



CLIMATE CHANGE ADAPTATION:
Engaging Business in Asia

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1.1. Context

It is expected that South and Southeast Asia will be one of the areas of the world most affected by climate change and most vulnerable to its effects. In some parts of the region, impacts are already being felt as climate variability and natural hazards such as floods and droughts threaten local economies and the livelihoods of entire communities. The region's unique development challenges—persistent poverty coupled with rapid economic growth—is already coinciding with significant environmental degradation in some areas. Climate change has the potential to exacerbate these development and environmental challenges.

Governments in the region have begun to develop climate change strategies and action plans to both mitigate climate change and adapt to current climate variability and future climate change. Institutional capacities are also being developed to add climate change adaptation to sustainable development agendas. The challenges are immense, however, and there is widespread concern about the costs of adaptation.

The role of the private sector in climate change adaptation is becoming more prominent, with private finance in particular regarded as critical to meeting adaptation goals. International negotiations and expert debates regularly reference the need for significant private sector investments to secure necessary resources for adaptation, both financial and non-financial. However, strategies to effectively incentivise these investments remain vague, and efforts to establish sustainable co-financing opportunities and effective and inclusive collaboration processes between public and private actors have yet to yield substantial results.

The development of a regulatory framework to guide action on climate change adaptation has not yet attracted the necessary private sector investments. Many businesses in the region lack a clear understanding of the concepts of climate change adaptation, which has hindered the development of an enabling environment for action. Some businesses are extending risk management approaches to include potential climate risks to their operations, but few seem to recognise risks that could impact supply chains, communities, and staff. There is little evidence of strategic approaches to building business resilience across the entire value chain.

1.2. Aims of the report

This report examines the current state of business engagement on climate change adaptation and identifies key barriers to greater private sector involvement. It aims to initiate a discussion on the business case for adapting to long-term climate change impacts and the need to improve incentives for action. The report links climate change adaptation to development and outlines ways that businesses can build on existing CSR practices to address adaptation needs in the region's most vulnerable communities.

The report is based on a series of business and multi-stakeholder dialogues on the role of the private sector in climate change adaptation. These dialogues were designed to initiate and facilitate an engagement process that would produce a better understanding of the barriers and opportunities to harnessing the innovative capacity of businesses to tackle the risks of climate change, both along their value chains and within their sphere of influence.

The research that informs this report was designed to contribute insights that would help to align the private sector, policy development processes, and multilateral initiatives concerned with the links between climate change, sustainable development, and adaptation. A key focus of the research was exploring opportunities for partnerships between businesses, development practitioners, communities, civil society organisations, and public agencies that would help to build resilience to a changing climate, with a particular emphasis on vulnerable communities and pro-poor community development.

The report is aimed at a diverse audience. Business in particular will find this report useful in gaining a better understanding of adaptation needs in South and Southeast Asia as well as opportunities for engagement that make good business sense and meets adaptation needs. The report also considers direct business risks from climate change and how to best address these.

Public and civil society actors will gain insights on the key barriers impeding business engagement on adaptation and develop a better understanding of why business engagement on climate change adaptation has been limited. The report discusses why the business case for engaging in adaptation is perceived as weak, and identifies potential paths to promoting and incentivising more business engagement. Awareness, education, dialogue, engagement, and better approaches to strategic partnerships are some of the recommendations to overcome barriers to business involvement.

1.3. Methodology

This report focuses on South and Southeast Asia and examines the role of the private sector in responding to climate change impacts in this particularly vulnerable part of the world. Five focus countries were selected for study: Indonesia, Sri Lanka, Thailand, the Philippines, and Vietnam. This selection was intended to provide a cross-section of low-income countries and emerging economies in the region.

Our research served a dual purpose: to examine business action on adaptation; and to raise business awareness of adaptation needs. For this purpose, we engaged a wide range of businesses in the region and undertook a series of structured dialogues on climate change adaptation in each of the five focus countries. In addition, multi-stakeholder dialogues and expert interviews were conducted to discuss preliminary findings, add to the research results, and shed light on partnership opportunities between business, public, and civil society sectors. Some of those were held in conjunction with relevant knowledge development and exchange platforms and events, including the 2010 CSR Asia Summit in Hong Kong, the Regional Adaptation Knowledge Platform for Asia's 2010 Forum and a dedicated seminar in 2011, both in Bangkok, Thailand, and the Fifth International Conference on Community-Based Adaptation (CBA) in Dhaka, Bangladesh.

Findings were supplemented with an extensive literature review that examined global and national adaptation agendas and assessed current channels for business involvement.

The series of structured business dialogues in the five focus countries provided insights into the business perspectives on climate change and adaptation needs, barriers to involvement in climate change adaptation, and perceptions of ongoing policy processes. The intention was to identify and discuss business incentives that could help build the business case for engagement. The business dialogues involved 51 business representatives from key industries and sectors in the region, including pulp and paper, agriculture (including plantations and especially palm oil, rubber, and tea), oil and gas, water and utilities, energy, fast-moving consumer goods, consulting, transportation, infrastructure, engineering, tourism, cement, and health care, as well as conglomerates.

While the results are not wholly representative of the general state of business involvement in South and Southeast Asia, they do provide valuable insights into the key barriers and challenges that businesses are facing in addressing adaptation.

2. Key messages

Based on the business dialogues, expert interviews, and extensive literature review that informed this report, 12 key messages have been formulated that describe the role of business in climate change adaptation. They summarise key findings, and cover barriers, drivers, opportunities and gaps on harnessing the innovative capacity of the private sector to respond to climate change adaptation needs in South and Southeast Asia.

1. The most significant driver for businesses to get involved with climate change adaptation is to protect the resilience of their own operations and of their value chain (both suppliers and customers). Assessing risk and planning for business continuity will be central to any adaptation strategy. This is already a concern among owners and operators of critical infrastructure who make long-term investments and need to safeguard their networks and services. Overall, however, enterprise risk management systems tend to be relatively limited in Asia and emerging sustainability risks such as climate change are not well-integrated.
2. More and more, companies are identifying the business opportunities of long-term climate change, such as water technologies (e.g. seawater desalination plants and water-saving initiatives), agricultural improvements (e.g. drought and saltwater-resilient seeds, alternative farming practices), and insurance solutions to climate change risks (e.g. weather index insurance).
3. The science of climate change remains uncertain, creating a gap in information on the expected impacts at the national or sub-national level and the business risks associated with these impacts. It is quite rational for profit-oriented businesses to avoid investments with long-term uncertainty. In order to understand business risks and integrate these risks in business strategies, the private sector needs improved climate information services.
4. Existing information on climate change and its associated risks is not currently useful to businesses. Climate information needs to be more geographically specific and tailored to particular industrial sectors to support business planning. In general, there is a lack of expertise, knowledge, and know-how relating to all aspects of climate change adaptation within businesses. Capacity building is required at all levels.
5. Any approach to climate change adaptation needs to be linked to a broader development agenda, and efforts to build the resilience of the poor must be prioritised. This could be an interesting entry point for businesses that are becoming more interested in proactively contributing to sustainable development.
6. Climate change adaptation requires responsible business practices that contribute to the sustainable development of an economy and society. Functioning ecosystems and sustainable livelihoods are key to building resilience to climate change. Proactive business approaches to protecting ecosystems and contributing to sustainable livelihoods, especially for vulnerable communities along their value chain, will need to be more effectively promoted.
7. Climate change adaptation projects can be a significant part of a company's corporate social responsibility (CSR) strategy, particularly when linked to community investment programmes, responsible supply chain management, inclusive business practices, and "bottom of the pyramid" (BoP) products and services. Innovative, community-based climate change adaptation can be an important element of CSR. Increasingly, businesses will need to screen their community investment projects for climate risks to ensure that project outcomes are not undermined by a changing climate in the long term.
8. The most common need expressed in the adaptation community in terms of private sector engagement is additional funding. However, existing public adaptation responses and financing mechanisms, including Official Development Assistance (ODA) efforts and the financial architecture of the UN Framework Convention on Climate Change (UNFCCC), are not clear in their direction, alignment, and effectiveness. The incentives for businesses to provide additional funding and targeted investments are limited.
9. There are opportunities to tap into business financing for adaptation. However, business can play an even greater role in climate change adaptation by contributing expertise, effective planning and management approaches, and fast moving innovative capacity. Through responsible business practices, products and services, as well as corporate community investment programmes, business can help to build resilient economies and societies.
10. National governments across the region have developed action plans to mitigate and adapt to climate change, but translating these plans into effective policy and regulatory mechanisms is in an early stage. Public consultation on climate change action plans and programmes is often inadequate and engagement with the private sector has been particularly limited.
11. National adaptation strategies will be most successful if they bring together partners from government (national and local), civil society organisations, and the private sector. Stakeholder engagement processes therefore need to be wide ranging and include both large and small business.
12. Some businesses are recognising the need to prepare for future impacts of climate change. They are looking for guidance from national governments to better understand the impacts of climate change, the business implications, and the response options. Many businesses would welcome the certainty regulation would bring, if it is fair and implemented evenly.

3. Climate change adaptation

3.1. The concept

There is growing evidence that human activities resulting in emissions of greenhouse gases (GHG) contribute to global climate change. Research also shows that many natural systems are already being affected by regional changes in the climate.¹

It is increasingly recognised that proactive responses to climate change will be necessary to both slow future impacts and adapt to existing or projected impacts.

- **Climate change mitigation** aims to reduce GHG emissions in order to “reduce the rate and magnitude of change” (IPCC, 2007a).
- **Climate change adaptation** refers to the “adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities” (IPCC, 2007a).

The central argument for climate change adaptation is that climate change is inevitable due to historic emissions and inertia within the climate system.² Even stringent emissions reduction efforts cannot avoid impacts for some decades to come. Climate change adaptation is therefore essential to reduce adverse impacts³ and to take advantage of opportunities to make appropriate adjustments and changes.

It is important to note that adaptation is a complementary strategy to mitigation and a climate change strategy will need to include both mitigation and adaptation efforts. Only combined efforts will help to reduce and manage the impacts of climate change and allow us to identify and address both co-benefits and the counteracting effects of mitigation and adaptation.

- **Co-benefits** can include projects that reduce GHG emissions and increase resilience to expected climate change impacts. For example, mangrove forests can function as carbon sinks and as coastal protection against typhoons and cyclones.
- **Counteracting** effects are those that bring positive results in terms of climate change mitigation but undermine adaptation goals and vice versa. A prominent example of adaptation measures with counteracting effects is desalination plants. Whereas these plants can help water-stressed regions to tap into alternative water sources, they consume significant amounts of electricity. In cases where electricity is not generated from renewable energy sources, adaptation measures lead to further increases in GHG emissions. Similarly, low-carbon technologies such as nuclear power plants require large amounts of water for cooling and as a result create stress on a climate-sensitive resource. In many regions, climate change is expected to affect the quality, quantity, and temperature of water and thus has the potential to adversely affect the operations of power plants.

Adaptation measures with counteracting effects can also be known as “maladaptation”: They result in unintended, adverse, or secondary consequences that may outweigh their benefits⁴ as they e.g. exacerbate the vulnerability of other systems or communities in the long term. Box 1 below discusses this in more detail.

To fully understand the concept of climate change adaptation, it is important to distinguish between slow onset climate change and the climate variability that is currently occurring.

- **Climate variability** refers to fluctuations in the climate system that can be observed in the short to medium term and occurs on a smaller scale in specific geographical regions. This includes extreme weather events such as cyclones, floods, droughts, and other hazards caused by weather phenomena.⁵
- In contrast, **climate change** refers to persistent long-term changes (decades or longer) in global oceanic and atmospheric systems, such as sea level rise or increasing temperatures.⁶

Climate variability and extreme weather events alone do not provide sufficient evidence of climate change. In fact, no single event can be attributed to climate change. However, monitoring weather events over time and building capacity to act on the consequences of climate variability can help to build an understanding of long-term adaptation needs. Building resilience to climate variability in the short to medium term is beneficial in itself and is the first step towards understanding how to adapt to future climate changes and impacts.⁷

¹ IPCC, 2007a

² Firth, J, and Colley, M, 2006

³ IPCC, 2007a

⁴ The International Joint Commission, 2003

⁵ Asian Development Bank, 2005

⁶ UNFCCC, 2011

⁷ Metcalf Gerry et al., 2010

Box 1: Understanding the risk of maladaptation

Maladaptation refers to adaptive measures taken to reduce vulnerability to climate change that adversely affect the other systems or groups in a society. More broadly, it includes secondary consequences that outweigh or cancel out the benefits of the measure.

