wbcsd

An enhanced assessment of risks impacting the food and agriculture sector

Contents

1 **FOREWORD** | 4

2 **EXECUTIVE SUMMARY** | 5

3 **INTRODUCTION** | 7

4 **ASSESSING AND PRIORITIZING ESG-RELATED RISKS** | 9

5 **UNDERSTANDING THE FOOD AND AGRICULTURE LANDSCAPE** | 14

6 **KPMG'S DYNAMIC RISK ASSESSMENT METHODOLOGY** | 18

7 **INSIGHTS AND FINDINGS** | 21

8 **KEY THEMES AND SUGGESTED ACTIONS** | 36

9 **CONCLUSION** | 38

10 **USEFUL RESOURCES** | 40

11 **REFERENCES** | 41

1

Foreword

The global risk landscape continues to change – constantly and at pace. Disruption, driven by environmental, social, governance (ESG) and technological risks, means business must respond and adapt to ensure long-term success, strategic resilience and value preservation.

Monitoring and managing ESG-related risks and opportunities is integral to business resilience in an economy that sees more frequent and severe impacts than ever before. Companies that do not manage their ESG-related risks miss out on opportunities and can suffer detrimental impacts.

However, ESG-related risks can be difficult to identify, quantify and prioritize. It requires a deep understanding of the business operating environment and leadership that acknowledges and accepts the evolving external landscape. On a technical level, the process must move beyond traditional impact versus likelihood analysis to consider the interconnectivity and speed of onset of these risks.

The food and agricultural sector in particular faces a multitude of risks and resource restraints in a rapidly evolving natural and social environment. More than ever, companies in this sector must demonstrate how they will continue to operate within the resource-scarce limits of the planet whilst meeting the needs and demands of feeding 9+ billion people.

Because of these challenges, the World Business Council for Sustainable Development (WBCSD) engaged KPMG, through its process known as Dynamic Risk Assessment.

KPMG's Dynamic Risk Assessment is an evolution of more traditional risk assessment methodologies that:

1. Incorporates future trends and potential downstream threats into risk management processes, injecting forward-looking analysis and assessment and making results reliant on more than just historical data; and
2. Expands analysis to estimate how risks might connect with each other and with what velocity to result in business impacts that are potentially more severe than would be assessed using other methods for estimating severity and risk event rates.

WBCSD, participating members and KPMG recognize the importance of broadening the lens of risk management to understand the potential magnitude of ESG-related risks so that they can be effectively integrated into companies' mainstream decision-making processes. This is fundamental to the future success of business.

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2

Executive summary

The complexities and connectivity of ESG-related risks mean companies must assess risks not just individually, but as an interconnected, aggregated and dynamically-dependent group.

② Executive summary

Traditional risk assessment processes express risk severity in terms of the impact a risk might have on business performance and the likelihood of the risk occurring. There are recognized limitations in the adequacy of traditional approaches for enabling businesses to appropriately assess and prioritize the multi-faceted and complex characteristics of ESG-related risks.

At the same time, companies are facing increased stakeholder expectations and demands to demonstrate effective integration of robust ESG-related risk management into business decision-making and performance to drive strategic resilience.

As a key interface between people and nature, the food and agriculture industry must address a wide range of ESG-related challenges and opportunities. Within this crucial sector where a diverse range of companies operate, global supply chains can be complex and vulnerable and market disruption has the potential to drive catastrophic impacts on financial and non-financial capital (e.g. natural, human and social capital).

This report presents analyses from the application of an enhanced risk assessment technique - KPMG's Dynamic Risk Assessment methodology - to the risk landscape represented by the perspectives of nine companies operating in the food and agriculture sector.

The analysis proves that the dynamic risk assessment methodology enables companies to better understand the risk landscape faced by the food and agriculture sector. By considering risks as an interconnected network, it is possible for firms to identify the most influential risks and to better target and apply risk mitigation techniques to positively impact key challenges facing the industry. The analysis highlighted these challenges as: understanding agricultural practices; regulation; and inefficient production practices.

By extending and introducing new risk dimensions, the analysis illustrated the importance of considering connected clusters of risks and exploring how the occurrence of one risk may change the likelihood of a connected risk being triggered. The analysis also highlighted greater severity and higher velocity of risks when viewed as clusters, compared to the impacts of individual risks captured using traditional approaches.

Two key clusters identified in this study were:

- Cluster 1: Inefficient production practices, land degradation and nitrogen inefficiency.
- Cluster 2: Inefficient production practices, land degradation and water.

The analyses suggests these clusters may be best managed as a connected group rather than individually. Further analysis highlighted clusters of risks with weaker linkages between risks, but for which risk-triggering and aggregated severity outcomes are not as readily recognized or anticipated.

Specific conclusions of the report are that companies operating in the food and agriculture sector should:

1. Manage clusters of risks and their connections, specifically in two primary risk clusters;
2. Focus on individual company and sector-level initiatives to deepen stakeholder awareness and understanding of current agricultural practices, with critical influence on the quality and effectiveness of regulation (including non-science based regulation) and production processes.
3. Allocate resources to target and mitigate the most influential sector risks, namely: understanding agricultural practices; regulation; and inefficient production practices.
4. Consider the application of a dynamic risk assessment approach to better prioritize risks, devise more effective risk management strategies and deploy resources more efficiently by directly identifying the risks most influential to business performance.

This report is intended to help companies more effectively assess their exposure to food system challenges and to integrate this knowledge into target setting and solution building.

It will enable readers to act as advocates for food systems transformation by responding proactively to the critical risks and opportunities identified in this report.

3

Introduction

Ten years ago, the top global risks identified by the World Economic Forum (WEF) in its Global Risk Report in terms of impact and likelihood were predominantly economic. But today, the risk landscape has radically changed.[1]

3 Introduction

In 2020, three of the top five risks identified for likelihood were environmental. Companies must quickly broaden the boundaries and scope of their risk management to include ESG-related risks to protect business performance in the decade to come.

The increased frequency of companies materially affected over the last ten years shows how failure to adequately address ESG-related risks can result in significant negative impacts for a company. Investors are applying increased pressure on companies to disclose ESG-performance with the expectation that disclosure of non-financial information and ESG activities demonstrates appropriate management of risk.[2]

With these increased expectations on companies to address ESG-related risks, there is evidence that companies are struggling to meet the demands. Research conducted by WBCSD revealed a misalignment between the material issues highlighted in companies' sustainability reports and the risk factors disclosed in the legal filing. Only 8% of the companies analyzed had full alignment between the two, 57% had partial alignment (where existing legislation dictated disclosure, usually for health and safety or compliance matters), which meant 35% of companies had zero alignment.[3]

This highlights a significant disconnect between what a company considers material in a sustainability versus a risk context - suggesting that material sustainability topics are not adequately considered in the enterprise risk management process.

Additionally, while initiatives are prompting increased focus on managing ESG-related issues, companies are challenged to embed solutions in their business processes. For example, the Task Force on Climate-Related Financial Disclosures (TCFD) provides a framework for companies to improve disclosure of the financial impacts of climate-related risk. But the most recent report issued by the TCFD demonstrates that, while 80% of the top 1,100 G20 companies are disclosing climate-related finance risks in line with the recommendations, more attention is needed to improve strategic resilience and integrate these activities into overall risk management.[4]

The need for robust risk management capabilities is of particular relevance to the food and agriculture sector, which is at high risk of a changing landscape. The global food system is depleting the resources of the planet and current diets are resulting in both over- and under-nutrition.* The food system produces 23% of global emissions, over 75% of food comes from just four major crops (there is a severe concentration risk associated with the collapse of these mono-cultures) and land conversion for food production is the biggest driver of biodiversity loss. In addition, over 30% of all food produced globally is lost or wasted. Such impacts pose both environmental threats and business-specific risks in terms of legislation, legal action and consumer preferences that may profoundly impact current business models and the food system's collective license to operate.

To support the integration of broad ESG-related and systemic risks into the enterprise risk management process, WBCSD worked with the Committee of Sponsoring Organizations of the Treadway Commission (COSO) to develop guidance to enhance companies' resilience as they confront the increasing prevalence and severity of ESG-related risks. The guidance helps risk and sustainability practitioners speak the same language, communicate the broad impacts and dependences of the company and address how these might translate into risks. Core components include consideration of how risks may impact company strategy and business objectives and how companies can assess and prioritize risks.

Within this context, KPMG's Dynamic Risk Assessment offers companies an enhanced capability to examine, understand and manage the interconnections, complexity and aggregated impacts of the risks that might impact business performance and strategic resilience. In particular, the analysis highlights the need for companies to extend risk management methodologies to effectively manage ESG-related risks.

This report is a call to action for the food and agriculture sector to consider how different prioritization criteria are needed to improve understanding of risk management and strengthen business resilience. Managing ESG-related risks is becoming critical for business success and developing methodologies for assessment and prioritization can support companies on their journey towards better integration of ESG information into business decision-making.

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* Amongst the global population 2+ billion people lack the micronutrients needed for growth, yet 75% of people suffer health issues linked to being overweight. Source: WBCSD, (2019), CEO Guide to Food System Transformation

4

Assessing and prioritizing ESG-related risks

④ Assessing and prioritizing ESG-related risks

4.1 INTEGRATING ESG-RELATED RISKS IN ENTERPRISE RISK MANAGEMENT

Effective risk management balances risk exposures, benefits and expenditures. Strong ESG-related risk management capability is necessary for companies to assess and address the impact of ESG-related risks on business strategy and objectives. In addition, companies must also understand the implications of strategy delivery on the creation and preservation of business value – across a broader range of resources and relationships used and affected by the entity.[5]

ESG-related risks can be challenging to identify, assess and prioritize. By their nature, the financial or business implications of an ESG-related risk may not be immediately clear or easily measurable. These challenges can be exacerbated by a company's limited knowledge of ESG-related risks, varying risk emergence periods relative to financial or operational risks and challenges to quantify risks or assess outcomes.

Companies are further challenged by the increasingly complex and interconnected global context and the evolution of the markets in which they operate. Disruption of markets, shifts in global economic power and changes in internal and external stakeholder expectations are driving the need for companies to demonstrate stronger, more transparent and robust management of ESG-related risks across business activities and operating models.

With the link between ESG factors and risk becoming increasingly explicit, companies must find ways to bring new functions and leaders into the conversation.

4.2 TRADITIONAL RISK ASSESSMENT APPROACHES

An effective risk assessment examines the extent to which identified risks may impact a company's strategy and business objectives.

The guidance developed by WBCSD and COSO, Applying enterprise risk management to environmental, social and governance-related risks highlights that companies typically achieve this by:[6]

- Identifying the impacts and effects that a risk may have on the entity; and
- Selecting the most appropriate approach, data and assumptions for the assessment.

Once a risk is identified, understanding the potential business impacts and effects allows management to prioritize risks and allocate resources to respond and monitor the risk over time. To achieve this, risks are translated into a common language that captures the risk magnitude.

Traditionally, risk severity is expressed in terms of impact and likelihood. Overviews and examples of these approaches are presented in Chapter 3b (Performance for ESG-related risks: Assess and Prioritize) of WBCSD's guidance. An illustration of an impact and likelihood assessment matrix is presented in Figure 1.

