



BUSINESS AND CLIMATE CHANGE ADAPTATION:

TOWARD RESILIENT COMPANIES AND COMMUNITIES



Caring for Climate



A Caring for Climate Report by the United Nations Global Compact and United Nations Environment Programme in cooperation with the CEO Water Mandate

Caring for Climate

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Summary

Business and Climate Change Adaptation: Toward Resilient Companies and Communities presents ten case studies from a broad range of Caring for Climate and CEO Water Mandate companies. These cases illustrate how businesses are responding creatively and effectively to address climate change opportunities, risks, and impacts in developing countries and emerging economies. It is designed as a companion piece to *Adapting for a Green Economy: Companies, Communities, and Climate Change*, a report issued in June 2011 by the United Nations Global Compact, the United Nations Environment Programme (UNEP), the World Resources Institute (WRI), and Oxfam. While *Adapting for a Green Economy* makes the business case for adaptation at the nexus of company needs and community needs, this supplementary report shows how companies are addressing real-world adaptation challenges in ways that support sustainable development. The case studies presented here underscore private sector strengths in identifying new business opportunities, creating new markets, and recognizing and managing risk, all of which are critical to ensuring resilient businesses and communities in the face of climate change.

The report's purpose is threefold:

- To inform and inspire companies to anticipate and adapt to climate change, while factoring community vulnerabilities into their analysis and decision-making processes;
- To engage policymakers to catalyze and support business contributions to climate change adaptation for more resilient communities and societies; and
- To encourage civil society organizations, universities and research institutes, and other non-governmental actors to see companies as key partners and allies in helping vulnerable communities cope with climate change risks and impacts.

These case studies highlight the private sector's important role in advancing the global climate change adaptation and sustainable development agendas. While it is ultimately governments' responsibility to meet the needs of poor and vulnerable populations, the private sector has much to contribute

to the development and implementation of effective solutions, including sector-specific expertise, new technology, significant levels of financing, the need to be efficient and make cost-effective choices, and an entrepreneurial perspective. These case studies show how this potential can be harnessed to help address adaptation challenges and promote the public good.

Below are key insights emerging from the case studies and through conversations with Caring for Climate and CEO Water Mandate companies about their adaptation efforts:

- ◆ *Overall, business engagement in adaptation is still at an early stage, particularly relative to mitigation.* The companies profiled in this report are early-movers in terms of their contributions to adaptation. Many companies are largely aware of climate change risks and opportunities, but do not yet have adaptation strategies, plans, and activities in place. There is a need for continuing education and information dissemination about climate change adaptation from outside the private sector, among sectoral and multi-sectoral business associations and within companies themselves.
- ◆ *When it comes to climate change, the idea that community risks are business risks is salient and persuasive.* Companies recognize that their ability to grow and prosper cannot be disconnected from community well being, and they do not view "the community" as an abstract concept. Companies view building community climate resilience as an imperative for strategic business action that must go beyond the realm of corporate philanthropy.
- ◆ *Companies are experiencing a diverse range of benefits from engaging in actions that increase climate resilience.* These benefits include the ability to better manage and mitigate risk, decreased costs, increased profits, new markets, and a reputation as a good corporate citizen.
- ◆ *Companies point to a wide range of success factors in designing and implementing climate change adaptation measures.* These insights, such as the value of considering long-term projections on returns from today's adaptation investments, can be useful in pointing



the way forward for other companies that are ready to take action on adaptation.

- ◆ *Climate change adaptation and resilience-building challenges present new opportunities for partnerships and engagement with stakeholders.* Building effective adaptation solutions will require marshalling the full range of complementary assets that the private sector, civil society, university and research community, public sector, and vulnerable communities have to offer.
- ◆ *National-level government leadership on adaptation is of critical importance.* A supportive policy environment is essential to catalyze broader private sector engagement and

facilitate scale-up and replication of effective approaches already underway.

There is tremendous scope for building climate-resilient companies while building climate-resilient communities. Companies that rigorously assess climate change risks and opportunities and implement creative solutions for long-term resilience will create business value while making important contributions to sustainable development and equitable green growth.

Introduction

Even with concerted efforts to curb global greenhouse gas emissions to slow the rate of climate change, it is still necessary to prepare for and respond to the adverse impacts that climate change will have on societies and economies across the globe. While some uncertainty exists about the exact nature, timing, location, and magnitude of these impacts, empirical scientific evidence clearly indicates the increasing likelihood and severity of climate-related threats, including: water shortages and droughts; flooding; extreme, unpredictable weather patterns and events; declining agricultural yields; spread of disease and decline in human health; and loss of biodiversity. Anticipated climate change risks and impacts are explored in detail in *Adapting for a Green Economy: Companies, Communities, and Climate Change*.

Adaptation measures are needed to reduce vulnerability and increase human and environmental resilience against the impact of current and future climate change. Governments in both developed and developing countries have initiated comprehensive strategies to ensure that citizens have the capacity to cope with changing climatic conditions at a meaningful (i.e., local) level. Climate change adaptation requires enhanced disaster risk reduction and preparedness, and new weather risk transfer solutions. New agricultural

practices, such as drought and saline tolerant crop varieties, need to be widely accessible and utilized; water and energy must be managed more efficiently; health systems must be fortified to respond to emerging threats, and new medicines are needed; biodiversity and ecosystem services must be preserved; and the livelihoods of poor people strengthened.

Recognizing the Role Businesses Play in Adaptation

Businesses have become increasingly aware of the critical role they play in enabling effective, timely, and appropriate adaptation. They recognize the risks that climate change poses, not only for their operations, but also to their suppliers, employees, customers, and people living in the areas in which they operate. Businesses have also begun to recognize opportunities to expand operations and increase their market share through developing climate-resilient products and services to help people, other businesses, and governments adapt. A 2010 survey conducted by Caring for Climate revealed some important perspectives on business engagement in climate change adaptation (see text box below).

The results of the 2010 survey were presented in *Adapting for a Green Economy: Companies, Communities, and Climate Change*. In a follow-up questionnaire circulated in March 2012 by Car-

BUSINESS PERSPECTIVES ON ADAPTATION

Among the 72 companies that responded to a 2010 survey on climate change adaptation conducted by Caring for Climate:

- 83 percent believe that climate change impacts pose a risk to their products or services;
- 86 percent of companies surveyed said that responding to climate change risks, or investing in adaptation solutions, poses a business opportunity for their company;
- However, only around one-third of the companies reported that their climate change strategy has a "strong emphasis" on addressing climate change risks and/or responding to emerging opportunities; and
- 82 percent of corporate signatories surveyed believe that public policy is of "high" or "very high" importance to their company's ability to adapt to climate change.

Source: Adapting for a Green Economy: Companies, Communities, and Climate Change. UN Global Compact, UNEP, WRI, and Oxfam: 2011.

PUTTING ADAPTING FOR A GREEN ECONOMY INTO PRACTICE

After reviewing and sharing *Adapting for a Green Economy* within the company, Sampo Japan Insurance Group established a study group on emerging issues in adaptation to climate change. Participants include staff from the Sampo Japan Environment Foundation and Sampo Japan's risk consulting company, NKSJ Risk Management, in cooperation with environmental experts and academics.

The report gave Nestle new insights that they used when completing their questionnaire for the Carbon Disclosure Project, an initiative that helps companies measure, report on, and manage climate change and other environmental risks and impacts.

The Coca-Cola Company noted that the report provided them with insights on how to better leverage their existing sustainability strategy in support of climate change adaptation.

Other companies reported that *Adapting for a Green Economy* has helped them to raise awareness among employees about the importance of strategic adaptation responses; begin to consider climate change opportunities, risks, and impacts; and to think about how public policy can advance adaptation.

Source: Company responses to Caring for Climate and CEO Water Mandate adaptation questionnaire, March 2012.

ing for Climate and the CEO Water Mandate, a public-private initiative on water sustainability within the United Nations Global Compact, several companies noted that they are using this report to help move adaptation discussions and action forward within their companies (see text box above), in concert with their existing mitigation efforts.

Business contributions to climate change adaptation play a very important role in supporting sustainable development and efforts to build the green economy, while also promoting a company's viability, profitability, and competitive edge. Some international market-leading businesses have started to analyze climate change risks and opportunities, and important efforts are already underway to implement adaptation measures in many of the world's emerging economies and developing countries, which represent valuable markets for new business opportunities. Business-led adaptation interventions are particularly important in developing countries, where poor communities have significant exposure to climate change impacts.

The ten case studies in this report represent a wide range of industries, from financial services to construction to consumer products, and adaptation solutions applied

across the globe, from Bolivia to Kenya to the Philippines. The cases illustrate how companies contribute to climate change adaptation in three spheres of action by:

- Instituting new practices within their own operations to manage climate risks and impacts;
- Developing products and services that help vulnerable countries and communities adapt to climate risks and impacts; and
- Engaging with governments, communities, and other stakeholders to put policies and ground-level practices in place that contribute to long-term resilience.

The case studies examine companies' motivations for action, and describe where and how they are applying their technical expertise and capacity to innovate to address climate change challenges, while at the same time improving their bottom line and maintaining their social license to operate. While it may not yet be possible to identify the full suite of best practices in private sector adaptation to climate change, the emerging approaches presented here show promise based on results achieved to date. They are examples of actions that will need to be expanded and

CASE STUDY SELECTION

In March 2012, Caring for Climate and the CEO Water Mandate distributed a short screening questionnaire to 50 of their most active member companies to stimulate companies' thinking about how they are responding to climate change opportunities, risks, and impacts in ways that simultaneously support adaptation and resilience-building in vulnerable communities and countries. Ten case studies were selected based on a number of criteria, including: interest in showing diversity of current adaptation efforts (for example, by sector and geographic origin of company, location of adaptation activity, nature of intervention, and nature of partnerships); importance of public policy support; demonstration of clear impact or high potential for impact; potential for replication by other companies; and assessment of value-added to the overall body of knowledge about businesses and climate change adaptation. The case studies presented in this report draw on companies' responses to the adaptation questionnaire and publicly available information, supplemented by telephone interviews and follow-up communications with the companies.

scaled-up for companies to reach their full potential as providers of effective climate change solutions. Many of these approaches have potential for replication in other country and sector contexts to promote adaptation and resilience.

Annex A of this report provides a summary of the case studies by business sector and includes the specific adaptation challenge, the solution, and region. Annex B includes brief descriptions of additional climate change adaptation efforts currently underway among select Caring for Climate and CEO Water Mandate companies.

Key Insights on Business Engagement in Adaptation

Several notable insights for expanding the role of the private sector highlighted below are based on Caring for Climate and CEO Water Mandate companies' responses to the March 2012 climate change adaptation questionnaire, the resulting case studies, and conversations with company employees.

Overall, business engagement in adaptation is still at an early stage, particularly relative to mitigation.

Companies still find it difficult to differentiate between adaptation and mitigation, and to recognize potential synergies between the two approaches. Mitigation and management of greenhouse gas emissions continues to be the main focus of companies' climate change efforts. Companies are also grappling with

how building adaptive capacity can intersect with sustainable development, but may require distinct and additional responses.

Most companies profiled in this case compilation are currently identifying, analyzing, and addressing select, individual climate change-related risks and impacts, such as increasing water scarcity, through their overall sustainability plans, environmental management systems, risk management frameworks, and product research and development teams. While not a comprehensive response to the need to adapt, this approach does appear to result in the creation of "no-regret" adaptation measures for companies: actions that make good business sense regardless of climate impacts. Few companies appear to be taking a thorough, focused look at climate risks and opportunities and developing a dedicated adaptation strategy as part of their overall approach to climate change, as Eksom has recently done.

Even though many companies are well aware that some of their actions make strong contributions to long-term climate resilience for the company and for vulnerable communities, they do not tend to categorize and communicate these actions as climate change adaptation. They may be framed as "sustainable supply chain management" or "disaster risk reduction" or "community engagement projects" within the company and in external communications. Framing adaptation in specific terms that resonate with the company's mission and its employees can be of real

benefit to the company, in terms of securing buy-in. For example, Hindustan Construction Company is concerned about growing water scarcity and drought in India, and has thus made “sustainable water resource management” a major plank of its overall “sustainable infrastructure” strategy. In the future, it will be useful for companies to make these additional and important climate change connections to enable their external stakeholders to assess the full scope of the company’s actions on adaptation, as well as to enable companies themselves to recognize their considerable contributions in this area.

Some companies are starting to take a focused look at the full range of climate risks and impacts, and some have even begun to conduct cost-benefit analysis of adaptation measures, but have not yet moved to the implementation phase. Across the board, companies cite continued challenges in responding to climate change, including: lack of granular information and data about anticipated impacts in specific geographic areas; considerable uncertainty about the timing of anticipated impacts; lack of cost-benefit information; unsupportive policy environments; lack of understanding within the company about climate change adaptation; and lack of consensus about the level of focus the company should give to adaptation, and the approach that should be taken.

When it comes to climate change, the idea that community risks are business risks is salient and persuasive.

The companies profiled here see a clear and robust business case for strategic engagement in adaptation at the nexus of company needs and community needs to support sustainable development (see Figure 1). Companies see the inextricable connections between their ability to operate and prosper and the well-being of the communities that comprise their value chain: suppliers, employees, customers, and people living in the areas in which they operate. Companies are committed to tackling business challenges and community challenges in an integrated fashion. They actively seek out opportunities to create shared value. For example, Coca-Cola’s water stewardship platform has enabled the company to view long-term watershed health and community well-being as essential to bottling plant performance and corporate growth, and they

simultaneously implement measures within the plant’s operations and through partnerships with community stakeholders to tackle shared water sustainability challenges.