Maladaptation can occur in five different ways, through:

- **Adaptive measures that increase GHG emissions.** For example, desalination plants that require large amounts of energy to operate.
- **Adaptive measures that affect vulnerable groups.** These include measures that meet the needs of one group while disproportionately affecting other groups. For example, the introduction of drought-resistant seeds can force already poor farmers to depend on suppliers for their inputs as well as become vulnerable to volatile market prices.
- **Adaptive measures that have comparatively high opportunity costs.** In evaluating the effectiveness of adaptive measures, the full spectrum of costs needs to be considered, including economic, social, and environmental costs. Engineering solutions such as dams, reservoirs, and levees destroy wetlands, which in the long term can increase risks from climate change as crucial ecosystem functions are undermined.
- **Adaptive measures that reduce incentives to adapt.** These include measures that encourage “unnecessary dependence on others, stimulating rent-seeking behaviour, or penalising early actors”. For example, new technologies such as desalination or drip irrigation can shift attention and concern away from the problem of water shortages and reduce public awareness of the need to conserve water. Another example is dams, which can give a false sense of security about water availability and discourage or disincentivise conservation measures.
- **Adaptive measures that limit the choices of future generations.** For example, large infrastructure projects with long lifetime and investment costs. These projects limit a community’s ability to adjust to unforeseen changes in the future and may have high sunk costs. One example is a desalination plant built in Santa Barbara in 1990 that has never been used because rainfall has been sufficient to supply the area’s water needs since it was constructed.

The risk of maladaptation highlights the need for a holistic approach that combines mitigation and adaptation and frames objectives and measures within a long-term perspective.

*Note: Rent seeking behaviour refers to the act of manipulating the social or political environment through, for example, the spending of resources in order to bring about an uncompensated transfer of goods or services from another person or persons to one’s self as the result of a “favorable” decision on some public policy.

References: *The International Joint Commission, 2003; Johnson, P., n.d.; Barnett and O’Neill, 2010*

3.2. Getting climate science right

In late 2009, news of alleged misconduct and manipulation of scientific data by a team of reputable climate scientists travelled around the world. Though allegations were refuted, the “controversy has brought new scrutiny of the process of scientific discovery and uncertainties in climate change science.”⁸

The need to interpret scientific information on climate change carefully and understand the uncertainty surrounding it is clear. The aim of this report is not to describe the science behind climate change impacts in South and Southeast Asia. Instead, we draw relevant and reliable information from a credible source in order to provide an accurate overall picture of the challenge of climate change adaptation.

The Intergovernmental Panel on Climate Change (IPCC)⁹ Fourth Assessment Report (AR4) provides rigorously reviewed climate change data from scientific sources worldwide. It is the current global standard for information on climate change observations, impacts, and possible responses to adapting to climate change and is our primary reference on climate data for this report.¹⁰

The key message of the Assessment Report is that “climate change is occurring now, mostly as a result of human activities” (IPCC, 2007a). It illustrates the impacts of global warming, both those being observed now and those expected in future. It is important to note that the IPCC report uses uncertainty assessments¹¹ to describe the impacts of climate change. The following key messages can be derived from these assessments:

- There is growing scientific consensus over long-term climate changes and their predicted impacts. The IPCC Fourth Assessment Report ascribes high or very high confidence levels to the general trend and magnitude of rising temperatures, rising sea levels, and the acidification of oceans. Greater uncertainty remains over the timing of onset, however.
- There is more uncertainty about the severity and geographical and temporal scale of changing rainfall patterns, and the frequency and intensity of extreme weather events such as storms, heat waves, droughts, floods, and fires.¹²

Given these uncertainties, decision-makers will need to be cautious and flexible when devising adaptive strategies to potential changes in climate, particularly climate scenarios at national and sub-national levels.

Climate change scenarios described in the IPCC Fourth Assessment Report are available at regional and sub-regional levels, while scenarios at national and sub-national levels are mainly available through national communication reports submitted to the UNFCCC by the national climate change focal point offices. Climate change projections with more precise geographical detail at the sub-regional level are more difficult to calculate and their results are more uncertain (see Box 2 below). This is particularly the case in developing countries where local empirical data from weather stations over long periods is usually not available.¹³

Climate science “does not give exact or certain forecasts of the future climate”.¹⁴ Instead, decision-makers need to rely on climate projections and scenarios of possible change with varying degrees of uncertainty.

⁸ The Conference Board Inc., 2010

⁹ The IPCC is an intergovernmental scientific body established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO).

¹⁰ The IPCC’s Fifth Assessment Report is currently under development and aims to provide more detailed information on regional impacts, the socioeconomic aspects of climate change, and related risk management issues. A synthesis report is scheduled to be finalised in April 2014.

¹¹ The IPCC report uses a set of terms to describe assigned confidence levels to major statements or the likelihood of certain outcomes of future climate change. (IPCC, 2007a)

¹² Derived from IPCC, 2007a

¹³ Kropp, J. and Scholze, M., 2009

¹⁴ Ibid.

Box 2: Understanding the uncertainty of climate science

Climate change scenarios are based on two main categories of climate models:

- **General Circulation Models** (or global climate models, GCMs) project globally- or regionally-averaged estimates of future climate change.
- **Regional climate models** provide climate projections in more precise geographical detail and are derived largely from downscaling results from GCMs.

Both models describe how certain climatic parameters, such as precipitation or temperature, are expected to change in the particular geographic area under investigation. They provide climate scenarios for near-, medium- and long-term time frames.

The models project climate change scenarios based on calculations of the interrelationships of the elements of the earth and the climate system as well as GHG emissions scenarios. Global emissions scenarios describe how GHG emissions might develop in the future based on assumptions about demographic and socioeconomic development and technological change. The IPCC Fourth Assessment Report used 23 different GCMs and although they vary in terms of the accentuation of physical processes, their results are generally consistent.

Climate impact studies apply results from global or regional climate models to specific contexts (e.g. an agricultural crop or tree species) in order to illustrate how vulnerable these elements will be to changes in various climate variables. These impact assessments are undertaken by field experiments or modelling. “Vulnerability studies” go one step further by examining whether the elements are capable of adapting to these impacts.

Climate change scenarios based on these models do not provide precise or definitive information because of:

- **The uncertainty of future GHG emissions levels.** All climate models are based on predictions of future levels of GHG emissions. Simply put, they simulate climate responses to predicted emissions pathways (while taking into account interactions with major climate system components such as land surface and sea ice). Since we cannot predict future emissions trends with certainty, there will always be a degree of uncertainty in generating climate information.
- **Gaps in weather records.** The availability of local empirical data from weather stations is an important factor in generating climate change information. Statistical climate models analyse this data against model results from GCMs and extrapolate it into the future. Once data are generated from simulations, they need to be compared to observed data. However, in some developing countries, consistent empirical climate data over long time periods is lacking.
- **Complexity of the earth and climate system.** Climate scenarios are derived from our current understanding and ability to model the complex interactions between our oceanic and atmospheric circulation systems. The models attempt to describe this complexity in simple mathematical equations, but the different assumptions that inform these models produce varying results.
- **Non-linearity of climate change.** Our current climate varies according to seasonal changes and changes that occur over decades, such as the amount of solar activity and the redistribution of heat between the oceans and the atmosphere in the Pacific and Atlantic oceans. Humans have devised strategies to understand and cope with these fluctuations and cycles of extremes, but the impacts of increased GHGs in the current system are not well understood, especially how they will influence these fluctuations. Current models are good at projecting large-scale average changes, but less adept at modelling potential fluctuations. Examining a range of different results and averaging them to derive a mean climate change scenario is also not recommended because this would obscure the non-linear nature of climate changes and the full range of changes that might take place.
- **Lack of equipment and expertise.** There are few institutes in the region with the necessary equipment or expertise to produce climate projections at the subnational level, as well as store, share, and analyse the data being generated. Regional downscaling techniques require the use of high-end desktop or supercomputers, and it often takes months to simulate projections for a specific area using only one emissions scenario for one GCM.

It is important to bear in mind that global climate change is not the only factor affecting local weather and climate conditions or the frequency of natural disasters. In the short term, activities such as deforestation and development on natural floodplains pose greater risks of floods than global climate change.

Reference: Kropp Juergen and Scholze Michael, 2009 and IPCC, 2007a

4. Climate change vulnerabilities in South and Southeast Asia

4.1. Climate change impacts in South and Southeast Asia

The impacts of climate change will not be uniform. They will vary between geographical areas and over time with uncertain magnitude and frequency. Some impacts will be abrupt and immediate; others will be gradual, continuous transitions.

Climate change impacts are wide-ranging and include:

- Immediate impacts of climate variability such as extreme weather events. These manifest at regional and local levels and are already being observed.
- More gradual impacts of global warming include rising sea levels, increasing ocean acidity, and long-term changes in temperatures and precipitation. These can be far-reaching since they occur globally and can affect entire ecosystems, societies, and economies.
- There is also a risk of gradual changes exceeding critical thresholds as they affect complex feedback loops on a global scale. This could lead to abrupt changes in socioeconomic and ecological systems and wide-ranging, cascading detrimental effects. One example is the risk of widespread deglaciation of Greenland and West Antarctic ice sheets, which would result in inundation of low-lying coastal areas and, in turn, could lead to the relocation of populations, infrastructure, and economic activities.¹⁵

Table 1 and Table 2 below summarise observed and projected climate change trends and impacts for South and Southeast Asia as provided by the IPCC Fourth Assessment Report. While it is difficult to make generic statements on climate change impacts for the whole region, some key risk areas in South and Southeast Asia include:

- **Agriculture:** Changes in seasonal rainfall patterns, rising temperatures and increasing water stress will pose a risk of declining yields and farm revenues.
- **Fisheries:** A general decline in fishery production is expected.
- **Human health:** Increased rains, frequent floods and sea level rise will lead to more water-borne infectious diseases, diarrhoea and malnutrition.
- **Biodiversity and ecosystems:** Changes have been observed that could produce greater risks in terms of water supply, food security, and impacts from natural disasters.
- **Heavily populated mega-deltas:** These areas are at greater risk from flooding every year due to sea level rise and flooding from rivers.¹⁶

Governments of the five focus countries in this study have compiled more detailed information on national climate change projections from various scientific studies and empirical data from local weather stations. The Government of Indonesia, for example, provides information to the public on observed changes in rainfall patterns, monsoon onset, and temperature based on trend analyses from weather station data. It also provides projected changes in climate conditions based on different scenarios of GHG emissions. Results of both empirical trend analyses and climate change projections indicate delayed onset of the rainy season and changes in seasonal rainfall patterns. They also show that impacts will vary by region, with some provinces experiencing increases and others decreases in wet season rainfall. Changes will also vary over time, with some decades of increasing and other decades of decreasing rainfall.¹⁷

¹⁵ Adapted from IPCC, 2007a
¹⁶ IPCC, 2007a
¹⁷ Ministry of Environment, Government of Indonesia, 2010

Table 1: Climate change trends in South and Southeast Asia (summarised from IPCC, 2007b)

Climate phenomenon	Observed changes in South and Southeast Asia	Projected changes in South and Southeast Asia
Change in temperature	<p>Southeast Asia: Temperature increases of 0.1°C to 0.3°C per decade were reported between 1951 and 2000.</p> <p>The Philippines saw an increase in mean annual, maximum, and minimum temperatures of 0.14°C between 1971 and 2000.</p> <p>Sri Lanka has experienced an increase of 0.016°C per year between 1961 and 1990 across the entire country, with regional increases ranging from 0.008 to 0.025°C per year.</p>	<p>South Asia: Warming similar to global mean, with most of the warming taking place during winter</p> <p>Southeast Asia: Strong warming, with most of the warming taking place during winter</p>
Change in precipitation	<p>Southeast Asia: Decreasing trend between 1961 and 1998. The number of rainy days has declined.</p> <p>Indonesia: Decline in rainfall in southern regions and an increase in northern regions</p> <p>The Philippines: Increase in annual mean rainfall since the 1980s and in number of rainy days since the 1990s. Increase in inter-annual variability of onset of rainfall.</p> <p>Sri Lanka: Increasing trend in February and decreasing trend in June</p>	<p>South Asia: Increase in annual precipitation, particularly likely in summer and for mean winter precipitation</p> <p>Southeast Asia: Overall increase in annual precipitation, with increase likely in summer and decrease over winter</p>
Heat waves	<p>Southeast Asia: Increase in hot days and warm nights and decrease in cold days and nights between 1961 and 1998</p>	<p>Increase in heat waves, intense precipitation, and seasonal daily rain during the Asian summer monsoon</p>
Intense rains and floods	<p>Vietnam: Increased occurrence of extreme rains causing flash floods</p> <p>The Philippines: Landslides and floods in 1990 and 2004</p> <p>Sri Lanka: 17 May 2003 floods in southern province of Sri Lanka were triggered by 730 mm of rain.</p>	
Droughts	<p>Droughts in 1997 and 1998 caused massive crop failures and water shortages and forest fires in various parts of the Philippines, Laos, and Indonesia.</p>	
Cyclones	<p>The Philippines: On average, 20 cyclones cross the Philippines Area of Responsibility (PAR) with about 8–9 landfalls each year; an increase of 4.2 in the frequency of cyclones entering PAR between 1990 and 2003.</p> <p>Frequency of monsoon depressions and cyclone formation in Bay of Bengal and Arabian Sea on the decline since 1970 but intensity is increasing, causing severe floods and damages to life and property.</p>	

