



January 2009

# Making Climate Your Business

## Private Sector Adaptation in Southeast Asia



# Table of Contents

Executive Summary .....	3
I. Introduction.....	6
II. Climate Change – What Does it Mean for Business in Southeast Asia?.....	9
III. Adaptation – State of Play .....	14
IV. Business Risks and Opportunities.....	21
V. Assessment and Action for Adaptation .....	28
VI. Business Adaptation Case Studies .....	39
Socially Responsible Entrepreneurship Drives Rural Development and Poverty Alleviation: Sunlabob, Lao PDR.....	39
Micro-insurance Reducing Farmers' Exposure to Weather Risk: an ICICI Lombard and BASIX Partnership .....	41
Building Reputations, Securing Resources: Coca-Cola and WWF Team Up for Water Conservation.....	43
Rabobank Foundation: Expertise Reduces Climate Change Risks for Most Vulnerable in Jakarta .....	45
VII. Conclusions and Recommendations .....	47
VIII. Annexes.....	50
Annex 1: Public Sector Funding for Adaptation .....	50
Annex 2: National Planning for Adaptation in South and Southeast Asia .....	51
IX. References .....	53

Published by Sida 2009 in cooperation with WRI & CSR Asia

Author: Lauren Withey, Karin Borgerson, Kirk Herbertson, Heather McGray, Jacqui Dixon,  
Marie Morice, Richard Welford, Helen Roeth

Production/Print: Edita Communication, 2009

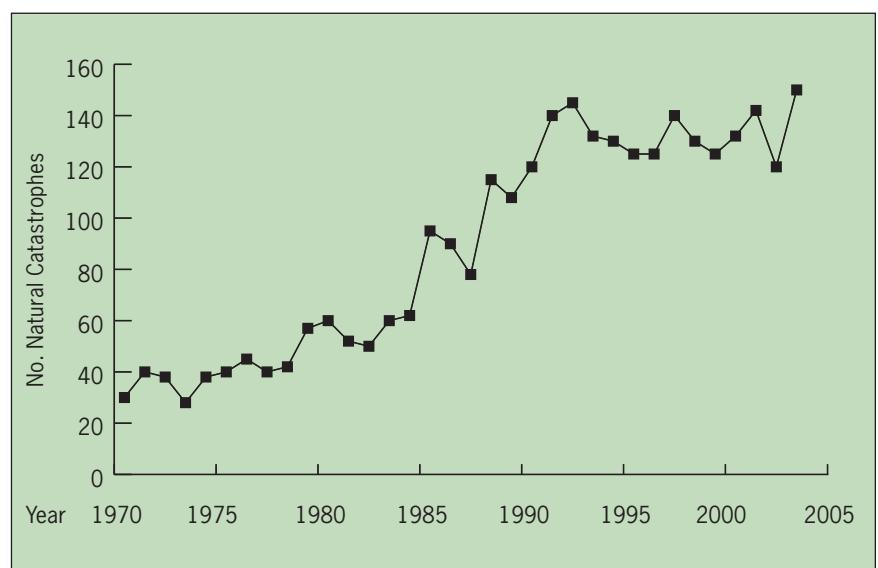
Art. no.: SIDA47299en

This publication can be downloaded/ordered from [www.sida.se/publications](http://www.sida.se/publications)

# Executive Summary

Climate change is here. The present and future implications of a warming climate are becoming clearer, thanks to a growing body of scientific evidence devoted to the topic. Most of society now recognizes the importance of dealing with the problem, which will include not just warmer temperatures in many regions and sea level rise, but also changes in weather patterns that produce more intense and frequent tropical storms, flooding, and drought. While much of the climate change debate has historically centered around how to prevent additional warming, efforts at halting climate change are no longer sufficient. We have passed the point of preventing all climate change effects: adaptation to inevitable impacts – including more natural disasters (see Figure 1) – is now equally critical to minimize the harm that these impacts cause across society.

**Figure 1: Climate Change Impacts Evidence: Natural Catastrophes, 1975–2005**



*Source: Swiss Re 2007*

Businesses need to adapt. Many businesses have no choice about whether to respond to climate change impacts: climate change will force itself upon them. Their choices now come down to:

1. *When* to respond. Should they act in anticipation of climate impacts or wait until they have no choice but to act?
2. *How* to respond. Should they upgrade their facilities? Change the standards for the businesses they finance? Alter their product line? Enter new markets? Do nothing?

What any given business chooses to do will depend upon the type of business, its place in a larger economic, political, and social context, and the unique ways that climate change affects its work.

Climate change may affect a business through a number of possible pathways. It could, for example, affect:

- Supply chains
- Employees
- Customers
- Distribution networks
- Finance options
- Insurance costs, and
- The macroeconomic environment

Companies in Southeast Asia are at particular risk. This region is likely to experience a combination of more frequent and severe floods, droughts, and cyclones. With its extensive coastlines, Southeast Asia is also significantly exposed to sea level rise. Though many of these countries and their businesses are accustomed to dealing with a challenging climate, climate change will present new difficulties, especially when added to ongoing environmental degradation, widespread poverty, and, in some cases, political and economic instability. Businesses with interests in the region will likely experience repercussions of climate change through at least one of the pathways listed above.

Business actions have consequences for the vulnerable populations in this region. Southeast Asia is home to some of the populations most vulnerable to climate change in the world. In many of these countries large portions of the population live in poverty, and are particularly vulnerable to climate change, as they lack the resources necessary for many types of adaptive actions. Moreover, ongoing social and environmental challenges in the region – notably growing income inequality, rising food prices, and widespread deforestation – contribute to social vulnerability and make climate change more likely to bring significant harms. Businesses may not typically focus much attention on assuring that the poorest populations around them can adapt to climate change. However, the private sector will play a substantial role in determining the level of adaptation success achieved across Southeast Asia. This report will emphasize possible “win-win” opportunities in this context – e.g. providing goods and services needed to aid adaptation across society, or contracting with government to deliver expertise or services that help broader segments of the population adapt – where business incentives may align with the needs of the poor, vulnerable populations of the region. The paper will also note where business actions might undermine adaptation among the poor.

Business is behind. While governments and non-profits in the region are busy tackling climate change with the help of funding from abroad, the business sector is notably behind. Now is a particularly opportune moment for the private sector in the region to catch up: doing so will allow business to keep a competitive edge by accounting for emerging climate risks and opportunities. Quick action will also help these businesses to team up with government and civil society to promote adaptation among the most vulnerable segments of the population – and make a profit while doing so.

# I. Introduction

Climate change is real, and we have passed the point where we can prevent all of its effects. Southeast Asia is already experiencing these effects—shifting monsoon seasons, more intense storms, and increased flood risks in coastal zones and major river basins. These new climate trends will become more pronounced in coming years.

Taking action to *adapt* to climate change needs to begin now. *Adapting* to climate change means adjusting plans and activities to account for new climate trends. It means changing the way businesses, governments, and other organizations operate, so that people can thrive in a warming world.

Business action is critical for assuring successful adaptation across society. The private sector, at its best, is nimble in response to new threats and opportunities, and is a source of creativity and innovation. The profit expectations of stockholders and investors drive avoidance or mitigation of risks, as well as the pursuit of ever-more-efficient implementation of business processes. The private sector also has the ability to move large flows of capital much faster than many public funding mechanisms can. All of these skills and qualities will be much needed as the climate changes.

This report seeks to assist businesses operating in Southeast Asia to:

- Understand the need to adapt to climate change. What is climate adaptation, and what does it mean for business?
- Learn what others are doing within government, civil society, and the private sector to promote adaptation, and how these activities may affect the rest of society.
- Identify the risks and opportunities that climate change impacts present, both for business and for the broader society.
- Provide examples of how companies can act on these risks and opportunities for their own benefit, and for others'.

The report focuses on business in Southeast Asia, though it also references parts of South Asia. South Asia faces many of the same challenges that Southeast Asian countries face and it provides useful examples of adaptation already underway (see Figure 2).

**Figure 2: Countries of Focus**



*Note: This report will discuss adaptation to climate change in the highlighted countries, including some from both South and Southeast Asia. The primary focus is Southeast Asia. However, Sri Lanka and Bangladesh are included because of their high vulnerability to climate change impacts and because of existing examples of adaptation found there.*

Southeast Asia is particularly vulnerable to climate change for several reasons. First and foremost, in many of these countries large portions of the population live in poverty. The proportion of the population living below the poverty line ranges from the lowest in Thailand at 10.2% to 53% in Lao PDR (ADB 2008). The poor are particularly vulnerable to climate change, as they lack the resources necessary for many types of adaptive actions. With its extensive coastlines, Southeast Asia is also home to many millions of people living at low elevations that are at risk from sea level rise. (See Table 1.) Moreover, ongoing social and environmental challenges in the region – notably growing income inequality, rising food prices, and widespread deforestation – contribute to social vulnerability and make climate change more likely to bring significant harms.

**Table 1: Vulnerability Metrics: Select Economic and Geographical Data for South and Southeast Asia**

Country	Population, 2007 (millions)	GDP per capita (US\$)	# People living within 10 m of sea level (millions)	% Population Living Below the Poverty Line*
Bangladesh	140.7	1,298	62.5	50
Brunei Darussalam	.4	49,370	.03	n/a
Cambodia	14.4	1,633	3.1	40
Indonesia	224.8	3,471	41.6	19 (Urban)
				-24 (Rural)
Lao PDR	5.9	2,032	0	44
Malaysia	27.2	12,314	5.2	0.54
Myanmar	57.7	n/a	12.3	n/a
Philippines	88.7	3,127	13.3	23
Singapore	4.6	47,055	.6	n/a

Sri Lanka	20.1	3,930	2.2	14
Thailand	65.7	7,403	16.5	0.40
Vietnam	85.3	2,363	43.1	21

\* <\$2.25/day, using 2005 purchasing power parity figures.

Sources: ADB 2008a; ADB 2008b; World Bank 2008a; CIESIN 2008

High levels of vulnerability among the population add complexity to businesses' adaptation efforts. Companies will need to consider the adaptation options of others in the region. What are the impacts of a company's operations and adaptation efforts on the capacity of others to adapt? Where can companies find win-win adaptation windows, where their adaptation efforts also help reduce the risk to those around them?

Businesses need to satisfy shareholders on a short-term basis irrespective of whether the shareholders have an interest in longer-term issues. However, if business leaders are courageous in explaining their strategies to create long-term value, and why these are linked to driving social progress, then investors will increasingly value such factors in their investment decisions.

– “From Challenge to Opportunity: The Role of Business in Tomorrow’s Society” (WBCSD 2008: 33)

*Section II* provides a foundation for answering these questions by laying out the basics of climate change, its impacts, and what they may mean for business. *Section III* then moves to a review of current activities on adaptation, both within Southeast Asia and more broadly. *Section IV* considers the risks and opportunities that climate change presents to different kinds of businesses. With these potential risks and opportunities in mind, *Section V* considers ways that a business might think about these risks and opportunities in its decision-making processes.

In order to illustrate the potential for climate-adaptive business practices, programs, and partnerships, *Section VI* provides four case studies highlighting business engagement in climate adaptation efforts in key economic sectors – electricity, agriculture, food and beverage, and insurance.

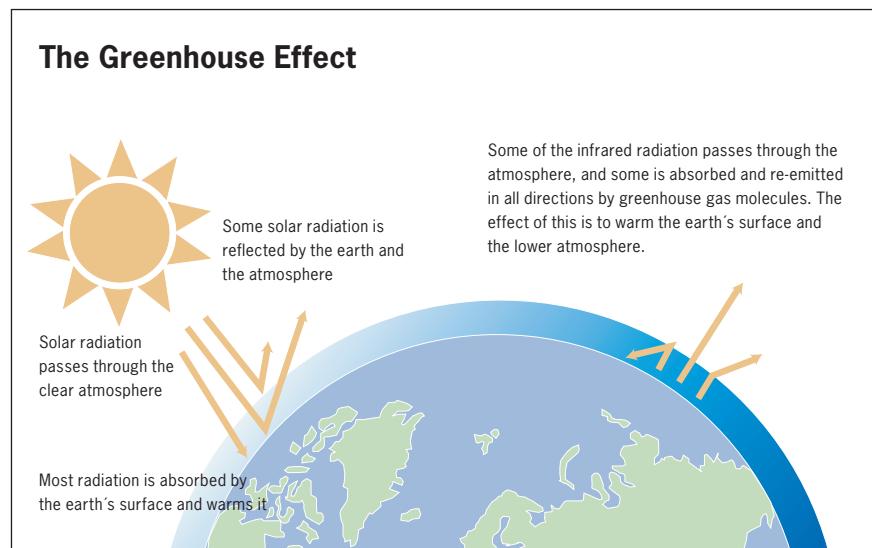
The conclusion, *Section VII* considers the many ways that climate change affects business and how business can respond. It also considers how the private sector affects the capacity for other segments of society to adapt. A set of recommendations lays out next steps for businesses to take as they consider how to incorporate new risks and opportunities associated with climate change into their work.

## II. Climate Change – What Does it Mean for Business in Southeast Asia?

*Climate change* describes long-term, worldwide changes in weather patterns that are happening in response to increasing concentrations of greenhouse gases in the atmosphere. *Greenhouse gases*, such as carbon dioxide, have been emitted in ever-larger quantities since the start of industrialization, and they are causing temperatures around the globe to rise. (Fig. 3) This *global warming* affects the broader climate system, and can lead to a wide variety of *impacts*, including: more frequent heat waves, disruption of monsoon cycles, longer droughts, more frequent floods, the melting of glaciers, stronger and more frequent storms, and rising sea levels.

Science is showing with ever-greater certainty that these impacts are already occurring. In its 2007 report, the Intergovernmental Panel on Climate Change declared that impacts from climate change are already discernable and emphasized the need for society to begin adapting to new climatic trends. (IPCC 2007: 8, 11, 15, 19). With the IPCC's assessment and increasingly specific science detailing the impacts of warming, risk-averse businesses now have a better opportunity to account for the changing climate in their business models – in other words, businesses are now better equipped to know how to adapt to these physical impacts.

**Figure 3 – The Greenhouse Effect**



Source: U.S. Environmental Protection Agency, 2006.

The physical impacts of climate change will have social, political, and economic repercussions. Impacts will vary by region and the extent of warming, but many are likely to be disruptive. Changes in precipitation, for instance, could lead to limited water availability in some places or seasons, which could lead to changes in agricultural output. If not well managed, shifts in agricultural output could have widespread economic, social and political implications – even conflict or famine, in the extreme case.

"Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level... A wide array of adaptation options is available, but more extensive adaptation than is currently occurring is required to reduce vulnerability to climate change."

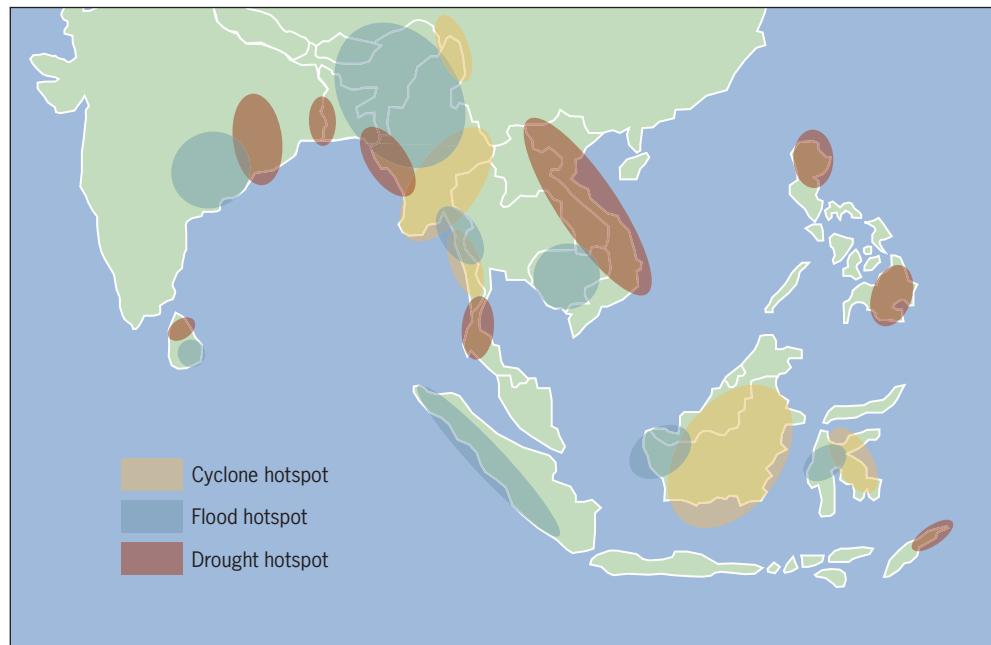
Source: IPCC 2007 *Synthesis: Summary for Policymakers*.

