Building Climate Resilience in Southeast Asia

A FRAMEWORK FOR PRIVATE-SECTOR ACTION

Flood on Phahonyothin Road, Bangkok, Thailand
Photographer: lovingyou2911

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CONTENTS

About This Report

Business and society in Southeast Asia face unprecedented risks caused by climate change. Warming temperatures, sea-level rise, extreme weather events that are more frequent or intense, and threats to ecosystem services can affect the private sector significantly. Businesses that fail to understand and manage climate change are exposed to a range of risks that could impact strategy, finance, operations, human resources, compliance, and sales and marketing.

It is imperative for the private sector to take a two-pronged approach to climate action:

1. **To transition to a low-carbon economy, and**

2. **To enhance adaptive capacity in the face of inevitable climate hazards.**

There is growing momentum among businesses to reduce emissions, but those businesses have not evidenced similar effort to build resilience to climate impacts. The private sector must pursue efforts to enhance climate resilience with urgency and ambition. This report focuses on what is necessary to increase adaptive capacity and aims to catalyze private sector action in Southeast Asia by demonstrating the business case for building climate resilience.

This report and the accompanying Business Action Handbook represent the culmination of an 18-month BSR research project that was funded by The Rockefeller Foundation.

The goal of the project was to analyze how the private sector in Southeast Asia is approaching climate risk and building resilience. Through these works, we aim to offer businesses tangible and accessible ways to understand climate risk and resilience and the opportunities that can arise from enhancing adaptive capacity.

In this report, we demonstrate why climate change is worthy of business action and leadership. We offer examples of how climate change is business-relevant, how it can affect core strategy, and how it can have cascading impacts throughout operations, supply chains, and the communities in which a business works. To do this, we offer an introduction to the concept of climate resilience, highlight climate projections for the region, and provide evidence of how climate risks in four Southeast Asian countries—Indonesia, Myanmar, Thailand, and Vietnam—are and will continue to affect business continuity.

We also provide an analysis of how climate change is impacting the private sector, and we offer examples of how businesses are approaching climate risk and resilience. Throughout the report, we share insights and case studies from our interviews with businesses, nonprofits, funders, and academic experts. Lastly, we propose opportunities for action by the broader business community in Southeast Asia.

This report aligns its approach to building climate resilience in Southeast Asia with BSR's global framework: Resilient Business, Resilient World, authored by Edward Cameron, Samantha Harris, and Emilie Prattico.

METHODOLOGY

BSR conducted research on how businesses in four Southeast Asian countries are addressing climate risks to their operations, supply chains, and to the communities in which they operate. We assessed physical climate hazards facing Indonesia, Myanmar, Thailand, and Vietnam and analyzed private-sector efforts in these four countries to address climate change risk. Our research focused on these countries because of their exposure and vulnerability to physical climate hazards, the presence of private-sector climate action, and the diversity of context and industry sectors taking action.

The research methodology for this paper is composed of three elements:

1 Literature review

We informed this work with research conducted on climate change, risk, and resilience. We focused particularly on Southeast Asia and the four aforementioned countries, as well as on private-sector and industry-specific actions pertaining to adaptation. We include findings from the Fifth Assessment Report, "Climate Change 2014: Impacts, Adaptation, and Vulnerability," compiled by the Intergovernmental Panel on Climate Change (IPCC). Furthermore we have drawn upon research conducted by multilateral development banks, international development agencies, governments, nonprofits, research institutions, universities, and companies specializing in risk.

2 Workshops

We convened four private-sector workshops (one each in Indonesia, Myanmar, Thailand, and Vietnam between November 2017 and April 2018) to test initial research findings and tools with a diverse set of stakeholders and solicit their feedback and experience.

3 Semi-structured interviews

Between January 2017 and May 2018, BSR conducted 85 semi-structured interviews, which is a qualitative strategy for data collection. We interviewed leading practitioners and experts in the fields of climate change and disaster risk reduction. We also conducted interviews with representatives from a cross-section of companies. Because almost all business departments face climate risk and share responsibility for building resilience, BSR conducted interviews with professionals from risk management, sustainability, finance, research and development, sourcing, procurement, human resources, operations, sales, and marketing, among others. The insights we gleaned from these discussions have informed our understanding of climate risk and resilience in Southeast Asia; the best way to integrate and implement capital assets to build climate resilience in the private sector in Southeast Asia; and opportunities to leverage business growth from building resilience. Organizations that participated in the interviews are listed in the Appendix.

AUTHORS

This report was prepared by BSR and supported by The Rockefeller Foundation. It was written by Eileen Gallagher, with additional guidance and insights provided by Brooke Avory, Mark Devadason, Laura Ediger, Samantha Harris, Olivia Li, Jeremy Prepscius, and David Wei. Any errors that remain are those of the author. Please direct comments or questions to Eileen Gallagher at **egallagher@bsr.org**.

ACKNOWLEDGEMENTS

BSR wishes to thank The Rockefeller Foundation for funding this research, and for all the thoughtful insights and feedback along the way.

BSR also would like to thank the organizations interviewed and profiled in the case studies for their contribution and review for accuracy. A full list of stakeholders consulted on this project can be found in the **Appendix**.

DISCLAIMER

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ABOUT BSR

BSR is a global nonprofit organization that works with its network of more than 250 member companies to build a just and sustainable world. From its offices in Asia, Europe, and North America, BSR develops sustainable business strategies and solutions through consulting, research, and cross-sector collaboration. Visit **www.bsr.org** for more information about BSR's more than 25 years of leadership in sustainability.

The ROCKEFELLER FOUNDATION

ABOUT THE ROCKEFELLER FOUNDATION

For more than 100 years, The Rockefeller Foundation's mission has been to promote the well-being of humanity throughout the world. Together with partners and grantees, The Rockefeller Foundation strives to catalyze and scale transformative innovations, create unlikely partnerships that span sectors, and take risks others cannot–or will not. For more information, please visit **www.rockefellerfoundation.org.**

SUGGESTED CITATION

Gallagher, Eileen. "Building Climate Resilience in Southeast Asia: A Framework for Private Sector Action." BSR, June 2018.

Climate change is altering the “rules of the game” for the private sector.

Tegallalang Rice Terrace, Indonesia Photographer: Jason Cooper

Executive Summary

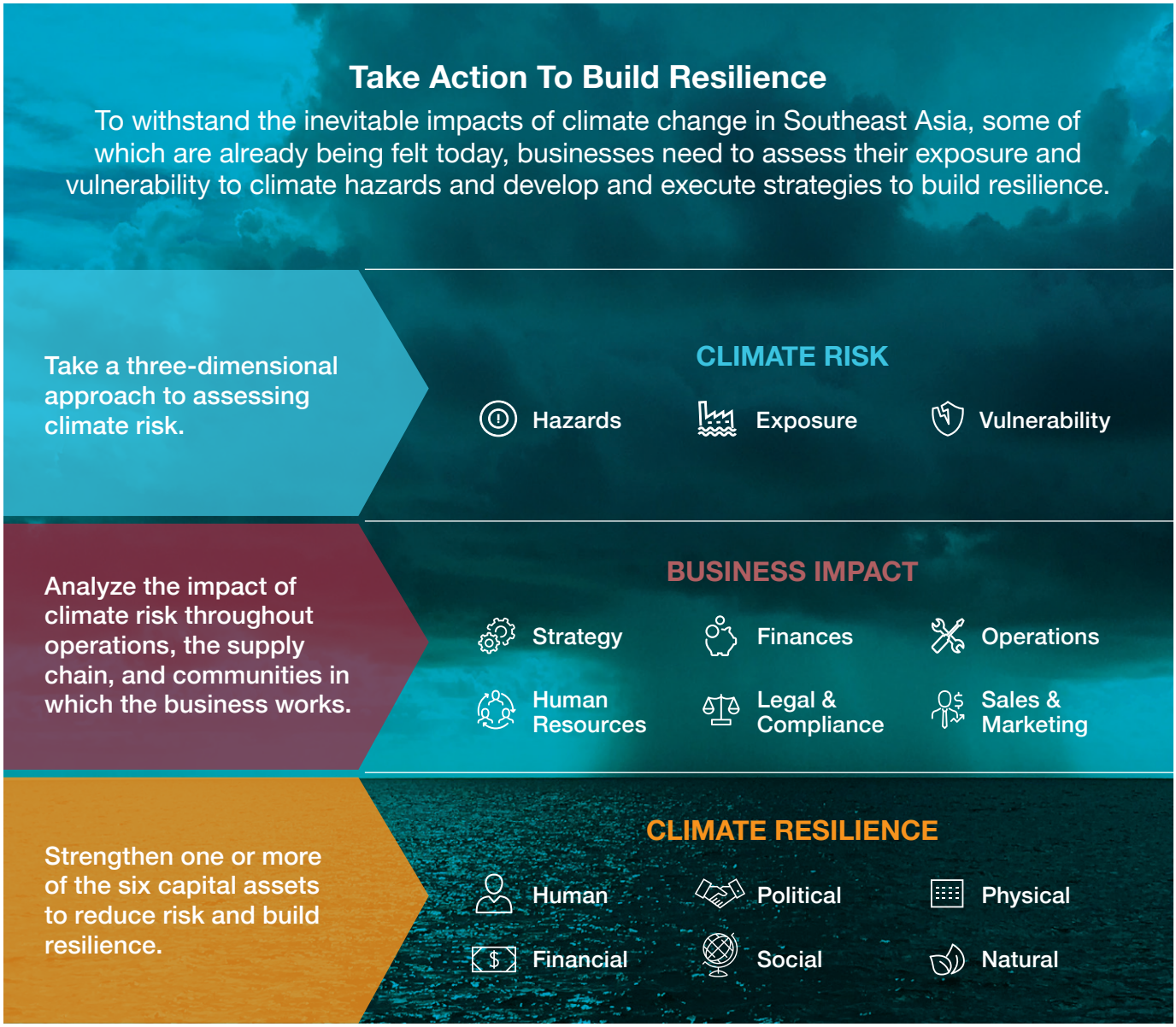
Businesses worldwide are facing climate risks, and companies with operations or supply chains in Southeast Asia are exposed to a range of climate hazards and vulnerabilities that can exacerbate these risks.

To prepare for the effects of climate change, businesses in the region need to build resilience, which is defined as the ability to anticipate, absorb, accommodate, and recover from the impacts of climate change.[1]

With a market worth US$2.6 trillion, Southeast Asia is the fourth-largest trading region in the world after the European Union, the United States, and Canada.[2] It is expected that the region, which is home to more than 630 million people and many of the world's supply chains, will maintain its economic momentum into the next decade.[3,4] But Southeast Asia's vulnerability and exposure to a range of climate hazards—including but not limited to sea-level rise, more frequent heatwaves and heavy rainfall events, land degradation, and biodiversity loss—put its private sector at risk.[5] Because of the existing and projected impacts from climate change, it is imperative for businesses in Southeast Asia—and those that conduct business in the region—to prepare for today's climate reality.

Southeast Asia experiences a high concentration of natural disasters.[6] Cyclones, flooding, and droughts all have had significant financial repercussions on economies and livelihoods in the region. In response, many businesses have developed disaster risk-reduction systems and have established philanthropic giving programs to aid local communities in post-disaster recovery. Such risk-management efforts often lack long-term perspective or fail to account for the range of climate hazards and vulnerabilities that can affect operations, as well as supply chains and communities on which businesses depend.