Table 2: Climate change impacts in South and Southeast Asia (summarised from IPCC, 2007b)

Affected sector	Observed impacts in Asia	Projected impacts
Water	Increasing frequency of El Niño, reduction in number of rain days, and temperature increase were contributing factors to water stress in Asia in the last few decades.	South and Southeast Asia: Expansion of areas under severe water stress increasing from 120 million to 1.2 billion in 2020, and 185 to 981 million in 2050 South Asia: Melting glaciers will initially increase in winter or spring and eventually decline as a result of loss of ice resources. This will be unfavourable for irrigated downstream agriculture areas of the region. Southeast Asia: Increased flooding risk during wet season and increased possibility of water shortages in the dry season in the Mekong Southeast Asia: Decline in annual flow in Red River by 13–19 percent and Mekong River by 6–24 percent by 2100
Agriculture and food production	Increasing water stress has led to a decline in production of rice, maize, and wheat in the last few decades.	South and Southeast Asia: Substantial losses in rain-fed wheat South Asia: 30 percent decrease in production of crops. Drop in yields of non-irrigated rice and wheat for temperature increase beyond 2.5°C leading to a loss in farm revenue of 9–25 percent. Net cereal production declined between 4 and 10 percent by 2100. Southeast Asia: 20 percent increase in production of crops
Oceans and coastal zones	El Niño events caused coral bleaching in 1997 and 1998, which led to a loss of 34 percent of coral reefs in Asia in 1998.	South and Southeast Asia: 24 percent reef loss in next 2–10 years and 30 percent in 10–30 years, with a loss as high as 88 percent in the next 30 years. Southeast Asia: 1m sea level risk will flood 0.5 million ha ² in the Red River delta and 15,000–20,000 km ² in the Mekong River delta. 2,500 km ² of mangroves will be lost and 1,000 km ² of cultivated farmland. Sea product culturing areas will become salt marshes.
Fishery and aquaculture	N/A	South and Southeast Asia: Reduced primary production in oceans due to changes in oceanic circulation in warmer atmosphere Likely increase in El Niño events could likely lead to declines in the abundance of fish larvae. General decline in fishery production.
Forest fires	Increasing intensity and spread of forest fires in Asia were observed in the last 20 years, largely attributed to a rise in temperature and decline in precipitation in combination with increased intensity of land use.	Future trend of forest fires due to climate change difficult to ascertain due to lack of literature

Affected sector	Observed impacts in Asia	Projected impacts
Biodiversity	Evidence of climate-related biodiversity loss in Asia remains limited. However, a large number of plant and animal species are reported to be moving to higher latitudes and altitudes as a consequence of observed climate change in many parts of Asia in recent years.	South Asia: Large decreases in the natural capital of grasslands and savannas are likely as a consequence of climate change.
Human health	Endemic morbidity and mortality due to diarrhoeal disease is linked to poverty and hygiene behaviour and is compounded by the effect of high temperatures on the proliferation of bacteria.	South and Southeast Asia: Relative risks for diarrhoea and malnutrition Warmer sea surface temperatures could increase incidences of cholera. Increased rains, frequent floods, and sea level rise will lead to more water-borne infectious diseases.

4.2. Understanding vulnerabilities to climate change

In South and Southeast Asia, climate change is likely to exacerbate underdevelopment and related challenges, such as community vulnerability. The main variables affecting community vulnerability include "exposure to climate variables, sensitivity to those variables, and the adaptive capacity of the affected community".¹⁸

The five focus countries of this report are frequently exposed to natural disasters, including geo-physical hazards such as volcanoes and earthquakes, and hydro-meteorological hazards such as floods, droughts, and storms. Climate change might increase the frequency and intensity of hydro-meteorological hazards in many parts of the region. With their long coastlines and economic activities concentrated in low-lying river deltas, these countries are vulnerable to a multitude of natural hazards.

In all focus countries, large parts of the population engage in economic activities that depend on stable and productive ecosystems, and are therefore vulnerable to extreme weather events and changing weather patterns. For example, agriculture and agro-forestry activities are susceptible to changes in average temperature, rainfall, and soil moisture. Fisheries and aquaculture are similarly sensitive to changes in the weather and climatic conditions.

The adaptive capacity of many parts of the focus countries is low as a result of various social, economic, physical, and environmental factors that increase vulnerability:

- **Environmental degradation:** The degradation of ecosystems undermines their crucial functions and services, making them less able to withstand the effects of natural disasters. Ecosystems such as estuaries, mangrove forests, and coral reefs provide valuable services such as flood regulation, storm protection, and erosion control. Ecosystem changes that are undermining these crucial functions and services include dredging of waterways, industrial and urban pollution, conversion of estuaries and wetlands, and over-harvesting of seaweed and sand (for construction).
- **Poverty:** Persistent poverty in large parts of South and Southeast Asia means that people lack the resources to adapt to climate changes or to recover from major disruptions to their livelihoods, such as floods or droughts. Insufficient assets and reserves to withstand loss, lack of economic diversification, lack of access to information and education, legal rights, and social exclusion¹⁹ all reduce a household's ability to cope with natural hazards even at a small scale.
- **Physical infrastructure:** Poor physical infrastructure can leave communities unable to withstand major shocks from natural hazards. Low construction standards for urban sewage drainage systems or poorly built coastal roads can worsen the impacts of extreme weather. When there is a lack of infrastructure to reduce the impact of natural hazards, such as sea walls, impacts are also more severe.

The above examples illustrate the strong connections between climate change adaptation and development. The World Bank (2009a) has emphasised that climate change impacts and adaptive capacity need to be systematically considered in all development cooperation efforts in order to ensure that development becomes more climate resilient. Stern (2009a) simply defines adaptation as "development in a more hostile climate".²⁰

Countries in the South and Southeast Asia have made progress in alleviating poverty and achieving the Millennium Development Goals (MDGs), but overall reductions in people living on less than US\$1.25 a day are proceeding slowly and major development challenges persist. Despite rapid economic growth in the five focus countries, "pockets of poverty" are evident when national growth figures are broken down by local level. These pockets tend to include people living in remote areas as well as the urban poor, who often live in precarious housing on riverbanks.²¹

Climate change impacts in South and Southeast Asia can intensify pressures on social cohesion and the environment and, therefore, threaten development gains.

UNDP finds that:

"Ecosystem decline and climate change together are altering the rules of development, bringing a new urgency to the MDG [Millennium Development Goal] agenda. Climate change will place additional stresses on ecosystems and further intensify the challenges facing the rural poor [...] and threaten the very basis of their household economies". Hazlewood Peter (2010)

Within the private sector of developing countries, small and microenterprises will be most at risk from the impacts of climate change. In particular, enterprises operating in the informal economy lack the resources to assess, monitor, and adapt to climate change-related risks, and severe weather or other major climatic disruption can put them out of business. In many developing countries, microenterprises are a significant source of employment (especially for people with limited access to formal sector employment) and extremely important to poverty alleviation and community development. In emerging markets, small and medium enterprises (SMEs) are the driving forces of economic growth, creating jobs and contributing to a country's GDP much more quickly than large firms.²²

¹⁸ USAID, 2007

¹⁹ See for example Bapna, M., 2009

²⁰ Fankhauser et al, 2010

²¹ UNESCAP, ADB and UNDP, 2010

²² Kearney A.T., 2010

There is therefore an urgent need to build adaptive capacity in developing countries, especially in poor communities and small enterprises. Technological and engineering solutions addressing climate change impacts do not fully address the underlying drivers of vulnerability; adaptation also needs to address the physical, social, economic, and environmental factors that make a community more vulnerable to the impacts of climate change.²³ This will require devising strategies that help to protect ecosystems and biodiversity, alleviate poverty, and ensure equal access to essential services.

²³ IPCC, 2001

5. Climate change adaptation and business

5.1. Business risks from climate change

The varied and wide-ranging impacts of climate change will produce equally varied challenges for business. Some of these impacts will be direct and immediately felt, with some industry sectors, geographical locations, and types of businesses feeling the effects more severely than others. Other impacts will be indirect, such as the social, ecological, economic, and cultural consequences of storms, floods, and other direct physical impacts of climate change. These impacts and risks will be more complex, uncertain, and difficult for business to predict.²⁴

Table 3 below provides an overview of possible climate change impacts and risks, and highlights sectors that might be particularly vulnerable. In general, business risks will include:

- **Risks to core business operations:** These stem from direct impacts on physical structures and assets such as production facilities or buildings. Impacts such as temperature changes or weather extremes can influence the “effectiveness or efficiency of production processes, the cost of operations and maintenance activities, or the quality of a product”.
- **Risks to the value chain (including the supply and demand network):** These include risks related to the availability of production inputs, changing consumer demands, and consumer access to products. Climate change could affect the availability and quality of natural resources, particularly water, utility services, logistics networks, and the health and safety of workers.²⁶
- **Risks to local communities:** These include risks that directly impact the local labour force and indirectly impact corporate community investment programmes that support local community development. As business comes to recognise the strategic importance of thriving communities, climate change impacts that negatively impact local livelihoods will become more relevant in business continuity planning.
- **Risks from economic and social changes:** In developing countries highly vulnerable to climate change there is a risk of humanitarian crises, conflicts, and instability. Climate change can contribute to a situation where environmental refugees will be forced to migrate, competition over scarce resources will increase, and ethnic tensions can be exacerbated. Recent storms and floods have already led to temporary and long-term dislocation of millions of people in the Philippines and Sri Lanka.²⁷

The types of businesses that are most at risk from climate change include:

- **Businesses dependent on climate or weather-sensitive resources:** Agriculture, forestry, agro-forestry, fishing, aquaculture, and tourism sectors in South and Southeast Asia are already experiencing impacts from increased climate variability. Changing seasonal precipitation patterns, droughts, and floods are affecting yields and profits throughout the region.
- **Businesses that make long-term investments and operate long-life assets:** These include utilities such as energy or transport, industrial facilities, and ports with a long operational life. Future climate change impacts pose risks to the efficiency and servicedelivery of these systems and will challenge their robustness and resilience.
- **Businesses with extended supply chains:** These include businesses that rely heavily on logistics and supply networks. Those who practice lean manufacturing based on just-in-time delivery and single source supply chain management are particularly vulnerable to disruptions that will restrict their flexibility and challenge their ability to adapt.
- **Businesses that are global in nature:** Global supply chains increase a company’s vulnerability to disasters since natural hazards at one location can trickle through the supply chain and create significant business disruptions. Strong interdependencies in the production process also increase the likelihood of business interruptions following a flood or storm.
- **Businesses that are labour intensive and highly dependent on local workers:** Local climatic disruptions may affect workers’ abilities to work or even to stay resident in a particular location.
- **Small, medium, and microenterprises:** The impact of a natural hazard can put these types of enterprises out of business since they do not have the capacity or resources to cope with and recover from major business disruptions.²⁸

Any effort taken to adapt to climate change carries the risk of maladaptation. Due to short-term planning horizons, businesses may be tempted to focus on adaptive measures that build resilience in the short to medium term but that increase vulnerability over time. This includes cases where a water supply is diverted to a company’s operations to mitigate immediate shortages, but this misallocation of water produces greater shortages and community conflicts in the longer term. To manage the risks of maladaptation, businesses will need to take a long-term approach to adaptation and climate-related risk management.