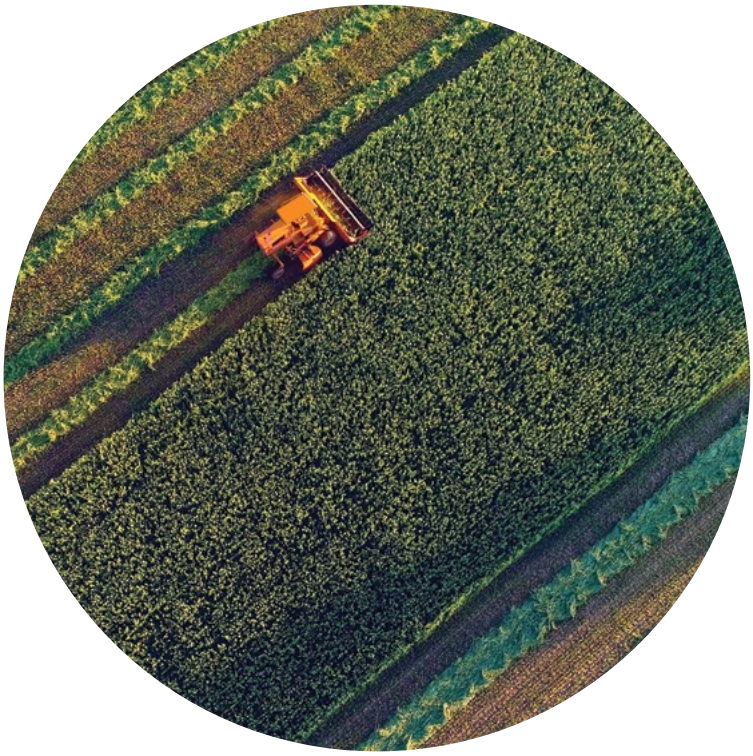
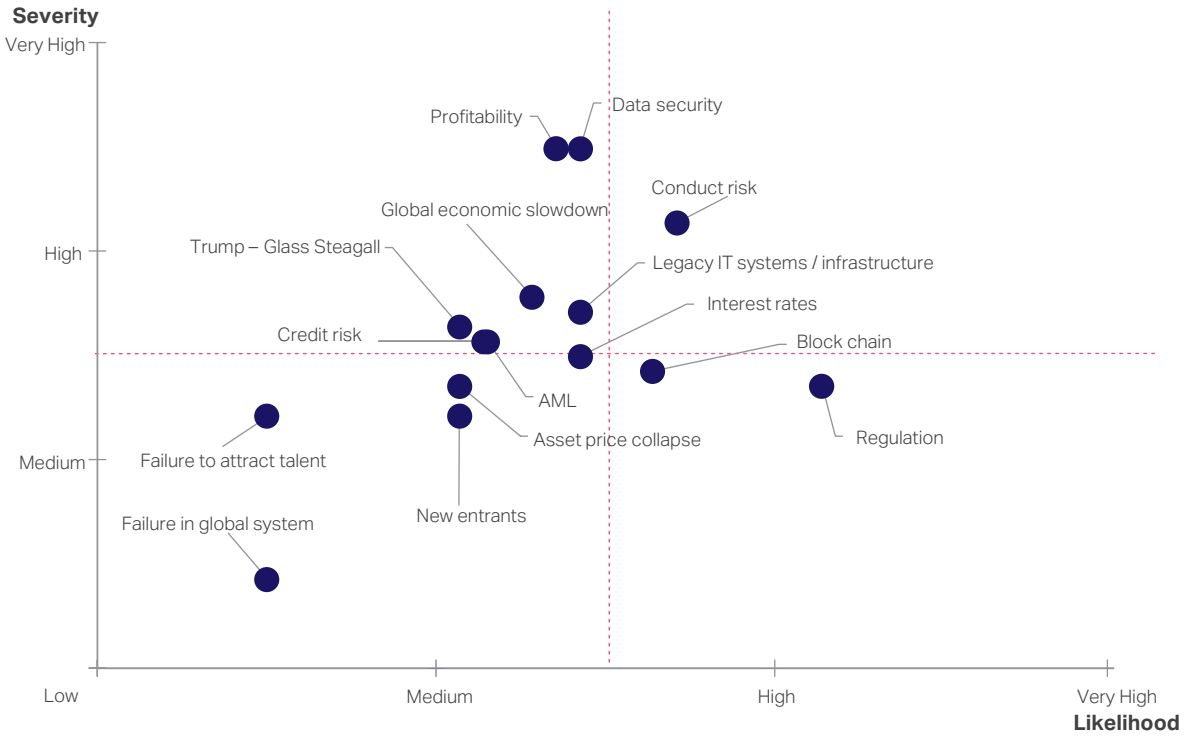


Figure 1: Illustration of an impact and likelihood risk matrix



Source: KPMG, (2018), KPMG's Dynamic Risk Assessment

Although impact and likelihood are common criteria for assessing risk severity and prioritizing risks, there are recognized limitations in the effectiveness of their application to ESG-related risks. Some of the characteristics of ESG-related risks that cause challenges, include:[7]

- ESG-related risks can be more unpredictable and may manifest over a longer and often uncertain time frame.
- For ESG-related risks, it can be difficult to find historical precedence and data to estimate the impact of the risk.
- Risks may be outside of an entity's control and responding to a risk may rely on collaboration, or on the actions of other parties.
- Specifically, and critically, ESG-related risks are macro, complex, multi-faceted and interconnected and can affect the business across many dimensions (including different forms of capital and value).

These complexities and interconnectivities mean it is crucial that companies review and assess risks not just individually, but as an interconnected, aggregated and dynamically dependent group.

4.3 MOVING BEYOND IMPACT AND LIKELIHOOD

To overcome the challenges highlighted above, it is important for companies to use criteria beyond impact and likelihood that extend the assessment of risk exposure and present results in a way that better supports decision-making. For example, an assessment of how vulnerable a company is to a risk (i.e. the capability to adapt or to recover) may better reflect how the severity of a risk is assessed and prioritized, beyond simply assessing likelihood.

The choice of assessment criteria is further influenced by the type of ESG-related risks which may be new to business decision-makers. For example, the use of social media has shortened the time period between stakeholder identification and communication of ESG issues, accelerating the speed at which markets, stakeholders and companies are informed of issues and reducing the time available for companies to respond. By way of another example, new legislation in some countries holds businesses accountable for modern slavery risks throughout their extended value chain anywhere in the world.

④ Assessing and prioritizing ESG-related risks

Heightened scrutiny, regulation and awareness of ESG-related challenges require companies to assess risks and impacts beyond traditional, internal business activities and assets – extending risk assessment requirements to, for example, the external environment, the full supply-chain and value creation across a broader range of capitals (e.g. financial, manufactured, intellectual, human, social and relationship, natural) and resources.

A list of example criteria provided by COSO for assessing and prioritizing risks and the relevance of ESG-related risks are presented in Table 1.

Against this backdrop, it is apparent that companies need to enhance their capabilities for assessing ESG-related risks to support business resilience, adaptability, long-term sustainability and capacity for growth. This requires a forward-looking, more sophisticated approach to risk assessment that examines the complexity, interconnectivity and aggregated nature of risks.

Table 1: Application of prioritization criteria to ESG-related risks

Criteria	Description	Relevance for ESG-related risks
Adaptability	The capacity of an entity to adapt and respond to risks	A risk may be significant and unpredictable; however, an organization can build in adaptability mechanisms to respond to or absorb the risk. For example, in the 1980s, Shell diversified its portfolio and used scenario planning to prepare and adapt to potential oil price fluctuations that were generally considered unforeseeable.
Complexity	The scope and nature of a risk to the entity's success	Many ESG-related risks are interrelated, global, industry-wide and constantly changing. For example, health care companies are aware of the complex relationship between climate change and health. Climate change impacts may lead to potential disruptions to operations, while also leading to health impacts on individuals (increasing the demand for health care services). CPA Australia, KPMG and GRI reported that companies that incorporated megatrend analysis into the risk processes tended to focus on one characteristic and did not deal with the "complex and systemic megaforce whose impacts are over the short, medium and long term." For example, companies with exposure to water scarcity are more likely to focus on immediate water efficiency than investigating the risks associated with future water scarcity. Similarly, companies looking at resource scarcity and deforestation are considering efficient consumption of energy, water and paper as well as recycling initiatives but are less likely to explore deeper issues of changing land use practices and systemic impacts on ecosystem design.
Velocity or speed of onset	The speed at which risk impacts an entity	ESG-related risks are often emerging and unforeseen until swift events result in extreme consequences. Climate change impacts often manifest in the form of more extreme or frequent occurrences of known events, such as droughts and floods, and are best understood by studying longer temporal horizons than are usually associated with typical risk management.
Persistence	How long a risk impacts an entity	Risk severity should consider the extent to which the impact will be an acute, onetime impact (e.g., cyclones, hurricanes or earthquakes) versus a chronic issue that will cause ongoing impacts (e.g., sustained higher temperatures or droughts).
Recovery	The capacity of an entity to return to tolerance	Consider how quickly the business would recover if a risk occurred today. For some ESG issues, impacts are irreversible. For example, in the food, beverage and agriculture sector, the impacts of climate change have the potential to alter growing conditions and seasons, increase pests and disease and decrease crop yield. Recovery from these impacts requires enhancing capacity to manage and respond to the risk.

Source: WBCSD-COSO, (2018), Applying enterprise risk management to ESG-related risks, available at: https://www.wbcsd.org/erm

4.4 KPMG'S DYNAMIC RISK ASSESSMENT

This methodology is an extension of traditional risk modeling approaches. It uses Expert Elicitation to construct risk networks of past and future risks due to emerging trends and 'known unknowns' – risks which the company is aware of but is, as yet, uncertain of the effects. It also examines risk combinations never seen before and is not reliant on the persistent past statistical relationships most traditional risk methodologies require.

The KPMG Dynamic Risk Assessment process provides insight on:

1. The combinations of future risks most expected, by expert forecasters, to occur;
2. Risks that are weakly connected to each other but, in combination, can cause catastrophic outcomes;
3. The opportunities with the highest network pay-off in the future risk environment;
4. The combination of highly vulnerable risks that, in aggregate, could pose existential crises; and
5. Residual risks that are individually not likely or consequential and are not expected to group up contagiously in catastrophic risk outcomes, nor likely to strike with speed. These risks can be delegated.

Applying this approach empowers risk analysts to extend and deepen a company's assessment and understanding of the interactions and aggregated impacts of identified risks. It helps companies to understand the most influential risks – those most interconnected with other risks – and the most influenced risks – those most susceptible to network risks.

Critically, this helps companies better prioritize risks to devise more effective risk management strategies and deploy resources efficiently by directly identifying the risks most influential to their business performance.

Further details of the methodology are presented in Chapter 6.

4.5 SUPPORTING THE TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES (TCFD) RECOMMENDATIONS

The identification, assessment and management of climate-related risks forms one of the key recommendations of the TCFD. It supports effective climate-related disclosures that 'promote more informed investment, credit and insurance underwriting decisions.

Given challenges associated with climate-related risk uncertainty, complexity, connectivity and time horizons, WBCSD's TCFD Preparer Forums help companies integrate climate change into overall risk management processes. Forum participants have discussed whether adaptations are required to risk management processes to account for the fact that climate change can often form one part of, or contribute to, other risks. In particular, the highly interconnected nature of climate change on business factors makes it appropriate to monitor it in combination with macro-economic, weather-related, regulatory, technological, market and investment factors.

The methodology offers a valuable approach to respond to these challenges by supporting the assessment of strategic resilience and effective climate-related disclosures. Markets need information to assess which companies are in a position to seize on the opportunities of a low carbon economy and which are strategically resilient to the physical and transition risks associated with climate change.

5

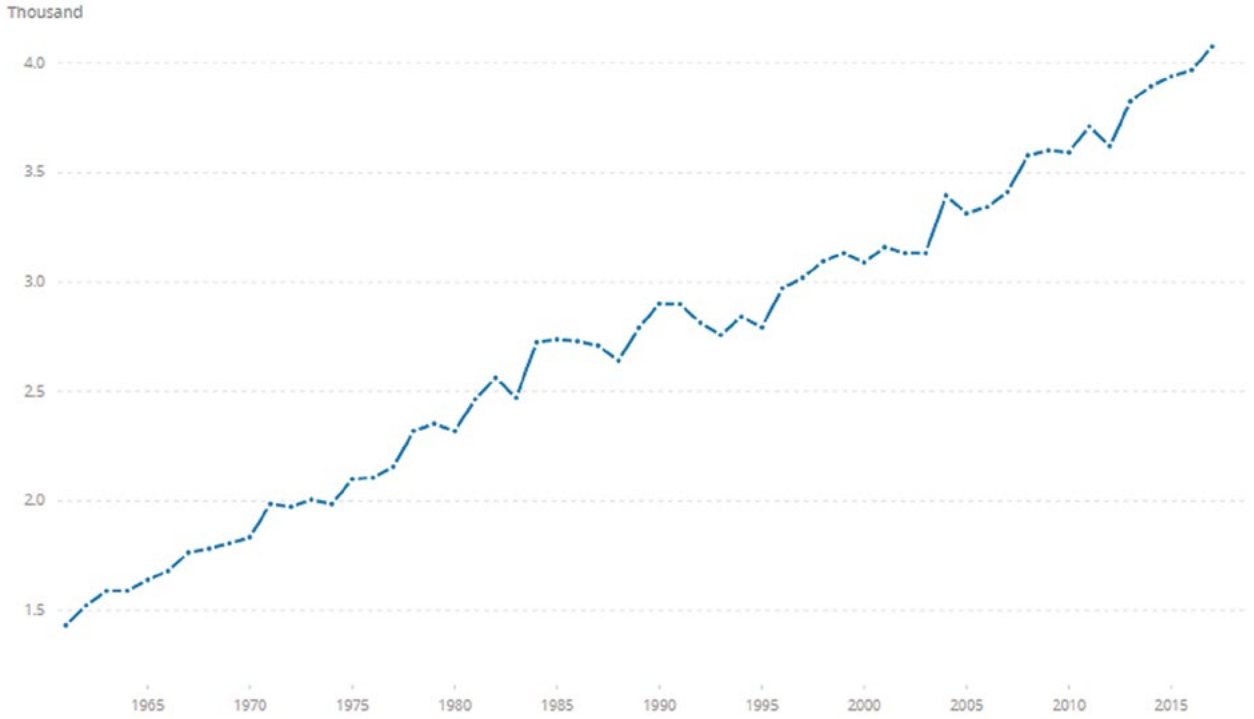
Understanding the food and agriculture landscape

Over the past 50 years, the food and agriculture industry has undergone extensive change that has boosted the output required to sustain a ballooning global population.

