demand. Achieving this increase by extensive culture would require 1,000,000 ha of land for new farms. However, the production increase could be achieved with no additional shrimp farm area, through controlled intensification. However, about 250,000 ha (at FCR=1.5) of additional cropland would be necessary for feed ingredients. Considering that land for shrimp ponds in coastal areas typically is of higher biodiversity than agricultural land (Boyd and McNevin 2016a, 2016b), it appears prudent to save 1,000,000 ha of coastal habitat at the expense of increasing agricultural land by about 250,000 ha.

The example postulates that existing infrastructure can pivot from extensive to intensive production methods to meet demand increases through the further intensification of land already used as aquaculture facilities or the targeted development of degraded land. Gradually pivoting the shrimp industry in this direction would effectively eliminate the need for ecosystem conversion at the production level, that is, if governments work with farmers to establish comprehensive land use planning guidelines. A simple analysis comparing the productivity of intensive systems with extensive systems corroborates these findings. It shows that global demand could be met by intensive systems with 2% of the land currently used to farm shrimp—roughly 42,622 hectares.[38] The more worrying element of the Boyd-McNevin example is the suggestion that meeting production increases would require 250,000 ha of additional agricultural land—a fundamental truth which must be addressed by leveraging the purchasing power of feed manufacturing companies to elevate smallholder farmers and decouple their bottom-line growth from the habitat conversion embedded in feed inputs.

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The Value of Mangroves

Beyond the thousands of rare, iconic, and threatened species that inhabit them, mangroves also provide many valuable ecological functions, including filtering water, protecting shores from erosion, and serving as a natural barrier against storms. They also store three to four times as much carbon as tropical forests and may be one of our best defenses against climate change. While there is no agreement on the economic value of mangrove forest, it has been estimated that the sustainable use of mangrove areas by local communities will have a direct benefit of around 30-300 USD/ha/yr. The benefit that includes all ecological services is 3,000-30,000 USD/ha/yr or possibly higher. Contrastingly, shrimp farming in mangrove areas cannot be expected to generate more than 1,000 USD/ha/yr and usually the income will be only 100-500 USD/ha/yr.

The demand for seafood is expected to grow over the next 30 years, as will the market for shrimp.* Therefore, it is imperative, as in other animal protein industries, that the expansion or production facilities and their agricultural inputs are managed responsibly to minimize impacts on natural ecosystems. In the case of shrimp, whose production footprint far exceeds what is necessary to meet global demand, as the industry pivots towards controlled intensification it is critical to replace old extensive ponds with the mangrove forests they replaced.

What follows is a timeline of the evolution of shrimp production highlighting the industry shift from mainly extensive production methods in the 1980s—where shrimp was mostly farmed in converted mangrove ecosystems—to intensive production methods of the last 20 years, where shrimp is farmed in above-ground tanks or much smaller ponds. The final segment of the timeline describes an ideal future for shrimp, which includes reforestation of converted mangrove ecosystems.

*Global shrimp production doubled between 2003 and 2016, spurred mostly by aquaculture, which surpassed wild shrimp production to become the predominant source of production in 2007. Source: ***FAO Fisheries Statistics***

Conversion-free production is the first principle in **WWF's Blueprint for Future Proofing Shrimp Supply Chains**, an initiative which challenges business that buy, sell, produce, or benefit from the farmed shrimp sector to demonstrate 5 achievements by 2025:

No conversion of natural ecosystems as of 1999.

Farm and feed use of natural resources (land, water, energy and wild fish) decreased by 30%.

Traceability of farmed shrimp and feed ingredients used to produce them.

Human and labor rights secured throughout the value chain for all workers.

Transparent reporting of progress.

THE EVOLUTION OF SHRIMP TOWARDS CONVERSION-FREE

EXPERIMENTATION (1980–2000)

During the shrimp industry's early expansion, reasonably priced feed is developed enabling farmers to produce higher yields.[39] Concurrently, inexpensive mechanical aerators are designed and manufactured, allowing greater shrimp stocking without causing dissolved oxygen depletion.[40] In Hawaii, researchers develop high health whiteleg shrimp, a penaeid species native to the western hemisphere,[41] which propels the market forward as farmers being to farm whiteleg shrimp intensively and consistently from the 1990s onward. As a means of poverty alleviation, aquaculture and development-oriented NGOs encourage smallholder shrimp farming in coastal areas, and governments establish policies encouraging ecosystem conversion to spur economic development.[42,43]

Production

Production hits 850,000 metric tons using 1,000,000 ha of shrimp pond area[44]