Responding to business risks from climate change adaptation will require investments and in many cases the investment needs are likely to be significant. However, as in other areas of business planning, it is likely that precautionary approaches will be more effective and less costly in the long run than ad hoc responsive action or delayed action that will require retrofitting or similar typically expensive secondary corrective action. Business will be well advised to take an anticipatory approach despite the potential opportunity cost of uncertainty.

Business will also need to focus on identifying the commercial opportunities that may arise for some industry sectors and locations.

²⁴ Beermann, 2011

²⁵ Sussman, F. G. and Freed, J. R., 2008

²⁶ Ibid.

²⁷ ADB, 2011

²⁸ Sussman, F. G. and Freed, J. R., 2008 and Metcalf, G. et al., 2010

Climate change may lead to new market opportunities, demand for new products and services, or declining operating costs in certain locations due to more favourable climatic conditions.²⁹

However, and despite what might seem to be a persuasive “business case for adaptation”, our dialogues with the private sector found that the business case is perceived as weak and that there are still major barriers standing in the way of action on adaptation.

Table 3: Overview of possible business risks from climate change (summarised from Metcalf Gerry et al., 2010; WBCSD, 2008 and Sussman Frances G. and Freed J. Randall, 2008)

Risk area	Description	Examples of vulnerable industry sectors and activities
Logistics	Extreme weather events can result in major disruptions to logistics, including transport arrangements, supply chains, utilities, and other essential infrastructure services. Just-in-time and single source supply systems increase a company’s vulnerability to such disruptions. This will affect business continuity and costs.	Retail industry: disruptions in the supply chain and distribution network Logistics companies: failure to meet contracts for delivery; loss of cargo
Physical assets and business premises	Risk from extreme weather events and changes in climatic conditions will affect the structure and interior and exterior of buildings. Physical assets will be at risk of damage from extreme weather events or sea level rise.	All sectors and real estate and property in particular. Design criteria for buildings based on historical climate data will likely be inadequate.
Efficiency of operations	Some industrial processes and business activities are temperature or climate sensitive and some require constant cooling. Productivity of these processes and activities can be affected and operational costs can rise due to the need for technical improvements or damage control.	Food industry: increased need for cooling for food preparation and storage Information and communication technology: increased need for cooling in data centres Manufacturing: increased need for cooling in process environment.
Competition over resources	Climate change will act as another stressor in regions already experiencing water stress. It can also affect the availability of water in non-water scarce regions. This will directly affect the operations of businesses that rely heavily on water supplies. Competition over scarce resources can lead to conflicts and undermine a company’s “social license to operate” or the acceptance and approval of the communities in which they operate. This is particularly the case if water is diverted to industries and away from local communities and farmers.	Electric utilities: greater uncertainty over water supply for cooling power plants Food and beverage: access to key resources, water, and other natural resources
Competition over resources	Climate change will act as another stressor in regions already experiencing water stress. It can also affect the availability of water in non-water scarce regions. This will directly affect the operations of businesses that rely heavily on water supplies. Competition over scarce resources can lead to conflicts and undermine a company’s “social license to operate” or the acceptance and approval of the communities in which they operate. This is particularly the case if water is diverted to industries and away from local communities and farmers.	Electric utilities: greater uncertainty over water supply for cooling power plants Food and beverage: access to key resources, water, and other natural resources

²⁹ See for example WBCSD, 2008

Risk area	Description	Examples of vulnerable industry sectors and activities
Reputational risks	Competition over scarce resources and business impacts on essential ecosystems can lead to reputational risks. This is a particular risk factor in countries vulnerable to climate change, with large parts of the population depending on climate-sensitive resources. Conflicts over protection of assets, for example, business districts being better protected than – or even at the cost of – neighbouring communities. Examples include cases where communities are not included in sea wall protection planning or may even be adversely affected by flood diversion schemes.	Beverages: community conflicts over water can arise or be exacerbated Conflicts over other scarce resources, including in the aftermath of natural disasters All – conflicts with communities; increased risk of social unrest
Financial drivers	Operational costs and business continuity costs can increase due to a combination of climate risk factors. Institutional investors and banks are increasingly interested in the investment implications of climate change. Governance of climate change risks is coming under closer scrutiny.	Electric utilities, properties, mining and extractive industries, agriculture, and forestry
Increased insurance costs	With greater risks from climate change impacts such as sea level rise and extreme weather events, premiums may increase. Insurance may no longer be available for certain assets and in very vulnerable regions. Insurance companies will see an increase in claims and will need to manage the increasing unpredictability of business disruptions.	All sectors that will not be able to insure weather-related damages as they become uninsurable; small insurance companies, e.g. cooperatives with weather risks in their portfolios threatened by bankruptcy in the event of an insurance case
Changing markets	Changing demand for goods and services and impacts on customer access can reduce sales.	All sectors but retail in particular
Workforce	Extreme weather events and changes in the distribution of vector-borne diseases can lead to more lost days. Health and safety risks may increase where business operations are prone to extreme weather events.	All sectors, especially those with outdoor site works, such as property construction
Loss of biodiversity	Changing weather patterns and rising ocean temperatures are additional stressors threatening species vital to business operations.	Pharmaceutical and cosmetics, fisheries, tourism (diving)

5.2. Focus on supply chain and value chain risks

As climate change adds to existing stresses on water resources and human health and increases the risk of flooding in coastal areas, especially in densely populated coastal mega-deltas, major industries in the region will see their value chain affected.

The agriculture and forestry sectors are important to the region's economy and the basis of many local communities' livelihoods. These sectors are also crucial to the global economy as a significant part of the supply chain of major global brands. Climate change can affect agricultural productivity through severe weather events and changing precipitation patterns, affecting the food, bio fuel, and cotton industries, as well as the vast number of industries that rely on rubber as part of their production process. Farms and factories located in areas prone to extreme weather events and other climate change impacts may indeed turn out to be the weakest and most vulnerable yet most important element in a supply chain. The ability of local farmers to adapt to these climate change impacts will be critical not only to development in the region, but also to global brands that source from the region.

In many cases, multinational enterprises will be in a position to draw on alternative sourcing locations that are less vulnerable to climate change. However, if vulnerable communities are abandoned in the midst of aggravated stress, such as in the aftermath of an extreme weather event, global brands will face immense reputational risks. In an era of easily accessible channels of protest, even for marginalised communities, they are likely to be held to account for the social impacts of their supply chain management.

Over time, climate change will likely exacerbate existing pressures on climate-sensitive resources such as water (see Table 2, Section 3.1). This will have direct impacts on businesses in agriculture, beverage, energy and other sectors that depend on a constant supply of water. It will also affect the supply chain of other businesses and potentially create major business disruptions. For example, a prolonged drought in the Philippines in early 2010 led to a sharp decrease in inflow into the reservoirs of hydroelectric power plants across the country. Major energy utilities had to curtail or stop operations because of low reservoir levels, which resulted in hours-long blackouts in the capital Manila and across various provinces.³⁰ Similarly, Henan Province in China saw blackouts in 2003 when unusually high summer temperatures led to blackouts during peak hours of energy consumption from increased use of air conditioning.³¹

In the long term, climate change will make the availability of important production inputs such as agricultural products and the continuity of critical utility services such as water and energy more uncertain. Extreme weather events such as flooding will introduce greater risks to logistics networks and affect consumer access to products as goods cannot be distributed or consumers cannot reach distribution points.

There is no doubt that the impacts of climate change will put every business at risk, rippling through value chains and stressing employee, customer, and partner relations. It is therefore in the interest of business to screen their supply chain and value chain for exposure to climate change in order to understand and anticipate potential risks, including uncertain ones. This will involve mapping the supply chain and interdependencies, screening and prioritising risks, gauging the company's appetite for risk, and eventually making operational changes and adapting the supplier strategy. Most importantly, it will involve building capacity in the supply chain to respond to disruptions. Businesses that fail to adapt their supply chains to emerging risks from climate change also risk profitability, credibility, and reputation with investors and stakeholders.

5.3. The state of business action on climate change adaptation

A review of business adaptation case studies, expert interviews and business dialogues revealed that the response of the business sector to climate change in South and Southeast Asia is still at an early stage, with many companies lacking an understanding of what climate change adaptation entails. These gaps in understanding include:

- **Focus on climate change mitigation:** Businesses in the study were largely aware of the need to act on climate change mitigation and related business risks, however, a majority failed to recognise the distinction between climate change adaptation and mitigation, especially in countries that have been less prone to natural disasters, such as Thailand. Going forward, this could have positive impacts on devising combined strategies for mitigation and adaptation. Energy providers, for example, already see opportunities in providing efficient and environmentally superior off-grid solutions that are not only climate friendly, but build adaptive capacity through independence from vulnerable grids.
- **Lack of understanding of risks:** A majority of companies are aware of the more imminent risks from current climate variability, especially with regard to extreme weather events. However, there is a lack of understanding of the wider implications of climate change and the indirect business risks these impacts pose in the long term.

This lack of understanding of indirect risks extends to industries considered to be at high risk from climate change, such as agribusiness and the beverage sector. Some large multinationals are beginning to develop strategic responses, but smaller companies are struggling to adapt.

Even in cases where some climate change response planning is in place this is usually concentrated on core business activities,

³⁰ Circle of blue water news, 07 March 2010

³¹ China Daily, 29 July 2003

and responses do not commonly address risks to the entire value chain. Management systems do not yet account for new value chain risks and there is limited awareness of the strategic need to invest in building adaptive capacity among suppliers and customers.

- **Significant variation among the five focus countries:** Companies in countries that have recently been subject to the effects of extreme weather events demonstrate a high awareness of threats associated with climatic changes. However, such awareness is often accompanied by an attitude of helplessness against the scale of the forces and a perception that they do not understand how to protect themselves and respond to risks. Small businesses in particular are exposed to existential risks since they cannot absorb the economic costs of major shocks.
- **Lack of awareness of opportunities:** There is limited awareness about the potential business opportunities created by climate change adaptation. This is not surprising given the limited understanding of long-term adaptation needs. As long as it remains difficult to forecast impacts and calculate associated damages more precisely, responses and opportunities will be difficult to identify and maximise.
- **Reliance on government interventions:** In regions prone to recurring natural hazards (e.g. cyclones in the Philippines and floods in Indonesia and Sri Lanka), many businesses feel that they have limited capacities to deal with the impacts of these events. They put the responsibility on governments to not only build resilience to these hazards, but to build capacity within the business sector to deal more effectively with these risks.
- **Reactive, not strategic responses:** In many cases, responses to already observable climate impacts on business operations are reactive and implemented on a case-by-case basis in the absence of a company-wide adaptation strategy. Some include engineering solutions to deal with floods, often implemented in the aftermath of a flood rather than as precautionary measures. Other companies are adopting ad hoc adaptive responses such as relocating operations or changing suppliers. These can pose a reputational risk and raise the risk of conflicts with local and advocacy stakeholders as vulnerable communities along the value chain may be negatively affected.

A few companies are looking at more strategic measures to make their value chain more resilient. Examples have emerged in the agriculture and agro-forestry sector where new resilient crop varieties have been introduced and efforts are being made to diversify crop varieties. Overall, however, there are very few cases of comprehensive strategies to systematically analyse projected climate change impacts in a particular location or business operation. Most companies in our research are not carrying out comprehensive business continuity exercises.

- **Lack of risk management:** Companies in the region are not integrating emerging risks such as climate change into corporate risk management systems and they only occasionally seem to impact business decision-making.
- **Low sense of urgency:** Businesses in countries and regions that have not been recently affected by extreme weather events are not only unclear about the need to engage with climate change adaptation but when that engagement should begin. The sense of urgency expressed by companies in the region to act on adaptation is very inconsistent. The greatest sense of urgency is coming from companies that have already experienced business disruptions and asset damage from severe weather events.

Our review of current business practices on adaptation shows that overall awareness of climate change impacts and corporate strategies to respond to climate change remain limited. Some businesses in the region are making proactive efforts to better understand long-term climate risks to their own operations, supply chains, and customer base. The majority, however, have not yet incorporated climate change adaptation into their risk management systems, due diligence processes, or business strategies, especially in areas that have not experienced severe weather events recently.

5.4. Barriers to business engagement in climate change adaptation

Business risks and opportunities created by climate change are not yet well understood by companies in the region, and barriers to proactive adaptation planning persist.

