Integrating Nature: *Assessing Interconnected Risks in the Food Retail Ecosystem*

→ What is the network of risks in food retail that are impacting a retailer's ability to embed nature into business practices?

World Business Council *for Sustainable Development*

Contents

Foreword

The World Business Council for Sustainable Development (WBCSD) Vision 2050 sets out a world where more than nine billion people live well and within planetary boundaries by mid-century. To achieve that goal, Vision 2050's ambition is for a regenerative and equitable food system which produces healthy, safe, and nutritious food for all. This requires food production that restores and safeguards nature and our natural resources, with value chains that are prosperous, equitable and free from human rights abuses.

In 2022, WBCSD engaged KPMG to conduct an enhanced assessment of risks impacting the food and agriculture sector.[1] The report underscored the need for companies to act as advocates for food systems transformation by adapting business practices. It emphasized that the food and agriculture sector must integrate nature-positive approaches into its business models to ensure its own survival and to minimize its adverse impact on people and the planet.

This report builds on the recommendations of the 2022 report by examining the views of food retail and supply sector participants and shares perspectives of the dynamics, risks, opportunities, and dependencies faced as retailers integrate nature into their business models. It assesses the array of risks and challenges encountered by food retailers and suppliers, aiming to and seeks to highlight how value chain and supply chain participants or wider stakeholders can more effectively understand:

- → The **dynamics and interconnectedness of key risks and interventions** enabling businesses to meet today's needs without compromising the future.
- → **Risks as a connected network rather than individual risks** to build more effective, strategic approaches on calculated prioritization.
- → Where **management interventions drive positive performance** while lessening the potential of a contagion effect across a network of risks as they transform their respective business.

Understanding these risks and responding to the insights in this report are critical to a resilient food system that produces nutritious, high-quality food while ensuring the long-term prosperity of our planet.

Executive *summary*

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The World Business Council for Sustainable Development (WBCSD) engaged KPMG to conduct a second dynamic risk assessment to understand the network of risks that are "impacting the retail and supply sector's ability to embed nature into business practices". The assessment engaged 34 experts from 14 companies across multiple continents, representing various roles within food retail and their supply chains, including not-for-profit and NGOs. It demonstrates the essential reliance of these companies and companies on nature, and their inherent link to growers and producers at the start of large and complex value chains, referred to as those in the 'first mile'.

The findings correlate to those in the recently released '2024 Global Risk Report' by the World Economic Forum.[2] It showed that five of the top ten risks facing businesses over the next ten years are directly related to nature, including the impacts of extreme weather events, changes in planetary systems and loss of biodiversity.

The report acknowledges that addressing nature-related risks is different, and more complex, than responding to climate-related risks. This is because each food system has its own unique risks arising from the environment in which raw materials are cultivated. It also highlights that the future viability of food retailers and suppliers is dependent on organizations and companies working collaboratively along food value chains to identify solutions to the risks they face.

In the absence of data or other reference points, a dynamic risk assessment helps food retail companies and others in the food system to better understand the range and combinations of potential risks they face. This analysis delves into the likelihood, severity, and velocity of these risks, as well as their interactions, empowering decision-makers to optimize resource allocation to maximize their mitigation. It also highlights that current business models of some food retailers and suppliers are disproportionately contributing to nature and nature-based system depletion. However, these businesses are also in a unique position to lead material change in global food systems and value chains.

This report lays out the internal and external changes needed to transform the impact that food systems currently have on nature and nature-based systems.

The work also highlights that addressing identified risks can foster sustainable, profitable growth and enhance food supply by fostering longer-term partnerships.

There are four key insights for the food retail sector based on our findings:

1. **Traditional business models in the global food sector prioritize short to mid-term financial gains, often neglecting externalities like their impacts on nature and nature-based systems.** This current approach poses significant risks to businesses in food value chains by undermining farmer resilience and perpetuating environmental depletion to cut costs. This creates risk to long-term food supplies and the viability of businesses in the food sector.

   Urgent action is needed to **rethink food procurement models and establish long-term supplier partnerships** to ensure continuity of food supplies while protecting nature. Recent analysis by FSEC[3] further supports this, outlining that existing regulations and policies create incentives which steer the choices of all food system actors. Ideally these would align with the true economic value of what is produced and consumed, however, this is rarely the case.

2. **The combination of any risk with climate change and its consequences amplifies the magnitude of challenges faced by food systems.** Whilst businesses have stakeholder mandates to assess and address climate-related risks, they do not currently have a comparable mandate to address nature-based risks, despite evolving regulations and directives such as the CSRD,[4] EUDR,[5] and TNFD.[6]

   However, solutions to climate risks may lie in broader nature-based strategies. Thus, businesses should adopt holistic solutions to address both their climate exposures and nature-based risks. This may mean taking a longer-term perspective to climate response, prioritizing projects that are slower in delivering benefits but ultimately will enhance the resilience and sustainability of key supply chains.

3. **The challenges faced by food systems are too great to be addressed by any one single company.** Nonetheless, food retailers and suppliers hold a pivotal position in the value chain, bridging the 'first mile' (producers) and the 'last mile' (consumers) and enabling them to instigate significant change both individually and collaboratively within supply chains.

   Achieving change in a nature context will require companies to place more focus on the 'first mile', developing deeper partnerships with farmers, providing appropriate financial and non-financial rewards for sustainable farming and investing in technology solutions to improve outcomes and transparency throughout the value chain.

4. **There is an urgent need to develop more nuanced approaches to measuring success of companies within food value chains** given that their inherent reliance on thriving nature is central to their long term success. This involves investing in educating teams about the environmental impacts of their operations, ensuring awareness across all departments, particularly finance and legal which often shape organizational policies. Building knowledge and capability will enable companies to identify partnership opportunities that drive transformative change across value chains.

These key insights have the potential to provide benefits to nature and our environment, as well as to our communities and those who produce food for the world.

Introduction

Introduction

Stopping the decline of nature and nature-based systems is critical to addressing the climate challenges we face as a society. Growth in demand is an unassailable assumption underpinning retail business models. However, natural and planetary boundaries are increasingly constraining economic expansion without fundamental change to current supply chains. **Businesses that can pivot towards sustainable or circular business models, working in harmony with nature, stand to gain early-mover advantages in a world where growth must be redefined.**

The World Economic Forum surveys global business leaders annually on the critical risks facing their company. The Global Risk Report 2024 highlights extreme weather risk as the most likely global crisis in the coming year. Concerns over misinformation's impact on societal cohesion and long-term risks like biodiversity loss and natural resource shortages also emerge. All these risks are inextricably linked to the climate crisis and an expectation that its impacts will increase over the next decade.[7]

Given the food and agriculture sector's direct dependency on nature, integrating nature into Enterprise Risk Management practices and business models is urgent. Responsible for roughly 30% of the world's greenhouse gas emissions[8] and the primary cause of biodiversity loss globally,[9] the sector is under severe threat. Businesses have a critical role to play in reversing climate change impacts, biodiversity loss, and rising inequality, to ensure their own survival and protect the planet.

