



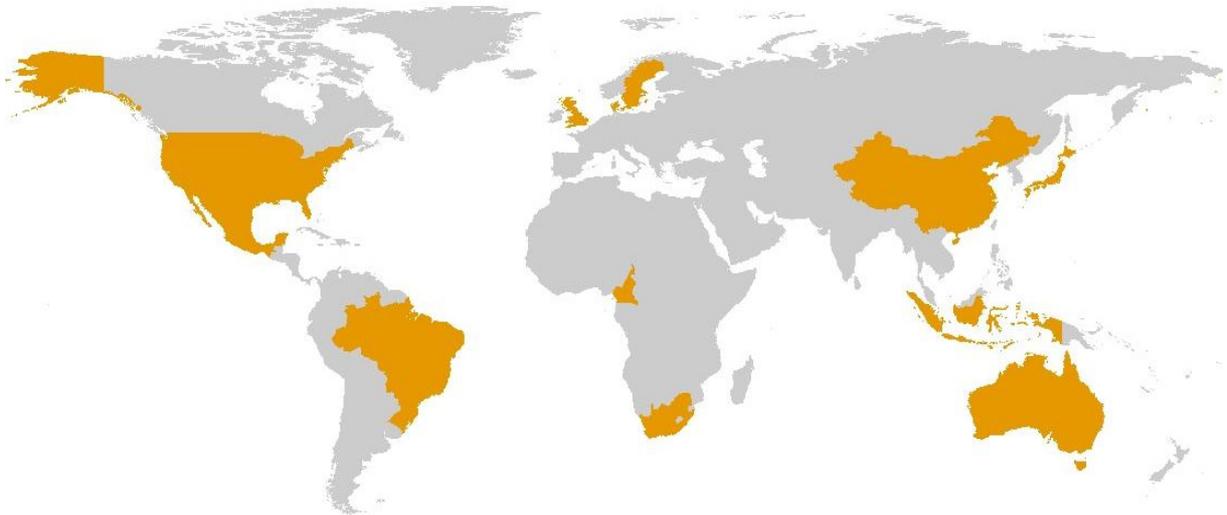
**GLOBE**  
INTERNATIONAL



# Natural capital: The new political imperative

An interim report prepared for the 'Parliamentarians and Biodiversity Forum' at the tenth Conference of the Parties to the Convention on Biological Diversity, Nagoya, Japan.

October 2010



**GLOBE International Commission on Land Use Change and Ecosystems**  
Supported by the Global Environment Facility and the United Nations Environment Programme



## **Natural capital: The new political imperative**

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Prepared as part of the work of the GLOBE International Commission on Land Use Change and Ecosystems.

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All figures quoted in this report are in US dollars unless otherwise noted.

October 2010

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GLOBE Parliamentarians at the GLOBE Forum in Copenhagen, October 2008 © GLOBE International.  
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## Foreword

In 2010, we celebrate the International Year of Biodiversity, culminating in the tenth Conference of the Parties to the United Nations Convention on Biological Diversity in Nagoya, Japan. Almost twenty years after the importance of ecosystems and biodiversity was recognised at the Earth Summit in Rio de Janeiro, we are still losing species of plants and animals to extinction faster than ever before. As we lose species, the integrity of the ecosystems on which we all depend becomes ever more threatened. Today, more than ever, our leaders and parliamentarians must find new ways to value, restore, conserve and manage our natural environment, before our very way of life is also under threat.

Governments have begun to realise that the conservation and restoration of the natural environment can help to achieve major public policy goals. The relationship between nature and the economy is now better understood, and it has been shown that economic growth and sustainable environmental management can go hand-in-hand. A central aspect in these recent developments is the valuation of natural capital and ecosystem services, or in more simple terms, putting an economic value on the natural environment and the services that nature provides to the economy and society.

Despite these timely advances, the true value of natural capital is rarely integrated into policy making processes across government departments. Public works programmes ensure that built capital and infrastructure are maintained and restored at regular intervals to prevent service deterioration and cost blow-outs. We must now do the same with natural capital and ecosystem services. Until this happens, the growing body of scientific and economic evidence supporting the natural capital approach will not achieve the required results of halting the degradation of critical ecosystem services and global biodiversity loss.

Examples of successful policies must be added to this evidence base. This report aims to fill this gap by profiling a set of policies, programmes and legislation from around the world where the value of natural capital has been incorporated into decision making. The examples have been put forward by legislators from the GLOBE International network, and range from large-scale 'payment for ecosystem services' programmes in Mexico and China, to incentivising conservation through tax revenues in Brazil, to increasing the flow of ecosystem services through land restoration in Denmark and South Africa, and recognising the economic contribution of protected areas in Australia.

Each of these examples builds upon a critical message: environmental policies can help deliver positive benefits to the economy and society, and help achieve short-term, mainstream public policy goals. By demonstrating that economic growth, job creation, energy and food security, health benefits, climate change objectives and sustainable resource management can be achieved through innovative means that involve the natural world, this report provides unique insight from GLOBE's network of legislators on how to win political support for policies that deliver long-term environmental goals.

Currently, the policies profiled in this report are seen as progressive due to their recognition of the true value of ecosystem services. We need to move towards a world where these approaches are second nature to policymakers and where the value of natural capital is recognised throughout decision-making processes.



**The Rt Hon. John Gummer, Lord Deben**  
President, GLOBE International

## Summary of key messages

Parliamentarians can help develop and guide policies that will ensure better management of our ecosystems and species. In many cases, improved environmental management can also deliver tangible economic, social and political benefits, as well as meet key public policy goals.

This report showcases examples from around the world where legislators have been actively involved in developing and implementing projects and legislation that have demonstrated, quantifiable benefits for the environment, the economy, and society. Examples are drawn from Australia, Brazil, Cameroon, China, Denmark, Indonesia, Japan, Mexico, South Africa, Sweden, the UK and USA, as nominated by members of the GLOBE International legislators' network.

Parliamentarians and key experts have added their political insights to these case studies, to demonstrate how these innovative and progressive ideas were developed and implemented. In many cases, difficulties were encountered along the way that had to be overcome. In a way, this report could be considered as the parliamentarians' 'response to TEEB' (the study on The Economics of Ecosystems and Biodiversity).

This document is an 'interim' report. It will be presented to and discussed by parliamentarians at the 'Parliamentarians and Biodiversity Forum' on October 25-26, to be held in parallel with negotiations at CBD COP10, in Nagoya, Japan. At this meeting, legislators will add their insights and ideas to those collected here. The final report, incorporating these additions, will then be released in late 2010.

We hope that this report will demonstrate that legislators are making a difference towards a new, more sustainable world order, and act as inspiration for new initiatives. Here, we provide a short summary of some of the key messages contained within this report.

### Messages for legislators on natural capital

**Nature is a form of capital that provides tangible goods and services that benefit people.** The real economic and social value of natural capital is ignored or underestimated, resulting in ecosystem degradation and loss of valuable services (pp. 2-3).

**Better management of natural capital can buy political capital,** given the level of community interest in environmental issues, and the multiple benefits that can be delivered (pp. 2-3).

**Long-term goals for managing natural capital can be balanced with short-term policy goals** in key areas such as jobs, health, agriculture, defence, energy and water (pp. 4-6).

**All countries can use natural capital to meet economic, social and environment objectives,** through restoration, conservation, and improved management, if initiatives are well-designed and thoroughly implemented (pp. 7-29).

**Strong political leadership by individuals and parties is crucial** to the success of the natural capital approach. In many of the case studies, legislators acted to promote, negotiate and champion legislation, with strong involvement from the public sector and civil society (p. 30).

**Policies on natural capital are most likely to succeed if aligned with other political priorities,** and if they are based on sound scientific and economic evidence, developed through wide consultation, and regularly reviewed and updated (pp. 30-31).

**Community involvement is a key factor in successful environmental management.** Many of the case studies involved extensive community involvement, which often helped to increase participation and political support, allay negative reactions, scale up initiatives, and maximise beneficial outcomes for local people (p. 30).

# Natural capital: The new political imperative

Legislators have the unique responsibility of looking after the national interest by representing their nation's people and holding their government to account. As the impacts of climate change begin to hit home, and with the loss of species and ecosystem degradation occurring at an unprecedented rate, it has become ever more obvious that sustainable environmental management is a key part of securing every nation's future. Legislators have a duty to show the political leadership that is required to address ecological crises in a coordinated and timely manner.

The global economy now consumes the equivalent resources of 1.4 planets, and we are now drawing down on our natural capital <sup>1</sup>. As national economies surpass what are considered to be 'safe' boundaries in the stability of the Earth's natural cycles, we are reminded of our critical dependence on nature.

Across most industries, the private sector and financial markets are fundamentally challenged to rethink their impact on the natural world. The task for governments, political leaders and legislators around the world is even more challenging: to ensure that their country's ecological systems can continue to meet the needs of their populations for shelter, food, water, health and well-being in a rapidly changing future landscape.

This report highlights the role of legislators as stewards of natural capital. Here, we detail political insights from initiatives in 12 countries where legislators have been directly involved in 'investing' in natural capital, through innovative approaches to ecological restoration, conservation, sustainable management, and financing for nature. We hope that the political messages from these examples will help legislators engage effectively with a new agenda for change, which will help to shift economies and societies towards a healthier balance with the natural systems that underpin them.

## What is natural capital?

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We don't often think of nature as a form of capital. However, biodiversity and natural ecosystems provide key goods and services that sustain our economy, and the value of these services has often been taken for granted. 'Natural capital' provides a flow of services that are considered valuable to human society.

Healthy wetlands, for example, provide a natural water purification service, as well as flood protection, carbon sequestration, food products, and much more. The disappearance of a wetland means that these services would need to be replaced by man-made capital - like a water treatment plant. The value of the 'ecosystem service' provided, and the value of replacing this service through man-made infrastructure, gives economists and policy-makers a rough idea of the value of the natural capital that surrounds us.