Findings from business dialogues and interviews provided valuable insights into barriers to business action on climate change adaptation. Addressing these barriers will be essential to establishing a business case for adaptation. The key barriers identified by business are:

- **Lack of awareness and understanding:** One of the main constraints to greater business activity on climate change adaptation remains a lack of awareness of the diverse business risks from climate change. This is particularly true of indirect business risks from climate change impacts, such as changes in the societal and political environment in which businesses operate. Such changes can include building regulations to ensure developments do not take place in high risk areas or conflicts over decreasing water resources.
- **Lack of business involvement in global and national climate change agendas:** There is limited involvement of the private sector in international and national adaptation processes. Companies we interviewed that are involved in such processes are the exception – they have sought out engagement opportunities and invested company resources to participate. Although the need

for business involvement is highlighted in global and national climate change agendas, none of the five focus countries has a formal process in place to encourage involvement.

- **Uncertainty surrounding climate change impacts:** Despite consensus on climate risks at global, regional, and national levels, there is still great uncertainty about the intensity and timing of local impacts. This has created inertia in the decision-making process on business adaptation.
- **Lack of robust climate data in a useable format:** Businesses feel that currently available climate data is of limited use because it is not presented in a format that is relevant to their particular locations and industries. For example, businesses want to better understand how climate change projections translate into industry-specific risks and opportunities, but there is a lack of robust data on likely local impacts of climate change. The inability of business to access and interpret data has led to a wait-and-see approach that constrains decision-making on adaptation.
- **Discounting the future:** The financial implications of climate change impacts are difficult to assess, and the expected onset of impacts are beyond the time horizons most businesses typically work within. Business investments that extend into the future commonly discount potential future costs and prioritise short-term benefits, especially where projected long-term outcomes and impacts are highly uncertain. In using net present value calculations, businesses are reluctant to invest in long-term projects where discount rates are high. It is quite rational for profit-oriented businesses to avoid investments when uncertainty allows limited confidence in expected returns.
- **Uncertainty about effective adaptive measures:** The effectiveness and costs of adaptation measures are uncertain and economic analyses of the various adaptation options available to business are lacking. This uncertainty, together with unpredictable future impacts on business operations and value chains, increases the risk of sunk costs and lost investment and reduces incentives to invest in anticipatory adaptation measures where benefits might not materialise for many years or decades.
- **Lack of community focus:** Apart from a few isolated cases, the majority of businesses are not contributing to community-based adaptation strategies that could enhance and protect development goals. For many companies, this will have negative impacts as unresolved development challenges in a company's sphere of influence pose reputational risks. In addition, there are direct economic risks around issues such as access to labour and markets as communities are essential as a basis for employees and customers. The future success of most companies will depend on healthy communities with access to education, essential services, infrastructure, etc.
- **Lack of regulatory guidance:** A growing number of developing countries have drafted climate change strategies and identified climate change risks and adaptation measures, but these strategies have yet to be translated into a regulatory or legal framework. Business representatives who participated in our research noted that there are some existing legislative frameworks that would be effective if they were enforced. There is poor enforcement of some regulations and many are not effectively monitored (e.g. regulations guiding environmental impact assessments, ecosystem conservation, and building codes). Many businesses indicated they would not be opposed to regulation if it was evenly applied and properly enforced.
- **Lack of incentives to engage:** Market incentives, the potential for new markets, and efforts to capitalise on opportunities in certain sectors and locations have not made much impact and investments in adaptation are limited.
- **Lack of effective strategic management frameworks:** Crisis and risk management frameworks are far from common practice in the region. Even companies that have sophisticated risk management systems in place largely fail to take into account emerging, long-term risks such as climate change where direct impacts are not immediately evident.

Overall, our research suggests that the business case for involvement in climate change adaptation is too weak to trigger any significant action by the private sector. Financial benefits, including cost savings from effective risk management, are not yet sufficiently compelling. Common business accounting practices continue to encourage discounting long-term impacts over short-term profitability. For the majority of businesses in the region, the motivation to engage in climate change adaptation is not sufficiently clear to prompt or inform effective business planning.

How an individual business will be affected by climate change depends on its unique circumstances and includes factors such as geographical location, type of business operations, lifespan of assets, and type and structure of the supply chain and customer base. The business case is stronger in sectors with long planning horizons, long-life assets, dependence on climate-sensitive resources, and physical vulnerability to climate change impacts. Some multinational companies are engaging in climate change adaptation because of brand and reputational gains from engagement. However, the uncertainty surrounding climate science, the limited predictability of business impacts, and the difficulty of quantifying and comparing adaptive measures to inaction incline most businesses towards a wait-and-see approach.

6. Adaptation beyond business resilience

6.1. Leveraging corporate social responsibility

Section 4.2 established key linkages between climate change adaptation and sustainable development. In South and Southeast Asia, climate change threatens to add another stress factor, compounding development challenges related to rapid population growth and urbanisation, rural and urban poverty, the destruction of ecosystems, and the exploitation of natural resources. Climate change is therefore a development issue, and adaptation an important element of sustainable development. Without concerted and strategic efforts, climate change will undermine development gains in the region and put sustainable development efforts at risk.

Social responsibility is evolving as a guiding principle for business contributions to sustainable development. At its core, social responsibility is an effort taken by an organisation to “incorporate social and environmental considerations in its decision making and be accountable for the impacts of its decisions and activities on society and the environment” (ISO 26000).

Although corporate social responsibility (CSR) is becoming more prevalent in the region, few companies are devising comprehensive CSR strategies to guide proactive contributions to sustainable development and tackle development challenges such as vulnerability to climate change. Many companies continue to focus on CSR projects that remain in the realm of philanthropy rather than building on strategic management approaches to CSR. Efforts largely continue to be guided by an understanding of CSR as a company’s responsibility to spend a proportion of its profits for social or environmental projects rather than being comprehensively integrated across company operations or in value chain management practices. In the region’s Buddhist countries corporate engagement is often founded in religious concepts and the central role that charity plays in this context.

Few companies focus on comprehensively building social and environmental considerations into core business practices and throughout value chains to ensure that profits are made in a way that consistently minimises negative impacts on the environment and communities in the first place. Most companies, especially small and medium sized ones, still lack the internal capacity to build sustained profitability on business practices that maximise the conservation of resources and ecosystems and contribute to sustainable and inclusive socioeconomic development.

The competitive advantages from strategic approaches to CSR and comprehensive approaches to responsible business management practices that pursue environmentally and socially sustainable growth strategies are not widely understood. Companies do not yet systematically seek to capitalise on opportunities that CSR brings for improved risk management and stakeholder relations, enhanced brand and reputational value and access to new markets for products, services, and capital as investors and large brands take sustainability risks increasingly seriously. The economic benefits of improved employee satisfaction to be gained from good CSR policies and practices and the related effects on staff recruitment, retention, and productivity, as well as the fundamental strategic relevance of healthy ecosystems and communities for future economic success, are not yet a strategic focus for most companies.

The common lack of understanding and internal professional capacity for strategic business engagement with sustainable development is also at the root of some of the key barriers to business involvement in climate change adaptation:

- **Business does not see climate change adaptation as a development issue.** For the most part, business considers climate change simply as another business risk to be addressed through traditional risk management frameworks. Climate change risks are viewed in relation to their impact on business operations, assets, and supply chains.
- **Business does not see the opportunities for proactive engagement with adaptation as a development issue through strategic approaches to CSR.** The concept of CSR is widely misunderstood by businesses in the region and globally, which tend to confuse CSR with philanthropy. Most businesses do not yet effectively respond to opportunities to contribute strategically to sustainable development. They do not include a focus on development risks from climate change into comprehensive CSR strategies that embrace approaches to climate change adaptation that make business sense while helping vulnerable communities meet adaptation needs.

The business case for extending planning horizons, tackling the broad effects of climate change, and identifying adaptation needs therefore requires companies across the region – as well as globally – to adhere to more comprehensive and strategic approaches to CSR. They need to move beyond philanthropic efforts and be driven by a sophisticated understanding of the reciprocal relationship between business activities, the environment, local communities, and society at large. Charity and philanthropy do not take advantage of the full potential of business to address development challenges.

Effective CSR practices require businesses to adopt management approaches that minimise negative impacts on the environment and society and maximise opportunities to create social and environmental value in a competitive business environment. Strategic approaches to adaptation incorporate business practices that systematically address impacts that could make ecological or human systems even more vulnerable to climate change in the future. This includes activities that would affect the integrity of ecosystems and the livelihoods of local communities.

Business contributions to sustainable development should be anchored in core business models, cover all areas of operation, and include the provision of sustainable products and services. This approach incorporates the concepts of inclusive business and “bottom of the pyramid” (BoP) strategies (see Box 3 below) that engage the poor in entrepreneurial business models to open access to critical

services, goods, and, ultimately, livelihood opportunities. Business models at the bottom of the pyramid fall into three broad categories: selling to, sourcing from, and distributing through the poor.³²

Climate change will exacerbate vulnerabilities at the bottom of the pyramid. With no or limited access to critical goods and services, this group will be hardest hit by a changing climate and threats to their livelihoods. The poor are most vulnerable to, and least able to recover from, the impacts of droughts, floods, freshwater shortages, diseases, and other impacts of climate change.

The potential of BoP strategies needs to be investigated further to help reduce vulnerabilities and build the adaptive capacity of the poor. These strategies could:

- **Open access to critical services, products, and technologies** that anticipate and help people to respond to extreme weather events and natural hazards. For example, early warning systems based on mobile phone networks, insurance, and drought- or flood-resistant crops and seeds.
- **Help safeguard critical ecosystem services** and, therefore, people and their assets. For example, community-based forestry enterprises that generate income from sustainably managed forest ecosystems or community-based ecosystem management such as mangroves.
- **Contribute to sustainable livelihoods through pro-poor supply chain** management that links producers to markets, transfers skills, and builds capacity to develop competitive sourcing options for poor and vulnerable communities. Ultimately, this would help to support livelihood security and sustainable development.

Successful approaches to adaptation will need to be based on an integrated approach that builds resilience and promotes sustainable development. The first step for business is to develop a better understanding of the roles and opportunities that exist in the region and to recognise that strategic involvement in development challenges can help to build brand, reputation, and trust and, therefore, long-term business value.

Box 3: Understanding business opportunities at the bottom of the pyramid

The bottom of the pyramid (also known as Bottom of the Pyramid or BoP) refers to the billions of people who are not traditionally recognised as a company’s target customer audience. These are those who live in relative poverty with limited or no access to essential services and goods (e.g. water, electricity, and communications). Earning only US\$1 to US\$8 in purchasing power parity (PPP) per day, they often pay higher prices than higher-income groups. Their accumulated purchasing power is significant. Taken together, the 4 billion people at the bottom of the pyramid constitute a \$5 trillion global consumer market.

These figures indicate that significant market opportunities lie at the bottom of the pyramid. Ever since C.K. Prahalad’s influential book pointed to the potential “fortune at the bottom of the pyramid”, BoP strategies have evolved and provided businesses with ways to help alleviate global development challenges and tap into potential markets at the same time.

While early attempts were applauded for making an effort, many simply did not work. Many BoP strategies did not succeed because they treated the poor as a homogeneous group of consumers or they engaged in unsustainable business practices and produced negative environmental impacts, such as excess packaging.

Learning from the past, companies that are successfully engaging the BoP are shifting from “selling to the poor” to “business co-venturing”. This next generation of BoP strategy brings multinational corporations into partnership with local communities to produce and distribute products. Companies can help communities to develop social enterprises that, in turn, help them to reach and better understand a new market.

For some companies, this is a very different way of doing business. Local participation and a “bottom-up” approach to product development are crucial for such ventures to work, and success will be measured not just by financial viability but by the social value they create.

References: Hammond, A. et al., 2007; Welford, 2006; Brown, 2009; and Prahalad, 2004

6.2. Opportunities for business involvement in community-based adaptation

Business can play an important role in improving the economic, social and environmental circumstances of poor communities in Asia. As such, business has an important role to play in climate change adaptation by contributing to reducing the underlying drivers of vulnerability including poverty, environmental degradation, and lack of access to resources.

Companies with sophisticated CSR strategies and programmes in place are increasingly interested in supporting development through corporate community investment programmes, defined by the International Finance Corporation (IFC) as “voluntary contributions and actions taken by companies to help communities in their areas of operation address their development priorities, and take advantage of opportunities created by private investment – in ways that are sustainable and support business objectives (IFC, 2010)³³.”