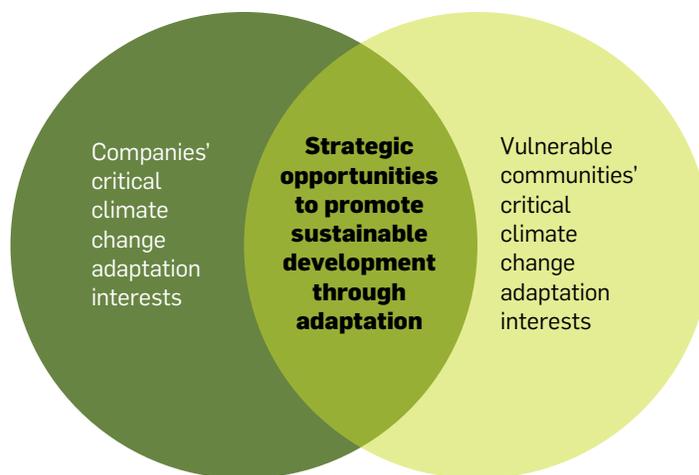
Companies are experiencing a diverse range of benefits from engaging in actions that increase climate resilience.

Companies profiled reported numerous positive benefits from their engagement in climate change adaptation, including:

- Ability to mitigate and better manage risk;
- Assured continuity of operations (for example, by avoiding damage to assets or interruptions in supply of inputs);
- Financial benefits (either due to lower costs, or new revenue streams);
- Expansion into new markets;
- Reputational benefits with external stakeholders, including continued social license to operate, and meeting current (and anticipated future) customer expectations; and
- A competitive edge over companies that are failing to respond to climate change challenges.

In addition to these benefits, a few companies also see future possibilities to leverage and expand their adaptation efforts, particularly the development of products and services that

FIGURE 1. THE STRATEGIC NEXUS FOR PRIVATE SECTOR ADAPTATION EFFORTS



facilitate adaptation and promote resilience, by accessing new public financing streams earmarked for climate change adaptation. However, the companies profiled in this report have not yet experienced this benefit through their current adaptation activities.

Many of the companies highlighted in the case studies experience multiple benefits through a single adaptation intervention. Banco do Brasil uses lessons learned from agriculture pilot projects that promote sustainable water use and environmental restoration to reduce its investment risk in the agribusiness sector, as well as to develop new financial products and services that promote climate change adaptation, mitigation, and sustainability. Telvent's innovative systems and equipment for national meteorological services have allowed it to enter new markets and establish a competitive position in a climate-change relevant industry. Lastly, one of China Minmetals' subsidiary companies reduced operating costs, ensured a steady water supply for industrial use, and boosted the company's image with both community and government stakeholders through internal treatment and re-use of water.

These on-the-ground perspectives underscore the business case for adaptation that supports sustainable development, as described in *Adapting for a Green Economy* (see Figure 2).

FIGURE 2. THE BUSINESS CASE FOR CLIMATE CHANGE ADAPTATION



Companies point to a wide range of success factors in designing and implementing climate change adaptation measures.

These cases illustrate how climate change and resilience-building efforts have been initiated, implemented, and, in some cases, institutionalized within companies. Although each company addresses adaptation from a unique perspective, this report also found common threads that may guide other companies looking for a way to start the process. Companies currently engaged in addressing adaptation challenges and opportunities have found it useful to:

- Treat community well-being not as something to be addressed solely through corporate philanthropy, but rather as a goal that must be incorporated into the company's mainline growth strategy and everyday business decision making;
- Secure senior-level support for and commitment to addressing climate risks;
- Link climate change adaptation to the company's other efforts, such as managing weather variability, or developing cutting-edge technology, and cast the purpose and impact of adaptation in terms that resonate with staff, such as "increased efficiency", "ensured continuity of operations", and "market innovation";
- Integrate the company's response to climate change risks and opportunities into established, core business policies, plans, and processes; use existing (well-working) channels rather than creating brand new ones;
- Put together cross-functional teams to identify and assess climate risks and opportunities, and to address, monitor and evaluate, and communicate the company's climate adaptation response;
- Evaluate, recognize, and reward business units and individual employees for their ability to innovate, implement new approaches, and meet company goals for increasing resilience and contributing to sustainable development; and
- Consider the long-term benefits of investing in adaptation, and do not underestimate the value of benefits that are important but difficult to quantify—for example, continued license to operate.

Eskom integrates climate change adaptation analysis and responses into existing proce-

dures and structures, such as its Integrated Risk Management Process, Resilience Teams, and organizational strategy and planning. Coca-Cola's water stewardship platform takes a cross-functional approach, drawing on the expertise of staff from throughout the company to formulate, implement, and communicate water stewardship initiatives. Hindustan Construction Company provides positive incentives for employees at its work sites for implementation of successful water conservation initiatives.

Climate change adaptation and resilience-building challenges present new opportunities for partnerships and engagement with stakeholders.

The cases in this compilation underscore the need for companies to partner with other stakeholders, such as civil society groups, universities and research organizations, national or sub-national government agencies or elected bodies, and vulnerable communities themselves, to address adaptation needs in ways that advance sustainable development at the local level. Companies mentioned partnerships as an additional, important success factor and cited numerous assets that external stakeholders contribute, including:

- Additional sector-specific technical knowledge;
- Convening power from the local to national level;
- A nuanced understanding of community development needs and of appropriate, effective climate change adaptation interventions;
- Research and analytical capabilities;
- Ability to disseminate information and lessons learned from resilience-building interventions to key audiences;
- Materials and equipment;
- Co-financing for projects; and
- Ability to “own” and sustain local-level adaptation measures once companies have provided initial financial, planning, and technical inputs.

Companies find that a creative combination of assets and perspectives enables them to achieve more than they would on their own. Nokia, Agbar, and China Minmetals have all partnered with top-notch universities to develop new technologies that help address critical climate change adaptation challenges; Sompo Japan Insurance Group's partner-

ship with Thailand's Bank for Agriculture and Agricultural Cooperatives has enabled it to provide climate-vulnerable farmers with micro-insurance policies and protect them from catastrophic losses due to drought; AXA is working with CARE International to gain a deeper understanding of the impact of changing rainfall patterns on vulnerable populations and to reduce disaster risk in developing countries; and Banco do Brasil's partners in the Agua Brasil programme, the National Water Agency and the WorldWide Fund for Nature (WWF)-Brasil, have brought considerable technical and community-level knowledge to the table.

National-level government leadership on adaptation is of critical importance.

Finally, companies pointed to the essential leadership role that government policymakers must play in catalyzing, facilitating, and supporting business engagement in climate change adaptation that benefits vulnerable communities. In order for these efforts to expand and scale-up in places where they are most needed, they must be done in the context of a supportive policy environment. Companies would like to see governments do the following:

- Establish clear, coordinated, cross-ministerial strategies and plans to address pressing climate change adaptation priorities, such as water security, agriculture, and disaster risk reduction. Companies can then shape their own adaptation strategies and interventions—whether operational, or in the area of new products and services—to contribute to and reinforce these agreed priorities;
- Generate and provide high-quality climate change modeling and risk and impact information, including cost-benefit information, in a business-friendly format at a business-friendly scale that companies can use to inform their adaptation analysis and actions;
- Align sector-specific policies with national climate change adaptation goals to send clear market signals to companies. For example, make smart water management a requirement in tenders for infrastructure projects to provide a level playing field for bidders; or provide policy incentives that facilitate the harnessing of mobile technology for climate change information dissemination, early warning for disasters, and

other adaptation and resilience building purposes; or establish appropriate regulatory frameworks for insurance;

- Consider providing financial incentives to stimulate the uptake of climate-resilient technologies and services, such as subsidies for drip irrigation equipment or micro-insurance for smallholder farmers; or co-financing for research and development (R&D) of new products and services; or preferential tariffs for sustainably sourced products; and
- Engage with businesses as key stakeholders, central partners and innovators in defining climate change adaptation solutions, and as implementers of actions and projects that can advance climate change resilience, including those formulated in national adaptation plans.

Several case studies illustrate the importance of government policy support in encouraging private sector engagement in adaptation. For example, the Chinese government provided R&D support that enabled China Minmetals to invest in development of new wastewater treatment technology. The South African government has invited businesses to participate in implementation of the strategy provided in its new National Climate Change Response White Paper, thus enabling Eskom to play a leading role in shaping the country's adaptation plan for the energy sector. Through CETaqua, a public-private partnership comprising Agbar, the Spanish National Research Council, and the Polytechnic University of Catalonia, the Spanish government is supporting development of new technologies to improve water resource management at all stages of the water cycle.

NEW RESOURCES ON BUSINESS ADAPTATION TO CLIMATE CHANGE

There is a growing body of practical resources to help companies take action on climate change adaptation. Several new resources have been released over the past year, in addition to the resources referred to in *Adapting for a Green Economy: Companies, Communities, and Climate Change*.

Adaptation to Climate Change: BSR's Industry Guides (Consumer Products; Energy and Utilities; Financial Services; Food, Beverage, and Agriculture; Information and Communication Technology; Mining; Transportation). BSR: 2011. www.bsr.org

Climate Change and Health: Framing the Issue. GlaxoSmithKline, Accenture, University of Oxford: 2011. www.accenture.com

Facing the Elements: Building Business Resilience in a Changing Climate (Case

Studies, Advisory Report, Business Primer). National Round Table on the Environment and the Economy: 2012. www.nrtee-trnee.ca

Insights into Climate Change Adaptation by U.K. Companies. Carbon Disclosure Project: 2012. www.defra.gov.uk

Principles for Sustainable Insurance. UNEP FI: Forthcoming, June 2012. www.unepfi.org

Private Sector Engagement in Adaptation to Climate Change. OECD: 2011. www.oecd.org

Resilience and Adaptation to Climate Change: electricity utilities' perspective. Global Electricity Initiative: 2011. www.globalelectricityinitiative.org



United Nations
 Framework Convention on
 Climate Change

THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC) NAIROBI WORK PROGRAMME—PRIVATE SECTOR INITIATIVE (PSI)

The purpose of the UNFCCC PSI, which is part of the Nairobi work programme on impacts, vulnerability, and adaptation to climate change, is to catalyze private sector engagement in the wider adaptation community. The PSI is a platform for businesses to contribute to adaptation in a sustainable and profitable manner, particularly in developing countries and communities that are the most vulnerable to climate change risks and impacts. Through engagement with the PSI, companies can: assess climate change risks and opportunities, develop adaptation strategies, communicate and monitor adaptation, and connect with other adaptation leaders.

One particularly valuable feature of the PSI is an online database of company case studies that illustrate good adaptation practices and profitable activities, including those done in partnership with

civil society groups or government, from a wide range of sectors and geographic regions. This searchable database was launched in 2011, and includes over 100 examples of how companies are ensuring the resilience of their business operations, and are providing new technologies and services that help vulnerable communities adapt. Case studies from both developed and developing countries are included to encourage rich cross-fertilization of ideas and approaches. Numerous Caring for Climate and CEO Water Mandate companies are featured. The UNFCCC PSI is soliciting additional examples on an ongoing basis to be included in the database through a simple, user-friendly case submission form that can be downloaded from the PSI database webpage.

Source: unfccc.int/6547





TEN CASE STUDIES:

Business
Contributions
to Adaptation

AGBAR

CETaqua: Building the Adaptation Knowledge Base for Water Resource Management

Through a public-private research partnership, Agbar is increasing understanding of the impacts that climate change and other global trends will have on water resources, and developing innovative technologies that can be used to ensure a sustainable water cycle.

The company

Headquartered in Spain, Agbar's group comprises more than 150 companies specialized in all processes related to the water cycle and water management: catchment, transport, drinking water treatment, distribution, monitoring of health standards, and water supply. Agbar also provides sewerage, wastewater treatment, and subsequent reintroduction of treated water back into the environment. Founded over 140 years ago, Agbar now reaches 28 million customers through a presence in eleven countries: Spain, Chile, the United Kingdom, Mexico, Cuba, Colombia, Algeria, Peru, the United States, Turkey, and Brazil.

Leadership in addressing adaptation challenges

For Agbar, climate change is part of a much broader concept of "global change", which includes all impacts that humans are having on the planet, such as demographic trends

(for example, overpopulation and migration) and changes in land use and plant cover due to deforestation, urbanization, and industrialization. Agbar's business model is based on a sustainable water cycle, which is aimed at preserving the environment's ecological equilibrium in each phase of the cycle. Water is one of the natural resources most affected by global change, including climate change. Agbar is examining and addressing both climate change adaptation and mitigation in water management, with staff from different parts of the company—including the innovation, environment, energy efficiency, and corporate responsibility divisions—working together to achieve a coordinated response to the effects of global change on water resources.

Agbar's corporate culture promotes innovation and R&D to tackle emerging challenges like climate change, turning them into driving forces for the company as it creates specialized knowledge in the area of known and new technologies, proposes different ser-

vice offers to access new markets, and demonstrates corporate responsibility. Agbar sees cross-sector collaboration with universities and governments as an engine of innovation and value creation for the company and for society as a whole. One way that the company is operationalizing its commitment to innovation is through the creation of the CETaqua Water Technology Center, a research institute with a strong focus on helping societies adapt to global change, including climate change.

The adaptation response

About CETaqua

In 2007, Agbar joined with the Polytechnic University of Catalonia (UPC) and the Spanish National Research Council (CSIC) to found CETaqua. CETaqua contributes to research and development of technologies linked to the integral water cycle, striving for synergies between the business, research, and education sectors to meet pressing water-related challenges at the national and global levels. Numerous business units within Agbar, as well as the Agbar Foundation, had been involved with research for many years. Agbar made a strategic decision to consolidate these research efforts under one roof for improved coordination and broader societal impact. Early in the development of CETaqua, it was agreed by CETaqua's high-level, appointed Scientific and Technical Committee, which advises the Board of Directors, that climate change—under the broader umbrella concept of global change—should be incorporated in the center's mandate as one of the main lines of research. Other research areas include: alternative resources, efficient infrastructure management, environment and health, water and energy, and managing water demand.