Despite food retailers' role at the center of extensive global supply chains, **there's limited evidence to show that food retailers have taken sufficient action against the risks that nature poses to their supply chain operations.** To address this gap, the WBCSD partnered with KPMG to assess the challenges and opportunities for food retailers and suppliers as they transition toward integrating nature into their business models.

KPMG's Dynamic Risk Assessment (DRA) analyses the interconnectedness, complexities, and aggregated impacts of risks within a system. This report highlights critical system dynamics and interdependencies, areas of focus and actions to more effectively embed nature into food retail business models.

The imperative to embed nature *in business models*

01.

01. The imperative to embed nature *in business models*

Understanding and managing environmental risks is fundamental to ensuring long term business viability. With more than half of the world's total GDP moderately or highly dependent on nature and its services,[10] the economy is highly exposed to risks from the unprecedented loss of nature, ecosystems and biodiversity in recent years.[11] In 2022, major weather and climate-related events causing physical damage to people, property and critical infrastructure cost the global economy USD313 billion.[12]

The current and expected impacts of nature on the resilience of corporate business models and their long-term value creation are becoming difficult for any business to ignore – especially their interconnected nature. They can impact different operational functions, supply chain entities, geographies and social groups in different ways. In particular, **the connection between climate and nature risk cannot be underestimated**, highlighted by the WEF Global Risk report.[14]

"Nature loss and climate change are intrinsically interlinked – a failure in one sphere will cascade into the other. Without significant policy change or investment, the interplay between climate change impacts, biodiversity loss, food security and natural resource consumption will accelerate ecosystem collapse, threaten food supplies and livelihoods in climate-vulnerable economies, amplify the impacts of natural disasters, and limit further progress on climate mitigation".

Long-term and short-term risks of climate change

Looking forward, the escalating severity of climate-related risks, including biodiversity loss, ecosystem collapse, changes to earth systems, and pollution, continues to heighten their impact on businesses.[13] The most impactful risks projected for the next decade stem from our collective failure to mitigate and adapt to climate change, encompassing natural disasters, extreme weather events, biodiversity loss, and ecosystem collapse. These risks are deeply interlinked with climate change, with consequences impacting communities at various levels.

Source: World Economic Forum Global Risks Perception Survey 2023-2024.

Nature risks are inherently more complex to identify and analyze than climate risks because they are specific to local ecosystems which differ greatly from place to place:

> "While general principles of diversification of dependencies on nature will remain central to effective risk management, in some cases, managing the risks associated with nature loss may require total business transformation and new ways of conducting business. This could include, for example, new ways of approaching business with a granular understanding of where operations and value chains are located"[15]

This degradation of ecosystems poses substantial risks to the food sector, which heavily depends on nature and ecosystem services to function. Changes in land use for food production, particularly through forest conversion, have emerged as the main drivers of unprecedented biodiversity loss and ecosystem change over the past 50 years, with food production being the leading contributor to global biodiversity decline.[16]

By proactively identifying and addressing climate and nature-related risks, businesses within the food system can work to avoid or mitigate the most significant global risks in the coming decade. This proactive approach involves transforming business models and practices to reduce environmental damage and promote safeguarding against potential threats.

The nexus of action, food retailers are pivotal drivers *of systems change but face competing priorities*

02.

02. The nexus of action, food retailers are pivotal drivers *of systems change but face competing priorities*

As food retailers sit at the nexus of extensive value chains, connecting consumers to global producers, they hold a unique position in the food system. Retailers possess the capacity to drive change beyond their own operations, influencing consumers, producers, input providers, financial institutions, insurers, and even regulatory bodies. To effectively enact change, food retailers must understand the nature-related risks and opportunities inherent in their business and broader food systems, and subsequently implement measures to integrate nature into their business models.

However, nature is just one of several wider challenges that food retailers are grappling with. The Consumer Goods Forum, held in Japan in 2023, highlighted that environment and social sustainability, health and wellness, end-to-end value chain visibility and food safety are all top-of-mind priorities for food retailers.

There is an opportunity to think more broadly about **nature's integration into business models** by extending thinking across the entire value chain, looking for opportunities to implement change at a systems level.

Addressing nature can mitigate wider challenges in two key areas:

1. **Cost of living and food security**. The food system is at the forefront of the cost-of-living crisis as consumer behavior shifts towards lower-cost items amidst increasingly rising costs of goods, energy, transport, and labor. This dynamic has sparked tensions among retailers, manufacturers, producers, and governments over how to absorb increasing input costs throughout the value and supply chains. Additionally, the disconnection of consumers and businesses from nature means that true costs of meeting customer preferences is often overlooked during product pricing.
2. **Uneconomical farming crisis**. There is growing evidence that climate change is adversely impacting crop production and yields in many parts of the world, driving up costs and reducing earning potential for millions of farmers. This trend renders farming increasingly unsustainable due to low earnings, volatile commodity prices and limited access to resources and investment, jeopardizing livelihoods. An over-reliance on a small range of crops poses significant risk to society, particularly those with limited means to afford food. Without crop diversification and improved prevention technology, new pests and diseases will continue to threaten the stability of our critical food systems.

Competing priorities often impede progress, as stakeholders compete for resources and capacity to address their respective goals. However, prioritizing nature has been identified in this assessment as something which requires urgent action. The global food system's failure to meet the nutritional needs of all communities and its increasing strain on planetary resources demand immediate transformation and food retailers are the only businesses able to initiate and accelerate these changes at great scale.

This report analyses the interconnected risks facing the food retail sector using KPMG's DRA methodology. This approach identifies clusters of interdependent risks hindering the integration of nature into business models, pinpointing key areas for prioritized action.

KPMG's Dynamic Risk Assessment *Methodology*

03.

03. KPMG's Dynamic Risk Assessment *Methodology*

Background

The complexities and connectivity of nature-related risks mean companies must assess risks not just individually, but as a dynamic, interconnected and interdependent network. While traditional risk assessment processes analyze risk severity in terms of the impact a risk might have on business performance and the likelihood of the risk occurring, they may not capture the multi-faceted and complex characteristics of nature-related risks. As stakeholder expectations rise, companies are urged to integrate robust nature-related risk management into decision-making to enhance strategic resilience.

KPMG's Dynamic Risk Assessment builds on traditional risk assessment methodologies by:

1. Incorporating future trends and their potential downstream threats into risk management processes, injecting a forward-looking analysis and assessment to no longer have to rely solely on historical data.
2. Expanding the analysis of the resulting risks to estimate their interconnectedness and velocity, in addition to traditional methods to estimate severity and risk event rates.

The approach captures the wisdom of deeply experienced industry professionals through a scientifically structured 'expert elicitation' approach, harnessing their collective knowledge and representing it mathematically as a network.