In a few cases, businesses are starting to assess risks throughout their supply chains and are incorporating climate hazards into risk assessments. For example, an automotive manufacturing company is mapping the location of its suppliers to assess whether they are in flood zones and disseminating annual surveys to suppliers to identify risks. The company also is exploring how to protect at-risk facilities. Efforts like these need to be scaled up to incorporate the full range of climate hazards and vulnerabilities to which the business may be exposed.



To maintain business continuity amid a changing climate, BSR recommends businesses take a three-dimensional approach to assessing risk using the latest science compiled by the IPCC: 1) Understanding the physical hazards of climate change, 2) Minimizing exposure to these hazards, and 3) Reducing vulnerability or underlying weaknesses that can exacerbate risk.[7]

Businesses should conduct this three-dimensional assessment across the value chain—not only in direct operations, but also throughout the supply chain and the communities in which it works. By assessing risk across value chains, businesses can work toward ensuring owned and direct operations are preserved, restored, or improved. The comprehensive assessment also enables businesses to establish safeguards to reduce climate risk among suppliers and communities. Failing to understand and manage climate change properly throughout the value chain exposes a company to a range of risks that are material to the business. Ultimately climate risk could have an impact on strategy, finances, operations, human resources, compliance, and sales and marketing.

To mitigate these risks, businesses can enhance their resilience to climate change. Resilience not only empowers a workforce and its surrounding community to rebound faster after experiencing extreme weather events or other climate hazards, but it also can spur economic development, environmental sustainability, and positive social impact.[8]

Analyzing 25 resilience frameworks used by development agencies worldwide, BSR developed a global, multisector framework for businesses to assess climate risks and enhance adaptive capacity comprehensively.[9] To build resilience, businesses can strengthen a series of six components known as "capital assets" across their value chains. These capital assets—physical, financial, political, human, social, and natural—are valuable resources that businesses can create, strengthen, or leverage depending on their sector, geography, needs, and resources.

In this report, we analyze climate risks facing businesses in four Southeast Asian countries—Indonesia, Myanmar, Thailand and Vietnam—selected because of their exposure and vulnerability to climate hazards, the presence of private sector climate action, and the diversity of context and industry sectors. We conduct our analysis through an industry-specific lens, focusing on agriculture, manufacturing (which includes automobiles, garment, and information communications technology), tourism and hospitality, and financial services.

Businesses in each of these industries face climate risk. To address these risks, we recommend businesses to strengthen or invest in one or more capital assets.

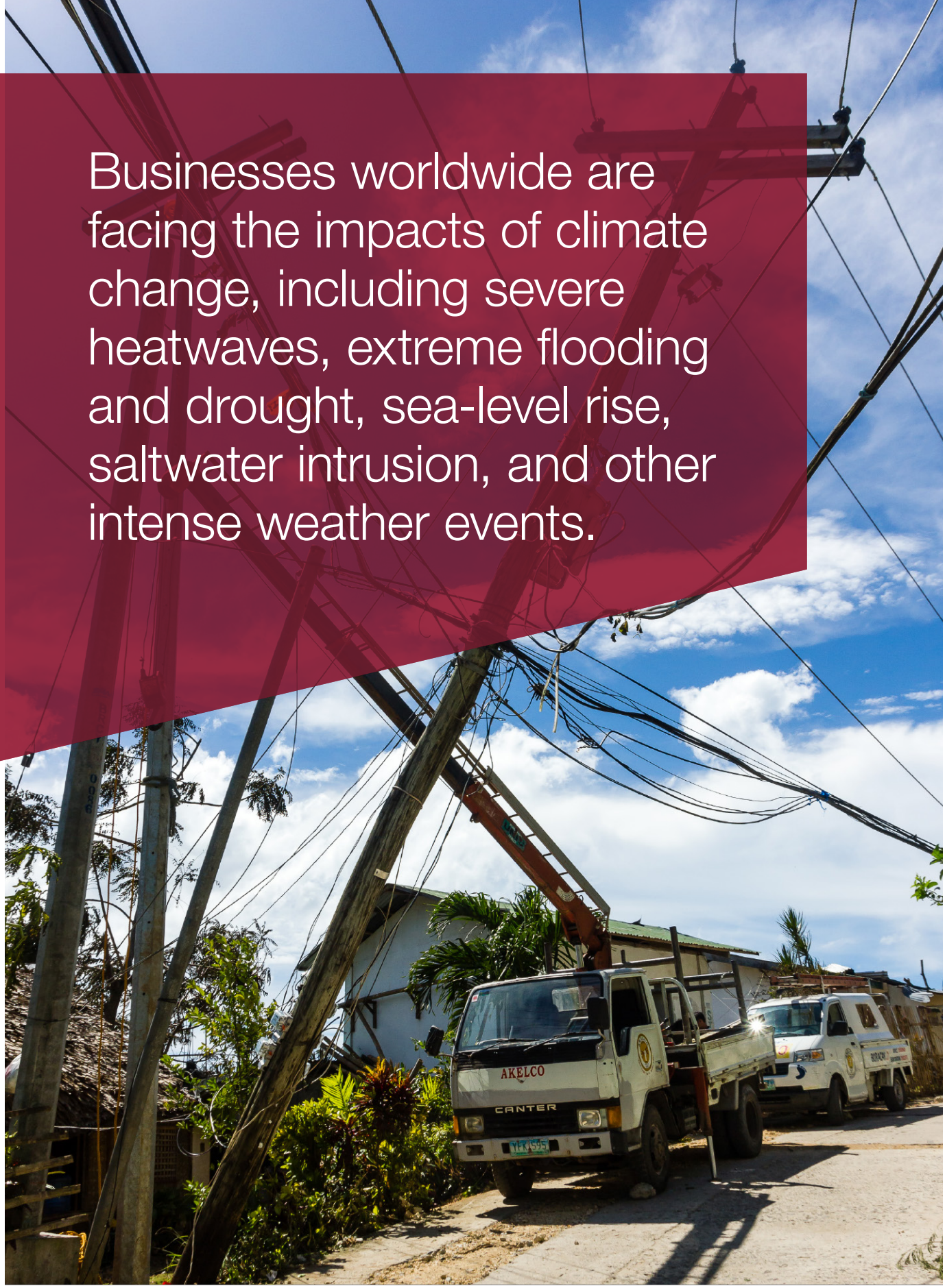
For instance, in agriculture, flooding can damage crop quality and decrease yields. To reduce these risks, agricultural businesses and farmers can strengthen at least two assets: physical and natural capital. Investing in irrigation technology (physical) and plant barriers (natural) can help control floodwater and contaminants. We propose that resilience can offer a range of opportunities to lead and grow in the marketplace. For example, the financial services industry can deploy its expertise (human capital) and tools (financial capital) to offer advisory services or insurance to build resilience in other areas of the private sector.

We believe building resilience is essential to continue doing business today. Businesses can take five steps to start building climate resilience:

1. **Develop a governance structure.**
2. **Analyze the impact of climate change throughout operations, the supply chain, and communities in which the business works.**
3. **Map existing assets, develop a resilience strategy, and implement a plan.**
4. **Partner with others to scale up resilience.**
5. **Disclose risks and report on progress.**

We offer additional guidance, tools, and resources in the accompanying *Business Action Handbook*.

Businesses worldwide are facing the impacts of climate change, including severe heatwaves, extreme flooding and drought, sea-level rise, saltwater intrusion, and other intense weather events.



Damaged power lines and infrastructure, Boracay, Philippines Photographer: WhitcombeRD

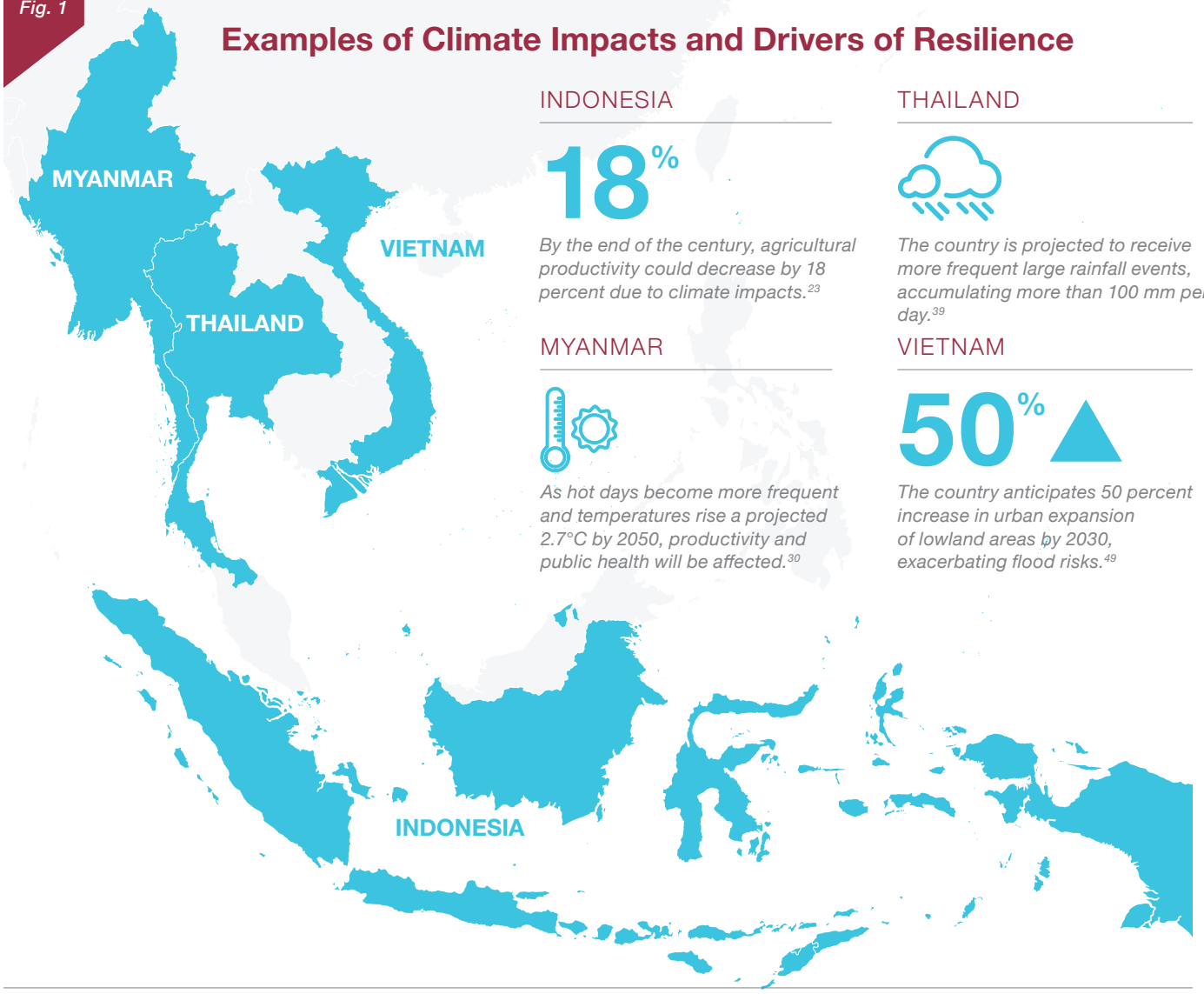
Climate Change in Southeast Asia

The World Economic Forum reports that the leading threats to businesses today are extreme weather events, natural disasters, and the failure to mitigate and adapt to climate change.[10] Climate volatility can disrupt or damage almost all aspects of a company's operations, affecting access to natural resources that are vital for production, infrastructure and logistics that are essential for a functioning supply chain, and markets for goods and services. Failing to understand and manage climate change properly can impact a business's strategy, finances, operations, marketing, compliance, and human resources.[11]

