

A Strategy Playbook for Disaster and Climate Resilient Supply Systems

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INTRODUCTION

Climate change poses significant risks to the security and resilience of supply chains worldwide. Climate associated impacts, ranging from droughts, floods, storms, and heatwaves, create significant disruptions across production, processing, transportation, and retailing systems. Moreover, the increasing frequency of extreme weather-related events threatens critical infrastructure, such as transportation networks and storage facilities, with cascading consequences for both domestic and international trade. These risks are especially critical for companies operating in or sourcing from vulnerable regions around the world where climate impacts are already being felt and are expected to intensify.

Companies are beginning to recognize and quantify these impacts to their businesses, including diminished availability and quality of resources, reduced labour productivity from heat stress, increased operational costs from insurance and regulation, and losses from supply chain interruptions. Climate impacts permeate every function of supply chains, from planning, production and sourcing to delivery and forecasting.

Building resilience to these impacts in industries such as agriculture and food production, medical equipment, and critical minerals is essential to the economic and social security of Canada. These efforts must go beyond a company's locations in Canada. Canadian companies will need to focus on supporting resilience across their global supply chains, including the many small and medium-sized enterprises (SMEs) that play key roles in our supply systems.

Based on over a decade of work with hundreds of companies, both large and small, across a range of industries and global locations, this strategy playbook outlines key considerations and approaches that companies of all sizes can take to build more resilient supply systems.

The critical starting point is that no single company can achieve this on its own. Climate and disaster risk resilience across a supply chain depends on integrated multi-actor/company strategies that build capacity and direct resources to the locations and assets that are most critical. It goes beyond business continuity planning to focus on shared risk through collaboration, information sharing and investment that create long-term trusted relationships on which resilience and climate adaptation can be built.



THE CASE FOR A SHARED RESILIENCE STRATEGY

Climate change poses significant risks to supply chains worldwide. These risks are especially critical for companies operating in or sourcing from global hotspots where climate impacts are already being felt and are expected to intensify. These impacts have exposed deep vulnerabilities across sectors, as disruptions in one domain or point in the supply system often amplify risks and losses in others downstream.

At the same time, risk information flows, resources and solutions necessary for adaptation planning and disaster prevention often remain siloed within single organizations; therein limiting their use for strategic decision making, and ultimately narrowing opportunities for innovation and risk reduction. Yet it is increasingly clear that no company can insulate itself or independently cope with the impacts of climate change. Traditional risk management strategies, such as diversification of sources, or shifting of established supply locations, are becoming less effective as risk zones expand globally. These approaches come with significant opportunity costs, and undermine value created by trust and partnerships among businesses in a supply chain built over time.

In the emerging climate reality, stability and operational reliability will depend less on individual company capabilities and more on the ability of supply chains to incorporate learning and innovation across multiple organizations to strengthen their resilience. These types of systems will be best positioned to adapt to rapidly changing climate conditions.

Moreover, climate risks and impacts are compounded by an increasingly volatile international market, shifting geopolitics, changing regulation and fragmented supply chains. This volatility is already forcing companies to rebuild or reconfigure their supply networks and offers a significant opportunity to ensure that resilience thinking informs business strategy both in the short and long terms.

A shared climate and disaster risk and adaptation strategy is framed in systems thinking, where understanding risk and resilience is accomplished through multi-site, multi-actor, and multi-capacity processes that complement one another. This playbook draws on data gathered with companies across several countries: reflecting their challenges, perspectives, experiences, and strategic priorities in understanding and addressing climate related risks and impacts.

The strategic components draw on these insights to put forth a practical tool for climate adaptation and resilience. We call on business leaders to rethink their risk management approaches and dedicate time and resources to building trust and collaboration that can underpin shared learning processes and investments that can strengthen their supply system's ability to thrive in a changing world.



BARRIERS TO MULTI-ACTOR RESILIENCE STRATEGIES

In our work with directors, risk management officers, and employees on the production floor and in the field, in several countries of the Americas, companies have consistently identified several barriers keeping them from being able to make the changes necessary to adapt to the impacts of climate change and reduce the costs of disruptions. These barriers fall into four broad categories:

- Lack of specificity of climate and disaster risk at different levels of the organization and across supply chains.
- Siloed information, resources and communication channels.
- A culture of accepting disaster-related losses and the costs of recovery as normal; and
- Misalignment of climate adaptation needs and and externally-imposed sustainability certifications.

BARRIER 1: LACK OF SPECIFICITY OF CLIMATE AND DISASTER RISKS TO THE SUPPLY SYSTEM

Over the past decade, international organizations, universities, local governments, and civil society groups have made concerted efforts to raise awareness and build private sector capacity to better understand the impacts of climate change. However, in practice, adoption of climate and disaster risk-informed business strategies and programs remains limited among small, medium, and large companies.

While many tools and resources exist to help companies benchmark climate and disaster risk, there is no consistent framework for integrating disaster risk management into business and investment decisions. In addition, the recommendations and objectives set out in international policy frameworks such as the Sendai Framework for Disaster Risk Reduction, the Sustainable Development Goals, and the global climate agreements are often difficult for companies to translate into business routines and daily operations.

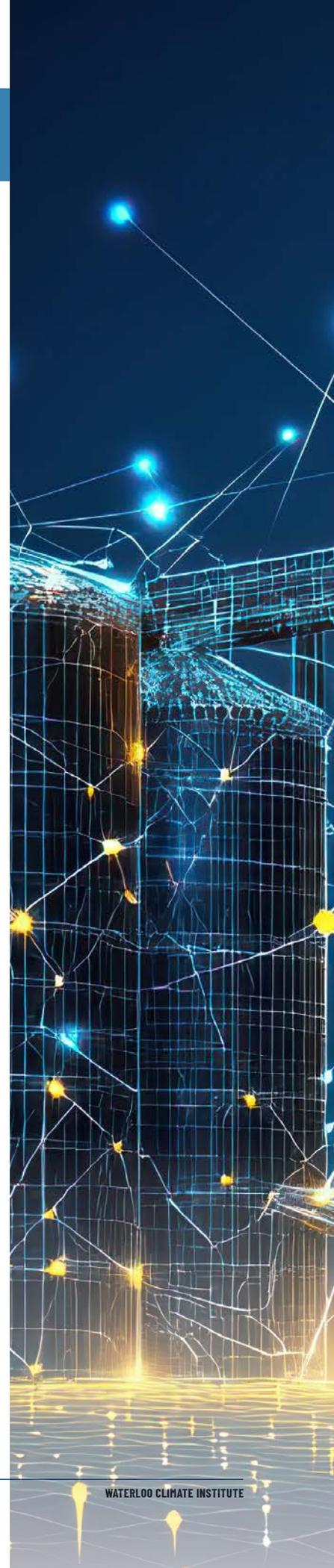
Businesses need support to understand historical impacts and losses, classify hazards and categorize future risks across different locations, activities, and processes within their supply systems. An increased level of specificity is required to identify supplier vulnerabilities and operational exposure to physical climate risks, which is a necessary step for targeting investments or operational changes that build resilience. However, relevant information remains fragmented, unreliable, or treated as confidential, limiting opportunities for more meaningful and effective adaptation and risk reduction investments.

