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Mark Kenber CEO, The Climate Group Executive Vice President, Earthwatch Institute Corporate Sustainability, HSBC Holdings plc UK Chief Executive, WWF Director, Smithsoniar Tropical Research Institute

Tackling climate change together

Climate change from carbon dioxide emissions and other greenhouse gases is putting our planet at serious risk. The direct impact may be felt most acutely by people in developing economies where public infrastructure is least able to withstand higher sea levels, increased frequency of storms and droughts, and changes in rainfall patterns.

HSBC, with its global network and local knowledge, recognised early on the significance of climate change and its global impacts, and has been actively seeking to contribute to a greater understanding of the issue, its implications and opportunities.

In 2007, we set up the HSBC Climate Partnership with four leading environmental organisations – The Climate Group, Earthwatch Institute, Smithsonian Tropical Research Institute and WWF.

Our aims were ambitious – to impact on individuals, governments, the environment and species across four continents. Our targets were a combination of advances in scientific understanding; measurable impacts on the physical environment; improvements in economic conditions and changes in behaviour for millions of people; and accelerated adoption of new technologies by governments around the globe.

We set out to improve water quality for 30 million people in China by restoring water sources and reconnecting rivers and lakes. We aimed to secure the water supply of over two million people in Brazil by working with local water and sewerage companies. We challenged the programme to find ways to reverse or halt the decline of over 50 threatened species in India, China and the United Kingdom.

We wanted to research the impacts of climate change on temperate and tropical forests, to understand the role of forests in the global carbon cycle, and establish forest plots in which to do this. We planned to use the findings to develop sound management practices to protect forest land and river basins around the world.

We saw the importance of engaging the world's great cities to take action on climate change, working with business, city governments and consumers to understand the opportunities to cut emissions while making cities better places to live.

Through the programme we also sought to inform 100,000 HSBC employees globally about climate change, what it means to the organisation, to our customers and other stakeholders, and ultimately, how we can tackle it.

Above all, we wanted to create a force for change, building on the environmental experience and expertise of the partners and making countless individual contributions that would, collectively, make a real difference.

We've already delivered much of what we set out to do and, in many cases, far surpassed our initial expectations. This review shares some of the impacts the programme has achieved so far.





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Groundbreaking projects across four continents

The HSBC Climate Partnership is conducting and supporting innovative scientific research and policy development in cities, forests and river basins around the globe.

Rivers

The HSBC Climate Partnership is working in river basins in four continents to secure water supply, improve water quality, safeguard habitats, and protect threatened species.

Cities

The HSBC Climate Partnership brings together government and business to increase energy efficient technologies in iconic world cities.

Regional Climate Centres

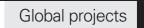
Selected HSBC staff are trained by **Earthwatch** as 'Climate Champions' at one of five Regional Climate

Centres worldwide. The centres have been established to involve HSBC staff in scientific research and associated learning, helping them to understand climate change and the action they can take in their personal and professional lives.

The Regional Climate Centres are located in Brazil's Atlantic forest outside Curitiba, in North America's Chesapeake Bay, in protected native woodland near Oxford in the UK, in the Western Ghats of southwest India and in eastern China's Gutianshan Forest reserve.

The Regional Climate Centres are also available to other organisations and institutions seeking to develop their understanding of climate change.





The role of forests in mitigating climate change

Billions of people worldwide rely on trees and forests for food, shelter, fuel, medicines, stable soils, clean air and fresh water regulation. Forests cover about a third of the Earth's land area and harbour more species than any other terrestrial habitat. However, all this is under threat from deforestation, degradation and climate change.

Surprisingly little is known about how forests are affected by changing temperatures and rising levels of carbon in the atmosphere, and how changes to forest management could play an important role in helping to reduce the impact of climate change.

Temperate and tropical forests may respond very differently to changing climate and atmospheric composition. The HSBC Climate Partnership is helping to build understanding of these 'forest carbon dynamics' by supporting intensive research at forest sites across the world. Cross-continental research is analysing the carbon contained in trees, their roots, and in dead wood, twigs, leaves, fruit and seeds.

The resulting data is enabling scientists to predict forests' response to climate change and calculate the amount of carbon that could be captured through reforestation.

Two complementary research programmes, managed by the **Smithsonian** and **Earthwatch**, are running in

tropical and temperate forests.

The **Smithsonian** has created a single database that links 40 forest areas of over four million trees in 21 countries. A consistent methodology has been developed by the **Smithsonian** and is used to monitor and track tree development. The data are managed on common software programmes so any scientist working on tree carbon can access data gathered in the forest sites.