Companies will need to respond to the direct climate change impacts and the broader consequences of these impacts. The rapid global increase in commodity prices in 2008 and the resulting social unrest provide one example. In this case, droughts and floods in key agricultural regions contributed to reductions in supplies of rice, wheat, and corn.<sup>1</sup> The implications for commerce were wide reaching: wheat farmers in drought-stricken Australia and corn farmers in the flooded Midwest United States struggled to produce crops; livestock farmers across Europe felt the strain of higher feed prices; store owners in Vietnam turned to rice farming to take advantage of higher rice prices; and factories in Dhaka suspended operations while their workers took to the streets to protest double digit inflation caused by rising food prices (Parry 2008; Hayley 2007; Cutler 2008).

Companies in South Asia and Southeast Asia are particularly vulnerable. Climate change presents several major challenges for business with operations or customers/suppliers in Southeast Asia (see Figure 4 and Box 1). Longer and more intense droughts in forested zones such as Indonesia and Malaysia will lead to more forest fires and insect damage to drought-stressed trees (World Bank 2007:19). Droughts in the agricultural regions of the upper Mekong River Basin will threaten food security. At the same time as some areas are experiencing water shortages, others, such as coastal zones and river basins, are predicted to experience more frequent flooding, like that of August, 2008 across Thailand, Cambodia, Laos and Vietnam – the worst Mekong River delta flooding in 100 years (IRIN 2008a). The floods result from faster Himalayan glacial melt, more intense and frequent storms, and sea level rise (World Bank 2007:25). Seawater intrusion from the rising sea levels will make agriculture more difficult and threatens to contaminate sources of potable fresh water. Low-lying islands of the Philippines and Indonesia are at risk of disappearing altogether due to sea level rise (World Bank 2007: 21).

<sup>1</sup> Other factors included sudden demand for biofuels and growth in global meat consumption.

**Figure 4: Climate Hotspots in South and Southeast Asia**



*Source: Adapted from CARE 2008a: 31.*

**Box 1: Climate Change Impacts Across Southeast Asia**

**Severe weather events: Weather-related disasters – already common in Southeast Asia – will likely increase in frequency and intensity.**

- In 2006 in the Philippines alone, such events accounted for 3,000 deaths and widespread property destruction (OneWorld.net 2008).
- In 2007 in Vietnam, an exceptionally severe typhoon season led to widespread loss of life, flooding, and estimated damages of US\$725 million (OneWorld.net 2008; Independent Online 2008).
- In August 2008, the Mekong River reached its highest level in 100 years, causing landslides and forcing thousands to evacuate (Binh Minh 2008; Mydans 2008).

**Rising sea levels: Rising sea levels, caused by the melting of glaciers and expansion of warmer water, threatens the coastlines of many Southeast Asian countries.**

- In Vietnam, which has over 3,200 km of coastlines, a one-meter rise in sea levels would submerge 12 percent of land and displace 23-25 percent of the population, destroying many agricultural and fishing livelihoods (OneWorld.net 2008; Independent Online 2008; World Bank 2008b).
- Major cities such as Ho Chi Minh City, Hanoi, Jakarta, and Bangkok risk becoming submerged within this century (see Figure 4) (Prachatai 2008; Gray 2007).

**Water supply and drought: Climate change may also make water scarcer during the dry season for household use, energy, and irrigation.**

- This will force governments and consumers to prioritize water uses and improve efficiency of water use. In some cases, there may be increased competition for access to water sources.
- The city of Manila, for example, already faces frequent water scarcity. In July 2007, a dry spell led to severe water shortages in the city, causing electricity blackouts. Low water levels affected at least five major dams and forced a power plant on Caliraya Lake near the city to be shut down temporarily (Associated Press 2007; Garcia Rincón and Virtucio 2008).
- The tourist destination of Phuket Island in Thailand has faced water shortages during peak seasons, creating tensions between local communities and the tourist industry (Bienthuy 2008).

**Disease: As temperatures rise, flooding increases, and water quality decreases, disease vectors (e.g. mosquitoes) across Southeast Asia will change.**

- Outbreaks of diseases – especially waterborne diseases – may become more severe, affecting employees' health and productivity.
- In September 2008, more than 200,000 people in northern Thailand were diagnosed with waterborne diseases after 19 days of heavy flooding (IRIN 2008b).

Political, economic, social, and environmental trends will likely exacerbate climate impacts. For instance, migration to threatened coastal regions is on the rise across these countries, where 200.5 million people already live within 10 m of sea level (CIESIN 2008). Deforestation has increased erosion throughout the region. Now, when heavier rains come – which is predicted to occur with greater frequency – fertile soil will be washed off of agricultural fields and cloud the rivers with silt. Businesses will face challenges from direct physical impacts and their broader implications, which may include, for example, disease outbreaks, price inflation, or political shifts.

Now that the climate is changing, business as usual is not a viable option. In October 2008, the UK-based NGO Forum for the Future, in collaboration with HP Labs, published a report examining five different possible climate futures in the world 2030. These scenarios - developed with input from 67 experts from industry, academia, government, and civil society – go beyond the physical impacts of climate change to explore public attitudes, political responses, natural resource availability, and the role business plays. While each of the scenarios points to a very different future, one commonality among them is that the changing climate makes the business world look radically different than it does today (Bent et al. 2008).

Now is the time for business leaders to think carefully about what climate change may mean for their companies. Planning and taking action to minimize the effects of climatic changes – for a family, a community, a business, or industry – is known as *adapting* to climate change. The overall goal of adaptation is to lower risk or take advantage of an opportunity resulting from the changing climate. *Section III* reviews current activities on climate change adaptation to help businesses understand emerging trends in this new area of human endeavor.

**Questions for Discussion:**

- Which climate change impacts will be matter most for the business environment in Southeast Asia?
- What additional information about climate change impacts is needed by business in the region?

# III. Adaptation – State of Play

For business, adaptation involves taking new climate trends into account in company decision-making. Accounting for climate change's physical impacts is a relatively new consideration for most businesses. To date, climate change has primarily been viewed in terms of the regulatory, reputational, and litigation risks associated with the release of greenhouse gases (i.e. new regulations to limit greenhouse gas emissions or pressure from investors and customers to reduce emissions).

Faced with such a complex problem, many executives have wondered where to begin...  
Despite the body of scientific evidence that points to climate change, they find the actual details overwhelming. But it's not good business to hope the problem will go away.  
Kerry Packard, McKinsey & Company, 2000:130

Adaptation can add costs, but not adapting can be more costly. Acknowledging that adaptation is necessary is one thing – carrying it out is another. The UNDP, for instance, estimates that adaptation will cost between US\$86 and 109 billion globally per year by 2015 (Agrawala and Fankhauser 2008:69). This and other adaptation cost estimates include many assumptions, but they reaffirm that proactive adaptation will require more investment than businesses, bilateral and international donors, governments, and civil society are currently providing. Meanwhile, a major global analysis concludes that ignoring climate change now would reduce average per capita consumption around the world by between 5 and 20 percent (Stern 2006). In Southeast Asia, one study that aggregates climate effects across sectors suggests that a doubling of carbon dioxide in the atmosphere beyond pre-industrial levels<sup>2</sup> would lead to a 5 percent drop in regional GDP in the region (Sanderson and Islam 2007:17; Adam 2008). Early adaptation efforts can help to reduce some of these long-term costs.

All of society will need to be engaged to pay for these adaptation needs: government, civil society, and the private sector. Each sector has a distinct but important role to play in meeting society's overall adaptation needs (see Box 2). Because adaptation is so new, these roles have not yet been completely clarified, and it is not certain whether or how the broad spectrum of adaptation needs will be met. However, roles and responsibilities are emerging.

<sup>2</sup> Global carbon dioxide levels are presently about 40 percent higher than preindustrial levels.

The private sector will, first and foremost, need to adapt its own operations. This includes actions ranging from companies relocating facilities, to assuring that their workers are safe under climate change's impacts, to considering how their customers will shift their behaviors as a result of climate change and planning product lines around how customers may shift their behaviors in response to changes in their climate. All of these decisions will comprise a critical part of the global adaptation equation.

There will be specific opportunities for companies to help a broader segment of society to adapt:

- As contractors for publicly-funded adaptation projects.
- As providers of goods and services that promote adaptation more broadly (including finance).
- Through partnerships with civil society in which they provide expertise.
- Through community investments and philanthropy.
- Through payment of taxes and levies that go toward public adaptation programs.

#### **Box 2: Key Definitions**

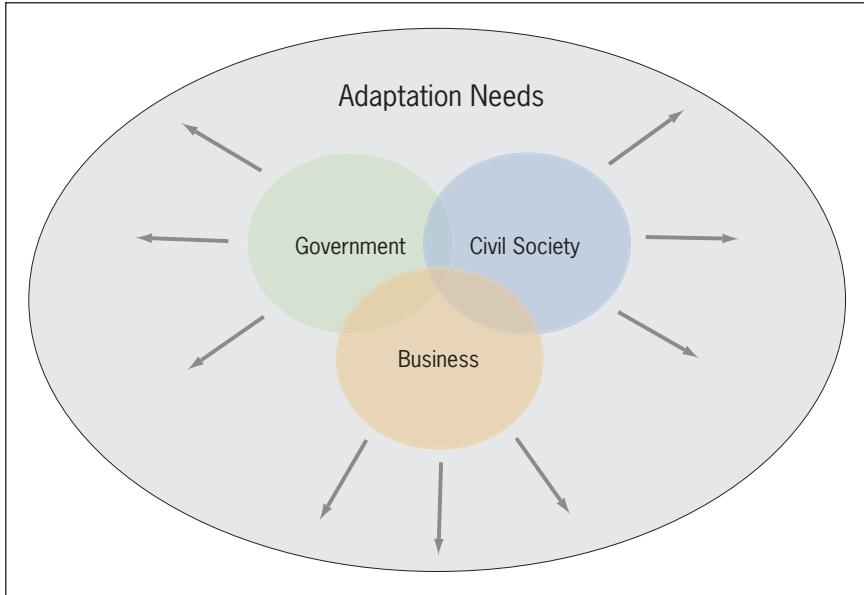
**Public Sector:** All institutions, actions, and funds controlled by governments and inter-governmental organizations. Public sector funding is produced through taxes, levies, and, in some cases, government-run businesses.

**Private Sector:** All manner of business, ranging from small enterprises to multinational corporations.

**Civil Society:** The collection of “voluntary” civic and social organizations and institutions that are part of neither state nor commercial enterprises. This includes cause-based non-governmental organizations (NGOs) and non-profits at all levels – from local community action groups to international institutions like the World Wildlife Fund or Oxfam.

Adaptation requires the combined efforts of business, government, and civil society, with each group taking actions on its own and in collaboration with others. The large gray oval in Figure 5 (below) represents overall societal adaptation needs. The overlapping colored circles represent current efforts by business, government, and civil society to meet those needs. It raises several key questions:

- How will each sector expand its actions to address the huge unmet adaptation need?
- What are the relative contributions of each sector now? How might the relative size of each sector’s contribution change over time?
- How will the intersections between the sectors evolve? Are there synergies to be gained by collaboration across sectors?



**Figure 5: Adaptation Requires Everyone**

*Current actions fall far short of meeting the scale of the adaptation needs and each group must greatly expand its work and its collaboration with other sectors to meet the adaptation challenge.*

Actor(s)	Adaptation Actions
<b>Government</b>	<ul style="list-style-type: none"> <li>– National adaptation planning</li> <li>– Policy that creates incentives and reduces barriers to adaptation</li> </ul>
<b>Business + Government</b>	<ul style="list-style-type: none"> <li>– Infrastructure projects financed by government and completed by business</li> <li>– Public-private partnerships</li> </ul>
<b>Business</b>	<ul style="list-style-type: none"> <li>– Adapting own operations (e.g. supporting employees and supply chain partners)</li> <li>– Providing products and services needed for adaptation by others</li> </ul>
<b>Business + Civil Society</b>	<ul style="list-style-type: none"> <li>– Business/civil society partnerships (including corporate philanthropy)</li> </ul>
<b>Civil Society</b>	<ul style="list-style-type: none"> <li>– Aiding community-based adaptation and other adaptation projects</li> </ul>

To date, government and civil society have taken the lead. Climate change poses a serious threat to public sector and non-profit efforts to reduce poverty. Indeed, the targets of many poverty reduction efforts – poor communities in tropical countries – are the communities likely to be hit hardest by climate change. In response, many of the public sector and civil society agencies that focus on poverty reduction are turning their attention to climate change, and are developing new funding mechanisms that can supplement the scarce resources poor communities have for adaptation. (Please see Annex 1 for more on public finance mechanisms).

**Box 3: The United Nations Framework Convention on Climate Change**

Since 1992, the United Nations Framework Convention on Climate Change (UNFCCC) has provided an overall framework for intergovernmental efforts to tackle climate change. Within this framework treaty, the Kyoto Protocol was agreed in 1997 to set targets and programs to reduce greenhouse gas emissions and address the impacts of climate change. The Kyoto Protocol sets national emissions caps for developed countries through 2012, and establishes ground rules for international trade in greenhouse gas emissions. It has been ratified by 192 countries, but has not reversed the growth of global emissions (UNFCCC 2008a).

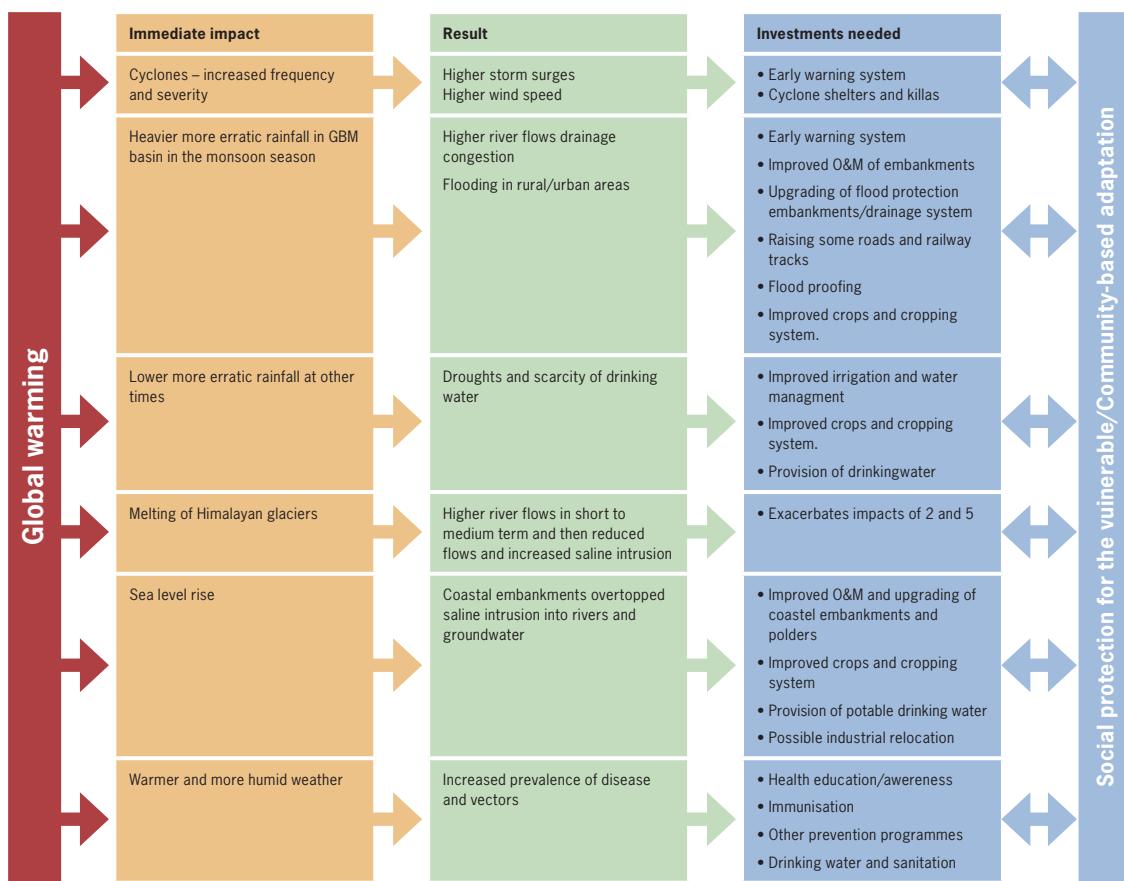
Asian developing countries do not have legally binding emissions caps under the Kyoto Protocol. However, they may host emissions-reduction projects under the Clean Development Mechanism (CDM), which allows developed countries to meet their binding targets in part by paying for emission reductions in developing countries. All countries are also requested to submit “National Communications” to the UNFCCC Secretariat in which they report on their plans and accomplishments for addressing both climate adaptation and mitigation (UNFCCC 1998 – see [http://unfccc.int/national\\_reports/items/1408.php](http://unfccc.int/national_reports/items/1408.php)).