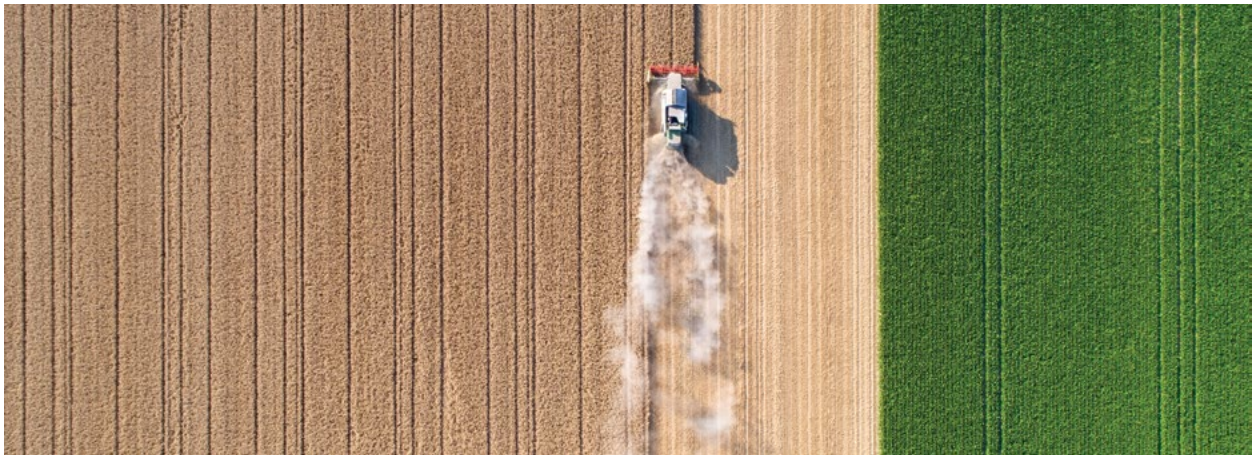
In many ways, this transformation has been incredibly successful in that levels of global hunger are at an all-time low (growth stunting reduced from 32.6% of the global population in 2000 to 22.2% in 2017).[8] However focusing on yield without due consideration of natural, social and human capital comes with associated negative impacts that are more visible than ever before - the urgency for change is clear and action is inevitable.

As one of the key interfaces between people and nature, the food and agriculture industry must balance the challenges associated with impacts and dependencies on society and the environment. On the one hand, we face the dual crisis of over- and under-nutrition. The health related impacts of food alone account for USD $1 trillion in the US and USD $3.5 trillion globally (4% of global GDP),[9] whilst wages of smallholder farmers can be some of the lowest in the world, forcing reliance on family and state support. On the other hand, we see increasing land being used for agriculture. 11% of global land is being used for crop production and 26% for livestock grazing, driving biodiversity loss and nutrient pollution[10] that, along with changing agricultural practices, are driving alarming impacts on nature; IPBES reports 1 million species at risk of extinction.[11]

Figure 2: World cereal yield (kg per hectare)



Source: The World Bank, World Bank Open Data, available at: https://data.worldbank.org/indicator/AG.YLD.CREL.KG



⑤ Understanding the food and agriculture landscape

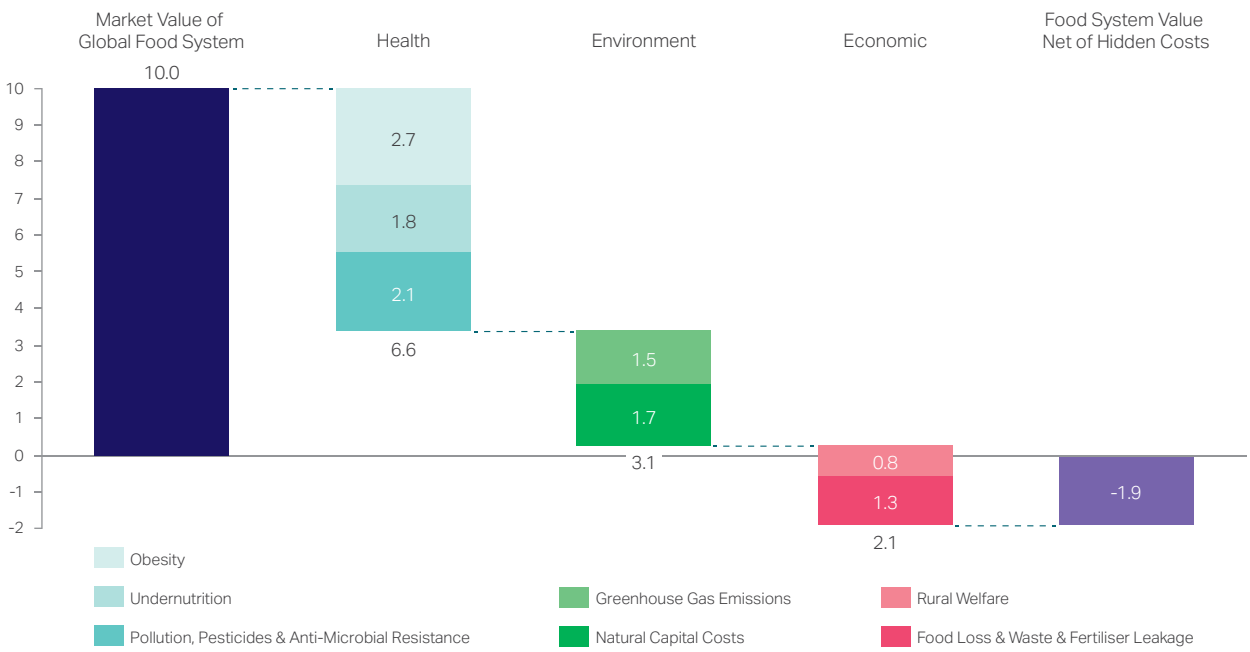
Figure 3 below highlights some of the main costs to society (externalities) resulting from key negative impacts of doing business.[12] Humanity must transform the food system by 2030 to effectively balance the sometimes opposing interests of nature and people if we are to stand a chance of achieving the Sustainable Development Goals (SDGs), healthy people and a healthy planet.

The internalization of costs associated with negative business impacts into business models through policy and regulation, markets, technology and customer preference (as per the TCFD framework)[13] is increasing. In Mexico, the tax on sugar in drinks provides just one example of how such external costs to society are being internalized.[14] Food and agriculture businesses should be aware of the implications of cost internalization as potentially material risks and also as opportunities for transitioning to new business models that are sustainable over the long term.

Over the past two years, there has been a pronounced move towards potentially highly disruptive technology in the food industry. This is most apparent when combined with changing consumer preferences, as demonstrated by the rise of the meat-free meat. Beyond Meat's blockbuster Initial Public Offering (IPO)* sent shares rocketing more than 800%.[15] With new science-based substitutes for egg white, meat and dairy products, companies in the livestock industry that fail to plan appropriately may be justifiably concerned, whereas those businesses that assess, manage and pursue adaption to these trends may capitalize on significant new opportunities.

Figure 3: The hidden costs of global food and land use systems sum to USD $12 trillion, compared to a market value of the global food system of USD $10 trillion

Trillions USD, 2018 prices



Source: Food and Land Use Coalition, (2019) , Growing Better: Ten Critical Transitions to Transform Food and Land Use, available at: https://www. foodandlandusecoalition.org/wp-content/uploads/2019/09/FOLU-GrowingBetter-GlobalReport.pdf

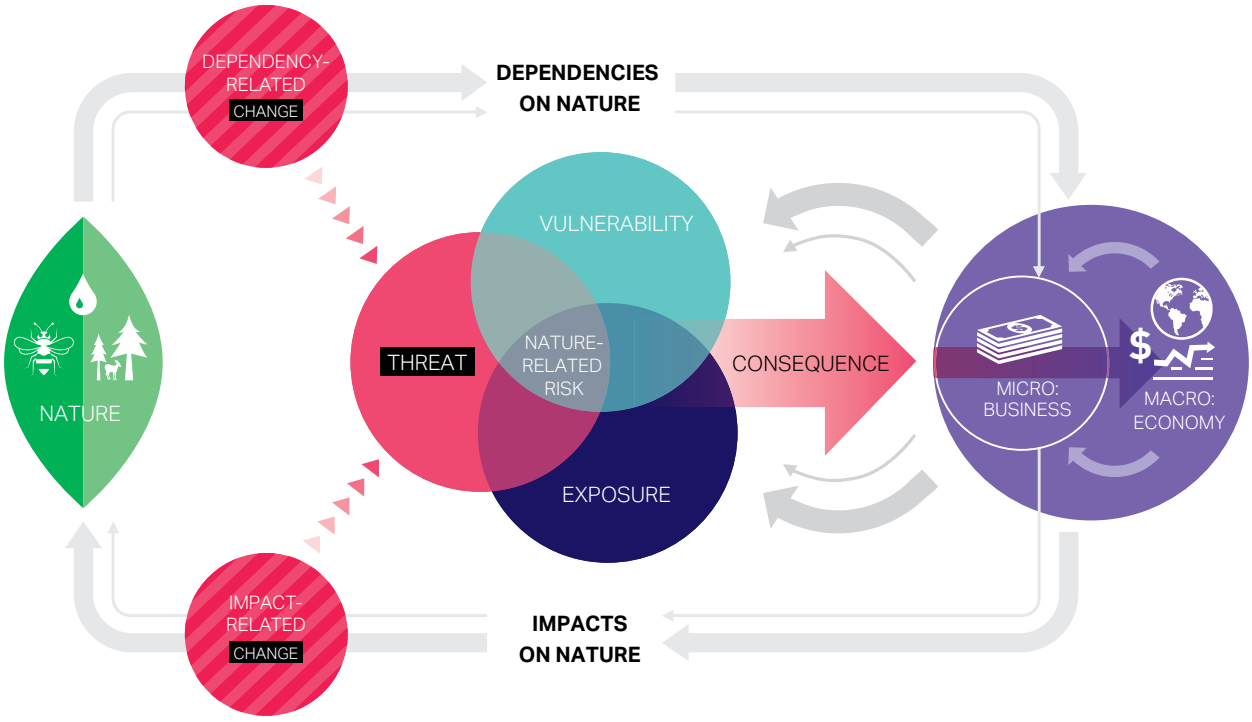
* Stock prices following initial offerings are often highly unstable. Whilst the first months of trading may not be an indication of long-term stock price, we do believe this IPO to be an indication of the level of interest and potential of disruptive food technologies

Alongside the increasing internalization of previously external costs to society, food and agriculture businesses are on the frontline of challenges related to megatrends such as climate change, loss of pollinators, the water crisis and land degradation, many of which are top-rated risks in the WEF Global Risk Report 2020.[16]

WBCSD and KPMG focused on the food and agriculture sector for several reasons:

- Global food and agriculture industry supply chains are some of the most vulnerable to disruption.
- No industry is more critical to life, health and wellbeing than the food sector, which we rely on to meet our most basic of needs. Disruption in this sector risks not just financial chaos but it is an existential threat to civilization as we know it.
- The vulnerability of the food and agriculture industry to a quickly changing operating environment, combined with the criticality of continued food production, render the sector an optimal testbed for KPMG's Dynamic Risk Assessment methodology, as does the complex nature of interacting risks such as drought, storms and biodiversity loss, which traditional risk management processes often fail to account for.