Businesses are increasingly aiming to make their community involvement and contributions to local development more strategic. Unlike corporate philanthropy, community investment initiatives are usually based on a long-term strategy with well-defined objectives and guiding principles and will commonly look beyond finance to achieve greater community impact. They seek to make effective use of core business assets, expertise and networks to contribute to strategically selected community development areas. Through their products and services, policies, and practices, companies seek to make a positive impact based on a sound understanding of the development priorities of the people living in those communities.

Examples of community investment projects that are linked to a clear business case include the work of beverage companies with local farmers on sustainable water resource management, logistics companies working with governments to build capacity of airports after major disasters, or hotel chains contributing to ecosystem conservation and diversifying community livelihoods.

To date, only a few companies systematically take climate change and adaptation needs of local communities into account in their community investment strategy and programme development or seek to make targeted contributions to community-based climate change adaptation (see Box 4 below).

- Large multinational corporations have undertaken community climate change adaptation initiatives in order to differentiate their CSR programmes and gain a brand and reputational advantage.
- Insurance companies have begun to help local communities through a mixture of initiatives driven by CSR strategies and commercially-driven micro-insurance programmes.
- Leading businesses in the region have devised strategies to help contribute to sustainable community development at the local level through community investment and inclusive business models. Such efforts can play an important role in helping to build adaptive capacity by reducing the underlying causes of climate vulnerability.

Often such approaches have not been conceptualised and designed to explicitly deal with adaptation needs. Businesses have therefore been criticised for rebranding existing community programmes as climate change adaptation. Many nevertheless make a significant contribution to reducing community vulnerability, enable effective coping mechanisms, and build adaptive capacity.

There is however much scope for improvement to ensure the long-term risks from climate change are systematically addressed, community investment strategies are screened for climate change related risks, and their impacts on adaptation are measured and maximised. There is also an increasing need for targeted approaches designed to address inequality, poverty, degraded ecosystems, and lack of resources with a focused view towards climate change adaptation.

As biodiversity and ecosystem services become more interesting to business, investment opportunities in ecosystem-based adaptation may also be an attractive entry point for business engagement in climate change adaptation. Indeed, an interesting focus for future community investment initiatives could be linked to ecosystem restoration, which would protect and enhance biodiversity as well as reduce community vulnerability to climate change. Box 5 below provides a brief introduction to ecosystem-based adaptation.

To date, business efforts to effectively support community, as well as ecosystems based adaptation in the context of their CSR and community investment strategies have been limited. Both have however been identified as areas with much future potential for effective ways for companies to contribute to climate change adaptation. In line with a compelling business case for strategic investments in community development as well as ecosystem conservation and management, both are areas with high potential gains for both businesses and communities.

Box 4: Understanding community-based adaptation

Community-based adaptation (CBA) requires us to study vulnerabilities and adaptation needs and efforts at the local level. The focus is on identifying needs and assisting in the implementation of community-based and community-driven development activities.

CBA seeks to strengthen the capacity of local people to adapt to new risks resulting from climate variability and addresses local development concerns that make people vulnerable to these risks in the first place. It usually takes into account planning requirements for future climate change impacts as well as immediate needs to secure sustainable livelihoods that decrease vulnerability. Approaches are commonly needs driven, guided by participatory processes, built on local knowledge and cultural norms, and involve local stakeholders throughout.

Successful CBA projects contribute to sound ecosystem management since many vulnerable communities rely on natural resources. They also seek to tap into wider economic opportunities to drive development and increase resilience.

However, CBA has not adequately incorporated climate change information or communicated climate scenarios at the community level. Experts argue that, in some locations, CBA will not be sufficient in the long run to deal with the physical impacts of climate change, such as inundation of large and densely populated areas. To be effective, CBA needs to manage risks from present climate variability as well as future climate change, complemented by technological solutions.

References: Ayers, J., 2009 and Care, 2009

Box 5: Understanding ecosystem-based adaptation

Ecosystem-based adaptation seeks to maintain ecosystem and biodiversity services because they are essential to sustainable livelihoods and building resilience to climate change.

Mangroves, coral reefs, and watershed vegetation act as natural buffers and help to reduce vulnerability to storm surges, rising sea levels, and changing precipitation patterns. In many cases they can be a more cost-effective way of protecting against extreme weather events than physical structures. Ecosystems are also essential in sustaining the livelihoods of large parts of the population in South and Southeast Asia, providing food, fibre, medicine, clean water, coastal protection, fuel wood, soil stability, and pollination.

Ecosystem-based adaptation also aims to improve the resilience of vulnerable ecosystems since climate change will exacerbate existing ecosystem and biodiversity threats, such as deforestation and land clearing for agriculture.

References: IUCN, 2008 and IUCN, 2009

³³ IFC, 2010

7. Encouraging business involvement in adaptation

7.1. Improving private sector engagement in adaptation planning

To date, business involvement in developing national and international climate change adaptation agendas has been limited. Although adaptation is primarily a public responsibility, budget and operational constraints will mean that governments will need to draw on the private sector to accelerate investment and improve the effectiveness of public adaptation measures. To achieve this, inclusive processes that engage the private sector and effective incentives for proactive private sector commitment will be inevitable.

At the global level, a series of meetings associated with the Conference of the Parties (COP) to the UN Framework Convention on Climate Change (UNFCCC) have been the key drivers of an international climate change agenda. Businesses have been included in this process only through separate side events targeted at business representatives, such as Global Business Day organised by the World Business Council for Sustainable Development (WBCSD). These are valuable dialogue platforms that help to keep the business sector involved in global discussions on climate change, albeit on the margins. However, they have not provided clear entry points for businesses into negotiations or reached an audience beyond a limited number of global business leaders.

At the last COP16 in Cancun, an initial step was taken to engage business in adaptation. The Private Sector Initiative (PSI) under the Nairobi Work Programme (NWP) held its first focal point forum at the COP16. The PSI aims to mobilise private sector engagement in adaptation and provide a platform to exchange experiences and expertise. However, with no mandate on private sector engagement processes, the PSI is limited in its work as a facilitator and disseminator of experiences, expertise, and lessons learned.³⁴

COP16 saw the adoption of the Cancun Adaptation Framework (CAF). The CAF, a result of three years of negotiations, affirms that adaptation must be given the same priority as mitigation³⁵ and represents the first formal agreement by the Parties to the UNFCCC to improve action on adaptation. The framework provides general guidance and principles on how to reduce vulnerability and build resilience to climate change in developing countries. Details related to finance, technology, and capacity building are still to be worked out.³⁶

With the adoption of the CAF, the global agenda on climate change is set to change, with adaptation receiving greater attention at global, regional, and national levels. The CAF suggests establishing regional centres and networks, especially in developing countries, and recognises the need to engage a broader range of stakeholders at all levels, including business.

The UNFCCC process on adaptation under the Nairobi Work Programme focused on National Adaptation Plans of Action (NAPA) in least developed countries (LDCs). Other countries in Asia have developed broader climate change strategies, in many cases with support from bilateral development agencies or UN bodies. For example, the Indonesian Climate Change Sectoral Roadmap was developed with support from the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the German agency for development cooperation.

In Sri Lanka, the Asian Development Bank has been working with the Ministry of Environment to formulate a climate change adaptation strategy that focuses specifically on sustainable economic development. Impacts and response options for a number of industry sectors were discussed, but business representatives who participated in the dialogue felt that engagement with key businesses on the practical details of implementation had been lacking.

There have also been limited opportunities for private sector engagement in national adaptation plans. While businesses have been identified as crucial partners and potential sources of funding, governments in the region have not yet established effective channels or processes for private sector involvement in adaptation planning. Businesses in the region have generally not been informed about national adaptation plans and have not received targeted communications on projected climate change risks and response options.

While the adoption of the CAF will strengthen the adaptation agenda at all levels, it will not automatically lead to better integration of businesses. Developments so far suggest that there will be limited scope for inclusive private sector engagement. The initiative to engage business in adaptation strategies and actions will need to be taken by national governments and other institutions at the national and regional level, but this is not set to improve significantly in the near future.

Table 4 in Annex 1 provides an overview of national adaptation agendas in the five focus countries. Our review indicated that these countries are building institutional capacities and legal frameworks to address climate change. However, they have not yet systematically engaged business in informing these processes or focused on building a better understanding of climate risks in the private sector.

³⁴ Personal communications with UNFCCC NWP PSI

³⁵ UNFCCC, 2010

³⁶ Kovacevic, M., 2011

³⁷ UNFCCC, 2007

7.2. Financing adaptation and the need for private sources of funding

Adaptation costs are estimated at levels that will be too high to be covered by public budgets and additional private sources of funding will be essential. The impacts of climate change will be most severe in developing countries, which will need investments between US\$26 billion and US\$87 billion annually in order to cope with the additional burdens of climate change. On a global scale, annual investments between US\$49 billion and US\$171 billion will be required to finance an adequate level of climate change adaptation.³⁷

Business engagement can add value to public adaptation efforts both by making additional financial resources available, as well as by contributing expertise, efficient management approaches, and process as well as technological innovation. Both investment and innovation are essential in developing and commercialising technological and engineering solutions to climate challenges, such as technologies that access new water resources, improve energy efficiency, or protect against natural hazards such as storm surges or floods.

With most public budgets already severely strained, the need for private investment is now firmly on the agenda of most discussions about climate change and its effects on economies, societies, and communities. Indeed, the one place where a private sector perspective has become a regular feature at major adaptation meetings and conferences is at sessions on funding needs and adaptation financing. However, strategies to encourage such investments and establish sustainable co-financing opportunities between public and private actors remain vague.

Improved consultation and engagement processes will be needed to identify opportunities for allocating public money in ways that effectively leverage additional private funding. The public sector will need to create clear framework conditions that incentivise the private sector to allocate resources to meet adaptation needs. Businesses cannot be expected to do so unless there is an attractive investment climate conducive to the needs of the competitive business environment in which private companies operate. Major private investments will require reliable indicators against which to calculate investment risks and opportunities for returns, both financial and non-financial.

As discussed in Section 5, companies with sophisticated CSR strategies and approaches tend to understand and seek to capitalise on non-financial returns on investments. The increasing preparedness of businesses to integrate non-financial calculations into their balance sheets is an important lever to encourage effective engagement with climate change adaptation. As is the case for any other investment decision, business however depends on stable and reliable contexts and will require clear policy directions and much improved access to reliable information on which to base such investment decisions.

Public awareness and resulting consumer behaviour will be a further important driver for private sector engagement in climate change adaptation. As an essential basis for encouraging consumer behaviour that rewards responsible business strategies on adaptation, it has the potential to be a critical tipping factor for making a compelling business case for adaptation that will be key to incentivising major investments. There is an important link not only between improved access to reliable information to businesses themselves and the identification of worthwhile investment opportunities, but also between improved public knowledge and awareness of adaptation challenges and needs and an attractive business case for investing in adaptation.

Further opportunities to incentivise private investments need to be explored and implemented. They will require clear policy directions and priorities, public co-financing mechanisms, tax incentives, and procurement policies that reinforce stringent adaptation criteria.

In addition to positive incentives, there may also be a need for regulatory requirements that mandate business planning for climate change impacts. This could include requiring business to invest in disaster response strategies and business continuity planning, and protect privately owned assets, including those of public significance (e.g. critical infrastructure and essential services) through privately financed insurance schemes. Leading companies that adhere to responsible business practices are likely to welcome the certainty regulation would bring. In order to maximise the effectiveness of regulatory action, it will be advisable to engage such business leaders in inclusive development processes of "smart" policy approaches, and even and fair implementation will need to be ensured.

Other suggestions for leveraging adaptation funding include implementing and earmarking carbon taxes, which link the causes of climate change to responsibility for its impacts. Similar taxes have been suggested for the airline industry and other high impact sectors. There is also an ongoing debate on the responsibility of industrialised nations to finance adaptation in developing countries that are suffering from impacts they have not caused. This discussion will need to include mechanisms to effectively mobilise responsible business action in areas such as technology transfer that are essential to building adaptive capacity in affected areas.

While private investment cannot and should not substitute public obligations, it is clear that whatever the calculation of adaptation costs and level of funding secured through the UNFCCC, resources will be limited. Therefore, it is essential that public funds are spent in ways that leverage maximum adaptation by the private sector (and avoid perverse incentives that promote maladaptation). It is also clear that the required private sector investments cannot be expected without significantly improving engagement mechanisms and collaborative approaches and putting in place framework conditions that incentivise such investments.