Except for Myanmar, all countries of the region have submitted National Communications. These documents vary in the quality and depth with which they address adaptation activities. Among the Asian countries with the most comprehensive consideration of national adaptation strategies or measures are the Philippines, Thailand and Vietnam.

The climate negotiations pay special attention to the limited ability of the least developed countries (LDCs) to deal with the adverse effects of climate change. A special LDC work programme was established to encourage LDCs to develop National Adaptation Programmes of Action (NAPAs), through which they identify priority adaptation needs and activities (UNFCCC 2008b). So far, Bangladesh, Bhutan, and Cambodia have submitted NAPAs (UNFCCC 2008b). Lao PDR is currently developing its NAPA, which is scheduled to be finalized in the next months (Laganda 2008).

The public sector and civil society typically uses adaptation funds in two different ways. The first is to fund or implement projects specifically designed to protect communities from climate impacts. For the public sector, this includes efforts like building sea walls, conducting agricultural research to develop crop varieties that are more drought resistant, and implementing rapid response systems to natural disasters. It also includes “climate proofing” current infrastructure, to prepare construction for the effects of climate change in the future (see Figure 6 for Bangladesh’s public sector adaptation plans).

**Figure 6: Predicted Impacts of Climate Change in Bangladesh and Investments Required**



Bangladesh is in the process of carrying out the Climate Change Strategy and Action Plan that its Ministry of Environment and Forests completed in September, 2008. The following chart illustrates the predicted impacts from climate change on the country and the corresponding investments required to adapt to these impacts. The private sector will have the opportunity to support many of these investments.

Source: Ministry of Environment and Forests, Government of the People's Republic of Bangladesh, 2008. Bangladesh Climate Change Strategy and Action Plan 2008.

Civil society's direct adaptation work often involves working at the local level to minimize and prepare for climate change impacts. In Vietnam, for example, the Red Cross worked through its local branches with communities to plant 22,000 hectares of mangroves, which amounted to 100 km of protection for sea and river dykes (Oxfam 2007: 19). This local level adaptation work, which often begins with assessments of community needs, is known as *community-based adaptation*. Large international civil society organizations, such as the Red Cross, CARE, and Oxfam, have made this a stream of their work in Southeast Asia (Red Cross/Red Crescent 2007; CARE International 2008b; Oxfam Novib 2008).

The other line of public sector and civil society adaptation efforts fall under the category of "mainstreaming" adaptation into ongoing planning and projects. These efforts do not have adaptation to climate change as their core objective; instead, climate impacts must be taken into account in order to achieve a pre-existing development objective. For example, how will more frequent droughts affect the operations of a planned hydropower plant? How will sea level rise affect efforts to restore a wetland? Having answers to these questions, the institutions then carry out their development work based upon a more complete view of future risks. A number of South and Southeast Asian governments and civil

society organizations are working toward such mainstreaming (see Annex 2 for additional information about national adaptation plans and mainstreaming).

“Most countries already have policies and plans to manage financial risks, human health risks, biosecurity risks, agricultural risks, transport sector risks, and energy supply risks. Logically, responses to climate variability and change (including extreme events) should also be included and addressed in the same portfolio of national risks. Such an approach would strengthen decision-making processes by requiring that specific programs and projects include strategies and measures to manage risks arising from climate variability and change.”

– Asian Development Bank (ADB) on Mainstreaming Climate Risks (ADB 2005)

The private sector has been slow to react. Thus far, business has shown less interest in addressing the impacts of climate change in its operations than the public sector and civil society. The difficulties associated with conducting risk assessments for complex and seemingly distant trends have driven many businesses away from investing in such assessments.

There are signs that this is beginning to change, however, starting with companies' increasing general awareness of climate change risks. For example, the Carbon Disclosure Project (CDP) surveys some of the world's largest publicly traded companies about climate issues on behalf of institutional investors. The results of the 2008 CDP show that 70 percent of respondents from Asia (excluding Japan) cite weather-related risks, including drought, flooding, and typhoons, as having the potential to disrupt production, interrupt services, and impact assets – although these analyses often lack precise details on how such risks affect business (ASRrIA/CDP 2008). All those companies that acknowledged physical risks indicated some form of response to these impacts.

But reacting to impacts – such as typhoons or floods – is different from systematic planning for anticipated climate change impacts. Most businesses have not started this more proactive approach to the adaptation process. Few have even assessed the likely effects of climate change on their operations. Those that have done such assessments find them eye-opening: results from the 2008 CDP suggest that, “Initial climate change risk assessments often uncover a more frequent and higher impact pattern of weather risks to facilities and dispersed operations than managements had previously appreciated. As a result, the climate change assessment process is acting as a catalyst for enhanced risk management, especially where managements had seen climate impacts in narrow operational terms” (ASrIA/CDP 2008: 3).

Given such findings, systematic adaptation efforts will likely expand among private sector actors in the near future. Also, some companies have begun including climate change impacts in their Environmental, Social, and Governance (ESG) assessments. This trend seems likely to grow in parallel with public sector and civil society interest in adaptation.

Some companies are already out in front. A few sectors and corporations are leading on adaptation, typically because they are already feeling its impacts. Insurance and tourism sectors are the most visibly ahead. Reinsurance companies like Swiss Re and Munich Re are redesigning contracts and pushing insurers and policymakers to address climate change, as changing weather patterns threaten to negate former risk and cost structures (Mills 2007) (see Box 4). The World Tourism Organization, housed in the UN, has made climate change its central

focus in recent years. Coastal tourist destinations are under particular threat from sea level rise and more intense storms. The World Tourism Organization's members, including ministers of tourism and hundreds of companies from the tourism industry, have been working to develop mitigation and adaptation strategies for the sector (UNWTO 2008).

#### **Box 4: Insurance: Driver of Adaptation?**

The insurance sector has a particularly important role in shaping how society adapts to climate change. Insurance companies can force businesses and individuals to account for climate change impacts in their plans by raising premiums and limiting or refusing coverage on projects that seem inappropriately risky under climate change. Ideally, insurance companies can thereby minimize the "moral hazard" associated with insurance – the hazard of an insured individual (or firm) engaging in risky behavior knowing he will be bailed out if he is injured. This would drive business and individuals to minimize autonomously their own climate change risks even if they have not carried out the risk calculations themselves.

The insurance sector has also taken a leading role among businesses in adaptation because it faces the potential of huge losses due to damage from climate change impacts. SwissRe, a leading global reinsurer, for example, partnered with the United Nations Development Program to sponsor a major report from Harvard Medical School on the potential health, ecological, and economic repercussions of climate change (Epstein and Mills 2005). SwissRe has also raised awareness across sectors about climate change risks among business and government, supported risk mapping, and developed products and services to mitigate and adapt to climate change. One instance is their 2004 partnership with a local Indian insurer and the World Bank in 2004, the company launched a pilot weather index-based insurance policy in India – by 2007, there were 67,000 different weather index policies backed by SwissRe in India (Nelson 2008: 17). However, Southeast Asia as a whole is generally very under-insured (Brown 2008) and coverage remains especially patchy among poor households and in poor countries. While the relatively well-off and larger organizations may buy health, property and business interruption insurance from local or international insurance companies, the poor and even governments have very limited access. In the absence of affordable reinsurance markets, governments are forced to trust in their ability to meet disaster costs through tax revenues or further borrowing. Furthermore, a report by DFID (2004) points out that despite 40 years of efforts to highlight the necessity for the rural poor to offset risks through insurance markets, the rural market has not proved financially viable to either the private or public sectors. In spite of a number of promising cases, there remain many hurdles to insurance becoming a widespread climate solution for the region.

Climate change may impact the performance of investment portfolios, increasing market volatility and affecting the value of companies whose products or operations are perceived as particularly vulnerable to climate change consequences.

– Zurich Financial Services, Response to Carbon Disclosure Project Survey in Mills 2007: 22

#### **Questions for Discussion:**

- Why are businesses in Southeast Asia lagging behind both government and civil society in adapting to the impacts of climate change?
- Which roles in adaptation will be most important for business to play in the region?

# IV. Business Risks and Opportunities

All business will be impacted by climate change, whether via their core operations, their supply chains, changes in customer demand, or larger macroeconomic shocks. In many cases, a single company may be affected at all these levels. Even without exact information about when and where climate impacts will occur, it would therefore be wise for companies to consider likely effects of climate change in their risk planning, just as they would any other risk that includes some uncertainty. This will be especially important for companies in South and Southeast Asia, where climate change's direct effects on physical infrastructure, employees, and consumers is likely to present substantial challenges. In many cases, climate change may not only present risks, but also opportunities.

Risks and opportunities for businesses can be grouped into five general categories.<sup>3</sup>

- Operational
- Regulatory and legal
- Reputational
- Market and product
- Financing

## **Operational**

*Risks* include direct risks to facilities, employees, and supply chains. According to the Pew Center on Global Climate Change, companies with the greatest operational risks from climate change impacts are those “facing decisions about long-term capital investments (infrastructure, equipment), those in sectors where weather and climate is an integral part of production (such as agriculture or construction), industries that rely heavily on transport and other infrastructure in their supply and demand chains, or those facing reflected risks, such as the insurance industry.” All operations, however, will have to deal with the possibility of property damage, business interruption, and changes or delays in electricity, water and transport services (Sussman and Freed 2008:7, 29).

Many companies can expect to see, at a minimum, effects on their

---

<sup>3</sup> This framing comes from the Corporate Ecosystem Services Review, a tool developed by three non-profit organizations (including WRI) to help businesses understand and proactively address the risks and opportunities that arise from corporate dependence on and influence on ecosystems (Hanson et al. 2008).

operations as a result of higher commodity, raw material, and insurance costs (Nelson 2008:5). Additionally, severe weather events and rising sea levels may pose a risk to facilities and employees. Employees must also deal with changing disease patterns.

Today's supply chains often span the globe, so even distant climate impacts may affect businesses if suppliers' operations are disrupted. Operational risks also come from disruptions to infrastructure – if roads or railways are damaged or submerged, supplies cannot come in and finished goods cannot go to market. Similarly, electrical disruptions may result from climate change, as both supply and demand for electricity change. Increased temperatures can cause higher peak demand for electricity that outstrips the capacity of electrical infrastructure, leading to brownouts and blackouts. At the same time, reduced river flow from declining precipitation or snowpack may disrupt electricity generation, both from hydropower facilities and from other power facilities that depend on water flow for steam or cooling.

*Opportunities* include cost savings and efficiency gains that come from implementing more energy- and water-efficient processes. In addition, by helping employees to adapt, companies can enhance the productivity and loyalty of their employee base. By working to secure their supply chains and distribution networks in the face of climate change, business can build more effective and collaborative partnerships with their networks that will serve them well under any circumstances.

### **Regulatory and Legal**

*Risks* are hard to predict at this time, given how few countries have begun to address the effects of climate change in their laws and policies. However, the policies of the most proactive governments, such as the UK, Australia, and Bangladesh suggest that changes may be far-reaching. The physical risks from climate change may spur changes in land use and zoning laws, irrigation and other water use regulations, and the threat of climate-related lawsuits.

*Opportunities* include the chance for companies to engage with governments on policy design. An increasing number of companies are weighing in on climate policies regarding mitigation. In the coming years there is likely to be an increased focus on regulatory changes related to physical impacts of climate change.

### **Reputational**

*Risks* are likely to multiply as the physical impacts of climate change accelerate. Companies whose products or operations appear to exacerbate risks to their customers, employees, or the communities where they operate may face public opposition that could cost them market share or opportunities for expansion. Coca-Cola's reputation, for instance, was damaged between 2004 and 2005 when it was accused of depleting and contaminating the water resources of the communities surrounding its plants in southern India (see Case Study 3: The Coca-Cola Company, for more information). Such damage is exacerbated by the droughts predicted with climate change.

*Opportunities* will also abound as the climate changes. Companies that are proactive about adapting their operations and providing products and services that help others adapt may find themselves with greatly enhanced brands. Being seen as a leader on climate issues may become a key differentiator for companies in the future. For example, City Development Limited (CDL), a real estate firm based in Singapore, anticipates

value from the greening of its facilities: “CDL is able to offer innovative and energy and water-efficient developments, commercial as well as residential properties, for when potential demand from customers arises as a result of climate change. CDL’s branding as an eco-developer that offers innovative designs and features, gives it a competitive edge in its pricing” (CDP 2008). In addition, there are philanthropic opportunities for companies to aid their reputations, as they contribute to broader societal adaptation with funding or with free or reduced-price goods and services. As part of its philanthropic commitment, for example, DuPont Philippines has helped to reforest a key watershed and provides free dental and medical clinics for farmers and their families (DuPont 2008).

### **Market and Product**

Risks will be many and varied. As climate shifts, demand for certain products may change and customer bases may move geographically. Products sensitive to heat may become less effective as climates grow warmer; those that use a lot of water may become less appealing to some customer bases. Large institutional purchasers, including governments, may change the way they procure goods and the products and services that they seek.

The climate changes that have already taken place or are forecast offer BASF new market opportunities. BASF is developing and selling products and technologies that help mitigate and adapt to climate change and therefore have sales potential in line with changes in climate conditions.

BASF

Carbon Disclosure Project Global 500, 2008: 9

*Opportunities* will also be plentiful. Companies may find new markets for cooling systems, healthcare products, and infrastructure products and construction. There may be particularly valuable opportunities in contracting with governments and NGOs that seek to provide products and services particularly aimed at adaptation to climate change. Some companies may also market resilience-building products and services directly to individual customers; so-called “bottom of the pyramid” strategies, which market to those who are poor and historically underserved by the markets, may be increasingly significant as the impacts of climate change increase (see Box 5).

### **Financing**

Risks exist for all firms seeking capital. Loans or other debt financing may be harder or more expensive to access for companies at risk from the impacts of climate change. Some investors are paying increasing attention to how proactively companies plan for and manage the kinds of long-term risks presented by climate change. Yet many financiers still fail to systematically integrate climate change concerns. For example, the Carbon Disclosure Project’s 2008 Global survey found that, “Fund managers... thought that there is no hard evidence about the timing or degree of climate change impacts on specific sectors, making the inclusion of climate change factors in investment strategies on a systematic basis problematic” (CDP/Pricewaterhouse Coopers 2008: 87). Investors today are beginning to focus on actions corporations take regarding climate change mitigation; some investors believe that with better information about climate change impacts in the coming years, interest will

grow among financiers to account for corporate adaptation efforts in their investment decisions (CDP/Pricewaterhouse Coopers 2008: 87). As an example of this trend, JP Morgan recently completed a report for its corporate and investor clients about the risks associated with changes in water in the coming years; the report attributes many of the most severe water challenges ahead to climate change (JP Morgan 2008). Investor interest in water is also growing in Asia, where CLSA Capital Partners launched in August 2008 its third equity focused fund for investors looking to take advantage of the considerable long-term water and waste management opportunities in Asia. (CLS Asia-Pacific Markets 2008)

*Opportunities* also exist. Demand for new financial products will likely emerge or expand, including microfinance and microinsurance (see Box 5). Companies with innovative products, services, or business models that help broader swaths of society adapt to climate change may also be attractive to investors looking for new markets. F&C's Global Climate Opportunities Fund (GCOF) is on the cutting edge of this trend. The GCOF "invests in companies providing climate change solutions along nine investment themes. The fund seeks out companies that have the technologies and strategies to reduce greenhouse gas emissions (mitigation), and to help society adapt to the impacts of changing climate (adaptation). The themes include Alternative Energy, Energy Efficiency, Sustainable Mobility, Waste, Advanced Materials, Adaptation, Water, and Supporting Services" (CDP/Pricewaterhouse Coopers, 2008: 38). However, in Southeast Asia, innovative private finance options like these remain limited. For the poorer parts of the region, institutional inertia, a scarcity of technological adaptation options, and additional economic burdens are limiting factors for climate investment.

#### **Box 5: Microinsurance: A Market Opportunity in Risk Transfers to Help the Poor Adapt?**

In October of 2008, Swiss Re, a reinsurer based in Switzerland, announced that it would be partnering with the International Development Association (IDA) – the arm of the World Bank that supports the world's poorest countries – to provide weather derivative insurance to farmers in Malawi. According to Swiss Re, the plan "links rainfall and maize production, so that if precipitation falls below a certain level the index will reflect the value of the projected loss in maize production." Swiss Re would pay out the maximum US\$5 million if maize production dropped to 10 percent below the historical average.

The Malawi plan is part of a broader Swiss Re partnership with civil society, governments, and public financiers to bring risk transfer instruments to farmers across Africa to help them adapt to climate change (Swiss Re 2008).

Swiss Re is a leader in microinsurance, a growing field that unites insurance companies, the public sector, and non-profits to provide risk transfer mechanisms to low-income individuals. While life insurance is the most common form of microinsurance, crop, property and health microinsurance schemes are increasingly available worldwide.