Although financial values cannot be attached to all ecosystem services, economic valuation frameworks exist for many of them. For example, the ecosystem services provided by coral reefs have an estimated value of \$172-375 billion per annum <sup>2-5</sup>. These services include fisheries, raw materials, storm protection, climate regulation, and tourism.

A nation's economy and wellbeing depends on the services provided by nature. And yet, insufficient political attention is given to ensuring that we are not depleting our natural capital, even though, ironically, its degradation implies that governments will have to spend more money in the future to ensure that ecosystem services are sustained. The hardships faced by the communities living around the shrinking Aral Sea, who once relied on a healthy freshwater ecosystem for their livelihoods, bear testimony to the social, economic and health problems that can ensue if we continue to deplete our natural capital <sup>6</sup>.

If our legislators and policy makers had clearer information on how improved management of natural capital could deliver benefits in key areas of public policy, better decisions would be made. Agriculture, fisheries, forestry, health, and water provision are all intricately linked with the state of our natural capital.

Part of the difficulty with dealing with these issues is related to the short-term nature of political terms, compared with the long-term approaches that are needed to properly manage our natural capital. Therefore, it is critical to demonstrate that environmental policies that achieve long-term sustainability can also deliver short-term, mainstream policy goals.

Today, there are many examples of how legislators, community leaders and entrepreneurs are working in or with governments to create new investment and governance systems that can preserve natural capital as a form of national wealth.

Ecological restoration, innovative legislation on environmental management, and novel ways of incorporating nature into decisions on water management and agricultural productivity are just a few of methods that can have positive returns on financial investment over the long term, given the right conditions <sup>7</sup>.

Governments have a critical role to play in ensuring that such investments are driven forward. Indeed, given the level of interest in the environment in the community, governments that demonstrate forward-thinking, long-term management of natural capital are likely to accumulate substantial political capital. We hope that this report provides inspiring examples of innovative ways that legislators are becoming involved in improving management of our natural capital, and at the same time delivering economic and social benefits to local communities.

**“It is essential that we begin to integrate the true value of natural capital and ecosystem services into policy making processes across government departments. Otherwise, we risk further deterioration that will result in greater cost to our economies.”**

Zac Goldsmith MP, UK member for Richmond Park and North Kingston.

## Achieving public policy goals through nature

Increasingly, governments and businesses are realising that using nature, biodiversity and ecological processes in creative and innovative ways can help achieve major public policy and financial goals. These can range from increasing agricultural output and food security, to providing jobs and a healthier future for communities. Below, we present some examples of how investing in and improving the management of natural capital can have positive impacts on six key public policy areas.

Governments and businesses can choose to 'invest' in natural capital in many different ways. This could include spending money on ecological restoration programmes, 'green infrastructure', promoting sustainable agriculture and forestry, and the management of protected areas. 'Green infrastructure' refers to the use of natural assets, such as mangroves, reed banks, river beds and forests, to fulfil functions that might otherwise be dealt with through more expensive built infrastructure, such as storm walls and water purification plants.

As we realise the enormous impact of the loss of biodiversity on our forests, fisheries, farmlands, waterways and urban areas, programmes that maintain and restore natural capital and ecosystem services will advance up the list of government spending priorities.

### Jobs and the economy

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Under the right conditions, investing in natural capital can provide jobs, promote economic development, and 'capture' the financial value of ecosystem services.

These considerations are as relevant to OECD countries as they are to the developing world. Improving the management of natural capital can have a direct financial impact on local income through payments for ecosystem services, employment income, and the proceeds of tourism. Other economic benefits include increased availability of natural resources such as fish and non-timber forest products, greater availability of water, increased agricultural productivity, and higher property prices.

In South Africa, the large-scale *Working for Water* programme (see page 26) to remove invasive species has provided jobs and training for up to 30,000 people over 15 years. In Namibia, locally-managed, government-sanctioned wildlife conservancies provided over 500 full time and 3000 part-time jobs between 1998 and 2005, with substantial economic benefits to local people <sup>8</sup>. Government payments for ecosystem services (also known as 'PES') schemes have had positive effects on income in parts of rural China <sup>9</sup> and Mexico <sup>10</sup>.

### Agriculture, forests and fisheries

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Improving environmental management has obvious benefits for the agriculture, forests and fisheries sectors. The use of sustainable farming practices on agricultural lands can mitigate against the effects of land degradation, and increase productivity. Australia's Landcare movement has demonstrated that such practices, such as adopting conservative stocking rates, planting trees, protecting remnant vegetation and rotating crops, can lead to more profitable farming, and help guard against the worst effects of severe droughts <sup>11</sup>.

**“Public budgets can be used more efficiently if governments improve how they ‘work with nature’ to advance economic priorities.”**

Patrick ten Brink, Coordinator of the TEEB report for policy-makers.

Over the short term, it might seem more profitable to convert forests to other land uses. However, over the longer term, the loss of forests can lead to a lack timber, fuel-wood and other forest products, as well as depletion of ecosystem services such as erosion control and flood protection. Investing in forest restoration and sustainable forest management can help to restore some of the economic benefits of forests, if well-designed and well-managed <sup>12</sup>. The success of community-based forest management in the Petén region of Guatemala has shown how sustainable management can provide multiple economic, social and environmental benefits <sup>13</sup>.

Although it may at first seem counterintuitive, investing in the creation and management of marine protected areas is increasingly being considered as an important tool in marine fisheries management <sup>14</sup>. Marine protected areas can allow fish populations to recover from exploitation <sup>15</sup>. The overflow effect means that as adult fish leave the protected area, there is a direct benefit to neighbouring fisheries <sup>16</sup>. Globally, the additional catch from restoring fish stocks to health through better management of fishing activity could avert undernourishment and hunger for 20 million people <sup>17</sup>.

## Energy security

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Given the finite reserves of oil and natural gas, and the need for countries to reduce their carbon emissions under international law, natural and agricultural ecosystems will need to provide an increasing proportion of energy supplies. Biofuels and biogas could provide part of the answer to this problem, although strict regulations must be enacted to ensure that the expansion of crops for biofuels does not lead to losses of biodiversity, food insecurity, and a net carbon debt <sup>18-19</sup>.

Investing in genuinely sustainable biofuel and biogas production (such as using waste materials that would otherwise remain unused) can be part of an overall package for achieving energy security.

Other natural assets can provide sources of low-carbon energy, such as wind, wave, tidal and geothermal energy. In coastal and marine areas, if the generation of offshore energy is carefully planned and included within integrated coastal zone management, this can provide a relatively low-environmental impact method of boosting energy security.

## Defence and security

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Scarcity of food and water due to environmental mismanagement can amplify conflict and contribute to instability, although natural resource scarcity is very rarely the sole cause of conflict. Desperation on the part of local fisherman in the face of illegal foreign fishing and toxic waste dumping is thought to have contributed to the rise of piracy in Somali waters <sup>20-21</sup>. Shortages of farmland and land degradation may have contributed to tensions in Rwanda in the 1990s <sup>22</sup>. More sustainable and equitable management of natural resources could help to address the roots of conflict, and offset funds spent on peacekeeping and humanitarian relief <sup>23</sup>.

As water resources becoming increasingly scarce, the potential for conflict over the distribution of water resources along transboundary rivers has been raised as a potential political issue. However, co-operative water management across borders can build trust among neighbouring countries, and prevent conflict <sup>24</sup>. Instances of cooperation among countries that share a river outnumber instances of conflict by about two to one <sup>25</sup>.

## Climate change and water

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Mitigating and adapting to the effects of climate change will be one of the biggest challenges for the 21<sup>st</sup> century. Natural capital and ecosystems will play a key role in both of these tasks. The loss and degradation of tropical forests accounts for 18 to 25% of global greenhouse emissions <sup>26</sup>. 'REDD+' refers to strategies to reduce emissions

from deforestation and forest degradation, combined with enhancement of forest carbon stocks, sustainable management of forests and conservation. REDD+ strategies are a key part of the transition to a low-carbon economy <sup>27</sup>, and are being negotiated under the international climate change convention.

'Ecosystem-based adaptation' centres on maintaining ecological functions across a landscape in the face of climate change, and it can be a cost-effective method for adaptation <sup>28-29</sup>. Strategies can include developing alternative livelihoods and food sources for fishing communities that are reliant on coral reefs, which are threatened by climate change. Another example is increasing agricultural resilience through the use of soil and crop management techniques that make the most of reduced rainfall. Investing in sustainable ecosystem-based management that explicitly considers the local effects of global climate change will soon become central to effective resource management.

Securing sufficient reserves of high quality water will become increasingly challenging under many of the projected scenarios for climate change. Already, between 5 to 25% of global freshwater use currently exceeds renewable supply <sup>30</sup>, and if no new policies on water management are introduced, by 2030 nearly half the world's population could be living with severe water stress <sup>31</sup>. Government-led initiatives on water trading, water law reform, water use efficiency in agriculture and watershed management will be important to ensure continued water availability.

## Health and well-being

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The links between a healthy natural environment and healthy human populations are clear, through the provision of safe drinking water, absence of harmful pollutants, and productive farmlands and fisheries. The condition of the natural environment should be considered as part of the overall health policy, particularly

where land degradation, and pollution of the atmosphere and water supplies have had adverse health effects.

Watershed management and restoration of wetland areas can reduce pollution loads and the incidence of water-borne diseases, which can lead to significant cost savings on expensive water treatment plants. This idea has been famously illustrated by the City of New York's use of the Catskills Mountains watershed as a 'natural' water treatment facility <sup>32</sup>.

There are significant benefits to health and well-being that can be gained through access to natural areas. A recent study found that residents in the British city of Bristol were 24% more likely to be physically active if they had good access to green space. By extrapolation, if it were possible for all households in the UK to have access to green space, this would save an estimated £2.1 billion per year from the health budget <sup>33</sup>.

Running down natural capital can have dire consequences for human health and well-being, particularly in the face of devastating natural disasters. A study including over 50 developing countries showed that the area of forest cover is negatively correlated with flood frequency <sup>34</sup>. Following the devastating 2004 Boxing Day tsunami in south-east Asia, some governments are re-establishing mangrove forests that have the potential to act as a barrier to storm surge <sup>35</sup>.

