CDP
DISCLOSURE INSIGHT ACTION

HUNGRY FOR CHANGE

Are companies driving a sustainable food system?

CONTENTS

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KEY TAKEAWAYS

For food system stakeholders

1

Achieving the Paris Agreement and Sustainable Development Goals will only be possible with a transformation of the global food system. Scientific consensus confirms this transformation must include a transition to more plant-rich diets that include alternative protein sources (particularly in regions of high per capita meat consumption), increased agricultural productivity without expanding agricultural land and water use, protecting and restoring natural ecosystems including forests, increased adoption of nature-based solutions and reduced food loss and waste.

- Even with complete elimination of fossil fuels, GHG emissions from the food system are on track to prevent the world from limiting warming to both the 1.5°C and 2°C targets.[1] There is a remarkable opportunity for food systems stakeholders to be a key part of the solution to tackling climate change and environmental degradation.
- The next ten years are critical and will require all players from across the food value chain to move away from business as usual.

2

The global food value chain is a complex system, and impacts at one level have significant implications for others. COVID-19 has demonstrated this, but future climate shocks also present a threat. Companies must go beyond disclosure to monitor and fully engage their value chains to address critical physical climate and environmental risks – but such engagement is lacking.

- Companies in CDP's Food Value Chain sample (FVC) cited value chain risks from changing precipitation patterns at 4x the rate of non-food companies (24% vs. 6%). Yet, only 16% of climate change disclosers and 21% of water security disclosers engage with all levels of the value chain; about half of forests disclosers fail to engage beyond first-tier suppliers to ensure sustainable production and consumption of forest-risk commodities like cattle. This transparency is important and increasingly being demanded by investors and consumers alike.

3

Food Value Chain companies face significant impacts and risks, and there may be more lurking than disclosure reveals. But the pathway to a sustainable food system also presents a remarkable opportunity for companies that take swift, bold action. While there are promising signs of companies identifying and capitalizing on opportunities, there is a critical shortage of reported opportunities aimed at increasing resilience in the face of a changing environment.

- Risk assessment is a vital process that helps companies understand their vulnerabilities and drive appropriate action where it's needed most. While most companies across the Food Value Chain identify substantive risks from their assessments, many others foresee risk but do not think it will impact business. Viewed in aggregate, these risks may be material and suggest that risks to the global food system may be more prevalent and severe than corporate disclosure alone reveals.
- Companies are showing signs of capitalizing on opportunities to implement resilience into their direct operations and supply chains. 80% of companies implement management practices on their own land with a climate change mitigation and/or adaption benefit, and several of those cite benefits beyond climate mitigation, including benefits to biodiversity, soil, water and their annual yield. And 78% of companies encourage their suppliers to undertake agricultural or forest management practices with climate change mitigation and/or adaptation benefits. But opportunities to increase resilience are outnumbered more than two to one by opportunities related to products and services, revealing a critical gap to corporate ambition.

4

There is an opportunity to drive a shift to a sustainable food system – but most companies operating in the global food value chain are falling behind on key actions to incentivize sustainable best practices.

- The FVC sets Science-Based Targets (SBTs) and utilizes water pricing at a higher rate than the Global Sample, demonstrating leadership in these key areas.
- However, while nearly 90% of all disclosed emissions from FVC companies come from the value chain, just 16% of companies have targets that address value chain emissions explicitly. And just 14% of FVC companies have a water quality target, suggesting action may be lacking to address discharge, pollution and other important issues.

KEY ACTIONS

For companies

To ensure they are doing all they can to deliver on the Paris Agreement and Sustainable Development Goals, companies in the food value chain must strategically assess their role in a sustainable food future. Some companies are waking up to this transformational opportunity. The number of companies setting targets, especially SBTs, is increasing year on year, and FVC companies that assess risk and engage their value chains are finding strategic value in doing so, particularly around smallholder engagement and opportunities like product innovation to meet changing consumer demands.

While there are a handful of companies demonstrating leadership in practices that support this transition, further adoption by the entire FVC is necessary to drive change. There are specific actions backed by science and research that point to the way forward:

1 **MEASURE, MANAGE AND REPORT** both the climate and environmental risks and impacts that FVC companies may be exposed to in their direct operations and value chains from farm to fork, as well as the impacts that they are responsible for.

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2 **INCENTIVIZE AND SUPPORT VALUE CHAIN PARTNERS** – particularly smallholder farmers – to support the adoption of productive, resilient and regenerative agricultural practices.

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3 **IMPLEMENT FORWARD-LOOKING MECHANISMS TO PLAN FOR THE LOW-CARBON TRANSITION,** including setting verified science-based emissions reduction targets, along with forests- and water-related targets, conducting scenario analysis and setting internal carbon and water prices.

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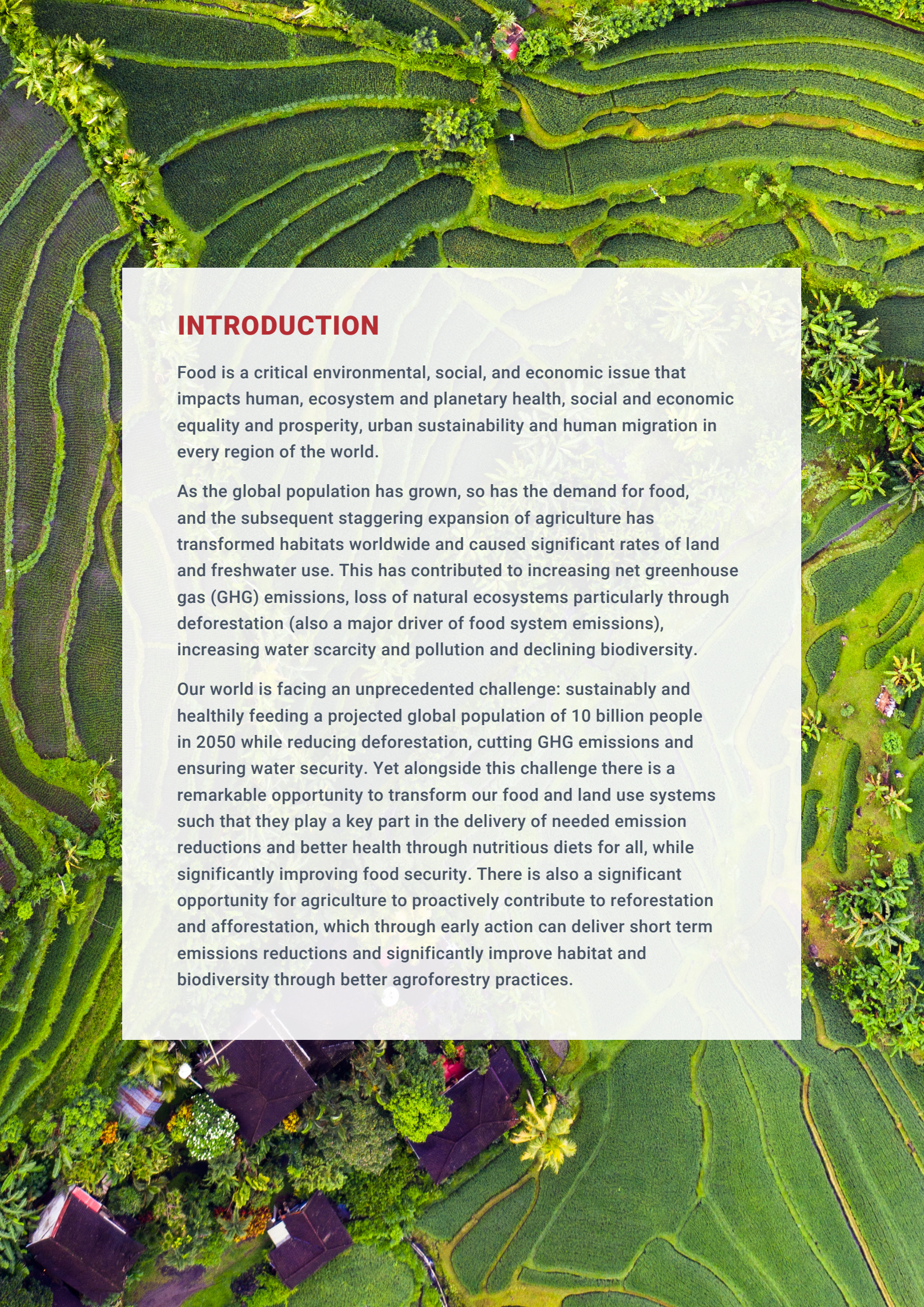
4 **ALIGN PRODUCT PORTFOLIOS, MANAGEMENT INCENTIVES, R&D AND MARKETING SPEND** with regional variations of the EATLancet Planetary Health Diet, alongside efforts to build value chain resiliency.



INTRODUCTION

Food is a critical environmental, social, and economic issue that impacts human, ecosystem and planetary health, social and economic equality and prosperity, urban sustainability and human migration in every region of the world.

As the global population has grown, so has the demand for food, and the subsequent staggering expansion of agriculture has transformed habitats worldwide and caused significant rates of land and freshwater use. This has contributed to increasing net greenhouse gas (GHG) emissions, loss of natural ecosystems particularly through deforestation (also a major driver of food system emissions), increasing water scarcity and pollution and declining biodiversity.

Our world is facing an unprecedented challenge: sustainably and healthily feeding a projected global population of 10 billion people in 2050 while reducing deforestation, cutting GHG emissions and ensuring water security. Yet alongside this challenge there is a remarkable opportunity to transform our food and land use systems such that they play a key part in the delivery of needed emission reductions and better health through nutritious diets for all, while significantly improving food security. There is also a significant opportunity for agriculture to proactively contribute to reforestation and afforestation, which through early action can deliver short term emissions reductions and significantly improve habitat and biodiversity through better agroforestry practices.

THE CHALLENGE

In 2015, 194 countries and the European Union signed the Paris Agreement[i], agreeing to reduce emissions year on year to limit global temperature rise to "well-below 2°C" and to further pursue efforts to limit that increase to 1.5°C, the point beyond which the Intergovernmental Panel on Climate Change (IPCC) has warned will result in increased frequency and intensity of serious climate impacts that in themselves affect our ability to grow ample, nutritious food. Since then, however, emissions have continued to rise, and even if all Nationally Determined Contributions (NDCs) are realized, temperatures are still projected to increase to 3.2°C by 2100.[2] If we are to be successful in reaching this ambitious (but critical) target, we will need to halve emissions by 2030, reach net-zero emissions by 2050 and become carbon-negative thereafter.[3] This will require reductions across all major sectors, including the food system.

Cutting emissions from the food system has received less attention than other sectors such as fossil fuels "perhaps because these emissions might seem to be an unavoidable environmental cost of feeding humanity."[4] However, recent research has shown that even if a rapid reduction in fossil fuels were achieved, GHG emissions from the food system alone are currently on track to prevent the achievement of either the 1.5°C or 2°C target.[5]

There is consensus in the research community that achieving the Paris Agreement targets will require extensive and unprecedented changes to the global food system — changes that can also advance the targets set forth in the United Nations' Sustainable Development Goals (SDGs). Many of these goals are intrinsically tied to the food system. Goals 2 (zero hunger), 3 (good health and well-being) and 12 (responsible consumption and production) speak to agriculture's challenge: to provide nutrition and health within planetary boundaries, requiring the reversal of current trends of agricultural production.[6] Goals 6 (clean water and sanitation), 13 (climate action), 14 (life below water) and 15 (life on land) are unachievable without the transformation of agriculture.[7,8] And goal 8 (decent work and economic growth) is agriculture's opportunity to bring greater equity and parity to the food system by addressing labor compensation and safety issues.[9]

In its report on land use and climate change, the IPCC was clear that a rapid change in course — a fundamental change — at a global scale in how we consume and grow our food, particularly with respect to how we utilize land and water resources, is necessary.

To meet the challenges laid out by the Paris Agreement and the SDGs, systemic and transformational change to our food system within the next ten years is critical. It lies at the heart of the necessary solutions to tackle climate change, reduce water stress, pollution and deforestation, restore lands and protect the world's biodiversity; and to do so equitably in a way that betters the lives of those people dependent on the food system for sustenance and livelihood. With multiple, inter-related issues, it will not be possible to pursue one aspect of the solution to the exclusion of the others.

i As of November 2020, 194 states and the EU have signed the Agreement. 187 states and the EU, representing 79% of global GHGs, have ratified or acceded the Agreement. The United States has left the agreement.

ENVIRONMENTAL IMPACTS OF THE FOOD SYSTEM:

By the numbers

AGRICULTURE AND LAND USE CHANGE

Land use is a key driver of both the emissions generated from food production and the emissions the global food system has the potential to sequester. Forest preservation is one of the most efficient ways to meet global emissions reductions goals.[ii] In January 2020, the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) launched the GHG Protocol for Carbon Removals and Land Sector Initiative, which will explain how companies should account for and report carbon removals and storage in GHG inventories, including emissions and removals from land use, land use change, bioenergy and related activities, building on the Corporate Standard and Scope 3 Standard.

This report analyzes corporate disclosures from 2019 and as such, there was no clear guidance or expectation for companies to account for and disclose emissions from land use and biogenic sources.

That said, just one FVC company explicitly disclosed Scope 1 emissions from land use change to CDP, while 40% of primary producers and 18% of processors and wholesalers said that biogenic carbon pertaining to direct operations is considered relevant to their disclosure.