Many are surprised that the even the poorest of the poor may be able to benefit from insurance. Yet experts contend that premiums can be made affordable to farmers making between two and four dollars per day – plans for those living on less likely require donor or public support, at least to get underway (Hunt 2008). By providing liquidity in the face of weather damages, microinsurance can help poor individuals and communities reduce vulnerabilities caused by weather variability and climate change. Individuals can buy insurance against a specific event and pool their risk of loss with a larger group of insurance buyers. If a loss does occur, they can expect payouts.

Interest in microinsurance contracts and instruments has grown tremendously in these last few years. A CERES report in 2007 detailed more than 400 climate-related insurance initiatives in the United States and abroad – double the number of products and services identified in a similar report done just 14 months ago.

Microinsurance relies on many of the same principles as micro-credit to allow people to access financial resources for lower costs. One way to achieve these lower costs is by relying on indices, as in the Malawi case, to determine payouts for crop and property microinsurance. Index plans use a natural index like rainfall that has a very strong correlation with property or crop losses. According to a previously agreed contract, if the rainfall for a given area is lower than a threshold, all insurance buyers get a payout regardless of losses incurred. Pegging payouts to an index lowers transaction costs, and makes the insurance scheme simple, flexible and transparent.

However, microinsurance is still plagued by various design and implementation issues. Moral hazard and adverse selection that occur under improperly designed microinsurance schemes can promote maladaptations in the face of climate change. Also, unless properly managed and regulated, microinsurance might cause poor and resource starved people to pay considerably more than what their payments would be in the case of weather losses. Microinsurance can aid adaptation, but must be properly designed, well regulated, and tailored to specific local contexts.

The most successful microinsurance plans have been public-private initiatives. Private companies normally work with an NGO or the government to design, implement and market such schemes. NGOs have the experience of working with low-income communities, while insurance companies have the experience of designing, writing, and selling insurance contracts. Large insurance companies are typically backed up by reinsurance and also have a wider client base to assure that not all their clients face the same risk profile. Despite increasing interest in microinsurance, however, penetration of insurance in many poor communities remains limited. There are therefore many opportunities for private insurance companies to work together with NGOs and governments to serve these consumers with well-designed partnerships.

*Risks* vary by industry. While all businesses will be affected by climate change, they will not all be affected in the same ways. Certain sectors may be affected sooner and more profoundly than others. Figure 7 highlights some of the specific risks and opportunities that key sectors in Southeast Asia may face.

**Figure 7: Examples of Risks and Opportunities of Climate Change's Physical Impacts**

SECTOR	RISKS	OPPORTUNITIES
<b>Tourism</b>	<ul style="list-style-type: none"> <li>– Need to abandon coastal tourist infrastructure</li> </ul>	<ul style="list-style-type: none"> <li>– Shifts of tourist destinations to higher latitudes</li> </ul>
<b>Insurance</b>	<ul style="list-style-type: none"> <li>– Increased losses increase volatility and promote consolidation of insurance market</li> <li>– Annual payouts may be higher than at present</li> <li>– Need to shift areas insured with flooding threats</li> </ul>	<ul style="list-style-type: none"> <li>– New insurance products, including catastrophe bonds and weather derivatives</li> <li>– Increasing demand as weather risks increase</li> <li>– Public-private partnerships open for microinsurance markets</li> </ul>
<b>Manufacturing</b>	<ul style="list-style-type: none"> <li>– Changes to water availability threaten many processes</li> <li>– Coastal plants under threat of sea level rise and coastal storms</li> <li>– Shifts in customer demands, especially overall decreases as a result of extreme weather or macroeconomic downturn</li> <li>– Reduced demand for certain equipment, like heating units.</li> <li>– Warmer inland water shuts down water cooling systems</li> </ul>	<ul style="list-style-type: none"> <li>– Need for water-minimizing manufacturing processes</li> <li>– Rising demand for green energy products</li> <li>– New demand for variety of products, including cooling equipment, resilient building materials</li> </ul>
<b>Agriculture</b>	<ul style="list-style-type: none"> <li>– Loss of competitive advantage with change of growing zones</li> <li>– Commodity price swings, shifting demand</li> <li>– Decreased water supplies for irrigation</li> <li>– Input price swings</li> <li>– Increased risk of disease and pest outbreaks</li> </ul>	<ul style="list-style-type: none"> <li>– Increased yields in some regions due to longer growing seasons</li> <li>– Opportunity to plant new crops in zone shift</li> <li>– Agricultural technology companies benefit by helping farmers adapt.</li> </ul>
<b>Energy</b>	<ul style="list-style-type: none"> <li>– Electricity grid interruption due to extreme weather</li> <li>– Supply chain interruption (for fuel, especially from offshore rigs)</li> <li>– Inability to meet demand in hotter or extreme weather, generating blackouts</li> <li>– Coastal facility closure limits supply</li> <li>– Lower demand for heating</li> <li>– Shortfall of supply from lack of water for hydro plants</li> </ul>	<ul style="list-style-type: none"> <li>– Increased demand for off-grid, green energy alternatives</li> <li>– Increased demand for cooling in regions that experience hotter weather</li> </ul>
<b>Finance</b>	<ul style="list-style-type: none"> <li>– Equity investments and debt instruments may become riskier as recipient companies struggle to adapt</li> <li>– Climate change impacts can affect markets, including by provoking macroeconomic downturns.</li> </ul>	<ul style="list-style-type: none"> <li>– Higher risks (in both existing struggling companies and new models in development) may command higher returns</li> <li>– Emerging companies offering new products, services, and business models may provide lucrative investment opportunities</li> </ul>

Source: WBCSD 2008a: 14-19; Epstein and Mills 2005: 7, 98

**Questions for Discussion:**

- In which sectors should Southeast Asian businesses cooperate with each other in identifying climate risks?
- What is the role of the government in identifying climate risks and creating opportunities for businesses?
- What is the role of communities and civil society in identifying risks and creating opportunities for businesses?

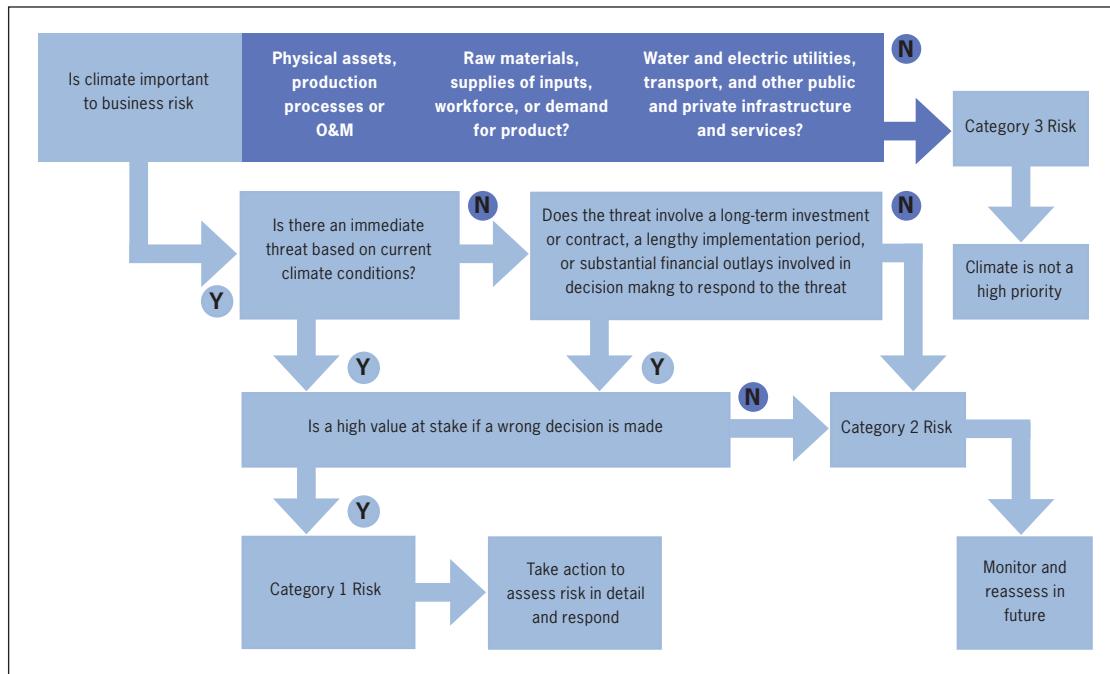
# V. Assessment and Action for Adaptation

An effective adaptation plan begins with an assessment of the risks and opportunities. There is extensive business literature on ways that companies can assess risks and opportunities and build strategies to address them. These range from simple brainstorming exercises to complex methodologies and management systems. While these approaches are not climate-specific, many can be applied effectively to examine and respond to climate change. When assessing climate-related risks and opportunities, it is important to bear in mind that the past is unlikely to provide a reliable guide to the future. Incorporating predictions from climate models, as well as techniques such as scenario planning that build visions of possible futures, will be helpful in building strategies that account for the range of changes that may come from a warming planet.

The Pew Center on Global Climate Change has developed one framework that specifically addresses climate risks. This assessment is based around three questions that help identify three categories of risk. (See Figure 8 for a graphic representation of this framework.) The questions help determine if climate poses a significant business risk for a given firm, if climate risks are immediate or may impact long-term investments, and the scale of the impact if wrong decisions are made. The Pew Center describes categories of risk based on potential answers to these questions:

- Category 1 – potential significant climate risk that may need to be managed in the short term.
- Category 2 – potential climate threats that need to be monitored and reassessed over time.
- Category 3 – climate risks do not appear significant, no further analysis is required (Sussman and Freed 2008:18).

**Figure 8: Screening for Climate Risks**



Source: Pew 2008: 16

There are a growing number of these risk assessment frameworks tailored specifically to climate risk, and these frameworks now consistently make physical impacts a part of these assessments (see for example, Andrew Hoffman's *Getting Ahead of the Curve: Corporate Strategies That Address Climate Change* or Jonathan Lash and Fred Wellington's *Competitive Advantage on a Warming Planet*.)

The actions that business may take in response to climate change are diverse, and will vary greatly, based on factors such as industry, geography, company size, and perceived risks and opportunities. This section will outline some of the types of actions that companies may undertake, as well as looking more closely at how these actions may impact the poor both positively and negatively.

Businesses need to satisfy shareholders on a short-term basis irrespective of whether the shareholders have an interest in longer-term issues. However, if business leaders are courageous in explaining their strategies to create long-term value, and why these are linked to driving social progress, then investors will increasingly value such factors in their investment decisions.

– “From Challenge to Opportunity: The Role of Business in Tomorrow’s Society” (WBCSD 2008b: 33)

Business adaptation actions can be considered at varying levels. These include a firm’s internal operations, interactions with other actors in its supply chain, and activities that involve a broader range of stakeholders, including industry associations, government, civil society, and the larger community.

Addressing operational, market, and product risks often requires adjusting processes and product mixes. Changes may include, for example, entering new areas of business or closing down product lines for which demand is flagging. Firms that take part in building or upgrading

infrastructure, providing information and communications technology (ICT) solutions, and those that provide services to help other organizations manage risks and prepare for possible disasters will be particularly well-positioned (Nelson 2008: 10). Small and mid-sized enterprises may be particularly nimble or innovative in these regards. (See Box 6 for an example.)

**Box 6: Small and Medium Enterprises: Advancing Adaptation at the Base of the Pyramid in Asia**

Small and medium enterprises (SMEs) are at the heart of much of the present development in Southeast Asia. Many developing states in the Asia Pacific recognize the importance of this sector for realizing poverty alleviation and equitable economic growth, and are pursuing policies aimed to develop their SME communities. This is likely to be a strength as society adapts to climate change, since many small and medium enterprises are well positioned to support adaptation by providing innovative goods and services that reach the poorest populations. This market, sometimes referred to as the “Base of the Pyramid,” presents opportunities for businesses that are able to keep their production and distribution costs down and thereby make their products affordable for this most vulnerable segment of the population.

One example is Ankur Scientific Energy Technologies Pvt. Ltd., founded in India in 1986. Ankur manufactures biomass gasifier systems for large and small businesses, communities, and individuals across Asia. Running on local biomass – either rice husks or wood – the gasifiers are cleaner and cheaper than using liquid fuels. The payback period for companies installing the gasifiers has been between five and twelve months.

Among Ankur’s accomplishments is an installation that has provided electrification without interruption for 800 households on an island in the India’s northern Sunderbans for over 11 years. With the success of this demonstration, policy-makers have now required the entire 10,000 km<sup>2</sup> of the Sunderbans to be powered by biomass gasifiers and solar photovoltaic cells.

By using local resources, these gasifiers free their owners from dependence on liquid fuels, which exhibit volatile prices – especially when fuel supplies are cut off or limited because of natural disasters. For an area like the island in Sunderbans, electricity from a mainland source is both expensive and at risk of being cut off during storms. Thus, local electrification makes the community more self-sufficient, supports local development by providing consistent electricity, and less vulnerable in the face of the storms that are likely to increase with climate change.

In other cases, businesses may use new techniques to meet changing markets in response to climate change. One example of such a business is the blue crab processing company started by entrepreneur Alfonso Gamboa in the Philippines in 2005. By responding to a business opportunity, Gamboa’s business also adapted autonomously to climate change. Gamboa requires that his crab suppliers use a sustainable method for catching crabs in baskets – as opposed to gill nets that damage crabs, wasting part of the catch. This was implemented as a solution to the depletion of the local crab population, caused partially by warming waters that result from climate change. The new method, which has increased local incomes along the supply chain, also allows crab fishermen to make catches in the rough weather conditions that are predicted to increase with the changing climate (Gamboa 2008).

Climate change impacts deserve special attention when making long-term capital investment decisions, such as where to build and how to design new facilities. These siting and design decisions are often made with reference to events like 100-year floods, expected peak wind speeds,

and other environmental/weather elements that may occur with very different frequencies or intensities than they have in the past.

Companies can also use voluntary efforts to improve the resource bases upon which they rely. For example, Unilever has invested substantial efforts in Indonesia to clean up the Brantas River around its shampoo, toothpaste, and soap manufacturing plant. The production process required clean water inputs, so it was certainly in Unilever's best interest to have a clean river. The company therefore donated management expertise, voluntary help, and equipment as part of a larger government and civil society joint effort to encourage four villages along the river to act as better stewards for the river over the long term (Unilever 2003). Having an improved secure water source puts Unilever in a more secure position to handle climate impacts down the line like new precipitation patterns.

Businesses depend for their survival on a network of direct stakeholders including employees, suppliers, and customers. The needs, preferences, and capabilities of these groups are likely to change as the world warms. Here are some examples of ways businesses can engage with these groups as part of their adaptation efforts. If the physical effects of climate change, or the other changes that flow from those effects, are impacting a firms' employees, these individuals may not be able to work or may suffer a decline in productivity. Companies can help ensure their own well being by helping their employees become resilient in the midst of change. Offering health and wellness services, transportation assistance, and aid in response to disasters can help ensure the health, safety, and loyalty of employees.

One example of business recognizing that its interests are aligned with those of its employees comes from the businesses across Southeast Asia that train their employees about HIV/AIDS. HIV/AIDS poses a threat to employee retention, especially among young employees, creating an incentive for companies to engage in HIV/AIDS prevention (WEF 2003). In Thailand, for instance, Property Care Services, Ltd., a property support services company that provides janitorial, security, gardening, pest control, and stocktaking and facility management services, has collaborated with the non-profit Thailand Business Coalition on AIDS to incorporate information about the disease into its induction training for new employees. This 1.5 hour module covers prevention, employee rights around AIDS, and care and support resources for those infected or affected by the disease. PCS follows up on the training with a section about HIV/AIDS in its quarterly staff newsletters and HIV/AIDS information booths at its staff events.

This example readily translates to the importance of business helping employees adapt to climate change, since climate change is likely to cause many changes in disease patterns. Malaria and dengue prevention efforts, including distribution of mosquito netting, may also be in order in many of these sites. In fact, mosquito nets are already proving to be rapidly growing market in the region. In 2007 a manufacturer in Viet Nam reported an increase of nearly 33% in sales of mosquito nets in the first half of the year. According to a news report, “[t]he Hanoi-based firm gave no reasons for the surge in sales, but tens of thousands of people in Southeast Asia have been infected by dengue this year as warmer weather and heavy rains helped spread the mosquito-borne virus across the region.” (Reuters 2007).

Supply chains can be especially vulnerable to disruption in the face of climate change. Supply chain networks now span the globe and can tie

thousands of companies together. This means that the implications of climate change in one area of the world, whether in the form of sudden disasters such as floods and typhoons, or slower changes such as droughts, will have ripple effects that are felt around the world. Companies can protect themselves from these ripples by building resilience into their supply chains. However, the ways in which they do this can be beneficial or harmful to others in their supply network. Companies that collaborate with suppliers to ensure mutual benefit (for example, by extending adaptation knowledge to a supplier) may build lasting relationships that can weather the coming storms. In contrast, firms could switch away from affected suppliers when problems arise. As a recent study on the role of business in disaster preparedness notes, “[L]ong-term business relationships with suppliers are crucial and business continuity should not mean expediency – dropping suppliers if supplies are temporarily disrupted” (Warhurst 2006).