Businesses in Southeast Asia already are experiencing climate change impacts. As the world's fourth-largest economy,[12] the region has seen rapid economic growth and urbanization over the last decade and is projected to experience more severe economic losses from climate change than many other regions of the world.[13] By 2050, the population of Southeast Asia is expected to reach 760 million people. Many of these people live in cities concentrated in low-elevation coastal areas that are exposed to sea-level rise, severe coastal erosion, and projected increases in cyclone intensity.[14] This combination could lead to stronger storm surge and severe flooding, causing damage to local communities and industries. The Asian Development Bank finds the "collective effect of impacts on agriculture, tourism, energy demand, labor productivity, catastrophic risks, health, and ecosystems" could diminish GDP in the region by 11 percent by 2100.[15]

Fig. 1

Examples of Climate Impacts and Drivers of Resilience



INDONESIA

18%

By the end of the century, agricultural productivity could decrease by 18 percent due to climate impacts.[23]

THAILAND

The country is projected to receive more frequent large rainfall events, accumulating more than 100 mm per day.[39]

MYANMAR

As hot days become more frequent and temperatures rise a projected 2.7°C by 2050, productivity and public health will be affected.[30]

VIETNAM

50%

The country anticipates 50 percent increase in urban expansion of lowland areas by 2030, exacerbating flood risks.[49]

INDONESIA

ENVIRONMENTAL AND ECONOMIC IMPACT

Indonesia has the world's second largest coastline, exposing nearly 60 percent of its population and 80 percent of business production to sea-level rise, storm surge, and inundation.[16] Indonesia is urbanizing rapidly—second only in the world to China—but has an infrastructure gap of US$1.5 trillion compared to other emerging economies.[17] Land subsidence and poor infrastructure are causing the country's capital of Jakarta to sink faster than any other big city in the world.[18] In 2007, flooding in Jakarta cost more than US$900 million in damages.[19] Flooding, among other climate risks, threatens the country's ability to protect its people, ecosystems, and industry from climate hazards.

Conversely, climate change is projected to lengthen the dry season, intensifying drought and depleting water resources during the El Niño-Southern Oscillation cycles. Longer dry seasons will contribute to more forest fires[20] which also will be exacerbated by the country's extensive logging and land degradation.[21] In 2015-2016, severe drought disrupted food production and left 1.2 million people in need of food aid.[22] By the end of the century, agricultural productivity could decrease by 18 percent due to climate impacts, and declines in rice yields may strain food security.[23]

PROGRAMS, PLANS, AND POLICIES

The Indonesia Climate Change Sectoral Roadmap offers a 20-year plan to protect fisheries, water resources, and agriculture.[24] Priorities include improving water storage capacity, elevating and enhancing infrastructure in coastal areas, developing climate-tolerant food crop varieties, and building cold chain systems and food storage warehousing in food-scarce regions.[25]

The National Action Plan on Climate Change Adaptation established in 2013 outlines targets to address climate hazards by 2025. It looks to seek funding from and for the private sector to build adaptive capacity.[26] Adaptation targets also are integrated into the National Long-term Development Plan, aiming to build economic, livelihood, and ecosystem resilience.[27] Further, 100 Resilient Cities, pioneered by The Rockefeller Foundation, has designated grant money to Jakarta and Semarang to appoint chief resilience officers who can develop and implement resilience strategies in collaboration with local stakeholders including the private sector.

MYANMAR

ENVIRONMENTAL AND ECONOMIC IMPACT

Myanmar is facing several climate hazards and extreme weather events. The populous Ayeyarwady Region has been exposed to severe weather events that are increasing in intensity, rainfall is becoming more variable, and a shorter and more intense monsoon season is worsening both floods and droughts.[28] Drought strains water availability for residential, agricultural, and industrial users, especially in communities without consistent access to groundwater.[29] As hot days become more frequent and temperatures rise a projected 2.7°C by 2050,[30] productivity and public health will decline. Weather events in this country have shown their potential for devastating impact—in 2008, Cyclone Nargis killed more than 138,000 people and cost US$4 billion in economic damages, with short- and long-term effects on public health, infrastructure, agricultural production, and coastal ecosystems.[31]

PROGRAMS, PLANS AND POLICIES

Businesses have been navigating a rapidly changing operating context over the last decade. In this period of economic and political reforms, businesses can play essential roles in establishing basic foundations of resilience. The government is developing programs and policies to enhance climate adaptation and is seeking support from the international community to build capacity, develop technology, and invest in resilience building.[32] The National Adaptation Programme of Action of 2012[33] and the Myanmar Climate Change Strategy and Action Plan 2017-2030 outline current and potential impacts from climate change and recommend action for agriculture, energy, industry, transport, and urban sectors.[34] For the agricultural sector, Myanmar's Climate Smart Agriculture Strategy prioritizes risk management and adaptation for crop varieties and farming practices.[35] The country's second-largest city, Mandalay, is a member of 100 Resilience Cities.

THAILAND

ENVIRONMENTAL AND ECONOMIC IMPACT

Precipitation could become a major challenge for Thailand. The country is projected to receive more frequent large rainfall events, accumulating more than 100 mm per day. Thailand frequently experiences flooding, and in August 2017, flooding cost the nation US$300 million in losses.[36] The biggest hit came in 2011; flooding that year cost US$45 billion in damages[37] and impacted 240,000 small businesses, which are significant drivers of economic growth.[38] For the agricultural sector, increased precipitation during the growing season likely will contribute to flooding, waterlogging, pest infestation, and fungal disease.[39]

By the end of the century, average temperatures could rise as much as 4.0°C.[40] Despite heavier rainfall, drought is projected to worsen in the northeast region of the country.[41] Economic loss from the 2015-2016 drought amounted to US$3.4 billion with significant impact on agriculture production.[42]

PROGRAMS, PLANS, AND POLICIES

Thailand's Climate Change Master Plan (2015-2050) provides a framework for both mitigation and adaptation. Resilience goals include protecting marine ecosystems and increasing forest cover, developing health surveillance and early warning systems, promoting sustainable tourism, strengthening climate modeling systems, and fostering regional cooperation and knowledge sharing.[43] Thailand aims to implement its first National Adaptation Plan by 2021 and strengthen six priority areas: flood, drought, and water management; agriculture and food security; tourism; public health; natural resource management; and human settlement and security.[44]

Bangkok is recognized as one of the 100 Resilient Cities. The city seeks private-sector support to implement its resilience strategy while driving a strong and competitive economy.[45]

VIETNAM

ENVIRONMENTAL AND ECONOMIC IMPACT

The projected hazards and Vietnam's vulnerability to climate change demonstrate its need to build resilience with urgency.[46] Sea-level rise, stronger cyclones, and storm surges will continue to be significant contributors to flooding and saltwater intrusion for the Mekong Delta, the River Delta, and the Central Coast.[47] The Mekong Delta, where more than half of Vietnam's rice is produced, is projected to lose nearly 2,280 square miles of land due to sea-level rise, flooding, and salinization.[48] The country anticipates 50 percent increase in urban expansion of lowland areas by 2030, exacerbating flood risks.[49]

Vietnam is projected to experience an increase in the number of heatwaves by 100-180 percent,[50] as well as 95 more hot days per year.[51] Winter and summer rainfall will increase, and shifting seasons can cause more floods, droughts, and soil erosion.[52] The Central Highlands will experience extended periods of drought, affecting coffee and tea farms.[53] Extreme flooding and warming temperatures could worsen infectious, vector-borne, and respiratory diseases.[54]

PROGRAMS, PLANS AND POLICIES

To build adaptive capacity, Vietnam plans to strengthen integrated water resources management, improve sustainable forest management, and modernize hydro-meteorological observatory and forecasting systems.[55] Under Resolution 33/2013/QH13, the national government must prepare a National Strategy on Natural Disaster Prevention and Control every 10 years and account for climate-related impacts on socioeconomic activities.[56] The National Action Plan on Climate Change (2012-2020) aims to strengthen monitoring and early warning systems as well as improve the country's response to extreme weather events.

The Ho Chi Minh Stock Exchange requires listed companies to publicize their sustainable development report.[57] With an increase in transparency, climate action may become required disclosure. Can Tho and Da Nang are executing strategies to boost adaptive capacity amid rapid industrialization as part of 100 Resilient Cities.

Construction team on a high-rise building, Thailand Photographer: lamontak

It is imperative for businesses with operations or supply chains in Southeast Asia to respond to existing and projected impacts of climate change. The establishment of the Paris Agreement and the United Nations Sustainable Development Goals (SDGs) has generated greater awareness of climate change among the private sector in Southeast Asia, particularly when it comes to mitigation. For instance, countries have submitted Nationally Determined Contributions under the UNFCCC that outline ambitions and targets to reduce emissions. To achieve national targets, country governments are establishing programs and policies to encourage both public- and private-sector participation. Thus far, many companies are taking steps to reduce carbon footprints and transition to a low-carbon economy. But policies to adapt and build resilience to a changing climate remain weak. To withstand the inevitable impacts of climate change, some of which are already being felt today, businesses need to assess their exposure and vulnerability to climate hazards and develop and execute strategies to build resilience.

Why Businesses Should Invest in Climate Resilience

With climate change already underway, we must ask: How resilient are businesses in Southeast Asia? BSR defines a climate-resilient business as one that can anticipate, absorb, accommodate, and recover from climate hazards in its own operations, throughout its supply chain, and in the communities in which it works. Asking this multidimensional question is essential to curb the cascading effect that climate change can have on businesses and society.

Building resilience can help a business protect its valuable assets, maintain productivity, and reduce costs. But the benefits to building resilience extend beyond business continuity and asset protection and link to the broader community and operating context. Every business relies on basic resources and infrastructure to function and needs a thriving economic community to support its operations with essential human, natural, and financial assets. Resilience can unlock multiple business benefits, ranging from a consistent source of raw materials to healthy and safe employees. These benefits are known as the "resilience dividend."[58] Resilience not only enables a business, its workforce, and its surrounding community to rebound faster after experiencing extreme weather events or other climate hazards; it can also spur job growth, environmental sustainability, and positive social impact.[59]

Resilience also can help businesses unlock growth opportunities in the marketplace. For instance, a business can market its own products and services to help others build adaptive capacity by offering flood mapping tools, monitoring and communication technology, drought-tolerant seeds, protective apparel, or eco-tourism experiences. Resilience even can help a business maintain stakeholder confidence, build customer loyalty, and assure investors that the company is preparing for and able to recover from climate hazards.