BARRIER 2: SILOED INFORMATION, RESOURCES AND COMMUNICATION CHANNELS

In many supply systems, and even within individual companies, information remains in silos, leading to duplication, inefficiency, and conflicting priorities in resilience investments. There is a need for joint risk identification, integration of information and analysis to advance stronger and more coordinated commitments from all parties involved in the supply system. Significant gaps exist in information flows and communication around critical data and knowledge needed to build resilience, including future investment planning and risk scenarios that support stronger foresight. These gaps occur not only between companies but also within organizations, driven by rapid operational demands across differently sized firms, and by the lack of systematized approaches or clarity around what information is required to make risk-informed decisions that could enhance coordination and stability in supply relationships.

Smaller suppliers and local actors often lack the skills, resources, and institutional support needed to participate effectively in climate adaptation initiatives. Access to information and financial resources is uneven across supply chains, and in many cases is weakest in high-risk areas of the Global South that face greater exposure of people and infrastructure, and higher vulnerability due to limited capacity for recovery. In addition, routine communication between companies is often limited to a single individual or fragmented across multiple touchpoints, with a primary focus on short term operational efficiency to maintain supply flows.

Together, these factors result in adaptation efforts that are fragmented, unevenly distributed and inequitable. Larger organizations can advance resilience, while smaller suppliers remain exposed, undermining overall supply chain stability. In worst case scenarios, risks and costs are transferred to smaller organizations or concentrated at system bottlenecks, prompting supply chain shifts or relocations that come with high opportunity costs and the loss of critical capabilities.



BARRIER 3: NORMALIZING DISASTER LOSSES AND RECOVERY COSTS

Disruptions to supply chains caused by extreme weather events have long been a recognized operational risk, with some hazards escalating into disasters. Many companies have already experienced and responded to climate related impacts, but the magnitude and frequency of these events across different parts of the supply chain are increasing, with disruptions now projected to occur more frequently, leading to steadily rising costs.

Despite this, companies continue to focus primarily on recovery and reconstruction. Procurement and financial systems are generally not designed to prioritize long term value creation and resilience, creating impediments to adaptation and “build-back-better” efforts. Limited financial resources, insufficient investment in equipment, and inadequate funding for training entrench these short-term decisions. The absence of flexible funding mechanisms or dedicated budget lines to support data collection, technology deployment, and activities focused on disaster prevention and adaptation leads to delayed or foregone investments, leaving supply chains exposed to future climate shocks.

This approach either transfers the costs of disasters to organizations with greater financial capacity or treats repeated disruptions as acceptable losses. As a result, supply chain efficiency is prioritized without adequate consideration of upstream components of the supply system, including workers and livelihoods, as well as shared infrastructure that supports local suppliers and provides essential services to surrounding communities. This narrow focus limits the broader benefits that resilience investments could deliver.

BARRIER 4: MISALIGNMENT OF ADAPTATION NEEDS AND SUSTAINABILITY CERTIFICATIONS

Increased efforts to raise awareness of sustainability and climate agendas among private sector actors have led to the proliferation of business certification schemes over recent decades. In practice, many of these schemes have become costly for upstream suppliers, particularly in the agriculture and food sectors. Smaller companies often bear the financial burden of certification inspections and are required to make investments and operational changes to comply with frameworks designed by certifying institutions.

Increasingly, these certifications have also kept companies and business partnerships from developing their own internally relevant programs or action plans, and the related performance metrics, information and monitoring systems, and evaluations necessary to understand and manage climate impacts. Standardized contingency plans are often absent, with no established framework for identifying supply chain risks or defining escalation pathways that are tailored to the specific realities of supply systems.

In many cases, efforts and requirements to comply with sustainability certifications are misaligned with activities that would support climate adaptation and disaster risk management, creating confusion and competition for limited resources. Companies end up making trade-offs between meeting certification requirements and making necessary investments that would deliver tangible business and community resilience through adaptation and innovation.

This gap limits opportunities for organizational learning and continuous improvement. While dedicated teams or individuals with the capacity to interpret climate risk information and engage with risk committees could support the development of monitoring models and parameters to set clear milestones and meaningful indicators, resilience strategies frequently remain theoretical and are neither fully implemented nor systematically evaluated.

DESIGNING A SHARED STRATEGY FOR SUPPLY SYSTEM DISASTER MANAGEMENT AND CLIMATE ADAPTATION

Building meaningful and durable resilience to disaster impacts depends on balancing collaboration, governance, and the practical allocation of financial resources at the appropriate points of intervention.

The components of a disaster and climate adaptation strategy shared across a supply chain aim to provide business leaders, risk managers and practitioners the ability and information to design and implement actions needed to address climate risk. Our analysis shows that shared risks along supply chains are not limited to direct operational touchpoints between supply chain nodes. They also include risks that ripple downstream, triggering strategic or operational changes across companies (see Figure 1). For example, labour disruptions caused by flooding or increasingly harsh thermal conditions affecting field workers in upstream agricultural cooperatives or farms can lead wholesale buyers to experience fluctuations in crop volumes or seasonal availability (see Table 1 below).