# Case studies from around the world

The following sections of the report profile a range of responses that legislators have taken to increase investment in natural capital. The approaches range from making payments to communities to manage forested watersheds in Mexico, to incentivising conservation through the taxation system in Brazil, initiating large-scale restoration to combat land degradation in China and Indonesia, and formulating integrated legislative responses to environmental management in Europe.

The case studies in this report were selected with the involvement of parliamentarians from the Global Legislators Organisation, known more commonly as GLOBE. GLOBE consists of senior cross-party members of parliament, drawn primarily from the G20 countries. Membership of GLOBE is open to members of parliament from any country. Recently, GLOBE has expanded beyond its historical emphasis on climate change and energy security to policies related to land use change, marine ecosystem management, the provision of ecosystem services and biodiversity conservation.

GLOBE focal points in ten countries and the European Union were asked to nominate projects or pieces of legislation that embodied the principles of investing in natural capital (see Figure 1). To be considered for inclusion in this report, the case studies had to demonstrate evidence of the environmental, economic and social benefits associated with the project or legislation, and that there was potential for the principles of the approach to be applied in other geographic areas. GLOBE members and experts associated with each of the case studies were asked to provide political insight into the factors that enabled each approach to succeed.

Most of the case studies focus on ecological restoration, ecosystem-based management, payments for ecosystem services, and conservation initiatives. The kinds of policies that are described in the following pages might be seen currently as ‘progressive’, but once the value of natural capital is fully integrated into decision making, these types of approaches could become second nature to policy makers.

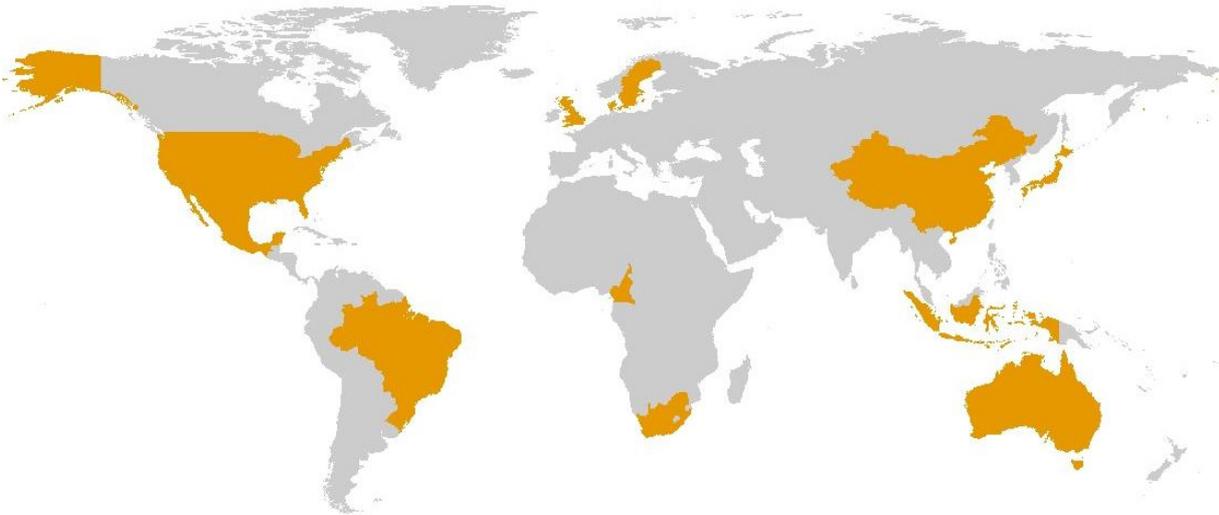


Figure 1: Map showing the countries from which the cases studies are drawn.

## Australia: Managing the Great Barrier Reef

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**The Great Barrier Reef Marine Park was established in 1975. Following the implementation of an ambitious re-zoning plan in 2004, all resource extraction, including fishing, was prohibited across one-third of the park. Evidence suggests that the rezoning has resulted in better protection for a wide range of species and habitats, including more abundant fish populations, a reduction in invasive species, coral recovery and enhanced support for tourism, and commercial and recreational fishing industries. The planning process and successful outcome of the rezoning have influenced marine conservation efforts around the world.**

Australia's Great Barrier Reef is the largest tropical coral reef system in the world (Figure 2). The Great Barrier Reef Marine Park supports a wide range of uses, including marine tourism, indigenous traditional uses, fishing, ports and shipping, and recreation, that together support more than 50,000 jobs and contribute over \$5 billion to the Australian economy every year.

In 1999, the Great Barrier Reef Marine Park Authority (GBRMPA) embarked on a process to develop a new zoning plan, in response to concerns over biodiversity and habitat protection. Scientists advised that unless at least 20 per cent of each habitat could be properly protected, the ability of the ecosystem to remain healthy and productive would be seriously compromised. At the time, highly protected 'no-take' zones occupied less than five per cent of the total area of the park.

The Hon. Professor David Kemp was the Australian federal Minister for Environment and Heritage who authorized the commencement of the public process and had the new Zoning Plan passed through the Parliament in 2003. Reflecting on his experiences, Professor Kemp said, "The rezoning was a complex political task because of the number of industries and communities that could be affected, and the adverse impact of the rezoning on access to a significant portion of the reef for exploitative purposes."

Building political support was crucial to the rezoning programme. This process was greatly aided by the fact that head of the GBRMPA at the time, the late Hon. Virginia Chadwick, was a former New South Wales Cabinet Minister and skilled political negotiator.

When asked to comment on the complexities of the negotiations, Professor Kemp said, "As Minister for the Environment I sought to establish good working relationships with the various industries, and to assure them that their genuine interests would be taken into account. The tourism industry was highly supportive of the rezoning, as the ecological health of the reef was critical to their future. Coastal communities were also generally positive, as they were aware of the value of the Marine Park to their prosperity. The trawling industry presented the most difficult issues because of the size of their capital investment and wide community hostility to the by-catch problems that the industry was seeking to address".

Professor Kemp added the following insights on the benefits of rezoning: "The main benefit of the rezoning has been the improvement in the ecological health of the Great Barrier Reef. Fish populations have increased in the protected zones, and there is recent scientific evidence demonstrating that fisheries benefits are also occurring in the adjacent fished areas through the 'spillover' of adult fish as well as larval

**"Many industries rely on the continued health of the Great Barrier Reef ecosystem, which underpins a significant and growing proportion of Queensland's regional economy."**

The Hon. David Kemp, former Australian Minister for Environment and Heritage (2001-2004)

movement from the adjoining protected areas. Outbreaks of the invasive ‘Crown of Thorns’ starfish plagues have lessened, and the ecological resilience of the area to cope with other pressures has also been increased. Further time is needed to determine the full extent to which the increasing fish populations will provide substantial benefits to the commercial and recreational fishing industries. So far, the results fully justify the rezoning.”

Professor Kemp’s comments are supported by a recent scientific analysis of data on fish populations, which also indicated that expenditure on management and maintenance of the park represents only a tiny fraction of the total revenue generated by reef-based activities <sup>36</sup>.

The role of community involvement in the rezoning and management of the Great Barrier Reef provides interesting insights for legislators. Over 31,000 public submissions were received, making it the most comprehensive process of community involvement in any environmental issue in Australia. The timetable for public consultation was specifically designed to be able to manage intense community interest. Amongst the broader community, there was strong support for increasing the level of protection for the Great Barrier Reef <sup>37</sup>.

Ongoing engagement with the community is key to implementing and enforcing the amended management rules from the new zoning plan. Education is viewed by the GBRMPA as one of the most effective strategies to encourage compliance with the management objectives of the Marine Park, according to Professor Kemp. He added. “Effective protection for the Great Barrier Reef Marine Park requires the support of the community, and can only be sustained if it has political support”.



**Figure 2: Australia's Great Barrier Reef.**

The Great Barrier Reef is a complex system that extends for 2,000 kilometres along the northeastern coast of Australia. The condition of the reef ecosystem is influenced by human activities on land and at sea. This picture, from NASA’s ‘Earth Observatory’, shows part of the southern portion of the reef adjacent to the central Queensland coast.

[earthobservatory.nasa.gov/IOTD/view.php?id=1337](http://earthobservatory.nasa.gov/IOTD/view.php?id=1337)

## Brazil: Tax revenue and ecological criteria

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**Since 1992, a number of Brazilian states have redistributed some of the revenue raised through value-added tax to municipalities according to environmental indicators. This practice was originally intended as a means of compensating municipalities for maintaining protected areas within their territories, rather than as a tool for improving environmental management. However, evidence suggests that the practice has acted as an incentive to set aside new areas for conservation, and improve management of existing protected areas.**

One of the biggest challenges to achieving good stewardship of natural capital is the development of fiscal instruments that can encourage conservation and reward sound environmental management. A number of Brazilian states have done just that by distributing a portion of revenue from value-added tax (known in Brazil as the ICMS or *Imposto sobre Circulação de Mercadorias e Serviços*) revenue to local municipalities, based on environmental criteria.

The ICMS tax constitutes approximately 90% of overall state tax revenues. One quarter of the revenue raised by the ICMS must be allocated by states to local governments. Of this 25%, three-quarters must be distributed in accordance with the share of state ICMS collected from that municipality. States that have an 'ecological ICMS' (often referred to as ICMS-E) redistribute some of the remaining ICMS revenue according to environmental indicators, such as the area of the municipality occupied by protected areas.

Brazil has some of the largest protected areas in the world. Protected areas in Brazil include Indigenous Territories and Conservation Units. Between 2003 and 2009, Brazil was responsible for establishing nearly three-quarters of all protected areas declared across the globe during this period <sup>38</sup>.

Protected areas deliver numerous economically valuable environmental services, as well as strong social benefits for indigenous peoples who are able to maintain their identity and culture through close association with their lands. However, there are also opportunity costs associated with not developing the land.