This network enables joint analysis of the likelihood and severity as well as the connectivity and velocity of each risk. It enables us to generate insights that are impossible to observe through the traditional approach to risk management which usually identifies risks through the views of a few factors, the likelihood of the risks eventuating and the level of impact of an individual risk on the business.

When performed well, expert elicitation can produce results that are more accurate than any individual subject matter expert's modelling or forecasts. This is possible as (i) a group of smart individuals is collectively smarter than the smartest person within the group, (ii) the group represents diverse organizations and companies that bring complementary insights, (iii) their participation was democratized so that each voice and perspective could be obtained with equal importance, and (iv) controlling for group thinking and bias.

The Dynamic Risk Assessment process

The Dynamic Risk Assessment is a four-step process.

The first two steps form the risk identification phase. They are based on individual and group interviews with experts to capture past risks that may re-occur (Type I risks), over-the-horizon risks and completely new risks (both Type II risks) which typically have no relevant historical data.

We use a scientific process of 'expert elicitation' and behavioral finance to determine;

- → How we identify experts
- → The protocols we use to gather data from the expert panel.

Step three leverages an interactive, gamified and human bias-reducing software tool to aid risk quantification, with experts providing data independently and anonymously.

The final step generates a network that best represents how the group of experts think about the topic. In this report, that is the network of risks that impact a retailer's ability to embed nature into business practices.

Note: As the results are based on expert input received through the assessment, they do not represent the entire sector but are indicative of expert perspectives of the sector.

Step one: Expert identification and Interviews	Experts from industry and non-government organizations participated to capture a diverse range of views. These experts represented 14 companies from multiple continents and varying positions in the food retail sector and value chain. We conducted interviews with 34 experts, applying our expert elicitation protocols. Each interview aimed to seek a base-level understanding of the industry's risks.
Step two: Group Interview	All experts participated in a group interview process, aligned with expert elicitation and behavioral finance protocols. This included bias reduction training and external reference data to prompt consideration of external and internal risks and trends that present risk consequences to the industry, both today and in the future.
Step three: Survey	Each expert used a patented, interactive software tool to help collect data points on their individual estimate of four dimensions of each risk: likelihood, severity, interconnectivity, and velocity. We designed the survey, using expert elicitation principles, to: → Apply non-linear thinking processes. → Reduce survey fatigue effects. → Reduce biased estimates. → Collect continuous-valued data collection avoiding categorical analysis; and → Support self-consistent estimates of the most challenging risks commonly seen in food retail.
Step four: Findings	We generated and analyzed a risk network to produce four key insights which are set out in section four of this report. We presented the findings to industry experts and discussed next steps.

Food retailer insights *and findings*

04.

04. Food retailer insights *and findings*

1. Key risks

The table below sets out the key risks identified during risk assessment steps one and two.

Table 1: Expert-identified key industry risks

N°	Risk name	Risk description
1	**Barriers to collaboration**	Barriers to collaboration between governments, companies and producers at national and international levels are impeded, including frameworks for governments to work with organisations, anti-competition laws, complexity, numerous role players and stakeholders, time requirements or others.
2	**Business model driving depletion of natural systems**	"Business as usual" business practices deplete natural systems. These include monocultures, favoring scale over diversity, and excessive inputs (fertilizers). Assumption that there are infinite natural resources (land, water, plants, animal species) or an ability to always source from somewhere.
3	**Climate-related physical and transition risk**	Underestimating / not being able to manage physical and transition effects of climate change, such as the effect on crop performances and yields and climate driven migration of people.
4	**Complexity and interdependencies between components of ESG**	Not understanding true impact and limitations of system complexity and interdependencies between and within ecological, social and economic systems. Difficult to value and prioritize nature in the economic and social systems.
5	**Complexity of supply chain structures and sourcing relationships**	Long, complex supply chains facing disruption and affecting stability. 'Just-in-time' versus local sourcing requires new relationships and mechanisms. Challenges of coordinating actions to initiate and accelerate change across the supply chain.
6	**Consumer awareness and institutional distrust**	Consumers' distrust of traditional companies, institutions and political leaders is accelerated by technology. Few widely trusted sources of information perpetuate a lack of understanding about the true impact of current food systems on nature.
7	**Consumerism - price over sustainability**	Consumers' current concern and behaviour are largely price-centric and less about the sustainability of products they purchase.
8	**Food inequality**	Challenges of poverty and social inequality vary. How to obtain societal alignment to support sustainability progress when there are large income differentials, such as some groups / regions of the world focused purely on survival from a food perspective.
9	**Geopolitical instability**	Global events (bifurcation, deglobalisation, hot - cold wars), populism and national interests first (protectionism), as well as local politics (regional and local subsidies) impacting the food chain. For example, the weaponisation of food and natural capital.
10	**Incentives misalignment across value chains**	Different actors throughout the value-chain (consumers / food retailers / distributors / processors / regulators / farmers) pulling and pushing in different directions.
11	**Ineffectual public facing initiatives**	Public facing initiatives (including non-government companies) tend to maintain the status quo. Companies often hide behind these initiatives and do not fundamentally change their business practices to materially move forward.
12	**Lack of clear metrics, targets, and impact disclosures**	Lack of clarity around universally acceptable 'baselines' and / or comprehensive metrics and targets to disclose against leads to inability to define, measure, monitor and disclose sustainability progress.
13	**Lack of expertise, resources and capability**	Lack of / underestimation of expertise, knowledge, systems, resources and capabilities or time required to embed nature-centric processes into business models. Bandwidth and ability to change in companies is questionable.
14	**Regulation and enforcement**	Misaligned policies. Unhelpful, changing and complicated laws, regulations, and standards increase cost, complexity, drive non-sustainable behaviors and debilitate from the intended objectives. Enforcement lacking from regulators.
15	**Shareholder/ investor inaction**	Insufficient shareholder / investor community action to hold companies and boards accountable for embedding nature-based practices.
16	**Supply chain traceability and transparency**	Poor traceability and transparency in supply chains due to lack of useful or relevant data. Minimal traceability standards.
17	**Uneconomical farming**	Diminishing number of farmers and producers. Economics / viability of farming increasingly unattractive - urbanization a factor. Incentives for farmers to keep farming are increasingly lost, which results in limited food production.
18	**Unwillingness to absorb and pass on true input costs**	Unwillingness to absorb and pass on true input / nature costs and price fairly for sustainability practices. Results in inequitable sharing of collective value created along the supply chain.

2. Scales

Below are the risk scales experts used to rank each risk in Step three. Food price increase was used as a measure of severity (or 'impact') of the risk, as it reflects risk-related food system disruption. Risk likelihood is measured on a logarithmic scale.

A typical scale for risks' time-to-impact (velocity) is one to five years. However, food producers and their retail partners tend to work to a longer time horizon due to dependence on biological systems, the potential for risk accumulation and longer-term climate-cycle effects. For this reason – and recognizing its vital role in sustaining a growing global population - we use a risk velocity scale of up to 10 years.

