Climate change adaptation in the private sector

UNFCCC Private Sector Initiative

30 March 2012
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Introduction
Introduction

Private sector adaptation initiatives

- The UNFCCC website hosts a database of adaptation case studies as part of the Private Sector Initiative of the Nairobi work programme.
- The case studies reflect climate change adaptation activities undertaken by private companies (sometimes in partnership with NGOs or the public sector) from a range of sectors and regions.
- Templates are available from the UNFCCC website which are populated with information related to each case study. An example of the template structure is represented alongside.

Scope of work

- KPMG has undertaken an assessment of the adaptation case studies on the UNFCCC database, assessing the initiatives per region. In particular, the following aspects were considered:
  - The target and drivers for each adaptation case study
  - The type of organisation undertaking the initiative i.e. consulting/services organisation or internally developed initiatives
  - Regional findings.
What is climate change adaptation?
What is climate change adaptation?

Vulnerability to climate change

- Vulnerability to climate change refers to the degree to which a system is susceptible to, or unable to cope with, the adverse effects of climate change, including climate variability and extremes.¹
- The vulnerability of a system depends on a number of factors, including the rate and magnitude of climate variability or changes, the sensitivity of the system and its ability to adapt (adaptive capacity). Vulnerability can be exacerbated as a system gets exposed to multiple stressors.

Climate change adaptation

- Climate change adaptation is an adjustment in natural or human systems in response to actual or expected climate impacts.¹ Adaptation measures can target both climate variability (at an inter-annual scale) as well as longer-term mean climatic changes.
- Adaptation is an essential response strategy to climate change for a number of reasons:²
  - A time-lag exists between the emission of greenhouse gases into the atmosphere, and the associated climatic response. Climatic changes will continue to occur into the future, with mitigation only limiting the severity of these changes.
  - Social pressures such as rapid population growth and urbanisation can result in an increased vulnerability to climate-related stresses and impacts.
  - The impacts of climate change are expected to fall disproportionately on developing countries, which may be limited in their ability to respond effectively to such climatic stresses.
  - Adapting to climate change involves reducing the sensitivity of the system to climate change, altering the exposure of the system to the effects of climate change, and lastly, increasing the resilience of the system to cope with climatic changes.³ Adaptation often involves moderating potential negative impacts, coping with consequences and taking advantage of opportunities.

What are the business drivers for adaptation?
What are the business drivers for adaptation?

Business drivers for adaptation can include:

- Business opportunity
- Wider social advantages
- Social licence to operate
- Reputation
- Reduced operational costs
- Reduced disruption to production/services
- Improved ability to do business
- Changing demands for goods/services.
What types of organisations are undertaking adaptation?
What types of organisations are undertaking adaptation?

### Consulting/services organisation

<table>
<thead>
<tr>
<th>Targets</th>
<th>Business drivers</th>
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<tbody>
<tr>
<td>Climate-sensitive sectors and regions</td>
<td>Business opportunity</td>
</tr>
<tr>
<td>Vulnerable communities</td>
<td>Wider social advantages</td>
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<td>Driving or changing demands for goods/services.</td>
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</tbody>
</table>

### Internally developed

<table>
<thead>
<tr>
<th>Targets</th>
<th>Business drivers</th>
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<tbody>
<tr>
<td>Own infrastructure and supply chain</td>
<td>Reduced disruption to production/services</td>
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<tr>
<td>Surrounding communities</td>
<td>Improved ability to do business</td>
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<td></td>
<td>Reduced operational costs</td>
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<td></td>
<td>Social licence to operate and reputation</td>
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<td></td>
<td>Wider social advantages</td>
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<td></td>
<td>Changing demands for goods/services.</td>
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</table>
What are the regional trends in adaptation?
What are the regional trends in adaptation initiatives?

- **Europe**: 13 initiatives
- **Asia**: 16 initiatives
- **North America**: 13 initiatives
- **Central America**: 5 initiatives
- **Africa & Middle East**: 15 initiatives
- **South America**: 4 initiatives
- **Multiple Countries**: 11 initiatives

Number of private sector initiatives represented on the UNFCCC database as per 24 February 2012.
What are the regional trends in adaptation initiatives?

North America
- Majority of initiatives by consulting/services organisations
- Business opportunity-focused
- Insurance and climate-proof reconstruction key areas.