The forest plots are known collectively as the **Smithsonian**'s 'Global Earth Observatories'. Covering an area of 1,200 hectares, they are a 'scientific infrastructure' and contribute to the legacy of the Partnership.

By measuring and tracking the growth of trees in the Regional Climate Centres, **Earthwatch** is building an understanding of climate change impact on forest ecosystems and biodiversity, how species are dying, thriving or adapting, and the role of forests in the global carbon cycle.







18 peer reviewed scientific publications to date

33 research institutions involved in Climate Partnership research

40 forest plots worldwide

42 PhD scientists involved in Climate Partnership research

43 citations in scientific papers / publications

99 graduate and undergraduate theses based on Climate Partnership data

190,000 trees measured and calibrated

462,000 research hours by scientists and HSBC staff

2,900,000 hectares of forest with increased protection

'The Agua Salud project in the Panama Canal Watershed has the potential to be the tropical-hydrology project of the decade.' Dr Sampurno Bruijnzeel, Professor of Land Use Hydrology, Vrije Universiteit, Amsterdam

Panama's Agua Salud Experiment

Over 5% of global trade passes through the Panama Canal and the transit fees levied play a vital role in the local economy. 2.6 billion m³ of fresh water are required each year to operate the three sets of locks which raise ships to 25.9m above sea level and back down again. A staggering 200,000 m³ of this water is lost every time the locks are opened. In addition, the Canal provides drinking water to 1.5 million people.

High water levels and floods in the watershed put the locks and dams at risk; drought and low water levels reduce ship passage, affecting commerce. The 'landscape-scale' Panama Canal Watershed Experiment, funded by the HSBC Climate Partnership, is helping to understand the factors that control seasonal water flows, and the role that different types of trees and vegetation play in regulating these flows.

The project has reforested over 100 hectares of degraded land with 150,000 seedlings of different native species to create a mixed experimental landscape of plantations, pasture and forest.

Smithsonian ecologists and hydrologists are measuring and tracking the way different landscapes affect water regulation and storage.

Project updates

The knowledge and models derived from this project, known locally as 'Agua Salud', will aid land-use decisions in Panama, the Caribbean basin and much of the seasonal tropics. The data will help secure the long-term viability of the Canal and ensure the continuing passage of trade through its waters.

Calculating the commercial value of the environment

As fees are levied on ships transiting the Canal, it is possible to assign a financial value to its waters. The work in the watershed will help develop a methodology for calculating the financial value of the 'environmental services' provided by the forests along the banks of the Canal. This in turn will help to protect and preserve the world's forests and woodlands that regulate water supplies.

Tackling illegal deforestation

Carbon emissions from the destruction and degradation of forests are estimated to contribute about 20% of all global greenhouse gas emissions. Every year the Amazon loses a forested area almost the size of Belgium. Much of the forest clearance is a result of illegal loggers chopping down mature trees and destroying forest habitats.

In Brazil, **WWF** is working with the Acre state government and the National Institute for Space

Research to develop a methodology for assessing the extent of illegal logging in the Amazon forests. A pilot study is using satellite imagery to compare the extent of deforestation with data on wood legitimately marketed from a 12,000 hectare plot.

The information obtained will provide a more concrete picture of illegal logging which will help local and federal government take effective preventative action.





Cities – the heart of the problem and of the solution

This is the era of the city. In 1950, there were around 750 million urban dwellers; today there are about 3.5 billion and by 2050 there will be more than 6 billion.

Cities are where energy is consumed, where people live, where commerce is done. As they grow and their populations become wealthier, they require more energy. But cities also have a critical mass of technology, infrastructure and finance, which means they can help create a less carbon-intensive world.

The HSBC Climate Partnership is helping The Climate Group to pioneer this 'clean revolution' in iconic cities like London, Mumbai, New York and Shanghai - role models for other jurisdictions in helping to accelerate the speed of change. There is no shortage of low carbon ideas, but the issue is persuading city administrations to adopt new, carbon efficient solutions in place of older technologies.

The HSBC Climate Partnership, together with The Climate Group's city and business partners, is a catalyst to fast-track the adoption of three proven applications - LED lighting, electric vehicles and SMART technologies. Each of these has the potential to deliver huge reductions in emissions by 2020, whilst improving city life, enhancing energy security and generating new jobs and prosperity.

LED (Light Emitting Diode) street lights

Operated with adaptive controls, these consume 50-70% less energy than traditional street lights. They also last longer and produce less light pollution.

Electric vehicles are more energy efficient and less carbon intensive than conventional vehicles, even

when plugged into coal-fired grid electricity. They have huge potential to cut emissions when powered by renewable and low-carbon energy. The HSBC Climate Partnership is working with large fleet operators, city governments, car makers and banks to establish the infrastructure needed to support their wider take-up.