With better resources available to companies for understanding and reporting their biogenic and land use change emissions, we expect this critical element of disclosure to improve and allow for more detailed analysis and evaluation as to how companies are taking action to meet this part of a sustainable food future.

ii "By the Numbers: The Value of Tropical Forests in the Climate Change Equation." WRI. https://www.wri.org/blog/2018/10/numbers-value-tropical-forests climate-change-equation

CLIMATE

The food system contributes approximately one quarter of all GHG emissions, with the latest IPCC research estimating Agriculture, Forestry and Other Land Use (AFOLU) activities account for 23% of total net anthropogenic GHG emissions. If emissions associated with pre- and post- production activities in the global food system are included, it is estimated that this share increases to as much as 37%. Driving up this number are two very potent GHGs, with 50% of global human-caused methane emissions coming from agriculture (mostly from livestock and rice cultivation) and up to 75% of nitrous oxide emissions coming from the use of nitrogen fertilizer in the field. Of the food that is produced, 25-30% is lost or wasted both in the food production process and by consumers, leading to additional GHG emissions and wasted resources.[10]

FORESTS AND LAND

Half of the world's habitable land is used for agriculture, the majority of which (77%) is used to graze livestock and grow their feed.[11] The conversion of natural ecosystems (i.e. permanent land use change) through deforestation to produce agricultural commodities including beef, soy, palm oil and wood fiber — four of the forest-risk commodities on which companies are asked to disclose through CDP's forests questionnaire, three of which are analyzed in this report[iii] — has led to over a quarter of global forest loss.[12] Forests are a natural carbon sink, and their destruction, and subsequent release of stored carbon, has a significant impact on the climate.

This is particularly notable in the world's most biodiverse regions — for example, 80% of deforestation in the Amazon is caused by cattle ranching.[13] Research shows that even if we ceased fossil fuel use immediately and phased out all anthropogenic emissions, we could still see a 2°C global temperature increase by 2100 if deforestation continues at its current rate.[14] The IPCC has been clear that we cannot address the climate crisis without ending deforestation, and, therefore, a necessary shift in the utilization of deforestation-risk commodities in our food system.

iii This report analyzes 2019 data. As of 2020, CDP's forest risk commodities also include coffee, rubber, and cacao. In addition, wood fiber is a commodity in 2019 and onward, but is excluded from this analysis as a non-food commodity.

ENVIRONMENTAL IMPACTS OF THE FOOD SYSTEM:

By the numbers

WATER SECURITY

Water diverted to agriculture's roughly 300 million hectares accounts for 70% of global freshwater withdrawal and 93% of water depletion globally.[15] Growing food is therefore not only a land-intensive, but a thirsty endeavor. Research by WRI using their Aqueduct Food tool indicates that water withdrawals are already too high relative to available supply, with one-third of irrigated cropland located in areas of extremely high water stress — and this is projected to increase to 40% by 2040.[16] Additionally, agricultural effluent is responsible for 78% of global ocean and freshwater eutrophication.[17]

BIODIVERSITY

Agriculture is driving the replacement of the natural ecosystem with one shaped by humans. Forests and grasslands are being converted to cropland, and natural wetlands — approximately 70% of which have been lost to agriculture and urban expansion since the 20th century — are being replaced by rice-paddies and water storage bodies.[18]

The loss of habitat to agriculture has major repercussions for biodiversity. Increased use of pesticides and fertilizer and monocropping is reducing critical biodiversity in crop fields.[19] Beyond the land, aquaculture is heavily impacting already imperiled coral ecosystems and reducing fish stocks around the world.[20] Species in freshwater ecosystems have seen an 84% average decline in population since 1970, and approximately one-third of biodiversity loss in rivers, lakes and wetlands globally is estimated to be a result of excessive algal growth caused by eutrophication (largely driven by pollution from nutrient-rich agricultural runoff).[21]

How we produce, process, distribute, market and consume our food is a deeply interdisciplinary environmental issue that exacerbates, but at the same time is significantly impacted by, climate change and relies on finite natural resources. With rising temperatures comes increasingly unpredictable precipitation patterns, increased soil degradation and increased frequency of extreme weather events that can negatively impact yields and production. Farmers and other primary producers are struggling with these impacts, and evidence suggests a ripple effect is impacting the bottom line of large corporations dependent on complicated and vast global supply chains.

Feeding the world is a massive undertaking, and how we do so has significant implications for the state of the environment and natural ecosystems. Different commodities have varying degrees of impact, and so what we chose to grow, and the processes we use, can dictate the sustainability of the food system.

Most food-related GHG emissions globally (31%) come from on-farm livestock and fisheries, primarily in the form of methane emitted through enteric fermentation of ruminant animals (particularly beef cattle), along with manure management. Of the remaining GHG emissions entering the atmosphere annually, 27% comes from crop production (21% from production for human food and 6% from production for animal feed), 24% comes from land use change (16% for livestock grazing and 8% for human food production) and 18% is emitted in the subsequent value chain processes like transport, packaging and retail.[iv]

Some of the crops that the world most relies on for food are very resource intensive – 700 million tonnes of rice, for example, are produced annually, contributing 1.3 billion tonnes CO2e and a water scarcity footprint of almost 600 billion cubic meteres. Likewise, the 255 million tonnes of soybeans harvested annually contribute an outsized 700 million tonnes of CO2e, and 700 million tonnes of wheat have a water scarcity footprint of over 400 billion cubic meteres.[v]

But perhaps the most remarkable example of a resource-intensive commodity is cattle. Ruminant livestock (mostly cattle but also sheep and goats) use two-thirds of global agricultural land and consume one-third of all cereal crops we produce, translating to a total water requirement of about 1,800 gallons per pound (by comparison, soybeans require 216 gallons and corn 108). In addition, livestock contributes roughly half of agriculture's production-related emissions, due in part to the high emissions intensity of cattle – approximately 300kg CO2e per kg.[vi] Yet despite these intensive impacts, livestock production provides only 20% of global calories.

iv, vi Ritchie, Hanna (201). "Food production is responsible for one-quarter of the world's greenhouse gas emissions." Our World in Data. https://ourworldindata.org/food-ghg-emissions.

v Pearl Martinez, Rebecca and Time Gore (2016). Feeding climate change: What the Paris Agreement means for food and beverage companies. Oxfam International. https://www.oxfam.org/en/research/feeding-climate-change https://foodtank.com/news/2013/12/why-meat-eats-resources

THE FUTURE OF OUR FOOD SYSTEM IN A CHANGING CLIMATE

Companies in the corporate Food Value Chain are in some parts recognizing the challenges they face, the opportunities available to them and the key role they play in meeting the goals of the Paris Agreement and delivering the SDGs. But there are also remarkable unrecognized opportunities for companies and the world in the transformation of the food system.

The Food and Land Use Coalition (FOLU) has estimated that the food and land use systems generate hidden environmental, health and poverty costs estimated at almost US$12 trillion a year. These costs are expected to grow significantly with current trends leading to irreversible damage to key ecosystems and fundamentally undermining food security in certain regions.[22]

Failing to adjust course puts critical climate and environmental targets out of reach, undermines food security and will lead to market disruption.

Various scientists and stakeholder groups have put forward frameworks, strategies and analyses to determine what actions to deploy in the global food system to drive this critical transformation and deliver the wide array of benefits.[vii] Clark et al. point to five specific strategies that in combination can ensure the food system contributes to the necessary emissions reductions to keep global warming to 1.5°C.[23] These strategies include shifting global diets toward a plant-rich diet that contains moderate amounts of dairy, eggs and meat (i.e. the planetary health diet); adjusting per capita calorie intake across the world to healthy, recommended levels; increasing global yields by 50% above current maximum capacity by improving crop genetics and other agronomic practices; cutting food loss and waste by half; and reducing by 40% the emissions intensity of certain foods by increasing the efficiency of production through management practices like precision agriculture and/or utilizing technological solutions.

Taken individually, the research suggests that the single largest reducer of emissions from the food system would be from adopting a plant-rich diet globally, which could reduce emissions 48% from the business as usual scenario (BAU). But although each of these five solutions present promising opportunities, none of them alone are sufficient and their implementation in tandem is necessary. If all strategies are implemented to half completion, global emissions from the food system could be reduced 63% from BAU by 2100, giving the food system a 67% chance of meeting the 1.5°C target. Better yet, complete adoption and implementation of these strategies "could result in a food system with marginally negative net cumulative emissions because of lowered emissions and net carbon sequestration on abandoned croplands."[24]

The World Resources Institute has similarly put forward a "menu" of actions necessary (see Table 1) to address what they define as the food, land and emissions gaps that must be closed to achieve a sustainable food future.[25] FOLU also proposes structuring the needed transformation of the food and land systems in ten critical transitions, covering what we eat and how we grow and distribute foods in ways that also protect nature, expand consumer choice and supply options and make the system fairer, creating opportunities for all (see Table 1).

FOLU estimates that achieving these ten transitions would generate a societal return of around US$5.7 trillion annually by 2030 (US$10.5 trillion by 2050) — more than 15x the investment cost of US$300-350 billion per year required for the transformation of the food and land use system — and create new business opportunities worth up to an additional US$4.5 trillion a year by 2030.[26]

While it has been stated by many leaders in this space that there is no silver bullet solution in this transformation, there is broad consensus and alignment around the necessary transitions. Given the increasing scientific basis calling for food system transformation, companies must strategically assess their role in this transformation. This report analyzes the responses from companies who operate within the "food value chain" to CDP's climate change, water security and forests questionnaires in 2019, in order to establish a baseline of what companies are doing, and where the opportunities lie to catalyze this transformation.

vii Note that the magnitude and direction of each strategy or transition will vary depending on various country contexts and nutritional needs.

TABLE 1

Frameworks for transitioning to a sustainable food future

WRI's 'Menu for a Sustainable Food Future'*

*Listed in approximate order of magnitude of impact

1. **INCREASED FOOD PRODUCTION WITHOUT EXPANDING AGRICULTURAL LAND**
   Raising productivity through increased efficiency of natural resource use paired with efforts to protect forests, savannas and peatlands from conversion to agriculture

2. **REDUCE GROWTH IN DEMAND FOR FOOD AND OTHER AGRICULTURAL PRODUCTS**
   Reducing food loss and waste, shifting to healthier and more sustainable, plant-based diets, avoiding further expansion of biofuel production and improving women's access to education and healthcare in Africa (reductions in fertility rates to replacement rates)

3. **REDUCING GHG EMISSIONS FROM AGRICULTURAL PRODUCTION**
   Reducing emissions through improved management practices, more detailed analysis and tracking of agricultural production systems and improved technological innovation

4. **RESTORING NATURAL ECOSYSTEMS**
   Reforesting abandoned, unproductive and liberated agricultural lands and conserving and restoring peatlands to offset remaining emissions

5. **BOOSTING FISH SUPPLY**
   Improving wild fisheries management and the productivity and environmental performance of aquaculture

FOLU's Ten Critical Transitions to Transform Food and Land Use

1. **HEALTHY DIETS**
   Shifting diets towards local variations of the predominantly plant-based "human and planetary health diet"

2. **PRODUCTIVE AND REGENERATIVE AGRICULTURE TO SUPPORT MORE EFFICIENT USE OF RESOURCE INPUTS**
   Combining traditional techniques, such as crop rotation, controlled livestock grazing systems and agroforestry, with advanced precision farming technologies

3. **PROTECTING AND RESTORING NATURE**
   Ending conversion of forests and natural ecosystems, as well as investment in restoration at scale

4. **HEALTHY AND PRODUCTIVE OCEAN**
   Increasing supply of ocean proteins through sustainable fishing and aquaculture

5. **DIVERSIFYING PROTEIN SUPPLY**
   Rapidly developing diversified sources (aquatic, plant-based, insect-based and laboratory-cultured) to support dietary transition

6. **REDUCING FOOD LOSS AND WASTE**

7. **STRENGTHEN AND SCALE EFFICIENT AND SUSTAINABLE LOCAL FOOD ECONOMIES IN CITIES**

8. **HARNESSING THE DIGITAL REVOLUTION TO INFORM CONSUMPTION AND PRODUCTION CHOICES AND CONNECT THE VALUE CHAIN**

9. **STRONGER RURAL LIVELIHOODS**

10. **ENSURING EQUAL ACCESS TO RESOURCES FOR WOMEN AND ACCELERATING TRANSITION TO REPLACEMENT FERTILITY RATES**

DEFINING THE FOOD VALUE CHAIN: CDP'S "FOOD VALUE CHAIN SAMPLE"

A comprehensive understanding of the flows of production from farm to fork and of the companies contained therein is necessary to meet the challenges to the food system. A value chain level analysis can offer insight into key issues and actions for companies in different food-based sectors and allow policy makers and investors insight into the levers available to them to drive positive change.

CDP's Food Value Chain (FVC) is based on previous work conducted by the Food and Agriculture Organization of the United Nations (FAO), which defines the food value chain as "the full range of farms and firms and their successive coordinated value-adding activities that produce particular raw materials and transform them into particular food products that are sold to final consumers and disposed of after use"[viii]. This consists of a 'core' and an 'extended' food value chain with the 'core' comprising actors that own and add value directly to the product throughout the chain. For the purpose of this analysis, CDP focuses on the 'core' food value chain; however, a subsection of production input companies in the 'extended' value chain that provide some basic materials for crop production (i.e. agrochemical producers) have additionally been included, based primarily on the significant environmental impacts of nitrogen fertilizers when used at the farm level.

The FVC Sample therefore includes companies responsible for creating the material and chemical inputs to agriculture ("production inputs"), farmers, ranchers, and aquaculturists ("primary producers"), companies that gather and refine product prior to its delivery to market ("processors and wholesalers") and the stores and food service companies that sell the finished food product ("retailers").[ix]

Throughout this report, all other companies disclosing to CDP in 2019 that are not part of the FVC are considered together as the CDP Global Sample.