Private sector action to address climate change impacts on broader landscape will likely require partnerships with others. The scale of the problem is so large that no entity or sector can effectively respond to climate change in isolation. Instead, businesses will need to partner with one another, with non-governmental organizations (NGOs) and with government.

Many of the challenges we face can only be overcome by cooperation. No one player can solve the problem alone because each has different strengths and weaknesses.

Business has capacity but no democratic mandate and often limited trust. Governments have a mandate but not the same capacities as business. NGOs enjoy trust, if no formal mandate. They tend to have high levels of expertise but low levels of resources.

However, together we have all of the ingredients to take on the world's main concerns, and if we work together we can manage these concerns at a new and more effective level.

– The thoughts of eight CEOs of leading multinational corporations on businesses' role in helping to solve some of the world's most pressing problems (WBCSD 2008b: 33)

Business groups can be powerful forums to share ideas for addressing climate change challenges. Jane Nelson, director of the Harvard Kennedy School's Corporate Social Responsibility Initiative, identifies four categories of corporate networks that may address issues of climate change adaptation: geographic focused (bringing together companies from the same geographic area, but across industries), issue focused (created to address a specific challenge), industry focused, and groups that span these categories, such as the International Chamber of Commerce, the World Economic Forum, the World Business Council for Sustainable Development (Nelson 2008:25).

The Global Roundtable on Climate Change is an example of an issue-focused group. Comprised of over 150 businesses, non-profits, foundations, educational actors, and governments from around the world, the Roundtable, which has come together five times since its founding in 2005, is designed to “discuss and explore areas of potential consensus regarding core scientific, technological, and economic issues critical to shaping sound public policies on climate change.” In its joint statement, released in February of 2007, the Roundtable proclaims: “Governments, the private sector, trade unions, and other sectors of civil society should undertake efforts to prepare for and adapt to the impacts

of climate change, since climate change will occur even in the context of highly effective mitigation efforts” (see <http://www.earth.columbia.edu/grocc/about.html> for more about the GRCC). There are a wide range of similar climate-focused initiatives. Most still emphasize mitigation in their work, but others are beginning to include an adaptation component (see Figure 9).

**Figure 9. Examples of Global Initiatives to Promote Private Sector Engagement on Climate Change**

Initiative	Lead Organization/ Convener	Actions	Membership
CEO Climate Policy Recommendations to G8 Leaders (WEF 2008) <sup>4</sup>	World Economic Forum, World Business Council on Sustainable Development	Submission of climate change policy recommendations to G8 summit leaders for their July 2008 meeting. Included guidance on adaptation needs.	100 total signatories, including Alcoa, Applied Materials, Basic Element, British Airways, Deutsche Bank, Electricité de France (EdF), Eskom, Petrobras, RusHydro, Royal Dutch Shell, Telstra, Tokyo Electric Power, TNT, Vattenfall
Climate Disclosure Project (CDP 2008) <sup>5</sup>	Climate Disclosure Project	CDP seeks information on the business risks and opportunities presented by climate change and greenhouse gas emissions data from the world's largest companies to provide to institutional investors	354 Signatory Investors, including Goldman Sachs, Morgan Stanley, Barclays and HSBC
Investor Network on Climate Risk (INCR) (INCR 2007) <sup>6</sup>	Ceres, Inc.	A network of institutional investors and financial institutions that promotes better understanding of the financial risks and investment opportunities posed by climate change.	70 total investors, including AIG Investments, California Public Employees' Retirement System, Calvert Group, Deutsche Asset Management, Pax World Funds

Small and medium enterprises can also come together to achieve shared goals. For example, SMEs can also help to create resilient communities and ecosystems by maintaining or strengthening the natural resource base upon which their businesses depend. There are often opportunities for a group of SMEs within a community to manage a natural resource together in a way that allows all of them to use it over the long term. In Bangladesh, for example, communities are managing their wetlands to help the fish population to return. Simultaneously, community members are

<sup>4</sup> <http://www.weforum.org/en/initiatives/ghg/index.htm>

<sup>5</sup> <http://www.cdproject.net>

conducting business operations in a way that supports the restoration and allows individuals to make money from projects that are not destructive to the wetlands, such as through sustainable vegetable and poultry farms

Civil society can be a powerful partner for business to assure that its products and expertise are relevant to adaptation efforts around the world. One example is the world of microfinance. Large multinational financial institutions now provide funding for microfinance through non-profit institutions with teams on the ground in developing countries. These finance tools are critical to increasing the resilience of vulnerable populations in the face of climate change, by paying for services like health care and education and by creating new forms of income. One example of this collaboration is the \$108 million microfinance bond that Morgan Stanley used in 2007 to provide loans to 21 microfinance institutions around the world (Forum for the Future 2007).

Another important area of collaboration with civil society is in the form of corporate philanthropy, whereby companies support the activities of NGOs, either directly or through corporate foundations. Proctor and Gamble, for instance, has partnered with NGOs and relief organizations like Red Cross, CARE, and WorldVision to distribute its PuR safe drinking water packets in the wake of disasters like the tsunami in South Asia in 2005 and the 2007 Cyclone Nargis in Myanmar. The packets, which purify dirty and disease-ridden water, are provided to these relief organizations at the cost of production to Proctor and Gamble, meaning that the company does not make a profit for this work (Children's Safe Drinking Water 2008; WorldVision Singapore 2007; USAID 2006) (see Box 7 and Case Study 3: Rabobank Foundation for additional examples of corporate philanthropy efforts).

A focus on short-term profitability can sometimes lead businesses to take actions that are harmful to people or the environment. However, when private sector entities take a longer term, broader view they often see that their interests are aligned with the communities and ecosystems that surround them. We will see, however, that the way a business decides to adapt to climate change can have profound implications for the communities around them and for society at large (see Figure 10 for examples).

---

<sup>6</sup> <http://www.incr.com/NETCOMMUNITY/Page.aspx?pid=198&srcid=-2>

**Figure 10: Illustrative examples of how business action could affect the adaptation of vulnerable populations**

Sector	Positive Impacts	Negative Impacts
<b>Agriculture</b>	Diversify crops and tools available to local farmers. Provide extension services on climate change to small farmers.	Develop local dependency on a single crop. Introduce crops incompatible with changing climate conditions
<b>Water Resources</b>	Consult local communities before diverting or altering water resources. Create incentives and technologies for improved water efficiency in drought prone areas Invest in watershed restoration practices	Divert water sources upon which local communities rely Degrade or destroy wetlands and forests that provide water regulation and flood control services.
<b>Insurance and Finance</b>	Provide low-cost insurance and access to credit for poor communities.	Deny services to customers most in need
<b>Infrastructure</b>	Consult local communities during design of new infrastructure.	Build a facility at a site that involuntarily displaces communities or damages ecosystems.

### **Box 7: Corporate Philanthropy – Foundations Aid Adaptation in Southeast Asia**

Multinational corporations are increasingly developing philanthropic wings to give back to the communities in which they work and support development efforts around the world. Many of their projects enhance vulnerable communities' capacities to cope with climate change impacts.

For example, the DuPont Community Fund provides aid to improve school facilities in poor and vulnerable communities in Thailand. Better education infrastructure aids enterprise development, and enterprises bring in income that is critical in preparing for and recovering from climate change impacts.

Google.org, meanwhile, has provided funding to InSTEDD (Innovative Support to Emergencies Diseases and Disasters) as part of its Mekong Collaboration Program (MCP). Launched in December of 2007, the MCP will work in Cambodia, Lao PDR, Myanmar, Thailand, and Vietnam to speed village reporting systems for disease outbreaks and to improve the synthesis and analysis of this information at the national level. Given that many diseases are predicted to spread with higher temperatures and that disease is a major hindrance to productivity, this project also promotes the adaptive capacity of these countries.

These corporations join non-profit foundations like the Rockefeller Foundation and Ford Foundation in their climate change adaptation sponsorship efforts. Rockefeller has a specific program devoted to climate change adaptation in the Asian cities (see more about the Asian Cities Climate Resilience Network at [http://www.rockfound.org/initiatives/climate/asian\\_cities\\_climate\\_change.pdf](http://www.rockfound.org/initiatives/climate/asian_cities_climate_change.pdf)). The Ford Foundation supports a range of adaptation efforts in the region, including through a model program to aid poor and vulnerable communities in rural Vietnam in their adaptation to climate change impacts (read more about the initiative, led by the East Meets West Foundation, at <http://www.eastmeetswest.org/news/climatechangepropmapr08.html>).

These initiatives not only boost the reputations of the corporations providing funding, but they recognize the tight relationship between the global business community and social and economic stability around the world.

Sources:

DuPont Thailand. 2008. Social Commitment. Online at [http://www2.dupont.com/Our\\_Company/en\\_TH/social\\_commitment/social\\_commitment.html](http://www2.dupont.com/Our_Company/en_TH/social_commitment/social_commitment.html)

Google.org. 2008. Grants and Investments. Online at <http://www.google.org/projects.html>.

Rockefeller 2008

Ford 2008

Opportunities exist for companies to support government adaptation efforts, including as:

- Contractors providing products and services.
- Members in a variety of public-private partnerships.
- Influencers of effective public policy.

One of the most basic ways that companies can work with government, and be involved in climate change adaptation, is by serving as contractors to government-funded efforts such as infrastructure upgrades and disaster recovery. Government may also subsidize research efforts for which the private sector will provide key resources – whether in developing off-grid energy options, testing disease resistant crops, or carrying out climate change impact monitoring.

Another potential area of collaboration between the public and private sectors is through joint funding mechanisms. The World Bank's

Carbon Funds of the last ten years provide one example of how this might work, with 66 private sector companies contributing to these funds of over \$2 billion, which go toward a mix of mitigation and adaptation activities (Nelson 2008: 13–14). There may be a similar opportunity for private contributions to the recently-established World Bank Climate Investment Funds, though only governments have committed funds thus far (Nelson 2008:14; World Bank 2008c).

The Kyoto Protocol's Adaptation Fund provides another model for government to leverage funds through the private sector for adaptation. The monies for this fund come from a 2 percent levy on the proceeds of the Clean Development Mechanism (see Box 3), (Muller 2008: 16–17), and which comes down to a direct levy on business that does not rely on government financial support or collection. While business may dislike the levy, it is one way that government will be forced to leverage the wealth created by the private sector to help society adapt in arenas where a lack of business incentives prevents companies from supporting broader adaptation across society.

The scale of climate-related issues is such that governments at all levels will be involved in adaptation planning and execution. New policies and agreements will be enacted from the local to the global level. These policies will have a profound impact on business: companies are therefore stepping up their involvement in policy dialogues. Several major corporate initiatives already exist to influence climate policy. For example, a group of over 40 major corporations, in collaboration with several NGOs, prepared the “CEO Climate Policy Recommendations to G8 Leaders,” which was presented in Japan before the July 2008 G8 summit (see Figure 9). The CEO recommendations include a call for government to help the private sector take advantage of opportunities to adapt themselves and the rest of society and to collaborate with the private sector in its creation of a multilateral adaptation fund (WEF 2008).

In partnership with governments, international business can do much more in [the adaptation] space, particularly if the economic case for adaptation activities or markets for adaptation products is further developed...We welcome the important development of a new multilateral fund on adaptation and we offer to work with it, to ensure it leverages finance and expertise from the private sector to maximize its potential impact.

— From the “CEO Climate Policy Recommendations to G8 Leaders,” July 2008 (WEF 2008).

Businesses can also impact policies by providing expertise to line agency officials and policy-makers as they set new laws to help society adapt. For example, engineering firms and land-use planning companies can provide critical advice about changing building codes and zoning laws in the face of a changing climate.

**Questions for Discussion:**

- What are the key needs and next steps to advance business action on adaptation in Southeast Asia?
- What opportunities exist for win-win adaptation strategies that support business goals and reduce the vulnerability of broader society, particularly the poor?
- What incentives might government provide to leverage private sector support in adaptation?
- How can international organizations and donors partner with the private sector to meet societal adaptation needs?

# VI. Business Adaptation Case Studies

To illustrate some of the diversity of business activities that can contribute to adaptation, the authors conducted interviews with four companies engaged in adaptation efforts in South and Southeast Asia. The companies include a small electricity enterprise founded in Southeast Asia, an insurer in India that is operating a program with good potential for replication in Southeast Asia, as well as Coca-Cola and Rabobank, two large multinational corporations with concerns in the region.

## **Socially Responsible Entrepreneurship Drives Rural Development and Poverty Alleviation: Sunlabob, Lao PDR**

### **Sunlabob Fast Facts**

**Founded:** 2001

**Funding:** Makes most of its profit by getting people to pay for service of off-grid energy equipment, including solar, hydro, and biomass.

**Size:** Has installed over 5,600 systems in 450 villages across Lao PDR alone

**Annual Profits:** Unknown

**Activities:** Full service energy provider selling hardware and energy services in remote regions.

**Location:** Headquarters in Lao PDR, operations across Southeast Asia and growing number in Africa.

**Adaptation Activities:** Electricity services – and the resulting increase in incomes – make rural communities more resilient both to climate change and to other challenges.

Sunlabob strives to become the largest provider in the Lao PDR for renewable energy solutions. Licensed since 2001, it operates as a profitable, full-service energy provider for remote areas where the public electricity grid does not yet reach (Sunlabob 2008). Although 48% of the Lao population has access to grid electricity, this is concentrated in cities and towns, as are healthcare and communications, leaving large areas of the country without services (Schroeter 2007). Many poor people in remote rural areas rely on kerosene for lighting. Kerosene lamps can be dangerous, causing burns, starting fires and polluting the air indoors. Solar lanterns, portable lighting fixtures that run on batteries charged using solar power, are a very promising alternative to kerosene lamps.

Sunlabob has introduced high quality solar photovoltaic (PV) systems to Lao PDR in a way that people can afford.

Although solar lanterns are being widely promoted as a lighting solution in remote villages away from the grid, experience shows that the lanterns fail much earlier than would be expected due to low quality components that make them affordable for rural households. Furthermore, batteries are irregularly charged, and households engage in “hotwiring”, whereby they use the charge for operating other equipment, which causes the batteries to fail earlier. Independent solar lanterns with their own panels have therefore been uneconomical for rural households in the long run.

Sunlabob has responded to this challenge by providing solar lantern charging services, using a carefully selected and trained network of franchises that install and maintain state-of-the-art solar PV equipment at centrally accessible locations. Each franchise trains village technicians to perform day-to-day maintenance. Sunlabob rents maintenance equipment to a Village Energy Committee, who are selected by the whole community, and who lease the equipment to entrepreneurs in the village. Village entrepreneurs then collect a fee for recharging portable lamps. This fee is a regular small expense for a household, just like buying kerosene at the village shop. The village entrepreneur typically cannot make a living just from operating a charging station, but can gain a regular and reliable income to supplement other income streams.

Sunlabob’s products help rural communities build assets and capacities that they can use in adapting to climate change. Cutting back kerosene usage has left more money in citizens’ pockets for other purposes. The consistent local electricity supply from village systems has generated new sources of income and brought educational resources and modern communication tools to these communities, including mobile phones, power radios, and TVs (Osbourne 2008). Larger village systems provide power for community services such as health systems and water pumping. In some cases, electricity will even allow the schools, community centers, and government offices to install computers. All of these assets can help communities build resilience and reduce their vulnerability to climate change impacts.

Lantern users can now spend the evenings on craftwork, typically earning an extra 5,000 to 10,000 kip per month (Schroeter 2007). Larger systems are used for making ice in fishing communities, allowing them to transport fish to markets in towns. The systems have empowered individuals and the community as a whole. At present 1,870 home systems – including 20 larger ones for community use – and 500 solar lanterns are rented to families in 73 different villages. The installation rate has been around 500 systems per year, although it is expected to increase to 5,000 per year with new investment. Overall, the program has created full-time or part-time work for 34 franchisees and over 80 village technicians.

The innovation in Sunlabob’s model is primarily its ability to deliver renewable energy solutions to rural communities on a long term basis without the need for continued subsidization. Initial finance came in the form of private equity from the business founders, followed by some public grants to carry out capacity development. Sunlabob has now started receiving commercial bank loans.

Sunlabob maintains as its core philosophy that profit-making organizations are the best driving forces for sustainable economic development and for providing the managerial, technical, and financial resources needed to meet social and environmental challenges. Sunlabob realized the need for inexpensive, consistent, easily maintained, and low-impact

energy sources in rural communities. It conducted extensive market research in rural communities to establish cost-effective and sustainable practices, and to develop payment mechanisms that would complement existing practices. Its initial diligence has paid off, and it is now taking the lessons it learned in Lao PDR to new branches in Cambodia, Indonesia, Bhutan, East Timor, Eastern Africa and Latin America.