Global Market Value

Valued around $3.5 billion

Mangrove Impact

Between 30% and 80% of total global mangrove loss is caused by shrimp farming infrastructure

EXPANSION & INDUSTRIALIZATION (2000–2020)

Shrimp capture from the ocean plateaus in 2003, resulting in growing demand for farmed shrimp. In response to rapid mangrove degradation, governments in all major shrimp producing countries[45] (except for Vietnam) establish policies protecting mangrove areas and encouraging restoration projects. Unfortunately, diseases such as white spot and EMS impact shrimp farmers, costing the industry $20 bn USD[46] and challenging farmers to increase controls. Next, research emerges showing that the direct and indirect ecological services of mangroves are up to 30x more valuable than the revenue generated from farming, and that development of inland real estate is more economically efficient than mangrove areas for the construction and operation of farms. To support the industry's sustainability, the Aquaculture Stewardship Council (ASC) is formed as an independent nonprofit managing the world's leading certification program for responsible aquaculture.

Production hits 5 million metric tons using 2,135,110 ha of shrimp pond area

Valued around $12 billion

Mangrove loss rates decline to about 0.38% of remaining global mangrove area[47]

FUTURE SUSTAINABLE GROWTH (2020–2040)

In an idyllic future, **retailers and their suppliers will achieve verifiable zero emissions shrimp** by implementing regenerative agriculture practices for feed, using closed-loop recirculating aquaculture systems for production, and sourcing renewable energies.

Production is projected to hit 15 million metric tons, fueled by controlled intensification of whiteleg shrimp

A projected value of CAGR 5.4% in global shrimp crops (based on 2017-2021 estimates)

Complete restoration of intertidal extensive shrimp farming infrastructure to mangrove ecosystems

CONVERSION-FREE SOLUTIONS

> **“Do not go where the path may lead, go instead where there is no path and leave a trail.”**
>
> Ralph Waldo Emerson

CHANGE ENABLERS

Although the future of farmed shrimp has the potential to model conversion-free production at scale, shrimp and other aquatic species only account for about 20% of the world's consumption of animal protein.[48] Even if the shrimp industry did everything right, system-level change will only manifest if all other animal protein industries and their feed supply chains alter their current practices. Creating a future that eliminates degradation of natural ecosystems and habitat loss from our food systems also depends on interventions that elevate smallholder farmers and decouple economic growth from habitat conversion. At present, four change enablers are converging to increase pressure on retailers, FMCGs, traders, processors, and feed companies to lead the conversion-free movement.

Integrated Technology

Our global, interconnected world is trending towards technology that can verify whether food is sourced in a sustainable, ethical, and consumption-safe manner. Innovations in production methods, storage and transportation, infrastructure, and information sharing are occurring across the value chain. As the pace of technological change continues to accelerate, priority should be given to technologies that enable comprehensive understanding of the interconnectedness of food, economic development, and environmental well-being. These technologies will give companies, governments, and individuals the knowledge and capabilities needed to make more informed decisions.

Regulation & Enforcement

Countries, economies, and cultures are beginning to look much more like the natural ecosystems they evolved from—increasingly interconnected and reliant upon each other. The food sector must push further to create an enforceable regulatory infrastructure that reflects this reality. Governments are already stepping up to pass legislation to protect intact habitats and natural ecosystems—either by prohibiting conversion in entire ecosystems or setting limits on permissible conversion. However, governments should play a greater supporting role in identifying high-risk environments, tracking conversion, and collaborating with industry actors to put in place transparency and regulations that will safeguard the reputation of both country and industry. Through close collaboration with the private sector and civil society, governments can better define policies to regulate conversion. Companies should abide by the most stringent policies, regardless of changes in administration, and prioritize environmental conservation independently of changing political climates.

Business Model Innovation

The emergence of new business philosophies that commit to benefitting all stakeholders—customers, employees, suppliers, communities, and shareholders—supports the notion that business model innovations are not far behind. Business leaders are increasingly expanding their focus from simply delivering profits to being custodians of value for a global community. The evolution of conscious consumerism combined with conversion-free standards make it prescient for companies to reinvent business models to be less volatile and resource-intensive and more responsive to future shareholders. Beyond the environmental benefits of conversion-free production, companies that intentionally evolve based on the latest research and technology will undeniably enhance their reputations and secure their business longevity.

Demand-Side Pressure

Corporations without visionary and sustainability focused leaders will only change behavior if their bottom-line is threatened or if there is an opportunity to increase top-line revenue through differentiated, conversion-free products. Consumers play an important role in spurring this demand-side pressure. For example, NYU Stern's Center for Sustainable Business completed extensive research into US consumers' actual purchases of consumer-packaged goods (CPG) and found that 50% of CPG growth from 2013 to 2018 came from sustainability-marketed products.[49] Catering to conscious consumers and forming stronger product connections between consumers and companies will likely result in continuous conversion-free purchasing decisions, whereby consumers back responsible businesses and leave damaging businesses out to expire.