7.3. Opportunities for business engagement beyond the provision of financial resources

There is a strong link between economic development, business growth, and climate change adaptation. In providing jobs, livelihoods, and essential services, business plays a crucial role in driving economic development and building adaptive capacity in developing countries. This is true for larger businesses as well as smaller ones, which usually account for the bulk of national production and employment.

Business operations often operate critical infrastructure, deliver essential services, and affect ecosystems, all of which impacts public health and economic development in poor communities. They play a key role in determining development trajectories and whether and to what extent their operations increase vulnerabilities to climate change or build resilience to it. Large companies in particular are well positioned to leverage capital, technologies, products, processes and service innovations, networks, and management systems that will be essential for national and local governments and their citizens to adapt to climate change.

Building on core competencies that ensure business success, such as high levels of adaptability to rapidly changing market forces and consumer demands and the capacity for rapid innovation in response to changing circumstances, business is well positioned to contribute skills that can be usefully employed to adapt to climate change. Business resources and expertise can be applied to understanding vulnerabilities and potential impacts, identifying appropriate solutions, and mobilising the resources that will be needed to implement them. Business can also play a crucial role in promoting innovative solutions that build adaptive capacity by leveraging marketing skills, another core business competency.

Even effective risk management approaches, which have not yet been widely adapted to the specific types of risks associated with climate change, may effectively inform adaptation strategies in the future. Business disruptions from climate change impacts can significantly affect the long-term growth of an economy and impact socioeconomic development. It is therefore in the public interest to prevent such disruptions and encourage the effective use of business skills and opportunities through comprehensive, integrated approaches to adapting and building resilience to the impacts of climate change based on collaboration with the private sector. In turn, it is in the interest of business to contribute to safeguarding the economies, societies, and communities in which they operate.

In addition to business engagement with climate change adaptation through responsible value chain management as well as “climate smart” core operations, innovation, targeted products and services, and community investment approaches as discussed above, partnership approaches will be key to meeting adaptation needs.

Safeguarding economies and societies from the impacts of climate change creates mutual benefits for government, civil society, and business, and collaborations are vital to finding common ground and supplementing expertise and limited resources. To stimulate business-led adaptation – with regards to resource allocation and beyond – governments need to set incentives and work to create an enabling environment. There are also a number of areas in which development practitioners and for example environmental NGOs can effectively collaborate with businesses to pursue common goals of environmental sustainability and sustainable development.

8. Partnership approaches to meeting adaptation challenges

Partnerships with the private sector are becoming an increasingly important part of new approaches to development. UN agencies, development organisations, and NGOs now commonly have the role of the private sector in sustainable development on their agendas and are seeking to partner with business to meet social, environmental, and economic development objectives. Whilst the interest in business was initially linked to budgetary needs, it increasingly seeks to build on expectations that partnership approaches have the potential to meet higher expectations of efficiency in achieving development goals. The value of partnerships that go much beyond traditional fundraising approaches is increasingly well understood and widely pursued.

The private sector has been referred to as “one of the greatest untapped resources” in the race to achieve the Millennium Development Goals (MDGs). It is now widely recognised that commitments to the MDGs cannot be met “without effectively enabling, regulating and partnering with the private sector” (UNDP). The challenges at hand are simply too great to be achieved by one sector alone and will need to be tackled through strategic and effective partnerships. This argument holds for climate change and adaptation in particular, where single sector solutions are unlikely to suffice.

The private sector will be key to ensuring that economic development, trade and foreign direct investment (FDI), and the associated benefits of wealth creation, employment, and technology transfer do indeed translate into real benefits for vulnerable communities and contribute to building adaptive capacity. Partnering with business and harnessing the capacity for innovation, efficient implementation, as well as resources (financial and otherwise), will be needed to tackle the challenges associated with climate variability and change. A broad-based consensus is emerging around the need to identify and implement ways to improve collaboration between business and development practitioners at local, national, and international levels.

Public-private partnerships (PPPs) are no longer restricted to large infrastructure projects but increasingly being recognised as an innovative and effective approach to meeting development goals and responding to sustainability challenges. Most official development partnership agencies and UN organisations now engage in partnerships with businesses to tackle their respective development objectives and priorities.

To date, few PPPs explicitly respond to climate change adaptation needs. They do however have the potential to become an important response mechanism in the future and could be employed for example to respond to the need for demonstration projects focusing on engaging business for adaptation. For PPPs to become effective tools for adaptation, much work however remains to be done in improving PPP approaches in general, especially with regards to measuring their impact. Scaling-up mechanisms remain a challenge and successes often remain limited to individual projects without effective mechanisms for replication and to ensure the sustainability or targeted development outcomes in place.

While successful examples suggest that PPP approaches have potential to drive development, collaboration between public development agencies and business do not come without challenges. They commonly revolve around issues of internal resistance, different drivers, agendas and priorities, as well as very different modes and speeds of operation. These challenges are often exacerbated in partnerships between NGOs and business.

Partnership approaches nevertheless remain a promising option for climate change adaptation. What is needed, however, are extensive capacity building efforts for both businesses and their potential partners to develop professional competencies and improve partnership approaches to development and adaptation.

In the following we briefly discuss partnership approaches in three sectors in which public-private partnerships will be especially significant to meeting adaptation needs, namely, critical infrastructure, insurance, and agriculture.

Partnerships to reduce risks from natural disasters build on a compelling case for private sector involvement in disaster risk reduction (DRR) in developing countries. With substantial increases in investment and economic activity in developing countries, corporations have become more vulnerable to losses in countries that are prone to disasters. For example, the coastal cities of Jakarta, Bangkok, and Manila are strategic locations of many businesses in the region. They are, however, also highly vulnerable to natural hazards.

For businesses operating in affected regions, there is a clear need to look at exposure to risk and to identify appropriate ways of reducing this exposure through investments in hazard monitoring, risk mitigation, and business continuity planning.

There is a clear business case for business sector involvement in DRR, not only to minimise disaster risks to businesses themselves, but to reduce the vulnerability of value chains and communities where businesses operate or to which goods and services are sold. Damaged communications and transport infrastructures, disturbance to the supply and distribution chain, and employees unable to get to work can all significantly affect business operations. Business continuity planning can only be successful if it considers the vulnerability of infrastructure, utility services, suppliers, employees, and customers. Collaborating with governmental and intergovernmental actors provides businesses with an opportunity to find innovative ways to meet its own interests while also contributing to more resilient local economies and communities.



Public-private partnerships to safeguard critical infrastructure respond to the fact that entire economies depend on them, which makes the resilience of critical infrastructures a particularly important aspect of climate change adaptation that is of key strategic relevance to both the public and private sectors.

Critical infrastructures are those infrastructures that would produce serious impacts on social and economic well-being and national security if they were disrupted or destroyed. They include not only physical assets, but networks and supply chains that support the delivery of essential services and keep the economy and government functioning.³⁸ For example, the supply of food is dependent on a complex network of producers, processors, manufacturers, distributors, and retailers and the infrastructure that supports them.

The disruption or destruction of critical infrastructures and services can have far-reaching effects due to the complex, highly connected, and highly interdependent systems³⁹ that support them. Disruption in one part of the system will affect other interconnected systems.

In South and Southeast Asia, large parts of critical infrastructure systems are operated by the private sector. For instance, urban water supply systems in Manila and Jakarta are run by private companies. Therefore, joint efforts between commercial infrastructure operators and national governments are needed to build the resilience of infrastructure systems. There is a particular role for governments in establishing cross-sectoral collaboration to help infrastructure operators better understand the position of their assets in complex systems and the interdependencies. To ensure the continuity of critical services, governments will also need to encourage and enable operators of different critical infrastructure systems to share expertise and resources with the government and among themselves.

Governments need to engage businesses at a much earlier stage, such as during public procurement processes for infrastructure projects. Public procurement for large-scale and long-life public infrastructures (e.g. power plants) needs to take into account the projected impacts of climate change, and businesses need to be involved in developing design criteria and suitable project sites to safeguard infrastructure and improve resilience to climate change. This will also enable companies to innovate and tap into new business opportunities. For example, the World Resources Institute (WRI) mapped water scarcity data with plant locations of the largest publicly listed power generation companies in five Asian countries and found that over half of the companies' existing and planned capacity is located in areas considered to be water scarce or stressed.⁴⁰

Partnerships on risk mitigation and financing through innovative insurance solutions respond to the increasing risk of extreme weather events associated with climate change. They can help manage the burden on public budgets to cover the costs of disaster response and relief efforts and rebuilding communities and economies. This is of particular relevance in the region's developing countries and in poor communities where the private insurance cover of individuals is commonly extremely low.

Innovative insurance solutions have been piloted to transfer risks in countries vulnerable to natural hazards. Such solutions include:

- microinsurance services that protect previously uninsured individuals and small enterprises; and
- macroinsurance instruments that can help absorb the financial impact of disasters on government budgets. These include sovereign insurance instruments and regional catastrophe pools.

Climate change will likely intensify the need for these insurance solutions since it increases the risk of extreme weather events such as droughts or floods. As risks increase, however, they may become too big or unpredictable to be attractive as private sector products. Innovative partnerships between the public and private sectors will be needed to meet this challenge.

For businesses, however, insurance needs to be seen as one element of a comprehensive risk management approach that prioritises preparedness and risk reduction over risk transfer. Insurance should be used as a tool to incentivise proactive adaptation and risk reduction efforts. It also needs to encourage investments in activities and engineering solutions with net economic benefits, which will vary by location and type of climate change risk. In the region's low lying coastal areas and mega-deltas, they might for example include conservation of mangrove forests or the construction of defences against storm surges.

Supply chain partnerships can help large multinational enterprises safeguard their extensive value chains against potential climate change impacts whilst building resilience in vulnerable communities along their supply chains. They will typically be driven by risk management strategies and business continuity planning efforts, supported by responsible supply chain management practices that take into account the needs of vulnerable communities in a company's sphere of influence.

Business strategies that focus on drivers of vulnerability are likely to include efforts to increase resource efficiency which help to build adaptive capacity by reducing dependency on climate-sensitive resources. Efforts to reduce the consumption of resources throughout the value chain help to reduce vulnerabilities to climate change in regions that will experience increased water stress and declines in agricultural productivity.

With investors and stakeholders increasingly interested in the performance of a company's entire value chain, the business case to build capacity up and down the supply chain is getting stronger. For example, the Carbon Disclosure Project's supply chain programme has over 50 business partners who are working to understand how their supplier companies address climate change. Climate change

³⁸ FEMA: Website of the Federal Emergency Management Agency at the U.S. Department of Homeland Security

³⁹ Stapelberg, R.F., n.d.

⁴⁰ Klop, P. et al., 2010: The five focus countries of the WRI study include India, Malaysia, the Philippines, Thailand, and Vietnam.



adaptation underlines the importance of working towards sustainable value chains and building partnerships with suppliers to better understand climate risks in the supply chain.

Global brands have a stake in not only building the resilience of their supply chain, but also the resilience of small-scale farmers who are often the most vulnerable element. Efforts need to focus on reducing the consumption of climate-sensitive resources and inputs such as water, and promoting farming practices that use appropriate seed varieties. Joint efforts are also needed to provide affordable insurance to farmers and promote transparent and fair pricing of agricultural products. A degree of susceptibility to disruptions will remain as impacts ripple through the supply chain, however. Extreme weather events and export restrictions in some of the most productive cotton producing countries, including Pakistan, India, and Australia, have led to cotton scarcity and higher prices.

There is great potential for industry-wide coalitions and public-private cooperation to build the resilience of global supply chains. Governments need to establish the right incentives to implement industry standards in support of sustainable supply chains and responsible sourcing. There is also a need to increase awareness of supply chain risks by improving knowledge and access to information on the impacts of climate change on local economies, farmers, and industries.

9. Conclusion and Outlook

Climate change poses serious risks to the environment, economies, and societies in South and Southeast Asia. Climate change adaptation needs to be framed as a critical element of sustainable development. This is particularly important in the region's developing countries where considerable development challenges persist, at least in pockets, despite significant recent and ongoing economic growth.

Business plays a crucial role in building resilience within economies and societies and contributing to environmental protection. However, business awareness and understanding of climate change impacts, adaptation needs, and response options, are limited. Businesses that are aware of climate change impacts and the need to extend their planning horizons accordingly still face significant barriers that impede them from taking immediate and comprehensive action.