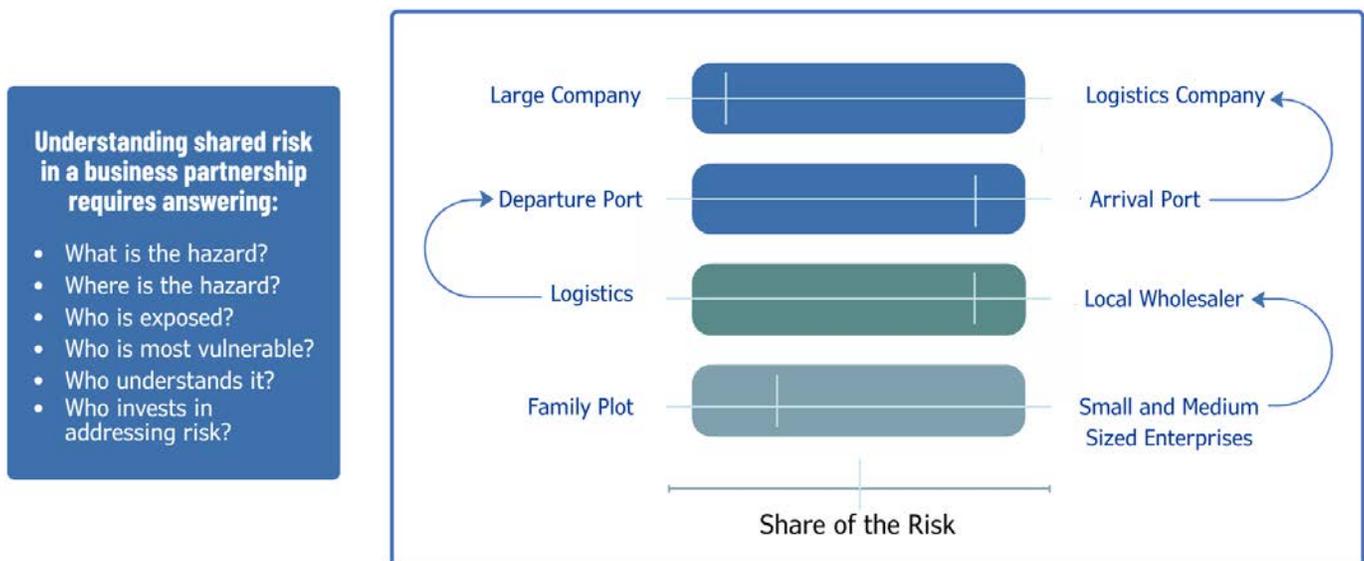
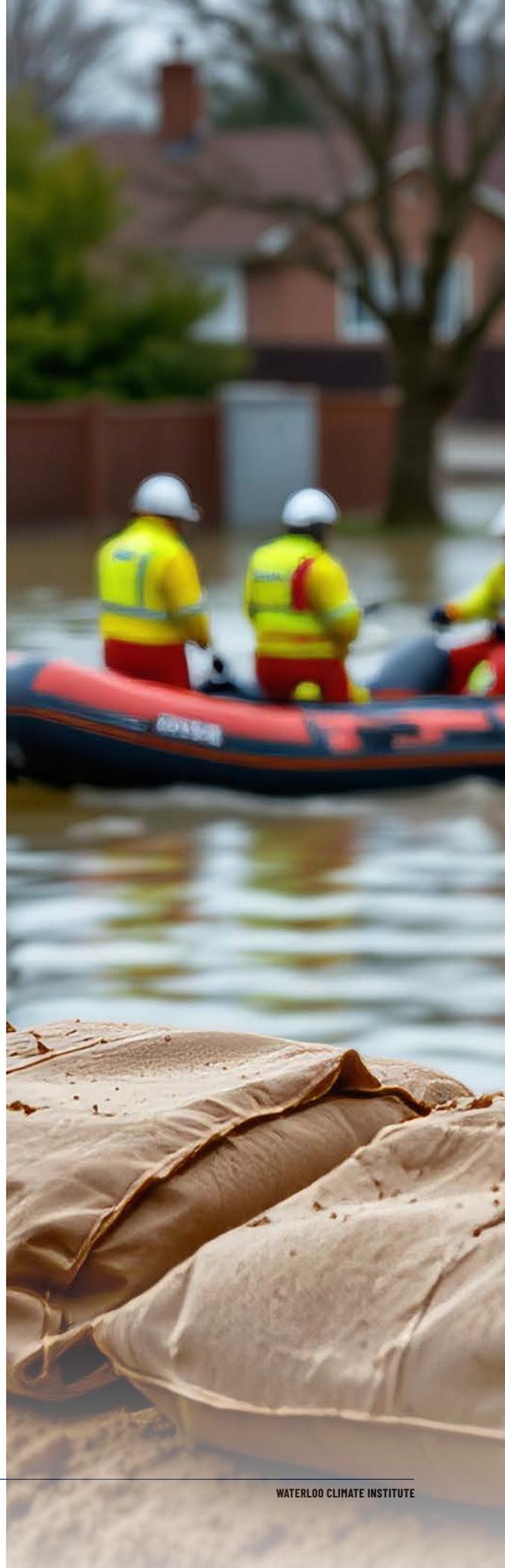


Figure 1. Identifying Shared Climate Risks in Supply Systems

Identifying a shared risk is a first step, but understanding it requires designing parameters to determine which business bears the highest degree of risk (see gradient in Figure 1) based not solely on their exposure but also on their vulnerability determined by the organization's capabilities. This can be driven by proprietary measures defined and agreed by the partners and is a stepping stone to seeking shared solutions or resources to address this weak point in the system. These are the important leverage points around which a strategy can be designed.

When disruptions occur repeatedly, they may prompt companies to reconsider sourcing locations. Instead, downstream companies should consider alternative approaches that focus on supporting field labourers or investment in infrastructure that is not in the buyer's direct responsibility. If deployed in locally appropriate ways, these approaches may be the most effective way to address risks. Such measures could include providing cooling spaces, adjusting harvesting routines, offering emergency transportation to support worker mobility, or identifying workers living in flood exposed or vulnerable neighbourhoods to target support more effectively.