There is a persistent attitude that government alone should be responsible for disaster recovery and climate change, but that is not realistic.

THE ASIA FOUNDATION

BUSINESS BENEFITS

Resilience can enhance business operations and lead to competitive advantage or new opportunities, such as:

- **Stable operations**, by protecting infrastructure and production from climate impacts.
- **Increased customer loyalty and consumer trust**, by maintaining production and quality products and services.
- **Enhanced logistics**, by identifying climate-proof transportation modes, channels, technology, and equipment.
- **Greater financial savings**, by receiving tax credits for adaptation and accessing new capital by meeting investor expectations.
- **Business growth**, by designing new or improved goods and services that the new climate reality demands.
- **More secure sourcing**, by protecting raw materials and ingredients from climate impacts.
- **A more productive workforce,** by equipping employees with tools and resources to reduce climate risk at home and in the workplace and by providing climate-proof working conditions.
- **License to operate**, by serving as a responsible member of the community to safeguard its people and environment while boosting the economy.
- **Community leadership**, by advocating for resiliency to protect the local workforce and natural resources needed for production.

Business plays an integral role in the effort to build climate resilience in local and national economies; domestic and global commitments that seek private-sector participation to reduce risk and strengthen adaptation recognize this explicitly. For example, Principle 7 of the United Nations Global Compact states that businesses are advised to "support a precautionary approach to environmental challenges," which encompasses efforts in risk management.[60] The Sendai Framework for Disaster Reduction notes that in addition to national and local governments, the private sector shares responsibility for disaster prevention and building resilience.[61] Businesses are invited to submit their climate action commitments to the Non-State Actor Zone for Climate Action (NAZCA), which tracks commitments from businesses, cities, and nonprofits, among others.

Under the Paris Agreement, each of the four Southeast Asian countries highlighted in this report agreed to enhance its adaptation to climate change. Each of the countries have National Adaptation Plans, albeit in various stages of adoption, aiming to build resilience to a changing climate. The plans also seek to protect economic activity and partner with the private sector to fulfill goals. For instance, Vietnam aims to build its adaptive capacity by installing storm shelters for piers and boats, ensuring off-shore vessels are equipped with communications technology, and increasing access to clean drinking water and healthcare across the country.[62] But the cost of reaching these goals by 2030 will exceed 3 to 5 percent of the country's GDP.[63] While the government commits to funding one-third of the adaptation costs, it is looking for participation and investment from businesses to offset some of the expenses.

As a first step in building resilience, a business needs to understand and assess its climate risks. We will explore this process in the next section.

ALIGNING PUBLIC AND PRIVATE SECTOR RESILIENCE STRATEGIES

Cities in Southeast Asia increasingly are aware of the need to bolster the resilience of their communities. By and large, city governments know they must enhance drainage systems, improve energy transmission, increase access to financial services and health clinics, and prepare for disasters. The global initiative 100 Resilient Cities, pioneered by The Rockefeller Foundation, is composed of several municipalities across Southeast Asia, including but not limited to Da Nang, Vietnam; Mandalay, Myanmar; Semarang, Indonesia; and Bangkok, Thailand. The cities have appointed chief resilience officers and are implementing resilience strategies that can benefit society and the local private sector. Businesses can support the city resilience strategies by aligning their own efforts, targets, and plans with the municipalities'. They also can partner with the 100 Resilient Cities initiative to provide support and offer solutions.

Traffic rushing in Jakarta, Indonesia Photographer: AsianDream

Assessing Climate Risks

In recent years, Southeast Asia has experienced a range of extreme weather events, including both record droughts and severe flooding. In 2017, Typhoon Doksuri, one of the most powerful storms to hit Vietnam in a decade, crippled homes and businesses along the coast. This followed a year that saw severe droughts in both Vietnam and Thailand. In 2015, unusually heavy monsoon rains compounded by Cyclone Komen caused significant damage in Myanmar. In 2013, Typhoon Haiyan swept through the Philippines, Vietnam, and the surrounding region, devastating communities and industry.

Extreme weather events, such as cyclones, floods, and heatwaves are considered "acute" or "short-lived."[64] Despite their short duration, their intensity and destruction can have costly impacts on the private sector. As businesses experience firsthand the disruption to production, financial losses, and damage to the community, they have begun to dedicate resources to disaster response and recovery plans as well as community philanthropic giving. In Myanmar, for example, local businesses were among the first to deliver supplies in response to Cyclone Nargis in 2008, often with their own employees transporting food and water to those areas that were hit hard. In the aftermath, several companies then created foundations to manage resources for disaster relief for both Nargis and any future events, with participation in relief and ongoing recovery efforts considered to be part of their social obligation to the community.[65]

Although there is growing awareness among the private sector of acute physical hazards we find that fewer businesses understand the long-term impacts from climate change, or "chronic" physical hazards.[66] Because chronic hazards can transpire more gradually over time, their impacts may not be discernible immediately or understood by the private sector as having been caused by climate change. For this reason, we find that businesses are not assessing fully the range of climate hazards that can affect their operations, supply chains, and communities.

Most listed companies have contingency plans to combat flooding and fire to ensure their business continuity, but it stops there. Only a handful of Thai listed firms have established climate resilience strategies, which require organization-wide goals and measures. Climate change should be addressed by the CEO and corporate leaders.

THE STOCK EXCHANGE OF THAILAND

Chronic, or gradual, climate hazards include sea-level rise, salinization, average annual temperature rise, land and forest degradation,

Heavy flooding, Thailand Photographer: skynavin

and biodiversity loss. In Indonesia, for example, shifts in precipitation patterns are intensifying both wet and dry seasons. This can increase flooding risks as well as drought risks, including the specter potential of fires. The scenario also has gradual but significant implications for the agricultural sector and others with assets in coastal or fire-prone locations.

Understanding the breadth of physical hazards that can disrupt a business is only one element of a climate risk assessment. For the private sector to build its resilience to climate change, businesses need to take a three-dimensional approach to assessing their risks.

Climate change hazards are complex. It is not just about one impact—there are extreme weather events, changing rainfall patterns, and sea-level rise, among many others. Companies will pay attention if their business models are affected.

ASIAN DEVELOPMENT BANK

THREE-DIMENSIONAL APPROACH TO ASSESSING CLIMATE RISK

To assess climate risk comprehensively, businesses should take a three-dimensional approach using the latest science compiled by the IPCC: Understanding the physical hazards of climate change, minimizing exposure to these hazards, and reducing vulnerability or underlying weaknesses that can exacerbate risk.[67] Our research finds that businesses are exposed to more hazards than they realize and that they often lack an understanding of their vulnerability. The three dimensions of climate risk are the following :

1 Hazard

A "hazard" is a possible future occurrence of natural or human-induced physical events that may affect assets like infrastructure, resources, goods, or services. Hazards include extreme weather events, floods, forest fires, storm surge, landslides, saltwater intrusion, drought, insect infestation, and disease.

2 Exposure

In this context, "exposure" refers to the presence of elements—such as employees, communities, environmental resources and services, buildings, and transportation modes—in an area where hazards may occur. Exposure to a hazard creates risk.

3 Vulnerability

When it comes to climate risk, "vulnerability" refers to the propensity of exposed elements—people, ecosystems, biodiversity, economic markets, supply chains and company operations—to suffer adverse effects when exposed to climate-related physical hazards. Underlying weaknesses can exacerbate the negative impacts of exposure to a physical hazard.

Fig. 2

The Three Dimensions of Climate Risk

Using a potential example from the region

All businesses should conduct a three-dimensional risk assessment across operations, supply chains, and the communities with which they interact. By assessing risk across their value chains, businesses can understand how to work toward ensuring owned and direct operations are preserved, restored, or improved. Businesses also can leverage the risk assessment to establish safeguards to reduce climate risk and build resilience among suppliers and communities. This approach enables people, organizations, and natural systems to respond to climate hazards more effectively. Climate risk assessments should be incorporated into a company's existing risk management system or risk register.

CASE STUDY

Honda's Risk Assessment Tool

The 2011 floods in Thailand damaged Honda Automobile's (Thailand) largest manufacturing facility, located in Ayutthaya, and suspended production for nearly six months.[68] To mitigate future flood risks, including recovery costs and profit loss from disrupted production, the company created a broad risk assessment tool in partnership with its insurance provider. The comprehensive, 91-question tool was also designed to assess other business and natural disaster risks. Today, more than 170 Honda group companies around the world are engaged in the annual assessment and are offered a suite of tools and resources to reduce elements deemed at risk.

BUSINESS IMPACTS FROM CLIMATE RISK

Applying a narrow approach to climate risk assessments can skew findings by failing to account for the hazards and vulnerabilities to which a business may be exposed. For this reason, a comprehensive evaluation of risk should address the diversity of potential hazards and vulnerabilities, as well as the effect these would have throughout operations, supply chains, and communities. The bottom line: Climate change can impact all aspects of a business, including strategy, finance, operations, human resources, legal, compliance, sales, and marketing functions.

Here's an example. In Thailand, the Asia Disaster Preparedness Center found that SMEs—which comprise 99.7 percent of all businesses in the country and 78 percent of its labor force[69]—experienced several impacts on their business from recent weather and climate-related events. About 37 percent of businesses surveyed said employees were unable to get to work; 26 percent were unable to deliver products; 22 percent experienced damage to facilities and equipment; 20 percent received damaged raw materials; and 17 percent were unable to receive materials or services from suppliers.[70] After the 2011 floods in Thailand, certain types of SMEs experienced a decline in sales. Households spent their resources on rebuilding and repairing homes, which reduced the discretionary income available for haircuts and apparel—also an important part of the local economy.[71]

Generally speaking, governing bodies and investors throughout Southeast Asia increasingly are seeking disclosure by businesses on the risks they are facing. This should serve as an additional impetus for the private sector to assess the impacts of climate change. In 2017, the Task Force on Climate-related Financial Disclosures (TCFD), composed of members across the G-20 chosen by the Financial Stability Board, released the first-ever recommendations for voluntary financial disclosures for businesses worldwide to report on the climate risks to their respective company. More than 250 organizations worldwide have expressed their support of the TCFD,[72] including businesses that have operations and supply chains in Southeast Asia.[73]

BUSINESS IMPACTS OF RECENT CLIAMTE RELATED EVENTS

*Asia Disaster Preparedness Center

37%
of SMEs had employees who were unable to get to work

26%
were unable to deliver products

22%
experienced damage to facilities and equipment

20%
received damaged raw materials

17%
were unable to receive materials or services from suppliers

BUSINESS IMPACTS

Climate risks can impact several areas of a business, including

Strategy

Climate change can compromise the efficacy of a business to achieve its goals and remain relevant and competitive in the marketplace. Impacts could include shifts in the demand for goods and services, the effect of hazards on quantity and quality of raw materials, and level of vulnerability where a business and its value chain are located.

Finances

Businesses can incur financial losses if they do not understand and manage climate risk. Banks and lenders may limit access to financial capital if businesses do not manage climate risks effectively. Climate fluctuations also could impact ecosystem services, while changes in food production and real estate could affect asset and commodity prices. Finally, of course, disaster recovery could be costly.