IMMEDIATE OPPORTUNITIES

As these change enablers converge, opportunities for companies sourcing commodities have emerged to deliver measurable outcomes, if prioritized and implemented at a jurisdictional level. Irrespective of the opportunity, design and implementation must center on farmers and the challenges they face if there is to be sustained change in commodity markets. Companies must holistically address conversion and the related carbon impacts in their supply chains, taking care to prioritize conversion at both the production level and the feed or input level. Simultaneously, companies must implement measurement objectives and key performance indicators to accurately report on progress. Until companies embed measurement systems into their sourcing, the food industry will continue to fall short of the commitments being made. The following opportunities are derived from a synthesis of expert interviews and extensive literature. They are meant to stimulate ideation and collaboration among companies **directly sourcing commodities** and their **broader network of partners**.

BUILD TRACEABILITY BETWEEN UP AND DOWNSTREAM SUPPLY CHAIN ACTORS

Retailers, FMCGs, Traders & Processors, Feed Companies, Farmers

In complex global supply chains, the relationship between up and downstream supply chain actors is often opaque, leaving customers and brands unsure of the journey, identity, and risks of a product. Traceability software and blockchain technologies have emerged as important tools to connect purchasers to product attributes while also verifying production origin and methods. Although mapping these interactions is costly and complicated, Statista has projected that the global food traceability market will be worth over $16 billion by 2022.[50] First movers in this space will deploy end-to-end automated systems that form the foundation of sustainable or legal product claims. These systems play the dual role of empowering informed purchases while also building verified connections between all nodes of the supply chain. Companies who ignore the urgent need for traceability will ultimately face reputational risk as their products become less trustworthy than those of leading companies.

Covantis, a digital platform powered by artificial intelligence and blockchain technologies will be piloted in 2020 along select trade routes. Covantis will digitize the entire execution process for international agricultural bulk commodities, from contract management to vessel finalization,[51] creating trust, transparency, and traceability along the entire value chain. The solution is backed by a partnership between companies including Glencore, Archer Daniels Midland (ADM), Bunge, Cargill, COFCO, and Louis Dreyfus.[52]

ESTABLISH STRATEGIC PARTNERSHIPS AND DATA-BASED INTERVENTIONS

Retailers, FMGCs, Traders & Processors, Feed Companies, Governments, Civil Society, Farmers

Verification and monitoring systems like ***Global Forest Watch*** and ***Clark Labs Coastal Habitat Maps*** provide the interface and underlying data to help companies measure and manage impacts, but more strategic and effective farm-level interventions could be realized if these platforms were to merge with social landscape data that is representative of actors' resource flows, priorities, and values. As international regulations and consumer demands stress the importance of working in partnership with farmers to enact change, technology will play a critical role in the targeted deployment of resources. Combining geospatial mapping, social landscapes, and infrastructure data (e.g., ports, roads, and processing facilities) at the jurisdictional level would enable supply chain actors to develop strategies that are innovative, efficient, and focused on high-risk, vulnerable areas. Ultimately, solutions should strive to identify the agricultural assets causing the damage, the owners of those assets, and finally, those who have influence over those owners and their behaviors. Due to the geographic, historical, and cultural nuances of societies around the world, matching commitment makers with verified implementation partners on the ground could also lead to faster and more impactful results.

Global Forest Watch (GFW) collects, maps, and monitors data about the health of forests online for free, creating unprecedented transparency about what is happening in forests worldwide. The tool is employed by governments and the private sector to identify and eliminate deforestation in supply chains. GFW has built an extensive community of over 100 organizations and over one million users, forming partnerships which help to realize a more sustainable future for ecosystems.[53]

SHIFT ATTITUDES FROM CASUAL COMMITMENTS TO MEASURABLE ACTIONS

Retailers, FMGCs, Traders & Processors, Feed Companies, Governments, Civil Society, Farmers

Massive global asset managers like BlackRock and GPFG are signaling that corporations must move beyond commitments and take verifiable action to be eligible for investment. Per the 2020 Edelman Trust Barometer, 74% of consumers are asking CEOs to take the lead on change rather than waiting for government to impose it.* These trends highlight the evolving role of business in society and the opportunity for CEOs to treat commitments as if they were enforceable regulations, setting ambitious standards regardless of political, administration-specific priorities. Businesses should work to implement changes at the jurisdictional level and take the time to find implementation partners who understand local nuances and are capable of driving change. As businesses begin working at more granular levels, investments should be made in technologies that proactively and credibly verify ethical and sustainable claims within their value chains, instead of relying on advocacy groups to reactively sound the alarm. Finally, it is critically important for the financial arms of agribusinesses and lenders to completely halt investment in any endeavor that may involve the conversion of natural ecosystems.