Based in Barcelona, CETaqua is a research institute with 70 full-time employees. Agbar provides core financing for CETaqua, and CETaqua also draws on the expertise of more than 100 technical experts made available by Agbar's companies across the world, who are encouraged to offer their real-world expertise in water management by participating in and advising CETaqua-sponsored research projects. The public-private partnership aspect of CETaqua is one of its greatest assets. CSIC is the largest public research institution in Spain, operating under the Ministry of Science and Innovation. Its main objec-

tive is to develop and promote research that will help bring about scientific and technological progress. UPC is a public university that specializes in the fields of engineering, architecture and science. Both institutions are able to lend significant technical expertise and laboratory facilities and equipment to CETaqua, and also partner with CETaqua on publication and widespread dissemination of research results. Agbar is currently developing local knowledge nodes such as CETaqua Galicia and CETaqua Malaga that will bring additional partners into the initiative.

Research to support adaptation

Under its global change priority, CETaqua is currently examining two aspects of adaptation:

- *Adaptation in water resource management:* The institute is developing methods and tools for modeling the impact of climate change and other aspects of global change on water resources. The goal is to estimate future impacts and propose and evaluate measures for adaptation at the basin level in areas facing heavy use by people and industry, using Spain's Llobregat River basin as a locus of research.
- *Adaptation in flood risk management:* CETaqua aims to improve flood risk prevention and estimation in planning, evaluate the probability of extreme weather events in a context of climate change, and analyze the adaptability of current infrastructure and management models to identify improvements for enhanced resilience against future floods.

In a complementary effort, CETaqua is developing methods and tools for evaluating the contribution of water cycle activities to climate change by estimating the associated carbon footprint, and evaluating other environmental impacts using lifecycle analysis tools. CETaqua is also developing methodologies to estimate and measure direct greenhouse gas emissions in urban water cycle processes and technologies. This research stream will enable CETaqua to identify synergies between climate change mitigation and adaptation efforts.

CETaqua's research on alternative resources also has high value for adaptation. This line of inquiry is looking at an emerging technology for aquifer recharge, a sustainable

solution to water stress that has potential for increased storage capacity, protection from saline intrusion, mitigation of the adverse effects of overuse, and additional treatment of recharge water. The institute is also identifying protocols and guidelines for optimizing water desalinization technologies, and promoting the use of rainwater by enhancing understanding of the collection, storage, and treatment systems required for optimal use.

To date, much of CETaqua's research has focused on water risks and opportunities in the European context. CETaqua's goal is to take these more localized insights and technological solutions and build them up into a widely applicable framework for tackling global challenges.

CETaqua's engagement in the Collaborative Research on Flood Resilience in Urban areas (CORFU) project has particular value for helping vulnerable countries adapt to climate change. Launched in 2010, this four-year project—a consortium comprising CETaqua and 16 other institutions, funded by the European Commission—enables European and Asian partners to learn from each other through joint investigation, development, implementation, and dissemination of short to medium term strategies that will enable improved management of urban flooding. Climate change will be specifically analyzed as a driver of increased flooding. Participating cities include Beijing, Dhaka, Mumbai, Taipei, Incheon/Seoul, Barcelona, Hamburg, and Nice. CORFU researchers, including experts from CETaqua and Agbar, come from a wide range of disciplines relevant to dealing with urban flooding: hydrology, hydraulics, urban planning, economics, social sciences, technology and management.

Impact on company and community resilience

Agbar takes the innovations developed at CETaqua, analyzes their market potential, uses them to expand its service offerings and strengthen its business position, and generates profits. These products are aimed at increasing operational efficiencies and reducing costs. The respect CETaqua has gained for its strategic, innovative projects also provides Agbar with positive reputational benefits.

Agbar created Aqualogy, a dedicated water solutions and technologies brand, in order to transfer water management knowledge and innovations to markets worldwide, including to lower- and middle-income countries. The water management techniques and technologies being developed by CETaqua and marketed through Aqualogy are aimed at helping governments and businesses manage and mitigate risks to water supply and quality due to climate change and other global trends, with significant follow-on benefits for the citizens who rely on their services.

Sources:

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www.agbar.es
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BANCO DO BRASIL

Agua Brasil: Promoting Adaptive Practices in Agriculture and Water Resource Management

Banco do Brasil and its partners are piloting and encouraging agricultural practices that conserve water, increase vegetation cover, and restore degraded natural resources, further catalyzed by specialized financial products and services that incentivize sustainable resource management.

The company

Banco do Brasil is Brazil's first financial institution, founded over 200 years ago. Today it is the largest financial institution in Latin America. With over 109,000 employees currently serving 55 million clients in 22 countries, Banco do Brasil covers every sector of the financial market, including banking, cards, asset management, insurance, pensions and saving bonds, and other products and services.

Leadership in addressing adaptation challenges

Banco do Brasil does not limit itself to the traditional role of lending agent, but rather sees itself as a catalyst for sustainable development in the country. The bank offers a range

of environmentally and socially responsible products and services for its clients, such as special investment funds and lines of credit for investments in sustainable agricultural activities, forestation and reforestation, agroecology, organic production, and reduction and absorption of greenhouse gases. It also has a dedicated business strategy called Sustainable Regional Development (DRS), which helps clients examine their entire value chain to craft a DRS business plan, then supports a range of complementary inputs such as training, linkages to cooperatives and associations, introduction of new technology, fostering of an entrepreneurial culture, and access to credit. Banco do Brasil is the country's largest lender to family farms, which are an important source of food, jobs, and revenue for the

country. The bank sees farmers as potentially valuable change agents in addressing the impacts of climate change.

Banco do Brasil has been engaged for several years on climate change mitigation policy and practice. The company has recently been considering how to more fully integrate climate change adaptation into the bank's business strategy, with a particular emphasis on development of new products and services that will help to address climate change and promote adaptation and resilience. For example, the Bank is participating in a working group with NGO and research partners to produce a study entitled *Climate Change, Social Inequalities and Vulnerable Populations in Brazil: Building Capacity* that will assist the bank to identify voluntary actions it can take to prevent, mitigate, or remedy the adverse impacts of climate change on local communities.

In March 2010 Banco do Brasil defined the conservation of water resources as the principal focus of its sustainability initiatives. Agua Brasil ("The Brazil Water Programme") is an example of how Banco do Brasil is exploring connections among water conservation, good agricultural practices, environmental restoration, forest conservation, and climate change adaptation and mitigation. This nexus is an important one in the Brazilian context, given that 29 percent of land in the country is dedicated to agricultural-livestock production activities, 82 percent of Brazil's water is consumed by the rural sector, and Brazil is anticipating adverse impacts of climate change on both water resources and the agricultural sector.

The adaptation response

In 2010, Banco do Brasil forged a partnership with the National Water Agency (ANA) and the WorldWide Fund for Nature (WWF)-Brasil to develop the Agua Brasil programme. The programme's objectives include:

- Promote societal awareness and attitudinal change with respect to environmentally-sound water resource management and conservation.
- Through the implementation of pilot projects in key watersheds, identify and encourage the adoption of sustainable practices in agriculture, reducing its impact on natural resources and biodiversity, improving water quality, and expanding vegetation coverage.

- Disseminate and replicate models and best practices for the management and conservation of the country's water resources.
- Review and update the social and environmental criteria Banco do Brasil it uses in its financing and investment process.
- Review and refine business models aimed at sustainable regional development, and strengthen and expand the bank's portfolio of financial products and services that offer incentives for and stimulate projects with socio-environmental characteristics.

Banco do Brasil and the Banco do Brasil Foundation are providing financing, overall conceptual guidance, and monitoring and evaluation for the programme out of the bank's Sustainable Development Unit. Staff from various other business units—including Agribusiness, Credit and Risk, Distribution, and Marketing—are providing financial and technical expertise through dedicated working groups. Through one of its investment funds, BB Multi Balanceado, the bank also transfers 20 percent of the management fee to support Aqua Brasil. The ANA is providing technical expertise in water management, supporting formation of local partnerships, identifying programme interventions, and supporting the awareness raising and social action components. WWF-Brazil, a well-established environmental organization, is responsible for programme and project implementation, and achievement of programme results. A wide range of other federal and state agencies, universities and research institutions, and civil society organizations are providing inputs to the programme as well.

For the pilot projects, the partners have identified 14 important watersheds, located in the Cerrado/Pantanal, Atlantic Forest, Amazonia, Caatinga, and Pampa biomes. Watersheds were selected based on a number of criteria, including synergy with partners' existing activities (for example, current level of Banco do Brasil investments), ecological diversity, diversity of size of the watershed, characteristics of agricultural production and existing agricultural enterprises, population of affected communities, existence of active civil society groups, level of policy support in the target area, and opportunities for ecosystem restoration.

Pilot projects will involve the creation of local water management plans, including water footprinting and training of basin com-

mittees and other stakeholders on improved watershed management to increase the quality and supply of water and vegetation coverage in the pilot water catchment basins. Wide participation will be sought from farming communities, local government, and civil society groups. Good practices will be identified and piloted in the agricultural and livestock sectors, and may involve techniques that restore degraded resources, use of new technology that results in more efficient resource use, and payments for environment services. The programme will focus on generation of watershed-specific information and data to support farmers' decision making, and will create a specialized training kit for wider dissemination of good practices. An Agua Brasil blog and website further supports exchange of ideas and promotion of lessons learned. The pilot projects are just getting off the ground and will be implemented through 2013.

Drawing on insights gained from the pilot projects, the partners will assist Banco do Brasil to revise the existing tools and criteria it uses to conduct socio-environmental analysis of financing and investment projects. The bank anticipates creating new policies around the themes of biodiversity, climate change, freshwater and forest based products to strengthen project analysis in the economic sectors that represent the bulk of the bank's portfolio: agribusiness, energy, mining and metallurgy, and construction, which together represented 46 percent of the bank's credit portfolio in 2011.

Banco do Brasil will also strengthen its portfolio of financial products and services that stimulate business models aimed at meeting sustainable regional development needs and fostering a green, low-carbon economy. The bank will expand its offerings of specialized lines of credit and other products that incentivize wide-scale adoption by its clients of the types of best practices in resource conservation and climate change adaptation identified in the Agua Brasil programme.

Impact on company and community resilience

Agua Brasil will enable Banco do Brasil to benefit from new business opportunities that result from its expanded range of climate-resilient products and services, as it uses its power within the banking industry to influence the practices of current and new clients. By revising its financing and invest-

ment criteria, the bank will have a refined ability to assess the principal risks associated with agricultural activities, and a heightened understanding of these risks throughout the value chain. As a result, Banco do Brasil will be able to not only promote sustainability, particularly regarding watershed management, but also significantly mitigate potential risks to its operations.

Through Agua Brasil, family farms will adopt new practices that enable them to manage the impacts of climate change on their water source, land, crops, and livestock. They will lessen their impact on the surrounding ecosystem, which will have positive benefits for community resilience more broadly, and will also contribute to climate change mitigation. Farmers will have access to an expanded range of financial products and services, including credit, that incentive and assist them to implement these sustainable farming techniques and improve their livelihoods. The programme's emphasis on dissemination of best practices, combined with supportive financial incentives, will ensure uptake of climate-resilient activities by farming communities across Brazil.

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Annual Report 2010. Banco do Brasil: 2011.
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CHINA MINMETALS CORPORATION

Innovation for Industrial Water Conservation

China Minmetals has developed and deployed a new technology that is enabling one of its large smelting operations to treat and recycle wastewater, thus greatly reducing the factory's use of new freshwater resources.

The company

China Minmetals Co., Ltd. is an international metals and mining corporation that primarily engages in exploration, mining, smelting, processing, and trading of metals and minerals. The corporation is also involved in finance, real estate, and the development of mining and metallurgic technology. Headquartered in Beijing, China Minmetals' business reaches 26 countries and regions around the world. It employs 177,900 staff and controls nine listed companies at home and abroad. China Minmetals was founded in 1950, and since that time has played an important role as a major import and export channel for metals and minerals in China.

Leadership in addressing adaptation challenges

China Minmetals is committed to pursuing an economic development model character-

ized by low consumption, low pollution, and low emissions. The company has become increasingly aware of the risks climate change impacts pose for the group's overall business portfolio and the importance of conducting analysis and taking action, and is currently considering ways to incorporate climate change adaptation practices into a comprehensive corporate sustainability strategy. China Minmetals sees climate change as an opportunity to increase its sustainability as a company.

China Minmetals is increasingly focused on addressing the challenge of water security, particularly water usage and wastewater treatment. China Minmetals operates in a water-intensive industry: water is an important process input to minerals and metals extraction, processing, and smelting. Industrial development and population growth are already placing stress on water resources

in China, and climate change is projected to result in additional stresses on water availability and quality. China Minmetals is concerned about water use as a cost management issue, and also as an important measure of the company's social and environmental performance. Individual companies owned by China Minmetals have set quantitative targets for water conservation, and China Minmetals has plans to conduct group-level water footprint analysis and set group-level targets to lower its water use ratio as part of its emerging sustainability strategy.

One way that China Minmetals is currently responding to the challenges of climate change—including water stress—is through the use of science and technology to achieve eco-efficiency, conserve resources, and promote the green economy across its value chain. One of its subsidiary companies is applying an innovative technology to conserve water in a community that is experiencing increasing water stress.