Following the implementation of stricter environmental legislation in the 1980s, some municipalities in the state of Paraná felt disadvantaged after the area available to agricultural expansion was restricted. They exerted pressure on the state legislature and government agencies for financial compensation. Subsequently, the ICMS-E was developed to give financial compensation to municipalities for the existence of protected areas and other ecological services.

Paraná began operating the ICMS-E in 1992. Other states have since adopted a similar system, including: Minas Gerais, São Paulo, Amapá, Rondônia, Rio Grande do Sul, Mato Grosso, Mato Grosso do Sul, Tocantins, Pernambuco and Rio de Janeiro. Santa Catarina, Espírito Santo and Goiás have drafted ICMS-E legislation; and Amazonas, Bahia and Ceará have submitted ICMS-E legislation to their respective state legislatures. See Figure 3 for a map of states currently with and without ICMS-E.

**“Services rendered by natural ecosystems are numberless, including the maintenance of the hydrological cycle, soil regeneration and protection, nutrient recycling, and the preservation of species that are critical to food security, medicine and industry.”**

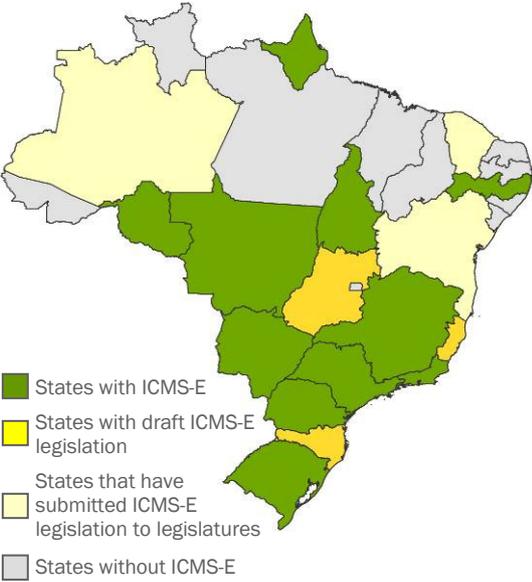
Representative Rebecca Garcia, member of the Brazilian Federal Parliament.

Each state decides on the ecological indicators to be used, as well as the overall proportion that should be distributed. There are no limits placed on how municipalities use the ICMS-E, which is handed over as a 'lump sum'. For example, in the municipality of Ilha Grande, in Paraná, ICMS-E resources are used for numerous activities in the community, including drilling of wells for drinking water, maintenance of seedling nurseries, cleaning and landscaping of urban areas, construction of industrial facilities, garbage collection, landfills, environmental education, enforcement of land use controls, and all the costs required to maintain Ilha Grande National Park <sup>39</sup>.

Although it was not originally designed as a tool for improving environmental management of protected areas, evidence suggests that the ICMS-E has acted in many cases as an incentive to establish new protected areas, and improve management of existing protected areas. There is also evidence to suggest that the introduction of ICMS-E has changed the way land managers view protected areas <sup>40-41</sup>. Instead of seeing protected areas as an obstacle to development, they are now seen as an opportunity to generate revenue <sup>41</sup>.

In the state of Paraná for example, the area of conservation units grew by 165% in the nine years following the introduction of ICMS-E in 1992 <sup>39</sup>. In 2000 alone, over one million hectares of land were declared as new conservation units in Paraná <sup>39</sup>, an area slightly smaller than the island of Jamaica.

Representative Rebecca Garcia, Member of the Federal Parliament of Brazil, said, "The success achieved with ICMS-E in the state of Paraná, measured by the increase in protected areas and increased income in municipalities with extended protected areas, has definitely influenced other states to adopt similar mechanisms".



**Figure 3: Uptake of ICMS-E in Brazil**

The popularity of ICMS-E has been gathering within Brazil since Paraná became the first state to adopt ICMS-E legislation in 1992. Source: Ring (2008).

It should be noted that it is not only the ICMS-E that is related to an increase in protected areas; other government policies are also at play. Further, not all municipalities with conservation areas benefit equally from ICMS-E <sup>39</sup>. In Rondônia, for example, the ICMS-E did not have such strong positive effects. Due to the way that revenues were distributed, it adversely affected poorer municipalities without conservation units, or with only small protected areas <sup>42</sup>.

The ICMS-E is strongly supported by Brazil's Federal Environmental Ministry. One of the key advantages for implementation of the ICMS-E is that it has very low transaction costs. It has been designed to build on an existing mechanism for transferring money between states and local municipalities <sup>41</sup>. Brazil's ICMS-E has been profiled in many international fora. It has even been advanced as a blueprint for distributing funds to developing countries the world over for efforts to conserve biodiversity and ecosystem services <sup>43</sup>.

## Cameroon: Restoration for rural livelihoods

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**More than 200,000 people use the resources of the Waza Logone floodplain in northern Cameroon for fishing, dry season grazing and agriculture. Since the early 1990s, the Government of Cameroon has been working to reverse the adverse impacts of the Maga Dam, constructed across the floodplain in 1979. Cost-benefit analyses show that ecosystem restoration, if delivered at a large scale, would have multiple long-term economic and social benefits, as well as benefits for wildlife and wetlands. However, securing funding to expand the restoration programme has proven extremely challenging.**

Covering an area of approximately 8,000 km<sup>2</sup>, the Waza Logone floodplain is one of the largest wetlands in the West African Sahel, and forms part of the Lake Chad Basin. The high productivity of the floodplain relies on seasonal flooding following wet season rains. The water-soaked soil allows grasses to grow well into the dry season, forming an important source of feed for graziers, and inundated areas provide fish and other food items.

The Waza Logone region faces serious problems of food security. The Maga Dam was built to increase food security by providing water for irrigated rice cultivation and year-round fishing. However, dam construction was carried out without considering environmental impacts. A period of dry years, exacerbated by the presence of the dam, reduced the flow of water to the floodplain, with negative consequences for the people living downstream. Many difficulties arose among local communities over sharing access to the limited water and other resources of the floodplain. Those affected by the altered hydrology of the floodplain include some of the poorest and most vulnerable people in the region <sup>35</sup>.

When the Government of Cameroon became aware of the ecological, hydrological and social impacts of the irrigation project, it “understood the necessity of being aware of environmental aspects in investing in development”, said Hon. Amadou Adji, a Cameroonian legislator from the region. This led to the Waza Logone Project, a collaborative effort undertaken with the International Union for the Conservation of Nature (IUCN) and other partners, to restore the hydrological regime on which the region depends,

and resolve some of the conflicts over access to resources. The intention of the project was not to restore the floodplain to its original state, but rather to try and strike a better balance between environment and development.

Trial releases of dammed water to recreate seasonal floods were a key part of the Waza Logone project. Results from 1994 and 1997 indicated improvements in perennial grass cover, wild herbivore populations, fishing yields and livestock production <sup>44</sup>. Based on the trials, three possible options for large-scale water release were developed <sup>45</sup>. Cost-benefit analyses indicated that implementation of any of the three options would lead to significant net economic benefits for local people, as recently highlighted in the TEEB study <sup>35</sup>.

**5 years**

The time that it would take to recoup the initial costs of restoring the flooding regime in the Waza Logone region

**US\$2.3 million**

The annual net livelihood benefits for local people in the Waza Logone region from floodplain restoration activities

Source: Loth (2004) <sup>46</sup>. TEEB (2009) <sup>35</sup>

Despite these impressive figures, no further large-scale donor funding has been forthcoming. In Cameroon, donors tend to fund forest-related projects, and overlook opportunities to fund sustainable development in other ecosystems <sup>47</sup>. This is despite the fact that funding restoration projects could have significant flow-on effects, because it would likely have a positive impact on Lake Chad. Water levels in Lake Chad have reached an unprecedented historical low, as a combined result of overgrazing, upstream water diversion for dams, water withdrawal and climatic variation <sup>48</sup> (see Figure 4). The shrinking of Lake Chad has had serious consequences for the estimated 22 million people living in the area <sup>49</sup>.

Aside from a dearth of funding to continue the Waza Logone project, the continued resilience of the region's ecosystems and agricultural systems is threatened by climate change. Since the 1970s, there has been a trend towards reduced annual rainfall across the Sahel <sup>46</sup>. Crop production in the Waza Logone area is already challenging, with reports that production of common crops may fail once in every three years. Facilitating adaptation to the effects of climate change, altered hydrology and reduced rainfall will be crucial to development and agriculture strategies in the area.

In the Waza Logone region, investing in ecological restoration and sustainable resource management is now considered as a central part of development planning because it is seen by legislators and community leaders as vital to the continued social and economic development of the area. International donors would do well to consider how investing in natural capital can help to meet social and economic outcomes.



**Figure 4: The changing face of Lake Chad.**

The Waza Logone floodplain region, shown as the elongated green area in the lower half of this satellite image, forms part of the Lake Chad basin (in the upper half of the image). The Maga Dam can be seen as a small crescent shaped grey patch in the image. Changing climatic conditions, water extraction, vegetation removal and grazing have changed the size of Lake Chad over the last fifty years. The lake's former extent can be seen by the green areas of vegetation and rippled brown and green areas; open water now occupies a small area in the southeast portion of the lake (visible as grey-green in colour).

[earthobservatory.nasa.gov/IOTD/view.php?id=1877](https://earthobservatory.nasa.gov/IOTD/view.php?id=1877)

**“Investing in this area by taking advantage of the lessons learnt by former interventions can be a good way to show the international community the necessity of maintaining natural capital”.**

Hon. Amadou Adji, Cameroonian legislator from the Waza region.

## China: Government incentives at scale

**The Chinese government has initiated some of the largest ecosystem restoration and land rehabilitation programmes in the world. Many of these programmes were developed in response to severe impacts on rural and urban dwellers from deforestation, desertification, soil erosion, river sedimentation and flooding. The Sloping Land Conversion Programme is one of the largest, and has so far enrolled around 23 million hectares of land for afforestation.**

China's vast interior has supported productive agriculture for millennia. However, in recent decades, expansion and intensification of agricultural activity has contributed to land degradation and soil erosion, which has affected crop yields, water quality, and human well-being. For example, the incidence of dust storms increased from once every three decades before 1949, to almost once per year from 1990 onwards<sup>50</sup>. Severe dust storms can bring Beijing to a standstill, erode topsoil, and can have serious health impacts. Greater frequency and intensity of dust storms has been partly attributed to deforestation<sup>50</sup>.