Table 2: Severity, likelihood, and velocity quantitative risk scales

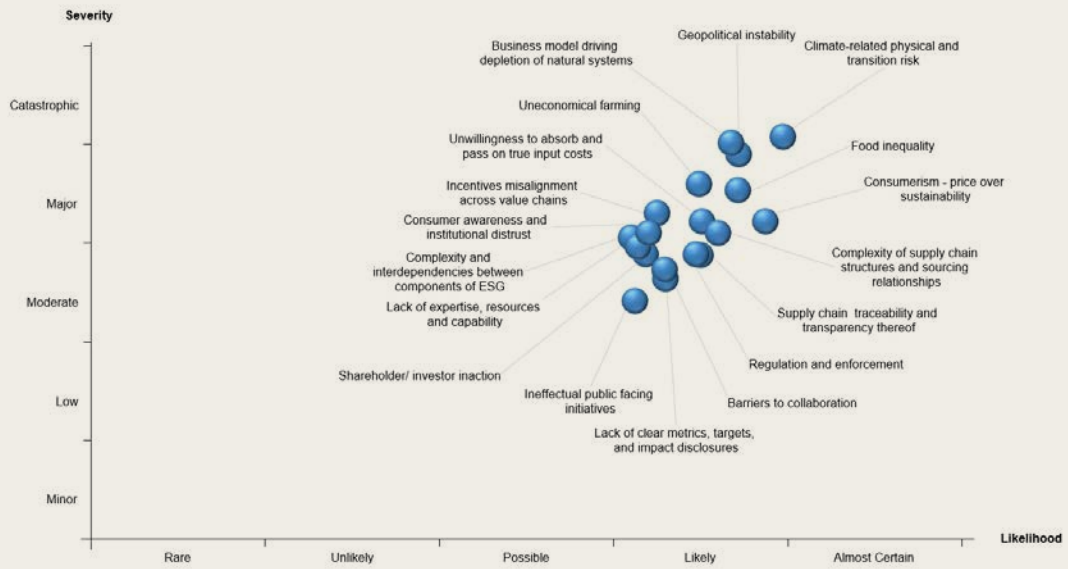
Severity (Food price increases)	**Minor** 0 – 3%	**Low** 3 – 10%	**Moderate** 10 – 30%	**Major** 30 - 100%	**Catastrophic** >100%
Likelihood **(Events per year)**	**Rare** 0.05 – 0.1	**Unlikely** 0.1 – 0.2	**Possible** 0.2 – 0.5	**Likely** 0.5 - 1	**Almost Certain** 1 - 2
Velocity	0 – 0.5 yrs.	0.5 – 1 yr.	1 – 2 yrs.	2 – 5 yrs.	5 – 10 yrs.

3. Results

Risk heat map

A risk heat map is a traditional severity vs likelihood map of the key risks, based on the information collected in Step three. Each risk's position marks the group average of these risk metrics, applying the scales noted above. It is notable that all risks are clustered towards the top right corner of Figure 1, meaning they are all individually likely (a one-in-two-year event rate), with severity levels from moderate to catastrophic (equal to food price increases of 10–300%).

Figure 1: A traditional two-dimensional risk heat map of the risks



Source: TCFD Status Report 2022 & 2023

Network risk map

Figure 2 shows how expert participants expect individual risks to affect each other. This figure is a summary and only shows the connections for which there was a consensus of above 32%.

This high-level view clarifies the key connections between risks, but it is important to note the subsequent insights are generated based on every single connection noted between risks, not just the high consensus ones. All connections can be seen in Figure A.2 in the Annex.

Figure 1: A network view of the risks identified showing the highest consensus connections. The circles represent the risks, their diameters depicting severity. The direction of arrow heads indicate the contagion flow and the strength of that flow is represented by the number of arrow heads.

Source: KPMG

4. Insights from the analysis

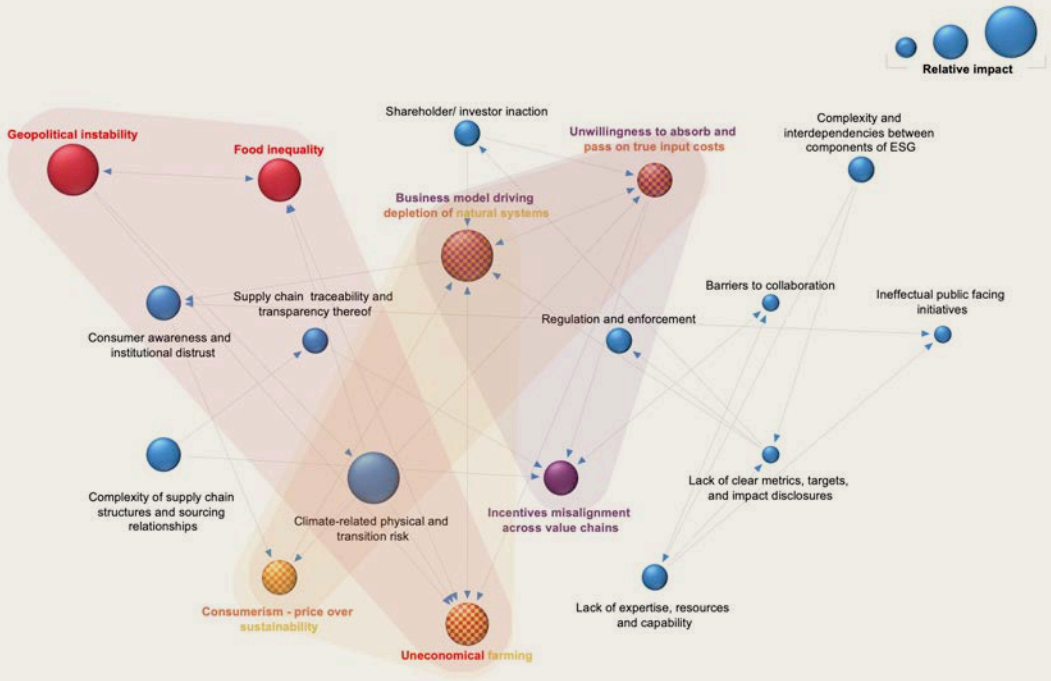
Insight 1 – Risks do not occur in isolation. We expect 'clusters' of connected risks will manifest together, with their collective impact exceeding the impact of any of risk individually.

The DRA process identifies risk clusters algorithmically by isolating groups of three or more risks where most experts linked them to each other in both directions. Between 25-30% of experts anticipated the top four clusters in Table 3 and Figure 3.

Table 3: Four expected initial clusters

N°	Cluster component risks
1	→ Business model driving depletion of natural systems → Incentives misalignment across value chains → Unwillingness to absorb and pass on true input costs
2	→ Food inequality → Geopolitical instability → Uneconomical farming
3	→ Business model driving depletion of natural systems → Consumerism - price over sustainability → Unwillingness to absorb and pass on true input costs
4	→ Business model driving depletion of natural systems → Consumerism - price over sustainability → Uneconomical farming

Figure 3: A network view of the risks identified in the four expected clusters



Cluster 1 – purple, Cluster 2 – red, Cluster 3 – orange, Cluster 4 – yellow.