The companies in CDP's FVC form a diverse subset, spanning multiple sectors ranging from bars, hotels and restaurants to farmers, chemical producers and the multinational conglomerates that move food through the system, all with primary business activities falling into the defined FVC for the purposes of this report. Representation is notably cross-thematic when compared to the Global Sample, demonstrating the cross-cutting nature of the food system – 45% of companies that responded to all three thematic questionnaires in 2019 (climate change, water security and forests) are in the FVC. In addition, 40% of all forests disclosures are in the sample due to the materiality to agriculture and food of nearly all the forest-risk commodities included in CDP's disclosure (palm oil, soy and cattle).

viii Neven, David. (2014). Developing sustainable food value chains. Food and Agriculture Organization of the United Nations. http://www.fao.org/3/a-i3953e.pdf

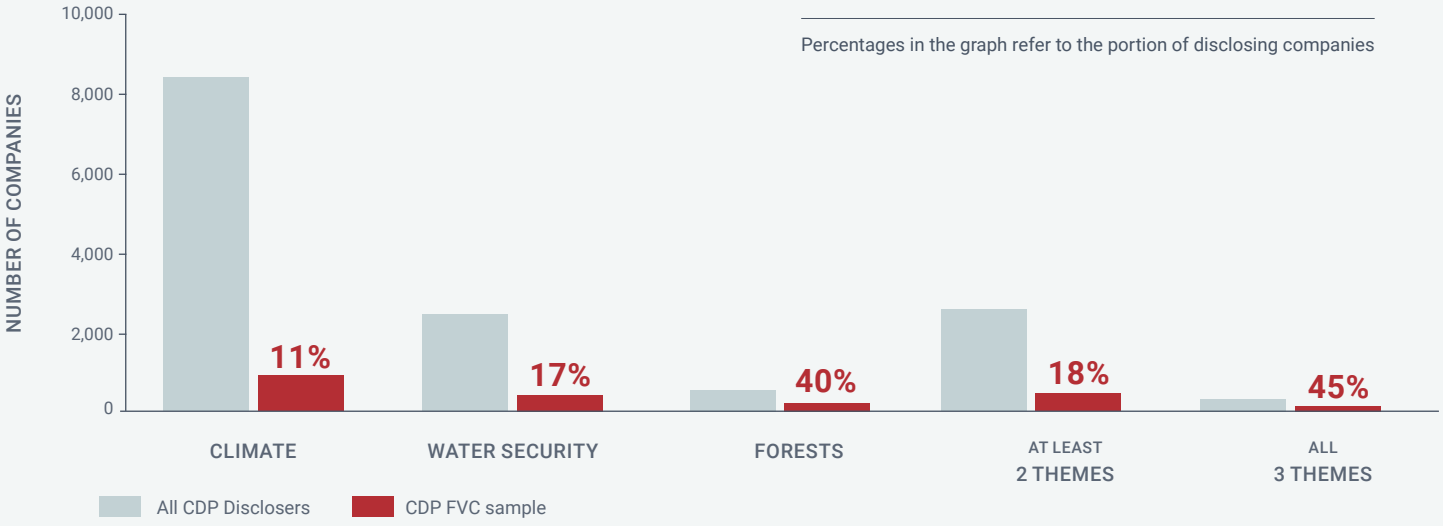
ix See Appendix 1 for more information on the methodology

HOW DOES THE SAMPLE STACK UP?

- 1,408 unique FVC companies were requested to disclose to at least one of the three CDP focus areas (climate change, water security and forests): 31 production inputs; 132 primary producers; 1,058 processors & wholesalers; and 187 retailers.[x]

- Of all the companies that submitted their disclosure to CDP in the 2019 cycle, the FVC sample represents 11% of all climate change, 17% of water security and 40% of forests submissions, as well as 45% of companies that submitted all three, demonstrating the cross-cutting nature of food.

Food Value Chain sample coverage



Top 10 Companies in the FVC by market cap[xi]

1. **WALMART, INC.** — Retailer
2. **NESTLÉ** — Processor and Wholesaler
3. **THE COCA-COLA COMPANY** — Processor and Wholesaler
4. **PEPSICO, INC.** — Processor and Wholesaler
5. **MCDONALD'S CORPORATION** — Retailer
6. **COSTCO WHOLESALE CORPORATION** — Retailer
7. **ANHEUSER BUSCH INBEV** — Processor and Wholesaler
8. **STARBUCKS CORPORATION** — Retailer
9. **MONDELEZ INTERNATIONAL INC** — Processor and Wholesaler
10. **TARGET CORPORATION** — Retailer

Top 10 Companies in the FVC by emissions[xii]

1. **WALMART, INC.** — Retailer
2. **NESTLÉ** — Processor and Wholesaler
3. **CARREFOUR** — Retailer
4. **CARGILL** — Processor and Wholesaler
5. **YARA INTERNATIONAL ASA** — Production Inputs
6. **MITSUBISHI CORPORATION** — Processor and Wholesaler
7. **TARGET CORPORATION** — Retailer
8. **COSTCO WHOLESALE CORPORATION** — Processor and Wholesaler
9. **TESCO** — Retailer
10. **PEPSICO, INC** — Processor and Wholesaler

x Of the FVC companes found in S&P500, the FTSE All World index, and in the top 500 global companiesby market cap, most are processors and wholesalers followed by retailers. The sample's heavy skew toward processors and wholesalers reflects the material concerns of investors. In addition, by definition the processosr and wholesalers category is broad stroke, including any company involved in the aggregation or distribution of materials, whereas the other categories refer to unique activities and therefore contain fewer companies. This ensures the breadth of imapct of these aggregator companies is captured without diluting the data of the other three value chain levels.

xi Data provided by Bloomberg; Market Capitalization as of October 2020

xii Data from CDP's 2019 Full GHG Dataset

HOW DO FOOD VALUE CHAIN COMPANIES IMPACT THE ENVIRONMENT AND HOW CAN THE CHANGING ENVIRONMENT IMPACT THEM?

The food system is responsible for around 1/4 of global GHG emissions and uses a significant portion of land and water resources.

But where in the value chain are the impacts and environmental externalities found?

ENVIRONMENTAL IMPACT TYPE:

GHG Emissions | Water Stress and Pollution | Deforestation and Land Use Change | Energy Use | Food Waste

	ENVIRONMENTAL IMPACT	POINT OF IMPACT	IMPACT TO FOOD SYSTEMS	DOWNSTREAM IMPACTS
WARMING CLIMATE	Increased pest and disease transmission	Primary Producers, Consumers	**Reduced Yields:** Crop blights **Human Health:** Increased chemical application, antibiotic resistance, zoonotic disease; **Biodiversity Loss:** More pesticide application	Costs are passed on to subsequent levels including consumer food security; Supply chain disruption; global pandemicy
WARMING CLIMATE	Climate Shocks (extreme weather)	Primary Producers, Processors and Wholesalers	**Reduced Yields:** Crop and animal loss; **Supply Chain Disruption:** Impeded transportation and operations	Supply shortage on retail shelves
WARMING CLIMATE/ DEFORESTATION	Land degradation and desertification	Primary Producers	**Increased Production Costs:** more water, land, fertilizers needed for production **Reduced Yields:** Reduced soil health, less productivity, water scarcity, drought, and unpredictable weather	Costs are passed on to subsequent levels including consumer; food security
WATER STRESS	Water scarcity, drought, and unpredictable weather	Primary Producers	**Reduced Yields:** Crop loss **Supply Chain Disruption:** Food and feed shortages	Costs are passed on to subsequent levels including consumer food security; Supplychain disruption

PRODUCTION INPUTS PRODUCERS

Agrochemicals

CO_2

high energy usage

Production inputs are highly water-intensive, especially those using phosphate and potash

1/4 of global deforestation due to production of agricultural commodities

50% of the world's available land is used for agriculture of which 77% is used for livestock and growing their feed.

The majority of food-related emissions happen at the production level from livestock and crop production and land cleared for food production

CO_2

CO_2

70% of global freshwater is used for agriculture

CH_4

Over 50% of human caused CH_4 is from livestock and rice production

PRIMARY PRODUCERS

Raw agricultural commodities

Run-off of fertilizers and manure causes 1/3 of riverine biodiversity loss via eutrophication and is a leading cause of contamination in estuaries and groundwater.

CH_4

as it breaks down food waste creates CH_4

1/3 of global food is wasted

CONSUMERS

Unused or unsold food ends up in the landfill

Pre-consumer food loss due to lack of storage infrastructure such as refrigeration

CO_2

CH_4

CO_2

N_2O

PROCESSORS AND WHOLESALERS

Final product for purchase

high energy usage

CO_2

energy usage

RETAILERS

Sale of fresh or packaged food products

WHAT ARE COMPANIES DISCLOSING?

Disclosure forms the bedrock of ambitious action. By disclosing on their environmental performance, companies can get ahead of regulatory and policy changes, identify and tackle growing risks and find new opportunities for action that investors and customers worldwide are demanding. But disclosure forms only the first step in transparency, and not all disclosure is equal. To move from the early stages of transparency to the advanced stages of leadership, companies disclosing to CDP must provide data and information for the aspects of their direct and indirect operations that are most critical to the sustainable future of the global food system, and that provide further insights into their planning and business strategy that are reflective of their position and role in the food value chain. Analysis of 2019 CDP data shows that FVC companies are not adequately disclosing in important areas like value chain (Scope 3) emissions, activities in water stressed areas, and traceability of the commodities on which they rely for revenue.

Disclosure

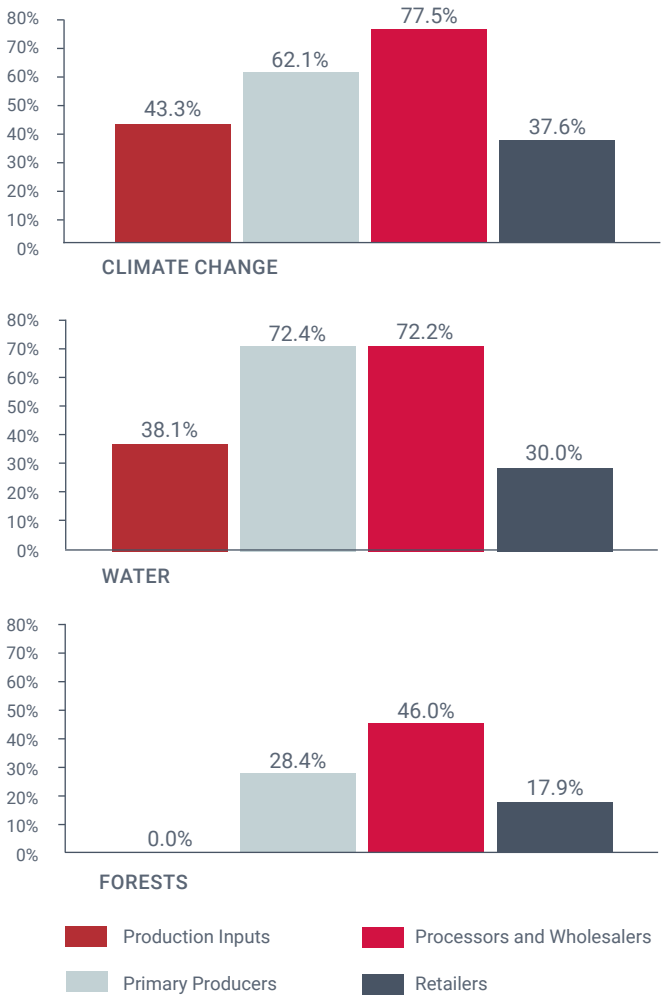
Broadly, the FVC has a relatively high disclosure rate: 70% of requested companies disclosed on climate change and 65% on water security — higher rates than for the Global Sample.[xiii] However, when analyzed at the value chain level, disclosure across climate change, water security and forests lags for production input and retail companies. Disclosure on forests is best understood at the commodity level.[xiv] Slightly more than half of all companies expected[xv] to disclose on palm oil in the FVC did so, leading cattle products (46%) and soy (41%).

Essential issue coverage

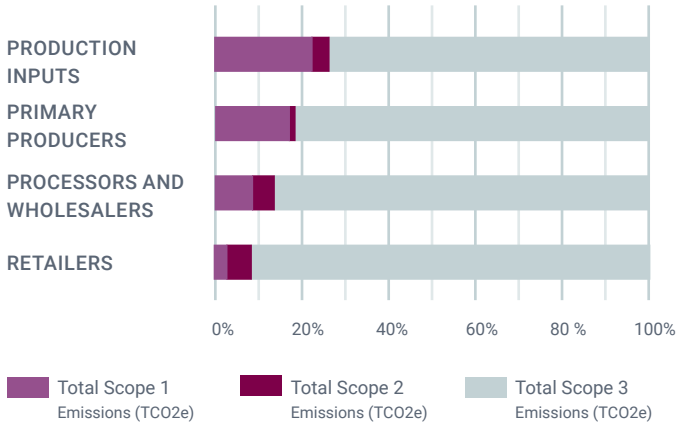
CLIMATE CHANGE

Emissions are the fundamental driver of climate impacts, and emissions can only be managed when their sources are understood. Most emissions – 88% – from FVC companies come from sources outside their direct control (Scope 3 emissions). In every level of the value chain, these Scope 3 emissions account for at least 74% of the total, increasing linearly through the value chain from primary inputs to retailers where it accounts for 92% of total emissions.[xvi] Comprehensive reporting of these emissions is lacking in the FVC: while 81% of FVC companies report Scope 1 and two-thirds report Scope 2, less than 60% of companies report Scope 3 emissions for categories relevant to their business. In many cases Scope 3 emissions are reported by FVC companies at higher rates than the Global Sample, but the rates of reporting fall below reporting of Scope 1 and 2 emissions. It is critical that companies report their Scope 3 emissions to CDP to ensure full transparency and enable direct action where it is needed most.

Food Value Chain responses rates



Food Value Chain emissions by Scope



xiii For the overall 2019 disclosure cycle, 67% of companies in the Global Sample disclosed on climate and 62% on water security.

xiv Companies requested in 2019 to respond to CDP's forests questionnaire answer questions on one or more forest commodity: timber, soy cattle, and palm oil. Timber excluded from analysis for the purposes of this report.

xv CDP determines the companies that are expected to use or produce a given commodity based on their assigned business activity (CDP-ACS).

xvi Emissions analysis in this report uses data from CDP's Full GHG Dataset (201), which in addition to raw company-reported data includes estimated emissions at a company-level based in part on cleaned and modelled data. When calculating emissions, a heirarchy was used to ensure that the best available data is always incorporated into aggregated emissions numbers.