Figure 4: High level framework illustrating nature related risk to business



Source: WWF, (2018) The Nature of Risk, available here: https://d2ouvy59p0dg6k.cloudfront.net/downloads/wwf_nature_of_risk_final2.pdf

6

KPMG's Dynamic Risk Assessment methodology

6.1 BACKGROUND

When academics first began the field of financial risk measurement in the early 1950's,[17] the macro-economic environment was very different to the conditions prevailing today. Back then, risks could be sufficiently analyzed by just a few properties such as likelihood and severity; no additional dimensions were required.

As globalization began to take effect post 1970, the global economic order transformed in the ensuing years. The new, unfolding order introduced more countries into the global economy, ingested rapid technological advances to render changes ever-faster and introduced new markets, products and theories. As a result, previously isolated risks found new ways to become interconnected and spread. This introduced new realms not previously catered for in risk management; specifically risk contagion and velocity, or time to impact.

Today's macro-economy requires us to consider risk contagion and velocity. Risks can no longer be managed satisfactorily in the absence of this information. Interconnectedness means that emerging trends, especially innovation and disruption in a part of a connected system, can evolve into threats and opportunities for the entire network. This has profound implications for risk science - as methods relying only on past data are unable to comprehensively examine potential future risks.

6.2 KPMG'S DYNAMIC RISK ASSESSMENT

KPMG's Dynamic Risk Assessment is an evolution in traditional risk assessment methodologies that:

1. Incorporates future trends and their potential downstream threats into risk management processes, injecting a forward-looking analysis and assessment and making results no longer reliant solely on historical data;
2. Expands the analysis of the resulting risks to estimate how the risks might connect to each other and with what velocity they might do so, in addition to more natural methods to estimate severity and risk event rates.

The approach captures the wisdom of a crowd of deeply experienced industry professionals through a scientifically structured Expert Elicitation approach, harnessing their collective knowledge and representing these mathematically as a network. This network enables joint analysis of the usual likelihood and severity with the expected contagion and velocity. It enables us to generate many insights that are impossible through the traditional two-by-two likelihood-and-severity heat map.

The process generates a non-individually dominated quantitative view of a company's or industry's best thinkers – its experts – who endow a mathematical network with their thinking on future risks through a scientific, replicable and bias-reducing process. When performed well, Expert Elicitation can produce results that are more accurate than any given subject matter expert's individual modeling or forecasts.[18]

6.3 KPMG'S DYNAMIC RISK ASSESSMENT PROCESS

The process comprises four steps that can be applied at industry, company, project and risk theme levels.

The first two steps form the risk identification phase that aims to capture past risks that may re-occur, over-the-horizon risks and completely new risks. For the latter purposes, historical data is redundant and Expert Elicitation science underpins how experts are identified and the protocols that form these first two steps.[19]

Step three introduces technology into the process in the form of an interactive software tool.[20] The tool facilitates the quantification of experts' views on the risks the company faces and the collection of independent and anonymous estimates.

The fourth and final step identifies the key risks for prioritization, mitigation and controls as the numerical analysis highlights historically unobservable risk combinations and relationships.

Table 2 outlines the approach and performance of the four process steps as applied in this assessment of the food and agriculture sector.

Table 2: Steps in KPMG's Dynamic Risk Assessment process

Step 1 Expert identification and Interviews	Thirty-two experts from across the industry participated to capture a diverse range of perspectives. They represent a variety of roles across nine different companies across multiple continents and positioned in different parts of the value chain. Individual interviews were structured in accordance with Expert Elicitation protocols and were conducted with 16 of the experts. The objective of the interviews was to obtain a base-level understanding of the risks faced across the industry.
Step 2 Group interview	All experts participated in a group interview process, structured in accordance with Expert Elicitation protocols. This included bias-reducing training elements and guided participants to consider both exogenous and endogenous risks as well as trends that may pose current or downstream risk consequences to the industry. The output was a set of risk themes, expressed as precise risk descriptions, to articulate the root causes and potential impacts of the risk as per Chapter 3b (Performance for ESG-related risks: Assess and Prioritize) of WBCSD's guidance.
Step 3 Survey	Each expert accessed a patented, interactive software tool which facilitates the collection of data points on their individual perspective of the four dimensions of each risk: severity, likelihood, interconnectivity and velocity. The survey is scientifically structured to: • Use non-linear thinking processes;* • Reduce the effects of survey fatigue; • Lessen bias;** • Avoid categorical analyses and promote continuous-valued data collection; and • Support the consistent quantification of even the most challenging risks - such as those that fall within the ambit of ESG.
Step 4 Findings	A risk network was generated and analyzed to produce the five key insights - set out in Chapter 7. We presented the findings back to industry experts and discussed the next steps with them.

WBCSD's engagement of KPMG and the utilization of KPMG's Dynamic Risk Assessment methodology for this project is not an endorsement, sponsorship or implied backing of KPMG International or KPMG member firms

* Kahneman, D. (2011). Thinking, fast and slow. Macmillan.

** Shefrin, H. (2016). Behavioral Risk management. Palgrave Macmillan.

7

Insights and findings

7 Insights and findings

7.1 PROJECT BACKGROUND

Nine WBCSD members across the food and agriculture industry collaborated with WBCSD and KPMG to produce a network view of the risks faced by the industry. They do not represent the whole sector but are considered indicative based on the expert input received, their geographical spread and industry focus.

7.2 THE RISK LIST

The table below sets out the risks identified for the industry based on Expert Elicitation and group workshops – i.e. the first two steps of the process as set out in Chapter 6.

Table 3: Identified industry risks

No.	Risk name	Risk description
1	**Aging farmers**	Aging demographic profile of farmers and the challenge to find continuous workforce due to the inability to produce a sustainable business model will result in insufficient numbers of knowledgeable farmers in future generations. This, in turn, impacts the level and quality of production.
2	**Biodiversity and genetic concentration**	Over-reliance on a few, key genetic products and natural resources (e.g. Mekong Delta) exposes industry and consumers to concentration risk, reduces biodiversity and results in potentially catastrophic shortfalls (e.g. food pandemic risk).
3	**Changing consumer trends**	Food increasingly regarded as a means of self-expression, not a basic need. Creates demand for products the industry is not producing, cannot produce, can produce but with lower margins, or cannot produce within a short timeframe. Includes no meat, reduced pesticides and lower sugar content. Business is required to adapt to changing markets.
4	**Disparate approaches adopted by producers, research and scientists**	Narrow framing of studies by research facilities, scientists and producers not considering downstream impacts creates distracting divergences, inefficiencies and wasted effort. Outcomes non-sensible in wider context. Could lead to disillusionment in funding bodies so that funding ultimately dries up. Fragmented approaches and inefficient practices negatively impact stakeholders, consumer markets and resources.
5	**Distribution channels**	Increasing power of distribution channels (through consolidation or otherwise) reduces negotiation leverage for farmers and shifts profits towards distributors. In the absence of identifying new distribution channels, it adversely impacts producers' margins and their longer-term sustainability with consequent disruption to business supply chains.
6	**Expanded supply chain governance**	Imposition of expanded supply chain governance to ensure upstream participants in the value chain comply with regulations, laws, policies and end consumers' expectations of appropriate practices and increasing demand for transparency. This can impact reputation, customer loyalty and sales.
7	**Extreme weather events**	Increasing frequency and severity of extreme weather events (potentially exacerbated by climate change) lead to land damage, equipment and infrastructure impairment and possible loss of life, impacting costs and sales.
8	**Food safety**	The risk that a food safety concern, actual or perceived, will adversely impact reputation and sales.
9	**Geopolitics**	International trade being disrupted or impaired due to erratic geopolitical decisions. Impacts access to markets, sales and cost of sales. Includes governmental actions introduced to obtain 'food security', as well as governments not acting on key issues but leaving it to industry instead.

No.	Risk name	Risk description
10	**Ineffective industry governance**	Failure to achieve global, holistic consideration of challenges leading to continuing inefficiencies within industry. Detracts from longer term sustainability, suppresses yields, increases costs and depletes resources. No economic sustainability plan or sustainable business model for small farmers.
11	**Inefficient production practices**	Current production practices not using or sustaining finite resources optimally when the technology to do so exists. This adversely impacts yields, cost and supply.
12	**Lack of accord on industry goals**	Lack of agreement along the value chain on sustainable production with profit objective. Includes trade-offs between feeding the poor and responding to the preferences of those who can afford to discern based on labeling and sustainable practices.
13	**Land degradation**	Poor understanding and incentivization of sustainable land and soil health practices result in potentially irreversible damage to production capacity and escalating costs per unit of production.
14	**Macroeconomic**	Anemic macro-economic outlook detracts from growth and disincentivizes investment. Includes its apposition - flow of funds into the sector, increasing numbers of actors drawn to it, saturation threshold reached, funds withdrawn from 'overheated' sector, followed by liquidity crash.
15	**Nitrogen inefficiency**	Nitrogen currently used to only 10 - 15% efficiency. Underutilization reduces yields, increases cost and adds to greenhouse gas emissions, limiting sustainability.
16	**Regulation**	Possibility of sudden, non-science based and/or increased regulation being introduced. Can lead to escalating compliance costs, existing markets suddenly becoming inaccessible, a rise in the number of breaches and/or increased costs of production.
17	**Social media**	A disconnect between the industry and social media renders it vulnerable to social activism, including inaccuracies. This can negatively impact sales and profitability.
18	**Technology / Biotechnology**	Limited engagement with and application of technology leads to inefficient practices, public disillusion and producer frustration, adversely impacting sustainable profitability.
19	**Understanding agricultural practices**	Populations moving away from farming and becoming dispassionate about the criticality of farming - adopting increasingly popular, urbanized views with adverse consequences to farming. Result is more regressive practices, higher costs, lower yields and other unintended consequences.
20	**Water**	The possibility that erratic or reduced water availability impacts the required volume of production and, hence, pricing. Includes increasing realization that water consumption used in production is effectively exported, and the prospect that it needs to be priced accordingly. Changing distribution and access to fresh water is a notable impact of climate change.

The risks initially identified as the most pressing from the discussions were food safety, changing consumer trends and inefficient production practices. If the risk assessment was terminated after these first two stages, we could have identified these risks as the highest priority for the industry. However, a KPMG Dynamic Risk Assessment network analysis yields richer insights, which we discuss later in this Chapter.

7.3 SCALES

The use of continuous-valued risk scales is essential for effective risk assessment. Without these a consistent interpretation of terms such as 'minor' or 'likely' is impossible.[21] It also provides the numerical estimates critical for the analysis presented in this chapter, collecting them in natural units and avoiding the concerns associated with categorical scales.

A typical time horizon for risk management could be 1-5 years. However, the crystallization of ESG-related risks post-event have longer expected duration. We adopted a ten-year time horizon to accommodate this longer time to impact compared to other business risks.
The quantitative risk scales for severity and likelihood were based on industry averages.

Severity (USD $'000,000)	Minor	Low	Moderate	Significant	Major
	0.3 - 10	10 - 30	30 -100	100 - 300	300 - 1000

Likelihood (events per annum)	Rare	Unlikely	Possible	Likely	Almost Certain
	0.003 – 0.01	0.01 - 0.03	0.03 - 0.1	0.1 – 0.3	0.3 - 1.0

Velocity (months)	0 - 3	3 - 12	12 – 36	36 - 72	72 - 120

7.4 INITIAL ANALYSIS

The analysis generates:
(1) a graph-like heat map which depicts individual risks in two-dimensions according to likelihood and severity; and
(2) a risk network from which we calculate five key insights. The former is a continuously valued improvement on the traditional risk reporting heat map and is best compared to that. We have presented the traditional methodology and the networked version and compared them to highlight divergences.

Specifically, the following insights are unattainable with the traditional depiction and can be generated only using a risk network:

- **Risk clusters:** risks most expected to spread to each other and hence to occur in combination;
- **Stress scenarios:** combinations of risks that are weakly linked, yet catastrophic in aggregate severity should they occur;
- **The most influential risks in the network:** risks affecting more risks directly or indirectly than any of the others in the network;
- **The most influenced risks:** risks with the highest expected propensity to be triggered directly or indirectly by any of the other risks, and
- **Velocity:** the expected time to impact of each individual risk and risk cluster - how rapidly the risk' consequences will impact an organization, sector or industry once triggered.