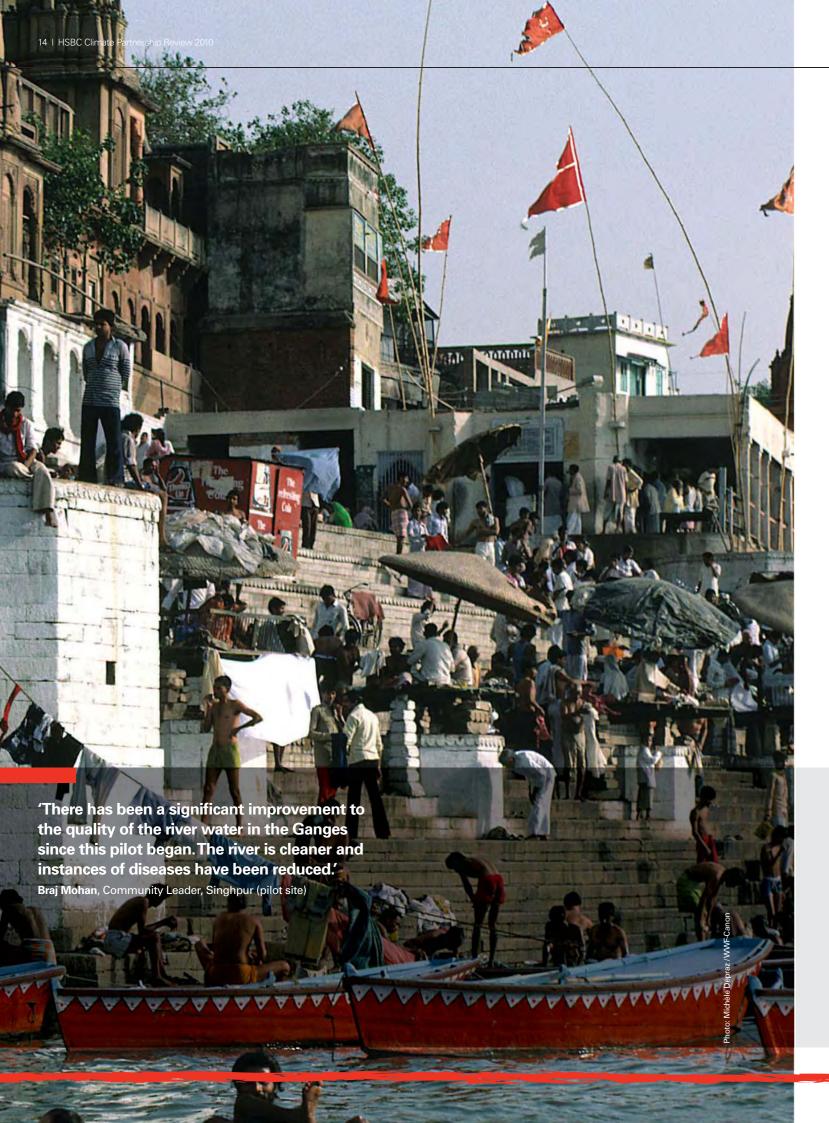
'SMART' Technology

'SMART' Information and Communications Technology (ICT) applications help distribute, store and use energy more efficiently. 'SMART 2020' is a network of cities, regions, IT companies and other bodies, collaborating on state-of-the-art trials in buildings, transport and electricity grids.

Whilst these solutions would probably supersede today's carbon intensive technologies over time, the programme is speeding up their adoption and overcoming some of the barriers, including lack of awareness, affordability and availability of enabling finance and policy, thereby generating significant carbon savings more rapidly.

The HSBC Climate Partnership has also enabled The Climate Group to establish offices in China and India, and begin work with their national, regional and city governments and businesses to help mitigate the climate impacts of rapid urbanisation.





Reducing emissions from lighting

There are an estimated 90 million street lights in public spaces around the globe, consuming vast amounts of electricity, much of which is wasted as heat or light pollution.

The Climate Group is trialling energy efficient LED lighting alongside existing streetlights in nine cities around the world. Together, these cities account for 1% of the total global outdoor lighting market. **Earthwatch**trained HSBC Climate Champions are involved in monitoring and reporting on the outcome.

Early results from a trial in Central Park and Franklin D Roosevelt Drive, New York, indicate significant cuts in energy consumption and a positive response to the lighting quality.

The trial findings, including critical data on lighting performance, energy use, CO₂ savings and pay-back times, will be shared with city administrations worldwide. A series of larger pilots is planned, and the ultimate project goal is for 25% of all outdoor lighting to be replaced with high quality LEDs by 2020.