WATER SECURITY

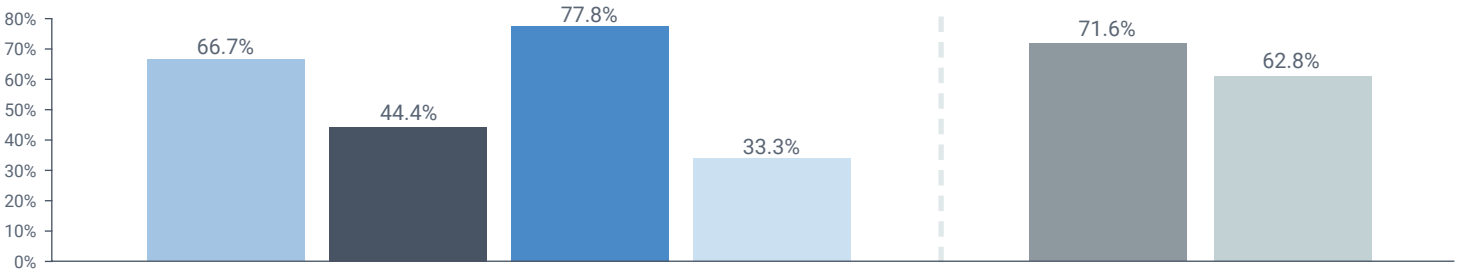
Put simply, there can be no food without water. Less than one percent of freshwater globally is available for human use, and 70% of that is estimated to be used for growing food and raising animals[27] and much of the world's agricultural expansion is taking place in water stressed regions.[28] Further, three quarters of FVC companies are rated Very High or Critical by CDP's Water Impact Matrix.[xvii] Therefore it is critical that companies understand their impacts on water quality and quantity and thus monitor water discharges, total withdrawals, and withdrawals from already water-stressed areas. 79% of the FVC adequately monitor[xviii] total discharge volume from direct operations and 86% adequately monitor total water withdrawals from direct operations, but fewer than half of companies do so for withdrawals from water-stressed areas where monitoring is most important.

It is also increasingly critical for companies to track the quality of their water discharge, as water quality has been characterized as an "invisible crisis" that is underappreciated and underestimated.[29] Water pollution from farming represents the greatest source of pollution in the food system and as such it is critical for primary producers to reduce the polluting potential of pesticides and other agri-chemicals and monitor and treat wastewater at the source. However, just 44% of primary producers are monitoring wastewater discharges, and just one (10%) had pollution management procedures in place in their agricultural practices.

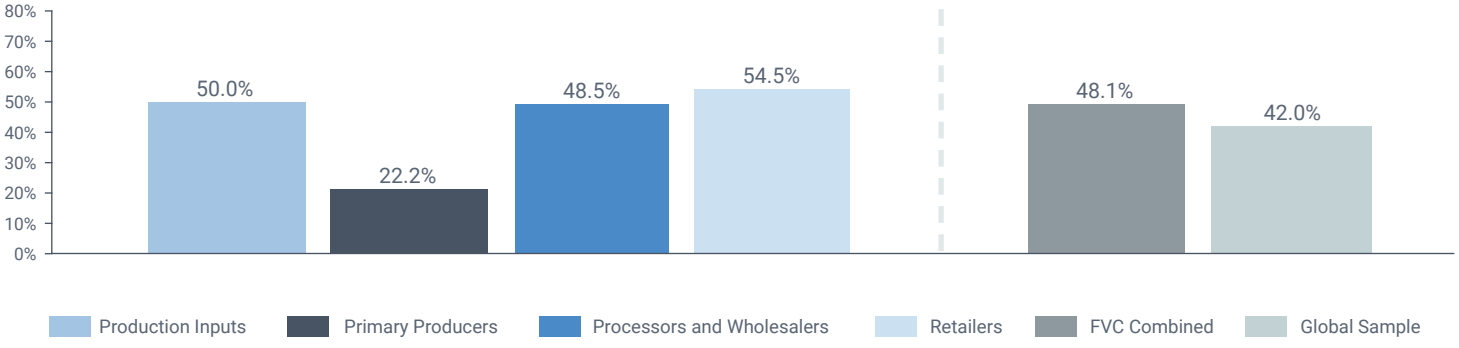
Beyond direct operations, companies lack information from suppliers regarding water use, risks and/or management information as just nine percent of FVC companies adequately request this information from suppliers.[xix] And only one quarter of the FVC have pollution management procedures in place for agricultural activities in their supply chains meant to minimize the adverse impacts of potential water pollutants on water ecosystems or human health.

Across important food commodities like palm oil, cattle products and soy that are also identified as forest-risk commodities, disclosure to CDP on water security is lacking in transparency. Most companies that cited these commodities as relevant to their business are unable to determine the proportion produced or sourced from water stressed areas. Rates were lowest for palm oil, where 85% of companies were unable to determine if the commodity was produced in a water stressed area and 86% unable to determine if it was sourced in a water stressed area. Rates were similarly low for cattle and soy products. Food companies must continue to look further into their supply chains to understand how production and/or sourcing of food commodities can further exacerbate water scarcity and stress globally.

Measuring and monitoring: water discharge quality



Measuring and monitoring: total withdrawals from water stressed areas



xvii CDP's Water Impact Matrix is a tool which ranks industrial activities according to their potential impact on water – both water quantity and water quality.

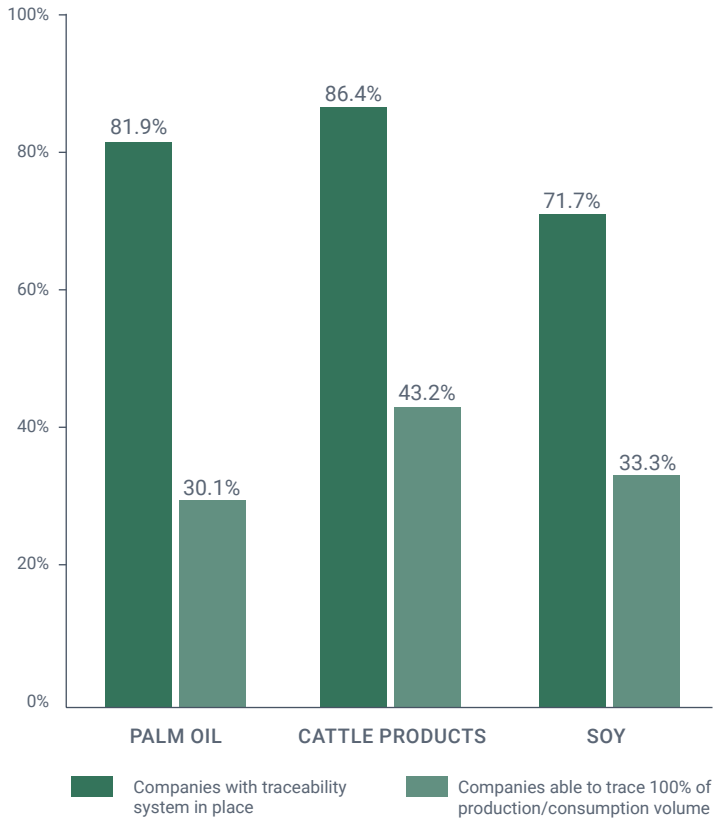
xviii This is defined as monitoring at three-quarters or more of sites/facilities

xix Adequately here means three-quarters of more of total procurement spend is requested

FORESTS

92% of companies in the FVC are rated Very High or Critical for forest impacts by CDP meaning their business activities have the highest potential to create detrimental impacts upon forests through the production or use of one or more of the focus commodities. For companies to understand the impacts of their sourcing on forests, they also need to be able to trace the movement of commodities through their supply chains. Traceability is an essential management tool to ensure regulatory compliance and supply chain transparency. Most FVC companies across relevant forest-risk commodities have implemented a traceability system to track and monitor the origin of their products. And most are able to trace more than 90% of the total production and/or consumption of the relevant commodities. But despite relatively high levels of traceability across commodities, the point to which the commodity is traced lags best practice, demonstrating poor visibility by companies into their complex supply chains and therefore their capability to implement sustainable practices in their supply chains. The most common origin of tracing for palm oil is to the mill (47% of FVC companies) and not further to the plantation of origin (9%). For cattle products, only 13% of companies have traced products to the rearing, breeding or finishing farm, and 26% are traced to the slaughterhouse. And just 5% of soy is traced to the plantation, compared to 53% traced only to the country of origin and no further.

Traceability for forest risk commodities



Impacts, risks and opportunities

Adequate coverage in disclosure is important, but so too is adequate depth. Best practice for transparency requires the assessment and identification of risks and opportunities, and details about impacts currently faced. This information allows investors and other stakeholders to understand how companies are currently impacted, how they might be in the future and if they are prepared to realize opportunities in transitioning to a low carbon, water secure and deforestation-free economy.

Despite mounting scientific evidence that climate change and environmental degradation are already impacting society and the economy, just one in eight FVC companies disclose current climate-related impacts (concurrent with the Global Sample)[xx] — most in relation to the low carbon transition (e.g. increased price of GHG emissions) as opposed to physical climate change.

SIGNALS OF CHANGE: INVESTOR PRESSURE DRIVING CORPORATE ACTION

Major investor networks in addition to CDP's investor signatories are also pushing for corporate transparency and action. One notable example is the FAIRR Initiative, a collaborative, 256-member investor network with US$25 trillion AUM that analyzes an index of 60 companies on a yearly basis judged to be the most impactful animal protein companies, and calls for large-scale corporate action such as a moratorium on deforestation for soy production in the Amazon.

Companies are responding to this pressure. In September 2020, JBS SA said "it plans to combat destruction in the Amazon by monitoring its entire supply chain for deforestation by 2025." This is a sharp departure from previous efforts to curb deforestation, in which only final-sale farms were checked, meaning indirect suppliers could still cut down forest with impunity. While this requires investment and technological development (JBS plans to use blockchains as a monitoring tool), it also can provide benefits by attracting future investors and avoid losing existing ones -- KLP, Norway's largest pension fund with US$80 billion under management, has threatened to pull out of Brazil-linked investments unless the country takes action to halt deforestation, and is putting pressure on JBS' shareholders to hold the company accountable.[xxi]

This call for transparency is central to CDP's theory of change, and reinforces the call for meaningful engagement with suppliers, a true up and downstream assessment of risks and opportunities and the translation of that effort into visible markers for consumers. How companies in the food value chain disclose gives insight into how the system is preparing for the future of food.

xxi Mair, Vibeka (201). "Norways' KLP to firms invovled in Brazilian soya production: "We expect answers". Responsible Investor. https://www.responisble-investor.com/articles/norways-kip0to-firms-involved-in-brazilian-soya-production-we-expectpanswer

xx Climate-related risks with a 'current' timeframe and a 'very likely' or 'virtually certain' likelihood serve as a proxy for climate-related impacts

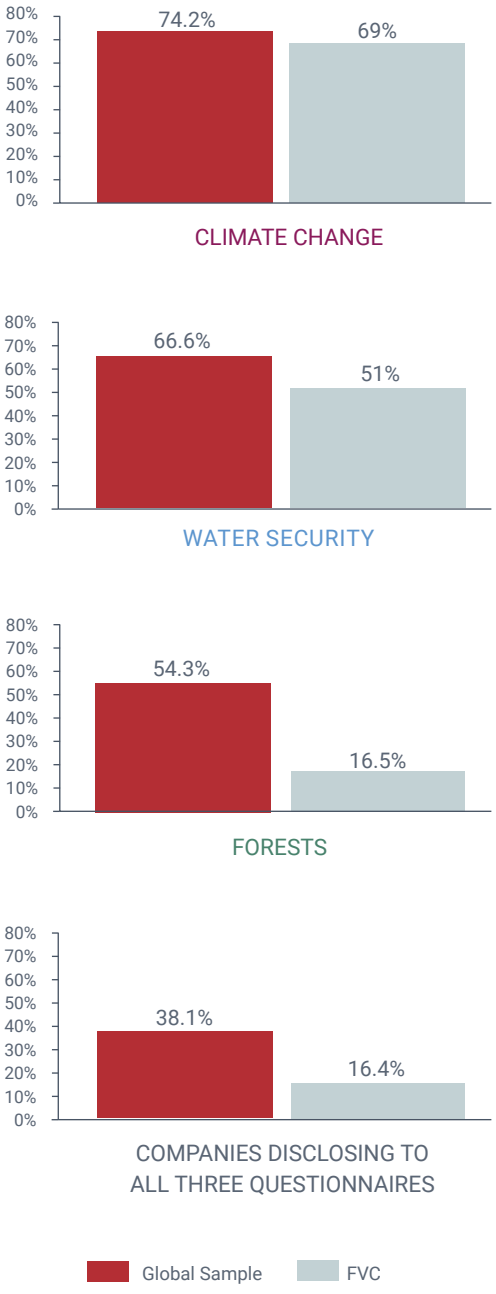
One quarter of FVC companies disclosing on water security cite current detrimental water-related impacts. This is nearly double the share of companies in the Global Sample — 24% compared to 13% — but still the most disclosed water-related impact (drought) affects less than seven percent of the FVC. Similarly, very few FVC companies disclose forest-risk commodity-related impacts. Just 32 total detrimental impacts were disclosed across palm oil, cattle products and soy. Despite the potential physical impacts from deforestation that are becoming increasingly prevalent with the conversion of natural ecosystems — rising mean temperatures, increased ecosystem vulnerability and land loss to desertification and soil degradation — the impacts most cited were negative stakeholder feedback and brand damage.

There is, however, a recognition of physical climate impacts in the FVC's risk assessments. While FVC companies assess risk at a lower rate than the Global Sample, when they do assess their risks, they are more likely to identify them compared to companies in the Global Sample. Most notably, companies that were requested and disclosed on climate change, water security and forests were more than twice as likely to identify substantive risks in all three issue areas than peers in the Global Sample — 38% compared to 16%. This suggests that there is unacknowledged risk to the FVC, particularly for those companies not yet assessing and reporting on the interconnected issues of climate change, water insecurity and deforestation.