As the model expands, there is ample opportunity for public-private partnership funding. Private investors such as social investment funds, eco-investment funds and carbon investment funds can invest to rent the charging stations. Public revolving funds, put forth by community members, can support purchase of the first batch of lanterns to start up the businesses of the village entrepreneurs. After the initial investment by the public, the village enterprises are expected to generate enough income to expand and continue their own operations. The biggest challenges to address in replication of Sunlabob's work are the development of a local skill base and the establishment of small enterprises to run the franchises.

#### *Keys to Success*

- Public-private partnerships
- For-profit structure of social enterprise
- Responds to a clear need using relevant technology
- Designed to be complementary to lifestyles of client base
- Builds capacity at community level to pass ownership of technology to locals
- Replicable model can be used worldwide

### **Micro-insurance Reducing Farmers' Exposure to Weather Risk: an ICICI Lombard and BASIX Partnership**

#### **ICICI Fast Facts**

**Founded:** 2001

**Location:** India

**Size:** 3,526,961 policies sold in fiscal year 2007–2008

**Annual Profits:** Fiscal year 2007–08: Rs. 1,029,000

**Business Activities:** “India ‘s number one private general insurance company” (ICICI 2008)

**Adaptation Activities:** By providing new, more affordable crop insurance products, ICICI helps small Indian farmers weather storms and droughts.

Agricultural productivity in Asia is at risk of severe losses as the climate changes. High temperatures, increased drought, and flooding all can lead to large-scale crop failure, as well as to slower productivity losses due to soil degradation. More than two thirds of the Indian workforce relies on agriculture for their income, and rainfall patterns often determine the availability of water for irrigation or the occurrence of floods. In other words, weather plays a very important role and is a risk that needs to be effectively managed.

Traditional crop insurance typically has not been available to help Indian farmers overcome weather risks, because contracts are expensive to administer and therefore not commercially viable in most Indian rural settings. A key cost is the expense of assessing crop damage for large numbers of small farmers. By contrast, insurance contracts that have

payouts pegged to a particular weather parameter, like rainfall levels. This kind of “index-based” insurance uses the strong correlation between crop yields and rainfall to trigger insurance payments to policy holders when rainfall is below a certain level, and therefore does not require insurance companies to assess crop damages for individual farmers. This can dramatically cut transaction costs and make insurance more affordable.

In 2003, ICICI Lombard General Insurance Company (a joint venture between ICICI Bank and Lombard, Canada) formed a partnership with BASIX, a Hyderabad-based micro-finance institution, to pilot the sale of such rainfall index insurance contracts to small farmers in Andhra Pradesh, India. The Commodity Risk Management Group (CRMG) of the World Bank provided technical support, and the project became the first weather insurance initiative in India and also the first farmer-level weather-indexed insurance offered in the developing world. ICICI Lombard emerged as a pioneer in the weather insurance business in assessing the risk exposure of the agriculture sector to weather fluctuations.

Its initial launch was very small and simple, with only 230 participants and a focus on only crop-specific risks. But by 2005, the scheme had graduated to considering the risk exposure of an entire district to climate variations. During the 2005 monsoon, BASIX sold 7,685 policies to 6,703 customers in 36 locations in six states. Strong existing delivery channels, strategic planning, effective and transparent communications with farmers and a complementary partnership with local organizations greatly contributed to this success.

The partnership’s communication strategy enabled farmers to understand insurance as a product, helped improve farmer trust in the scheme and also channeled customer feedback to ICICI, which then customized its product designs to suit different local conditions and needs. BASIX’s existing presence in more than 10,026 villages in seven states across India and a staff of 1,281, meant that adding weather insurance to its comprehensive set of livelihood services created many economies of scale. By offering various bundled micro-finance services for example, BASIX was able to maximize staff productivity, improve cost-effectiveness, and have a stronger impact on farmers’ livelihoods.

Strong partnerships and the use of BASIX as the intermediary agent between the ICICI and rural farmers were fundamental to the scheme being trusted and scaled up. Detailed qualitative and quantitative research of rural markets and farmers needed to be carried out, and new weather monitoring stations had to be installed to measure rainfall levels, activities that aided in improving the company’s image in front of the farmers. Moreover, innovative features like doorstep delivery and quick payouts when index triggers were reached also greatly aided in the smooth and effective expansion of the program.

While the project has increased ICICI Lombard’s penetration into the rural economy and expanded its customer base, it has also enhanced the company’s weather risk related knowledge. ICICI Lombard now uses weather data and analysis in designing broader natural disaster and catastrophic risk covers and products. Other stakeholders have also gained substantial benefits from this project: BASIX has increased its client services; poor farmers have access to cash in the event of a low rainfall and low crop yield thereby reducing their vulnerability; the government has had to invest less in establishing a safety net for its vulnerable populations; micro-finance institutions and banks have a lower risk of loan defaults; and finally international development agencies can focus on providing fast relief to victims of catastrophic disaster events.

This successful experience has sparked much broader interest in weather-indexed insurance in India, and elsewhere, in aiding adaptation to climate change by providing pro-poor weather insurance products. However, while insurance might decrease short term vulnerability by providing cash immediately after a weather event, it is difficult to tell what long term impacts it might have for adapting to climate change. By encouraging people to continue living in high risk areas or by making people more risk averse with insurance than they would have been otherwise, it is possible it could prove “maladaptive” in the long-run. Incentives for risk management need to be aligned well with insurance premiums for such mal-adaptations to not occur. Insurance companies like ICICI and BASIX also will likely go through a process of adjusting their products, pricing and delivery over time, as they learn more about their customers’ risk profiles and adaptation options. Ultimately, it may also require considerable government oversight of insurance and insurance products, and government intervention through other risk management initiatives, to make sure that resilience in the face of a changing climate increases with insurance.

#### References:

Manuamorn 2007; UNEPFI 2006

#### *Keys to Success*

- Partnership between major insurer and micro-finance institution
- Started with small pilot program and then scaled up rapidly
- Designed to meet the needs of an under-served market

### **Building Reputations, Securing Resources: Coca-Cola and WWF Team Up for Water Conservation**

#### **Coca-Cola Fast Facts**

**Founded:** 1886

**Location:** Headquarters in Atlanta, Georgia, United States. Operations in more than 200 countries.

**Size:** 1.5 billion servings per day

**Annual Profits:** 2007: USD 5,981 million

**Activities:** Maker of over 2,800 beverage products

In 2007, The Coca-Cola Company (TCCC) became the first multinational corporation to set a goal “to return to communities and to nature an amount of water equivalent to what we use in all of our [products] and their production.” (Coca-Cola 2007)<sup>7</sup> This means reducing the amount of water used to produce their beverages, recycling water used for manufacturing processes so it can be returned safely to the environment, and replenishing water in communities and nature through locally relevant projects. Coca-Cola’s dozens of bottling plants across the South and Southeast Asian regions are part of these efforts, which include improving water efficiency in the plants by 20 percent by 2012. Two major factors motivated Coca-Cola’s ambitious conservation aim.

First, water is the lifeblood of TCCC’s business and the foundation of sustainable communities and ecosystems. Coca-Cola recognized that it cannot have a healthy and growing business unless the communities it serves are sustainable themselves. TCCC’s water stewardship strategy

<sup>7</sup> [http://www.thecocacolacompany.com/citizenship/water\\_pledge.html](http://www.thecocacolacompany.com/citizenship/water_pledge.html)

incorporates four core focus areas: Plant Performance; Watershed Protection; Community Water Initiatives; and Global Awareness and Action. Over the past decade, TCCC has greatly increased its understanding of the many water issues the world faces and the link to the markets and business. Water stewardship is currently and for the foreseeable future the main sustainability focus of TCCC.

The second motivation for the water goal was the outcome of a 2005 global risk assessment that TCCC undertook. The assessment showed that climate change would increase water scarcity, social problems, and economic setbacks for the company. TCCC concluded that water scarcity presented one of the biggest challenges to their operations and decided to embark on a process of internal improvements and engagement with local communities to help conserve water resources for all uses.

Assisting local communities in the conservation of their natural resources also serves to improve the reputation of the Company among local stakeholders and international consumers. In the past Coca-Cola has been the subject of harsh criticism from local communities in India. In 2004 communities around Coca-Cola bottling plants teamed up with a group of non-profits to campaign against the Company because of its water usage and environmental practices. This not only had an impact on Coca-Cola's reputation but also served to disrupt its operations. Investing in water projects in the region thus not only brings sustainability benefits, but also helps the Company to maintain good relations amongst local communities and other important stakeholders.

The first step toward establishing the water goal came in 2006, when TCCC partnered with The World Wildlife Fund (WWF) to help conserve some of the world's most important freshwater resources, including the Mekong River (WWF 2008a). The company's seven bottling plants in Thailand and three in Vietnam made them particularly interested in pursuing work in these regions.

TCCC chose the watersheds to work in based on their biodiversity, the opportunity for meaningful conservation gains in the area, and the importance of the watershed to the communities in which TCCC operates. Upon completion of these initial assessments, Coca-Cola established watershed restoration and community natural resource management projects in Manchakhirri district in Khon Kaen province, Thailand and Tram Chim National Park in Dong Thap province, Vietnam (WWF 2008b). In Thailand, the Provincial Government, District authorities and local people are all active stakeholders, while in Vietnam, partners in the project include Tran Chim National Park Board and local People's Committees in Tam Nong District.

WWF leads the community workshops to engage local leaders through the many processes involved in establishing sustainable watershed management. To date, 11,600 households in Thailand and 9,903 households in Vietnam have taken part in these workshops. The communities use historical data to make planning tools, such as seasonal calendars to clarify major livelihood activities in relation to the natural habitats. Transects, resource use ranking exercises, and household interviews are also used to elucidate problems and concerns in association with natural resource management and livelihoods in each study area. These are then compiled into conceptual models that ranked problems and identified planned solutions<sup>8</sup>.

---

<sup>8</sup> Personal communications with:

Sombat Jungsaitakul, Environment & Quality System Manager, Coca-Cola Southeast & West Asia Edward Chan, Public Affairs and Communications, The Coca-Cola Company.

The overall objective of the partnership is to achieve conservation of these river basins' biodiversity through management of natural systems and promotion of sustainable livelihoods. In an effort to achieve this, WWF also works to encourage better agricultural practices in the dry season and to utilize integrated paddy field fisheries during the flood seasons. Livelihood promotion is an indispensable component in sustainable watershed conservation and local people will be involved as beneficiaries and co-conservers throughout the project phase, which will run initially for five years.

TCCC has put US \$23.75 million toward the global watershed conservation project overall, which includes seven of the world's most important watersheds. In Vietnam and Thailand, the annual budget is around US \$500,000 and focuses on providing technical support for wetland restoration activities, streamlining relevant government policies, and encouraging the sustainable use of natural resources by communities for their livelihoods. In Thailand, activities have included a reforestation project, which has so far seen 76,661 native tree seedlings planted in critical habitats across the watershed to retain water, reduce soil erosion and improve soil conditions.

In addition to providing funding, TCCC brings technical knowledge in the form of wastewater treatment and water quality testing to the projects. Workers from Coca-Cola also volunteer in community conservation activities, such as creating tree plantations in Thailand. Future plans include more direct water projects – such as working with Coca-Cola bottlers in Thai Namthip Limited in Thailand and SABCO in Vietnam to promote improved water stewardship – as well as initiatives like providing microcredit to local residents to set up small businesses, and promoting vocational training and education among local youth through schools and NGOs. All of these sustainable development efforts will help Coca-Cola to maintain its water supply, even in the face of drought, and will help the communities they support to be more resilient and better able to adapt to climate change impacts.

#### *Keys to Success*

- Partnership with NGOs
- Drawing on core competencies

### **Rabobank Foundation: Expertise Reduces Climate Change Risks for Most Vulnerable in Jakarta**

#### **Rabobank Foundation Fast Facts**

**Founded:** 1973 as independent foundation.

**Funding:** Receives funds from entire Rabobank group (7 million Euros in 2007). Also receives funds from loan portfolio.

**Total Budget:** 18 million Euros in 2007.

**Activities:** Develops saving and loan co-operatives in rural regions, by contributing donations, loans, trade financing and technical assistance

**Location:** Headquartered in Netherlands, field operations in Cambodia, India, Indonesia, Laos, Philippines, and Vietnam.

**Adaptation Activities:** A partnership that assists communities in strengthening their preparation for disasters, through both risk reduction and insurance.

In August 2005, the Rabobank Foundation provided philanthropic support for a climate change risk reduction program in Jakarta. The Foundation partnered with the Indonesian Red Cross (Palang Merah Indonesia – PMI) and its counterparts from Germany and the Netherlands, as well as Indonesian delegations of the International Red Cross and Red Crescent Societies to develop the “Integrated Community-Based Risk Reduction – Climate Change” program.

The program strengthens disaster preparedness in Jakarta’s four most flood-prone sub-districts – Bidara Cina and Cawang in East Jakarta, and Kedaung Kaliangki and Rawa Buaya in West Jakarta (German Red Cross 2007). In all, the program provides support to around 121,000 people. The program is planned to run nearly five years, from January 2006 through December 2010, and has a total budget of 364,000 euros.

From 2006 to 2008, PMI conducted assessments to identify disaster risks and the most vulnerable community groups, including household-level surveys. Community members learned assessment methods through this process are now conducting their own assessments and developing their own adaptation plans. As part of the program, the Rabobank Foundation’s Indonesian partner Yayasan Pengembangan Perdesaan (YPP) offers microcredit and microinsurance to vulnerable communities (Chandra 2008). Working with local organizations, PMI and YPP design microcredit and microfinance products to increase the capability of communities to cope with disaster risks and impacts. Additionally, the program provides public education and awareness-raising campaigns to teach low-income households about disaster risks and options for engaging in saving and insurance schemes (Chandra 2008).

The Rabobank Foundation’s contribution is self-sustaining: 100 percent of its funding will be returned through the microfinance program, which can then be invested in other community empowerment projects (Chandra 2008).

*Keys to success:*

- Capacity building in the community and within key humanitarian aid and civil society organizations.
- Project replicable to other locations, as centralized NGOs build the capacities and expertise of local organizations
- Community commitment created through involvement in design of project activities and project implementation.
- Microfinance and microinsurance programs increase clients’ resilience

# VII. Conclusions and Recommendations

Climate change is here. While businesses should continue the work they have begun to reduce greenhouse gas emissions – the source of climate change – this is no longer sufficient for addressing the larger climate challenge. They now must also begin to take action to address the physical impacts of a warmer world. Businesses that fail to respond to climate change impacts may find themselves struggling in years to come, as their facilities, employees, supply chains, distribution networks, and customers are disrupted by the significant and varied impacts of climate change around the globe.

In Southeast Asia, companies are already exposed to climate change impacts – earlier monsoon seasons, longer and more severe floods, and droughts in forested regions and agricultural zones are just a few of the impacts these regions have faced in the past year. No individual event can be directly attributed to climate change, but the overall trends are becoming clear. Moreover, as the scientific evidence of climate change grows, so do government and civil society efforts to support adaptation across society. Now is therefore a critical moment for companies to consider the risks and opportunities created both by the changing climate and the responses of government, civil society, and other business actors to climate change.

Business does not need 100% certainty about projected impacts in order to take action. Not only is it good risk management to account for various climate scenarios in business planning; the actions that are taken based upon this planning – for instance, the need to improve the management of limited natural resources – often benefit companies regardless of climate effects. When Unilever helped communities upriver of its plant in Indonesia to improve their resource management efforts, it was also helping to secure a cleaner water source for its plant. When Alfonso Gamboa developed a crabbing method that was less destructive and allowed fishermen to catch crabs in stormy conditions, he also added value to his product by entering a niche sustainable fisheries market.

Companies can begin to adapt to climate impacts – and help others in society adapt – even before they comprehensively integrate climate change into their business plans. Indeed, many adaptation success stories emerge from businesses simply seizing on business opportunities or purposefully avoiding risk. Sunlabob, for instance, found success by taking advantage of a market need for off-grid lighting in rural areas. It was not aiming to adapt itself or even its customers to climate change, yet it managed to do both simply by acting upon this opportunity.

Companies should actively seek opportunities to create business value, while helping society to adapt. Such opportunities are not simply random occurrences – they emerge from business cultures that integrate long term value into their planning and recognize the connection between the success of society and the success of their business. Sunlabob, for instance, had a specific aim of improving the lives of people in poor rural communities by providing a product that was both useful and affordable to them.

Companies can prepare themselves and help society adapt by emphasizing long term sustainability throughout their work. The eight CEOs that comprise World Business Council on Sustainable Development's "Tomorrow's Leaders" group recently suggested:

"Annual or quarterly financial results tell only part of the story. Social and environmental factors also play a part in any holistic process of performance measurement because a company with a good record in these areas will attract employees, and build trust among current and potential employees, customers, and governments, while a company with a poor record will suffer increasing isolation. Companies need to design such long term measures and metrics, explaining to the external world why these are valid as indicators of sustainable value creation."(WBCSD 2008b).