The adaptation response

ZhuZhou Smelter Group, Ltd. is a large subsidiary of China Minmetals operating in Hunan Province in the city of ZhuZhou along the Xiangjiang River, a large tributary of the Yangtze. Water security is one of the main development issues with which the city is grappling, given the dependence of millions of its citizens on access to water for their daily needs.

ZhuZhou Smelter Group is engaged in smelting of zinc and lead, among other activities. Smelting uses heat and chemicals to decompose the ore that contains these metals, leaving just the metal behind. In the smelting process, water is mainly used as a coolant to lower the temperature of the metals. Process wastewater contains heavy metals—including zinc, lead, chromium, and arsenic—which are harmful to human health and the environment if left untreated.

For its operations, ZhuZhou Smelter Group initially obtained water from the water utility in ZhuZhou municipality and treated wastewater through a chemical process before releasing it from the factory according to the government's environmental regulations. The company recognized that its water usage ratio could be greatly improved through better water management and use of new technology. In 2005 ZhuZhou Smelter Group installed a new wastewater treatment plant at the

Hunan smelter—updated in 2009—to address the challenge of protection of water resources in the province, and also due to concerns about the significant cost to the company of the volume of water needed for production. This initiative is a good example of the types of responses that will be required to respond to increasing water scarcity in the context of climate change.

China Minmetals developed this technology in collaboration with Hunan Province's Central South University, a respected academic institution conducting leading-edge research in metallurgy and mining. This type of public-private partnership in the R&D process is groundbreaking in the Chinese context, and it was incentivized through a package of financial support from the government. Through this new wastewater treatment system, wastewater from smelting passes through a deep purification membrane that applies a dual process of ultrafiltration and reverse osmosis that is extremely effective at filtering out very small particles of salt and organic matter from the wastewater. After deep purification treatment of wastewater, the main quality indicators of the treated water are better than those of the local urban water supply, so ZhuZhou Smelter Group is able to use the treated water as a substitute for fresh water during the smelting process.

The company is treating 100 percent of its wastewater, and re-use of wastewater is currently around 90 percent. The company's total discharge of industrial wastewater has decreased by 90 percent compared with 2005, despite the fact that from 2005 to present industrial output has doubled at the smelter.

Impact on company and community resilience

The installation of a dedicated wastewater treatment plant by ZhuZhou Smelter Group will eventually result in a "closed-loop" system, where the company will achieve 100 percent reuse of wastewater and have zero emission of industrial waste. The company can achieve important cost reductions because it will no longer have to purchase water from the local municipality, and it has improved overall operational efficiency and sustainability. ZhuZhou Smelter is a highly visible operator along the Xiangjiang River. Through public communication about water conservation efforts, the company has gained positive reputational benefits, with praise

from both citizens and government. In addition, China Minmetals sees strong potential to replicate use of this new technology within its value chain, and as other companies in the mining and minerals industry make commitments to improve water management there will be a commercial market for the technology as well. These tangible and intangible benefits allow China Minmetals to take a long-term view of its financial investment in this technology.

ZhuZhou Smelter Group has achieved 100 percent compliance with government regulations for disposition of wastewater, two years ahead of the targets set by the department of environment, and the company was able to make an important contribution to the provincial government's conservation strategy for the Xiangjiang River. This pollution reduc-

tion and water conservation effort has a positive impact on local communities in Hunan province who depend on access to a sustainable supply of clean water for their lives and livelihoods, particularly as these communities face a more water-constrained future due to climate change and other factors.

Sources:

China Minmetals response to Caring for Climate and CEO Water Mandate adaptation questionnaire, March 2012.
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www.minmetals.com

THE COCA-COLA COMPANY

Supporting Joint Stewardship of Water Resources

As a result of a system-wide requirement for its bottling plants to assess and address local water vulnerabilities through plant-level improvements and local partnerships, in India Coca-Cola has achieved full balance between the groundwater used in beverage production and the amount of water the company is replenishing to nature and communities.

The company

The Coca-Cola Company is a global beverage company that sources ingredients; makes and sells concentrates, bases, and syrups to its bottling partners; and owns and markets its brands. System-wide, the company operates in more than 200 countries, markets more than 500 brands and 3,500 beverage products, and sells 1.8 billion servings of beverages each day. Headquartered in Atlanta, Georgia, the company was founded over 126 years ago and today comprises six operating groups: Eurasia and Africa, Europe, Latin America, North America, Pacific, and Bottling Investments.

Leadership in addressing adaptation challenges

Coca-Cola views climate change as one of

three “mega-trends”—along with global development and urbanization, and population growth—that threaten long-term water availability on the planet. The Company views water security as the most pressing risk that climate change poses for the company. Not only is water an essential ingredient in all beverages produced by Coca-Cola, it is a central input to the agricultural ingredients that make up the Company’s products. In 2004 Coca-Cola was one of the first companies to disclose concerns about stress on global water resources as a “risk factor” in its annual reporting under the United States Securities and Exchange Commission (SEC) rules.

To address this challenge, Coca-Cola embarked on a comprehensive, global, qualitative and quantitative risk assessment

in order to better understand the nature of potential water risks facing their business. This assessment resulted in the creation of a system-wide water stewardship platform that has redefined Coca-Cola's business case for addressing water challenges: it enabled the company to view watershed health and surrounding communities' long-term access to water as essential to plant performance and central to the company's overall growth. The company has set concrete targets for reducing its water use ratio to improve efficiency, treating and recycling the water used in the manufacturing process, and replenishing the water used by the company by engaging in local water stewardship projects in communities where Coca-Cola operates.

The adaptation response

Source Vulnerability Assessments and Source Water Protection Plans

At the level of Coca-Cola's 859 system-wide bottling plants around the world, this platform translates into a corporate requirement—effective in 2008—for all plants to conduct a water Source Vulnerability Assessment (SVA) and develop and begin implementing a Source Water Protection Plan (SWPP) by 2012. The company provides guidance, planning tools, checklists, and training courses to facilitate compliance with this water resource sustainability standard, which is subject to audit by the organization. The company finances the SVA process and implementation of the SWPP through its core operating budget.

The SVA requires plants to conduct a “deep dive” inventory of the risks to water resources supplying the plant and used by the surrounding community. The process involves an in-depth technical assessment of the local watershed and groundwater basin and threats to the availability and quality of water; engagement with local governments and organizations to understand local water needs, policies, and management challenges; and analysis of the potential impact of Coca-Cola operations on local access to water. These assessments provide bottling partners with a detailed, multi-dimensional understanding of water-related risks across the environmental, operational, social, political, and economic spectrums.

The plant then develops a five-year, locally-relevant SWPP that details the mitigat-

ing actions, roles, responsibilities, and funding that will be allocated to address pressing water issues in that community. Mitigating actions take place within the plant's operations to manage water better, and also involve Community Water Partnerships (CWPs) with outside stakeholders—including local governments, water agencies, NGOs, and community members themselves—to address a wide range of challenges, from hydrological vulnerabilities to local government management capacity. Local stakeholder engagement in the SVA phase and project implementation partnerships in the SWPP phase are essential to the relevance, viability, and long-term sustainability of Coca-Cola-initiated watershed management projects.

Water stewardship in India

In India, where Coca-Cola has 56 bottling plants and provides direct employment for 25,000 people, the SVA and SWPP process has resulted in numerous efforts to improve water stewardship for long-term resource sustainability:

- The Coca-Cola system in India has improved its own water usage ratio (the amount in liters of water used for the production of one liter of finished beverage product) by over 25 percent since 2005.
- Coca-Cola plants treat wastewater to a level that often exceeds local regulatory norms before the water is released back into the environment. Treated wastewater is also re-used within the plants for various purposes—including for utility purposes in boilers, evaporators, and chillers, and also for landscape irrigation and dust control—thus reducing the company's use of external water resources.
- By the end of 2011 Coca-Cola had installed more than 600 rainwater harvesting structures to collect and store rainwater in areas where the groundwater supply is dwindling. Spread across 22 states, these structures are built and managed in partnership with local welfare associations, educational institutions, industry associations, NGOs, and community members. Approximately one million people are benefitting from these structures today.
- The Company has worked with local partners to restore numerous ponds in various parts of the country to improve

their recharge capacity, and established check dams to reduce siltation and create reservoirs.

- In the Kaladera area of the desert state of Rajasthan, Coca-Cola is partnering with local farmers and Krishi Vigyan Kendra (KVK), a government-run agricultural extension agency, to promote drip irrigation. This method minimizes the use of water and fertilizer through a network of pipes, tubes, and emitters that enable water to drip slowly onto the plant and efficiently reach the roots. KVK provides training and technical support to participating farmers, while Coca-Cola finances the training modules and partial funding for the drip irrigation equipment. Three hundred farmers have installed drip irrigation systems, and the company plans to scale up the project to reach 1,000 farmers. The project is lowering farmers' water and fertilizer costs, increasing their yields, and conserving more than 1.5 billion liters of water annually across approximately 100 hectares of land in this water-scarce, agriculture-dependent region.

Impact on company and community resilience

Coca-Cola is able to calculate and quantify the benefits of its community water partnerships through a rigorous, standardized methodology developed with technical assistance from two expert international environmental NGOs, The Nature Conservancy and the Global Environment & Technology Foundation. Coca-Cola's water stewardship efforts in India have enabled the company to achieve full balance between the groundwater used in beverage production and the amount of water

the company is replenishing to nature and communities. Achieving water balance in this critically important market not only helps the company reach its global water stewardship goals, it contributes to the company's social license to operate, ensures a sustainable source of water for Coca-Cola products, and sets the company up for long-term growth.

Coca-Cola's SWPPs result in concrete benefits for the people living in the communities that host Coca-Cola's bottling plants. Access to a sustainable water supply translates into improved health, improved livelihoods, and overall economic growth. Going forward, Coca-Cola is considering ways to marshal the power of its entire global supply chain—which includes agricultural producers across the globe—around the issue of sustainable water use, with potential for an even larger-scale contribution to the ability of vulnerable communities to adapt to a changing climate.

Sources:

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www.coca-cola.com; www.coca-colaindia.com

ESKOM

Engaging in Internal and External Policymaking for Adaptation and Resilience

Eskom has a comprehensive adaptation strategy to guide its operational response to climate change risks and opportunities, and is also participating in national and international policy dialogues on adaptation.

The company

Eskom was established in South Africa in 1923 as the Electricity Supply Commission. In July 2002 it was converted into a public, limited liability company, wholly owned by government. Eskom generates, transmits, and distributes electricity to customers in the industrial, mining, commercial, agricultural, and residential sectors, and also to redistributors, including municipalities. Eskom generates approximately 95 percent of the electricity used in South Africa, and it is one of the top 20 utilities in the world by generation capacity. Eskom is headquartered in Johannesburg, with operations spread out across the country.

Leadership in addressing adaptation challenges

Although Eskom has always had to gather and use weather and climate data for planning and decision making due to the nature of its business, climate change increases the importance and complexity of the task. Changes in rainfall patterns and temperatures, floods, droughts, lightning, intense storms, wind patterns, snow, sea swells, and

fires all have potential to adversely impact Eskom's infrastructure, performance, and efficiency of operations, from electricity generation to transmission and distribution.

The threat of increasing water scarcity in South Africa has emerged for Eskom as one of the most pressing risks of climate change. Eskom is a major user of South Africa's freshwater resources due to the ongoing need for water as a coolant in coal-fired power plants. The water catchment areas in which many of Eskom's power stations were built are already relatively water scarce, necessitating the need for inter basin transfers through a system of dams, pipelines, pumping stations, and reservoirs to ensure an adequate water supply. Decades ago Eskom recognized that to meet growing energy demand and survive as a business—as well as to retain its social license to operate—it would have to carefully manage its water consumption and contribute to sustainable water use in South Africa. Climate change adds new urgency to this longstanding imperative.

To address these risks, Eskom has begun to tackle the impacts of climate change from the executive level down to the plant level,

beginning with research and analysis, and then moving toward an adaptation strategy and implementation of specific measures to manage risk and build resilience. Eskom has also positioned itself as a valuable resource in external climate change adaptation policy dialogues at the national and international level.

The adaptation response

Eskom's climate change adaptation strategy

In 2010 Eskom embarked on a climate change vulnerability assessment process aimed at analyzing historical and current weather conditions, climate variability, and extreme weather events; the impacts on Eskom's business; and the effectiveness of existing adaptation measures in meeting emerging challenges. The company selected several of their power plants and distribution areas for case study analysis. This exercise led to the creation in 2011-2012 of a comprehensive Climate Change Adaptation Strategy for the company. Under this strategy, Eskom will:

- Ensure delivery of coordinated, timely weather and climate information within the company, grounded in a good understanding of the company's needs.
- Use existing Eskom tools and institutions to integrate needs assessment, implementation, evaluation, and reporting on climate change adaptation within the company (for example, through the Integrated Risk Management Process, Resilience Teams responsible for ensuring security of supply, and Organizational Strategy and Planning functions).
- Define and quantify weather, climate variability, and other long-term impacts of climate change on Eskom's business, and establish and incorporate cost-benefit analysis on climate change adaptation into decision making to support identification, control, and treatment of risk across the supply chain.
- Periodically define planning assumptions in the context of weather, climate variability, and long-term climate change impacts on Eskom.
- Invest in climate change research, as needed by various units within the company.
- Integrate climate change adaptation into Eskom's stakeholder communication and

reputation-building initiatives, including partnerships with information, research, and implementing bodies at the national, regional, and international level.

- Establish a consolidated Eskom position on the potential impact of climate change on all aspects of its business activities, its customers, and the country.

The strategy is accompanied by a set of specific actions that Eskom will take in the short term (up to 12 months), medium term (12-24 months), and long term (beyond 24 months) to build the company's adaptive capacity and long-term climate resilience. For example, the company will partner with South African climate change researchers at the Universities of Cape Town and Kwazulu-Natal and the Council for Scientific and Industrial Research to use climate modeling studies to identify and prioritize the most vulnerable "hot spots" within Eskom's operations.