A catalyst for low carbon growth

The focus of the HSBC Climate Partnership's work on cities is on cutting carbon emissions by building awareness of low carbon opportunities among business and government leaders, and consumers.

The Climate Group has built international networks of 12 city governments and over 40 leading corporations committed to low carbon growth. These are supported by briefings, reports, meetings and webinars.

The initiatives to speed market transformation for LED lighting, electric vehicles and 'SMART' ICT technologies have the potential to cut global greenhouse gas emissions by 15% – or 11 billion tonnes – a year by 2050.

Consumer-facing campaigns in the UK, USA and Hong Kong promoting low carbon products, services and behaviours have saved US\$1 billion in household bills and avoided over 5 million tonnes of emissions.

High profile events such as Climate Week NYC are an opportunity for government and business leaders to demonstrate their commitment to low carbon growth and position this as an opportunity, not a burden.

Providing cleaner water to cities

Over 40% of India's population and many species depend on the River Ganges or Ganga for their water, but untreated sewage and toxic industrial effluent is killing the river. The problem is most acute in Kanpur where 1.3 billion litres of toxic waste and raw sewage flow into the river daily.

Under the HSBC Climate Partnership, **WWF** is piloting sustainable, low cost waste water treatment to reduce pollution. In a process known as 'bioremediation', sewage-eating bacteria are added into open sewers that drain into the river. These micro-organisms return the water to its original condition; by the time the drain water reaches the river, it is odourless and clear.

Kanpur's government has invited **WWF** to prepare a feasibility study for implementing bioremediation on three further drains in the city. Pilot projects will also be funded by the governments of a further seven cities along the Ganges.

wwF has been appointed as one of four technical experts to the team representing Uttar Pradesh in the new Indian National Ganga Authority.

This appointment is due entirely to the credibility built up through the HSBC Climate Partnership.



Protecting the world's freshwater

The Earth has often been called the blue planet, but freshwater accounts for only 3% of the world's total water and 99% of that total is deep underground or in glaciers.

In reality, only 0.03% of the planet's water is usable, and this small percentage must support the growing needs of billions of people – from drinking water to farming and food production through to industry and clothing.

The situation is critical. Around 2.3 billion people live in river basins under water stress. Almost one billion people don't have access to safe drinking water. And biodiversity in freshwater habitats is declining at a faster rate than in any other environment.

The HSBC Climate Partnership is working with local communities, governments, businesses and civil society to safeguard these rivers for the benefit of millions who rely on them, and for the unique wildlife

The work is varied and far-reaching, but the emphasis is on developing and testing new practices and policies and lobbying governments to enact them in law.

In Brazil, the HSBC Climate Partnership has enabled **WWF** to support the government in introducing planning legislation on climate change adaptation that protects both the Amazon and the Pantanal wetlands.

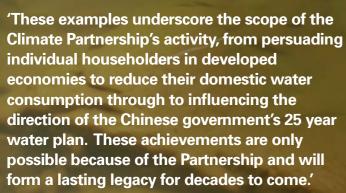
WWF has reconnected 40 lakes covering 4,000km2 to the Yangtze. This has significantly improved water quality and fish stocks over an area roughly two and a half times the size of Greater London, restoring the natural flow and biodiversity of the river, increasing flood retention and adapting this precious environment to the impacts of climate change.

In the UK, WWF is working with water companies to encourage customers to use 20% less water in their homes, reducing pressure on rivers and aquifers and helping to protect native species such as the water vole.









Dr Glyn Davies, Director of Programmes, WWF-UK



Cleaning up the Yangtze

The Chinese government has recognised that the lack of clean water will affect future development, and is working with the HSBC Climate Partnership and **WWF** to improve water management by turning demonstration projects into scalable solutions and long-term policy.

China produces half the world's pigs, and their slurry is routinely dumped in waterways. This causes algae to grow, killing animal and plant life and making the water undrinkable.

The HSBC Climate Partnership sponsored the design and trial of a cost-effective unit to capture pig slurry and turn it into methane which is then used to heat the farm and provide free gas to the local village. This simple but effective solution prevents slurry from polluting the water course, provides 'clean' energy and frees up money that might otherwise be spent on buying electricity generated by burning fossil fuel.

A new regulation is to be enacted in the Hubei region of central China, requiring all new pig farms to introduce this simple technology.

Best practice for water management

The HSBC Climate Partnership is helping to increase the income of farmers in the Central Yangtze region of China by encouraging them to employ sustainable agriculture and aquaculture techniques. These promote different farming methods which reduce the level of agrochemicals used and are less polluting. Not only have we seen 56,000 farmers increase their income by 30%, but the Ministry of Agriculture is now actively promoting these sustainable farming practices.