Source: KPMG

Figure 3 reveals that these four clusters overlap as they share key risks. The overlap suggests the experts anticipate risks to spread both within and between each cluster, highlighting that we are dealing, in every sense, with a systemic challenge.

Cluster 1 – "Unwillingness / disincentives to change".

Business model driving depletion of natural systems, Incentives misalignment across value chains, and Unwillingness to absorb and pass on true input costs.

Cluster one risks point to dogmatism, imperiousness, and inflexibility. A view that surfaces repeatedly in the market is that the current, well-researched and developed business model that has operated effectively for forty years is, in practice, becoming a threat to the existence of companies that follow it.

Cluster 2 – "National interests / my country first"

Food inequality, Geopolitical instability, and Uneconomical farming.

As presented in Figure 4, Cluster 2 risks combine to produce the most severe aggregate risk of all four clusters: catastrophic in consequence and likely in occurrence. This cluster points to the geopolitical fragmentation that is currently unfolding. Given food availability challenges as experienced globally during the pandemic, rising populism and 'put national interests first' initiatives, food systems are often central to geopolitical discord.

Climate change, food production and food supplies are global challenges that cannot be resolved by fragmented approaches. This suggests current policy settings are achieving the opposite to what is intended and increasing the risk of global food system failures.

Cluster 3 – "Myopic self-interest above common needs for the greater good"

Business model driving depletion of natural systems, Unwillingness to absorb and pass on true input costs, and Consumerism - price over sustainability.

Cluster 3 highlights the immense challenge of changing behavior. Tackling the impact of food supply chains on nature-based systems requires consideration and prioritization of common interests over individual ones (be that business or consumer). However, at no time have the rights and voices of individuals been more prominent. It remains unclear how the common interests of nature-based systems should be prioritized, when individual consumers are unwilling and often unable to pay the 'true cost' of production.

Cluster 4 – "Distance / removal from the realities and impacts on farming"

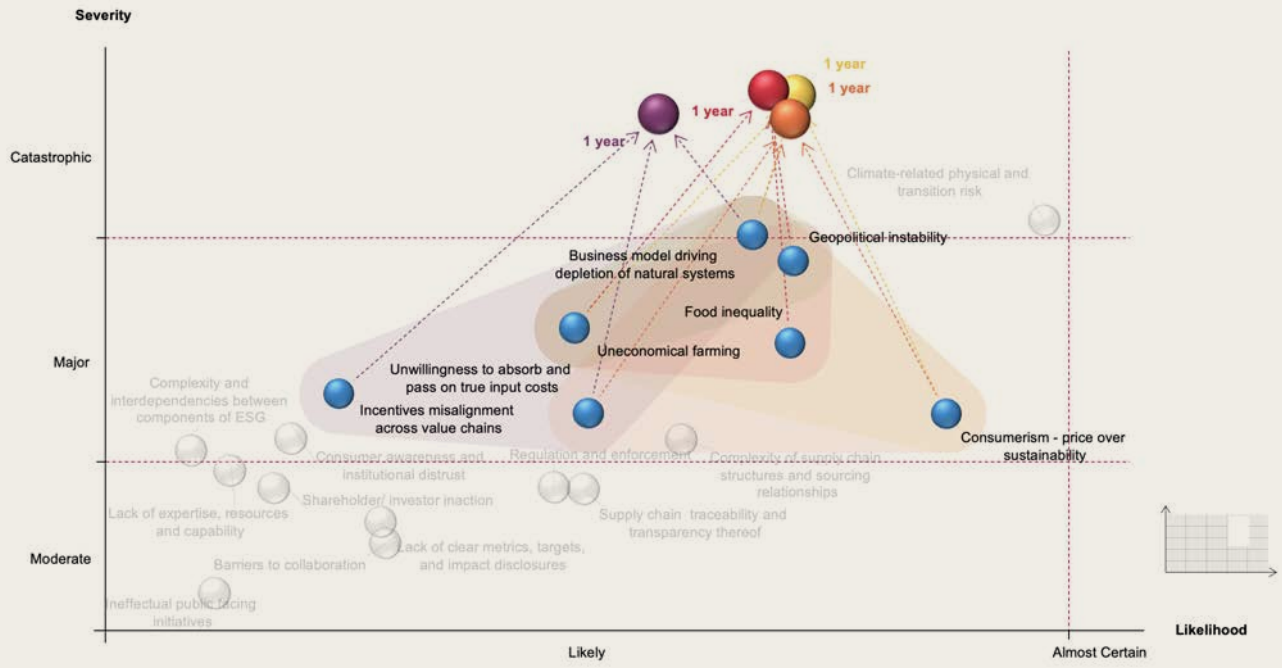
Business model driving depletion of natural systems, Consumerism - price over sustainability, and Uneconomical farming.

At the heart of Cluster 4 is the ever-increasing distance between consumers and farmers. Before a COVID-fueled 'return to local' focus, most businesses experienced lengthening supply chains. The realities of farming continually fade from collective consciousness as consumers and businesses increasingly forget the demands their expectations and requirements place on farmers. Products perceived by consumers as more natural (e.g., organic products and free-range eggs) require more acreage to produce in similar volumes to alternatives, with farmers left managing higher costs and lower yields. As consumers are unwilling and, often, unable to compensate farmers for these reduced yields, farming families and their communities are impacted by declining welfare and living standards. Consequently, farming communities are shrinking as younger generations opt against pursuing farming as a viable occupation and established farmers walk away from farming.

Velocity and severity of the clusters

All four clusters have a velocity of one year, showing the speed at which they may manifest within our world. This is particularly important, as the severity of each cluster is 'Catastrophic'. When we examine the profile of them on the heatmap, their risk profile appears markedly more threatening than individual risks' discrete ranking of 'Major'. This demonstrates a previously missing perspective on systemic risks: that is, that aggregate consequences are not easily detected and may be significantly worse than expected.

Figure 4: The aggregate view of the most expected clusters and their times-to-impact



Cluster 1 – purple, Cluster 2 – red, Cluster 3 – orange, Cluster 4 – yellow.

Source: KMPG

Insight 2 – We have a 'blind spot' to the potential impacts of Climate-related physical and transition risk and Regulation and enforcement.

In addition to the four most expected clusters, we can also isolate groups of three or more weakly connected risks, of which the aggregate severities exceed even the most severe, most expected cluster. These combinations reflect our collective 'blind spots'.

Two risks, Climate-related physical and transition risk and Regulation and enforcement do not appear in the four most expected clusters. However, analysis suggests they are weakly connected to the risks in those clusters. Therefore, their manifestation may drive the impact severity of Clusters 1-4 to levels beyond 'Catastrophic'. The key takeaway is that climate change consequences amplify the challenges global food systems are already facing.