Eskom is now incorporating this Adaptation Strategy into a revision of its overall Climate Change Strategy. Eskom's cross-divisional Climate Change Task Team meets quarterly, and adaptation has been incorporated into its mandate. The company is also ensuring that its Adaptation Strategy and other related strategies—for example, its Water Management Policy—inform each other and are mutually reinforcing.

Engagement in adaptation policymaking

Eskom sees policy engagement with the South African government as essential to its ability to operationalize its climate change adaptation strategy. In 2011 the South African government released the National Climate Change Response White Paper, which outlines the policies, principles, and strategies the country will use to adapt to and mitigate climate change. Eskom staff provided written inputs during the drafting process, and also participated in consultative workshops that the government organized to secure stakeholder ideas and feedback. The White Paper specifically mentions the important role that business and industry can play in driving a climate-resilient, green economy.

To implement the adaptation policy aspects of the White Paper, the government has set up a multi-stakeholder committee on long-term adaptation scenarios for South Africa that has organized itself into sectoral

task teams (for example, energy, water, and agriculture) led by government departments with primary responsibility for key sectors. Eskom is participating in this process. Participants are collaborating with universities and research institutes to examine climate change scenarios and models for the next five years and downscale them to determine potential impacts by sector at the national and sub-national level. The task teams will examine existing policies and plans in each sector and make recommendations to ensure that they support adaptation, and will look at the cost case for adaptation and identify appropriate adaptation measures for each sector. Eskom anticipates being able to use its own existing climate change data and analysis to make useful contributions to this process.

Eskom has also been active in international policy dialogues on climate change adaptation. In 2011, it joined with 24 other electricity utilities around the world to form the Global Electricity Initiative (GEI), which produced a report entitled *Resilience and adaptation to climate change: electricity utilities' perspective*. This report—which was launched by the GEI at the UNFCCC Conference of Parties (COP 17) in December 2011 in Durban, South Africa—provides insights into the drivers of climate change adaptation in the electricity sector, appropriate and effective adaptation responses, and the role that government and other stakeholders can play in facilitating adaptation among electricity utilities.

In addition, staff from Eskom's Climate Change and Sustainable Development Department have participated in recent COPs as members of the South African government delegation, representing the nation's strategic interests on both adaptation and mitigation issues at the negotiating table.

Impact on company and community resilience

Eskom's focus on analyzing and addressing climate change risks and impacts enables it to provide its customers across South Africa with uninterrupted access to energy, an essential driver of growth and development. In addition, by striving for synergy between its climate change adaptation and sustainable water management policies, Eskom can ensure that its water usage practices do not have a detrimental impact on community resilience.

Eskom's Climate Change Adaptation Strategy will help the company ensure continuity of operations and electricity supply, and thus its future viability as a business. Action on adaptation also helps Eskom meet public expectations; the company is a large and visible contributor to greenhouse gas emissions, thus its corporate reputation rests on being part of the climate change solution. Through external policy engagement on adaptation at both the national and international level, Eskom not only ensures that its own voice is heard, but contributes valuable information, analysis, and perspectives that can lead to the creation of more effective adaptation solutions in the energy sector.

Sources:

Eskom response to Caring for Climate and CEO Water Mandate adaptation questionnaire, March 2012.
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www.eskom.co.za

HINDUSTAN CONSTRUCTION COMPANY

Sustainable Infrastructure: A Focus on Water

Hindustan Construction Company is applying innovations in water treatment and rain-water harvesting to large-scale infrastructure projects in India that contribute to the company's goal of water neutrality.

The company

Hindustan Construction Company (HCC) is a global business group developing and building responsible infrastructure through next practices. With an engineering heritage of nearly 100 years, HCC has executed a majority of India's landmark infrastructure projects, having constructed 25 percent of India's hydropower generation and over 50 percent of India's nuclear power generation capacities, over 3,100 kilometers of expressway and highway lanes, more than 200 kilometers of complex tunneling, and over 324 bridges. The group employs more than 3,000 staff and over 35,000 workers at its 50 project sites across India.

Leadership in addressing adaptation challenges

HCC recognizes that wherever and whenever infrastructure is developed, it will have an impact on the community and the environment. Through its environmental manage-

ment systems, HCC has embedded a wide range of sustainability measures into its core operations, and it aims to innovate and apply next-generation practices as it executes some of the largest infrastructure projects in the country.

The company has long recognized the correlation between business viability and sustainable water resource use. The Chairman and the senior management of HCC have made water conservation part of HCC's core business strategy. HCC sees water as a profoundly cross-cutting issue, with environmental, social, developmental, and political ramifications. HCC has made reduction of water use across its construction project sites a priority, and beginning in 2008, HCC adopted a rigorous, company-wide framework for improving water resource management. The initial driver of HCC's focus on water was concern about not only the high cost of resource-inefficient infrastructure

development, but about the business risks posed by two types of water scarcity facing the country: physical scarcity, where there is not enough water to meet demand, and economic scarcity, where communities lack the infrastructure and/or financial capacity to access the water they need. The company has begun to consider how climate change adds a new dimension to these existing challenges and will likely worsen both types of water scarcity in India, especially in regions where water availability is already under pressure and where poor people will be the hardest hit.

To address the pressing challenge of water scarcity due to climate change and other factors, HCC has set an overall goal of achieving water neutrality through location-specific strategies. HCC takes a “4 R” approach to water interventions (reduce, reuse, recycle, recharge) at its construction sites, where it is typically on the ground for two to six years, and also in longer-term BOT (build, operate, transfer) projects. HCC identifies and implements water conservation interventions through a dedicated team responsible for carrying out the company’s water management commitments. Water experts and practitioners from HCC headquarters work with a designated point person at each project site—a “water champion”—to assess water impacts; conduct technical, social, and cost analysis of feasible water interventions; agree on measures to be implemented; and monitor and evaluate progress. HCC conducts public consultation processes to collect primary data, inputs, and perspectives from local communities, sometimes in collaboration with local civil society groups. Two recent examples illustrate how HCC has put its water stewardship commitments into practice.

The adaptation response

The Visakhapatnam Cavern project

As part of its energy security strategy, the Indian government is setting up underground storage facilities for strategic reserves of crude oil. In 2008 HCC was awarded a contract to construct the first of these facilities, the Visakhapatnam (also known as Vizag) Cavern in Andhra Pradesh in southeast India. This massive cavern, excavated and built at 79 meters below sea level, is nearly ten

stories tall and over three kilometers long. The water required for the construction process was initially brought in by tankers filled with water purchased from Vizag municipality. At the outset the project—mainly the drilling activity—was generating a volume of between .6 million to one million liters of wastewater each day. The water used for the construction process had to be of drinking water quality, thus HCC was treating this wastewater, disposing it once the company had complied with government regulations for removal of particulate matter, and bringing in high volumes of fresh water to meet ongoing needs.

Due to a serious drought in 2009 in this already water-stressed area, HCC became concerned about continuity of its operations in Vizag, and also about its license to operate due to competing local demands for water. HCC made a strategic decision to go beyond existing regulatory requirements and invested in installation of a dedicated wastewater treatment plant at the project site with the capacity to treat one million liters of water per day. This plant was specifically designed to treat water to the level where it could be re-used for process consumption. While the technology is not new, HCC sees the application of it in the context of this construction project as an innovation.

Installation of the plant enabled HCC to recycle and reuse nearly 95 percent of the water consumed by the project for drilling, dust suppression, and other activities. HCC saw a reduction of 62 percent in the purchase cost of water from external agencies, and the plant paid for itself after three months of operation. Based on these good results, HCC implemented a similar wastewater treatment solution at a second crude oil storage cavern project site in Padur, in the southwestern state of Karnataka.

The Delhi-Faridabad Elevated Expressway

HCC applied another water-related innovation during the construction in 2008 of the Delhi-Faridabad Elevated Expressway, a 4.4 kilometer long elevated toll road serving city and interstate traffic, designed to reduce travel time through an extremely congested corridor that serves over 100,000 vehicles per day. During the construction of the expressway, HCC strived to meet project specifications while at the same time minimizing

impact on the environment. Water resources were of particular concern in this low-rainfall part of the country. HCC implemented several measures to conserve, recycle, and reuse water, including creation of an artificial, rainfall-fed pond and rooftop rainwater harvesting to partially compensate for water drawn from a bore well at the concrete curing site.

The most notable of HCC's efforts was a unique model for harvesting rainwater runoff from the expressway itself as a way to recharge aquifers in the surrounding area. The project design incorporated channels and storm water drains running along the sides of the highway. Rainwater flows through these drains into strategically placed bore wells on the ground along the highway, with locations selected based on their potential for maximum percolation of rainwater and ability to facilitate recharging of groundwater. While rainwater is typically pure, a sophisticated filter mechanism was installed in this case to filter out impurities like oil and grease and prevent clogging that would reduce the efficiency of the recharging effort. HCC implemented two pilot rainwater harvesting systems during construction of the highway.

The highway will be financed and maintained by HCC for 18 years before being transferred to the government, and HCC estimates that during that timeframe it will become water positive: the water conserved during its construction and operation will be greater than the water consumed during construction.

Impact on company and community resilience

In the case of the Vizag Cavern Project, HCC's use of wastewater treatment technology enabled the company to reduce its dependency on external sources of water, ensure access to water and continuity of operations, effectively address the challenge of wastewater disposal, and save money. At the same time, it significantly reduced the potentially

adverse impact of the project on scarce local freshwater resources in the community. It also influenced government policy: based on HCC's experience, the Indian Strategic Petroleum Reserve Limited, the government body that awards contracts for such projects, has made the installation of a water treatment and recycling plant a requirement for all future tenders.

Rainwater harvesting along the Delhi Faridabad Elevated Expressway is helping HCC manage stormwater and exceed its goal of water neutrality for the project, and it makes an important contribution to long-term water security for communities in the surrounding area. The quantitative impact of the innovation is being measured through flow meters installed at the rainwater harvesting system sites. HCC believes this innovation has high potential for replicability in other road and highway infrastructure projects across India, and can help facilitate climate change adaptation in water-stressed areas in particular. HCC would like to see the government build this type of water intervention requirement into the tendering process as well, thus creating a level playing field for companies seeking to be both climate-resilient and competitive.

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NOKIA

Harnessing the Power of Mobile Technology to Build Climate Resilience for the Rural Poor

Nokia developed a mobile phone application that helps climate-vulnerable farmers make informed choices about the production and sale of their crops. They also created a mobile-enabled survey software that assists governments and civil society groups in gathering and transmitting health, weather, agriculture, and other data in real time across geographic locations for more efficient analysis, planning, and decision making.

The company

Nokia is a global leader in design and production of smartphones and mobile phones. Nokia also owns NAVTEQ, which provides comprehensive digital mapping and navigation services, and through Nokia Siemens Networks offers telecommunications infrastructure hardware, software, and professional services. Headquartered in Finland, Nokia has production facilities in nine countries and an R&D presence in 16 countries. Through sales in over 160 countries, Nokia is helping 1.3 billion people connect to one another.

Leadership in addressing adaptation challenges

Nokia has long recognized the potential of mobile phones as a force for positive social impact, particularly in developing countries. In 2009 the company made a strategic decision to refocus its corporate social investments away from more traditional

philanthropy, toward promotion of the use of mobile technology for development. This squarely aligned the company's core business interests with the economic and social development needs of lower-income communities. Once an up-front investment in mobile applications software has been made, the cost of replication is essentially zero. Nokia believes that marshalling mobile technology for development can result in important social benefits on a very large scale at low cost; innovations in this arena have potential to impact many more lives than could be reached through charitable giving. As a mobile provider, the company sees itself in a powerful position to use its core products and services to help people live more sustainably, particularly in the face of the considerable challenges posed by global trends like climate change.

As part of its social investment strategy, Nokia has developed two mobile applica-

tions—Nokia Life and Nokia Data Gathering—that are providing users in developing countries and emerging economies with critical tools and information to build climate change resilience in such areas as agriculture, health, and disaster risk management.

The adaptation response

Nokia Life

Nokia Life is a suite of mobile services currently enabling farmers in India, Indonesia, Nigeria, and China to improve their businesses by giving them reliable access to comprehensive news, information, and education on their mobile phones. Users of Nokia Life are primarily dependent on agriculture for their livelihoods, and have annual incomes around the poverty threshold. By subscribing to Nokia Life they can stay up to date on market prices and weather forecasts, and obtain information and advice on the best seeds, fertilizers and pesticides. The information is tailored to the farmer's geographic location and selection of crops. Information is delivered via SMS, thus there is no need for target customers to have data network coverage to use the service. Nokia Life is a commercial product, available only on Nokia phones, that costs subscribers approximately one euro per month. The information provided by the service is highly localized, and translated into numerous local languages for maximum outreach. Since its commercial launch in 2009 in India, nearly nine million people have used the service.

Staff from the company's Research Center in Bangalore, India—close to the core customer base for the product launch—conducted research and development for Nokia Life. Finding the right implementing partners in each country has been key: the product is only as useful as the information it provides. For the delivery of high-quality agricultural information through Nokia Life, Nokia is partnering in each country with a wide array of government agencies, nonprofit organizations, and private companies, including government meteorological agencies, the Indonesian Ministry of Agriculture, the Forestry Research Institute of Nigeria, the Spices Board of India, Beijing Nongxintong Technology Co. Ltd., and Plan International.