The cross-cutting nature of climate impacts means that adaptation strategy should be integrated throughout the business – not simply relegated to a sustainability officer. A company will not be in a strong position to adapt effectively unless the entire business is permeated by awareness of climate risk and opportunity.

Government has a key role to play in incentivizing business to incorporate society's long-term climate adaptation needs into its plans. This will take the form of sticks – penalties for excess water use, or for breaking building requirements, for instance – and carrots – subsidies or tax breaks for using new water-efficient technologies or practicing sound land management.

Government, civil society, and business make powerful partners. As examples throughout this paper illustrate, each has an important and distinct role to play, but all can go further when they work together. Coca-Cola, for instance, could not be promoting watershed management in Thailand and Vietnam without the support of local governments and WWF.

Government will ultimately need to fill certain voids where the private sector simply cannot make adaptation efforts commercially viable. This may require taxes and levies on business. Businesses have many viable opportunities to lead in adaptation for themselves and for society at large, and can even incorporate some philanthropic efforts into their work. However, there will be places where government will need to step in to help society adapt – in providing health care, education, early warning systems, infrastructure, and many other spheres where the market alone rarely provides sufficient incentive for action. These needs are especially pressing in countries across Southeast Asia, where millions of poor people are challenged by the climate on a regular basis. Government aid will require funding, however, and businesses will, over time, likely be asked to contribute a portion of their earnings to the larger cause through taxes or levies.

Given these circumstances, key steps for businesses to take include:

1. Assess

Conduct a systematic assessment of how climate change and its broader societal repercussions will affect your firm's operations.

2. Implement

Take action in response to the risks and opportunities uncovered in your assessment. In deciding how to act, consider how your company's actions could affect others.

3. Look to lead

Companies that take a clear position and demonstrate leadership in climate adaptation will not only be respected and trusted among stakeholders – they also will reap the rewards of creating and dominating new or specialized markets.

4. Look to partner

Consider how best to form productive partnerships with civil society organizations, governments and other businesses to deliver productive and efficient solutions for climate change adaptation.

5. Be flexible and innovative

Climate change is clearly not static – nor should business responses be static. Periodically reassessing risks and opportunities will keep your company resilient and ready to adapt to a rapidly changing environment.

6. Pay your share

Where there are gaps between business incentives and societal adaptation needs, businesses and individuals will be asked to fill these gaps via taxes and levies that the government will then use to meet these other adaptation needs. Businesses should be prepared for this inevitability.

# VIII. Annexes

## **Annex 1: Public Sector Funding for Adaptation**

Unlike climate mitigation, which is increasingly coordinated through global carbon markets, the international community has not developed a harmonized system for managing public adaptation finance. Existing public adaptation finance is channeled through a number of mechanisms, including “multilateral funds,” “official development assistance,” and developing countries’ own domestic spending. As the international community focuses greater attention on adaptation, public finance is likely to grow from all of these sources.

### **UNFCCC Funds**

The countries that are parties to the UNFCCC and the Kyoto Protocol established several multilateral funds to support adaptation activities.

The most promising of these is the Adaptation Fund, established in December 2007 at the climate conference in Bali, Indonesia. Some estimates suggest that the Adaptation Fund could raise total revenues of between US\$160 and \$950 million by 2012, making it the largest single source of dedicated adaptation finance to date (Bapna and McGay 2008). The final design and success of the Fund will depend in large part on the outcomes of global climate negotiations over the next two years.

### **World Bank Funds**

In 2008, the World Bank established the Strategic Climate Fund (SCF), which is designed to “pilot new approaches” to dealing with climate change. SCF’s first program will provide short term financing to developing country governments to integrate climate change risks into their development efforts. The World Bank hopes to leverage the unique capacities and tools of the private sector – including private sector finance – through these funding efforts (World Bank 2008c). Thus far, 10 developed countries have committed over \$6 billion toward this and the World Bank’s other climate funds (World Bank 2008d).

### **Asian Development Bank Funds**

The ADB’s Climate Change Fund is one example of a public funding mechanism dedicated to responding to climate change in the region. Established in 2008 with an initial \$40 million investment, the Fund channels money toward technical assistance to countries to create practical guidelines on how to protect projects from the impacts of climate

change (climate-proofing). The fund also supports specific adaptation efforts like infrastructure updates, drought resistant crop implementation, improvements in irrigation efficiency, water resource management, rehabilitation of degraded forests and pasturelands, and watershed protection (ADB 2005).

#### **Official Development Assistance**

Developed countries also fund adaptation projects as part of official development assistance (ODA). An estimated \$100 billion is contributed each year, typically through national aid agencies, to promote poverty reduction in developing countries. Because of the overlap between development and adaptation activities, it is difficult to calculate what percentage of this ODA currently goes toward adaptation specifically. In the future, however, growing portions of ODA are likely to flow toward “climate-proofing” development and anti-poverty activities. For example, an aid agency might construct community buildings to withstand high winds during typhoons or change the location of a hydropower project to avoid water scarcity.

#### **Domestic**

Many governments in climate-vulnerable emerging regions already invest in adaptation projects, such as developing disaster management plans, encouraging use of new technologies, or climate-proofing infrastructure (UNDP 2008). Bangladesh, for example, has allocated \$40 million from its national budget to set up a Trust Fund on Climate Change, but the government also invited donors to make contributions to the Fund – the UK government has pledged \$132 million.

### **Annex 2: National Planning for Adaptation in South and Southeast Asia**

Many countries have begun to plan for dealing with climate change, as a first step along the way to actually funding and implementing programs to carrying out these adaptation needs. One push for adaptation planning comes through the UNFCCC – all countries that are part of the UNFCCC process are requested to submit “National Communications” to the UNFCCC Secretariat, in which they report on their plans and accomplishments for addressing both climate adaptation and mitigation. Except for Myanmar, all countries in Southeast Asia have submitted National Communications. These documents vary in the quality and depths in which they address adaptation activities, though the Philippines, Thailand and Vietnam are particularly detailed in their plans.

In addition, the UNFCCC has established a least developed countries (LDCs) work program to encourage LDCs to develop National Adaptation Programs of Action (NAPAs), through which they identify priority adaptation needs and activities. So far, Bangladesh and Cambodia have submitted NAPAs. Lao PDR is currently developing its NAPA; it is scheduled to be finalized in the next months (Chandra 2008).

A number of countries are also working on climate change planning efforts outside of the UNFCCC framework, often with support from bilateral and multilateral donors.

#### **Lao:**

Lao PDR established a Climate Change Steering Committee and Working Group in 1997 consisting of representatives of all relevant government agencies (Lao PDR 2008).

**Philippines:**

In 2007 the Philippines central government created a Presidential Task Force on Climate Change (PTFCC) to coordinate climate change matters across the country (IGES 2008).

**Indonesia:**

Indonesia's 'National Action Plan addressing Climate Change' (NAP) focuses on adaptation for its most vulnerable sectors – namely, water, agriculture, fisheries, coastal and marine, infrastructure, health, and forestry. The NAP considers poverty, social and economic development, investment, and spatial planning, and aims to integrate climate change adaptation into national development plans (Republic of Indonesia, State Ministry of Environment, 2007).

**Bangladesh:**

Bangladesh's National Steering Committee on Climate Change coordinates and facilitates national actions on climate change. The 10-year Bangladesh Climate Change Action Plan (2009–2018) seeks to increase the resilience of vulnerable groups by supporting and scaling-up community-level adaptation and livelihood diversification, and by improving access to basic services and social protections (See Table 7) (Ministry of Environment and Forests, Government of the People's Republic of Bangladesh, 2008)

**Thailand:**

The Thailand Strategic Plan on Climate Change, approved by the Cabinet in January 2008, incorporates six strategies on capacity building, research and development, awareness and public participation, and international cooperation, addressing both climate change mitigation and adaptation.

# IX. References

- Adam, D. 2008. *World Carbon Dioxide Levels Highest for 650,000 Years, says US Report*. Guardian.co.uk. May 13. Accessed November 18, 2008. Online at <http://www.guardian.co.uk/environment/2008/may/13/carbonemissions.climatechange>
- ADB (Asian Development Bank). 2005. *Climate Proofing: A Risk-based Approach to Adaptation*. Online at: <http://www.adb.org/Documents/Reports/Climate-Proofing/climate-proofing.pdf>.
- ADB (Asian Development Bank). 2008a. *Key Indicators for Asia and the Pacific 2008*. Online at [http://www.adb.org/Documents/Books/Key\\_Indicators/2008/pdf/Key-Indicators-2008.pdf](http://www.adb.org/Documents/Books/Key_Indicators/2008/pdf/Key-Indicators-2008.pdf)
- ADB (Asian Development Bank). 2008b. *Basic Statistics 2008*. Online at <http://www.adb.org/Statistics/pdf/Basic-Statistics-2008.pdf>
- Agrawala, S. and Fankhauser, S. 2008. *Economic Aspects of Adaptation to Climate Change*. Paris: OECD.
- Ankur Scientific Energy Technologies Pvt. Ltd. 2006. *Biomass Gasification: An Introduction*. Baroda, India. Online at [http://www.ese.iitb.ac.in/events/other/renet\\_files/21-9/Session%203/Industry%20experience%20on%20bioenergy\(A.Jain\).pdf](http://www.ese.iitb.ac.in/events/other/renet_files/21-9/Session%203/Industry%20experience%20on%20bioenergy(A.Jain).pdf)
- Ankur Scientific Energy Technologies Pvt. Ltd. 2008. Baroda, India. *Welcome*. Online at <http://www.ankurscientific.com/main.htm>
- ASrIA/CDP. 2008. *Carbon Disclosure Project Report 2008 Asia ex-Japan*. ASrIA. Hong Kong. Online at <http://www.asria.org/publications/lib/CDP%20Report2008.pdf>.
- Associated Press. 2007. “Power Cuts, Water Shortage Hit Philippines as Dry Spell Persists.” *International Herald Tribune*. July 26 Online at <http://www.iht.com/articles/ap/2007/07/26/asia/AS-GEN-Philippines-Dry-Spell.php>
- Bapna, M. and McGraw, H. 2008. *Financing Adaptation: Opportunities for Innovation and Experimentation*. Washington, DC: World Resources Institute.
- Basnayake, S. *Assessing Adaptation Responses to Climate Change in Coastal Zones of Sri Lanka*. Sri Lanka: Centre for Climate Change Studies Department of Meteorology. Online at [http://unfccc.int/files/adaptation/adverse\\_effects\\_and\\_response\\_measures\\_art\\_48/application/pdf/basnayake\\_coasts.pdf](http://unfccc.int/files/adaptation/adverse_effects_and_response_measures_art_48/application/pdf/basnayake_coasts.pdf)

- Bent, D., J. Goodman, R. Hardymont, I. Watt, K. Wessling, C. Priest, and P. Shabajee. 2008. *Climate Futures: Responses to Climate Change in 2030*. London: Forum for the Future & Hewlett Packard Labs. Online at [http://www.forumforthefuture.org/files/Climate\\_percent20Futures\\_WEB.pdf](http://www.forumforthefuture.org/files/Climate_percent20Futures_WEB.pdf)
- Bienthuy (LTS). 2008. *Thai's Phuket Among World's 8 Most Endangered Islands*. 123's Blog, Sonletay. Online at <http://sonletay.vox.com/library/post/thais-phuket-among-worlds-8-most-endangered-islands.html>
- Binh Minh, Ho. 2008. "Vietnam, Cambodia Brace for Mekong Floods." *Reuters India*. Aug. 19. Online at <http://in.reuters.com/article/environmentNews/idINHAN2924720080819>.
- BSR (Business for Social Responsibility). 2008. *Drinking it In: The Evolution of a Global Water Stewardship Program at the Coca-Cola Company*. Online at [http://www.bsr.org/reports/Coke\\_Water\\_Study\\_March\\_2008.pdf](http://www.bsr.org/reports/Coke_Water_Study_March_2008.pdf).
- CARE International. 2008a. *Humanitarian Implications of Climate Change: Mapping emerging trends and risk hotspots*. Online at [http://www.careclimatechange.org/files/MainReport\\_final.pdf](http://www.careclimatechange.org/files/MainReport_final.pdf).
- CARE International. 2008b. CARE *Climate Change*. Online at <http://www.careclimatechange.org/>
- CDP (Carbon Disclosure Project). 2008. *Carbon Disclosure Project: Home*. London: Carbon Disclosure Project. Online at <http://www.cdproject.net/index.asp>.
- CDP (Carbon Disclosure Project)/Innovest. 2007. *Carbon Disclosure Project Report 2007: Global FT500*. Online at [http://www.cdproject.net/download.asp?file=CDP5\\_FT500\\_Report.pdf](http://www.cdproject.net/download.asp?file=CDP5_FT500_Report.pdf)
- CDP (Carbon Disclosure Project)/PricewaterhouseCoopers. 2008. *Carbon Disclosure Project Report 2008: Global 500*. Online at [http://www.cd-project.net/download.asp?file=67\\_329\\_143\\_CDP percent20Global percent20500 percent20Report percent202008.pdf](http://www.cd-project.net/download.asp?file=67_329_143_CDP percent20Global percent20500 percent20Report percent202008.pdf)
- Chandra, H. 2008. Director, Yayasan Pengembangan Perdesaan (micro-credit branch of Rabobank Foundation). Personal Communication. Oct.
- Children's Safe Drinking Water. 2008. *The CSDW Program*. Procter & Gamble. Online at <http://www.csdw.org/csdw/index.html>.
- Churchill, C. 2006. "What is Insurance for the Poor?" In *Protecting the Poor: A Microinsurance Compendium*. Munich: Munich Re Foundation.
- CIESIN (Center for International Earth Science Information Network), Columbia University. 2008. *Low Elevation Coastal Zone (LE CZ) Urban-Rural Estimates, Global Rural-Urban Mapping Project (GRUMP), Alpha Version*. Palisades, NY: Socioeconomic Data and Applications Center (SEDAC), Columbia University. Online at <http://sedac.ciesin.columbia.edu/gpw/lecz>. Accessed Nov. 12 2008).
- Coca-Cola Company. 2007. *The Coca-Cola Company "Replenish" Report: Achieving Water Balance through Community Water Partnerships*. Online at [http://www.thecoca-colacompany.com/citizenship/water\\_main.html](http://www.thecoca-colacompany.com/citizenship/water_main.html).
- Cutler, D. 2008. FACTBOX: *Food Price Rises Spark Protests*. *Reuters*. May 15. Online at <http://www.reuters.com/article/africaCrisis/idUSL15794527>

- DuPont Philippines. 2008. *Community Outreach Programs DuPont Philippines*. Manila. Online at [http://www2.dupont.com/Our\\_Company/en\\_PH/social\\_commitment/social\\_commitment.html](http://www2.dupont.com/Our_Company/en_PH/social_commitment/social_commitment.html).
- Epstein, Paul R. and Evan Mills, eds. 2005. *Climate Change Futures: Health, Ecological, and Economic Dimensions*. Boston: Center for Health and the Global Environment, Harvard Medical School. Online at [http://www.climatechangefutures.org/pdf/CCF\\_Report\\_Final\\_10.27.pdf](http://www.climatechangefutures.org/pdf/CCF_Report_Final_10.27.pdf)
- Ford Foundation. 2008. *Grants Database*. Online at <http://fordfoundation.org/grants/database>.
- Forum for the Future. 2007. *New Horizons: Creating Value, Enabling Livelihoods*. Online at <http://www.forumforthefuture.org/node/835>.
- Gagnon-Lebrun, F. and S. Agrawala. 2006. *Progress on Adaptation to Climate Change in Developed Countries: An Analysis of Broad Trends*. Paris: Organization for Economic Cooperation and Development (OECD). Online at <http://www.oecd.org/dataoecd/49/18/37178873.pdf>
- Garcia Rincón, M. F., and Virtucio, Jr., F.K. 2008. *Climate Change in the Philippines: A Contribution to the Country Environmental Analysis*. World Bank. Draft, June 27. Online at <http://siteresources.worldbank.org/INTPHILIPPINES/Resources/PhilippineCEACCIJuly.pdf>.
- German Red Cross. 2007. *Fact Sheet/June 2007: Integrated Community-based Risk Reduction/Climate Change (ICBRR/CC) in West and East Jakarta*. Online at [http://www.katastrophennetz.de/downloads/klimawandel/drk\\_fact\\_sheet.pdf](http://www.katastrophennetz.de/downloads/klimawandel/drk_fact_sheet.pdf)
- Government of the People's Republic of Bangladesh, Ministry of Environment and Forests. 2008. *Bangladesh Climate Change Strategy and Action Plan 2008*. Online at <http://www.moef.gov.bd/moef.pdf>.
- Gray, D. 2007. "Bangkok Faces Underwater Future." *USA Today*. Oct. 20. Online at [http://www.usatoday.com/weather/climate/2007-10-20-bangkok\\_N.htm](http://www.usatoday.com/weather/climate/2007-10-20-bangkok_N.htm).
- Hammond, A., W. Kramer, J. Tran, R. Katz, and C. Walker. 2007. *The Next Four Billion: Market Size and Business at the Base of the Pyramid*. Washington, DC: World Resources Institute. Online at <http://www.wri.org/publication/the-next-4-billion>.
- Hanson, C., J. Ranganathan, C. Iceland, J. Finisdoire. 2008. *The Corporate Ecosystem Services Review*. Washington, DC: World Resources Institute; Dillon, CO: Meridian Institute; Geneva, Switzerland: World Business Council on Sustainable Development.
- Hoffman, A. 2006. *Getting Ahead of the Curve: Corporate Strategies that Address Climate Change*. Arlington, VA: Pew Center on Global Climate Change. Online at [http://www.pewclimate.org/docUploads/PEW\\_CorpStrategies.pdf](http://www.pewclimate.org/docUploads/PEW_CorpStrategies.pdf).
- Hunt, J. 2008. *Are the Right Risks Insured?* June 24. Geneva, Switzerland: Global Humanitarian Forum. Online at <http://www2.ghf-ge.org/index.cfm?uNewsID=71>.
- ICICI Lombard. 2008. *About Us: Why ICICI*. Online at [http://www.icilombard.com/app/ilom-en/about\\_us/why\\_icici.aspx](http://www.icilombard.com/app/ilom-en/about_us/why_icici.aspx)
- IGES (Institute for Global Environmental Strategies). 2008. *Climate Change Policies in the Asia-Pacific: Re-Uniting Climate Change and Sustainable Development*. Japan. Online at <http://www.iges.or.jp/en/pub/pdf/whitepaper/whitepaper2.pdf>.
- INCR (Investor Network on Climate Risk). 2007. *Petition for Interpretive Guidance on Climate Risk Disclosure*. Boston, Massachusetts: Ceres, Inc.