Table 4: Two risks identified as a blind spot

N°	Cluster component risks
6	→ **Climate-related physical and transition risk** → Geopolitical instability → **Regulation and enforcement**
7	→ **Climate-related physical and transition risk** → Food inequality → Geopolitical instability
8	→ Business model driving depletion of natural systems → **Climate-related physical and transition risk** → Geopolitical instability

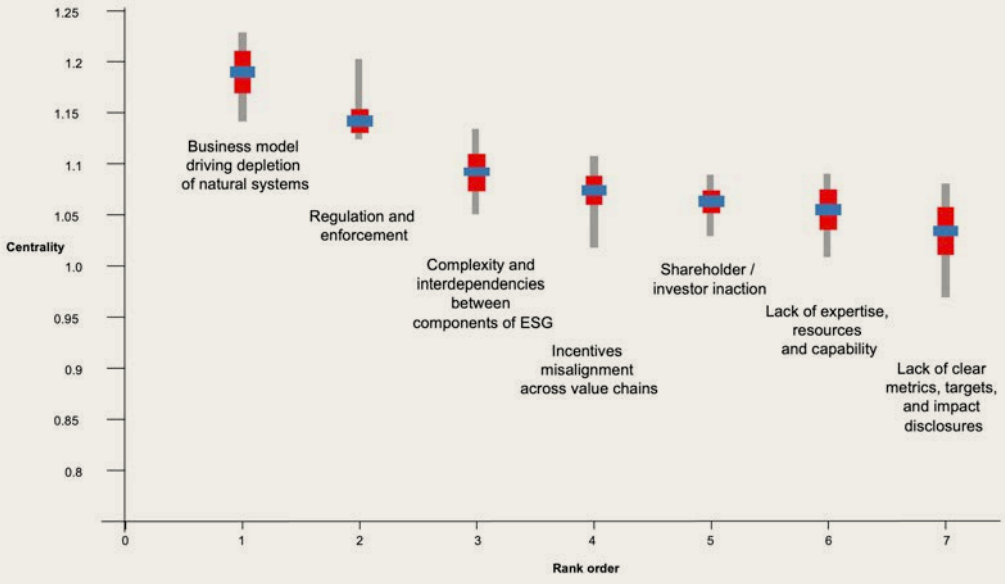
Insight 3 – Business model driving depletion of natural systems, Uneconomical farming, and Incentives misalignment across value chains are the greatest receivers of risk in the network.

Risks within the network both emit risk to and receive risk from others. Figure 5 ranks the nine greatest receivers of risk within the network, showing their centrality within the network.

From right to left, Barriers to collaboration (#9) makes Consumerism – price over sustainability (#8), more difficult to overcome. Combined, they worsen the risk of Regulation and enforcement (#7) and, together, the three worsen mitigation of Climate-related physical and transitional risk (#6). From this, Food inequality (#5) spirals, increasing customers' Unwillingness to absorb and pass on true input costs (#4). With margins not changing, value chain agents experience Incentives misalignment across value chains (#3), worsening the trajectory of increasingly Uneconomical farming (#2), with our Business model driving depletion of natural systems (#1) to the point where sustaining our species is unfeasible.

If action is not taken to reduce risk across the system, it will be more challenging to mitigate natural system depletion using our existing business models. However, the greatest receivers of risk do not tell us where is best to intervene within the network. For this, we must look to the emitters of risk.

Figure 5: Rank order of the network's most affected risks



Source: KPMG

Insight 4 – Focusing on mitigating the risk of 'Business models driving depletion of natural systems' is the most effective intervention point in this risk network.

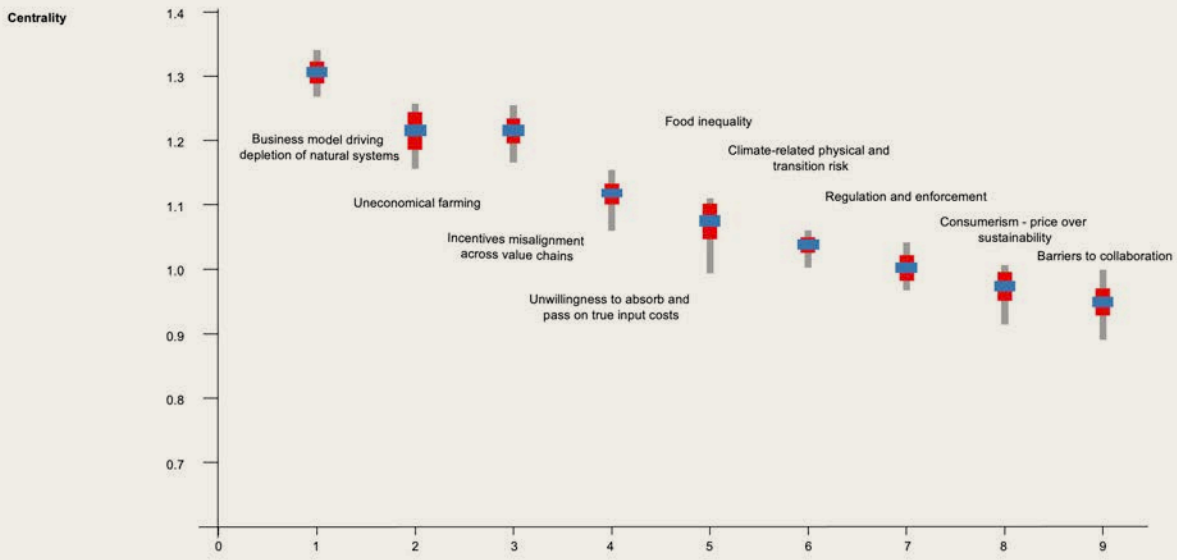
Like any network, our risk network has optimal intervention points which can be determined based on which risks emit the most risk to others. Those that emit the most risk will be the best to address first.

The risk with most potential for eliciting change is Business models driving depletion of natural systems (#1). It is at the heart of the risk network and will mitigate every other risk, with the lowest cost and the greatest return on investment. Successfully mitigating this risk also has the greater impact on mitigating others in the network. Conversely, leaving this risk unmitigated would likely exacerbate others.

Following from left to right is a further cascade of risks. Without a clear and common understanding of the true value of business inputs, Regulation and enforcement (#2) globally will fragment, worsening Complexities and interdependencies between components of ESG (#3) and further driving Incentives misalignment across value chains (#4). This, in turn, will prolong Shareholder / investor inaction (#5) as it becomes increasingly unclear where and how to invest in the market, exacerbating the risk of Lack of expertise, resources and capability (#6) and ultimately a Lack of clear metrics, targets and impact disclosures (#7) across the sector.

While acting on risks other than Business models driving depletion of natural systems is important and useful, trying to mitigate those on the right without resolving those on the left is shown to have reduced impact and be less cost-effective. However, the network suggests that without focused consideration of the impact current food retail business models have on the planet and its population, and without action to respond to the challenges, successful mitigation of other individual network risks is unlikely.