Over the last two decades, policy makers in China have taken a lead in developing novel approaches to environmental policy that can help to address the challenges of limited availability of arable land, environmental degradation and rapid economic growth<sup>51</sup>. These policy approaches have included some of the largest land restoration and reforestation programmes in the world.

Already, China has invested more than \$90 billion on planned public payment schemes and market-based programs for ecosystem services, with rapid growth over the past decade<sup>51</sup>. A key element that runs through many of the schemes is the use of public money to pay farmers to retire cropland and plant trees and other vegetation.

Almost all of China's 'eco-compensation' schemes have been developed and funded within China. With the exception of a few projects, such as the World Bank's 'Loess Plateau Rehabilitation Project', there has been relatively little international involvement<sup>51</sup>. All levels of government, from local to provincial to

national, have been involved in designing programmes with elements of payments or markets for ecosystem services that suit local needs and draw on various funding sources.

In China, food security is an enormous challenge. Despite this, China has initiated the Natural Forest Protection Programme, an element of which is the Sloping Land Conversion Programme (SLCP), to convert farmland on sloping land back to forests. The SLCP, also known as 'Grain for Green' is the most well known of China's large restoration programmes.



**Figure 5: Scale of the Sloping Land Conversion Programme in China**

The SLCP has a broad geographic reach across China, operating across 25 Chinese provinces. The provinces where SLCP currently has a presence are marked in green in the map above. Information from Liu et al. (2008)<sup>52</sup>.

The SLCP is the largest land retirement and reforestation programmes in the world, and has arguably been seen as a blueprint for national-level land conversion and payment schemes in China. It aims to reduce rural poverty by promoting a shift to sustainable production, through direct payments to rural landowners to plant trees and grass on farmland located in sloping and marginal areas.

Originally designed to reduce sediment loads in the Yangtze and Yellow Rivers, today the SLCP programme spans 2,000 counties in 25 Chinese provinces (Figure 5). So far, around 23 million hectares of land have been enrolled for afforestation, involving 32.5 million rural households. There is evidence to suggest that the programme has had a positive impact on cropping, livestock assets and total income <sup>52-53</sup>. Notable positive environmental outcomes include reduced surface runoff and soil erosion, reduced soil nutrient loss and increased vegetation cover.

The Sloping Land Conversion Programme has had a large impact on policy in China since it was launched in 1999. The development of this programme was strongly rooted in several successive ecological disasters, which prompted the government to implement more decisive, forceful and far-reaching measures than those that had previously been adopted <sup>54</sup>.

China's efforts to restore natural capital lost through decades of over-use of forests, farmlands and waterways hold many lessons for legislators from around the world. In China there is now a vast wealth of knowledge on how to design and implement large-scale payments for ecosystem services, which could be very helpful for other countries in similar situations.

Finally, the success of restoration and reforestation programmes in China has impacts that reach beyond the country's borders. As vegetation cover increases across China, uptake of carbon from the atmosphere is enhanced, and there is also a reduction in air-borne dust from the erosion of topsoil <sup>52</sup>. These effects demonstrate the increasing 'globalisation' of environmental issues.

## Facts and figures on China's Sloping Land Conversion Programme

### **\$US 50 billion**

Total budget of the programme, an amount greater than the annual GDP of over 100 countries.

### **9.3 million hectares**

Total area of cropland enrolled, which would cover all of Portugal.

### **13.6 million hectares**

Total area of 'wasteland' afforested - an area the size of England.

Source: Bennett (2009) <sup>51</sup>

## Denmark: From farmland to National Park

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**Denmark's Skjern River valley was extensively drained during the 1960s to reclaim land for farming. By the 1980s, the Danish Parliament recognised that farming on these lands was a marginal activity, and that the downstream estuarine region was suffering from high nutrient loading and declines of economically-important fish species. Since completion of restoration works in 2003, a wide variety of economic, social and environmental benefits have been measured. The area was nominated for consideration as a National Park in 2008.**

The ecosystems of northern Europe have undergone significant modification through millennia of human habitation and agricultural development. Clearing of native vegetation, draining of wetlands, and straightening of river courses have altered natural capital and changed the flow of environmental services in many areas. Many policy makers now realise that carefully designed ecological rehabilitation programmes can restore some of this natural capital and associated ecosystem services.

Danish legislators have long acknowledged the role of ecosystem restoration in meeting multiple policy goals. Between 1989 and 2004, about 10,000 ha of wetlands were restored in Denmark. In 1987, a parliamentary directive was issued with the aim of restoring economically unsustainable marginal agricultural lands back to their natural ecological state. The Skjern River valley was chosen as the 'headline' case <sup>55</sup>.

The lower section of the Skjern River valley was extensively drained during the 1960s to reclaim land for farming. However, by 1983, the Danish Parliament recognised that the farms of the area were declining in productivity and would eventually prove economically unsustainable. Further, the Ringkøbing Fjord was suffering from high nutrient loading and declines in economically important fish species.

The Hon. Steen Gade MP, Chairman of the Environment Committee in the Danish Parliament, shared his insights on the legislative process for the restoration works. According to Steen Gade, the Skjern River restoration programme was put forward largely as a nature project, emphasising the need to return the river to its natural state. Additionally, the proponents argued that agriculture would not be profitable in the future, and that river restoration could allow the development of tourism based on fishing.

Initially, there was opposition to restoration from farmers and other groups, just as there had been opposition to the original plans to reclaim land for farming in the 1960s. Key issues included concerns over an adequate level of compensation, and concerns over public access to the restored lands. There was support from some farmers, who preferred to be compensated by the government earlier, rather than later, after agricultural productivity had irreversibly declined.

"If we had known then what we know today about the economic and social benefits that restoration of the river would provide, perhaps it might have been easier for the local community to embrace the plans," commented Steen Gade. Meetings with local representatives took place over several years, during which time community attitudes towards the plan changed substantially. Eventually, restoration works began in 1998.

**"We can use natural processes to reduce the amount of nutrients, sediment and pollutants entering our waterways. Conservation and restoration of natural areas will help us fulfil our obligations under the Water Framework Directive, and provide benefits for nature."**

The Hon. Steen Gade MP, Chairman of the Environment Committee, Danish Parliament

Since completion of the restoration works in 2003 (see Figure 6), a wide variety of economic, social and environmental benefits have been measured, including saved pumping costs, reduced nutrient loading in the estuary, improved water quality, re-establishment of bird habitat and fish spawning grounds, increased outdoor recreation and improved land allocation<sup>56-57</sup>. The total cost of the restoration programme, much of which was funded by the Danish Government, was approximately \$42 million, while the total benefits have been estimated at \$83 million.

A new process for the area is now underway. Based on successful conservation outcomes, the area was nominated for consideration as a National Park in 2008. The local community and farmers are once again involved in discussions with management authorities, local and national politicians as to how farming activities can be incorporated within and around the proposed National Park boundaries.

Lessons from the Skjern River experience have been applied throughout Denmark. Follow-up projects have generally been at a much smaller scale. Securing funding for nature restoration has become difficult in light of changing priorities for governments. However, there has been much work on freshwater ecosystems in Denmark related to the EU's Water Framework Directive (WFD), including the large-scale pilot study for the Odense River Basin<sup>58</sup>.

Under the WFD, all EU states must achieve 'good' ecological and chemical status for surface water systems by 2015. In Denmark, there has been a focus on reducing eutrophication, a process that occurs when excess nutrients from fertilisers and runoff enter waterways, promoting the growth of algae and phytoplankton, which in turn reduces the amount of oxygen in the water column for other forms of life. Nature conservation and restoration have a key role to play in promoting better water quality in Denmark's rivers and estuaries.



**Figure 6: Transformation of the lower Skjern River**

The satellite images above, both from Google Maps, illustrate how the course of the Skjern River changed following restoration works. In the upper photo, the straightened, channelled sections of the waterway are clearly visible. In the lower photo, the straight stretches have been converted back to their natural, meandering state.

## Europe: Managing coastal zones

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**One third of the European Union's population lives along on the coastline, with maritime regions accounting for over 40% of Europe's GDP. A large proportion of the European coastal zone is considered at risk from multiple anthropogenic pressures and impacts. The European Parliament and Council Resolution on the implementation of Integrated Coastal Zone Management (ICZM) was adopted in 2002, and was intended to guide member states in formulating ICZM strategies. The UK and Sweden have now passed legislation on ICZM within new national marine policy frameworks.**

The coastal areas of Europe have come under enormous pressure from human activities such as agriculture, fishing, tourism and urban development (see Figure 7). There have been suggestions at the highest political level that the chronic degradation of European coastal areas is a direct result of a lack of coherent, co-ordinated policies for coastal activities<sup>59</sup>.

In 2002, the European Parliament passed a resolution on Integrated Coastal Zone Management (ICZM). The resolution encourages an ecosystem-based approach to coastal management that recognises that terrestrial, coastal and marine zones are interdependent, and that natural boundaries do not always coincide with political boundaries. Above all, it is intended to provide a framework for European nations to redesign their coastal policies to take a broader, cross-sectoral approach to management. The UK and Sweden are two countries that have recently passed legislation closely tied to the ICZM resolution.

### United Kingdom

The UK marine sector represents nearly 7% of the whole economy, providing around 890,000 jobs in areas such as fisheries, aquaculture, shipping, research, oil and gas production, and renewable energy. The UK has 20,000 kilometres of coastline, providing habitat for a diverse array of marine species and habitats.