Central America
- Balance between internally developed initiatives and consulting/services organisations
- Focus on small-scale farmers in food and beverage supply chain
- Partnerships with NGOs.

South America
- Most initiatives by consulting/services organisations
- Focus on small-scale farmers in food and beverage supply chain
- Partnerships with NGOs.

Europe
- Majority of initiatives internally developed
- Impact assessments or studies commissioned
- Focus on impacts on own company operations – particularly for transport & logistics sector.

Asia
- Balance between internally developed initiatives and those by consulting/services
- Partnerships with NGOs
- Focus on agriculture & water scarcity as well as flooding impacts
- Social co-benefits.

Africa
- Most initiatives by consulting/services organisations
- Partnerships with NGOs
- Focus on water & agricultural impacts
- Strong social co-benefits.

Australia
- Initiatives internally developed
- Focus on water issues.
### Key findings

- Private sector adaptation initiatives in developing countries generally have a strong social development context, and were often undertaken in collaboration with either NGOs or development banks.

- Private sector initiatives undertaken in developed countries generally focus on either business opportunities in climate sensitive sectors, or on companies’ own infrastructure, value or supply chains.

- The business sectors with the highest number of adaptation initiatives include food and beverages as well as energy and water utilities.

- The financial services sector has developed a suite of climate-sensitive insurance and investment products, with the consulting, environmental services and IT sectors taking advantage of many business opportunities arising from climate change adaptation.

### Key areas for future analysis

- How many private sector adaptation initiatives are being undertaken in areas of highest vulnerability – such as the top 10 vulnerable countries listed in the graph above?

- What are the conditions for facilitating a climate change adaptation initiative by a private sector company?

- What are the lessons learnt from existing adaptation initiatives from the business perspective, such as challenges, opportunities, drivers and business case?

- How can climate change adaptation initiatives be monitored to ensure their long-term effectiveness and limit the degree of maladaptation?

- How can private sector climate change adaptation initiatives link with local development priorities as well as the Millennium Development Goals?
Regional comparison of adaptation initiatives
Regional comparison of adaptation initiatives

The following set of slides describes the private sector adaptation initiatives on the UNFCCC database*, grouping them per region and the type of organisation undertaking the initiative. Where there were similar types of initiatives in the same region, these were grouped together.

The diagram below illustrates how the data is represented:

- **Climate impact**
- **Description of climatic event**
- **Description of impacts of climatic event**
- **Adaptation initiative to reduce impact of climate event**

* Initiatives reflected on website as at 24/02/2012
Africa and Middle East

Climate impacts

Weather extremes (cyclones, drought, floods) or sea-level rise

Property and infrastructure impacts

- Constructing cyclone-proof schools
- Water-efficient technologies used in coal-fired power stations (dry-cooling)
- Flood catastrophe bonds and micro-insurance products to reduce flood risk
- Construction of sustainable infrastructure at Masdar City (Middle East)
- Climate project screening tools to identify risks in climate-sensitive sectors
- Dissemination of weather information and early warning systems to small-scale farmers, fishermen and communities
- Insurance, micro-credit and savings schemes to assist small-scale farmers
- Spatial development planning in areas surrounding company operation to reduce prevalence of malaria
- Improved agricultural and water management practices in food and beverage company supply chain
- Rainwater harvesting for domestic or school use to reduce time spent by women on collecting water
- Water reclamation to treat water from mining operation and provide to local communities
- Water resource planning framework to assist water planning decision makers

Development projects

Natural resource-based livelihoods

- Agricultural production
- Access to drinking water
- Access to water information

Climate variability (precipitation and temperature changes)

Human health

Agricultural production

Access to drinking water

Access to water information

Improved agricultural and water management practices in food and beverage company supply chain

Rainwater harvesting for domestic or school use to reduce time spent by women on collecting water

Water reclamation to treat water from mining operation and provide to local communities

Water resource planning framework to assist water planning decision makers
North America

Climate impacts

- Extreme weather events (floods, hurricanes)
  - Impact on business, clients and communities
  - Investment products focused on climate-resilient and adaptation-based opportunities
  - Initiative to reduce exposure of company and clients: reassessing coastal underwriting, catastrophe modelling, insurance product redesign and risk control services
  - Development of new insurance products
- Infrastructure damage
  - Relocation of critical energy services to hurricane-proof geographical locations
- Loss of agricultural production
  - Online weather insurance product for agriculturalists
- Resource scarcity
- Uncertainty
  - Information management technology to assist decision makers better manage climate-threatened resources
Climate impacts