The rationale for these solutions, and the capacity to identify and implement them, varies not only according to a company's interest in addressing climate risk but also according to the availability of information and knowledge shaped by organizational culture, size, and geography. Informal communication channels, site visits, and daily operational routines are often critical sources of insight for understanding risks and identifying practical solutions that stabilize operations and ultimately strengthen system wide resilience.



Anchor/ Keystone Company	Shared risks in a supply system
People	<ul style="list-style-type: none"> ● Worker health and safety risks (heat, smoke, flooding, disease): Field worker illness/injury, dehydration, heat stress, and increased exposure to wildfire smoke, floods, and vector-borne disease; similar risks for warehouse/industrial plant workers due to high indoor temperatures, poor air quality, and disrupted site access.
Fixed Assets	<ul style="list-style-type: none"> ● Damage to critical logistics and port infrastructure (storms, sea level rise, flooding): Port infrastructure impairment from storm surge, coastal flooding, and sea level rise, reducing throughput and increasing downtime. ● Failure of transport connectors and access points (floods, landslides, extreme storms): Connecting bridges damaged or closed, cutting off routes to ports, plants, and distribution nodes. ● Impacts to storage and distribution assets (flooding, wind, wildfire): Storage facilities/distribution centres damaged or inaccessible, causing inventory loss, order backlogs, and rerouting.
Movable Assets	<ul style="list-style-type: none"> ● Container integrity and cargo contamination risks (heat, humidity, flooding): Pest outbreaks or spoilage in containers driven by high heat, moisture intrusion, and prolonged dwell times during disruptions. ● Fleet and equipment availability risks (flooding, storms, emergency response): Trucks damaged by hazard events, or repurposed during disaster recovery, reducing logistics capacity for commercial deliveries.
Products	<ul style="list-style-type: none"> ● Product quality degradation under extreme heat (heatwaves): Spoilage, seepage, or packaging failure when high temperatures exceed storage/transport specifications (e.g., cold chain strain, chemical/food degradation). ● Infestation and hygiene risks after floods/heat (flooding, high heat): Bug infestations and contamination risk triggered by floodwaters, standing water, and elevated temperatures.
Operations	<ul style="list-style-type: none"> ● Extended operational downtime (multi-hazard events, grid disruption): Operations down for extended periods due to facility damage, power outages, workforce disruption, or constrained access. ● Production disruption and loss (heat, water stress, storms): Loss of production/output from facility shutdowns, constrained inputs, or reduced labor productivity in high heat. ● Route disruption and longer transit times (flooding, storm impacts): Changes in routes and extra transit time due to closures, detours, port congestion, and damaged corridors.
Geographic Locations	<ul style="list-style-type: none"> ● Road network blockages (floods, landslides, snow/ice storms): Road blockages that interrupt last-mile and regional distribution and increase delivery risk and cost. ● Coastal access constraints (storm surge, sea level rise, erosion): Sea barriers in coastal locations overtopped, damaged, or closed, limiting access to ports and coastal industrial zones. ● Water quality and availability risks (drought, flooding, contamination): Water quality/availability disruptions affecting processing, sanitation, cooling, and workforce needs; flood contamination can also force shutdowns. ● Chokepoint drought constraints (canal water levels): Drought-driven low water levels (e.g., Panama Canal) reducing transit capacity, increasing queues, forcing re-routing, and raising shipping costs.

Table 1. Examples of Shared Risks Along the Supply System

Striking the Optimal Balance Between Technical and Social Strategic Approaches

Disaster risk and adaptation strategies for supply chains require differentiated approaches based on company size. Evidence suggests that larger companies are often able to transfer risk or shift their supply chains to protect core operational capabilities and pursue efficiency gains. In contrast, smaller companies may adopt slower or less systematized approaches, which can increase costs across the supply system, including for downstream anchor companies.

When partner companies have varying capacities and resources, effective risk identification and adaptation solutions depend on a combination of technical and social design approaches (see Figure 2). At the outset, when companies are just beginning their climate and disaster risk planning, the choice of approach is based mainly on the size of the organizations. Once adaptation processes begin, the optimal mix of technical elements and social learning activities should be negotiated and identified by the partners. This process will adapt the strategy to the realities of the supply chain.

In large anchor or keystone organizations, the more centralized technical and top-down approaches such as structured procedures, operational manuals, and benchmarking tools commonly guide the assessment of climate risks. These practices reflect established business routines and institutional capacity shaped by corporate policy, supported by a range of tools and technologies that underpin organizational functions.

In these contexts, strategy components must translate into more technically oriented innovations that embed new routines, adapt existing processes, or extract relevant information to support shared strategies with upstream partners and suppliers. These technical resources and activities form the basis for longer term learning and innovation across organizations that have the capacity to recognize, adopt, and operationalize such tools.