7.4.1 Findings of the risk heat map depiction

A traditional heat map of individual risks is a two-by-two matrix. KPMG's Dynamic Risk Assessment presents a two-dimensional graph of risks according to their likelihood and severity. The placement of each risk corresponds to the group estimate of these risk metrics. Figure 4 presents the relative positioning of the risks identified for the food and agriculture industry. These are located towards the top right corner of the graph, implying that they are all near or within the 'likely' band of values (0.1 -0.3 events per annum) and around the 'moderate' to 'major' impact (USD $100m - USD $1bn) band.

Figure 4: A typical 2-D heat map

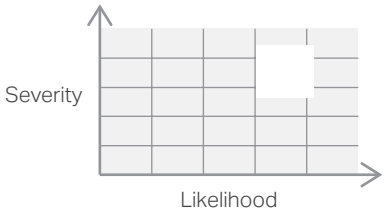
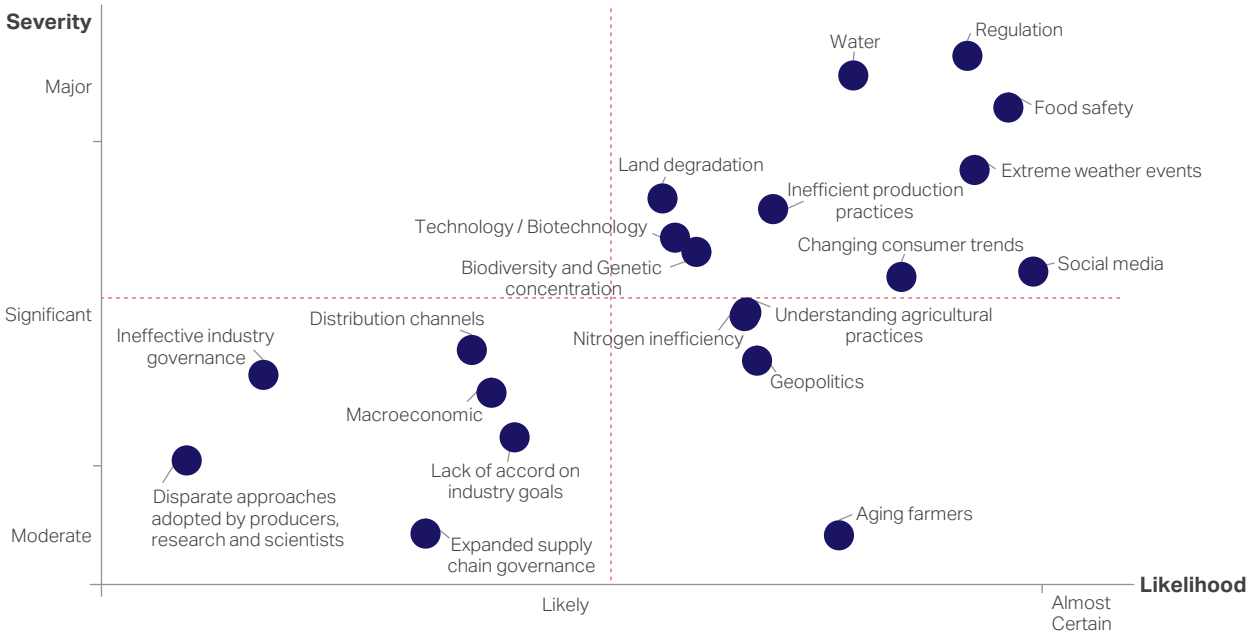


Figure 5 indicates that, on first analysis, the most severe individual risk was regulation and the most likely individual risk was social media.

This recognition of regulation as a critical risk is consistent with the focus of policy for the sector. The report issued by the EAT-Lancet Commission in February 2019 outlines how to deliver a sustainable and healthy food system for 10 billion people within the boundaries of the planet by 2050. It also provides a series of science-based commitments and targets for achieving the required system transformation.[22] This is an opportunity for governments to set regional- and country-specific targets and regulations. Baker McKenzie outline that, if the policies proposed are implemented, there is likely to be a significant impact on regulation of food producers with calls to reduce environmental impact, food labeling regulation, subsidies and mandates which may drive consumer behaviors towards more sustainable choices.[23] The global approach of the EAT-Lancet report means that some countries may be quick to address 'challenges through legislation and regulation'.[24] As the most severe individual risk, it is easy to see how regulation may disrupt business operations and influence many other aspects of the food system.

Without considering risk connectivity or contagion, the impact and likelihood assessment of Figure 5 would have been the extent of the insights generated. When the assessment approach is evolved to include expected contagion and velocity, a vastly different dimension of the same risk set discloses itself. This is discussed further in the following sections.

Figure 5: A severity versus likelihood heat-map for the risks identified



7.4.2 Finding a 'good' risk network depiction

A first representation of the network of risks is presented in Figure 6. It depicts every input from every participant and, in this context, provides a comprehensive view. The relative impact – as indicated by the size of the node – is consistent with the severity and likelihood results presented in Figure 5. Importantly, the enhanced analysis presented in Figure 6 captures the connections between risks, with the direction of connections indicated by the direction of the arrow heads and the strength of connection by the number of arrow heads. It is clear from Figure 6 that there are numerous connections between risks of varying strengths. To highlight the most important network structures, consideration was given to those connections where there was consensus across the participants of the risk connectivity.

Figure 6: A network view of the risks identified including relative impact and connectivity

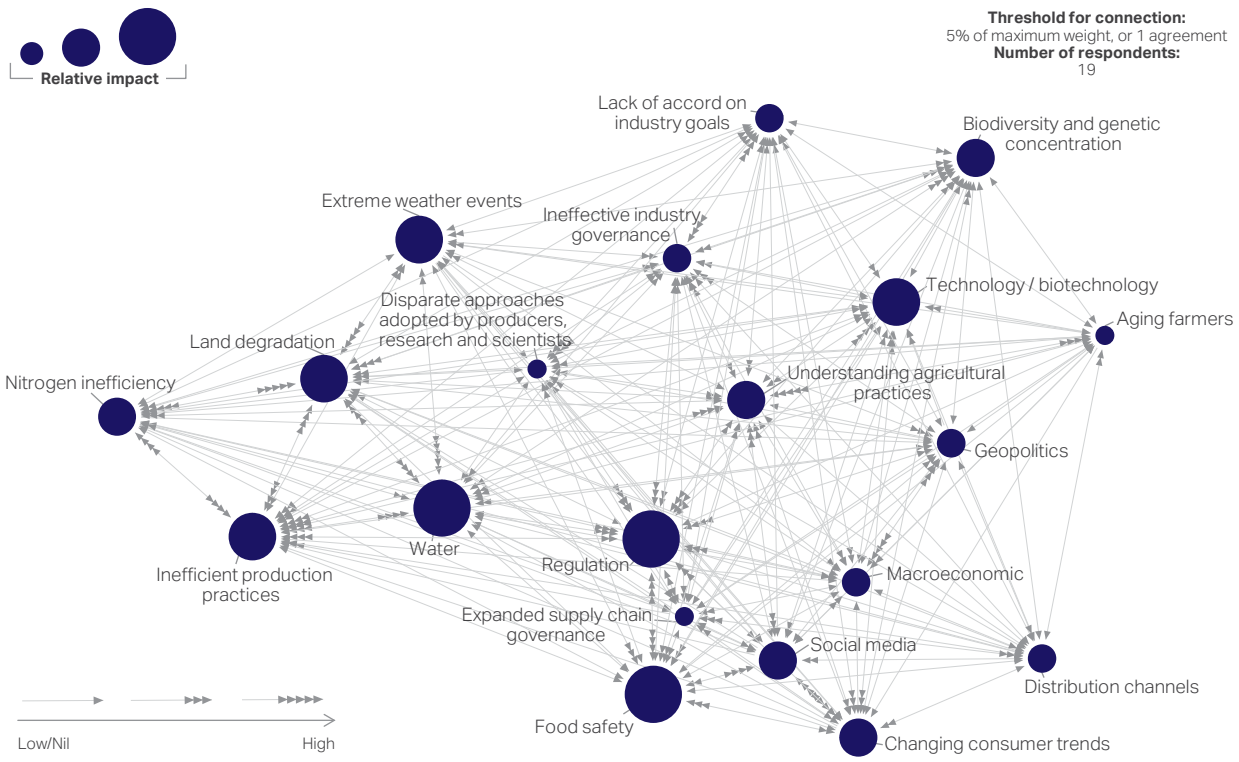


Figure 7: A network view of the risks identified showing only the highest consensus connections

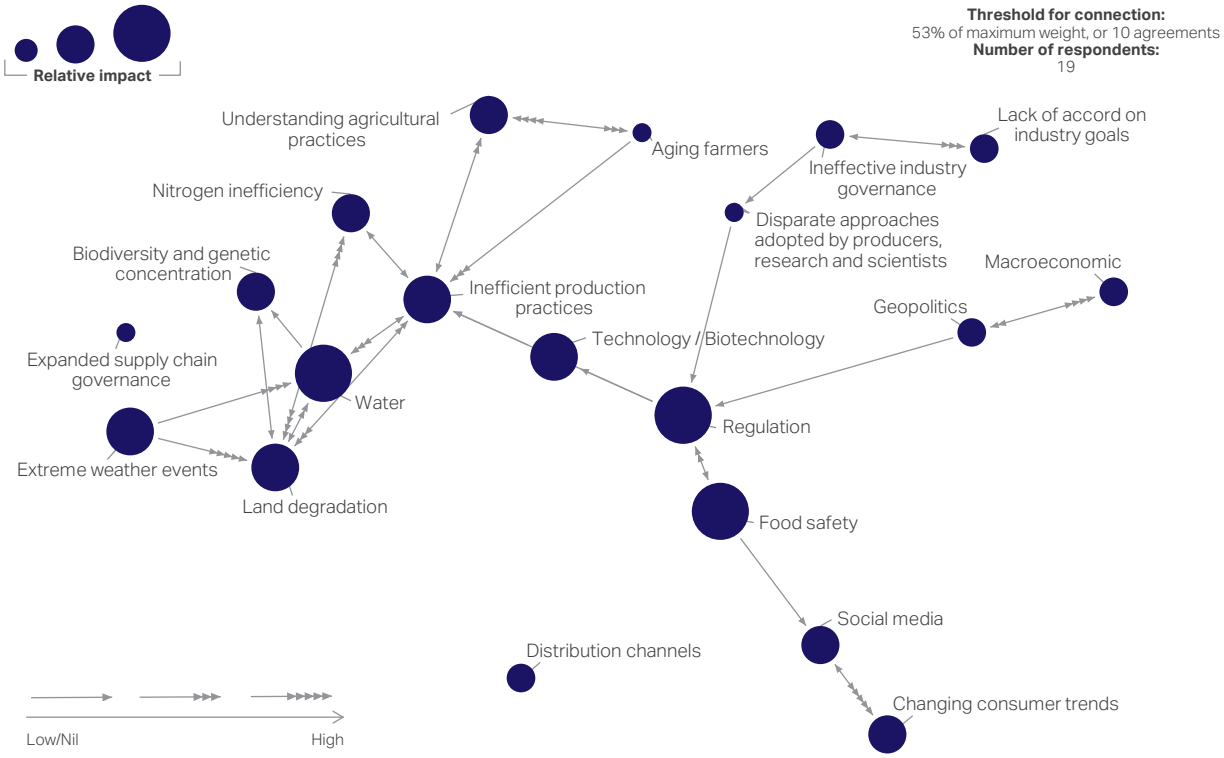


Figure 7 shows the same network as presented in Figure 6, but includes only the highest consensus connections – 53% of participants voted for these connections. Critically, in performing the analysis presented in Chapter 7, all linkages between nodes are retained. This means that every link identified by participants is still exerting its influence in the network. The weaker links in the depiction are suppressed only to simplify the visual depiction from Figure 6.

7.5 INSIGHTS FROM THE ANALYSIS

In this section, five key insights from the analysis are presented and discussed.