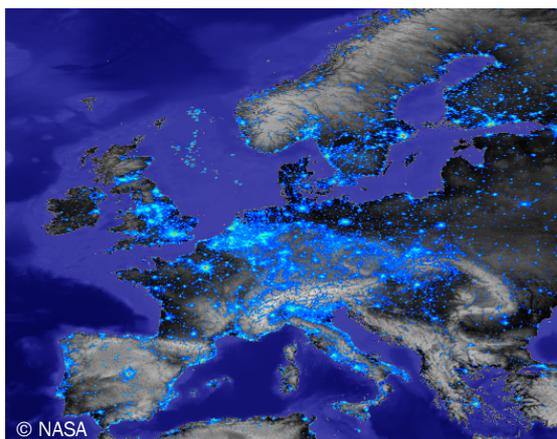
Recognising the need to have a coherent approach to coastal planning and management, the Marine and Coastal Access Act became law in 2009. One of the key components of the Act is a Marine Policy Statement, which is currently in

development. The Statement will provide the strategic framework for all future marine plans.

New marine plans will be developed by the new Marine Management Organisation, and will provide guidelines for industries and developers about where various activities will be allowed to take place. The new marine planning system is designed to bring together environmental, social and economic considerations.

An extensive consultation period has begun on the boundaries of marine plan areas and on the location of Marine Conservation Zones. Lord Hunt of Chesterton, member of the UK House of Lords, commented that, "Community awareness of and involvement in the planning process, and in data collection, is important for successful implementation and science-based decision-making." This inclusive approach is also important in alleviating potential public and commercial opposition to the marine planning proposals under the Act.

The new UK marine planning system is not only expected to provide better environmental protection, but it is also expected to deliver substantial economic benefits. An initial government impact assessment estimated that the annual value of environmental benefits associated with implementation of the act would be between £749 million to £1.6 billion, for English inshore and UK-wide offshore areas<sup>60</sup>.



**Figure 7: Europe by night**

This composite image of Europe by night shows the intensity of light emissions from major population centres. In many parts of Europe, particularly around the Mediterranean and Baltic Seas, the coastline is highlighted by a dense line of settlements.

[earthobservatory.nasa.gov/IOTD/view.php?id=981](http://earthobservatory.nasa.gov/IOTD/view.php?id=981)

## Sweden

With one of the longest coastlines in Europe and an archipelago of tens of thousands of islands, Sweden has an ancient maritime history. Eutrophication, heavy fishing pressure and pollution have had a major impact on the Baltic Sea. The current Swedish Environment Minister Andreas Carlgren noted: “The world’s richest nations should not have one of the world’s most polluted inland seas off their coasts”.

The Coherent Swedish Maritime Policy, established in 2009, is intended to provide a pathway for the sustainable development of Sweden’s marine and coastal industries. With 40% of the Swedish population living within five

kilometres of the coast and coastal tourism accounting for an estimated 71,000 jobs <sup>61</sup>, the health and productivity of Sweden’s marine environment is vital to the national economy.

The policy is guided by the principle that an ecosystems-based, holistic maritime policy will provide more potential for the sustainable use of the sea, generate synergies between different activities, and reduce conflicts over resources. A new agency has been established for marine activities, similar to the UK’s MMO. Other key elements of the policy focus on encouraging strategic regional and cross-sectoral co-operation, the development of a sustainable fisheries sector, and measures to address coastal pollution.

The marine environment is considered to be the highest priority environmental issue, next to climate change, by the Swedish government. The government’s first step in addressing this issue was to appropriate new funds for the marine environment within the budget, making available around \$190 million for restoration, research, and measures for environmental improvement between 2007 and 2012 <sup>62</sup>.

The Coherent Swedish Maritime Policy is very recent and implementation is yet to be fully rolled-out. However, Sweden is already pushing ahead with implementation of the regional integrated approach through the EU Strategy for the Baltic Sea Region, which outlines a strategy for regional cooperation on marine resource issues. Sweden’s new policy will contribute to a more rationalised and sustainable approach to European marine environment policymaking.

**The Swedish Maritime Policy provides model legislation for other EU nations to replicate. With almost half of Europe's population living within 50 km of the coastline it is imperative that a holistic approach is implemented, as demonstrated by Sweden, incorporating the objectives of sustainable resource use and ecosystem based management to safeguard the future integrity and resilience of our marine waters.**

**Sofia Arkelsten MP, Swedish Parliament**

## Indonesia: Reducing carbon emissions

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**The extensive forest peatlands of central Kalimantan suffered severe degradation in the 1990s during the drive to convert these lands for the production of irrigated rice, making them highly susceptible to damaging wildfires. Carbon emissions from peatlands are now thought to contribute up to half of all of Indonesia's greenhouse gas emissions. Since 2007, the Indonesian government has been working in partnership with the Australian government and others to restore and rehabilitate sections of these peatlands through the Kalimantan Forests and Climate Partnership.**

Kalimantan has extensive areas of tropical peatlands. These unique ecosystems provide a range of ecological goods and services, including water catchment for drinking and irrigation, carbon sequestration, food, shelter, medicine and cultural values for indigenous communities, and habitat for plants and animals.

The forest peatlands of central Kalimantan suffered severe degradation in the 1990s during the drive to convert these lands for the production of irrigated rice, making them highly susceptible to damaging wildfires. Fires occur every year in the dry season, from August to December (Figure 8). These fires are caused mainly by land-clearing and other agricultural activities. Fires can escape control, and burn into adjacent forests and thick layers of peat. Once alight, peat can smoulder for weeks or even months at a time, causing severe health problems related to smoke and haze.

Carbon emissions from peatlands are now thought to contribute up to half of all of Indonesia's greenhouse gas emissions. One analysis estimated the amount of carbon emitted during the devastating peat and forest fires across Indonesia during the El Niño event in 1997 was equivalent to 13–40% of the mean annual global carbon emissions from fossil fuels in that year<sup>63</sup>.

The Indonesian government has recognised the seriousness of this issue and has taken important steps to rehabilitate this vital ecosystem. Since 2007, the Indonesian government has been working in partnership with the Australian government and a consortium of non-government organisations,

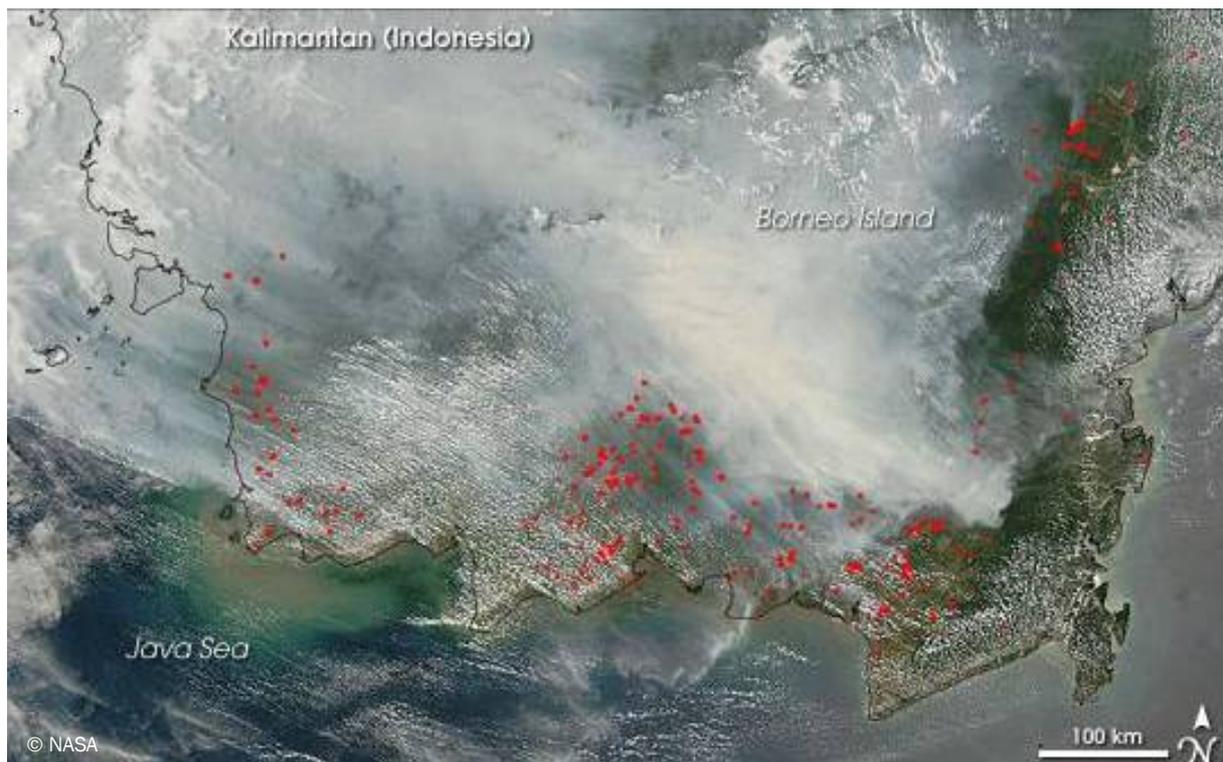
universities, private sectors and local communities to restore and rehabilitate sections of these peatlands through the Kalimantan Forests and Climate Partnership. Australia has committed \$29 million over four years towards the Partnership.

The aim of the Kalimantan Forests and Climate Partnership is to preserve up to 70,000 hectares of Kalimantan's peat swamp forests. In addition, over the long term it aims to restore 200,000 hectares of degraded peatland through re-flooding and reforestation. To give a sense of scale, the Mega Rice project involved draining around 1.4 million hectares of peatlands.

The Kalimantan Forests and Climate Partnership is one of the first large-scale REDD+ demonstration activities in Indonesia, and the first in tropical peatland anywhere in the world<sup>64</sup>. Subsequently, Indonesia and Australia have signed a second partnership agreement to tackle deforestation in Sumatra, under the Sumatra Forest Carbon Partnership.

The lessons learnt through the work of the Kalimantan Forests and Climate Partnership will inform the design of REDD+ programmes elsewhere in Indonesia, as the world prepares for a future regime of international trading in forest carbon offsets. The Partnership's activities include developing methodologies for restoration, piloting activities, undertaking carbon stock assessments, improving forest governance and monitoring. There will be opportunities for forest-dependent communities to receive payments for maintaining intact forest cover under the national REDD+ system.