Sea-level rise and storm surges
- Infrastructure damage
  - Reconstruction retrofit and protection products for urban areas
  - Information tools as well as assessment and modelling systems on key climate change impacts, risks and adaptation options available to clients

Climate variability
- Uncertainty
  - Frost protection techniques for crops such as resistant crop varieties and crop diversification
  - Development of resistant fibre materials such as flax and hemp, which withstand climate variability better than cotton
  - Water-Less jeans collection created which is more water-efficient and requires reduced washing cycles

Agricultural production

Snow season
- Insufficient snowpack
  - Expansion of ski resort to north-facing slope for more reliable ski conditions. Modifying ski terrain, land contouring, snow farming and glacier protection
Central America & Caribbean

Climate impacts

Climate variability (i.e. precipitation and temperature variability)

Agricultural production

Development of adaptation strategies for small-scale coffee farmers in supply chain, including watershed-level management, mapping ideal coffee production areas and identification of alternative crops

Water shortages

Identification of technology to reduce amount of water and energy used in production processes

Coastal erosion

Design of near-shore wave energy converters to absorb energy of waves approaching island coastlines vulnerable to erosion

Natural disaster recovery

Development of natural disaster micro insurance product

Extreme climatic events (hurricanes)
South America

Climate impacts

- Rainfall variability and temperature increases
- Stressed agricultural production
  - Development of stress-tolerant and higher-yielding crop varieties
  - Initiatives to improve sustainability of potato crop in South & Central America through improving productivity and assessing different potato varieties
  - Partnership with local coffee and team farmers to develop climate-adapted agricultural practices in supply chain
- Watershed impacts
  - Reforestation programmes by water utility company to improve water management in watershed area
  - Development of water superabsorbers for storing water in soils to promote rainforest restoration
- Extreme events (flooding)
- Coastal erosion
  - Development of coastal protection product for dykes to improve resistance to coastal erosion
Europe

Climate impacts

- Climate variability (i.e. rainfall and temperature variability)
  - Glacial retreat
    - Alpine company developed new routes in areas previously covered by glaciers
  - Impact on infrastructure
    - Sustainable house design concept with zero emissions and adaptive principles in design
    - Development of water resource management plan and adaptation solutions to impact of climate change on water infrastructure (UK)
    - Project undertaken to determine vulnerability and extent of climate change impacts on UK rail infrastructure
  - Stressed agricultural production
    - Breeding programme to identify or develop new varieties of blackcurrants which are suitable to changing UK climate. Blackcurrants are used in the popular Ribena soft drink.
    - Study commissioned by the Scottish whiskey sector to determine the impacts of climate change on whiskey production – particularly cereal yield and changes to precipitation
Climate impacts

Extreme climatic events

Impact on business, clients and communities

Climate vulnerability assessment tool developed internally by financial institution to assess risks of climate change on its clients

Impact on water infrastructure

Strategic planning of water utility includes impacts of climate change on infrastructure, including impact of floods on water infrastructure and sewer flooding

Impacts on road and rail infrastructure

Weather information and warning system for extreme events for railway services in Austria

Europe (cont.)

Project undertaken to determine vulnerability and extent of climate change impacts on UK rail infrastructure

Commissioned study on adapting road infrastructure to climate change in order to provide adaptation solutions (France and UK)

Adaptation of railway infrastructure project provides rail operators with information on risk assessments, adaptation costs, potential impacts and toolbox methodology for identifying vulnerable rail assets (France)
Asia & Australia

Climate impacts

Crop losses

Weather index insurance product developed for farmers who are heavily reliant on rainfall for rice production (Thailand)

Local farmers formed co-operative to focus on growing climate resistant lavender (India)

Risk and adaptation initiatives to assist local farmers in supply chain to improve resilience to climate change. Includes water conservation, rainwater harvesting and community development (India)

Telecommunications dissemination of water, weather and planning information to farmers, i.e. market prices, hydrological info, etc. (China and India)

Water shortages

Mining company undertook climate risk assessments and developed water strategies for countries of operation (Australia)

Food and beverage company undertook an afforestation programme to improve water yields for beverage production (Japan)

Adapted agricultural processes to reduce water used in rice cultivation through direct seeding (India)