Figure 6: Rank order (right to left) of network-wide influence of individual risks



Source: KPMG

Key themes *and possible actions*

05.

05. Key themes *and possible actions*

WBCSD has identified three key themes for focus and possible action based on the insights derived from KPMG's Dynamic Risk Assessment. These are not limited to food retailers but extend to those who work with, and partner across, the food retail value and supply chains, including stakeholders.

1. A lack of understanding, capability, and/or capacity is inhibiting action and material systems change.

In recent years, most businesses have developed greater clarity and understanding of the relationship their company has with the climate. This is accompanied by a remit from stakeholders to respond to these climate-related risks and their impacts. However, the same cannot be said of businesses understanding their broader relationship with nature. It is difficult to understand the resources and capabilities required to address natural system depletion without a comprehensive understanding of the significant consequences this depletion will have on a business. It is therefore essential that:

- → Nature or natural systems be recognized as a non-negotiable fundamental in developing strategies to address potential unsustainable practices given companies across global food systems are directly reliant on natural resources and their viability is dependent on them.
- → An assessment is carried out on the strategic nature-related risks faced and opportunities available to inform how companies can respond, embed nature into core business strategy and practices.
- → A holistic, foresight-based approach is taken to understanding potential impacts nature could have on companies' strategies, business models and operations as well as the ability to meet regulatory and compliance standards at board and executive level.
- → Consideration of nature-based risks becomes a standing item on board and executive agendas, with acknowledgement by those bodies of their responsibility and accountability for acting on, or assigning oversight to, board committees and/or management.
- → Businesses begin to take or accelerate genuine actions designed to stop further damage to nature-based systems and mitigate existing material impacts while plans are developed for restorative initiatives over time.

2. Food retailers will need to work with partners up-and-down the value chain to create and lead change, beginning with a significant investment in understanding the 'first mile'.

Despite their influence, food retailers only represent one step in a complex value chain; they cannot act in isolation. To change the focus placed on nature, it is essential relationships extend beyond typical contractual terms, in particular placing as much focus on the 'first mile' (producer) as has traditionally been given to the 'final mile" (consumer. The DRA analysis indicates that obtaining cross-value chain alignment on the response to nature-based risks is critical to the long-term prosperity of retail businesses. For retailers to maintain consistent food supplies and meet market demand, they must ensure farmers are compensated appropriately for their efforts. The return to farmers (both financial and non-financial, for instance access to technology or investment) needs to reflect the value their activities deliver to the entire value chain. With appropriate resources, the 'first mile' will be able to develop operations in line with global demand, while supporting and regenerating the natural assets on which the food system relies. Therefore, we recommend that businesses:

- → Proactively increase engagement with the 'first mile', building deeper relationships with partners and workers at the start of their value chains and understanding the unique environmental conditions they work with daily. This is an opportunity for businesses to build trust throughout their value chain and to introduce new incentive or shared benefit models that support farmers to deliver better outcomes for nature.
- → Provide additional financial reward and non-financial benefits to farmers that lead in adopting nature-based solutions within their farming systems. This means businesses must redesign how they work with farmers to move from inherently transactional structures based on short-term contracts with price as the only key metric. Instead, they should pursue partnerships built on long-term objectives to enhance food supply chain resilience by mitigating the impacts of production systems on nature and biodiversity.

- → Co-develop and use platforms for measuring, monitoring, and data sharing. A 'common language' must be spoken across the food system and its value chains to understand where and how others are acting, and the impact this has for nature. Establishing and using measurement platforms will also allow other value chain actors, such as banks, insurers or governments, to establish mechanisms for recognizing and supporting businesses who are taking proactive actions for nature.
- → Embrace emerging technologies, both digital and physical. The costs to do so will require funding and financing beyond the capacity of many farming business. Participants along the value chain will benefit from these technologies, so they must come together to determine who will fund or co-invest in them to ensure long-term food value chain viability. These investments will also create opportunities to deliver new offerings to consumers. It is critical that these costs are not seen solely as the responsibility of farmers to fund.

3. Changing to nature-based business models will require a fundamental restructuring of how the food retail sector connects with and manages relationships across its complex value and supply-chains.

There is a need to move from price being the sole measure of success to arrangements based on long-term relationships that recognize value creation as extending beyond purely financial outcomes. It is an opportunity to look at supply relationships differently, where supply chain partners have strong alignment in values, clearly articulated common goals to mitigate impact on nature and collaboration towards nature-centric business models. It is a transformation that will necessitate involving people across the company, not merely a 'sustainability' group. This should include board, executive, strategists, sales and marketing, procurement, tech specialists and, importantly, finance and legal functions. Given that finance and legal often determine the rules of engagement for a business and take responsibility for reporting results, their involvement in leading the business towards nature-based behaviour is essential. Therefore, possible actions include:

- → Educating leaders and team members about the impacts, both direct and indirect, the business has on nature as well as the opportunities inherent in nature-based systems. The remoteness of various food value chain elements to those in procurement, marketing or finance means they often do not understand the impacts of their decisions on farmers, communities and natural systems. Businesses must invest in boosting understanding and awareness of those who grow the produce on which food retail businesses rely, so they are able to make more informed decisions and explore alternative business models.
- → Investing in developing internal and external mechanisms to transform transactional relationships into partnerships to challenge, initiate and accelerate value chain change. This enables development of novel data collection and sharing methods to measure and monitor nature-related impacts and outcomes along the value chain. It is clear current measurement and reporting systems are no longer fit for purpose for the values we need to measure, as the contribution of nature to food supply chains extends beyond finances.
- → Shifting from short-term contracts to long-term partnerships and commitments with suppliers who align on nature-related values and work collectively to find new ways to create value. Incorporating and valuing strong relationships will encourage implementation of new nature-based business models that can propel the entire food sector towards enhanced nature-based outcomes.

Conclusion

06.

06. Conclusion

This report acknowledges the complexity of the challenge businesses in food value chains, and particularly retailers, face when working to embed nature into business practices, given how markets and investors measure business success today. However, it also recognizes that future business viability depends on their ability to embed nature into business practices. The risk network generated from the contributions of experts across food and retail value chains indicated that, when it comes to nature and nature-based systems, current business models represent the most significant risk to food value chains.

The DRA identifies and begins to unpack the clusters of risks and their interconnectedness. As such, it provides direction on where businesses can immediately intervene, initiate or accelerate activities and action to reduce the current impact on, and depletion of, natural systems. If the risks identified are not addressed and coordinated actions are not taken in respect of those that have greatest impact on the network, the analysis suggests their impacts will inevitably become stronger.

The report highlights the unique and significant value chain opportunity food retailers have, with both 'first mile' and 'last mile' relationships that place them in a unique position to initiate change. The urgency of the risks we face means food retailers must now move beyond understanding their emissions and climate-related risks, to act in relation to nature-related operational risks.