Project updates

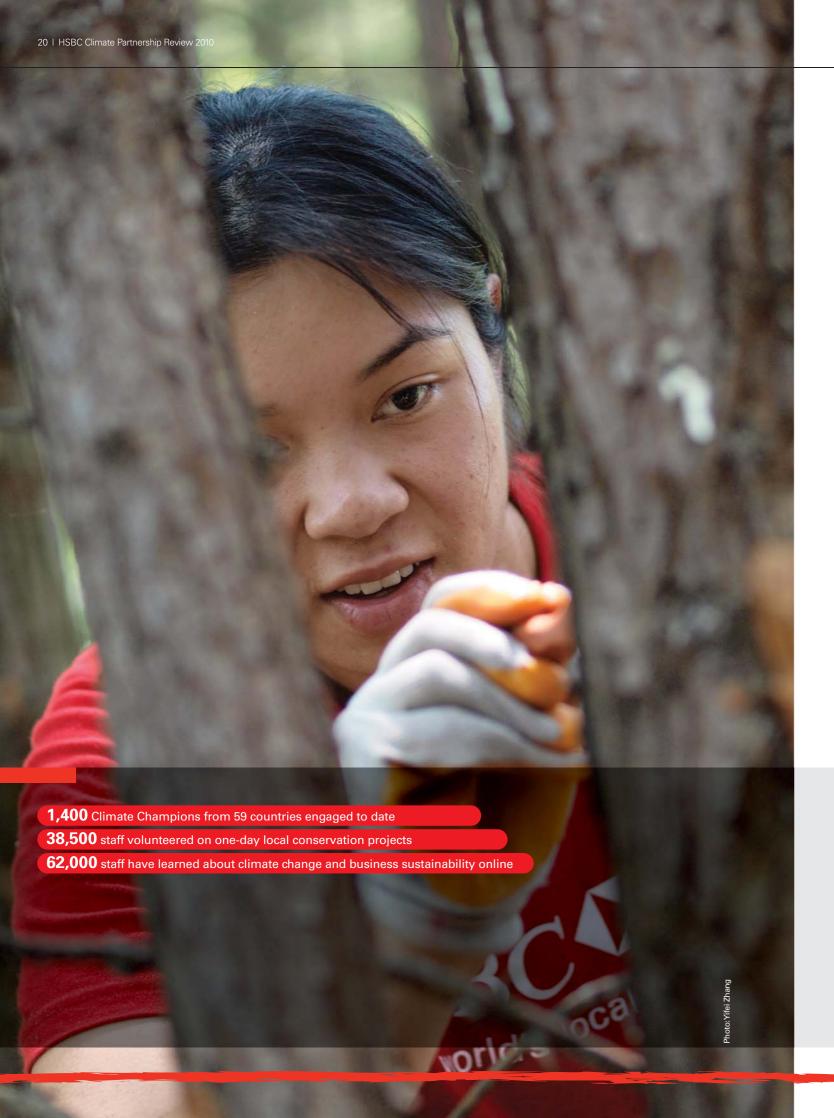
China's 25 year master plan

As a direct result of work on the Yangtze, the Chinese Ministry of Water asked **WWF** to advise on how international best practice should be incorporated into China's next 25 year master plan for sustainable water management. This plan will require the managers of the seven biggest rivers in China to ensure proper functioning of the rivers and wetlands, benefiting hundreds of millions of people, as well as animal and plant species.



Reducing the risk, seizing opportunities

There are commercial benefits for HSBC and others in the programme. Much of the work undertaken by the HSBC Climate Partnership will reduce business risk arising from water shortages and floods. Many of the low carbon pig farms will require equipment loans; entrepreneurs in India are investing in processes to produce the friendly bacteria needed to clean water courses; and a reduction in river pollution globally will yield more, higher value fish.



Taking direct action

Through a groundbreaking programme delivered by Earthwatch, HSBC staff are conducting primary field research into the effects of climate change, volunteering to support local climate-related mitigation and adaptation projects, and discovering more about climate change.

The pinnacle of the scheme is the 'Climate Champion' programme, where HSBC staff work alongside leading scientists in one of five Regional Climate Centres, discovering first-hand how climate change is impacting our natural resources and livelihoods.

Using methods developed by the **Smithsonian**, the Climate Champions map out research plots, measure trees, collect soil samples and ground-level leaf litter and conduct data transcription and analysis. To date, Climate Champions have measured over 100,000 trees – equivalent to 40 years' work for one scientist.