Operations

Climate hazards can disrupt logistics and damage infrastructure, production, and the quality of goods and services. Agriculture often suffers most prominently from natural disasters, but manufacturing facilities, utilities, and telecommunications also are at risk of production loss.

Human Resources

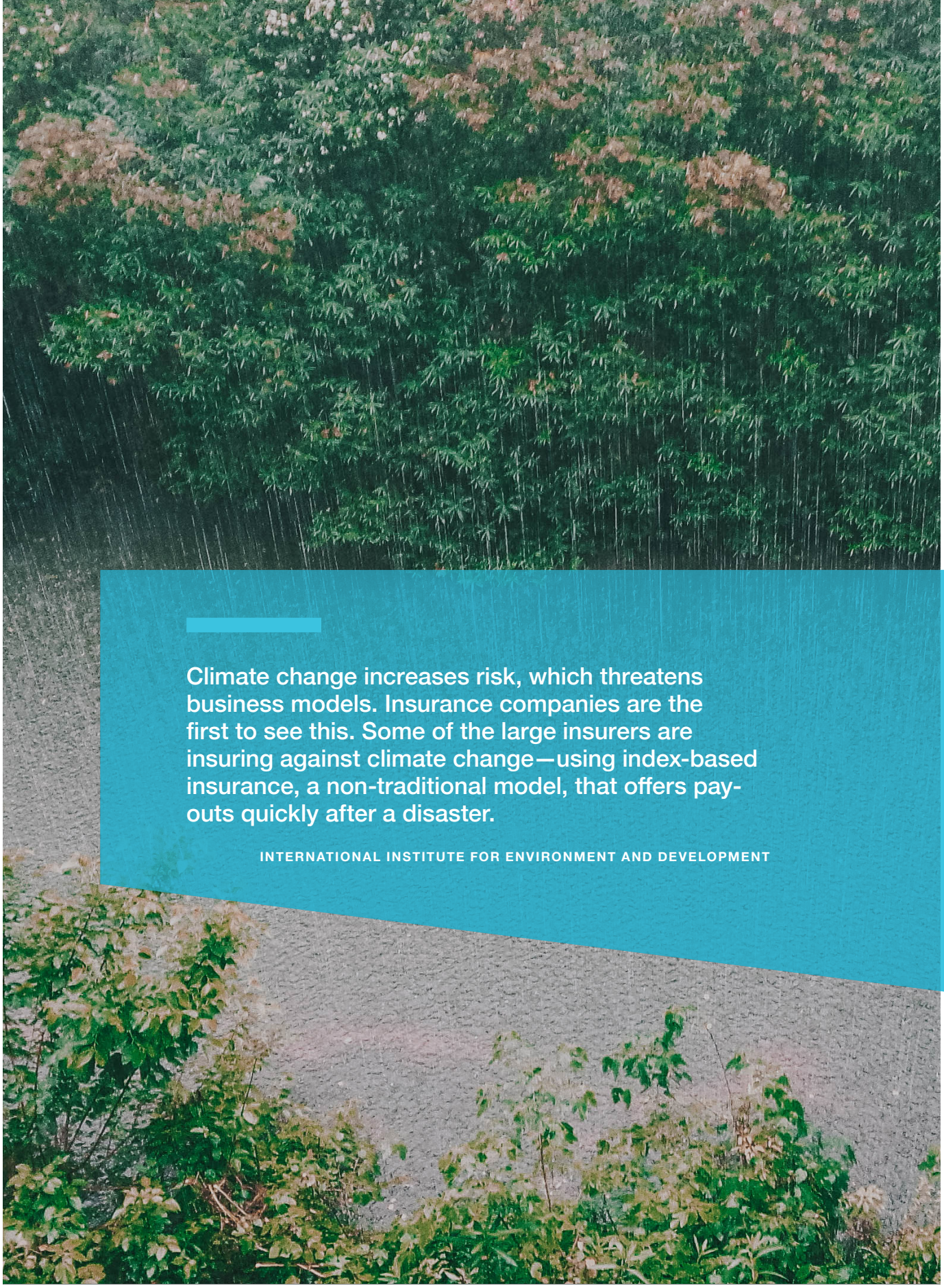
Climate hazards can threaten employee health, safety, and access to work. Heatwaves can compromise manufacturing production in facilities with poor air circulation. Employee access to work can be disrupted during periods of heavy precipitation and flooding. Recruitment and retention can suffer if a company does not address climate impacts on working conditions sufficiently. Some of these impacts might include an increasingly hot work environment or damaged infrastructure from flooding.

Compliance & Legal

The growing body of climate laws, liabilities, and regulations could impact the private sector. A study conducted by UN Environment has found that environmental litigation around the world has tripled since 2014.[74] In the Philippines, citizens successfully filed a petition alleging that 50 companies breached their responsibilities to respect the rights of the Filipino people due to their cumulative contribution to climate change.[75] While this is an issue of climate mitigation, lawsuits claiming inaction on climate change are on the rise.

Sales & Marketing

Damage or disruption to materials and services caused by climate hazards can diminish sales, and companies may face competition from businesses that are leveraging a commitment to tackling climate change to secure customer loyalty.



Climate change increases risk, which threatens business models. Insurance companies are the first to see this. Some of the large insurers are insuring against climate change—using index-based insurance, a non-traditional model, that offers pay-outs quickly after a disaster.

INTERNATIONAL INSTITUTE FOR ENVIRONMENT AND DEVELOPMENT

Downpour on a river

Photographer: Christopher Kismet

Building Climate Resilience

To reduce the material risks businesses face from climate change—and to seek opportunities in the marketplace—the private sector in Southeast Asia can build resilience across value chains by strengthening a series of components known as "capital assets." BSR's global analysis finds that to build resilience, businesses can strengthen one or more of six capital assets—human, political, physical, financial, social, and natural capital.[76]

To address risks identified from a three-dimensional risk assessment and to maximize resilience, companies should consider how to leverage the full suite of capital assets. Of course, depending on business specialties, geography, needs, and resources, certain asset categories may be more applicable than others. For example, a garment facility may invest in physical capital assets, such as permeable pavers and drainage systems, to protect against floods, or commercial air conditioners to keep workers cool and fabrics free of mold. At the same time, the facility also should consider planting trees that can serve as a natural barrier to flooding and provide shade to keep facilities cool and investing in human capital so that its workforce has the proper gender-sensitive training,[77] skills, and social benefits to withstand climate impacts since employee injuries, sick time, and absenteeism affect productivity. These kinds of resilience efforts can be incorporated into a company's core strategy, business continuity plans, human resources, and corporate social responsibility programs. This way, companies can integrate resilience fully across the business.

Fig. 3

Six Capital Assets to Build Climate Resilience

Human Capital

refers to the skills and knowledge of available human resources, particularly in the workforce.

Political Capital

refers to access to decision-making to shape policy environments that enable resilience.

Financial Capital

refers to the volume of available financial resources and access to financial goods and services.

Physical Capital

refers to infrastructure and equipment, including those related to manufacturing facilities, transport, logisitics, and communications.

Social Capital

refers to the strong relationships, collaborations, and bonds of mutual support and cooperation that are essential for addressing a systemic global challenge such as climate change.

Natural Capital

refers to the full range of services provided by biodiversity and ecosystems, including land and water.

BUILDING RESILIENT SUPPLY CHAINS

Just as businesses should assess risk in operations, companies also should look to build resilience among suppliers, since a consistent source of ingredients or materials is essential for any business to maintain productivity. SMEs in the supply chain may not have access to resources, information, or tools to assess risk and build resilience. Supporting these businesses by sharing best practices, offering trainings, or extending risk assessments to suppliers can help reduce production interruption and damage to the quantity and quality of supplies.

Ubud, Indonesia Photographer: Simon Fanger

Managing Climate Risk and Enhancing Resilience Among Industries

While awareness and measurement of climate risks are fragmented, our research found examples where businesses are leveraging capital assets to build resilience. In this section, we present industry-specific findings and recommendations on how businesses in the region can use capital assets to build adaptive capacity. We also offer specific case studies to further illustrate risk reduction and resilience-building in the region.

We analyze climate risks facing businesses in four Southeast Asian countries—Indonesia, Myanmar, Thailand, and Vietnam—due to their exposure and vulnerability to climate hazards, the presence of private sector climate action, and the diversity of context and industry sectors. We approached our analytical framework by assessing climate risks across industries rather than by country to demonstrate how climate change is affecting the industry at large in the region. We also organized our approach this way to encourage knowledge sharing and collaboration within the industry. We selected agriculture, manufacturing (which includes automobiles, garment, and information communications technology), tourism and hospitality, and financial services as industries to watch because, collectively, they offer diverse examples of risk and resilience. They also comprise a significant part of the region's economy.

While we assess risks across industries in this report, we recommend companies use the framework to conduct assessments of their own business and value chain. See the Business Action Handbook for additional tools and resources.

The Mekong Delta is under attack from saltwater. In 2016, saline intrusion from heavy rains and sea-level rise had reached 90 kilometers inland. The drought then reduced groundwater levels. Fish were dying, and there wasn't enough drinking water available.

GRUNDFOS

CASE STUDY

ECOM's Natural Capital, Strategy

ECOM Agroindustrial Corp., a global commodity merchant and supply chain management company, works with more than 5,000 coffee farmers in Vietnam's Central Highlands where changing weather patterns are affecting coffee production. Long-lasting wet days in peak harvest season are to blame for lower coffee quality as it limits time for harvesting and drying the beans. In the longer dry seasons, farmers experience water shortages. To remedy this, ECOM has partnered with IDH Sustainable Trade Initiative to administer soil management and water conservation trainings. They built terraced farm land to reduce soil erosion in the wet season, use pH meters to monitor soil acidity, and plant fruit trees such as avocado, durian, and jackfruit to provide shade for coffee and offer additional sources of income. Drip irrigation models are also applied, which can save water, energy, and labor costs. ECOM recognizes that without on-farm training and interventions to build resilience, Vietnamese coffee will lose out both on quality and quantity.[78]

CASE STUDY

Bolstering Human and Social Capital Assets in Cocoa Production

Agriculture is a key economic sector in Southeast Asia, and much of the region still relies heavily on agriculture for rural livelihoods, food security, and increasingly to produce commodity and cash crops. Still, agricultural support services, such as government research and extension and financial services, tend to be limited, increasing the vulnerability of both farmers and buyers to climate hazards. In Indonesia, the private sector is working closely with international donors on programs to support the country's cocoa sector, which is the second-largest global exporter of cocoa. Farmers have spent decades of work improving agricultural practices and economic options, but cocoa farmers in particular now are reporting climate change as the primary threat. They say climate change has altered the timing of harvests, the volume of yields, and the prevalence of pests and disease. The incorporation of climate change adaptation content into the cocoa farmer training platforms already in place with support from groups like SwissContact, IDH, and VECO signals a clear recognition of the imminent threat. Corporate commitments, such as that of the confectionery company Mars to buy only sustainable cocoa from around the world by 2020, are also bringing change and investment in farmer knowledge and practices, including in Southeast Asia.[79]

BUILDING RESILIENCE IN AGRICULTURE

The agricultural sector in Southeast Asia is highly vulnerable to climate change. In Myanmar, for example, where agriculture contributes to 43 percent of GDP,[80] heatwaves are expected to increase, and temperatures are projected to rise 2.7°C by 2050, affecting the health of farmers and crops alike.[81] Other climate hazards, including flooding, salinization, and drought, may limit access to freshwater for irrigation, diminish soil quality, and increase the prevalence of pests and disease. Cyclone Nargis in 2008 damaged more than 250,000 tons of stored crops in Myanmar and affected over 84,000 acres of cropland, with damage to crops and equipment amounting to roughly US$55 million.[82]

The following charts illustrate the three-dimensional approach to assessing risk for the aforementioned industries. The charts also identify the business impacts and highlight capital assets that businesses can strengthen to build resilience. The climate risks, business impacts, and resilience assets listed in the charts are examples from the region that we gleaned from our research. They are not exhaustive across the industry or region, nor are they necessarily relevant for every business.