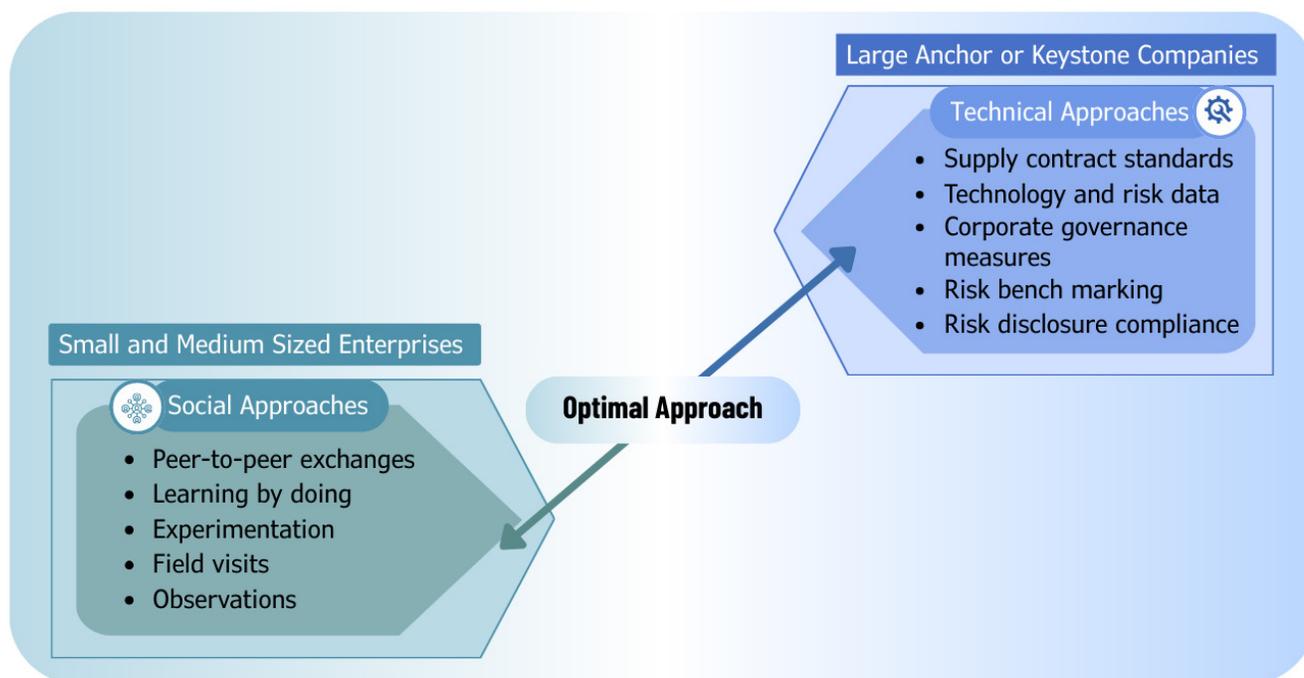
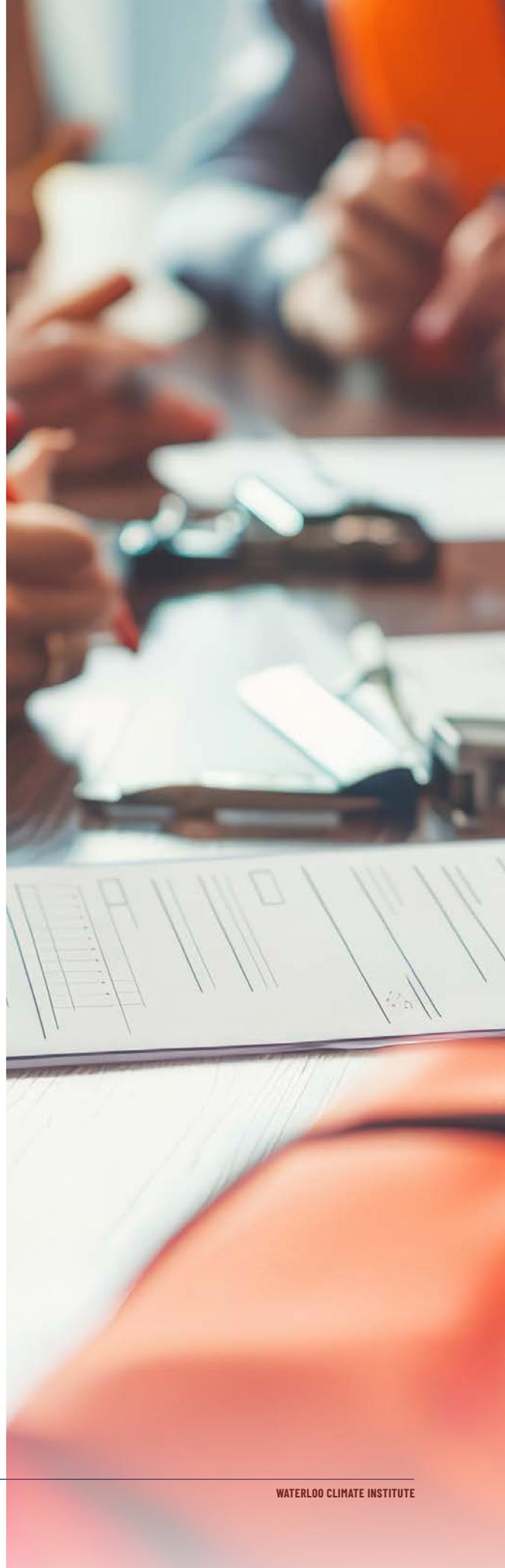


Figure 2. Approaches to developing strategy components based on company size in supply systems

A different approach or entry point is required for small and medium sized enterprises to minimize the cost of planning for risk and adaptation. In these contexts, social approaches to learning and innovation may be more effective in building the capacity to understand risk and act. These approaches are focused on peer-to-peer dialogues, field visits to observe practical solutions, and learning by doing. They provide an approach more in line with the pace of business operations for small and medium sized enterprises, the type of available resources and their range of skillsets and organizational structures, where often one individual might play multiple roles.

In practice, larger organizations need to consider their smaller partners' operational realities to shape their design, metrics, and milestones to benchmark risks, and more importantly to identify incentives and opportunities to engage in advancing the shared goal of reducing risks. In turn, smaller business partners need to recognize the processes and the way larger companies design and implement their solutions to better align their efforts and systematize climate risk management.

There is not a strict division between technical and social elements of innovation. These are simply different entry points that can trigger more rapid understanding and adoption of disaster and climate practices. Once the planning and implementation of solutions begins, it is necessary to combine and mix elements of both approaches to achieve an optimal balance based on the specific characteristics of the supply system. The objective is not seeking efficiencies, but rather sustained and ongoing innovation.



Essential Components of the Shared Strategy

In the following sections, we outline a set of essential components for companies to consider in their business strategies, informed by insights into existing practices and needs described by businesses operating at different points within a supply system. These components include:

1. Linking the system to map risks, resources and thresholds.
2. Enhancing system-wide communication and information flows.
3. Ensuring the right combination of skillsets.
4. Identifying and addressing barriers to a shared strategy.
5. Diffusing Early Warnings across the system
6. Creating a shared inventory of practices and solutions.

Each component is grounded in lessons from case studies and emerging practices in climate resilient investment planning that are already being explored by companies. These components are intended to support anchor companies and trade support institutions in designing and initiating activities that integrate these considerations into existing business routines, fostering learning and innovation to address the realities of shared climate risk in the private sector.

Rather than prescribing a fixed roadmap, these components offer a set of entry points to begin assembling the foundations for shared strategies to manage risk and build both operational and social resilience in response to the growing impacts of a changing climate.