Businesses in the region are already being affected by the physical impacts of climate change and climate variability. Throughout the region extreme weather events such as floods and droughts threaten assets and disrupt supply chains, logistics, and other business operations. Many businesses feel that their options for responding are limited. They are looking to governments for guidance to better understand the impacts of climate change, the business implications, and the response options. Small businesses and micro-enterprises will require public support as they do not have the capacity to shoulder climate change impacts on their own.

To ensure business continuity, some companies are investing in improving their risk management. Comprehensive risk management systems that include the entire value chain, however, are not common practice among businesses in the region. In addition, the uncertainty of climate change impacts and the limited availability of climate data at national and sub-national levels discourage the integration of adaptation concerns into business planning.

Nevertheless, the most important driver for business to act on climate change is the need to safeguard operations, assets and value chains. To strengthen the business case and enhance the economic viability of progressive adaptation strategies it will be necessary to:

- Set clear policy directions to provide businesses with greater certainty for business planning. For example, government leadership is required to ensure the integration of adaptation concerns into building regulations, standards and design criteria.
- Provide adequate information services on the impacts of climate change on specific geographical areas and industry sectors. This data is crucial to enable business to include climate change into risks management systems and decision making processes.
- Improve the allocation of public efforts and resources to incentivise private investments. This will require improved alignment of available public funding mechanisms, clear directions, priorities, and allocation criteria, as well as comprehensive impact measurement systems.
- More effectively engage business in public development processes for climate change adaptation. This applies to the international arena, e.g. the UNFCCC process, as well as local and national adaptation planning.
- Contribute to capacity building in the private sector, in particular for small, medium and micro-enterprises. Multi-disciplinary sector initiatives can help advance the awareness and availability of response options in industry sectors particularly vulnerable to climate change and benefit both private and public interests.

The private sector is recognised as an important actor to help build adaptive capacity in the region. With constrained public budgets and capacities there is great potential for the private sector to help meet public needs and to leverage its expertise, resources, and capacity to innovate. This can also yield significant business opportunities:

- Precautionary approaches tend to be more cost effective in the long run. Comprehensive and timely planning can help businesses avoid potentially high costs of, for example, major disruptions to critical infrastructure and essential services.
- Climate change impacts can present commercial opportunities related to business growth, diversification and innovation. For example, there is a need for new services and products that help businesses, individuals, and societies adapt to greater risk of water shortages or extreme weather events.
- Governments in the region have developed, or are in the process of developing, climate change strategies and plans that address the need to mitigate and adapt to climate change. In most cases, these strategies have not been informed by a multi-stakeholder consultation process and thus lack a business perspective. Through policy advocacy and engagement in national and international climate change deliberations, businesses can ensure that their needs are being considered. Proactive engagement will also enable business to stay ahead of regulation and avoid high costs of reactive responses.
- Companies committed to improving their CSR performance will see value in engaging with innovative community-based as well as ecosystems-based adaptation. There are opportunities for business to build on community involvement activities to contribute to the resilience of vulnerable communities to climate change. Companies that invest financial and other resources in community development activities will benefit from considering climate change factors to ensure that project outcomes are not undermined by future impacts from climate change.

Efforts to improve business engagement in climate change adaptation will need to go beyond risk management, business continuity planning, and new market opportunities. Any approach to climate change adaptation needs to be linked to a broader development agenda and prioritise efforts to build the resilience of vulnerable communities.

Much needs to be done to better harness the innovative capacity, resource wealth, and implementation efficiency of the private sector for effective response options to the development challenges that exacerbate adaptation needs:

- To date, very few businesses are developing climate change adaptation strategies that systematically focus on the link between climate change adaptation and development and tackle the underlying causes of vulnerability. Businesses will need to increasingly recognise the strategic relevance of integrating sustainability and development issues into their core business strategies for the development agenda to be effectively promoted as a viable entry point to climate change adaptation.
- Adaptation costs are estimated at levels that will be too high to be covered by public budgets. Many non-business actors concerned with climate change adaptation are looking to companies primarily for additional funding. This tends to limit their consideration of other, potentially more effective and sustainable, contributions that business can make to climate change adaptation. These include contributing expertise, effective planning and management approaches, and innovative capacity to meet changing needs.
- Engaging with business in partnerships for development has a great deal of potential. There is large scope in which to improve the engagement of businesses in community-based adaptation projects, and systematically build climate change adaptation into corporate community involvement.
- The link between functioning ecosystems, sustainable livelihoods, and resilience opens up opportunities for businesses to invest in protecting ecosystems and thereby building the adaptive capacity of communities along their value chain. Awareness raising, capacity building and successful demonstration projects will be needed to promote uptake.

Annex 1: National climate change agendas in the five focus countries

Table 4: National climate change agendas in the five focus countries

Country	Climate change strategies and processes
Indonesia	<p>National Action Plan Addressing Climate Change (RAN-PI): Published in 2007, it sought to provide guidance to various institutions bringing about a coordinated and integrated approach to climate change. RAN-PI introduces challenges and needs in addressing both mitigation and adaptation.</p> <p>National Action Plan for Reducing Greenhouse Gas Emissions (RAN-GRK) (Draft Document): Indonesia set a target to reduce greenhouse gas emissions by 26 percent from business-as-usual by 2020. RAN GRK outlines strategies to achieve this target through a coordinated approach by relevant sectors and provinces.</p> <p>Indonesia Climate Change Sectoral Roadmap (ICCSR): The ICCSR sought to accelerate the implementation of the National Action Plan Addressing Climate Change by various relevant sectors and to mainstream climate change issues into national development planning. It is meant to provide inputs for the five year medium-term Development Plan (RPJM) 2010-2014 and for the subsequent RPJMN until 2030. It must be considered in the strategic plans of every ministry and government agency. It outlines risks and adaptive actions required for key geographical areas and key sectors, including water, marine and fisheries, agriculture, and health.</p> <p>Indonesia Country Report on Climate Variability and Climate Change: The report, prepared by a group of leading Indonesian experts from various sectors and institutions, presents an analytical overview of climate impacts in Indonesia. The results presented in the report are sought to be in line with the work from the Intergovernmental Panel on Climate Change.</p> <p>Reference: Ministry of Environment of the Republic of Indonesia, 2010; Government of the Republic of Indonesia, 2009; and Government of the Republic of Indonesia, 2007</p>
Sri Lanka	<p>The Climate Change Secretariat under the Ministry of Environment and Natural Resources (CCS, 2010) developed their National Climate Change Adaptation Strategy for 2011–2016 (NCCAS). As part of the development of the NCCAS, an Information, Education and Communications Strategy for Climate Change Adaptation in Sri Lanka was developed in 2010, using a consultative process that included a stakeholder workshop attended by participants representing private sector institutions. This document highlights the role of the state in mainstreaming adaptation into society through the development of policies, laws, and regulations, and engaging state sector institutions from the beginning. The role of other stakeholders, such as the private sector, is acknowledged following the initial engagement of the former stakeholders.</p> <p>Following the December 2004 Indian Ocean Tsunami, a road map for disaster risk management was developed, entitled Towards a Safer Sri Lanka (2005). The National Disaster Management Coordinating Committee is the National Disaster Risk Reduction Focal Point.</p> <p>Reference: CCS, 2010 and PreventionWeb, 2011</p>
Thailand	<p>The Office of Natural Resources and Environmental Policy and Planning (ONEP) within the Ministry of Natural Resources and Environment (MONRE) has been designated as the formal contact and coordination point for climate change policy in Thailand.</p> <p>Thailand's Five-Year Strategy on Climate Change (2008–12) ordered relevant government ministries to form subcommittees, following the progress and coordinating activities of the various ministries and departments. Sections of this strategy relevant to climate change adaptation focused on building general capacity to adapt and reduce vulnerability to climate change impacts.</p> <p>A 10-year Strategic Plan on Climate Change (2010–2019) and a three-year Action Plan (2010–2012) have been drafted. Documents provided at consultation meetings to develop the Plan reveal that one of two primary goals highlights the need to build adaptive capacity.</p> <p>Reference: Adaptation Knowledge Platform, 2010</p>

Country	Climate change strategies and processes
The Philippines	<p>Climate Change Commission: established in 2009 under the Department of Environment and Natural Resources (DENR), its role is to coordinate, monitor and evaluate national climate change programs and action plans.</p> <p>Climate Change Act – Republic Act 9729: The Act calls for the development of the National Climate Change Action Plan (NCCAP) and mandates local government units (LGUs) to be the “frontline agencies in the formulation, planning and implementation of climate change action plans in their respective areas”. It thus places the onus on LGUs to mainstream climate change at the sub-national level. It also integrates climate risks into a 10-year blueprint for reducing risks to natural hazards.</p> <p>Provincial manifestos: Through these manifestos, municipal mayors commit “themselves and their communities to be more resilient and adaptive, incorporating vulnerability assessment and climate change adaptation measures as part of their development planning process, and implementing climate change adaptation measures to attain the MDG commitments”.</p> <p>Although the DENR noted that different stakeholders were consulted on how to address the issue of climate change, the extent to which the private sector was engaged in the development of the Philippines Strategy on Climate Change Adaptation or participated in the LGU summits is unclear. It is acknowledged though that the development of a national strategy on climate change would encourage private sector participation.</p> <p>References: PreventionWeb, 2011; LGU, 2010; and De Vera Ellalyn B., 2010</p>
Vietnam	<p>The Ministry of Natural Resources and Environment (MONRE) is the lead national agency mandated to coordinate national efforts related to climate change.</p> <p>National Target Program to Respond to Climate Change (NTP): Published in 2008, the NTP sets out a series of tasks to be undertaken by individual ministries by 2015 to address climate change. One of the strategic objectives is “to develop feasible action plans to effectively respond to climate change in the short-term and longer term”.</p> <p>MONRE acknowledges that it has faced some challenges in engaging the private sector in developing the NTP (personal communications, 2011), however, as the Ministry of Industry and Trade and other line ministries have identified specific tasks, there is scope for private sector involvement in setting agendas for their specific sectors, especially where line ministerial action plans have yet to be developed.</p> <p>Provincial and city governments have been tasked with developing local climate change adaptation plans. This provides additional entry points for the private sector to be involved as local adaptation strategies are developed where their businesses are located.</p> <p>A national disaster risk reduction and climate change adaptation forum led by the Ministry of Agriculture and Rural Development (MARD) has been proposed for Vietnam and is scheduled to begin work in October 2011. It is expected that the forum will provide a platform for government and non-governmental agencies and organisations to share information and experiences and enhance cooperation to reduce the vulnerability of areas at risk and improve recovery capacities in the aftermath of disasters. This will also provide the private sector with a way to engage in these issues.</p> <p>Reference: Vietnews, 2011 and The Ministry of Natural Resources and Environment, Thailand (MONRE), 2008</p>

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About this report

This report was funded by the Swedish International Development Cooperation Agency (Sida) and prepared by CSR Asia and the CSR Asia Center at AIT.

It is the first publication of a series of five and is complemented by the following four shorter focus documents:

- Climate change adaptation in Asia – A brief for business executives
- Incentivising business engagement with climate change adaptation - Recommendations for government
- Partnering with business for climate change adaptation – Recommendations for development practitioners
- A compilation of case studies showcasing examples of business engagement in adaptation efforts in South and Southeast Asia.



CSR Asia is the leading provider of information, training, research and consultancy services on sustainable business practices in Asia. Operating as a dynamic social enterprise, CSR Asia occupies the unique middle ground between civil society organisations and fully commercial consultancies.

CSR Asia helps define the role of the private sector in tackling global challenges and build partnerships with business for sustainable development. To inform policy and practice, we undertake research and facilitate engagement processes on behalf of international development agencies and other organisations aiming to improve their engagement with business. We also support businesses to understand the strategic relevance of sustainable development and build capacity to address sustainability and development challenges effectively in a competitive and dynamic business environment.



The CSR Asia Center at AIT is a joint venture partnership between CSR Asia and the Asian Institute of Technology (AIT), an international institution that promotes technological change and sustainable development in the Asia-Pacific region through higher education, research and outreach. The CSR Asia Center at AIT brings together the strength of the two founding organizations: It engages in research and engagement projects on cutting edge issues and trends for the role of the private sector in sustainable development in Asia with a focus on the region's least developed countries; and develops and delivers training and executive education programmes to build capacity for CSR and partnerships with business for sustainable development. As such, it coordinates the joint Professional Masters Programme in CSR offered by AIT in collaboration with CSR Asia.

To learn more about CSR Asia, the CSR Asia Center at AIT, or to provide a case study on business engagement in climate change adaptation, please contact Leena Wokeck at leena@ait.asia.

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