The value chain is a particular source of climate-related risk for FVC companies. More than one in four FVC companies cited risks to supply chains or customers from changes in precipitation patterns and extreme variability in weather patterns, compared to fewer than one in ten companies in the Global Sample. And FVC companies cited a risk from rising mean temperatures at more than three times the rate of the Global Sample.

One third of companies in the FVC disclosing on water security identified risks in both their direct operations and their value chains, but six times more companies identified risks only in their value chains than identified risks only in direct operations. Of risks disclosed to CDP, those to both direct operations and the value chain center on drought, water stress and water scarcity, and are cited at a much higher rate than in the Global Sample – again demonstrating the critical role of water in the global food system relative to other industries, business activities and value chains. Similarly, risk identification in forests is low across commodities but more concentrated in the value chain, with about half of companies disclosing on soy and cattle products citing risks to direct operations, or supply chains or other value chain stakeholders. Commodity-related risks are much more commonly cited in the supply chain and the rest of the value chain than direct operations, particularly in relation to increased stakeholder concern or negative feedback. **Conagra Brands Inc.** stated that "the potential for unsustainable and unethical practices among palm producers and related community opposition and grievance procedures threaten the availability, and stability of palm oil supply and price consistency, all of which are key to [their] business" — suggesting the importance of engagement beyond direct operations to manage risk.

Share of companies identifying risks in risk assessments



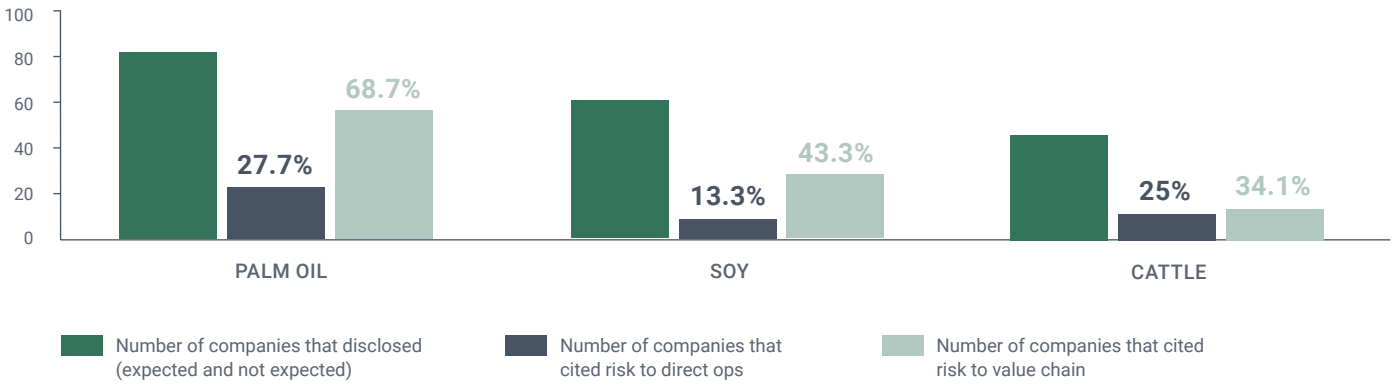
RIVER BASIN RISK

In major river basins in some of the world's largest food producing countries, very few impacts and risks were cited by FVC companies disclosing on water security: just one company cited impacts in the Mississippi and nine companies cited risks, no companies cited impacts in the Yangtze, and just three cited risks; and no companies cited impacts in the Ganges-Brahmaputra while just two cited risks.

This raises an important question: is risk being underestimated in areas where much of the world's staple foods are produced?

Companies reporting risk by forest commodity

Percentages in the graph refer to the portion of disclosing companies



There may be more risk lurking in the direct operations and value chains of FVC companies than disclosure suggests. Many companies that assessed risks and did not identify any with the potential to have substantive financial or strategic impact told CDP that they did identify risks not considered to be substantive — including 44% disclosing on climate change and 57% on water security. Though these risks may not be deemed as substantive to the financial or strategic operations of an individual company, for citizens with a stake in the market as a whole and the planet we live on, these risks in aggregate may in fact be material.

One particular risk companies may be overlooking is changing consumer preferences. While this did appear as a cited risk in climate and forests disclosure, just 45 companies in the FVC cited it as a risk. And companies were generally uncertain about its time frame, likelihood and financial impact. Yet trends suggest this may be important — especially for big ticket commodities such as cattle. In July 2020, the FAO released its Biannual Report on Global Food Markets, forecasting that world total meat production would be set to contract in 2020 after being depressed due to animal diseases, the lingering effects of drought and COVID-19.[30,31] Per-capita consumption of meat is set to fall to the lowest in nine years and the three percent drop from last year represents the biggest decline since at least 2000. This has concrete impacts on companies. In early 2020, two of the U.S.'s largest milk processors declared bankruptcy within two months of each other, citing shifting consumer demand as the cause.[32]

While a changing climate, water insecurity and deforestation present risks to businesses, they also present opportunities for companies able to proactively manage and adapt to these changes in ways that improve financial or strategic performance. Most (nearly 80%) of all climate-related opportunities are associated with efficiency (such as improved production processes or reduced energy use) and products and services (product development and shifts in consumer preference).[xxii] Most water-related opportunities are also from efficiency, but conversely, efficiency accounts for just ten percent of forest-related opportunities and 38% are market-related (including access to new markets and public sector incentives).

The opportunity for product development is made clear by the increasing investment in the space. In the first quarter of 2020, a record US$930 million was invested in alternative protein development – more than was invested in all of 2019. In addition, plant-based meat retail sales increased by 18% in 2019 to US$939 million.[33] While this remains only two percent of total meat retail sales, record investment and the declining costs of the technologies used to produce alternative proteins is expected to grow the market exponentially.

SIGNALS OF CHANGE

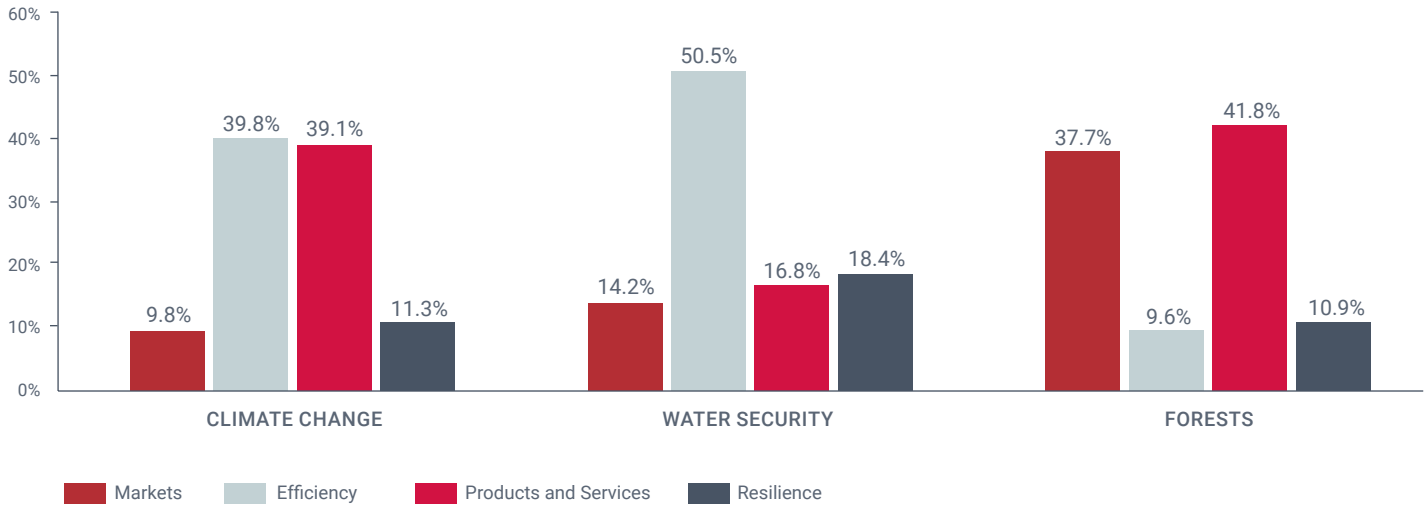
Declining meat consumption

Meat consumption is declining globally for many reasons, including increasing animal welfare and environmental concerns (particularly in Europe), emerging health dietary guidelines (China dictates a 50% reduction per capita), heightened consumer interest in safety, traceability and sustainability (especially in Brazil), and as incomes decline in part due to COVID-19.[xxiii]

xxiii (2020). "Pandemic to Spark Biggest Retreat for Meat Eating in Decades." Bloomberg News. https://www.bloomberg.com/news/articles/2020-07-07/pandemic-set-to-spark-biggest-retreat-for-meat-eating-in-decades

xxii Note that for the purposes of this analysis, climate change opportunities related to energy source were excluded so that the same categories across climate change, water security, and deforestation could be compared directly.

Disclosed opportunities in the Food Value Chain by type



Companies in the FVC are not blind to this opportunity, and a number of them report investment in the alternative protein market. Retailer **Tesco**, which values its alternative protein line at £572 million (US$750 million), cited financial incentives but also the opportunity to "[take the] lead in the transition to a low carbon economy" resulting in both reputational and environmental benefits. **Maple Leaf Foods** has adopted a target to reduce their "environmental footprint (50% by 2025)" to "lessen the impact of [their] meat protein (pork and poultry) product portfolio."

This level of investment is encouraging, but what remains to be seen is if these foods can supersede meat, and in doing so reduce the environmental costs of providing people with high quality protein. Because companies are citing this opportunity, but not consumer preference as a risk, we are only seeing incentive to expand production of alternative product but no incentive to reduce meat production. Likewise, despite the fact that many of the top risks cited by companies relate to physical impacts from changing weather conditions and violent storms, there is a critical lack of resilience-related opportunities identified across climate change, water security and forests disclosure. Given the scientific consensus, it would behoove companies to address this gap.

SIGNALS OF CHANGE

Diversified protein supply

COVID-19 has demonstrated that shocks to the food system can have real implications for markets, especially for more expensive food options like red meat. Should this decline stick, as some evidence suggests, companies will be well-served by investing in alternative protein and diversifying their product portfolios, while simultaneously contributing to building resilience in their value chains.

HOW ARE FOOD VALUE CHAIN COMPANIES PLANNING FOR THE FUTURE

AND CONTRIBUTING TO FOOD SYSTEM TRANSFORMATION?

CDP data suggests a lack of adequate depth of disclosure across climate change, water security and forests, as well as environmental impacts hitting corporate bottom lines. Unrecognized risks and minimal substantial opportunities for adaptation paint a stark picture of our progress toward the transitions needed to achieve the Paris Agreement and the SDGs.

CDP's disclosure focuses on the world's biggest companies, those with material importance to CDP's investor signatories. These companies, in turn, leverage their purchasing power to prompt disclosure from their supply chains. These levers are important when considering how these impacts might be mitigated. Preparing for environmental risks is important for the corporate bottom line but can also help shield small-scale suppliers who might be disproportionally impacted given lack of financial resources, and thus the impetus is on large, multinational corporations to take action to position themselves as stewards for the future of food while also bulwarking their own operations and value chains against future climate shocks.

There are signs that companies are increasingly using the tools available to them to do this. But further utilization is necessary. A lack of action signals maladaption to increasingly difficult environmental conditions, and rather than helping to drive the shift, positions the FVC as laggards who may be forced to adjust to changes down the road. While many of these actions outlined below help company bottom lines, they are also instrumental in meeting recommendations of food-system frameworks like those of WRI and FOLU, and and planetary health guidelines.

Scenario analysis

Scenario analysis is one of the key recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) as a well-established method that aids companies in developing strategic plans that account for a range of plausible futures, such as a 2°C world.

Scenario analysis helps companies understand how they will be impacted under different likely scenarios and recognize and manage risks in the medium to long term, as well as realize opportunities.[xxiv] **Starbucks**, for example, in conducting scenario analysis found climate change-driven pest increases were causing costs of coffee production to rise as much as 30% for some of their smallholder suppliers. In response, the company has committed to provide 100 million healthy coffee trees to farmers, reasoning that the investment "makes existing lands more productive and keeps farmers from expanding into forests." While this is an investment that helps protect their core business, it also serves to increase production without increasing agricultural land demands, harming ecosystems or driving deforestation.

Relatively few (~30%) companies employ scenario analysis in both the FVC and Global Sample, but those that do can identify areas of importance to their core business. For example, when FVC companies disclosed to both climate and water security and conducted scenario analysis, nearly three quarters identified water-related outcomes, compared to 58% of companies in the Global Sample, clearly demonstrating both the importance of water to food companies and the interconnected relationship between climate change and water security risks. When employed, scenario analysis can paint a roadmap toward a sustainable transition.

xxiv For further Information see: https://www.tcfdhub.org/scenario-analysis/

Carbon and water pricing

There is growing consensus that carbon pricing is the most flexible, cost-effective approach to mitigating the impacts of climate change by incentivizing emissions reductions and directing money toward sustainable investments such as compensation for ecosystem restoration or avoided deforestation. Companies choose to price carbon internally for a variety of reasons, one of which is to prepare for potential regulation on the price of GHG emissions. While FVC companies are about as likely to disclose that they are currently subject to or expecting GHG emissions pricing regulation as the Global Sample, they are less likely to use or plan an internal price on carbon. In contrast, FVC companies utilize internal water pricing at a higher rate – almost half of companies report the use of an internal water price or plan to implement one in the next two years, compared to 38% in the Global Sample. Ultimately, however, an increased utilization of pricing, either by corporate buy-in or public policy, is necessary to appropriately capture the environmental externalities embodied in food production and fund sustainable farming practices. By failing to price carbon, companies miss a vital opportunity to mitigate the dangerous impacts of greenhouse gas pollution and drive investment in sustainable agriculture practices.