Nokia Life also provides healthcare,

entertainment, and education services for its small-town and rural subscribers, and the company continues to add relevant content to meet pressing local needs. For example, in March 2012 Nokia launched a special add-on service to Nokia Life in Indonesia, Info Wanita (“Information for women”), in collaboration with the Foundation for Social Change, a non-profit women's empowerment organization. Info Wanita delivers information on such topics as small business management, financial management, life skills, healthcare, and childcare—all of which can help boost women's socioeconomic status, and thus make them less vulnerable to climate shocks like natural disasters and epidemics.

Nokia Data Gathering

Nokia Data Gathering is a survey and data collection solution—provided free of charge under an open source licence—that helps organizations and government agencies develop questionnaires and collect data using mobile phones instead of paper, PDAs, or laptops. Data collection by mobile phone has the potential to dramatically improve any initiative that relies on accurate and up-to-date information, from disease monitoring to agricultural management and emergency preparedness and response. Because mobile phone users can send data from many remote locations, information can be transmitted for analysis in near real-time. The system also allows users to tag data with GPS location information to build a more detailed picture of local conditions and control data accuracy.

Nokia Data Gathering was developed at the Nokia Technology Institute, a nonprofit research center set up by the company next to its mobile phone factory in Manaus, Brazil, by a team dedicated to social investment innovations that recognized the widespread need for more efficient and effective data collection. Launched in late 2008, Nokia Data Gathering has been used by over 200 organizations to date. The following examples illustrate its numerous practical applications:

- In Brazil, the Amazonas State Health Department and the Health Vigilance Foundation leveraged Nokia Data Gathering to help fight dengue fever, a devastating, rapidly-spreading, mosquito-borne disease.

The software helps health workers identify and investigate cases of dengue fever more quickly for more effective analysis and treatment. After piloting Nokia Data Gathering, health workers saw a 93 percent reduction in dengue cases in the area from one year to the next.

- In Kenya, the United Nations Food and Agricultural Organization is working with NGO partners to use the software to collect and publish data from over 500 water points and sources to alleviate drought risk among pastoralist communities.
- Also in Kenya, the Sygenta Foundation for Sustainable Agriculture is using Nokia Data Gathering to survey climate-vulnerable smallholder farmers to enhance the Foundation's service delivery and farmers' food security.
- The Department of Agriculture in the Philippines, in partnership with the World Wildlife Fund, is using the software to track and transmit data on crop stock levels and prices of agricultural goods, enabling faster and better decision making among producers nationwide. Nokia Data Gathering is also being used to monitor and assess damages caused by El Niño and natural disasters.

Based on valuable feedback from stakeholders using Nokia Data Gathering, Nokia makes continuous improvements to the software: for example, adding new fields, predictive text, pull-down menus with pre-set lists of responses, and standard compliance. Several new releases of Nokia Data Gathering have been developed in partnership with academic institutions, such as the Department of Computer Science at the University of Nairobi and the Center for Mobile Research and Innovation at Seton Hall University. Although Nokia Data Gathering was initially built for use with Nokia mobile phones, in 2010 the company decided to make it open source. It can now be replicated, customized, and localized quickly and easily anywhere in the world, creating new business opportunities for local information technology developers and entrepreneurs, and adding flexibility and independence for users.

Impact on company and community resilience

These two innovations have enabled Nokia to closely align its social investment strategy with its business interests, thus greatly increasing the scale and depth of the company's impact on human well-being in the developing world. Nokia is also gaining business value through a growing positive brand association with current individual and institutional users in important growth markets for the company, and these products have a sustainable financial trajectory. Next steps for Nokia may include the development of mobile-based tools and applications specifically aimed at improving the ability of governments, international and local organizations, and citizens to prepare for and respond to disasters.

Through Nokia Life, low-income rural citizens have improved access to high-quality, locally-relevant information about weather, markets, and technologies. They can use this information to better anticipate climate change-related risks and impacts and make adaptation investments and decisions.

Nokia estimates that with Nokia Data Gathering, the collection of field data can be twice as fast and half as expensive as traditional "pen and paper" data collection methods. Rapid yet accurate data collection on health and weather hazards, among other factors, will greatly facilitate the ability of government agencies and NGOs to put plans and programmes in place that build resilience in communities that are most vulnerable to climate change.

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TELVENT

Helping Governments Prepare for Severe Weather Events

Telvent provides technology and information management systems to national meteorological services to enable them to gather, analyze, and disseminate accurate weather information to help countries prepare for severe weather events and mitigate the impact on people, assets, and the economy.

The company

Telvent is a global IT solutions and information services provider, headquartered in Spain, that improves the efficiency, safety and security of companies, organizations, and governments. Through the delivery and integration of real-time business intelligence, Telvent's solutions enable clients to make better decisions as they manage vast infrastructure and complex operations. Telvent develops and offers IT solutions and services through its five business areas: energy, transportation, environment, agriculture, and global services. Telvent currently employs over 6,000 staff in 17 corporate offices worldwide.

Leadership in addressing adaptation challenges

For Telvent, addressing climate change is a main component of its corporate sustainability commitments, but it also views climate change as a business opportunity. Over 25 years ago, Telvent began offering IT solutions to help its customers address and adapt to climate change. Information technologies enable governments and the private sector

to tackle climate change challenges from numerous angles: reducing emissions from vehicles, using water in a sustainable manner, creating the electrical power grids of the future, and monitoring climate and weather. The company anticipated these needs before global climate change discussions reached full strength in the 1990s, and was thus an early mover in the market. Telvent's strategy has been to work along the entire value chain—offering not only technology but consulting, development, and implementation services as well—to be able to provide tailored solutions for each of its customers as they address climate change and other environmental challenges.

One of Telvent's main business lines within its Environment Division is the provision of technology and equipment for national meteorological services—including those of lower-income, climate-vulnerable countries—to enable them to gather and provide accurate, timely weather and climate information, and issue forecasts and warnings of heavy rain, severe winds, and other weather phenomena. Telvent views weather

and climate monitoring as a critical input to sustainable development. This information helps people, public services, and weather-sensitive businesses make essential preparations that can help mitigate adverse effects on people and property.

The adaptation response

Public meteorological services across the world now rely on Telvent to install, network, and maintain the radar observation systems that are of strategic importance to their countries. Telvent's meteorological solutions and services include:

- Observation stations, such as automatic weather stations, SYNOP (surface synoptic observations) stations, and climatologic stations.
- Weather radar, satellite data, and lightning information sources.
- Communication networks for quality-controlled, complete, timely transmission of observation data and weather forecasts, including data link systems.
- Value-added forecast services, assessed to be the most accurate in the industry.
- Customized weather alerting services.

Telvent has provided these services in several developing countries that are particularly vulnerable to the impacts of climate change, beginning in Bolivia in 2003. The National Service of Meteorology and Hydrology of Bolivia (SENAMHI), with the support of the World Meteorological Organization (WMO), embarked on a modernization project to expand its network of hydrometeorological stations and improve its data gathering and forecasting capabilities. The Bolivian government was particularly concerned about the incidence of heavy rain, drought, and frost, including impacts due to the El Niño phenomenon. The core of the company's response was the establishment of a National Processing Centre, where the Telvent Weather Information and Forecasting System (TWIFS) was installed to obtain hydrometeorological data, data from the WMO, weather forecast model data, and satellite images and transmit information to eight Local Processing Centers. Telvent also provided a hydrometeorological station network, a satellite network, and other equipment.

Telvent has been assisting the Mozambique National Institute of Meteorology (INAM) to upgrade and maintain its tools for climate

monitoring and reporting. Cyclones, floods, and other disasters had taken a heavy toll on Mozambique's colonial-era meteorological networks. Balancing INAM's significant need and limited resources, Telvent provided several forms of weather stations strategically located across the country, complemented by Automatic Weather Observation Systems (AWOS) at the country's main airports. The project also included supply and installation of a weather radar, as well as a Control Centre for the integration and centralized operation of all information generated.

The Moroccan Meteorological Service Direction (DMN) worked with Telvent to implement an upgrade of its weather radar network to improve operations. Using the DMN's existing infrastructure, Telvent supplied and installed data acquisition and management systems for five weather radar systems, and upgraded information systems in the DMN's four regional centers that manage the data collected from the radars. They upgraded the information system—including visualization and analytical tools—at the DMN's headquarters in Casablanca that manages weather information for the entire country, and improved telecommunications between the radars and control centers to assure availability of both raw and processed data.

Impact on company and community resilience

Telvent's service offering of weather-monitoring tools and systems positions the company in a market that can only grow due to concerns about climate change impacts, as national governments and their development partners allocate funding for investments in this area as part of their adaptation strategies. Telvent's work in Bolivia spurred the company to develop other technologies and systems specially tailored for sectors that rely on accurate weather information, such as aviation, energy, and transportation. These products are currently being used by public and private sector clients in developed countries but have clear global applicability.

Telvent's technologies are helping governments improve the accuracy and timeliness of climate-related information, analysis, and decision-making in a context of increased climate uncertainty and variability. Client governments are better positioned to predict and prepare for extreme weather events and mitigate the impact on infrastructure, the

economy, and human life. National meteorological services are also able to provide better weather information and data to a wide range of external stakeholders—including businesses, universities, NGOs, and the general public—to enable them to develop and implement strategies to adapt to climate change.

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www.telvent.com

SECTOR APPROACHES: THE INSURANCE INDUSTRY

Helping Climate-Vulnerable Communities Manage Risk

The global insurance industry is at the forefront of climate change adaptation, particularly through increasing understanding of weather and other risks facing vulnerable communities and developing new solutions to help them mitigate and transfer risk.

Leadership in addressing adaptation challenges

As noted in *Adapting for a Green Economy: Companies, Communities, and Climate Change*, among all business sectors the insurance industry has been the primary example of corporate engagement in climate change adaptation, driven not only by concerns about the anticipated increased damages and losses associated with climate change, but also in recognition of the business opportunities that arise from helping governments, other businesses, and households manage and transfer risk. Insurance companies are particularly well equipped to contribute to adaptation, given their expertise and core mission.

A 2010 position statement on the role that the insurance industry can play in fostering climate change adaptation in developing countries—issued by ClimateWise, the Geneva Association, the Munich Climate Insurance Initiative, and the UNEP Finance Initiative on behalf of more than 100 of the world’s leading insurers—points to several useful areas for insurance sector contributions:

- *Offering expertise in risk management:* Use tools, data, and modeling to analyze and

assess risks and vulnerabilities, put a price tag on risk, and advise on design of risk reduction and transfer mechanisms.

- *Prioritizing adaptation measures:* Enhance adaptive capacity and advise on cost-benefit of resilience measures.
- *Incentivizing loss reduction:* Provide economic actors with information about the risks they face and how to mitigate risk, and provide insurance for loss reduction.
- *Developing new insurance products:* Reach new clients to provide cover for health, crops, livestock, and other assets affected by climate change and weather risk.
- *Raising stakeholder awareness about climate change:* Inform government bodies, clients, other industry players, civil society groups, and academia about climate change impacts, the adaptation needs of those most vulnerable to climate risk, and the role of the insurance industry in promoting climate change adaptation.

Several leading insurance companies—both insurers and re-insurers—are currently using their expertise in these ways to advance climate change adaptation and increase resilience, including among the most vulnerable in society.

The adaptation response

In 2010, **Sompo Japan Insurance** began offering crop insurance to rice farmers in northeast Thailand to protect them from catastrophic losses due to drought. The product was developed in collaboration with the Japan Bank for International Cooperation (JBIC) and offered through Thailand's Bank for Agriculture and Agricultural Cooperatives (BAAC), a state-owned enterprise, to its loan clients at an affordable commercial rate. Payments are made based on analysis of rainfall data for the policy period. This insurance reached over 6,000 clients in five provinces in 2011, and payouts were made to 90 drought-stricken farmers. In 2012, insurance will be made available to farmers in nine provinces, and Sompo Japan Insurance will consider refinements to the product, coverage of additional crops, and marketing of the product to other countries in Southeast Asia.

Paris-based **AXA** launched a three-year, two-component partnership in 2011 with CARE, an international humanitarian and development organization, to help vulnerable populations better prepare for climate-related risks. "Where the Rain Falls" is an international research project conducted with the United Nations University in India, Thailand, Peru and Kenya. The project aims to identify and analyze the impacts that changes in rainfall patterns have on vulnerable populations, including changes related to food security and migration, and help them address these challenges through adaptation projects. Results will be made available to governments, researchers, and others to advance understanding of effective approaches to addressing climate risks and impacts. The second component of the partnership focuses on reducing the human and economic impacts of natural disasters in climate-vulnerable communities in Madagascar, Mali, the Philippines, and Vietnam. Activities include community-level risk analysis; development of early warning systems; community preparedness projects; risk training and awareness raising; risk mitigation measures; and investments in disaster response systems. For example, in Vietnam the project has supported restoration of mangrove forests as natural flood barriers, and in Mali is raising community awareness to better prevent and mitigate risks of food crises. In addition, The AXA Research Fund, a non-profit organization founded by AXA,

supports research aimed at contributing to global understanding and prevention of risks, including risks from climate change and the socioeconomic impact of natural disasters.

Munich Re is collaborating with the Munich Climate Change Initiative (MCII), the Caribbean Catastrophe Risk Insurance Facility (CCRIF), and MicroEnsure to implement the Climate Risk Adaptation and Insurance programme. Through 2014, the programme will design and implement products that combine risk reduction and insurance to protect the livelihoods of low income groups in the Caribbean. Up to three different insurance products will be developed and marketed in at least three countries across the region, and the extent to which they meet client demand and needs will be tested and analyzed. The programme will offer two products in the run-up to the hurricane season in 2012: "Loan Portfolio Cover," providing protection against loan client default for lender institutions (e.g., development banks, credit unions) with significant portfolios of individual and small business loans exposed to weather risks; and the "Livelihood Protection Policy," designed to help low income people (e.g., farmers, fisherfolk, taxi drivers) cope with severe impacts following extreme weather events. Payouts for both products will be triggered when winds reach a certain speed or rainfall exceeds a certain level, and will include an SMS-based warning system so clients have a chance to secure their assets and minimize losses. Munich Re is contributing its expertise in product structuring and risk modeling, natural catastrophe data, and understanding of regulatory issues to this initiative. Partners will feed lessons learned from the programme into national and international-level climate policy dialogues on adaptation, loss and damage, and risk management.