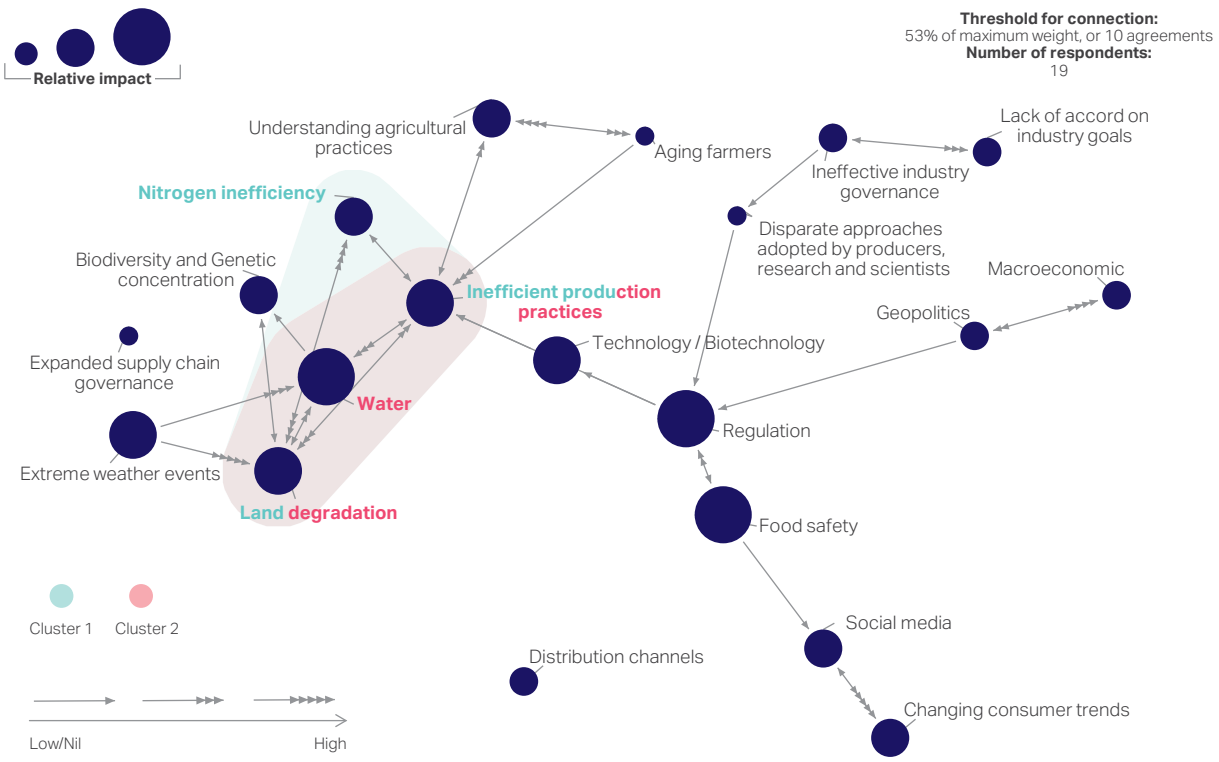
7.5.1 Insight one: Risk clusters

Linking risks to form a network allows the identification of risk clusters. These are groups of three or more risks that have bi-directional connections at the highest levels of consensus among the experts. In other words, if these risks occur, the overwhelming expectation is that they will spread to each other. 58% of experts agreed on two pronounced groups of risks occurring in combination, their consensus being that these risk structures are most likely to exist. They are listed in Figure 8 and identified in the network visualization in Figure 9. Some perspectives on the inclusion of the risks are also presented below.

Figure 8: The two clusters of risk occurring in combination

Risk cluster 1	Risk cluster 2
Inefficient production practices	Inefficient production practices
Land degradation	Land degradation
Nitrogen inefficiency	Water

Figure 9: A network view of the risks identified showing the two key risk clusters



Water

Given that the food and agriculture sector is highly dependent on continuous water supplies, using more than 70% of the world's fresh water to grow crops, feed livestock and process ingredients, it is not surprising this was identified as a risk with a high number of bi-directional connections.[25] Recent data from WRI suggests that one-third of irrigated crops, which make up 40% of the global food supply, face extremely high water stress, while rain-fed crops face the prospect of increasingly high seasonal variability of rainfall impacting yields.

Water risk in this study is defined as 'the possibility that erratic or reduced water availability impacts the required volume of production and, hence, pricing'. This puts the focus on a reduction in the availability and supply of water to the sector, rather than water risk due to flooding, for example. The Ceres report, Feeding ourselves thirsty, highlights that food companies are 'not only at risk due to water scarcity, [but] they are also responsible for it'.[26] Businesses can improve their strategic resilience by engaging in basin-wide collective action with public and private sector partners to identify shared water challenges, considering more sustainable production methods, and carrying out an appropriate assessment of their supply chain to support farmers in the areas that are likely to be most at risk.

Nitrogen efficiency

Proteins are an essential part of our diet; everyone needs 50-70 grams a day for the build-up of muscle, enzymes, antibodies in our immune system and hormones. They are built from amino acids which contain nitrogen. The nitrogen in our food derives from biological nitrogen fixation, from the use of chemical fertilizers, and atmospheric pollution. Use of nitrogen from fertilizer and animal manure applied to crops, combined with increases in the amount of protein fed to animals and included in human diets has led to large nitrogen losses to the environment. These losses occur along the entire food chain. The overall systems use-efficiency of nitrogen has been estimated to be in the range of only 5-15%.[27]

Over-use or poor nitrogen management increases farm costs and greenhouse gas emissions. It also leads to pollution of surface and groundwaters, driving eutrophication and biodiversity loss, and increasing the need for water treatment and ecosystem restoration. These impacts of anthropogenic nitrogen cycle modification make nitrogen flows to the biosphere and ocean one of the environmental processes to exceed planetary boundaries.

Land degradation

Soil health is the foundation of the food system, but it presents a number of profound risks.[28] Globally, one third of soil is moderately or highly degraded. This is only likely to increase with pressure from rising demand for food, increased temperatures and greater frequency of extreme weather. It is a key measure used to increase productivity, yield water efficiencies and provide a critical role as a natural carbon sink. By understanding regenerative practices to promote soil health, business can improve resilience and mitigate against the impacts of climate change.

Soil degradation and increasing land use pressure mean that businesses are at risk of not being able to provide for society and economies. Soil health is central to crop productivity and it is inextricably linked with land degradation and the availability of water. It is key that valuable nutrients are replaced to maintain soil fertility.[29] The risk clusters identified through KPMG's Dynamic Risk Assessment process highlight many key challenges outlined in current literature and represent some of the most important challenges facing the food system today.

Inefficient production practices

Meeting food demands either by expanding agricultural areas or intensifying production (i.e. seeking higher yields through the use of greater input), whilst both very different, have the potential to cause environmental harm including through increasing greenhouse gas emissions (GHG), deteriorating soil quality, use of scarce water and loss of biodiversity. Attaining greater food security in a sustainable way is a critical driver of the need for improved food system efficiency. Further production practices and consumer preferences also influence the efficiency of the food system.[30]

As highlighted in the WBCSD report, The Business Case For Investing In Soil Health (2018), soil health is a pressing global issue linked to agricultural production practices.[31] Creating an atmosphere that attracts environmentally and socially responsible investment in soil health is essential with investment models increasingly shifting towards more sustainable production practices. These trends can be promoted by providing the right economic incentives to agricultural producers and consumers and rewarding innovators (including financial institutions and mechanisms) that lead the transition towards more sustainable soil practices.

Aggregated cluster impacts

Having identified the risk clusters, we can now estimate the aggregate impact and time to impact for these groups of risks. Figure10 shows the aggregate impact of both clusters and illustrates the severity of these combinations compared with the previously identified single most severe risk, regulation.

This is one of the ways in which analysis of risks in isolation understates the risk environment. Risks seldom occur in isolation; on the contrary, when a risk occurs it changes the probability of neighboring risks being triggered, notably as a result of common root causes or contagion. Ultimately, the actual risk profile of the industry is significantly more severe than that which a traditional risk heat map would have the reader believe to be the case.

Key observations

The view of the participant companies is that the two risk clusters with the highest levels of agreement are composed of environmental issues. Social media and changing consumer trends might have been pronounced on their own in the initial analysis (Figure 5), but the most severe consequences to the industry are anticipated (with high degrees of consensus across individual participating companies) to be linked to the environment, the expected consequences of which far outweigh the individual severity of regulation.

The clusters illuminate the aggregate severity as a result of the confluence of environment-related risks, implying that they need to be managed as a cohort. More pertinently, their management may require a sector-wide response.

7.5.2 Insight two: Weakly-linked combinations with catastrophic aggregate outcomes

This insight also focuses on risk clusters, but with a significant difference: Insight one explored the consequences of the most anticipated risk combinations, while Insight two explores some of the weakest linkages (lowest foreseen contagion between individual risks) to identify combinations that can potentially produce unanticipated catastrophic aggregate severity outcomes. Four such clusters are considered.

Figure 10: The aggregate view of the strongest risk clusters and their time to impact

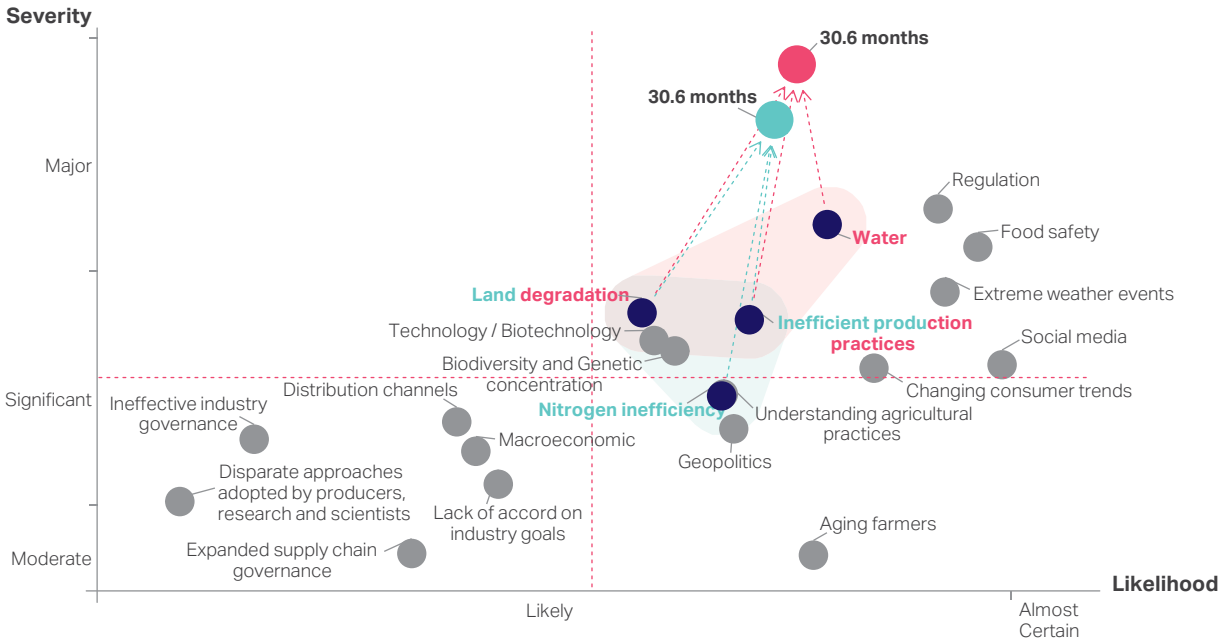


Figure 11: Additional risk clusters identified

Risk cluster 3	Risk cluster 4	Risk cluster 5	Risk cluster 6
Changing consumer trends	Extreme weather events	Regulation	Extreme weather events
Food safety	Inefficient product practices	Inefficient product practices	Biodiversity and genetic concentration
Social media	Water	Understanding agricultural practices	Water

Risk cluster 3 (changing consumer trends, food safety, social media) contains risks that did not appear in any of the previously identified risk clusters (Figure 8). Its components are, in this case, related to operational (as opposed to environmental) risks: changing consumer trends, food safety and social media.

These findings appear to be consistent with pressures currently faced within the sector. Companies are under increasing scrutiny to demonstrate transparency to governments, regulators and consumers in relation to the composition and nutritional benefits of food products. The extent to which they do so may influence consumer choice and, potentially, a company's license to operate. Accordingly, companies face increased regulatory and reputational risks relating to the management of portfolios of food products (and the associated supply chain) as well as the nutritional characteristics of products (e.g. sugar and salt levels, fat type and content).