The programme draws on the skills, experience and talents of HSBC staff, whilst building their expertise and confidence. It translates directly into increased employee engagement and motivation. Almost 80% of Climate Champions say their participation in the

programme has made them more strongly committed to HSBC. This is important to the business as employee engagement ultimately drives day-to-day commitment, productivity and performance.

Climate Champions apply the experience and knowledge gained with **Earthwatch** when they return to work, translating the significant investment in employee engagement into tangible benefits for HSBC.

Climate Champions have identified new sustainable banking products, introduced new ways of working that reduce HSBC's environmental footprint and designed projects that help to raise broader community awareness of climate change issues, as well as implementing practical mitigation measures.



Changing working practices

A Climate Champion from Hong Kong created an eAdvice service for HSBC corporate medical insurance customers. This saves over 10 million sheets of paper annually, equating to US\$400,000 each year, which has been reflected in the product pricing.

A Climate Champion in North America introduced automatic shutting down of PCs overnight. Since 2008 this has saved over 4.5 million kilowatt hours of electricity and 907 metric tonnes of CO₂, equivalent to taking 363 cars off the road for a full year.



Helping the River Ganges flow

The River Ganges, or Ganga, is a holy river with religious and cultural significance for 800 million Hindus. Water from the Ganges is used for ritual cleansing and religious rites, and bathing in it is believed to wash away sins.

The river is also the life blood of the local community, providing a vital source of water for domestic, agricultural and industrial use.

Water extraction for irrigation and industry has resulted in the main stream of the upper Ganges being heavily polluted and flowing at very low volume for much of the year. The situation is exacerbated by the building of hydroelectric power projects in the river's headwaters.

WWF India, supported by the HSBC Climate Partnership, has developed a methodology to determine how much

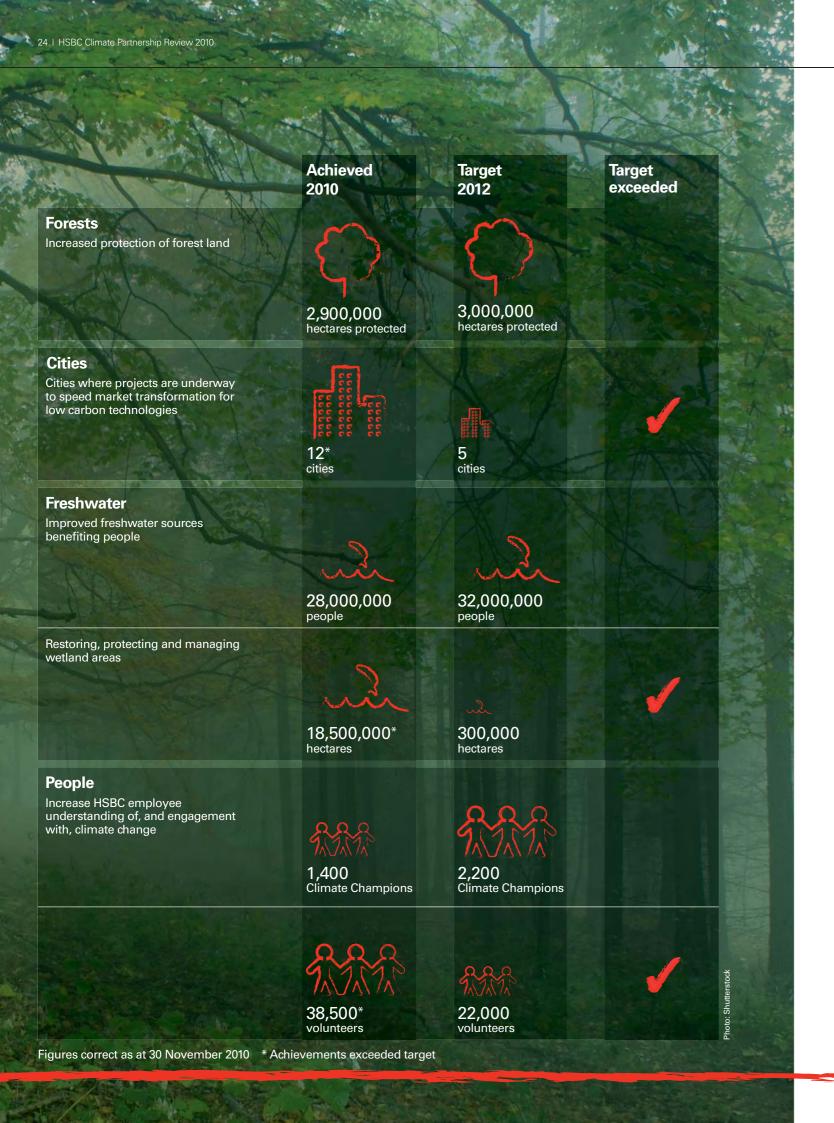
water needs to flow to keep the river alive. This takes account of ecological and geomorphological requirements, as well as livelihood, spiritual and cultural issues. It includes an evaluation of the volume of water required for ritual purification and also of the needs of individual species like the river dolphin.