*Up 9 percentage points since 2018

The ***Accountability Framework Initiative*** (AFi) was released in May 2019 after an open consultative process involving diverse stakeholder groups and led by a Steering Group of prominent NGOs, including The Nature Conservancy, Rainforest Alliance, World Resources Institute, and World Wildlife Fund. The AFi was created in response to the need for clear and unified guidance on how to set, implement, and measure progress towards supply chain commitments. The Framework offers companies a well-defined "roadmap" to the ethical supply chain journey. By using the Framework, companies can help ensure that their commitments, activities, monitoring systems, and reporting practices reflect common and agreed-upon norms and specifications.[54]

PROMOTE CONTROLLED INTENSIFICATION AND REGENERATIVE AGRICULTURE

Feed Companies, Farmers, Investors

Traditional agricultural practices deteriorate soil health by extracting valuable resources (e.g., nitrogen, water, and phosphorous) without replenishing them. Working with farmers on regenerative agriculture practices, which are carried out in tandem with sustainable intensification, leads to increased yields, decreased demand for additional land, and soil transformation from carbon source to carbon sink. The caveat is that intensification must be done sustainably, responsibly, and controlled, meaning that agricultural yields increase without adverse environmental impact, especially deterioration of soil health, and without the conversion of additional non-agricultural land. Farmed shrimp is a pertinent example since controlled intensive systems were designed to balance the dual goals of profitability and disease mitigation while increasing resource efficiency and reducing environmental impacts. As shrimp farms become more intensive, the operating costs and environmental burdens produced per unit decreases. This controlled intensification model should form the basis for sustainable intensification in commodity markets, wherever possible.

Feed companies are in a unique position to influence sustainable behaviors up and down stream within animal protein supply chains. On the one hand, sourcing practices like those employed by ***Biomar***[55] provide a demand signal to farmers, encouraging them to produce in accordance with leading standards and guidelines like those provided by ***The Roundtable on Sustainable Palm Oil***, ***Roundtable on Responsible Soy***, and the ***Proterra Foundation***. On the other hand, feed companies often have trusted relationships with farmers due to the symbiotic nature of their business models. Through these relationships, feed companies can educate farmers on resources that can move the needle on regenerative and sustainable intensification practices. Companies like ***XpertSea*** in the aquaculture space and ***Indigo Ag*** in the agriculture space offer a suite of products to help farmers on their journeys.

INCREASE FINANCIAL VIABILITY OF SMALLHOLDERS THROUGH CONNECTIVITY TO GLOBAL SYSTEMS

Retailers, FMCGs, Traders & Processors, Governments, Civil Society, Farmers

Creating sustainable business outcomes for smallholders requires an equal focus on environmental, social, and financial outcomes. Recent legislature and investment have been focused on establishing large corporate farms, leaving an significant opportunity to the livelihoods of smallholder constituents. Regulations must be put in place to overcome market failures, creating environments for fair trade between smallholder farmers and agribusiness and establishing democratic control over markets.[56] Commodity-dependent developing nations should ensure that foreign and domestic aid spending goes beyond establishing farming infrastructure and toward creating information networks that connect farmers to best practices and timely market information and creating educational outcomes that encourage independent critical thinking. Rural advisory, agricultural extension services, and farmer exchange programs should increasingly focus on engaging women who multiply the impact of investments by extending benefits to the world around them[57] and youth farmers who are more comfortable with digital technologies and bring innovative ideas to the industry. Furthermore, smallholders need formal access to risk management tools such as long-term contracts, employee stock ownership plans, or crop insurance to hedge against price swings and reduce exposure to the volatile nature of commodity markets.

Kennemer, a Philippine agribusiness company, offers comprehensive contract-growing programs to reliable farmers cultivating over a hectare of land. The program guarantees harvest buy-back at world prices, facilitates access to financing, and provides ongoing mentorship and training programs. The combined power of these interventions increases farmer income by 200-250%, according to the companies purchasing data.[58] Using an alternative approach, ***Project Nurture*** opened two new markets for smallholder farmers in Kenya and Uganda: 1) a new export market for high-grade mango and passion fruit and 2) a new domestic market for slightly blemished fruits. Between 2010 and 2015, nearly 54,000 farmers increased their fruit revenues by an average of 142%, according to a 2015 analysis by ***TechnoServe***.