COMPONENT 1: LINKING THE SYSTEM TO MAP RISKS, RESOURCES AND THRESHOLDS

A critical step is not only recognizing and mapping risk within individual companies or across the supply system but also connecting actors within the system to better understand capabilities, resources, and shared risks among companies and partners. Establishing mechanisms for reliable and usable information sharing, and for identifying bottlenecks or emerging risks affecting key products or geographic areas, is essential for collective planning and future adaptation.

Because organizations differ in their capacity to absorb climate change impacts and extreme weather events, understanding these differences is necessary for developing targeted strategies that recognize varying levels of exposure and vulnerability across the supply chain. A shared climate risk strategy should prioritize functional approaches over idealized designs and be grounded in feasibility. Such strategies should focus on areas where two or more organizations can benefit from participating in information sharing to achieve a broader and more integrated understanding of risks and their implications for operations.

Physical Climate Risks

Establishing a cross organizational team or designated contact points is an important step toward more strategic collaboration among business partners and suppliers. This enables a supply system risk assessment that accounts for historical impacts and projected future risks to operations, grounded in local conditions, organizational capacities, and the different components of the supply chain.

This process also creates an opportunity to:

- Select appropriate frameworks for the business partnership based on the parameters set by the organizations.
- Acquire technology aligned with the systems operational reality, capabilities, and geographic footprint to generate usable shared data.
- Identify the types of expertise needed to address information gaps and integrate data across organizations, with particular attention to vulnerable or exposed links in the supply chain. This integration should be informed by a comprehensive classification of natural hazards and relevant risk categories to assess both current and future risks.

Supply chain risk mapping helps identify and assess all key locations and supply chain partners, including geographically vulnerable areas affected by climate change, such as coastal zones or regions prone to droughts. This mapping should include prioritization of the most critical links based on their impact on production and distribution.

Existing Resources

In practice, most organizations already possess human, technical, or financial resources that could be allocated to support resilience-building efforts. However, these resources are often not visible to decision makers or have not yet been identified as inputs for developing solutions or testing approaches to strengthen adaptive capacity. This includes:

- Identifying opportunities to combine complementary skills and information for risk planning,
- Determining appropriate partnerships, and,
- Leveraging funding or learning opportunities to make better use of existing resources.

This component also includes material assets and physical resources that could be relocated, upgraded, or retrofitted to enhance operational resilience. Identifying these assets requires not only assessing risks and impacts but also defining a set of parameters, agreed upon by partners, to determine what resources are already within reach and how they can be mobilized to test and scale new solutions. For example, this might be budget lines which can be leveraged to train personnel, or good existing communication channels such as Whatsapp already being an efficient way to diffuse information across multiple hierarchies in the company.



Different Skillsets

Implementing changes in work organization, establishing real-time monitoring systems, and strengthening cross organizational capabilities to address shared risk and generate innovation require individuals with diverse and complementary skill sets. Teams that oversee risk mapping and solution development but fail to include key contributors may limit the effectiveness and impact of climate risk management and shared disaster risk actions. Innovation in adaptation requires multidisciplinary teams that bring together a range of stakeholders.

- **Senior planners** play an important role by providing both system- and organization-wide perspectives, ensuring that solutions align with strategic and operational plans within companies and across partners.
- **Individuals who can advocate** within organizations for undertaking new initiatives and support resource mobilization which are essential to securing buy in from staff for adaptation focused projects and innovations.
- **Technical and operational staff** with detailed knowledge of processes, resources, and operational challenges are critical. This includes personnel with deep understanding of local geography and topography, as well as an understanding of how climate change may affect their region.
- **Field coordinators and workers** who often hold firsthand knowledge of risks and operational constraints.
- **Junior staff and new employees** can also play a central role by contributing technical expertise and introducing fresh ideas into existing systems.
- **Communications and marketing staff** can help develop visual materials and effective information sharing tools

The combination of skills and units across the organizations will contribute to breaking down internal silos and translate team activities into clear value propositions for companies and their partners. These efforts can also support external engagement with investors, business associations, and local communities.

Understanding system thresholds

Each part of a supply system will have unique clear and quantifiable limits in its tolerance for disruption and its capacity to recover from natural hazards. Accounting for these differences helps define parameters for assessing climate risk at different points along the supply chain, considering not only the risk tolerance of individual organizations but also their criticality to the functioning of the overall system. These limits or thresholds fall into two broad categories: Financial and Operational.

- **Financial thresholds.** The ability of an organization to absorb financial shocks and recover quickly enough to maintain core business functions is a key dimension of resilience. Within supply systems, one way to identify the threshold beyond which recovery is no longer viable, or not rapid enough to prevent major system wide disruption, is to assess a company's capacity to absorb the financial costs associated with extreme weather events. This includes both rapid onset hazards, such as hurricanes or floods, and slow onset hazards, such as reduced water availability and extreme heat, which impose cumulative financial impacts over time.
- **Operational thresholds.** A second type of measurable threshold relates to critical failure in core business functions or routines, and the operational recovery time following a disaster. While financial losses are often a consequence of operational disruption, the duration of recovery and the delays in restoring normal operations are fundamental inputs for business continuity planning.

As anchor companies and supply chain partners gain a clearer understanding of these thresholds, shared adaptation and disaster risk management strategies can be designed with greater precision. Identifying the thresholds can be done through precisely conversations with the liaisons between companies to stress testing different scenarios, preparing questions from different operational points in the companies, will help determine the limits of products stocks, replacement equipment or vehicles available, operational capacity and any relevant processes to assess the limits of different organizations to cope with impacts.

This will enable differentiated and targeted investments, focused on critical points in the system, and support the development of customized plans that reflect the specific realities of each supply chain.

Categorizing suppliers and organizations across the supply system based on historical recovery times from past disasters, or on assessments derived from business continuity plans that have been designed, tested, or activated, can provide more accurate and actionable information. This approach supports the development of strategies that prioritize higher risk entities within the supply chain and helps strengthen their recovery capacity, contributing to improved resilience across the system.