In 2011, **Swiss Re** announced its support of Oxfam America and the World Food Programme's new R4 Rural Resilience Initiative, which builds on a successful insurance pilot effort in Ethiopia (described in detail in *Adapting for a Green Economy: Companies, Communities, and Climate Change*) to provide crop insurance, risk reduction, and savings and credit services to the most climate-vulnerable farmers. Swiss Re has led on the design of risk transfer solutions for the initiative, and is also making a financial contribution. Through an innovative "insurance-for-work" scheme, farmers have the option to pay for weather-index crop

insurance by contributing time and labor to local climate adaptation and resilience-building projects. Over 13,000 Ethiopian farmers purchased insurance through R4 in 2011. Drought conditions in Ethiopia triggered an insurance payout in late 2011, protecting the assets and livelihoods of over 1,800 farmers. R4 is being implemented in close collaboration in Ethiopia with Nyala Insurance, Ethiopian government agencies, non-governmental organizations, and other local partners. R4 will expand to Senegal in 2012.

AXA, Sampo Japan Insurance, Munich Re, Swiss Re, and other leading insurers are active members of the Principles for Sustainable Insurance Team of UNEP Finance Initiative (UNEP FI). The Principles for Sustainable Insurance (PSI) represent the first-ever global sustainability framework tailored for the insurance industry. The PSI are voluntary and aspirational principles, including possible actions, to better understand and manage risks and opportunities in the insurance business associated with environmental, social and governance issues such as climate change. The PSI are aligned with an insurer's spheres of influence and are applicable to all lines of insurance, insurance market participants and geographies. They span an insurer's business strategies and operations, including risk management and underwriting, product and service development, claims management, sales and marketing, and investment management. They also cover an insurer's interactions with its clients and business partners, and with governments, regulators and other key stakeholders. UNEP FI will launch the Principles in June 2012 to support the aims of the United Nations Conference on Sustainable Development, representing a landmark contribution of the global insurance industry to build a green economy and resilient communities, particularly in the context of a changing climate.

Impact on company and community resilience

Microinsurance is an emerging business opportunity, with potential for market expansion worldwide. New product lines are helping global insurers reach important new client bases as they help build the market, and enable them to improve their competitive position in ways that are closely aligned with sustainable development goals. Insurance companies' support for research and

pilot projects on vulnerability, risk reduction, and adaptation informs their development of relevant, marketable products. Sharing of lessons learned from these ground-level experiences can make a strong contribution to global dialogues on the role of risk management and risk transfer in climate change adaptation, particularly to the UNFCCC work programme to consider approaches to address loss and damage associated with the adverse impacts of climate change, and further highlights the role of insurance companies as providers of adaptation solutions.

Through these adaptation solutions, climate-vulnerable communities have an improved understanding of the risks that climate change poses to their livelihoods and are able to take action to mitigate risk. They have access to new, affordable risk transfer solutions that ensure that when crisis hits, they will not have to sell productive assets or rely on other coping mechanisms that drive them further into poverty. In the case of the Caribbean, local financial institutions, as well, will be able to reduce their exposure to climate risk and remain solvent following extreme weather events.

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SECTOR APPROACHES: THE PHARMACEUTICAL INDUSTRY

Preparing for the Health Impacts of Climate Change: A New Frontier

Global pharmaceutical companies are addressing public health challenges in ways that have high potential to help developing countries adapt to climate change, by tackling climate-sensitive tropical diseases and by increasing the capacity of health care providers and systems..

Leadership in addressing adaptation challenges

In May 2011, GlaxoSmithKline, Accenture, and the Smith School of Enterprise and Environment at the University of Oxford released a report entitled *Climate Change and Health: Framing the Issue*. The report reviews current science, uncertainties, and knowledge gaps on the health impacts of climate change, including impacts from extreme weather events and temperature shifts, as well as on cardio-respiratory disease, malnutrition, and vector- and water-borne diseases. It discusses implications for the pharmaceutical industry, and highlights four key areas—each with accompanying practical actions—that could comprise a sector response:

- *Engaging multiple stakeholders* to increase awareness and understanding (for example, creating forums where pharmaceutical industry, healthcare professionals, policy makers and wider society come together to discuss challenges and opportunities resulting from the impacts of climate change on health).
- *Building resilience* (for example, by working with the public health community to increase capacity of developing country health care systems to address emerging needs, or ensuring a climate-resilient supply chain).
- *Driving science and innovation* (for example, contributing to the knowledge base on climate change and health, or supporting a multi-stakeholder Climate Change and Health Observatory).
- *Being prepared to respond* (for example, ensuring R&D priorities factor in projected impacts on infectious diseases, particularly climate-sensitive tropical diseases, and developing appropriate approaches to pricing, marketing, supply, and distribution).

While corporate research, planning, and action at the nexus of climate change and health is at a nascent stage, it is important to note that some pharmaceutical companies are already using select approaches described above to address some of the diseases that will be most affected by climate change and build healthcare capacity in climate-vulnerable countries. These efforts can inspire thinking about how a more purposeful focus on climate change and health could be incorporated going forward, and how some of these existing good practices could be strengthened and scaled-up to meet emerging adaptation needs.

The adaptation response

After partnering with Accenture and the University of Oxford to produce the report described above, **GlaxoSmithKline (GSK)**, a U.K.-based company, issued a new corporate position statement in July 2011 on climate change and health. GSK committed itself to supporting the adaptation strategies required to address the healthcare impacts of climate change. GSK noted several contributions it is currently making in this regard. The company maintains a portfolio of products that will help governments address some of the projected impacts of climate change on the disease burden, including asthma and other respiratory disease products, anti-malarial medicines, and vaccines, including one that targets rotavirus, the leading cause of infectious diarrhea worldwide. In the world's poorest countries, which are considered most vulnerable to the impact of climate change, GSK makes anti-malarial treatments available at not-for-profit prices, and offers vaccines at preferential tiered prices. The company also invests in R&D to discover new medicines for the treatment and, ultimately, prevention of diseases most susceptible to climate change.

The Swiss company **Novartis** is working intensively on developing medicines for tropical infectious diseases where there is a clear understanding of the disease's underlying cause but real, unmet medical need. The Novartis Institute for Tropical Diseases (NITD), a public-private partnership between Novartis and the Singapore Economic Development Board, focuses on discovering new drugs for malaria, dengue fever, and tuberculosis. In developing countries where these diseases are endemic, Novartis will make treatments readily available and without profit to poor pa-

tients. A collaboration among NITD and other research partners—including the Genomics Institute of the Novartis Research Foundation, Swiss Tropical and Public Health Institute, and Scripps Research Institute—led to discovery of a promising new drug candidate for the treatment of malaria, currently completing phase 1 clinical trials in humans. Recognized for its potential as a next generation treatment for malaria, this new compound received the Medicines for Malaria “Project of the Year Award.” In late 2011, the same research partnership led to discovery of a new dual-acting class of antimalarial compounds that act on both blood and liver infections, and could become the first class to prevent and treat malaria if confirmed in clinical trials. The research results were made public to advance global discovery efforts.

Bayer, a German chemicals and pharmaceutical group, is combating Chagas, a serious and potentially fatal infectious disease widespread in Latin America transmitted by the bite of the assassin bug. Bayer HealthCare supplies the World Health Organization (WHO) with a lifesaving drug to treat Chagas, as well as additional resources, contributing to the WHO's ability to meet its target of making the drug accessible in all Latin American countries affected by the disease. Bayer HealthCare is addressing African sleeping sickness, which is transmitted by the tsetse fly, by providing the WHO with a drug—free of charge for a five-year period—that can be used with another drug in a combination therapy that has proved promising in clinical trials to combat the disease. The WHO added this combination therapy to the list of essential drugs in May 2009.

U.S.-based **Pfizer** implements a Global Health Fellows Programme that places Pfizer staff in short-term assignments with international development organizations in developing countries and emerging markets. Fellows share their medical and business expertise to increase access, quality, and efficiency of health services for people in greatest need. Since 2003, over 300 Pfizer staff have been placed in close to 45 countries. Pfizer partners with over 40 international development organizations through this programme, including Project Hope, Management Sciences for Health, and Save the Children. Pfizer also partners with the Accordia Global Health Foundation to support the Infectious Disease Institute at Uganda's Makerere University,

which conducts research, trains African medical professionals, and provides advanced clinical services to patients.

Impact on company and community resilience

These interventions enable pharmaceutical companies to draw on their core competencies in drug discovery and development to meet an anticipated growing demand for drugs that can prevent and treat tropical diseases, the incidence and patterns of which are likely to be impacted by a changing climate.

Improving affordability and access to these medicines, as well as building the capacity of the health care sector in climate-vulnerable countries, enables companies to deliver on their sustainability and social responsibility commitments while establishing long-term market linkages.

Not only will partnerships that tackle infectious diseases and other health impacts of climate change alleviate human suffering and build resilience at the household level, they can decrease the burden of public health expenditures on developing country and emerging economy budgets, enabling countries to make other investments that will contribute to long-term economic and social development.

Sources:

Climate Change and Health: Framing the Issue. GlaxoSmithKline, Accenture, Smith School of Enterprise and Environment at the University of Oxford: 2011.

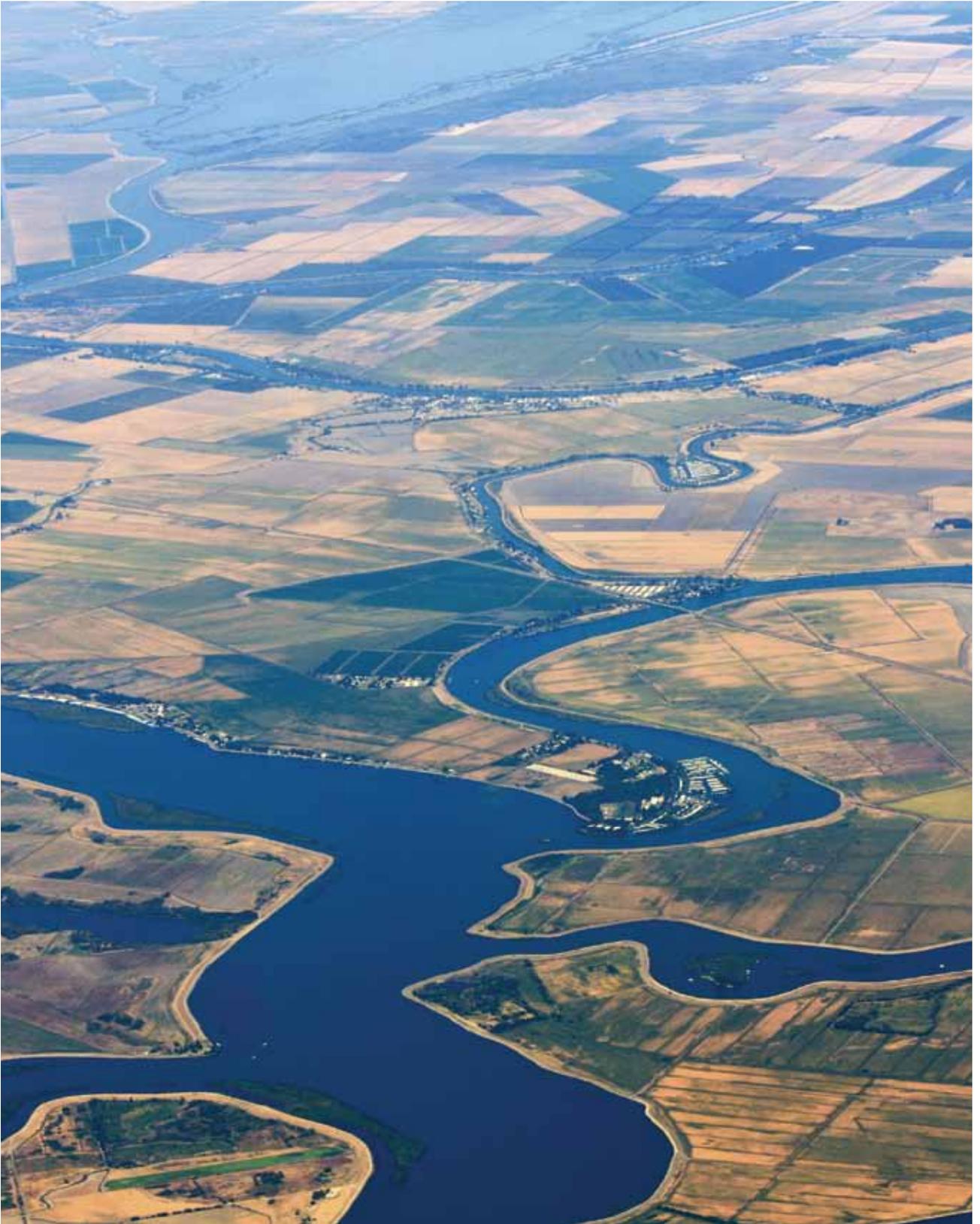
Novartis response to Caring for Climate and CEO Water Mandate adaptation questionnaire, March 2012.

www.bayerpharma.com

www.gsk.com

www.malaria-novartis.com

www.pfizer.com



Looking Ahead

The cases presented in this report focus on global companies that are ahead of the curve on climate change adaptation, and show how they are taking action to analyze and anticipate climate change impacts, manage risks, and take advantage of emerging opportunities. The companies are not only strengthening their business and becoming more competitive, but are simultaneously contributing to adaptive capacity and resilience in communities that are highly vulnerable to climate change. In the face of climate change challenges—whether related to water availability and quality, more frequent and intense weather events, or impacts on agriculture and human health—there is tremendous scope for building climate-resilient companies while building climate-resilient communities.