The development of this 'environmental-flow' or E-flow methodology, the first to take account of broader religious and cultural concerns, has led to India's government recognising the importance of E-flows and including the data in the overall comprehensive river management plan currently being prepared. The work will help to determine what needs to be done at a policy and operational level to ensure that the Ganges flows effectively in the future.



Changing consumer behaviour

Consumers are a vital part of the jigsaw. The HSBC Climate Partnership has worked with **The Climate Group** on two major campaigns to change consumer behaviour. In London, the 'Together' campaign provided consumers with practical steps to reduce emissions, saving one million tonnes of CO2 and US\$590 million in household bills. In Hong Kong, a DIY toolkit helped participants reduce their carbon footprint by 20%.



Future focus

'As we increase the production of greenhouse gases, we face the very real prospect of causing irreversible damage to the Earth's more fragile eco-systems. We are not powerless if we act now, collectively and decisively. We can significantly reduce the causes of climate change and greatly improve the chances of safeguarding for future generations the spectacular diversity of life on earth.'

Sir David Attenborough, at the launch of the HSBC Climate Partnership, May 2007

These were the words that launched the HSBC Climate Partnership in May 2007. We hoped that the HSBC Climate Partnership would help us to achieve something profoundly important, and that by working together and creating a 'climate taskforce' of thousands of HSBC employees worldwide, we would make a real difference.

We are now beginning to see the fruits of our labours in concrete, meaningful and measurable impacts on individuals, environments and society.

Our future programme goals include providing cleaner water sources for 30 million people in the cities, towns and countryside around the Yangtze basin; reducing emissions growth in the world's major cities; and continuing to generate invaluable scientific research that will help us adapt to, and mitigate, the effects of climate change globally.

What has this achieved for HSBC?

The work of the HSBC Climate Partnership has helped to inform the development of HSBC's policies for financing sensitive sectors, such as energy and forest land, where we have sought input and advice from our partners to take climate change into account more fully. It has also helped us to build on our understanding of the business opportunities which arise from the need to respond to climate change.

Our own research shows that the 'climate business' sector – the goods, products and services linked to

addressing climate change – now generates annual revenues of more than US\$500 billion and is already larger than the global aerospace and defence industries combined. It is expected to grow to two trillion dollars by 2020.

Last but not least, the HSBC Climate Partnership has resulted in a huge increase in organisational commitment among the many HSBC staff who have participated in the programme.

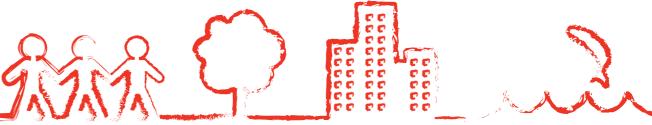
Where next?