COMPONENT 2: ENHANCING SYSTEM-WIDE COMMUNICATION AND INFORMATION FLOWS

Identifying operational risks, including those that lie outside a company's direct control or that occur several points upstream in the supply chain, requires well established communication mechanisms and agreement among partners on the type, quality, and frequency of information to be shared. This strategic component aims to forecast the expected impacts of climate risks on productivity and contractual performance, while also tracking damages, economic losses, and the frequency of climate related events. Because products and locations differ in their exposure and timing of high impact climate conditions, collectively analyzing this information can reveal existing and potential future vulnerabilities across the supply system. It can also inform the development of parameters for new supplier relationships and support the establishment of formal mechanisms to improve customized information flows across companies.

Important considerations for enhancing communication and information flows include:

- Details on suppliers' contingency and business continuity plans, and guidance on how business partners can respond in the event of an incident. This also involves assessing suppliers' resilience and understanding how business continuity plans are developed, reviewed, and tested over time.
- Agreement on shared and coordinated communication mechanisms to strengthen disaster alert protocols and enable the implementation of effective, localized risk management and adaptation plans.
- Clear identification of key contact points among partners, along with defined roles and responsibilities for individuals authorized to make decisions in support of risk management efforts and adaptation planning.

COMPONENT 3: ENSURING THE RIGHT COMBINATION OF SKILLSETS

Developing an effective multi-actor strategy requires input and buy-in from across the supply system and from different levels and units in individual companies. This multidisciplinary team helps ensure the timely provision of information to make risk-informed decisions, appropriate formats and the value of the data, and an understanding of what solutions are possible based on the existing resources and knowledge. In addition, a diverse set of individuals from multiple companies can expand the scope and reach of adaptation solutions by leveraging their networks, experience and expertise. These teams benefit from diverse technical knowledge, strategic skills, communication and marketing capacity, climate and disaster risk management capabilities, and knowledge of the practical realities of the field or shop floor.

Technical Knowledge

Technical knowledge of core risk management approaches is needed, such as substitution, engineering, and administrative controls for the specific industry already in place in the company. These types of skillsets will also help leverage existing software tools for data sharing, analysis, and planning, along with familiarity with strategies that can support effective collaboration and partnerships across organizations. In addition, dependent on the industry and sector, the organization will require diverse degrees of technical knowledge, be this in agriculture, manufacturing and processing, packaging and logistics, etc.

Strategic Skills

In order to identify and implement targeted adaptation solutions, strategic skills are needed to build collaborative approaches to resilience, to form partnerships that improve efficiency, and that help integrate learning across the system. These include the capacity to conduct climate risk analyses, such as annual assessments, to inform senior management decision making, and contribute to investment planning and business strategies.

Communications and Marketing

Communications and marketing skills can support risk identification and solutions mapping by helping team members engage effectively with different units within the organization, as well as with external partners and audiences. These skills support trust building, information exchange, and coordination for implementing adaptation and resilience actions. These skills can also help identify ways to generate value from documenting risks, and by communicating risk reduction and adaptation actions taken by the company.

Climate and disaster risk management capabilities

Climate risk management capabilities encompass knowledge of sustainability, climate change, and disaster risk reduction to translate risks into different aspects of supply chain management. These skillsets will be complementary to the technical expertise for the specific industry and will include the ability to assess and monitor climate risks over time, as well as to design and implement risk reduction and climate adaptation pilots that address identified vulnerabilities across operations and supply systems.

Companies will also need team members capable of understanding the complex priorities and tradeoffs between different adaptation and resilience-building actions. Finding synergies between these priorities will help establish and strengthen internal structures, and can provide a foundation for customized risk management models for the supply system that embed climate and disaster risk considerations within organizational processes and partnerships.

Practical realities

Individuals with practical knowledge of production process can support strategic planning by linking on-the-ground realities with broader risk management and adaptation objectives. This knowledge is critical to ensuring the appropriateness of technologies and the viability of adaptation solutions included in the strategy. This field- or production-level knowledge also plays a key role in identifying priority or high-risk locations that require targeted interventions, to localized solutions, and integrated system information necessary to drive adequate pace of change.



COMPONENT 4: IDENTIFYING AND ADDRESSING BARRIERS TO DEVELOPING A SHARED STRATEGY

A critical barrier to innovation for climate adaptation is working in silos. This is true for individual businesses, but it is even more challenging to overcome for business partnerships across supply chains. Developing an effective adaptation and disaster reduction strategy requires explicitly identifying and addressing these barriers to cooperation. Anchor or larger companies can lead the process should focus on barriers to understanding shared risk, building trust, sharing investments, and supporting learning across organizations.

Barriers to information sharing

Designated confidential information

Companies at all levels of a supply system compartmentalize certain information to maintain proprietary confidentiality or competitive advantage. When this information could be useful in identifying and implementing shared adaptation solutions, this strict confidentiality may inhibit rapid, informed responses to evolving climate and disaster risks.

Lack of shared technology

Mismatched digital platforms and inadequate technologies used by partners often hinder effective collaboration and data sharing across supply chains. Communication systems can also fail when there are no dedicated channels or standardized formats for exchanging information, leading to gaps and inconsistencies in how risks and impacts are reported. Limited direct engagement by large anchor companies with source suppliers, and delayed responses to operational inquiries can stall decision-making and disrupt momentum, preventing the timely implementation of potential solutions. This includes the ability to disseminate information at the field level.

Limited or inconsistent use of climate-related concepts and terminology

Effective climate risk management requires a solid understanding of basic climate change concepts, along with awareness of relevant targets, processes, and opportunities for innovation. However, partners often rely on different risk assessment methodologies and different frameworks for benchmarking sustainability and climate risk, which create confusion across the supply system and even within companies. Overall low levels of understanding among supply chain partners of climate impacts and future scenarios, including at senior leadership levels, limit the ability of organizations to make risk-informed decisions.

Unsynchronized, fast-paced business routines

The cycle and pace of business routines vary significantly across organizations, making it challenging to align timelines and decision processes to effectively address and understand climate risk. The inability to synchronize these different operational rhythms is a critical obstacle to taking coordinated and meaningful steps toward building resilience across the supply chain.

Cultural barriers

Differences in organizational and national cultures present significant challenges for communication and team building across supply chains. In the context of disaster risk management and adaptation planning, variations in how partners understand climate phenomena and perceive the urgency for action are often shaped by their geographic locations, influencing priorities, responses, and levels of engagement.