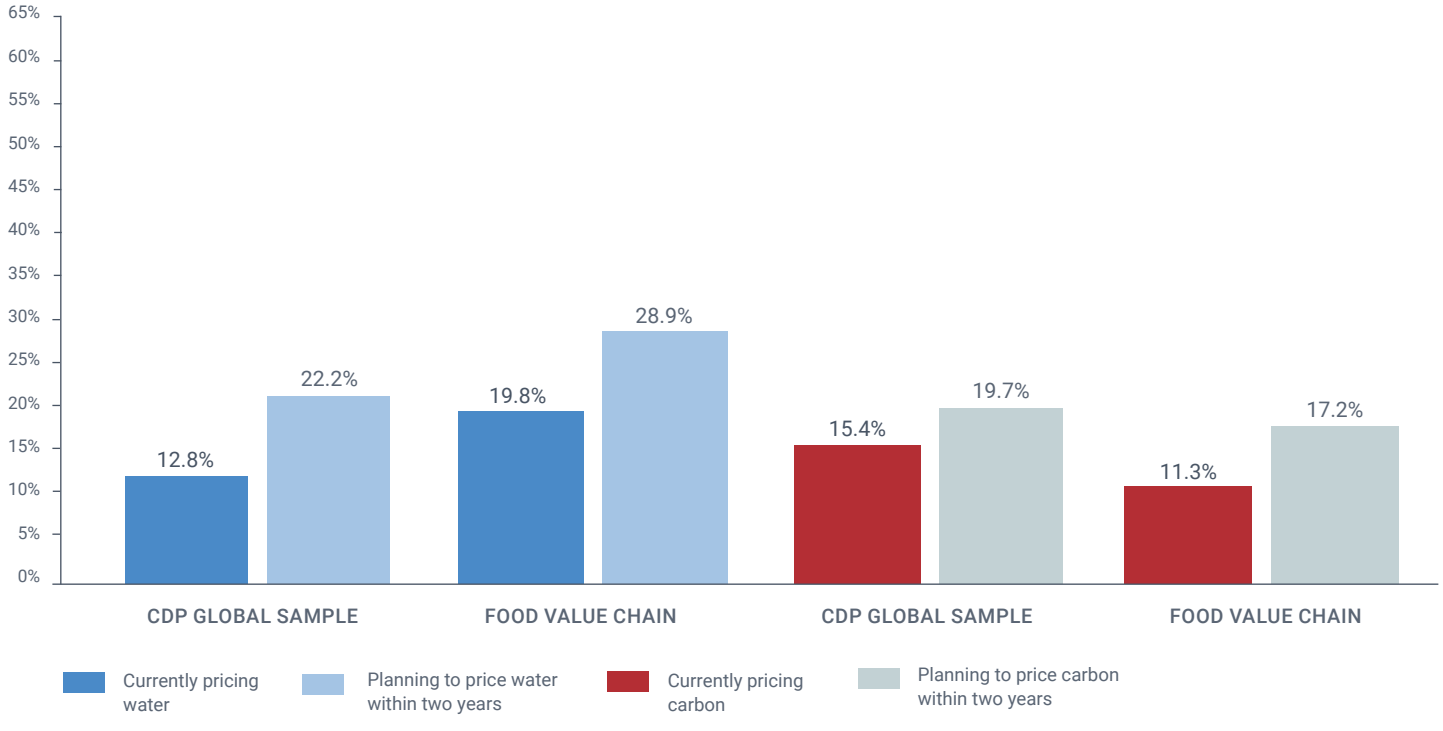
Target setting

Targets are an essential action for companies in the low-carbon transition. Setting emissions reduction targets demonstrates ambition and increases transparency for stakeholders and investors into how companies seek to address environmental impacts. Company-level targets also allow the corporate sector to align with more comprehensive global targets such as those from the Paris Agreement, or set deforestation, water use or other targets that prompt companies to look for solutions to meet those goals.

Although the practice of setting emissions reduction targets has become standard business practice and is an expectation from capital market stakeholders, the proportion of companies setting targets to reduce their GHG emissions is low in the FVC: one third of production input companies, 44% of primary producers, 42% of processors & wholesalers and one quarter of retailers *did not* set any climate-related targets in 2019.[xxv] For the 58% of FVC companies that did set targets, most are insufficient in addressing the most critical aspect of their emissions — 84% of disclosing companies across all value chain levels *did not* set targets that explicitly address Scope 3 emissions.

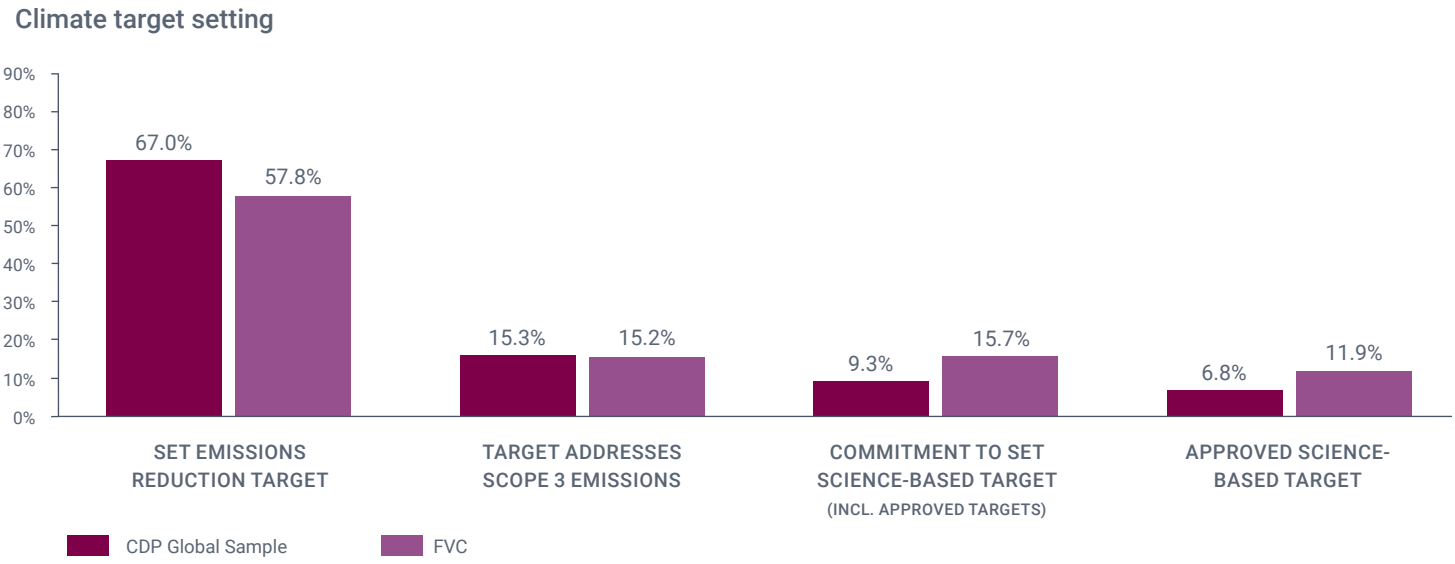
Science-based targets (SBTs) further demonstrate corporate leadership and ensure resiliency, climate change preparedness and the ability and intention to stay ahead of ever-changing regulatory and business environments. They also align with the scientific consensus that provides the basis of the Paris Agreement. A higher share of companies in the FVC commit to and adopt SBTs than their counterparts in the Global Sample – as of September 2020, 75 FVC companies had committed to or adopted an SBT, of which 15 approved targets were classified at 1.5ºC.[xxvi] This is an encouraging trend, especially when coupled with the year-on-year growth of companies setting SBTs generally. Overall, 15% of all approved SBTs from CDP disclosing companies are from the FVC. Retailers lead the way within the FVC, with one third committing to and nearly one quarter adopting an SBT. Both food and non-food companies continue to increase their use of SBTs – over 1,000 companies with a combined market capitalization of over $15.4 trillion USD — including one-fifth of the Global Fortune 500 — are now working with the Science-Based Targets initiative (SBTi) to reduce their emissions at a pace and scale required by scientific consensus. However, the rate of SBT setting will need to increase more rapidly across both samples if we are to meet the requirements of the Paris Agreement.

Internal water and carbon pricing



xxv Absolute and intensity targets are both included in this analysis. Across the FVC, 11 percent of companies set both an intensity and absolute target.

xxvi This means that the Scope 1 and 2 portion of the approved target is aligned with emissions scenarios to keep warming below 1.5C as classified by the SBTi



Despite the demonstrated importance of water to the food system, target setting occurs at low rates within the FVC. While 60% of FVC companies have some type of water-related target, most relate only to quantity and not quality. Just 14% of FVC companies have a water quality target, meaning little action is being taken to address discharge, pollution and other important issues. Crucially, there is little to no correlation between CDP's Water Impact Matrix and target setting — companies operating in industries deemed a "critical" risk to water are no more likely than non-critical industries to set water targets. This is vitally important because nearly three quarters of the companies in the FVC sample are rated 'very high' or 'critical' in CDP's Water Impact Matrix — eight percent higher than the Global Sample.

With respect to the forest-risk commodities prevalent in the FVC, 60% of companies disclosing on palm oil set a commodity-based target, while only 40% of soy and less than 35% of cattle disclosing companies do so for their relevant commodities. Most cattle targets are for sustainable procurement standards, and most soy and palm oil targets are for third-party certification schemes.[xxvii] Across the commodities, very few targets relate to traceability, a vital element to halting deforestation as it allows companies the necessary insight into their operations to track the forest impacts of their suppliers.

Finally, 14% of companies have a waste target, less than one percent have a land use target, and and one company in the FVC has a specific methane target.

A robust combination of emissions, forest- and water-related targets, beyond what is currently being demonstrated will be necessary to reduce emissions and restore and preserve ecosystems in the food system system.

Value chain engagement

The food value chain is a complex relationship between inputs, producers, processors & wholesalers, retailers and customers. Impacts in one level often reverberate within the companies themselves and between different levels of the chain. Within individual companies, there are also complex relationships between operations, suppliers and other value chain partners. As previous analysis in this report has shown, the primary impacts from and caused by FVC companies often exist beyond their direct operations. As such, companies must fully engage their value chains to understand and address risks particularly in their supply chains stemming from Scope 3 emissions, deforestation, water pollution and ecosystem degradation, and to ensure their operations support labor equity and strong rural livelihoods.

Value chain engagement is not only important to address environmental issues – there is also financial incentive for companies to employ innovative approaches to their operations and encourage investment. Investors looking for insight into food companies' ESG performance often encounter issues associated with the complex supply chain-centric impacts of the food value chain. Without transparency beyond direct operations and first-tier suppliers, investors do not have the tools they need to make informed decisions.[34] Likewise, consumers are demanding full supply chain transparency. Innova Market Insights, a food industry analysis firm, labels transparency their top industry trend in a 2020 report. According to their own research, 3 in 5 consumers worldwide say that they are interested in "learning more about where food comes from and how it's made," and 75% of consumers say they "expect companies to invest in sustainability." Lu Ann Williams, Director of Insights and Innovation, states, "transparency throughout the supply chain will dominate in 2021, with consumers searching for brands that can build trust, provide authentic and credible products, and create shopper confidence in the current and post-COVID climate."[35] This transparency can only be established with a credible understanding of the entire value chain.

xxvii Currently no third-party deforestation certification standards exist for cattle producers.

However, value chain engagement is relatively shallow for the FVC. While 75% of companies engage in some way with their value chain on climate change, just 15% engage with all aspects of the value chain (e.g. suppliers, customers and other partners). Water value chain engagement is higher among FVC companies: 60% of companies compared to 45% of the Global Sample engage in any way with their value chain. However, just 43% of the FVC engages suppliers on water-related issues, and just 21% engage with all value chain aspects. And companies lack information from suppliers regarding water use, risks and/or management information as just nine percent of FVC companies adequately request this information from suppliers. Furthermore, only one quarter have pollution management procedures in place for agricultural activities in their supply chains meant to minimize the adverse impacts of potential water pollutants on water ecosystems or human health. Forest engagement is high with direct suppliers — more than three quarters of companies across all three forest risk commodities analyzed here do so. However, engagement beyond that is limited; across commodities, about half of food companies do not engage beyond their first-tier suppliers to manage and mitigate forests-related risks.

When engaging value chains, companies commonly seek to influence compliance and onboarding procedures, collect information on behavior, change behavior through incentives or change markets via innovation and collaboration. The most common type of engagement on climate-related issues is information collection to understand supplier behavior. Just 11% of FVC companies utilized innovation and collaboration in their engagement practices, meaning most companies miss out on integrating their suppliers and other partners into larger conversations about how to change markets. Most companies (80%) disclose that they implement management practices on their own land with a climate change mitigation and/or adaption benefit, and several cite benefits beyond climate mitigation, including benefits to biodiversity, soil, water and their annual yield. And 78% of companies encourage their suppliers to undertake agricultural or forest management practices with climate change mitigation and/or adaptation benefits.[xxviii] When managing for climate impacts, companies are finding synergistic benefits to their business.

SIGNALS OF CHANGE

Nature-Based Solutions

Companies with a full understanding of and engagement with their value chain are finding innovative, collaborative ways to improve the sustainability and resilience of their supply chains through the adoption of nature-based solutions - and by doing so are realizing benefits to their bottom lines.

On water-related issues, FVC companies are engaging on innovation and collaboration at more than twice the rate of the Global Sample, but just one in ten FVC companies are incentivizing suppliers and other partners to improve water management and stewardship.

To manage upstream supply chain disruptions, some companies are proactively engaging their suppliers – processor and wholesaler **Constellation Brands, Inc.** stated that they "request [their] primary suppliers to undertake their own assessment covering water and climate change to understand their risk and how best to manage it to help reduce the risk of impact to the company's supply chain. For suppliers in water stressed areas Constellation Brands, Inc. request that they actively manage their water use and find ways to increase efficiencies and build resilience." In this instance, engagement is beneficial to managing risk – but it also serves to advance sustainability and equity in agricultural production.

xxviii Note that only companies responding to sector-specific questionnaires received this question, therefore the sample size is smaller than for other data points in the report.