Water utilities developed reverse osmosis desalination plant to supply a portion of city water requirements (Australia)

Beverage company improving water efficiency of production process and recycling water for transfer to local communities (SE Asia)

Climate variability

Crop losses

Water shortages
Climate impacts

Extreme events (droughts, floods, storms)

- Floods impacting fishing and water-based transport
  - R&D into fiberglass boats which are more resilient to extreme events and stable for use in flooded rivers (Bangladesh)

- Community preparedness for floods
  - Integrated community-based risk reduction programme to improve community preparedness in flood-prone areas (Indonesia)

- Water shortages
  - Implementation of water efficiency, recycling and treatment projects to reduce water stress in Asia

- Crop losses
  - Index-based weather disaster insurance system developed to assist farmers (India)

- Damage to property/infrastructure
  - Development of hydroponic greenhouses that are powered by renewable energy, portable and eco-friendly (India)

- Electricity outages/shortages
  - Micro-insurance and finance programme for communities affected by floods (Indonesia)

  - In response to frequent power outages, biomass gasifiers have been developed for island communities to generate electricity (India)

  - Providing cheaper solar lanterns to communities to replace kerosene lanterns that pose a health and safety hazard (Lao People’s Republic)

  - Development of one of first privately owned hydro-electric power stations, with strong social development impacts such as household electrification and development projects (Nepal)
Climate impacts:

- Extreme climatic events (floods, hurricanes)
- Water scarcity due to droughts
- Loss of tourism due to hurricanes

Uncertainty:

- Insurance products developed for developing countries to manage climate change impacts
- Priding rural communities with solar powered lighting and cellular phone-charging facilities which improve communications on range-land grazing conditions
- Travel agencies, resort and vacation companies in the Caribbean are offering replacement booking policies for holiday-makers that have booked a holiday when a hurricane threatens to make landfall
Climate impacts

Climate variability (i.e. rainfall and temperature variability)

Water shortages

Academic partnership to provide online access to environmental research from many information sources

Climate change risk atlas has been developed for business to assess their vulnerability, risks and adaptation options

Design of a range of washing products that require less water

A role-playing computer game has been developed to focus on how people react to water shortages under climate change. Game aims to assist in development of water policy

Water purification technology developed to provide clean drinking water. Technology is portable and for use in stressed areas

Development of drip irrigation systems for small-scale farmers in water-stressed areas; in addition to micro-finance options

Genome mapping project of cocoa genome to determine fungal-resistant crop varieties

Use of biotechnology to develop more climate-resistant varieties of crops

Stressed agricultural production
Summary of adaptation initiatives
## Summary of adaptation actions per region and business sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>Africa &amp; Middle East</th>
<th>North America</th>
<th>Central America &amp; Caribbean</th>
<th>South America</th>
<th>Europe</th>
<th>Asia &amp; Australia</th>
<th>Multiple countries</th>
</tr>
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<tbody>
<tr>
<td>Mining &amp; metals</td>
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<td>✓</td>
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<tr>
<td>Transport &amp; logistics</td>
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<td>✓</td>
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<tr>
<td>Agriculture/ food &amp; beverages</td>
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<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<td>Textiles</td>
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<td>✓</td>
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<tr>
<td>Energy &amp; water utilities</td>
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<tr>
<td>Tourism &amp; recreation</td>
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<tr>
<td>Financial services</td>
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<td>Telecommunications</td>
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<tr>
<td>Consulting &amp; environmental services (incl Information Technology)</td>
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<td>Real estate/ construction &amp; engineering</td>
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## Summary of business drivers per type of company & region

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<tr>
<th>Business drivers for adaptation initiative</th>
<th>Regions</th>
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<tr>
<td></td>
<td>Africa &amp; Middle East</td>
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<td></td>
<td>±</td>
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<tr>
<td>Business opportunity</td>
<td>✓</td>
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<tr>
<td>Wider social advantages</td>
<td>✓</td>
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<tr>
<td>Social licence to operate</td>
<td></td>
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<tr>
<td>Reputation</td>
<td></td>
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<tr>
<td>Reduced operational costs</td>
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<tr>
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<tr>
<td>Changing demands for goods/services</td>
<td>✓</td>
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### Notes
- Consulting or services organisations
- Internally developed initiatives

| Equal distribution of initiatives | Majority of initiatives |