- Independent Online. 2008. "Vietnam Rice Farmers Threatened by Rising Sea Levels." *Thang Nien Daily*. Aug. 3. Online at <http://www.thanhniennews.com/society/?catid=3&newsid=29817>
- IPCC (Intergovernmental Panel on Climate Change). 2007. *IPCC Fourth Assessment Report, Working Group II Report: Impacts, Adaptation, and Vulnerability*. Geneva: IPCC.
- IRIN (Integrated Regional Information Network). 2008a. *Thailand: Worst Mekong river flooding in 100 years*. Aug. 18. Nairobi: UN Office for the Coordination of Humanitarian Affairs. Online at <http://www.irinnews.org/Report.aspx?ReportId=79869>.
- IRIN. 2008b. *Thailand: Disease Concerns Risking as Floods Toll Reaches 23*. Online at <http://www.irinnews.org/Report.aspx?ReportId=80696>.
- Jenkins, Beth et al. 2008. "Business Linkages: Supporting Entrepreneurship at the Base of the Pyramid." Report of a Roundtable Dialogue June 10-12, 2008, Rio de Janeiro, Brazil. Washington, DC: International Finance Corporation, International Business Leaders Forum, and the CSR Initiative at the Harvard Kennedy School. [http://www.hks.harvard.edu/m-rcbg/CSRI/publications/report\\_31\\_Business%20Linkages%20Rio.pdf](http://www.hks.harvard.edu/m-rcbg/CSRI/publications/report_31_Business%20Linkages%20Rio.pdf)
- JP Morgan Chase & Co. Global Equity Research. 2008. *Watching Water: A Guide to Evaluating Corporate Risks in a Thirsty World*.
- Laganda, G. 2008. Regional Technical Advisor Climate Change Adaptation, UNDP Regional Centre in Bangkok. Personal Communication, Oct. 6.
- Lao PDR, Science Technology and Environment Agency. 2008. Laos Climate Change. Vientiane, Lao. Online at <http://www.laosclimate.org.la/>.
- Lash, J. and F. Wellington. 2007. "Competitive Advantage on a Warming Planet." *Harvard Business Review*. March. 95–102.
- Marketplace. 2008. *Home Insurance in Post-Katrina World*. Sep. 2 Audio report. Los Angeles: American Public Media.
- Manuamorn, O. 2007. *Scaling Up Microinsurance: The Case of Weather Insurance for Smallholders in India*. Online at [http://www.climate-insurance.org/upload/pdf/Manuamorn2007\\_weather\\_insurance\\_india.pdf](http://www.climate-insurance.org/upload/pdf/Manuamorn2007_weather_insurance_india.pdf)
- Merrill Lynch. 2005. *Energy Security and Climate Change: Investing in the Clean Car Revolution*. New York: Merrill Lynch.
- Mills, E. 2007. *From Risk to Opportunity: 2007 – Insurer Responses to Climate Change*. Boston, MA: Ceres.
- Ministry of Environment and Forests, Government of the People's Republic of Bangladesh, 2008. Bangladesh Climate Change Strategy and Action Plan 2008.
- Mydans, S. 2008. "Thousands Flee as Mekong Breaks Flood Records." *The Age*. Online at <http://www.theage.com.au/world/thousands-flee-as-mekong-breaks-flood-records-20080818-3xnv.html>.
- Nelson, J. 2008. *Corporate Action on Climate Adaptation and Development: Mobilizing New Business Partnerships to Build Climate Change Resilience in Developing Countries and Communities*. Paper prepared for Brookings Blum Roundtable: Development in the Balance: How Will the World's Poor Cope with Climate Change? Aspen, Colorado, USA, Aug. 3. Online at [http://www.brookings.edu/events/2008/0801\\_development.aspx](http://www.brookings.edu/events/2008/0801_development.aspx).

- NYC DEP (New York City Department of Environmental Protection). 2008. *Assessment and Action Plan, Report 1: A Report Based on the Ongoing Work of the DEP Climate Change Task Force*. Online at [http://www.nyc.gov/html/dep/pdf/climate/climate\\_complete.pdf](http://www.nyc.gov/html/dep/pdf/climate/climate_complete.pdf).
- Osborne, L. 2008. Financial Controller, Sunlabob. Personal Communication. Nov.
- Oxfam International. 2007. *Adapting to Climate Change: A Briefing Paper*. Online at <http://www.oxfam.org.au/campaigns/climate-change/docs/adapting-to-climate-change.pdf>.
- Oxfam Novib. 2008. *Coping with Climate Change*. Online at [http://www.oxfamnovib.nl/id.html?lang=EN&id=PROJ\\_DETAIL&pid=BAN-501114-0006018](http://www.oxfamnovib.nl/id.html?lang=EN&id=PROJ_DETAIL&pid=BAN-501114-0006018)
- Parry, R.L. 2008. "World Food Crisis Turns Rice into Gold." *The Times Online*. April 28. Online at <http://www.timesonline.co.uk/tol/news/world/asia/article3828373.ece>
- Prachatai. 2007. "Climate Change: Thailand's Grim Future." *Prachatai*. Oct. 6. Online at <http://www.prachatai.com/english/news.php?id=287>
- Rabobank. 2008. *Rabo Sustainable Agriculture Guarantee Fund*. Online at [http://www.rabobank.com/content/images/G5334%20RI\\_MVO\\_fund-LR\\_tcm43-50951.pdf](http://www.rabobank.com/content/images/G5334%20RI_MVO_fund-LR_tcm43-50951.pdf).
- Red Cross/Red Crescent Climate Center. 2007. *Red Cross/Red Crescent Climate Guide*.
- Republic of Indonesia, State Ministry of Environment. 2007. *National Action Plan Addressing Climate Change*.
- Reuters. 2007. "Vietnam mosquito net sales soar as dengue spreads." 18 July <http://www.reuters.com/article/environmentNews/idUSH-AN8585720070718>
- Rockefeller Foundation. 2008. *Asian Cities Climate Change Resilience Network*. New York. Online at [http://www.rockfound.org/initiatives/climate/asian\\_cities\\_climate\\_change.pdf](http://www.rockfound.org/initiatives/climate/asian_cities_climate_change.pdf).
- Sanderson, J. and S. Islam. 2007. *Climate Change and Economic Development: SEA Regional Modeling and Analysis*. England: Palgrave Macmillan.
- Schroeter, A. 2007. *Sunlabob Rural Energy Ltd.: Rental of PV Systems Provides Quality Lighting in Remote Laos Villages*. Ashten Awards for Sustainable Energy. Online at [http://www.ashdenawards.org/files/reports/Sunlabob\\_2007\\_Technical\\_report.pdf](http://www.ashdenawards.org/files/reports/Sunlabob_2007_Technical_report.pdf).
- Solomon, I. 2007. *Compensating for Climate Change: Principles and Lessons for Equitable Adaptation Funding*. Washington, DC: ActionAid USA.
- Sunlabob. 2008. *What Is Sunlabob?* Online at <http://www.sunlabob.com/en/what-is-sunlabob.html>.
- Sussman, F. and J.R. Freed. 2008. *Adapting to Climate Change: A Business Approach*. Washington, DC: Pew Center on Global Climate Change.
- Swiss Re. 2007. "Number of Events: 1970–2005." In *Sigma 2/2007*. Zurich. Online at <http://www.swissre.com/pws/research%20publications/sigma%20ins.%20research/facts%20and%20figures/number%20of%20events%201970-2006.html>.
- UN (United Nations). 2007. "Climate Change Around the World: A View from the UN Regional Commissions." *UN Chronicle Online Edition*, XLIV (4). Online at <http://www.un.org/Pubs/chronicle/2007/issue2/0207p33.htm>

- UNDP (United Nations Development Program). 2008. *Human Development Report 2007/2008: Fighting climate change: Human solidarity in a divided world*. New York.
- UNEP (United Nations Environment Program). 2007. *The Last Stand of the Orangutan: State of Emergency: Illegal logging, fire and palm oil in Indonesia's national parks*. Online at: [http://www.unep-wcmc.org/resources/PDFs/LastStand/full\\_orangutanreport.pdf](http://www.unep-wcmc.org/resources/PDFs/LastStand/full_orangutanreport.pdf)
- UNEPFI (United Nations Environment Program Finance Initiative).  
 2006. *Adaptation and Vulnerability to Climate Change: The Role of the Finance Sector*. CEO Briefing, Nov. Geneva, Switzerland: UNEPFI.
- UNFCCC (United Nations Framework Convention on Climate Change).  
 2007. *Climate Change: Impacts, Adaptation, and Vulnerability in Developing Countries*. Bonn, Germany: UNFCCC.
- UNFCCC (United Nations Framework Convention on Climate Change).  
 2006. *Technologies for Adaptation to Climate Change*.
- UNFCCC (United Nations Framework Convention on Climate Change).  
 2008a. *Feeling the Heat*. Online at [http://unfccc.int/essential\\_background/feeling\\_the\\_heat/items/2913.php](http://unfccc.int/essential_background/feeling_the_heat/items/2913.php)
- UNFCCC (United Nations Framework Convention on Climate Change).  
 2008b. *National Adaptation Programs of Action*. Online at <http://unfccc.int/adaptation/napas/items/2679.php>
- UNFCCC (United Nations Framework Convention on Climate Change).  
 1998. *Kyoto Protocol to the United Nations Framework Convention on Climate Change*. Online at <http://unfccc.int/resource/docs/convkp/kpeng.pdf>
- Unilever. 2003. *Cleaning up the Brantas River*. Online at [http://www.unilever.com/Images/2003%20Cleaning%20up%20the%20Bran tas%20River%20in%20Indonesia\\_tcm13-5526.pdf](http://www.unilever.com/Images/2003%20Cleaning%20up%20the%20Bran tas%20River%20in%20Indonesia_tcm13-5526.pdf)
- UNWTO (United Nations World Tourism Organization). 2008. *Responding to Economic Downturn – UNWTO “Tourism Resilience Committee” will link with Long-Term Climate Development Goals*. Nov. 12. Online at [http://www.unwto.org/media/news/en/press\\_det.php?id=3031&idioma=E](http://www.unwto.org/media/news/en/press_det.php?id=3031&idioma=E)
- USAID. 2006. *Safe Drinking Water Partnerships*. Online at [http://www.usaid.gov/our\\_work/global\\_health/eh/partnerships/sdw\\_partnerships.pdf](http://www.usaid.gov/our_work/global_health/eh/partnerships/sdw_partnerships.pdf).
- US EPA (United States Environmental Protection Agency). 2006. *The Greenhouse Effect*. Online at <http://www.epa.gov/climatechange/kids/greenhouse.html>
- WBCSD (World Business Council for Sustainable Development). 2008a. *Adaptation: An Issue Brief for Business*. Geneva. Online at <http://www.wbcsd.org/DocRoot/2W6pIkEp3ra0vRDXZ961/Adaptation.pdf>
- WBCSD (World Business Council for Sustainable Development). 2008b. *From Challenge to Opportunity: the Role of Business In Tomorrow’s Society*. Geneva. Online at <http://www.wbcsd.org/DocRoot/CZ2dt8wQCfZ-KX2S0wxMP/tomorrows-leaders.pdf>
- WEF (World Economic Forum). 2008. CEO *Climate Policy Recommendations to G8 Leaders*. Online at <http://www.weforum.org/en/initiatives/ghg/index.htm>
- WEF (World Economic Forum). 2003. *Global Health Initiative – Private Sector Intervention Case Example: Raising Employee HIV/AIDS Awareness Through Induction Training In A High Employee Turnover Business*. Geneva, Switzerland. Online at [http://www.weforum.org/pdf/Initiatives/GHI\\_HIV\\_CaseStudy\\_PCS.pdf](http://www.weforum.org/pdf/Initiatives/GHI_HIV_CaseStudy_PCS.pdf).

- World Bank. 2007. *East Asia Environment Monitor: Adapting to Climate Change*. Washington, DC. Online at [http://www-wds.worldbank.org/external/default/WDSCContentServer/WDSP/IB/2007/09/10/000020439\\_20070910101110/Rendered/PDF/407720PAPER0EA1onitor0200701PUBLIC1.pdf](http://www-wds.worldbank.org/external/default/WDSCContentServer/WDSP/IB/2007/09/10/000020439_20070910101110/Rendered/PDF/407720PAPER0EA1onitor0200701PUBLIC1.pdf)
- World Bank. 2008a. PovcalNet. Poverty Database. Washington, DC. Online at <http://go.worldbank.org/NT2A1XUWP0>.
- World Bank. 2008b. *2008 Primer: Reducing Vulnerabilities to Climate Change Impacts and Strengthening Disaster Risk Management in East Asian Cities*. Online at [http://siteresources.worldbank.org/EASTASIAPA-CIFICEXT/Resources/City\\_profile\\_Hanoi.pdf](http://siteresources.worldbank.org/EASTASIAPA-CIFICEXT/Resources/City_profile_Hanoi.pdf)
- World Bank. 2008c. *Strategic Climate Fund*. Washington, DC. Online at [http://siteresources.worldbank.org/INTCC/Resources/Strategic\\_Climate\\_Fund\\_final.pdf#Strategic\\_Climate\\_Fund](http://siteresources.worldbank.org/INTCC/Resources/Strategic_Climate_Fund_final.pdf#Strategic_Climate_Fund).
- World Bank. 2008d. *Donor Nations Pledge Over \$6.1 Billion to Climate Investment*
- WorldVision Singapore. 2007. *Procter & Gamble and World Vision Join Hands to Make Over 20 Million Litres of Safe Drinking Water Available to Victims of Myanmar Cyclone*. Online at [http://www.worldvision.org.sg/st\\_news\\_rm\\_article.php?article=120](http://www.worldvision.org.sg/st_news_rm_article.php?article=120).
- WWF (World Wildlife Fund). 2008a. *The Coca-Cola System Announces New Global Targets*. Online at <http://www.worldwildlife.org/who/media/press/2008/WWFPresitem10453.html>.
- WWF (World Wildlife Fund). 2008b. *Water Conservation Fact Sheet*. Online at <http://www.worldwildlife.org/what/partners/corporate/Coke/WWFBinaryitem6677.pdf>





Sida works according to directives of the Swedish Parliament and Government to reduce poverty in the world, a task that requires cooperation and persistence. Through development cooperation, Sweden assists countries in Africa, Asia, Europe and Latin America. Each country is responsible for its own development. Sida provides resources and develops knowledge, skills and expertise. This increases the world's prosperity.

SIDA47299en

### **Want to know more?**

Visit Sida's Website, [www.sida.se](http://www.sida.se), and find additional information about Sida and Swedish development cooperation

SWEDISH INTERNATIONAL  
DEVELOPMENT COOPERATION AGENCY

SE-105 25 Stockholm Sweden  
Phone: +46 (0)8 698 50 00  
Fax: +46 (0)8 20 88 64  
[sida@sida.se](mailto:sida@sida.se), [www.sida.se](http://www.sida.se)