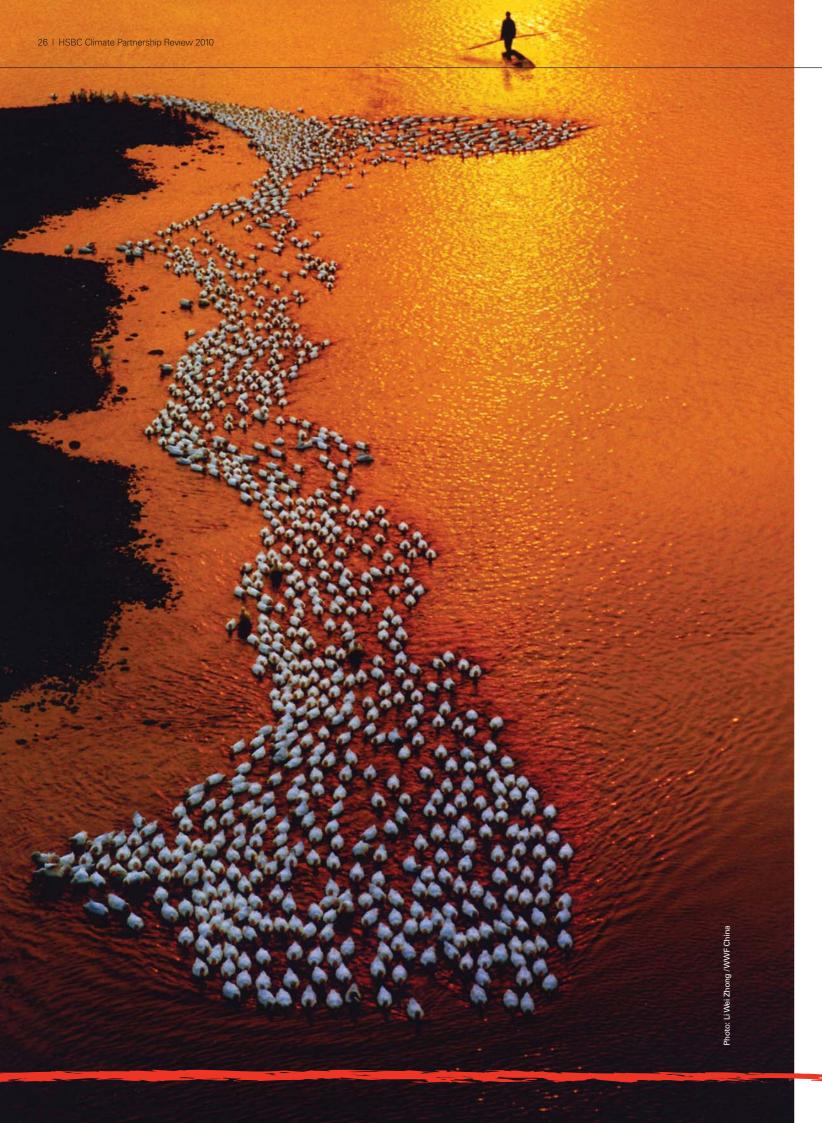
It takes many years to establish a complex programme of this nature, and to move from original science through demonstration projects to policy implementation.

A number of the projects described were initiated by HSBC with WWF, Earthwatch and The Climate Group before the HSBC Climate Partnership was formalised. The Smithsonian has been monitoring long-term forest plot changes in the tropics since the early 20th century, and it is only recently that the HSBC partnership has enabled it to extend its research activity into temperate zones.

It is our sincere hope that the benefits of these longterm projects and the new activities sponsored directly by the HSBC Climate Partnership will be felt long into the future.

To find out more about HSBC's work on climate change, visit hsbc.com/sustainability.





The Climate Partners

We wanted to create a partnership of organisations with the knowledge and skills to envision projects and make them happen. We selected partners with a track record in conservation and original scientific research; the capacity to deliver an effective programme at an unprecedented level; and the ability to collaborate and work in partnership to deliver joint goals.

WWF

The iconic panda logo is synonymous with WWF's invaluable work on species conservation. Less well-known is their practical policy work, advocacy and campaigning to address the threats to society and nature that arise from climate change.

Earthwatch

Earthwatch is an international environmental charity, engaging people worldwide in scientific field research and education to promote the understanding and action necessary for a sustainable environment. Earthwatch creates 'citizen scientists' who conduct field research and, through education and engagement, are able to make a practical contribution to sustainability in their workplace and community.

The Climate Group

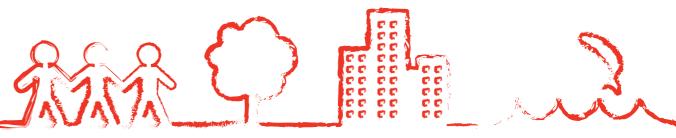
The Climate Group is an international, not-for-profit organisation working with government and business leaders to cut global emissions and accelerate a clean industrial revolution. Our global coalition of companies, states, regions and cities around the world recognise the imperatives of taking decisive action now. The Climate Group was founded in 2004 and has operations in Australia, China, Europe, India and North America.

The Smithsonian Tropical Research Institute

Starting from a small island field station in the Panama Canal in 1923, The Smithsonian Tropical Research Institute has grown to become a world-leading authority on tropical habitats, working in global forest plots. The Smithsonian's facilities are used extensively by visiting scientists from academic and research institutions around the world every year. The work of the Smithsonian's resident scientists allows us to understand tropical habitats more fully and the institute has trained hundreds of tropical biologists.

HSBC Group

HSBC Holdings plc, the parent company of the HSBC Group, is headquartered in London. The Group serves customers worldwide from around 8,000 offices in 86 countries and territories in Europe, the Asia-Pacific region, the Americas, the Middle East and Africa. With assets of US\$2,418 billion at 30 June 2010, HSBC is one of the world's largest banking and financial services organisations. HSBC is marketed worldwide as 'the world's local bank'.





For more information please contact:

Group Corporate Sustainability
HSBC Holdings plc
Email: sustainability@hsbc.com

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