SUPPORT COMPREHENSIVE LAND USE PLANNING

Governments, Civil Society, Farmers

National governance bodies should distinguish between ecosystem types when setting land use policies. This approach could ensure that ecosystems possessing vegetation and soil characteristics with high carbon sequestration potential are protected and prioritize 1.5 billion hectares of degraded land globally for development or restoration (e.g., the High Carbon Stock Approach implemented in Indonesia).[59] Due to existing infrastructure investments, degraded land is an especially good candidate for agricultural or livestock intensification, such as greenhouses, vertical farms and recirculating aquaculture systems), whose processes are not dependent upon soil health but can contribute to regeneration through responsible effluent disposal (e.g., manure, algae, etc.). As crises like the 2020 Amazon Fires highlight the dependency of the global population on the ecological assets of developing nations, it is critical for agribusinesses that often originate in affluent regions like North America and the European Union to work with local governments to protect and conserve ecosystems that are tantamount to global well-being. There is an opportunity to revolutionize the land planning process by better aligning land use to policy. These policies could take shape through international organizations, establishing a new land use framework that transcends political boundaries.

Reducing emissions from deforestation and forest degradation (REDD+) is a mechanism developed by Parties to the ***United Nations Framework Convention on Climate Change*** (UNFCCC). It creates a financial value for the carbon stored in forests by offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. Developing countries would receive results-based payments for results-based actions.[60] Under the REDD+ framework, Indonesia was able to meet their pledged Nationally Determined Commitment (NDC) to reduce deforestation, making them eligible for a payment of $24 million from Norway.[61] The ***High Carbon Stock Approach*** (HCSA) is one method that may be employed by countries to meet their NDCs by distinguishing forest areas for protection from degraded lands with low carbon and biodiversity values that may be developed. The methodology was developed with the aim to ensure a practical, transparent, robust, and scientifically credible approach that is widely accepted to implement commitments to halt deforestation in the tropics while ensuring the rights and livelihoods of local peoples are respected.[62]

CALL TO ACTION

> **Sentiment without action is the ruin of the soul.”**
>
> Edward Abbey
> Author and Environmentalist

Imagine a world where the production of the food we eat no longer threatens our natural world. Hundreds of years ago, people lived off the land in more harmony than at present. They were inherently respectful of nature and its importance to our survival. We must stop the strain that land conversion for food production is putting on the planet if we are to feed more than nine billion mouths—two billion more than today—by 2050.

The solutions are all around us. There are regulatory systems and circularity built into the cycles of nature. But by destroying whole ecosystems for short-term benefit, humans have tipped that balance and created almost irreversible damage. We must work collectively to act upon immediate opportunities to remedy these systemic impacts.

Innumerable experts promote collaboration and multi-stakeholder action as imperative to successful interventions, and the conversion-free movement will be no different. However, close examination of the institutions responsible for leading change very clearly illustrates the need for collaboration. According to the 2020 Edelman Trust Barometer – a survey of more than 34,000 adults in 28 countries – neither businesses, NGOs, nor government are viewed as both ethical and competent. NGOs are the only group seen as ethical, and businesses are the only group seen as competent. Governments are viewed as neither ethical nor competent and rank the lowest in serving the interest of the masses.[63]

This lack of confidence between society and the institutions that serve it underscores the need for collective action because of the gaps each group can fill for each other and the untapped innovation that would undoubtedly come from closer collaboration. Proving on a global scale that companies, NGOs, and governments can work effectively together to lead a movement removing conversion of critical natural ecosystems and habitats from our food supply chains could be a step towards shifting this distrust.

It is in this vein that we propose our call to action. Though this report specifically points to actors with substantial roles to play, we need all businesses, NGOs, governments, and farmers involved in food production to lend their voices and resources to the conversion-free movement. While positive change is already occurring, as evident from the breadth and depth of commitments worldwide, we must now translate those commitments into measurable action and build the socio-political infrastructure that will sustain them long-term.

Half the world's trees have already been cut down, and many other natural ecosystems continue to be underfunded and undervalued, accelerating the onset and risk of climate change. Avoiding large-scale conversion driven by commodity production and restoring degraded lands must occur before it is too late to reverse the damage. Food industry actors could profoundly change the story of global food production and the fate of remaining forests, grasslands, and wetlands by acknowledging nature as our life support system and a key to prosperity, and by working to end environmental degradation. With that express aim in mind, let us assume the first domino has fallen.

WWF and Accenture thank the industry experts who provided critical insights to inform this narrative.
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