Barriers to taking actions within and between companies

Inconsistent or fragmented sustainability approaches

Many companies have yet to adapt or translate sustainability frameworks into their organizations and management. Without a consistent framework from which to start, climate-related activities may not be well-integrated into existing environmental management or risk assessment processes in the organization. This fragmentation limits the ability to systematically identify, prioritize, and act on climate and disaster risks across operations and supply chains.

Variable commitment levels

While there may be stakeholders interested in supporting resilience actions, collective awareness and shared resources to support adaptation measures are often limited. When even one link in the supply chain lacks commitment, coordinated action becomes difficult and weakens the overall effectiveness of risk management and adaptation efforts. Progress is further constrained by difficulties in identifying and engaging the right partners who have decision making authority. Without clear ownership and leadership, climate risk and adaptation plans across the system will be limited.

Implementation challenges

Even with strong commitment levels within and across companies, implementation of climate and disaster risk reduction actions faces several barriers ranging from limited information, inconsistent or incompatible technology levels, and limited connection to operational and financial metrics. In many cases, companies lack the data and analyses to understand which adaptation and risk reduction actions are most effective. While technologies can help bridge this gap, they can also pose challenges to different parts of the organization or supply system with different capacity, language, or accessibility levels. Where climate risk initiatives are not explicitly connected to financial and operational metrics and impacts, companies will lack the ability to anticipate trade-offs, identify thresholds and tipping points, or to plan for rapid changes.

Acceptance of change

Acceptance of new practices can be limited among clients, suppliers, and equipment managers, and reaching agreements across the supply chain is often complicated by economic conditions. The short business cycles, particularly quarterly planning horizons, make long-term climate and disaster risk management more difficult, while resistance to change and resource constraints among partners reduce motivation to act when immediate operational impacts are not evident.

COMPONENT 5: DIFFUSING EARLY WARNINGS ACROSS THE SYSTEM

There is a concerted call for governments and the private sector to enhance the capabilities of early warning systems and weather forecasting services to support disaster preparedness and prevention. Many businesses already incorporate alerts into their risk management frameworks, but significant



challenges remain in expanding the reach of alert systems to different users, and in localizing the information they provide to support risk reduction measures.

Important steps that businesses can take to address these challenges and make early warning systems more effective include:

- Identifying the main sources for alerts in key locations of the supply chains and connecting to early warning systems to enable timely preventive measures.
- Documenting area-specific information on geographic risks and threats, and real-time information on local on route and weather conditions that can be relayed to those who can make decisions and take action.
- Training key positions on early warning systems and how these relate to the multiple stages of risk reduction.
- Developing response protocols to enact to minimize impacts of disasters, and training staff to understand what to do when alerts are received.

These steps can improve the utility of early warning systems and serve as the foundations for identifying the escalation paths for decision-making to prepare for impending extreme events and can be used to inform longer-term adaptation planning. It is also part of a larger scope of work aimed at building a culture of risk-informed activities and coordination within the company, and an important step to more strategic, coordinated risk reduction and adaptation between business partners.

COMPONENT 6: CREATING A SHARED INVENTORY OF PRACTICES AND SOLUTIONS

As companies begin developing solutions, it is essential that these be documented in a shared inventory. This inventory can both act as a repository of tried and tested solutions, but also a mechanism for connecting the upstream parts of the supply system to the anchor or keystone company and ultimately to downstream buyers and points of sale. This shared inventory provides an important view of the supply system that is critical for understanding partners' real needs and the priorities they are setting, including their risk reduction milestones. It enables partners to adapt their own strategies and decision making and can be a source for investment opportunities or for financial resources for climate action. The inventory can also help businesses identify and clearly communicate priorities and risk management to external stakeholders.

A key barrier to adoption of resilience building practices is the tendency toward overly normative or heavily prescriptive recommendations about what companies should do. Especially true for smaller companies, overly prescriptive approaches can set companies up to fail by imposing steep learning curves and changes that require complex organizational adjustments.

By developing a tailored inventory of solutions that spans small and medium sized organizations across the supply system, as well as larger anchor companies, decision makers can better identify and articulate what the system needs to make meaningful investments and set priorities grounded in partners' collective knowledge and experience. This approach strengthens agency over adaptation and disaster risk management, rather than outsourcing it to generic best practices.



CONCLUSION

Ultimately, climate adaptation is an evolving process that is intended to recognize the signals, address the negative changes and seek out the opportunities presented by a changing climate. The first steps that companies might take to build on their own organizations' capabilities and knowledge. As we move towards more complex scenarios of greater levels of risks and uncertainty, integrated and multi-actor business strategies are required to trigger innovations for disaster and climate risk that can create real value for businesses and communities.

Sharing climate risk mapping and geographic data across the supply chain can support coordination and enhance preparedness for disasters among business partners. Competitors at industry level also hold significant potential to enhance learning and best practices and can play a crucial role in advocating and working with governments to generate new and bold mechanisms to support disaster risk reduction efforts. Expanded to the industry scale, or in economic clusters or sub-national economic regions, the gains within supply systems can be amplified to support resilient trade corridors.

Additional tools such as technology platforms and communication systems can accelerate the adoption of new solutions, generating an evidence base that accurately represents the reality of climate impacts in different industries, companies and clusters of economic activity. These can be translated into more targeted training programs to build strategic teams across different organizations and countries, ensuring that partners throughout the supply system find value in shared adaptation planning.

Similarly, more specialized and multi-actor teams are likely to help identify gaps in information and technical or financial resources, and to advocate for support. These resources should translate into real economic benefits for supply systems such as:

- Planning to secure adequate stocks of products and inputs in their system;
- Reduced exposure to price fluctuations;
- Improved security of supply volumes; and,
- Lower financial impact when risks materialize.

Efforts to build climate and disaster resilience across supply systems will be driven by learning and innovation as core business functions. When this process is intentionally planned and accelerated through partnerships among companies, governments, and business support institutions spanning multiple supply chains and countries, more meaningful and measurable changes can be achieved. These advances can help create disaster-resilient trade corridors and inform the next stage of cooperation needed to cope with a changing world and climate.