Navigating the response to nature-based risks is more complex and challenging than that of climate change, because nature is, by definition, place-based. While with climate, decisions can be taken at the center around fuel use or travel that can be consistently applied across the whole business, this is not the case with nature. Each ecosystem is different and will require its own unique solutions, thus there is an inherent need to engage those who operate or produce in the 'first mile' to find workable solutions to protect and regenerate natural systems.

The Taskforce for Nature Related Disclosures is useful as an overarching framework but does not negate the need to engage all value chain actors to lead change. By thinking about the risks global food systems face and how those risks are expected to cascade from one to another in the coming months and years, businesses can pinpoint where and how to start to decrease the chance of this happening.

The scale and scope of this work cannot be underestimated. It is critical to the future of a resilient food system that action is undertaken in an inclusive, economically sustainable manner while also meeting essential environmental and social goals.

Useful resources

- → Roadmap to Nature Positive: Foundations for the agri-food system - row crop commodities subsector - World Business Council for Sustainable Development (WBCSD)
- → Food, Agriculture, and Forest – WBCSD (climatescenariocatalogue.org)
- → An enhanced assessment of risks impacting the food and agriculture sector - World Business Council for Sustainable Development (WBCSD)
- → WBCSD's TNFD pilot - World Business Council for Sustainable Development (WBCSD)
- → Food & Agriculture Roadmap - World Business Council for Sustainable Development (WBCSD)

Annex

Figure A.1: Close up of the risk heat map in Figure 1

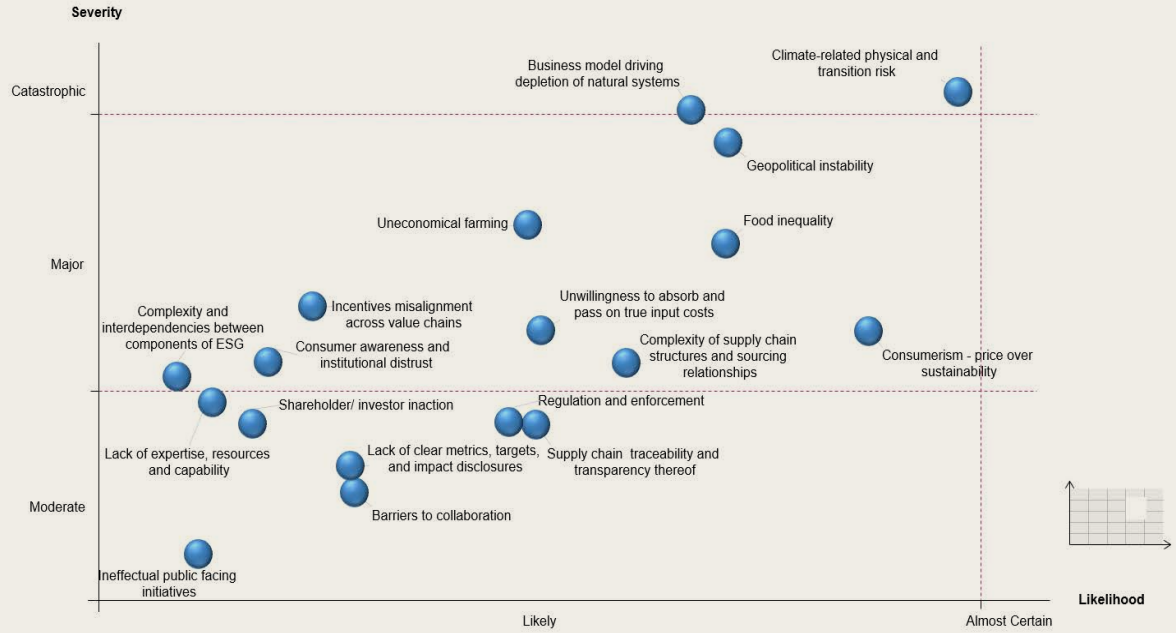
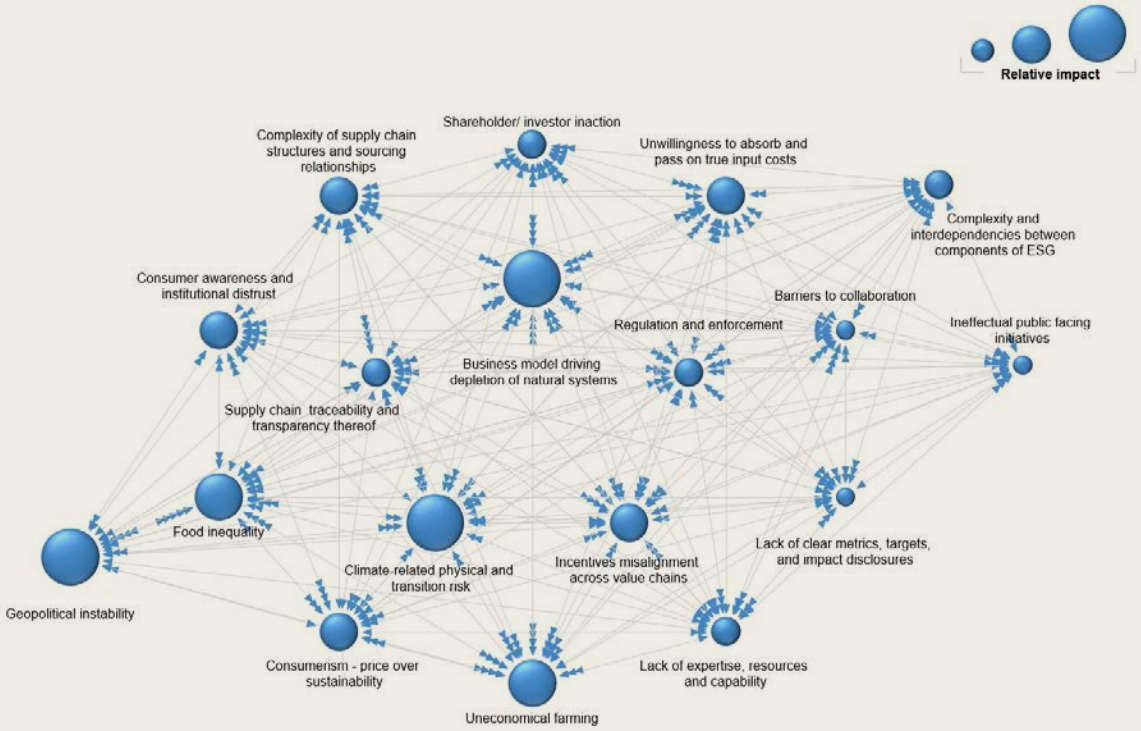


Figure A.2: A view of the full network data for the risks including relative impact and connectivity. Circles represent risks and their diameter depicts severity. The direction of the arrow heads indicates the contagion flow, where the strength of the flow is reflected by the number of arrow heads.



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