The work of the Partnership also complements other initiatives by the Indonesian Government to protect and rehabilitate the peatlands of Kalimantan. This includes Presidential Instruction No.2/2007 on rehabilitation of the Ex-Mega Rice Project area, and the “Heart of Borneo” initiative with the Governments of Malaysia and Brunei Darussalam. In May 2010, Indonesia announced that there would be a two-year moratorium on issuing new permits to convert natural forests or peatlands to other land uses.



**Figure 8: Fire and haze over Kalimantan**

This image of fire (red dots) and smoke over the island of Borneo was captured in October 2006. Fires occur every year in the dry season, from August to December. These fires are caused mainly by land-clearing and other agricultural activities. Fires can escape control, and burn into adjacent forests and thick layers of peat. Once alight, peat can smoulder for weeks or even months at a time, causing severe problems of smoke and haze.

[earthobservatory.nasa.gov/NaturalHazards/view.php?id=17363](http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=17363)

## Japan: Legislation on restoration

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**In Japan, nature restoration is a daunting task because of high human population density, urbanisation and challenging environmental conditions. Despite these challenges, 23,000 river restoration projects were completed in Japan between 1990 and 2004. Japan is one of the few countries in the world to have introduced legislation on restoration, through the Law on the Promotion of Natural Restoration. Japan's work on nature restoration has to date received relatively little profile in the international sphere.**

The Japanese archipelago is recognised as a global biodiversity hotspot. Because much of Japan is covered in mountains and forests, coastal areas and river valleys have experienced intense pressure for conversion to agriculture and urbanisation. Just under half of Japan's population live on floodplains, which represent 14% of the total land area. Japanese rivers have been heavily affected by canalisation, isolation from floodplains, flow regulation, exotic species, and urbanisation <sup>65</sup>.

At its widest point, Japan is just 300 kilometres wide. Owing to its geological youth, Japan is endowed with mountains, volcanoes, steep slopes and fertile floodplains. Japan's unique topography and monsoon climate with intense seasonal rainfall means that many rivers in Japan are short, steep, fast flowing and 'flashy'. Typhoon damage, mudslides, landslides and floods are common. Annual flood damage in Japan is amongst the highest in the world.

### **\$US 1.2 billion**

The amount spent by Japan's River Bureau on river conservation and rehabilitation in 2004.

### **\$US 5.4 billion**

The average annual cost of flood damage in Japan between 1994 and 2003.

### **60%**

The proportion of Japan's wetland area that has been lost since the Meiji Restoration in 1868.

Today, only 3 out of Japan's 109 major river systems remain free-flowing. River restoration in Japan is related not only to a desire to restore the ecological integrity of river ecosystems, but also to the strong need to improve water quality and protect people and property from floods <sup>65</sup>.

Japan's first River Law was passed in 1896, after a series of devastating floods propelled flood protection to the forefront of government concerns <sup>66</sup>. Between 1945 and the early 1970s, Japan's rivers went through a period of intense development associated with flood control works and rapid urbanisation. As an energy crisis took hold in the early 1970s, people began to once again to appreciate the value of natural landscapes and their role in well-being <sup>66</sup>.

According to the Hon. Shuichi Kato, Japanese MP and Acting Chairman of GLOBE Japan, another major reason for increased awareness of nature conservation was because the Japanese people faced issues of environmental damage, including four major pollution-related diseases.

In 1990, Japan's River Bureau launched an initiative to conserve and restore river corridors, which was known as 'Nature-oriented River Works' <sup>66</sup>. The number of river restoration programmes climbed steadily, reinforced by an amendment to the River Law in 1997. Under this amendment, 'conservation and improvement of the river environment' became one of the principal goals of the law <sup>66</sup>. Between 1990 and 2004, more than 23,000 Nature-oriented River Works were carried out in Japan <sup>66</sup>.

Japan created a new National Biodiversity Strategy in 2002. This strategy included nature restoration as one of the main themes. In response, the 'Law for the Promotion of Natural Restoration' was passed by the Japanese Diet in January 2003. The law on restoration aims to recover lost or degraded ecosystems, to implement conservation and the restoration or creation of natural spaces, and to manage such natural environments.

There were some difficulties associated with the passage of the legislation. The opposition party pushed strongly for cuts in spending on public works. “As a result, the government cancelled 255 public works projects,” commented Shuichi Kato. “At the same time, the Ministry of Land, Infrastructure, Transport and Tourism positioned nature restoration projects as the new public works projects of the 21<sup>st</sup> century, and the River Bureau expressed their intention to expand the budget for nature restoration projects”, he said. Careful negotiation and detailed explanations of nature restoration projects eventually led to the successful passage of the legislation.

Japan's Law for the Promotion of Natural Restoration encompasses all the ecosystems of the archipelago, from kelp forests to coral reefs, forests, tidal flats, wetlands and grasslands. The Natural Restoration Council has implemented 22 projects around the country based on the law. Some examples include restoration works on the Arakawa River, Tama River, the oak forests of Musashino, and the Sekisei coral lagoon. Funding comes mainly from public works expenditures of several national ministries, with some local government contributions.

The appreciation of nature is deeply ingrained within Japanese culture. “The psychological attitude of trying to live with nature rather than fighting against and overcoming nature dates back to the Nara and Heian eras several hundred years ago when people cherished all aspects of nature,” said Shuichi Kato.

Community groups and small non-government organisations are heavily involved in ecological restoration in Japan <sup>65</sup>. Community groups are often involved in planning and decision-making, and many restoration activities take place at a very local scale. In many ways, restoration in Japan could be considered a ‘grass-roots’ activity that is supported at a higher level by national legislation on restoration.

The Law on the Promotion of Natural Restoration must be seen in the context of numerous other Japanese laws related to the environment and natural capital. Relevant laws include the River Law, Invasive Alien Species Act, Landscape Law, Urban Green Space Conservation Law, Natural Parks Law, and Natural Environment Protection Law. “We need to re-evaluate legal systems based on the perspectives of natural capital”, said Shuichi Kato, “but domestic policies alone will not be sufficient to achieve our goals”. Through their actions and legislation, the people and parliamentarians of Japan have recognised the importance of sustainable environmental management to the future of their country.

**“Since Japan has limited habitable areas, we need to protect the environment. We intend to use nature conservation to prevent disasters.”**

The Hon. Shuichi Kato, Japanese MP and Acting Chairman of GLOBE Japan

## Mexico: National payments for ecosystem services

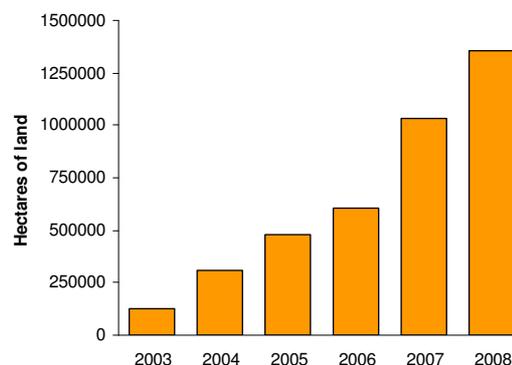
**The Mexican government currently supports one of the largest national payments for ecosystem services programmes in the world. Payments are made to local communities and landowners for hydrological services, biodiversity and agroforestry. The hydrological component of the programme uses a fee charged to large non-agricultural water users to pay forest owners to protect natural forests. In 2008, the programme paid close to \$8.4 million to landowners, individuals, and communities, protecting around 324,000 ha of land.**

Mexico faces problems of severe water scarcity and high rates of deforestation <sup>67</sup>. As part of a broader policy response to address these issues, in 2003 the Mexican government initiated a programme of payments for hydrological services, known as PSA-H. This programme was based on paying individuals and local communities to conserve natural forests that would otherwise have been converted to alternative land uses. In Mexico, around 70% of forest lands are communally owned.

In 2004, another programme of payments for carbon sequestration, biodiversity conservation and agroforestry services (known as PSA-CABSA) was established to complement PSA-H. However, direct payments for carbon sequestration have ceased to exist <sup>68</sup>, largely because of a lack of technical capacity to design forestry carbon projects that met the necessary requirements of additionality, permanence and leakage <sup>69-70</sup>. The hydrological services component is the largest part of the programme, and the most popular. The agroforestry component predominantly supports shade-grown coffee farming.

Funding for the PSA-H is provided largely through a fee charged to water users. Payments are made directly to landowners with forests on their land that are in good condition. This creates a link between the providers of environmental services (land stewards), and those who benefit from them (water consumers) <sup>67</sup>. Additional support is provided via grants from the Global Environment Facility and the World Bank.

A key factor promoting the uptake of payments for hydrological services is a general belief held across many sectors of Mexican society that there is a link between forest conservation and water quality and quantity <sup>67</sup>. This broad-based community support comes from many quarters, including urban professionals and public officials to smallholder farmers and local environmental groups. Interestingly, scientific evidence presents a far more complex picture of the link between forest cover and water availability <sup>67</sup>.



**Figure 10: Growth of the area covered by payments for hydrological services.**

The graphic above shows the cumulative area of forested land enrolled in the Mexican payment for hydrological scheme (PSA-H) from 2003 to 2008. Over this same period, annual federal funding for the programme increased from \$16.9 million in 2003 to a peak of \$65 million in 2007.

Source: McAfee and Shapiro (2010) <sup>71</sup>.

Local communities have been heavily involved in the design and implementation of the programmes. Indeed, one of the major reasons for expanding payments beyond hydrological services was because of lobbying by community organisations for greater recognition of their role in sustainable land management, which reaches beyond simply protecting forests <sup>10</sup>. As the programmes have evolved over time, so has community involvement.

The structure of payments and procedural rules have also evolved over time. In the first phase of the hydrological services programme, which ran for five years, there were two set levels of payments per hectare, with a greater amount paid to stewards of montane cloud forest. Investigations into the first phase of the programme found that payments were not always targeted towards areas at highest risk of deforestation, or where there would be greatest benefits to water supply from modified behaviour.