According to the World Health Organization, almost one in ten people who eat contaminated food each year fall ill. Many foodborne illnesses are infectious or toxic, entering the body through contaminated food or water.[32] Food safety and foodborne illness outbreaks rapidly gain the attention of social and worldwide media and can be very damaging to a company's reputation. They can lead to reputation risk for the entire sector. For example, Chipotle Mexican Grill in the US suffered a significant drop in its share price following a series of public health scares throughout 2015, when approximately 500 consumers became sick as a result of three different pathogens causing five known outbreaks (including; E.coli, Norovirus and Salmonella).[33]

Further, there is a continuing need for companies to identify and manage risks and opportunities relating to changing consumer trends and drivers of food choice – for example, towards health and belief-driven alternatives with, at the same time, convenience being a key purchase factor. Shifting towards healthier and more sustainable consumption behavior will require companies to take into account present and emerging eating behaviors and their relative importance in different regions.[34]

Key observations

Cluster 4 (extreme weather events, inefficient product practices, water), Cluster 5 (regulation, inefficient product practices, understanding agricultural practices) and Cluster 6 (extreme weather events, biodiversity and genetic concentration, water) again focus on environmental challenges, giving a clear message about the risks and risk combinations expected to exert the greatest impact on the industry. These clusters also reinforce the significance of clusters 1 and 2, adding to the importance of these individual risks being responded to or mitigated as a theme. Cluster 3 departs from this trend; it raises the question whether changing consumer needs, food safety and social media need to be raised to be seen as a sector-level issue (i.e. beyond individual company responses)?

Network power

Different levels of connectedness imply that risks will not have the same level of influence or network power. Location within the network, and the number and strength of links, all play a role. Mathematicians have created many ways to try and measure network power, but it was social scientists who looked for methods to capture the idea that powerful risks are connected to powerful risks. We use considerations of network power to generate insight three and four.

7.5.3 Insight three: Influencing risks

Armed with a way to measure network power, we can look for the risks that exert maximal contagion effects throughout the network and rank them accordingly. Frequently, we encounter networks where a small group of risks will exert extreme leverage throughout the network. This small group is powerful and the mitigation of the systemic risk of an industry should start with them. It generates the highest payoffs as the resource spent on their mitigation will flow readily throughout the network. This holds hidden opportunities for the generation of shareholder and stakeholder value. Companies that effectively manage these greatest systemic risks may gain competitive advantages with additional potential upside business effects.

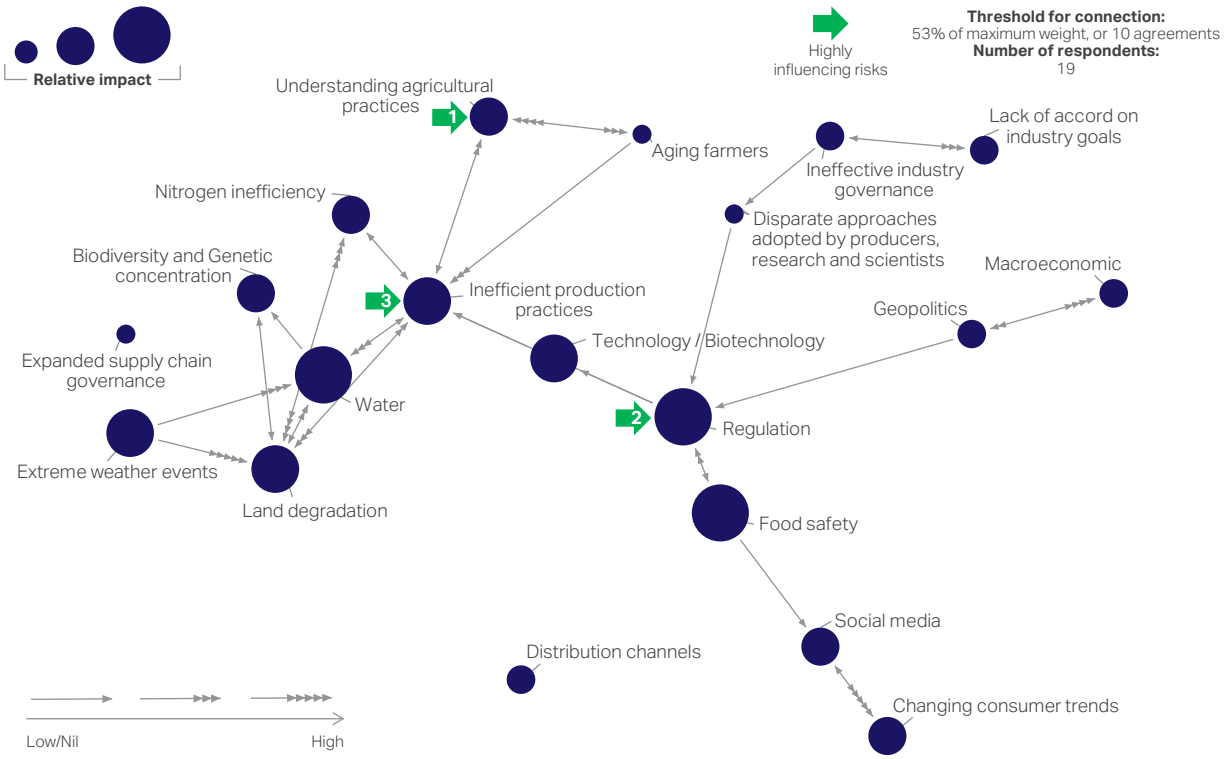
In Figure 12 the dynamic risk assessment process identifies the most influential risks in their ordinal rank order for the food and agriculture Industry. The top three most influential risks are: understanding agricultural practices; regulation; and inefficient production practices.

The finding is profound; the risk with the greatest systemic opportunity to mitigate every other risk is understanding agricultural practices. It is with this risk that mitigation of the industry's future risks must start. Allocating resources to improve the understanding of agricultural practices will deal with the key systemic root cause, while everything else will only address identified risks on a symptomatic level.

Key observations

A key finding from the process is the systemic significance of understanding agricultural practices. If the sector is to control its destiny, its success or otherwise depends on positively influencing and improving understanding of current agricultural practices – different as these are in various parts of the world.

Figure 12: The most influential risks in their ordinal rank order



7.5.4 Insight four: Influenced risks

We can invert the network power concept to identify those risks most vulnerable to contagion. Turning the arrows backwards, we can ask the same question.

The risks highlighted in Figure 13 are most vulnerable because every other risk in the network flows, either directly or indirectly, towards these risks more than to any other. These risks clog up the network the fastest, to a point of systemic crisis. We should never allow them to occur concurrently. The simultaneous occurrence of these three risks will prevent the sector from achieving its mission. It follows that pro-active mitigation of these three risks is of paramount importance.

With reference to Figure 14, the most influential risks (on the left-hand side) are those that have the ability to mitigate other risks when they themselves are mitigated. On the other side, the most influenced risks (on the right-hand side of Figure 14) are those that act as systemic risk intensifiers.

When considered as a whole, this identifies the most powerful responses to the most influenced risks. Companies should mitigate the most influential risks in the order presented, because their follow-on impact on every other risk triggers the most comprehensive response to ensure the most influenced risks are not triggered together.

Figure 13: The most vulnerable risks in the network, those that are the most influenced

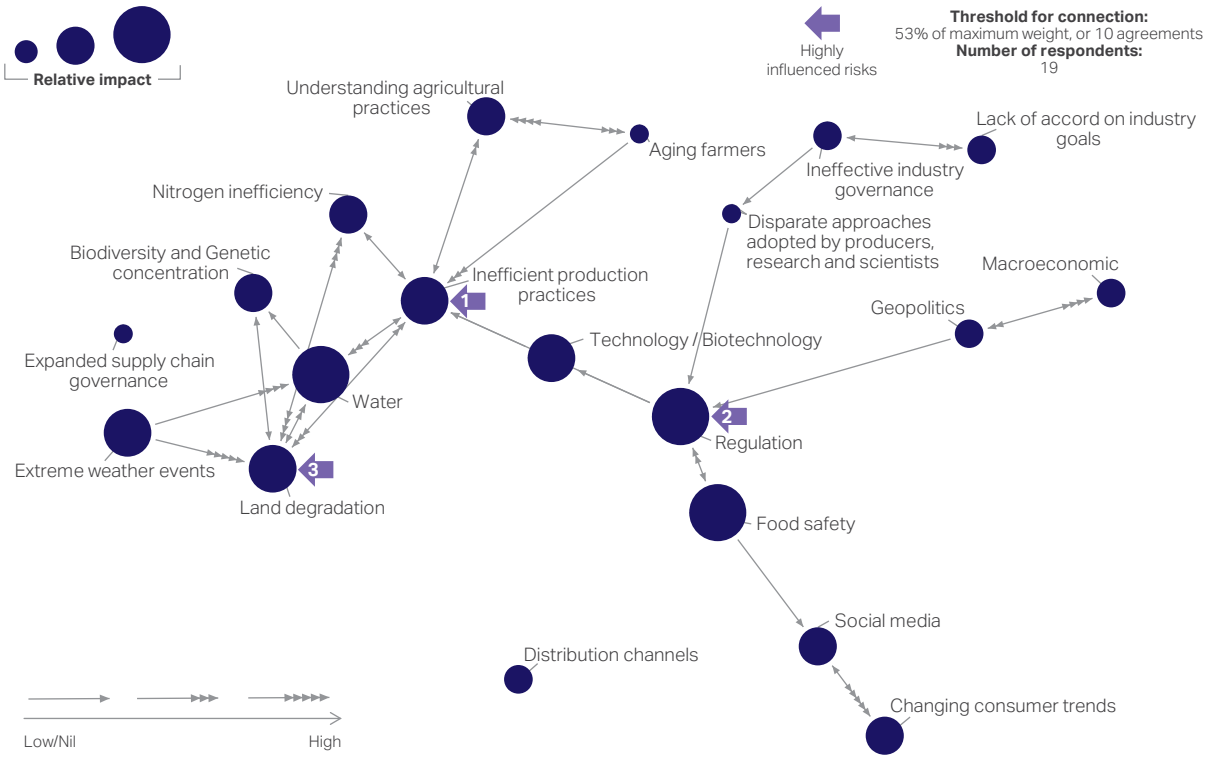


Figure 14: A summary of the most influenced and influential risks

Rank	Top influential risks
1	Understanding agricultural practices
2	Regulation
3	Inefficient production practices

Rank	Top influenced risks
1	Inefficient production practices
2	Regulation
3	Land degradation

Regulation features as number two on both the left and the right-hand sides. It functions either as a mitigant or as a systemic risk intensifier – there is no middle ground. The optimal way to ensure that it functions as a mitigant is to focus the main mitigation effort on the most influential risk – understanding agricultural processes – leading to better informed regulation and policy.

Getting this right will determine which way regulation will pivot – towards being helpful in meeting the challenges of feeding a future world with 9+ billion inhabitants, or towards being a barrier to doing so as a result of unintended consequences of (misguided) regulation.

Key observations

In short, the most important finding of the project is that the story of the farmer and their efforts needs to be re-introduced and re-emphasized to all participants in the supply chain – up to, and including, consumers.

The standout determinant of the industry's future will be how well it responds to mitigating the risk associated with understanding of agricultural practices. A strong response will lead to regulation that is helpful to the industry's objective. Indeed, it is the only risk that will determine whether regulation is going to be an enabler for the industry, or a barrier with unhelpful and unintended consequences.

It follows that the industry's future interests will be best served by allocating its resources, in descending order, to address understanding agricultural practices, regulation and inefficient production practices.

7.5.5 Insight five: Velocity

By developing an understanding of the velocity, or time to impact, of risks, it is possible to discern between tactical and strategic responses to the risk landscape. Whilst a ten-year velocity scale was adopted to accommodate ESG-related risks, the risk in Figure 15 with the slowest velocity is aging farmers, at 75 months. The average velocity was only 28 months.

Even though the time horizon to a decade was adopted, participants indicated there is not, in reality, that much time. The most immediate example is the potential impact of social media – that it may require management in a sectoral as well as a company-specific context. The time to impact for the clusters of sustainability risks was a mere 30.6 months, underlining the need for prompt action.