AGRICULTURE

Climate Risk

HAZARD

Changing rainfall patterns • Seasonal shifts • Sea-level rise
Floods • Salinization • Drought • Fires • Rising temperatures
Heatwaves • Disease affecting people and crops

EXPOSURE

– Half of Vietnam's rice is produced in the Mekong Delta, which is exposed to flooding and salinization from sea-level rise.[83]

– Vietnam's Central Highlands, where nearly 80 percent of the country's coffee[84] and 24 percent of tea[85] are grown, is exposed to drought, soil erosion, and pest infestation.[86]

– Indonesia is the second largest cocoa producer globally and its production is affected by increasing temperatures and fluctuating rainy and dry seasons.

– Indonesia's plantations for commodities like palm oil, cocoa, and coffee are in landscapes already experiencing significant fire risks, exacerbated by severe drought.[87]

– In Thailand, where 40 percent of the population works in agriculture, 74 of the 77 provinces were affected by droughts in 2016.[88]

– In Myanmar, drought and unpredictable rain patterns impact fruit production and salinization in coastal areas affects grain and pulse producers.[89]

VULNERABILITY

– **Crops are sensitive** to changes in temperature and precipitation. Climate change can reduce rice yields by 20-30 percent.[90] Salinization and inundation could decrease rice productivity by 13 percent in the Mekong River Delta by 2050.[91]

– The Mekong Delta is home to 17 million people, with 80 percent engaged in rice production.[92] Because the majority of the population's workforce is **dependent** on rice cultivation, changes to production can harm the region's socioeconomic well-being.

– Multinational companies are **reliant** on cocoa from Indonesia. The crop is affected by climate hazards, and as a perennial plant, it cannot be moved easily to a different growing location.

– There are **resource constraints,** including limited access to financial services, crop insurance, or support from government agricultural extension services.

– There is a **lack of adequate infrastructure,** including drainage systems, irrigation technology, and storage facilities for agricultural inputs and products.

– There are **competing water needs** for drinking and industrial use **limited information** available on weather, crop calendar, and early warning systems and **limited awareness and training** to manage diversified cropping systems.

Business Impact

Strategy: Climate change can affect growing locations and agriculture supply, including the quality and quantity of yields.

Finances: Businesses can lose profits from low yields and damaged land. And they can experience commodity price fluctuations from low or uncertain supply.

Operations: Farmers may have difficulties planning production due to shifts in planting and harvest seasons.

Human Resources: Farmers may face health risks, including infectious, vector-borne, and respiratory diseases.

Sales & Marketing: Sales can decline if production is limited or quality is poor.

Climate Resilience

CAPITAL ASSETS

Physical Capital: Invest in irrigation technology and flood barriers to curb soil loss and fertilizer runoff.

Natural Capital: Strengthen plant barriers to control flood waters; invest in better sowing and cultivation practices for erosion control and cropping patterns; diversify crop systems.

Human Capital: Support farmer trainings in practices that boost plant and soil health.

Financial Capital: Identify insurance products that cover climate and disaster risks for suppliers.

Social Capital: Form farming cooperatives to share risk among small-scale suppliers.

Political Capital: Partner with peers to influence policies that can channel greater investment for agriculture insurance and subsidies for crops affected by climate impacts.

If people around the world want Vietnamese coffee in the future and at a reasonable price, let's support farmers to maintain sustainable production and adapt to climate change.

ECOM AGROINDUSTRIAL CORP.

Ho Chi Minh City, Vietnam

Photographer: Thanh Tran

Bandung, Indonesia Photographer: Lidya Nada

BUILDING RESILIENCE IN MANUFACTURING

Manufacturing in Southeast Asia, including the apparel, automotive, and technology industries, is booming. However, like agriculture, manufacturing is susceptible to climate impacts. In Thailand, for example, the 2011 floods closed 900 factories that employed 460,000 workers[93] and ultimately cost US$45 billion in damages. As Thailand and its Southeast Asian neighbors face increasing temperatures and flood risks, the manufacturing industry needs to assess its exposure to climate hazards and vulnerability and consider how to strengthen its capital assets to build resilience.

The climate risks, business impacts, and resilience assets listed in the chart are examples from the region that we gleaned from our research. They are not exhaustive across the industry or region, nor are they necessarily relevant for every business.

MANUFACTURING

Climate Risk

HAZARD

Sea-level rise • Flooding • Landslides • Salinization • Drought
Rising temperatures • Heatwaves

EXPOSURE

- The flood zone in Thailand's growing industrial zone is projected to increase 30 percent by 2050.[94]
- In Thailand, dykes, roads, and floodwalls are antiquated, limited, or put other locations at risk, exposing facilities to inundation.[95]
- In Thailand, average temperature could rise as much as 4.0°C by 2100.[96]
- In Vietnam, the apparel industry accounts for nearly 15 percent of GDP and a consistently increasing percentage of foreign direct investment and exports.[97]
- By 2100, Vietnam's nearly one-meter sea-level rise could affect 20 provinces, and the country could experience 95 more hot days per year.[98]
- Manufacturing comprises 40 percent of Indonesia's GDP[99] and serves as the main contributor to economic growth.[100]
- Firms located in and around Jakarta have been significantly impacted by recurring floods;[101] conversely, drought also affects the sector, disrupting production and temporarily closing operations in Jakarta and Surabaya.[102]

VULNERABILITY

- Thailand is **highly dependent** on exports of electronics and automobiles,[103] the facilities of which are exposed to inundation, drought, and salinization.
- 99.7 percent of all businesses in Thailand are SMEs and most do **not have insurance.**[104]
- Despite the 2011 floods, the **drainage system remains inadequate** in Ayutthaya. Communities located outside of flood walls, as well as Bangkok and Nonthaburi Province located downstream, could be inundated after heavy rainfall.[105]
- In garment facilities, a**pparel and footwear materials are sensitive** to high temperatures and humidity.
- In Vietnam, the apparel and footwear industry employs 2.5 million workers, of which **80 percent are women.**[106] Women are more vulnerable to climate change than men given their skills, opportunities, and responsibilities.[107]
- **There is competing demand for water** for drinking and industrial use.
- In Myanmar, there is **inadequate infrastructure,** unreliable energy supply, and insufficient ventilation and cooling. There is also **substandard housing** for workers with limited access to water and low capacity of public health services.
- Indonesia suffers from the **lowest electrification rates** in the region, and blackouts are common throughout the country.[108] Flooding has caused power and communication outages, leaving tens of thousands without electricity.[109] Jakarta currently lacks a coordinated approach to managing floodwater.[110]

Business Impact

Strategy: Business continuity may be disrupted by manufacturing facilities located in at-risk areas.

Finances: Businesses can incur costs from damaged infrastructure and higher insurance premiums.

Operations: Severe droughts limited Bangkok's freshwater supply in 2014-2015. This disrupted production and caused resource competition among waterworks stations, agriculture, and manufacturing.[111]

Human Resources: Employees may face health risks from hot working conditions without proper ventilation or cooling.

Legal and Compliance: Businesses may need to comply with laws that limit worker activity if temperatures exceed a set threshold.

Sales and Marketing: Leading brands saw sales decline of cold-weather goods, such as jackets, boots, hats, and scarves after warmer winters—a trend that, if repeated, could alter manufacturing lines and facility production.[112]

Climate Resilience

CAPITAL ASSETS

Physical Capital: Invest in flood-proof infrastructure and cooling systems to keep equipment, workers, and materials safe.

Social Capital: Serve on local planning boards to build resilience in the community; protect employees' health and roads for uninterrupted flow of goods and services; partner with local manufacturers to co-invest in building zone-specific resilience.

Human Capital: Invest in disaster response training for frontline workers and community members to prepare for and recover from more intense natural disasters. Enable experienced companies to share resources and best practices in resilience with others, including SMEs in the supply chain.

CASE STUDY

H&M's Physical Capital Strategy

Leveraging its physical capital, a garment facility for H&M, located outside of Ho Chi Minh City, constructed high ceilings to facilitate natural ventilation for its workers. As temperatures have risen over the past several years, this has not been enough. The facility then installed cooling systems in every production workshop. This helps workers feel comfortable and reduce health-related issues. By investing in the facility's physical assets, H&M and the supplier boosted employee productivity and retention.[113]

CASE STUDY

SCG's Social Capital Strategy

To address risks associated with drought, Siam Cement Group (SCG) leveraged its social capital by establishing a task force and working with local stakeholders in Thailand's eastern region, the country's manufacturing hub. In this area, water resources are in high demand during the dry season, and one-fifth of the 500,000 cubic meters used daily is needed for manufacturing. SCG sought to find an equitable solution with the community to ensure resources were not constrained—especially in times of severe drought. In addition to its policy to not take more than five percent of water supplies from a local area, SCG established ground water and reserve wells to acquire a reserve of 200,000 cubic meters. Further, the company created ground wells for local agriculture and donated water tanks to store water supply for the community. SCG has taken additional steps to conserve water, including piloting a water footprint assessment model in collaboration with Chiang Mai University, offering a Water Resources Management Leadership curriculum for employees, and implementing water recycling programs that conserve more than 160,000 cubic meters per year. SCG also conducts regular risk assessments and manages continuity plans to reduce water-related business disruptions and maintain strong relationships with its communities.

CASE STUDY

Isuzu Strengthens Social and Capital Assets

The 2011 floods in Thailand damaged facilities, transportation, and logistics, forcing businesses to suspend manufacturing across several industries temporarily. This move hit the automotive industry hard. Isuzu Motors Co. (Thailand) stopped production for six weeks as more than 160 of the company's suppliers were flooded.[114] Learning from this experience, Isuzu strengthened its human and social capital assets by working with its Tier 1 suppliers to build disaster risk management (DRM) and business continuity plans (BCP) to shorten the disruption time and reduce impact from physical hazards in its supply chain. Isuzu worked with ADPC to initiate a Business Continuity Management (BCM) orientation training program for 198 suppliers, and provide comprehensive on-site BCP technical support to eight Tier 1 suppliers for the first phase of the project.[115] Finding that the integration of DRM and BCP as part of corporate strategy is an "entry point to reach international standards and gain competitive advantage for both the business and its supply chain," a key recommendation arising from this pilot project is that training on DRM and BCP should be incorporated within the Human Resources department policy.[116] This ensures relevant employees are properly trained. Additionally, leadership and support from top management are key for the effective implementation of resilience building including BCM. Today, working closely with its workforce and supply chain, Isuzu aims to build resilience to future weather- and climate-related events through this initiative.