Nature-based solutions

Engagement also opens pathways for implementing sustainable farming practices like regenerative agriculture, which can help make corporate supply chains more resilient, less intensive and more attractive to investors and consumers. This is a substantial opportunity economically, but it also supports the shift to productive and regenerative agriculture. Nature-based solutions such as regenerative agriculture — in which farming and grazing practices are implemented that rebuild soil organic matter and restore degraded soil biodiversity — have synergistic benefits to the environment and the corporate bottom line, and can contribute to carbon drawdown and soil health, protect biodiversity and habitat, contribute to afforestation and protect watersheds from agricultural run-off and pollution.

In Australia, the National Farmers' Federation (NFF) is supporting the country's economy-wide goal for carbon neutrality by 2050. To achieve this, they are looking to invest in nature-based solutions such as soil management and afforestation, and they are looking to public policy to provide the financial impetus by way of carbon and natural capital markets, and compensation for agricultural land devoted to sequestration.[36] By doing so, the NFF hopes to continue to see a viable and robust agriculture industry, but to find a balance between the sizeable externalities of production, especially for intensive industries like cattle, and nature.

COVID-19

"The COVID-19 pandemic has revealed how fragile, lengthy, and complex supply chains can be - and how much society has riding on their continued smooth functioning."

MACKINSEY GLOBAL INSTITUTE[xxix]

The onset of the COVID-19 pandemic has revealed the vulnerability of our global supply chains, seventy-five percent of which rely only on 12 plant and five animal species. It has also demonstrated the dramatic implications of our continued disruption of natural systems, increasing human exposure to disease through habitat destruction and climate change.[xxx]

Nearly overnight, the pandemic caused the global economy to grind to a halt as supply chains were disrupted and consumers were confined to their homes. The shock of COVID-19 has reverberated through society, particularly for vulnerable populations and low-wage workers that support the global economy, and it is both demonstrative and symptomatic of the compounding impacts of an extractive and exhaustive economic system.

xxix, xxxi Sneader, Kevin and Susan Lund. 2020. "COVID-19 and climate change expose dangers of unstable suppply chains." McKinsey Global Institute. https://www.mckinsey.com business-functionsoperations/our-insights/covid-19-and-climate-change-expose-dangersofunstable-supply-chains

xxx Keesing, F. et al. (2020). "Impacts of biodiversity on the emergence and transmission of infecitous diseases." Nature 468,647-52. https://doi org/10/1038/nature09575

CDP disclosures also provide examples of companies looking to nature-based solutions.

Danone employs regenerative agriculture as a mean to reduce GHG emissions and restore natural ecosystems while reducing their risk exposure to climate impacts: "Agriculture…is of paramount importance for Danone, as it represents the most significant contribution to the company full scope carbon footprint…with almost 60% in 2018. Danone is thus strongly engaged into the implementation of regenerative agriculture (RA) practices within its supply chain. RA aims at protecting soils and water and restoring biodiversity and sequestrating carbon in the soil. Danone's supply chain will become thus more resilient to climate change, ensuring sustainability of supply of agricultural products and reducing exposure to price volatility." The Danone Ecosystem Fund supports the transformation of agricultural practices in the company's supply chain. As of December 31, 2018, the Danone Ecosystem Fund has 45 active projects worldwide; Lait Pieds sur Terre, for instance, aims to help farmers in France reduce their carbon footprint while increasing revenue and leveraging innovative financing tools.

And **General Mills** is investing in the switch to organic agriculture in response to shifting consumer demand, investing in a "multi-pronged strategy, including the following: 1) Supplier partnerships: An example is our Cascadian Farm organic brand partnering with Grain Millers, the largest organic oat supplier in the U.S., to promote continuous improvement within organic farming; 2) Industry collaboration: In 2017, we launched and hosted two meetings of the Organic & Regenerative Agriculture Transition Council. We are a founding member of the U.S. Organic Grain Collaboration and support the Prairie Organic Grain Initiative. 3) Research: We support the Organic Farming Research Foundation's efforts to encourage widespread adoption of organic farming practices through research, advocacy and education; 4) Large-scale land conversion: In fiscal 2018, General Mills and Gunsmoke Farms LLC signed an agreement to convert 34,000 acres of conventional farmland to certified organic acreage by 2020."

Of note is the method these companies employ to implement nature-based solutions. They are doing so with supplier engagement throughout their value chains, in recognition that the brunt of their impact is embedded therein.

"...Ripple effects [of COVID-19] into that previously balanced system have become clear. Distribution channels have been upended, with food stranded upstream, creating food-security risks for vulnerable populations. Companies that produce, convert, and deliver food to consumers and businesses face a web of interrelated risks and uncertainties across all steps in the value chain – from farmers to end-customer channels.

MCCKINSEY & COMPANY[xxxi]

xxv Ignacio, Felix et al (2020). "US food supply chain: Disruptions and implications from COVID-19." McKinsey & Company. https://www.mckinsey.com/industries/consumer-packaged-goods/our-insights/us-food-supply-chain-disruptions-and-implications-from-covid-19

A SHOCK TO THE SYSTEM:

Potential impacts to the food value chain from drought

If COVID-19 serves as an example of what can happen to the global food value chain when a shock is introduced nearly overnight, environmental degradation presents a useful counterpoint: what can happen to the food value chain if repeated warning signs about the effects of increasing emissions, reduced water quality and quantity and deforestation go unanswered?

The world is already seeing environmental shocks to the food supply chain: in 2007 and again in 2009, regional droughts and heatwaves in the Ukraine and Russia damaged wheat crops and caused a substantial global jump in wheat prices. In the U.S., a 2012 heat wave and drought reduced national corn, soybean and other crop yields by as much as 27% in some places.[37] These are just two examples, but on our current course, climate change and environmental degradation will continue to affect the amount of food produced worldwide, directly and indirectly via impacts on water availability and quality, pests and diseases.[38]

One shock that emerges in corporate disclosures of risk and impact — surfacing both in climate change and water security disclosures as a top-ranked risk in the FVC — is drought. Almost one in five companies cited drought-related risks in water disclosures and 15% did so in climate disclosures, compared to just nine percent of all other disclosing companies. And drought impacts every level of the FVC. Production input companies cite drought as a risk in 44% of climate and 33% of water disclosures. Primary producers are concerned with yield and production capacities and physical impacts to their business. Downstream, one in five processors and wholesalers cite drought-related risks, and most of those see risks to their raw materials and supply chains. They also look further downstream, acknowledging policy regulations and consumer preference for responsibly produced goods. Similarly, nearly 20% of retailers cite drought-related risks to production capacity of their suppliers as well as consumer preferences.

What is clear from the disclosure is that shocks to the food system rarely stand in isolation: even when initial, physical impacts are felt only by one value chain level (often at the producer level), the ripple effects touch companies upstream and downstream of the point of impact. In their 2019 disclosure, **The Spar Group Ltd.**, a retailer, wrote, “In 2018, South Africa experienced drought and five provinces were declared agriculture disaster areas. This drought had a significant impact on the agricultural sector. Increased cost of production as a result of reduced yield has been partially absorbed by SPAR's suppliers, direct operations, retailers and customers.”

Reduced yield results in reduced sales for producers. **Marfrig Global Foods S/A**, a livestock producer, disclosed to CDP that drought which they acknowledge “may be attributed to climate change,” has caused some of their production units to suffer from a reduction in water availability,” and as a result, those production units “had to reduce operating activity levels during scarcity period.” While the producer can attempt to compensate with increased pricing, that can in turn impact processors and wholesalers as well as retailers downstream from production. Additionally, reduced operating activity means fewer work hours for farmers, many of whom already enjoy the least profits of the food system. Furthermore, reduced operations means less purchasing of the inputs necessary to grow food – an upstream impact to production input companies who rely on the success of producers to support their core business.

When a large producer like Marfrig reduces production due to drought conditions, it often limits the buying power of processors and wholesalers. In their climate change disclosure, **Archer Daniels Midland** states that a “reduced supply of agricultural commodities could adversely affect the Company's profitability by increasing the cost of raw materials and/or limiting the Company's ability to procure, transport, store, process and merchandise agricultural commodities in an efficient manner.” They cite drought in Argentina in 2017/18 which “reduced the availability of corn and soybean inventories while prices increased.”

The ripple effects of climate shocks are felt through the food value chain. Whether disease, drought or another catastrophe, shocks to the food system have wide-reaching implications. What remains to be seen is how companies can adapt to deal with the increasing variability, intensity and unpredictability of climate-related impacts in the future.

CONCLUSION

As the world prepares to convene for the UN Food Systems Summit, COP26 and the UN Biodiversity Conference (CBD COP 15) in the midst of a global pandemic, it is clear that we are on the precipice of change. COVID-19 has destabilized traditional economic systems built on globalization, extraction and commoditization. While this has had tremendous impact on people and planet, it also offers an opportunity to change course. Rather than return to business as usual, we can ensure green recovery plans work to safeguard against deforestation, water pollution and depletion, and climate change, and reshape our world to be more resilient in the future. The food system plays a key role in this and the next ten years are critical to ensure our capability to meet global goals including the Paris Agreement. The science is clear that this will not be possible without transformational changes, tailored to regional contexts – from how we grow, harvest, distribute, market, eat and dispose of food to how we improve food security, make supply more resilient and decrease the negative environmental and social impact of the food system.[39] This includes:

- Transition to more plant-rich diets that include diversified, alternative protein sources particularly in regions with high per capita consumption of meat from ruminant animals including beef,
- Increased agricultural productivity (above historical rates) without expanding the agricultural land footprint,
- Increased adoption of nature-based solutions – agroecological farm management practices such as regenerative and precision agriculture that support more efficient use of critical resources and provide ecosystem services,
- Protection and restoration of forests and natural ecosystems, and
- Significant reduction in food loss and waste.

Analysis of 2019 CDP disclosure data suggests that some companies are waking up to this transformational opportunity. The number of companies setting targets, especially science-based GHG emissions reduction targets, is increasing year on year. And companies that assess risk and engage their value chains are finding strategic value in doing so, particularly around smallholder engagement and opportunities like product innovation to meet changing consumer demands.

But there are still barriers to overcome in creating the necessary transformative shifts, and the economic benefits of transition have not been widely recognized. FVC companies lag peers in the Global Sample in risk assessment practices, and cite very few current detrimental impacts across climate change, water security and deforestation despite mounting scientific evidence that people and planet are already feeling the consequences of a changing climate and a degraded environment. And there is a clear gap in resiliency opportunities cited by companies – instead, companies have focused on reaching new markets and developing new products and services. This, however, must be coupled with transformative action in line with scientific frameworks for transition.

All players in the food value chain must strategically assess their role in sustainable production and consumption, requiring they move away from business as usual. According to the suggested research and frameworks discussed in this report, this means working with their value chains to support reform and transition that incentivizes productive and regenerative agriculture and the establishment of transparent and deforestation-free, water-secure supply chains. They can do so by shifting procurement and prioritizing deployment of innovative financing to reach underfinanced parts of the supply chain. Tools include setting internal standards and targets to reduce GHG emissions aligned with science, particularly in resource-intensive sectors, and reduce food loss and waste. To incentivize necessary dietary shifts – the key demand-side intervention for a sustainable food future – companies, particularly processors and wholesalers as well as retailers, can work to redesign product portfolios and product offerings based on regional variations of the Planetary Health Diet, and all businesses can work to increase R&D spending in alternative protein innovation.

But existing market mechanisms — translating environmental impact into financial impact (e.g. pricing environmental externalities) — are not sufficient and thus, effective, concrete policy is also necessary to shepherd system-wide change. Financial tools are available, including subsidies and trade deals, to serve important goals around ecosystem conservation and restoration. Other financial mechanisms could also be deployed with the collaboration and support of investors and the financial services industry.

One of the biggest levers incentivizing action from companies is pressure from capital markets, and CDP's 515+ investor signatories representing US$106 trillion in assets are critical to driving corporate disclosure. Increasingly, investors are looking beyond disclosure to action and engagement, calling for increased transparency into companies' long-term risk planning, stakeholder and supply chain transparency. While some companies are responding to investor requests for environmental disclosure, most do not engage beyond their first-tier suppliers, meaning the capacity for companies and investors to understand risks to their value chain is limited. Companies that are not responding to this push face the potential of sizable losses of investment capital.

Companies in the FVC, with support and collaboration from food system and value chain stakeholders, must move to proactively measure and manage risks to their direct operations and value chains from farm to fork. In doing so, they can minimize risk to their operations, improve resiliency and build opportunities in service of the planet as well as their bottom line.

A sustainable food system is one that works for people and planet by using low- and no-carbon inputs, conserving water and other resources and decoupling commodities from deforestation to provide ample, nutritious, low-carbon food to the world's population without exceeding the Earth's planetary boundaries. Without meaningful action in the near term, the global food value chain will serve as an impediment to progress rather than as a catalyst for a sustainable future. Companies have a clear choice – they can help shape the future of food, or they can be left behind.

The CDP Sustainable Food Systems initiative will track this progress – and help drive this change by working to support companies in transition and raise awareness of the impacts and risks to business, making the economic benefits of transition clear and recognized.

APPENDIX 1

Sample setting methodology for the CDP Food Value Chain

The CDP Food Value Chain (FVC) sample was defined based on previous work conducted by the Food and Agriculture Organization of the United Nations (FAO). The FAO defines the food value chain as "the full range of farms and firms and their successive coordinated value-adding activities that produce particular raw agricultural materials and transform them into particular food products that are sold to final consumers and disposed of after use."[40] Drawing from this definition, the FVC sample includes companies responsible for creating the material and chemical inputs to agriculture ("production inputs"), farms ("primary producers"), companies that gather and refine product prior to its delivery to market ("processors and wholesalers") and the stores and food service companies that sell the finished food product ("retailers"). This definition excludes end users (consumers) and companies involved in waste disposal, as well as transport and storage companies that work with food but do not produce or sell it.