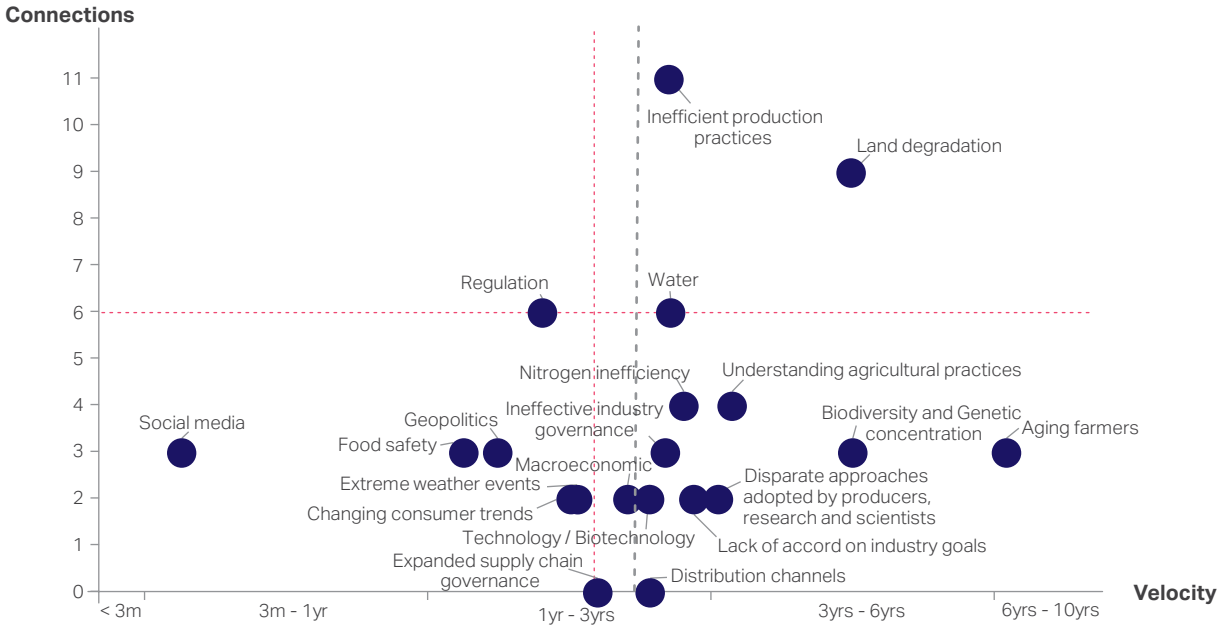
Key observations

The timeframe available to the industry to tackle its challenges appears to be shorter than originally considered and could manifest within the next strategic planning period for many companies.

This compressed timeframe for response is consistent with the increasing urgency of food system transformation. The food system must transform by 2030 to achieve the SDGs and ensure it can support healthy people and a healthy planet.[35]

WBCSD's recently released CEO Guide to Food System Transformation outlines that business needs to take urgent action over the next few years to avoid a global health crisis.[36] This action needs to take place across seven pathways spanning the entire value chain. Business must lead action on critical issues to have the opportunity to manage risk, seize opportunities and thrive. These seven pathways include; agriculture transformation, equitable value distribution, dietary shift, food loss and waste, transparency, policy and finance and new business models.

Figure 15: **The speed of on-set (velocity) of the risks identified**



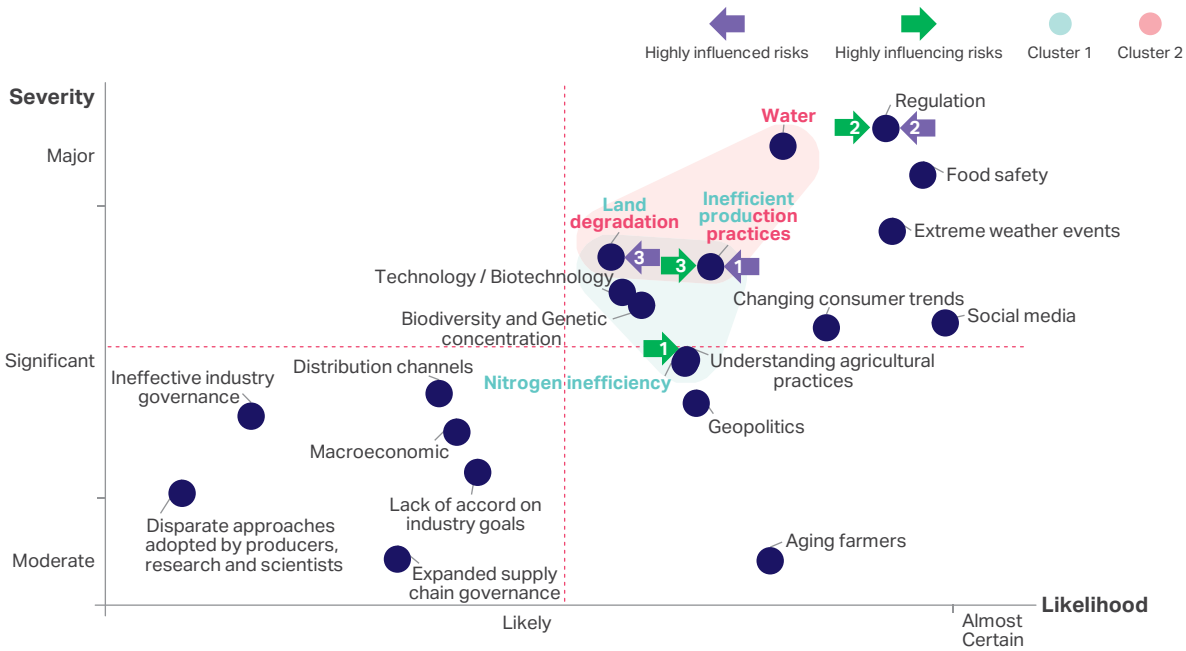
7.6 IN SUMMARY

A dynamic risk assessment process makes it possible for companies to obtain a better understanding of the risk landscape faced by the industry. Analyses of additional risk dimensions illustrated that the actual risks to the industry are more severe and of a higher velocity, than the risks depicted by traditional risk impact-likelihood methodology – as presented in Figure 16.

In addition, by considering risks as a network, we can identify the most influential risks and the most significant levers to positively impact the challenges the industry faces – namely: understanding of agricultural practices; regulation; and inefficient production practices.

The networking insights are designed to facilitate improved risk management practices in terms of risk mitigation, controls and prioritization, with the ultimate objective to underpin and inform effective business strategy in an increasingly complex environment.

Figure 16: **The aggregate network view including clusters, influenced and influential risks**



8

Key themes and suggested actions

Founded on the analysis of KPMG's Dynamic Risk Assessment, key themes and some suggested actions are presented in this Chapter. Whilst the profile of the participant companies may not be fully representative of the entire sector, the themes and actions highlight potential areas of focus for companies operating in the food and agriculture sector and for the sector as a whole.

The key themes and actions fall under three main areas that reflect the potential type of response:

- **Enhanced internal capabilities and processes:** e.g. improved risk management techniques within a company;
- **Individual company actions:** e.g. steps a company may take to raise awareness and to incorporate better risk management in business processes; and
- **Sector or pre-competitive collaboration:** e.g. driving change via collective initiatives, cross-industry alignment and coordinated sector approaches.

Enhanced internal capabilities and processes

1. Companies need to extend their risk assessment approaches to include additional prioritization criteria (such as interconnectivity, velocity and vulnerability) in order to understand potential impacts of ESG-related risks on the achievement of short-term business objectives and strategy.
2. Companies should improve processes to review the internal and external business context in order to identify and capture interconnected and complex networks of risk. Companies should implement comprehensive impact and dependency mapping processes that support understanding of factors that influence the value chain and value creation across different forms of capital (financial, human, intellectual, society, natural).
3. Companies should supplement their risk activities to include an assessment of relevant risk clusters and the aggregated impact of these clusters.

Individual company actions

4. Establish risk monitoring thresholds for the most influential and influenced risks. For example, relating to measures of sugar content and usage, effectiveness of production, awareness levels of agricultural practice, water usage and scarcity metrics.
5. Apply different approaches to risk management as a tool for cross-functional engagement and collaboration within the company. For example, applying a KPMG Dynamic Risk Assessment-style approach to inform strategic planning and to assess and review the risks that are formally recorded in the risk register, which are typically assessed on an impact-likelihood basis.
6. Improve stakeholder engagement (e.g. with farmers) to develop stronger understanding of food and agricultural business practices and the company's management of its impacts and dependencies on sector-specific resources.
7. Identify appropriate key metrics which are representative, leading indicators of current or emerging risk profiles of other ESG-related risks. For example, measures of soil health linked to assessments of crop productivity, land degradation and availability of water.

Sector or pre-competitive collaboration

8. Increase the sector-wide focus and action to develop a better understanding of agricultural practices among internal and external stakeholders. It will be particularly important to provide a strong understanding of these practices across relevant regulatory bodies to ensure regulation is supportive of sustainable performance, whilst enabling the delivery of business objectives.
9. Critically focus on implementing mitigating approaches to reduce the manifestation of risks related to inefficient production processes, inappropriate regulation and land degradation.
10. Transparent collaboration across companies and stakeholders within key, prioritized geographies to represent combined demands, impacts and dependencies on resources and capital. Such an approach will support companies to form a better understanding of the aggregated risk position and, consequently, to manage and mitigate their own risk exposure – for example, measurement of aggregated quantities of water dependency and the implementation of water utilization metrics at aggregated and individual levels.
11. Consider cross-industry alignment opportunities or sector-level initiatives that can be leveraged to manage or mitigate individual or clustered risks, e.g. land use, deforestation, regulatory engagement, and more sustainable, effective production techniques.
12. Consider the system-wide impacts of potential solutions to recognize and assess downside effects on other parts of the system.

9

Conclusion

The food system requires rapid transformation to support the healthy population and healthy planet on which we all depend. It is deeply connected to agriculture, land use and working forests for non-food production purposes.

The very nature of the food and agriculture sector is that it spans the full value chain; many elements of the industry are inherently connected, which means many of the risks that the sector is exposed to are also connected.

Companies operating within the sector need to apply robust sustainability and risk management capabilities to build strategic resilience and deliver effective operational performance across complex business models, a changing risk landscapes and diverse global markets.

This report highlights that traditional risk management approaches are inadequate for capturing and assessing the complex, interconnected groups of risks that must be managed by companies operating in the food and agriculture sector. There is a clear need for companies to broaden the lens of risk management, to extend risk assessment methodologies and to apply more sophisticated risk management techniques.

A dynamic risk assessment process provides companies with an enhanced capability to examine, understand and manage the interconnections, complexities and aggregated impacts of the range of risks that might impact their business performance and strategic resilience. The process incorporates future trends and their potential downstream threats and expands traditional risk analyses beyond severity and likelihood. It critically supports companies to identify how risks are connected, as well as their anticipated velocity.

Analyses of the application of the approach has critically highlighted that companies operating in the food and agriculture sector should:

1. Manage clusters of risks and their connections, specifically in two risk clusters comprising:
    - Cluster 1: Inefficient production practices, land degradation and nitrogen inefficiency.
    - Cluster 2: Inefficient production practices, land degradation and water.
2. Focus on individual company and sector-level initiatives to raise awareness and deepen stakeholder understanding of current agricultural practices, with critical influence on the quality and effectiveness of regulation (including non-science based regulation) and production processes.
3. Allocate resources to target and mitigate the most influential sector risks, namely: understanding agricultural practices; regulation; and inefficient production practices.
4. Consider application of a dynamic risk assessment approach to better prioritize risks, devise more effective risk management strategies and deploy resources efficiently by directly identifying the risks most influential to their business performance.

10 Useful resources

Water

- WBCSD, (2018), CEO Guide to Water
- WBCSD, (2017), Co-optimizing solutions in water and agriculture
- WWF, Water Risk Filter
- WRI, Aqueduct

Climate smart agriculture

- WBCSD, (2019), CEO Guide to Food System Transformation
- WBCSD, (2019), The UNCCD Delhi Declaration from Business
- WBCSD, (2018), The Business Case for Investing in Soil Health
- WBCSD, (2015), Land Degradation Neutrality: A Business Perspective
- UNEP, (2013), Drawing Down N2O to Protect Climate and the Ozone Layer
- UNEP, (2013), Our nutrient world: the challenge to produce more food and energy with less pollution

Consumer trends

- WBCSD, (2018), Consumption Behavior and Trends: Understanding the shift required towards healthy, sustainable and enjoyable diets

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