Da Nang, Vietnam Photographer: Anh Nguyen

BUILDING RESILIENCE IN TOURISM AND HOSPITALITY

Tourism throughout Southeast Asia is on the rise. Infrastructure development in Vietnam's tourism industry continues to grow—over 350,000 rooms in hotels and guest houses emerged over a 15-year period from 2001 through 2016.[117] Despite projected sea-level rise of nearly one meter by the end of the century,[118] more than 9,000 condominiums and hotels were launched in 2016 in the three coastal cities of Da Nang, Nha Trang, and Phu Quoc Island, up 48 percent from the previous year.[119]

Combined with stronger tropical cyclones, storm surge could cause severe coastal flooding, and temperature rise and heatwaves already are affecting worker well-being and guest comfort.[120] In Thailand, land use for tourism is contributing to land subsidence, water scarcity, and natural habitat loss.[121] Ten popular Thai islands closed dive sites or beaches temporarily in 2016 to protect ecosystems from coral bleaching, which can hinder natural barriers that protect from storm surge.[122] And in Indonesia, sea-level rise, coastal erosion, and stronger storms are destroying the country's valuable coastal reef structure, which lures tourists from around the world.[123] Together, these challenges threaten business continuity in the tourism industry by impacting operations, finances, human resources, and sales and marketing.

The climate risks, business impacts, and resilience assets listed in the chart are examples from the region that we gleaned from our research. They are not exhaustive across the industry or region, nor are they necessarily relevant for every business.

TOURISM & HOSPITALITY

Climate Risk

HAZARD

Stronger tropical cyclones • More frequent rainfall in the dry season—peak tourist season • Increasing average temperature Heatwaves • Beach erosion • Flooding

EXPOSURE

- Vietnam's tourism industry along the 3,260 km of coastline is at risk from storm surge and erosion.[124] Total contribution of the tourism sector is nearly 14 percent of Vietnam's GDP.[125]
- Ho Chi Minh City received 5 million international and 21.8 million domestic visitors in 2016 and expects a year-on-year increase of 10 percent and 12 percent respectively.[126] At the same time, annual average temperature in the city is expected to rise 1.4°C, and 61 percent of the city area will suffer from regular flooding by 2050.[127]
- In Thailand, 830 kilometers of coastline are suffering from erosion.[128]

VULNERABILITY

- The industry is **weather- and climate-dependent**; warmer temperatures affect worker health and guest comfort.
- The industry is also **dependent on efficient transportation,** both for air travel and local routes, which can be affected by hazards.
- Furniture and linens in hotel guest rooms are **sensitive to mold from heat and humidity.**
- In Thailand, one-meter sea-level rise would affect nearly **1.4 million people** living or working in low-lying tourism areas.[129]
- Serving as a natural barrier to storm surge, **mangroves are at risk of thinning** by 18 meters on the Thai coast.[130]
- Land use in the Thai tourism sector is contributing to **land subsidence, water scarcity, and natural habitat loss,** all of which can make hazards worse.[131]

Business Impact

Strategy: Climate change can impact a hotel's business continuity if it is located in an area that is projected to receive stronger cyclones, storm surge, and beach erosion.

Finances: A hotel or restaurant may incur high recovery costs from infrastructure damage due to increased intensity of storms, flooding, or mold.

Operations: A hotel's cooling system may be cut off by a disrupted energy supply caused by flooding or storm surge.

Human Resources: Employee health may be at risk from working in increasingly hot, outdoor areas.

Legal and Compliance: Businesses may need to comply with laws that limit outdoor worker activity if average temperatures exceed a set threshold.

Sales and Marketing: Businesses may experience a decline in sales as the number of rainy days and temperatures increase. Strong cyclones, flooding, and high temperatures restrict travel, access to hotels, and guest comfort.

Climate Resilience

CAPITAL ASSETS

Physical Capital: Build in elevated areas to reduce exposure to storm surge; equip hotel rooms with energy-efficient cooling systems.

Natural Capital: Build and restore natural coastal barriers to prevent flooding; plant trees to provide shade for guests and outdoor workers.

Human Capital: Protect outdoor workers who are exposed to warmer temperatures by offering access to health exams, frequent hydration, and shorter rotations in the sun.

Social Capital: Serve on local planning boards to build resilience in the community, including roads, seaports, and airports to ensure guest access.

Da Nang, Vietnam Photographer: Phan Hoang Phe

CASE STUDY

Natural Capital in Da Nang, Vietnam

Tourism accounts for more than half of all economic activity in coastal Da Nang, Vietnam.[132] Despite its exposure to sea-level rise, coastal erosion, typhoons, and warming temperatures, the hotel industry in Da Nang is booming. By late 2017, Da Nang had more than 450 foreign direct investment projects worth US$3.6 billion; these projects were geared toward tourism, services, and property development.[133] At the same time, hotels in Da Nang and nearby Hoi An are experiencing impacts from climate change. In Hoi An, beach erosion washed away 4,000 square meters of Cua Dai Beach.[134] According to the local Department of Natural Resources and Environment and others, monsoon rains, wastewater discharge, and development led to the erosion.[135] Hotel guests in Cua Dai Beach have relocated to other locations in Hoi An and Da Nang as a result. Considering that sea levels are projected to keep rising, coastal hotels and property developers need to build resilience to stay in business.

The effects of climate change also are present in Da Nang. Furama Resort, Furama Villas, and the Ariyana Convention Centre have partnered with the local tourism association, the Danang Climate Change Coordination Office, and the Typhoon Prevention Committee to prepare for physical weather and climate hazards to its facilities, workforce, guests, and community.[136] For instance, Furama has invested in physical assets to strengthen its infrastructure to withstand strong typhoons such as Xangsane, which it experienced in 2006. The hotel also is investing in natural capital by protecting sand dunes to prevent erosion.

Hotels in Da Nang also are finding that the increasing frequency of heatwaves and changing weather patterns are negatively impacting guest comfort and outdoor seasonal activities that boost revenue.[137] While coastal cities such as Da Nang continue to see an influx of visitors and property developers, it is evident that climate change will continue to impact businesses, which requires effective strategies in response.

BUILDING RESILIENCE IN THE FINANCIAL SERVICES INDUSTRY

While the financial services industry may seem to be less directly vulnerable to climate change than other sectors, the industry's vital role in investment, banking, and insurance makes it susceptible to the effects of climate change. Companies with large numbers of physical branches and employees may experience negative effects to buildings and workforce productivity, and our interviews suggest that even more significant impacts will occur from credit risk exposure to other sectors such as those outlined above: agriculture, manufacturing, and tourism. Global banks have begun taking this exposure seriously, mapping investment portfolios against projected climate change impacts.[138] After Thailand's 2011 floods, some lenders responded by making clear to manufacturing clients they should improve insurance coverage.[139] And Dragon Capital is finding that financial services companies are reassessing investment activities caused by the recent and growing salinization of the Mekong Delta, Vietnam's main agricultural region.

Financial services companies bolster climate resilience among businesses and society by offering savings, loans, and insurance products that can provide a safety net. These services providers also are important in the way they protect household financial assets in parts of the region where use of bank accounts is just beginning to gain more widespread acceptance. In Myanmar, for instance, AYA Bank sees its role as increasing financial access to a population that has had limited banking experience. AYA Bank has added 1 million new accounts in the past three years, and many of the roughly 8,000 employees, particularly outside the main cities, were the first in their families to open bank accounts.[140]

There is a 1:5 to 1:10 cost to benefit ratio for investing in prevention and resilience building. Flooding is one of the biggest challenges and is causing more insured losses than any other peril.

ZURICH INSURANCE GROUP

CASE STUDY

The Evolving Role of Insurance in Resilience

Insurance companies enable resilience for companies and households by providing protection from losses and damages through products and services. In addition, the insurance sector shares risk management expertise with others to inform adaptation and resilience-building efforts. Swiss Re was one of four partners behind the establishment of the 100 Resilient Cities initiative, and the company provided access to risk-assessment and risk-financing tools.[141] Another example comes from Zurich Insurance Group, which developed a flood resilience measurement framework for communities with 88 sources of resilience that has been tested in more than 100 flood-prone communities worldwide, including one in Indonesia in partnership with Mercy Corps.[142] Insurance companies also see the opportunity to develop new business models. AXA has shifted its strategy in the past few years and is now offering advisory services and detailed climate risk-modeling to companies and local governments. The company currently is developing more parametric insurance products that can provide a quicker payout to individuals or companies in the event of natural disasters.[143]

The climate risks, business impacts, and resilience assets listed in the chart are examples from the region that we gleaned from our research. They are not exhaustive across the industry or region, nor are they necessarily relevant for every business.

FINANCIAL SERVICES

Climate Risk

HAZARD

Stronger tropical storms • Sea level rise • Flooding • Droughts

EXPOSURE

- Financial services companies may have offices in low-lying areas that are exposed to flooding.
- Across Southeast Asia, financial services companies insure or offer loans to commercial and residential infrastructure that could be damaged by flooding and other hazards associated with climate change.
- Loans may be backed by property with declining value due to climate change hazards.[144]
- Financial services companies may invest in hotels or restaurants that are located in at-risk areas such as coastal communities.[145]

VULNERABILITY

- Many insurance companies are selling products with insufficient diversification of risk.
- Some investment products or business models are directly dependent on climate-vulnerable sectors like natural resources, agriculture, or forestry.[146]
- Data storage or communications technology can be destroyed by heat or flooding.
- A weak risk regulatory environment in some countries may allow firms to operate with limited risk evaluation and management.
- Where banking customers are primarily rural and dependent on agriculture, cash reserves and loan portfolios may be more vulnerable to negative impacts on agriculture.
- Underdeveloped public safety nets may be unable to protect against private sector loss of assets and investments from disasters.

Business Impact

Strategy: Climate change can impact a business model if entire sectors suffer setbacks at once. This could happen in sectors like agriculture or tourism.

Finances: If large volumes of commercial or individual clients experience losses due to climate change, there could be significant impacts on balance sheets or to cash flow. There also may be exposure to higher risk for investments and insurance products.

Operations: Damage to physical infrastructure, such as buildings, computers, and communications equipment, can disrupt daily production.

Human Resources: : Employee safety and well-being may be at risk if climate change wreaks havoc on their homes or health. Significant climate events also could disrupt employees' travel to work.

Legal and Compliance: Depending on fallout from certain climate events, businesses might become unable to comply with investment risk guidelines.

Sales and Marketing: Climate change also could impact the market for financial products as company and household resources are redirected toward spending on recovery.

Climate Resilience

CAPITAL ASSETS

Physical Capital: Ensure data and communications equipment utilize robust and weather-resistant materials and design.

Human Capital: Train local insurance agents and other staff in basic emergency response and adaptation measures.

Financial Capital: Invest in climate-resilient sectors, technologies, and infrastructure, among others.

Social Capital: Apply risk knowledge and mapping to benefit other public and private-sector actors; establish programs that educate bank and insurance customers on measures to increase their household and community resilience.

Political Capital: Work with sector associations or civil society to advocate for increased financial access and improved safety nets.