The CDP-ACS methodology[xxxii] was used to sort activities into value chain levels. Each activity listed in CDP-ACS was assigned to a value chain level (e.g. production inputs, primary producers, processors and wholesalers, retailers) or was excluded from the FVC. The full list of activities for each value chain level is below:

PRODUCTION INPUTS

- Agricultural chemicals
- Nitrogenous fertilizers
- Non-nitrogenous fertilizers

PRIMARY PRODUCERS

- Cocoa bean farming
- Cotton farming
- Fruit farming
- Grain and corn farming
- Other crop farming
- Other oilseed farming
- Palm oil farming
- Rice famring
- Soybean farming
- Sugarcane farming
- Vegetable farming
- Aquaculture
- Cattle farming
- Fishing
- Poulty and other animal farming

PROCESSORS AND WHOLESALERS

- Alcohol beverages
- Animal processing
- Baked goods and cereals
- Chocolate confeciton
- Dairy and egg products
- Fruit, nut and vegetable processing
- Grain and corn milling
- Non-alcoholic beverages
- Non-chocolate confection
- Oilseed processing
- Other food processing
- Palm oil processing
- Seafood processing
- Soybean processing
- Sugar
- Agricultural products wholesale
- Animal products wholesale
- Food and beverage wholesale

RETAILERS

- Fast food
- Food and beverage amenities
- Hypermarkets and superstores
- Supermarkets, food and drugstores

There are two notable omissions from the FVC:

- **Biofuels:** Despite being agriculturally intensive, biofuels themselves are not food items and do not meet the threshold for inclusion as mentioned earlier in the report and appendix;
- **Industries:** Such as hotels and casinos and airlines. These industries are related to the food system but not as a primary business activity.

xxxii The ACS methodology can be found at http://6fefcbb86e61af1b2fc4-c70d8ead6ced550b4987d7c03fcdd1d.ssl.cf3.rackdn.com/cms/guidance_docs/pdfs/000/001/54/original/CDP-ACS-full-list-of-classifications.pdf?1520244912

Every company in CDP's database is classified according to the CDP-ACS methodology. Activities were tagged with the appropriate value chain level per the process outlined above. Companies were then sorted into value chain levels based on their primary activity. Only companies with a relevant activity listed as their primary activity are included in the sample. This is to prevent inclusion of companies that may have one activity in the value chain but many others not within the value chain, thereby ensuring that the sample is not diluted by companies only tangentially related to the food value chain and more appropriately classified as non-food companies based on their primary business activity (e.g. airlines, hotels).

Companies that disclosed to CDP using minimum tier questionnaires are included for the purposes of general sample information (e.g. disclosure response rates, sample coverage) but were omitted from question-level analysis to avoid high rates of non-responses and thereby ensure consistent sample sizes to all data points included in the report. This created two distinct samples: the coverage sample and the analysis sample. More information on each can be found below.

Sample size breakdown

The tables below details the final CDP Food Value Chain sample for each CDP questionnaire. Note that the sample size of the FVC for response rate purposes includes all companies regardless of tier, whereas the sample size for analysis includes only companies responding to the full questionnaire tier in a given theme.

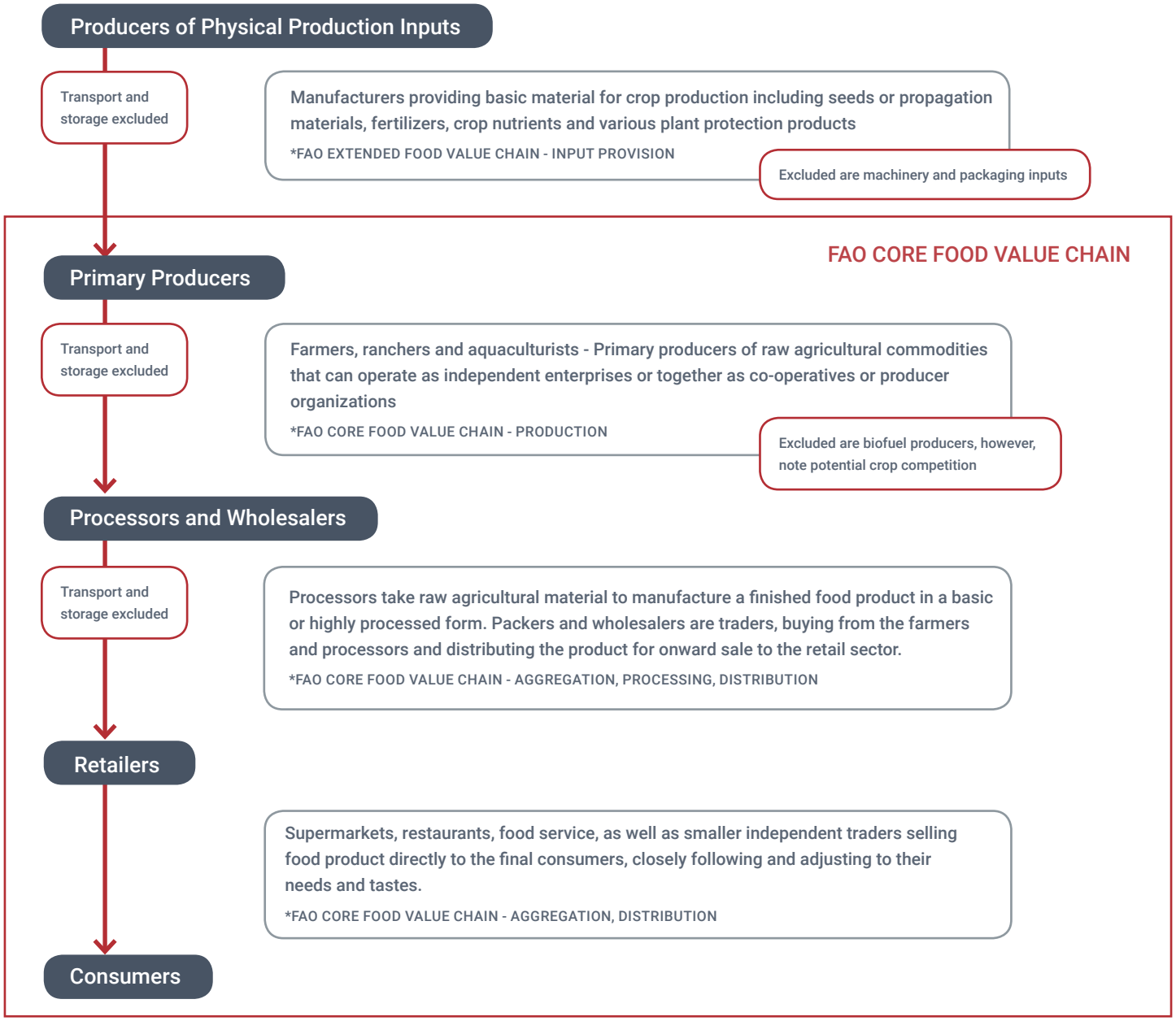
Note that there is considerable overlap between the themes and the thematic numbers cannot be summed to reach a total number of companies.

FVC analysis sample

	Production Inputs	Primary Producers	Processors and Wholesalers	Retailers	Food Value Chain - all levels	CDP Global Sample
Climate change analysis	9	29	384	57	479	4,443
Water security analysis	6	10	178	22	216	1,389
Forests analysis	0	13	93	23	129	218
Forests analysis PALM OIL					83	
Forests analysis CATTLE PRODUCTS					44	
Forests analysis SOY PRODUCTS					60	

FVC coverage sample (response rates)

	Production Inputs	Primary Producers	Processors and Wholesalers	Retailers	FVC combined	CDP Global Sample
Climate change all submissions	13	64	760	62	899	7,461
Climate change all requests	30	103	981	165	1,279	11,132
Water security all submissions	8	21	364	24	417	2,016
Water security all requests	21	29	504	80	634	3,234
Forests all submissions	0	19	173	26	218	325
Forests all requests	1	67	376	145	589	1,053


Producers of Physical Production Inputs
Transport and storage excluded
Manufacturers providing basic material for crop production including seeds or propagation materials, fertilizers, crop nutrients and various plant protection products
*FAO EXTENDED FOOD VALUE CHAIN - INPUT PROVISION
Excluded are machinery and packaging inputs
FAO CORE FOOD VALUE CHAIN
Primary Producers
Transport and storage excluded
Farmers, ranchers and aquaculturists - Primary producers of raw agricultural commodities that can operate as independent enterprises or together as co-operatives or producer organizations
*FAO CORE FOOD VALUE CHAIN - PRODUCTION
Excluded are biofuel producers, however, note potential crop competition
Processors and Wholesalers
Transport and storage excluded
Processors take raw agricultural material to manufacture a finished food product in a basic or highly processed form. Packers and wholesalers are traders, buying from the farmers and processors and distributing the product for onward sale to the retail sector.
*FAO CORE FOOD VALUE CHAIN - AGGREGATION, PROCESSING, DISTRIBUTION
Retailers
Supermarkets, restaurants, food service, as well as smaller independent traders selling food product directly to the final consumers, closely following and adjusting to their needs and tastes.
*FAO CORE FOOD VALUE CHAIN - AGGREGATION, DISTRIBUTION
Consumers

APPENDIX 2. DATA POINTS AT A GLANCE"

*climate impacts are defined as risks which have "current" timeline and "very likely or "virtually certain" likelihood

**includes all traceability targets not just those covering 100%

	CDP GLOBAL SAMPLE	ALL FVC	PRODUCTION INPUTS	PRIMARY PRODUCERS	PROCESSORS AND WHOLESALERS	RETAILERS	CDP GLOBAL SAMPLE	ALL FVC	PRODUCTION INPUTS	PRIMARY PRODUCERS	PROCESSORS AND WHOLESALERS	RETAILERS	PALM OIL	CATTLE PRODUCTS	SOY	CDP GLOBAL SAMPLE	ALL FVC
DISCLOSURE																	
Total requests: All tiers	11,132	1,279	30	103	981	165	3,234	634	21	29	504	80	N/A	N/A	N/A	511	298
Total submissions: All tiers	7,461	899	13	64	760	62	2,016	417	8	21	364	24	N/A	N/A	N/A	182	150
Response rate	67.0%	70.3%	43.3%	62.1%	77.5%	37.6%	62.3%	65.8%	38.1%	72.4%	72.2%	30.0%	N/A	N/A	N/A	35.6%	50.3%
Analytical sample size (full tier submissions)	4,443	479	9	29	384	57	1,389	216	6	10	178	22	83	44	60	134	84
Companies expected to disclose on commodity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	195	121	145	N/A	N/A
Companies disclosing on commodity that were expected	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	99	55	59	N/A	N/A
Response rate for expected companies	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	50.8%	45.5%	40.7%	N/A	N/A
COVERAGE																	
Share of emissions from Scope 3	79.2%	87.5%	73.7%	81.7%	86.4%	91.5%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Share of companies monitoring/measuring withdrawals from water stressed areas at +75% of sites/facilities	N/A	N/A	N/A	N/A	N/A	N/A	42.0%	48.1%	50.0%	22.2%	48.5%	54.6%	N/A	N/A	N/A	N/A	N/A
Share of companies with a traceability system in place at commodity-level	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	81.9%	86.4%	71.7%	N/A	N/A
Share of companies for which biogenic carbon pertaining to direct operations is considered relevant disclosure	N/A	N/A	N/A	40.0%	17.6%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TARGETS																	
Share of companies with emissions reduction, water, or commodity-level forests target	68.2%	60.0%	66.7%	55.6%	57.6%	76.8%	56.4%	59.3%	66.7%	20.0%	61.2%	68.2%	80.7%	34.1%	40.0%	16.4%	22.6%
Share of targets set that cover Scope 3	15.3%	16.2%	16.7%	13.3%	15%	23.3%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Share of companies with water quality targets	N/A	N/A	N/A	N/A	N/A	N/A	49.0%	55.6%	66.7%	20.0%	56.2%	63.6%	N/A	N/A	N/A	N/A	N/A
Share of companies with water quantity targets	N/A	N/A	N/A	N/A	N/A	N/A	11.3%	13.9%	0.0%	0.0%	16.3%	4.5%	N/A	N/A	N/A	N/A	N/A
Share of companies with a commodity-level traceability target**	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	15.7%	7.5%	6.1%	N/A	N/A
Share of companies committed to / have an approved Science-Based Target (9/15/2020)	9.3%/6.8%	15.7%/11.9%	22.2%/11.1%	6.9%/6.9%	13.8%/10.7%	31.6%/22.8%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VALUE CHAIN ENGAGEMENT																	
Share of companies engaging with suppliers	49.7%	55.5%	77.8%	55.2%	51.3%	80.7%	32.5%	43.5%	33.3%	20.0%	42.1%	68.2%	82.3%	76.2%	74.5%	14.2%	33.3%
Share of companies engaging smallholders	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	62.5%	55.6%	35.7%	N/A	N/A
IMPACTS, RISKS AND OPPORTUNITIES																	
Share of companies assessing risks	82.6%	77.3%	88.9%	68.0%	74.8%	94.7%	73.9%	75.5%	100.0%	60.0%	74.2%	86.4%	N/A	N/A	N/A	70.1%	59.5%
Share of companies identifying risks	67.1%	72.0%	88.9%	68.0%	69.5%	87.7%	60.0%	66.7%	66.7%	60.0%	67.9%	59.1%	73.5%	47.7%	51.7%	16.4%	38.1%
Share of companies identifying opportunities than can be realized	66.2%	64.1%	88.9%	65.5%	60.4%	84.2%	52.7%	59.9%	83.3%	40.0%	60.3%	59.1%	N/A	N/A	N/A	47.8%	27.4%
Share of companies identifying detrimental impacts*	11.8%	12.5%	11.1%	10.3%	11.2%	22.8%	13.0%	23.7%	66.7%	10.0%	19.7%	50.0%	15.9%	15.9%	17.2%	2.2%	1.2%
STRATEGY																	
Share of companies conducting climate-related scenario analysis	33.1%	29.4%	11.1%	17.2%	29.4%	38.6%	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Share of companies that identified water-related outcomes from scenario analysis	N/A	N/A	N/A	N/A	N/A	N/A	58.0%	73.9%	66.7%	66.7%	74.6%	75.0%	N/A	N/A	N/A	N/A	N/A

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