While governments must lead the creation of climate-resilient societies and economies, private sector adaptation efforts will be a crucial complement to public finance and public sector action. Business responses to climate change must be greatly accelerated and scaled-up to achieve their full potential. Going forward, companies of all sizes and in all sectors are encouraged to determine what climate change adaptation means for their business, building on existing mitigation efforts; integrate adaptation into core strategic businesses planning process; identify current and emerging business risks and opportunities, and corresponding adaptation responses; build partnerships that create shared value and contribute to sustainable development; and communicate with stakeholders about adaptation strategies and initiatives.

These cases also illustrate the catalytic role governments can play in incentivizing,

facilitating, and supporting climate change adaptation at the nexus of business interests and the public good to promote sustainable development. As governments develop and implement national and international climate change adaptation responses, they are encouraged to build a firm foundation for private sector investments by creating clear adaptation plans and strategies that envision a role for the private sector; marshalling public finance to meet pressing adaptation priorities; establishing an enabling policy and regulatory environment to send the proper market signals; generating and disseminating information on climate change risks, impacts, and vulnerabilities to enable companies to see areas of shared public-private interest; and engaging with companies as partners in implementing adaptation solutions.

Addressing the impacts of climate change requires a purposeful departure from business-as-usual. Governments, civil society groups, and communities can see businesses as indispensable allies in applying creative, effective solutions to address the considerable challenges posed by a changing climate. Businesses have a unique and exciting opportunity to deploy their missions, expertise, and employees to respond to this global imperative and make climate change adaptation a core driver of the green economy.

Annex A

Summary of Company Case Studies

COMPANY NAME Headquarters Sector	ADAPTATION CHALLENGE	ADAPTATION RESPONSE	REGION(S) REFERENCED IN CASE STUDY
Agbar Spain; Gas, water and multiutilities	Water resources, urban flood management	Research partnership to contribute to knowledge base and new technology for urban flood management, water resource management	<ul style="list-style-type: none"> ■ Bangladesh ■ China ■ India
Banco do Brasil Brazil; Financial services	Water resources, agriculture, forestry	Support for pilot projects in sustainable agriculture, water management, and environmental conservation and restoration; use of financial risk analysis and new products and services to catalyze adaptation and sustainable practices	<ul style="list-style-type: none"> ■ Brazil
China Minmetals Corporation China; Industrial metals and mining	Water resources	Development and deployment of new technology to treat, recycle, and reuse wastewater in smelting	<ul style="list-style-type: none"> ■ China
The Coca-Cola Company United States; Beverages	Water resources, agriculture	Use of plant-level assessment and planning tools for sustainable watershed management; local partnerships for shared water stewardship	<ul style="list-style-type: none"> ■ India
Eskom South Africa; Electricity	Full range of adaptation challenges	Development of internal climate change adaptation policy; external policy engagement on adaptation at national and international level	<ul style="list-style-type: none"> ■ South Africa
Hindustan Construction Company India; Construction and materials	Water resources	Deployment of technology to treat, recycle, and reuse water in infrastructure project; rainwater harvesting along highway to restore aquifers	<ul style="list-style-type: none"> ■ India
Nokia Finland; Technology hardware and equipment	Agriculture, human health, disaster risk reduction and preparedness	Development of mobile phone applications to build farmers' resilience; mobile survey application for efficient data gathering, analysis, and decision making by NGOs and government agencies to build community resilience	<ul style="list-style-type: none"> ■ China ■ India ■ Indonesia ■ Kenya ■ Nigeria ■ The Philippines

COMPANY NAME Headquarters Sector	ADAPTATION CHALLENGE	ADAPTATION RESPONSE	REGION(S) REFERENCED IN CASE STUDY
Telvent Spain; Software and computer services	Disaster risk reduction and preparedness	Development and provision of technology, equipment, and information systems for national meteorological service agencies	<ul style="list-style-type: none"> ■ Bolivia ■ Morocco ■ Mozambique
Insurance sector AXA France Munich Re Germany Sompo Japan Insurance Japan Swiss Re Switzerland	Agriculture, disaster risk reduction and preparedness, disaster risk transfer	Development of microinsurance products to help clients reduce and transfer risks to livelihoods; research on and support for disaster risk reduction and local resilience-building activities	<ul style="list-style-type: none"> ■ The Caribbean ■ Ethiopia ■ India ■ Kenya ■ Madagascar ■ Mali ■ Peru ■ The Philippines ■ Senegal ■ Thailand ■ Vietnam
Pharmaceutical sector Bayer Germany GlaxoSmithKline United Kingdom Novartis Denmark Pfizer USA	Human health	Research to expand understanding of climate impacts on health and role of pharmaceutical industry; development of adaptation position statement; tropical disease research and drug discovery; provision of drugs to treat tropical diseases at affordable cost; capacity building for health sector and service delivery in developing countries	<ul style="list-style-type: none"> ■ Africa ■ Latin America

Annex B

Additional Examples of Business Engagement in Climate Change Adaptation

In addition to the companies highlighted in the case studies, other Caring for Climate and CEO Water Mandate companies are employing strategies and measures that build company and community resilience to climate change impacts, either within their operations and value chains or through the development of new products and services to help people adapt.

The examples provided below were drawn from companies' responses to Caring for Climate and the CEO Water Mandate's March 2012 climate change adaptation questionnaire.

Product developers at **Allergan (United States, Healthcare Pharmaceuticals)** are thinking about the human health impacts of climate change and how Allergan's eye care products might be useful for treatment of sun exposure, allergies, glaucoma, and infections that could increase due to a changing climate. As a long-term business strategy, Allergan is evaluating its supply chain to assess climate change risks and considering climate change impacts when identifying the location of future operations. By adapting to climate change, Allergan expects to achieve a competitive edge due to greater efficiency and lower manufacturing costs, increased sales due to enhanced reputation, and lower probability of supply interruptions.

Ericsson (Sweden, Information and Communication Technology) recently piloted Mobile Auction in India, which enables farmers to initiate an auction of their crops via SMS on their mobile phones. Registered buyers receive the message, and the buyer with the highest bid is put in touch with the farmer to arrange for payment and delivery of the crop, thus enabling farmers to improve their livelihoods and economic resilience through accurate information about market prices. In addition to the user database and bidding engine, the solutions have an SMS broadcast function. Agricultural suppliers, farmer cooperatives, and non-profit organizations can distribute messages or weather

alerts that are relevant for the farmers to help improve their business, which becomes ever more vital in keeping farmers abreast of solutions to tackle and adapt to climate change. The Mobile Auction trial in India involving a small group of farmers and buyers showed a positive response to the concept and confirmed the need to involve agricultural support organizations to connect the technology to rural users. In 2012, Ericsson will launch a larger-scale pilot in Macedonia to evaluate economic benefits for agricultural producers, in close cooperation with the Macedonian government.

As it develops new products, **Hitachi (Japan, Manufacturing)** is promoting the concept of "intelligent water systems" aimed at providing optimized water usage in a city or other geographic area, including components on irrigation, flood control, fresh water generation, purification, delivery, sewage treatment, water recycling, and operation and management using information technology and control systems. From a risk management point of view, Hitachi is also considering the risk that climate change impacts like floods or drought will have on its supply chain, and taking appropriate measures to mitigate risk.

In late 2010, **Nestle (Switzerland, Food and Beverage)** dramatically reduced its water usage at its milk factory in Mossel Bay, South Africa in response to the Western Cape's worst drought in 132 years. The level of the local dam dropped to 20 percent of its normal level at the height of the drought. Nestle's operations rely on water from the municipality. The company installed a water monitoring and measurement system to assess water usage in various sections of the plant, and recovered and reused condensate from the milk evaporation process for other process and cleaning needs within the factory. Nestle also implemented other conservation measures, such as shortening automated wash times, modifying hosepipe nozzles to reduce water flow, reducing shower head water flow, and reducing the pressure in ablution blocks. The

company reinforced the new water saving policies through notice boards and other staff communications, and water saving suggestions made by staff were implemented and rewarded. Through this effort, Nestle achieved a 50 percent reduction in water consumption in 2010 compared to 2009 values.

Through its Veracel joint venture in Brazil, **Stora Enso (Finland, Forest Products)** is implementing a project with co-benefits for adaptation and mitigation, with funding from the voluntary carbon market. Sale of carbon credits has led to the replanting and restoration of 318 hectares of Atlantic rainforest, forming a wildlife corridor between two national parks, Monte Pascoal and Pau Brazil. This project is contributing to safeguarding of biodiversity resources and habitats, as well as increasing carbon stocks, and also providing income generation opportunities that build community resilience. Members of a local cooperative, Cooplantar (Cooperative of Reforestation Workers of Far Southern Bahia) are carrying out the planting and restoration activities.

Unilever (United Kingdom, Consumer Goods) has identified increased water scarcity as a particular climate change adaptation challenge for the company. Good water management is one of 11 sustainability indicators in Unilever's Sustainable Agriculture Code, which it uses when assessing agricultural suppliers. Unilever shares its expertise on soil management and water collection techniques with suppliers and, where appropriate, provides technical support to help farmers convert to drip irrigation methods that enable them to use less water and fewer pesticides. The company has also begun to expand its work at the farm level to look at the wider impact of agricultural practices and

the consequences of competing demands on water catchment areas. This has led to some positive outcomes, such as Unilever Tea Tanzania's planting of 10,000 trees on its own estates and donating 20,000 indigenous trees to communities in its local water catchment area to help conserve water resources and provide other important ecosystem services.

In 2009, **Vale (Brazil, Mining and Metals)** cooperated with the Brazilian National Institute for Space Research (INPE) on a report that analyzed climate change effects in the Brazilian states of Pará and Maranhão. This report indicated that these regions are highly vulnerable to climate change impacts that could alter the water balance and lead to periods of water shortage, among other problems. Vale followed up on that report in 2010 by identifying its principal assets at risk at the Carajás mines, on the Carajás Railroad, and at Ponta da Madeira Port Terminal—all in the states of Pará and Maranhão—due to potential climate change, as well as the cost of adapting operations. The company then outlined a strategy to expand these initiatives to other operational units that have significant climate change vulnerability, and to rank and prioritize the associated risks not only to its operations but to surrounding communities as well. Vale seeks to identify and implement those adaptation actions that have positive net benefits for Vale's operations and for communities.



Caring for Climate



About Caring for Climate

Launched by the UN Secretary-General Ban Ki-moon in 2007, "Caring for Climate" is the UN Global Compact and UN Environment Programme's initiative aimed at advancing the role of business in addressing climate change. It provides a framework for business leaders to advance practical solutions and help shape public policy as well as public attitudes. Chief executive officers who support the statement are prepared to set goals, develop and expand strategies and practices, and to publicly disclose emissions as part of their existing disclosure commitment within the UN Global Compact framework, that is, the Communication on Progress - Climate. Caring for Climate is endorsed by nearly 400 companies from 65 countries. http://www.unglobalcompact.org/Issues/Environment/Climate_Change



The CEO Water Mandate

About the CEO Water Mandate

The CEO Water Mandate is a special initiative of the UN Secretary-General and the UN Global Compact, providing a multi-stakeholder platform for the development, implementation, and disclosure of corporate water sustainability policies and practices. <http://ceowatermandate.org>



United Nations Global Compact

About the United Nations Global Compact

Launched in 2000, the United Nations Global Compact is a both a policy platform and a practical framework for companies that are committed to sustainability and responsible business practices. As a multi-stakeholder leadership initiative, it seeks to align business operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption, and to catalyze actions in support of broader UN goals. With more than 6,800 corporate signatories in more than 135 countries, it is the world's largest voluntary corporate responsibility initiative. <http://www.unglobalcompact.org>



About the United Nations Environment Programme

The United Nations Environment Programme (UNEP) is the voice for the environment in the United Nations system. It is an advocate, educator, catalyst and facilitator, promoting the wise use of the planet's natural assets for sustainable development. The mission of UNEP is to provide leadership and encourage partnership in caring for the environment by inspiring, informing and enabling nations and peoples to improve their quality of life without compromising that of future generations. The Division of Technology, Economics (DTIE) is the division within UNEP responsible for working with business and industry. With its longstanding activities in the areas of green economy, climate change, resource efficiency, harmful substances and hazardous waste, finance and corporate responsibility, it provides solutions to policy makers and helps change the business environment by offering platforms for dialogue and co-operation, innovative policy options, pilot projects and creative market mechanisms. <http://www.unep.org>

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The Ten Principles of the United Nations Global Compact

HUMAN RIGHTS

- Principle 1 Businesses should support and respect the protection of internationally proclaimed human rights; and
- Principle 2 make sure that they are not complicit in human rights abuses.

LABOUR

- Principle 3 Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining;
- Principle 4 the elimination of all forms of forced and compulsory labour;
- Principle 5 the effective abolition of child labour; and
- Principle 6 the elimination of discrimination in respect of employment and occupation.

ENVIRONMENT

- Principle 7 Businesses should support a precautionary approach to environmental challenges;
- Principle 8 undertake initiatives to promote greater environmental responsibility; and
- Principle 9 encourage the development and diffusion of environmentally friendly technologies.

ANTI-CORRUPTION

- Principle 10 Businesses should work against corruption in all its forms, including extortion and bribery.