Recommendations

Business efforts to assess climate risk and build resilience in Southeast Asia are fragmented. When we examine the range of physical hazards and vulnerabilities to which businesses in the region are exposed, it becomes clear that the businesses who build adaptive capacity will benefit. Climate risk can impact companies in myriad ways, and strengthening resilience can offer those companies a range of opportunities to lead and grow in the marketplace. In short, building resilience will be essential to continue doing business in today's climate reality.

In this section, we outline five distinct calls to action. For tools and resources, please refer to the accompanying Business Action Handbook.

1 Develop a governance structure.

Because climate change is a core business issue, it should be integrated into strategic planning and must transcend internal business units and silos. This likely will require a level of organizational change management. Studies by McKinsey and the Harvard Business Review find that for change to be successful within an organization, it must be led by the most senior executives.[147] Our research uncovered gaps in climate leadership across Southeast Asia. Several organizations we interviewed recognized these gaps and said action on climate resilience must come from the top.

To engage the C-suite, find an entry point that is meaningful. Clearly outline the business impacts that climate risk can pose to demonstrate the practicality and relevance of taking action. With the increasing intensity of extreme weather events, business leadership would be negligent to ignore climate risks and marginalize resilience. Globally and within Southeast Asia, we are seeing large-scale efforts and commitment from the private sector to take action on climate change as evidenced by the UN SDGs, business support of the Paris Agreement, and the conversations taking place among business leaders at the World Economic Forum. C-suite leadership is also essential to meet the demands and expectations of critical external stakeholders, including the board of directors, since these groups will want to ensure businesses are doing everything possible to reduce risk.

With private-sector efforts to build resilience fragmented across Southeast Asia, we did not uncover a consistent approach among businesses to designate a team or leader to own the portfolio of work. Our interviews suggested that this was due primarily to a lack of awareness, tools and resources, and capacity.

We believe senior executives should designate a qualified individual or team of qualified individuals to work on assessing climate risk and building resilience. This can ignite and accelerate action, enable consistency, and allow for centralized measurement of progress. The resilience leader(s) should seek participation across the business and expertise from external sources and organizations to gather and analyze data, identify priorities, map assets, and implement resilience strategies. Finally, the resilience leader(s) should communicate updates to and seek ongoing support from C-suite and senior executives.

The private sector should engage actively with local and national policymakers, nonprofits, and academia to share challenges, create solutions, and uncover new opportunities in building resilience.

Sukhumvit Road, Thailand

Photographer: Andreas Brücker

We know there is a business risk with climate change, but we do not have an adaptation strategy. Right now, our focus is on reducing our carbon footprint. Unless my company's leadership team says we need to build resilience to the impacts we're seeing from climate change today, we won't take it on."

ANONYMOUS

2 Analyze the impact of climate change throughout operations, the supply chain, and communities in which the business operates.

The growing intensity of cyclones, extreme flooding, and the guidelines outlined in the Sendai Framework have prompted businesses in Southeast Asia to assess flood risks and "flood-proof" facilities. Some businesses have devised disaster risk management systems, enterprise risk management systems, or risk registers. But, many others have not. We recommend integrating climate change into existing risk management tools or processes and working closely with an internal risk management team to streamline these efforts.

As described earlier in this report, businesses need to conduct a three-dimensional assessment of risk across their value chain that includes looking at the hazards; identifying exposure to those hazards throughout operations, the supply chain, and communities; and understanding additional vulnerabilities that can exacerbate risk. The resilience leader(s) should seek data and information from peers, partners, investors, and other stakeholders to feed into the assessment. Leveraging existing and publicly available climate science—or investing in company-specific climate modeling—can help forecast specific climate risks.

One option to consider in understanding future potential risks to the business is to conduct a scenario analysis. This exercise can help a business assess the range of hypothetical impacts on operations and the value chain in a variety of scenarios under a given set of assumptions and constraints.[148] The TCFD, for example, supplements its climate disclosure guidance by providing a technical overview for businesses to understand scenario planning. The TCFD also advises businesses to explore what the impacts on their business will be as temperatures rise by 2°C or more.[149]

After it identifies its climate risks and prioritizes areas to address, a company can develop a plan to take action.

3 Map existing assets, develop a resilience strategy, and implement a plan.

Resilience does not need to be a radical change in how a business operates, but instead can be integrated into strategy or a business continuity plan. Building resilience can be incremental, consisting of several steps that help avoid interruption to productivity. Simply protecting the foundational assets of any business—employees, banking, and infrastructure—is essential for resilience.

Businesses should take inventory of their valuable resources as they pertain to the six capital assets—physical, human, political, financial, social, and natural. Next, businesses should map assets against climate risks. This includes identifying which assets can solve immediate risks and which should be enhanced or developed to mitigate future risk. As an example to mitigate risks to the workforce and productivity, a business can bolster human capital by leveraging several assets: Expanding training exercises to ensure employees can prepare for and respond to extreme weather events; offering benefits to employees so they have access to healthcare; or exploring company subsidies for home insurance so individual employees have coverage to protect their homes. These initiatives can be integrated within existing departments and programs, including business continuity planning, human resources, and corporate social responsibility.

Businesses also should explore what tools and products they can offer the marketplace to help others build resilience. ICT companies can provide communication and monitoring tools for early warning systems, apparel companies can offer protective garments to keep employees cool or protect against flood waters, and healthcare companies can offer health monitoring devices to ensure the well-being of outdoor workers in warmer temperatures or heatwaves.

Businesses should also explore what tools and products they can offer the marketplace to help others build resilience.

Bali, Indonesia Photographer: Alexey Marchenko

4 Partner with others to scale up resilience.

To enhance internal, community, and industry resilience efforts, businesses should look to partner with suppliers, industry peers, professional networks, multilateral agencies, and government agencies. In Southeast Asia, multilateral agencies and global nonprofits have demonstrated expertise in reducing climate risk and are eager to partner with others and share resources and knowledge.

Large multinational companies should consider supporting suppliers in the region. By working with SMEs inside the supply chain, businesses can address risks that can have cascading effects on operations, production, and logistics. Similarly, businesses can collaborate with peers in industrial zones to share knowledge and spread resources to prepare for climate risks.

Companies should consider partnering with government agencies to uphold commitments to the Paris Agreement and the Sendai Framework. While the public sector has set policies, plans, and targets to build adaptive capacity, government agencies may have neither funds nor expertise to build resilience for the private sector. Regulatory leadership and processes differ across the region, and businesses in Southeast Asia may want to consider taking a proactive leadership role to mitigate risks and build resilience. Businesses also can help inform political decision-making processes that can have consequences for the private sector, such as where to access financial resources.[150] The private sector should engage actively with local and national policymakers, nonprofits, and academia to share challenges, solutions, and uncover new opportunities in building resilience.

The private sector can influence the decision-making processes that have long-term effects on the level of climate exposure and vulnerability that shape the serious risks facing companies. For example, businesses can share insights with development practitioners to redirect industrial zones away from disaster-prone areas, such as floodplains."

RED CROSS RED CRESCENT CLIMATE CENTRE

5 Disclose risks and report on progress.

To bolster stakeholder confidence, a business should transparently disclose its climate risks and efforts to build resilience. Companies should consider following the TCFD recommendations on disclosure. This can help assure investors and build trust among customers and the communities in which a company operates. As evidenced by industry efforts on climate mitigation to set emission reduction targets and work toward a lower-carbon economy, reporting on progress and sharing information and knowledge within the business community can also help generate awareness and build momentum for building resilience. Businesses can consider integrating risks into annual reports and submit climate action commitments to NAZCA, which collects and lists efforts from businesses, cities, and nonprofits, among others.

For tools and resources please refer to the accompanying *Business Action Handbook*.

Appendix

BSR thanks the following organizations that participated in interviews or workshops. Their insights and feedback helped us shape our analysis and the resilience framework.

100 Resilient Cities • Advanced Info Service Public Company Limited • AECOM • Allianz • APIK DAI • The Asia Foundation • Asia Disaster Preparedness Center • Asian Cities Climate Change Resilience Network • The Asian Development Bank • Asian Honda Motor Co., Ltd. • ASSIST Asia • Atlantic VN Co. Ltd. • Aung Naing Thitsar Group of Companies • AXA • AYA Bank • B. Grimm Power Public Company Limited • Bangchak Corporation Public Company Limited • Bangkok Bank Public Company Limited • Banpu Public Company Limited • Berli Jucker Public Company Limited • Better Work • Bubler Asia Viet Nam Co. Ltd. • Building Resilience and Adaptation to Climate Extremes and Disasters • Business Association of 5th District, Ho Chi Minh City • Central Plaza Hotel Public Company Limited • Chief Resilience Officers, Da Nang and Semarang • CIMB Thai Bank Public Company Limited • Citymart • Care Vietnam • Cocoa Sustainability Partnership (Indonesia) • Conyat Create • Charoen Pokphand Foods Public Company Limited • DBS Bank • Dragon Capital • East West Seeds • ECOM • Ericsson • Esquel • Evoluzione Tyres • Fico JSC. • Furama Five-Star Resort • Glow Energy Public Company Limited • Great Giant Pineapple • Grundfos • H&M • Hai Vinh Plastic Co. Ltd. • HCMUNRE University • HERO Supermarket Tbk. • Hoanh Phat Trading and Services Co. Ltd • Hoa Sen University • Holcim • HSBC • IDH The Sustainable Trade Initiative • International Institute for Environment and Development • Indonesia Business Council for Sustainable Development • Indonesian Institute for Corporate Directorship • Ingreentech Co., Ltd. • ISET - International Vietnam • KBZ Bank • KDDI Corporation • Livelihoods and Food Security Trust Fund • LiMa Mandalay Technology • The Myanmar Centre for Responsible Business • Myanmar ICT for Development Organization • Myanmar Climate Change Alliance • Medco Energi • Mercy Corps • Myanmar Institute for Integrated Development • Nam Phat Dat Transportation Co., Ltd. • Nang Hom Rom Resort • Nanyang Textiles • Ooredoo • Pembangunan Jaya Ancol Proximity Designs • PTT Exploration and Production Public Company Limited • Pullman Danang Beach Resort • Ratchaburi Electricity Generating Holding Public Company Limited • Seagate • Shwe Than Lwin Co., Ltd. • Siam Cement Group • The Siam Commercial Bank Public Company Limited • Siam Steel Service Center Public Company Limited • Dr. Sikstus Gusli • Simexco • SMEDEC 2 • Standard Chartered • Starbucks • Stock Exchange of Thailand • Swisscontact • Telenor • Textile and Garment Association of Ho Chi Minh City • The Thai Institute of Directors • Thai Oil Public Company Limited • Thai Union Group Public Company Limited • Thaicom Public Company Limited • Thailand Environment Institute • Than Lap Trading Co. Ltd • United Nations Development Programme • True Corporation Public Company Limited • TTCL Public Company Limited • United Nations Office for the Coordination of Humanitarian Affairs • United States Agency for International Development • VECO Indonesia • VF Corporation • Vietnam Chamber of Commerce and Industry • Vietnam Rubber Association • Walmart • WWF • Yoma Bank • Your Trip 365 Co. Ltd. • Zurich Insurance

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September 2018