During the next phase of the programme, selective targeting of areas will assume a higher priority. According to José Carlos Fernández, Director of the International Affairs and Finance Unit at the National Forestry Commission, over time it is likely that there will be fewer communities benefiting directly from national PES programmes, but they will receive higher prices in exchange for more precise and demanding forest management and conservation practices.

The payments made to communities and families have provided financial benefits, and there is evidence to suggest that the national PES schemes have played a role in poverty alleviation <sup>10, 67, 72</sup>. Over time, the poverty alleviation component has come to play an increasingly greater role in national payment for ecosystem services programmes.

There is very strong support for Mexico's PES programmes at federal level, and increasingly at state level and across civil society organisations <sup>68</sup>. According to a recent report, President Felipe Calderón named payment for ecosystem services as one of his top 10 priorities <sup>10</sup>.

Mexico's national programme of payments for environmental services has served as an example to other countries of what can be achieved through federal investment in natural capital. They have evolved substantially through time in response to community involvement, political priorities monitoring of conservation outcomes, and advice from scientists and economists.

There are many lessons from Mexico's experience that are highly relevant to other countries that have, or will, set up initiatives based on financial transfers to land stewards to promote sustainable land management. The challenge now is to evolve this government-financed programme into a market-based scheme, where the direct beneficiaries of services provided by forest owners would help to underwrite the programme cost.

## South Africa: Poverty alleviation through restoration

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**South Africa's innovative *Working for Water* Programme has been referred to as one of the most successful integrated land management programmes in the world, in terms of its impacts on biodiversity, water and socio-economic development. The programme model is based on employing local people to remove invasive plant species that threaten water supplies, and has been so successful that it has since been scaled out to working for wetlands, woodlands, and working on fire.**

South Africa, like many countries around the world, must address issues of water scarcity and resource degradation, as well as complex challenges of unemployment and poverty in rural areas. South Africa's *Working for Water* programme has found an innovative way of tackling these difficult challenges in a holistic way, by employing local people to clear mountain catchments and river corridors of invasive alien species. Since its inception in 1995, the programme has provided jobs and training to up to 30,000 people per year.

The *Working for Water* programme is administered through the Department of Water Affairs and Forestry (DWAF). A 'water resource management fee' is included in the water tariff that DWAF charges to consumers, and this fee contributes to the programme's budget. Unemployed people tender for contracts to restore public or private lands by removing invasive species. The annual budget for the programme is approximately \$72 million, and there are Working for Water projects in all nine of South Africa's provinces.

Environmental degradation and rural development are closely linked in South Africa. It is estimated that around 7% of the country's mean annual runoff is lost to invasive alien plants<sup>73</sup>, with significant flow-on effects for economic activity and agricultural productivity. Clearing land of alien species contributes to the restoration of natural fire regimes, increased production potential of land, improved biodiversity conservation, reduced soil erosion and better hydrological functioning and flood protection<sup>74-75</sup>.

The *Working for Water* programme has cleared invasive plants from over one million hectares of land over the last 15 years. A recent study indicated that the removal of invasive plant species from water catchments has increased water yield by approximately 34.4 billion litres per year<sup>76</sup>. This is equivalent to about 40% of the water yield from a new, built water infrastructure scheme in the Western Cape, constructed at a cost of approximately \$232 million<sup>76</sup>.

The results of *Working for Water's* activities are impressive in environmental terms, and it has been called an 'inspirational' example of restoration of natural capital<sup>77</sup>. However, it is the social and economic outcomes that the programme has delivered that have cemented political and community support. In addition to job creation, the programme has also emphasised gender equity, and has provided skills training, and health and HIV/AIDS awareness programmes<sup>75</sup>.

*Working for Water* has always had a strong emphasis on poverty alleviation and supporting the livelihoods of the programme participants. The programme was born during the post-apartheid period, with initial funding through the Reconstruction and Development Programme (RDP). According to Dr Guy Preston, Chairperson and National Programme Leader of *Working for Water*, securing jobs for poor people was a key political goal at the time, and one of the major reasons that the programme secured high level political support was due to its role in job creation.

The importance of political support to the success of natural capital initiatives is well illustrated by the experience of *Working for Water*. At the time the idea was first proposed, it was championed by Professor Kader Asmal, the Minister of Water Affairs and Forestry at the time<sup>78</sup>. Jay Naidoo, who at the time was the Minister responsible for the RDP, was impressed by the proposal, which was subsequently passed by the RDP committee<sup>78</sup>.

*Working for Water* spent its full budget, created work opportunities for the poor, and delivered ecological outcomes. Immediately, it became a flagship programme of Government<sup>74</sup>. The programme has consistently spent about 98% of its allocated budget within the financial year in which it was given, a feat unparalleled for other government programmes in South Africa.

The roll out of the programme was not without difficulties; some people believed that money spent on restoration could be better directed to other initiatives, there were claims that the benefits of the programme had not been adequately quantified, and that the rapid deployment of the programme led to disorganisation<sup>77</sup>. Today, information collected over the life of the programme provides concrete evidence that if well-managed, such programmes can have tangible effects on poverty, ecosystem health, water availability and land productivity.

The success of the *Working for Water* model has seen the development of a number of 'sibling' programmes. Among these are the *Working for Woodlands*, *Working for Wetlands* and *Working with Fire* programmes. The programmes on woodlands and wetlands focus on ecological restoration, while *Working with Fire* targets the prevention and control of wild fires. There is strong community support for these programmes, and in many towns, the programmes have been the only source of new work<sup>74</sup>.

South Africa's *Working for Water* programme is an example to other countries of what can be achieved for poverty alleviation and environmental management through sustained government support for the restoration of natural capital. The need to align environmental and social goals with political priorities has always been at the forefront of planning for the programme, and is a key reason for its success.

**“The long-term risks associated with environmental degradation are simply too massive. It is essential that legislators understand the returns on investment from better land management, as well as the importance of early detection and rapid response.”**

Dr Guy Preston, Chairperson and National Programme Leader of *Working for Water*.

## USA: Marine and coastal restoration at scale

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**The ecosystems of the Puget Sound basin in north-west USA provide economically valuable services including flood protection, water supply and filtration, food and fibre production and climate regulation. These valuable services are currently threatened by urbanisation, land degradation and pollution. If signed into law, the Puget Sound Recovery Act will allow the creation of a federal grant program to support large-scale restoration works in the sound, which will have multiple social and economic benefits.**

Puget Sound is the second largest estuary in the USA. The sound, located in Washington State on the Pacific coast, is a complex estuarine system fed by 19 watersheds. Over the last 150 years, large areas of the region's formerly extensive marshlands, wetlands and forests have been degraded and developed. Polluted runoff from developed areas has led to serious impacts on the marine environment, which in turn has affected human health, fisheries, and tourism.

The Puget Sound ecosystem provides flood protection, clean drinking water, food, aesthetic value, and many other valuable services. A partial valuation of 14 ecosystem services across the Puget Sound basin indicated that these services provide at least \$9.7 billion in annual benefits to the region. The sound's natural capital is worth at least \$305 billion in terms of its net present value <sup>79</sup>.

According to Chris Townsend, Special Assistant to the Director of the Puget Sound Partnership, "National leaders recognize the importance of healthy natural environments to thriving economies. The Puget Sound economy is driven in large part by high-tech industries such as Microsoft and biomedical research. Those companies need to attract the brightest and best employees who have choices about where to work and live. The natural beauty of the area and recreation opportunities are key to attracting and keeping a highly qualified work force."

The indigenous peoples of the Puget Sound area are also very influential in both cultural and legal terms. "Federal Court decisions have recognized Native American tribes' rights to harvest and manage the habitat of fish and shellfish in the entire Puget Sound basin. If that 'natural capital' is degraded, tribes are able to bring suit to protect their rights", said Mr Townsend. The state of the sound's natural capital also influences the activities of the broader public, through water supply limitations and declines of trees, salmon and shellfish.

Recognizing that the region's economy and the well-being of its inhabitants is tied to the health of its natural capital, in 2007 the Washington State Legislature created the Puget Sound Partnership (PSP). The governor of the State of Washington convened a high level panel to make recommendations on how to achieve ecosystem recovery in Puget Sound. Two national legislators and four state legislators from both major parties participated in this panel. The bill creating the PSP was passed by both houses of the state legislature with bi-partisan support.

The PSP is a state government agency given the task of protecting and restoring the Puget Sound. The Partnership is highly collaborative, led by a board of local citizens and advised by a science panel. The Partnership's Action Agenda, published in 2009, includes ecosystem recovery goals, actions and indicators <sup>80</sup>.

**"We have taken a significant step toward restoring Puget Sound and protecting everything from animal habitats, to tourism, to our precious environment and our regional economy".**

US Senator Maria Cantwell, co-sponsor of the Puget Sound Recovery Act.

Already, existing conservation and restoration efforts have seen some positive results. Policies to focus new urban development in previously developed areas rather than in natural areas have helped to slow the rate of loss of natural areas, while pollution mitigation and watershed projects have improved water quality <sup>81</sup>. Ecosystem restoration activities are expected to boost the local economy and provide jobs.

In developing its Action Agenda, the Puget Sound Partnership has drawn on a wealth of experience from a number of large-scale, science-based, collaborative ecosystem restoration programmes that have been carried out elsewhere in the US <sup>82-83</sup>. The scale of these projects makes them expensive, and federal funding, supported by national legislators, is crucial to their success.

Two key actions at the federal level, have enabled federal funding for implementation of the Puget Sound Partnership's restoration programme. The US Federal Environmental Protection Agency approved the restoration project in 2009 under the National Estuary Program, securing greater federal funding and support for the initiative, thanks in part to the efforts of the congressional delegation. In 2010, the US Senate Committee on the Environment and Public Works approved the Puget Sound Recovery Act, sponsored by Washington Senator Maria Cantwell. If signed into law, this national legislation will provide a consistent level of funding for the programme.

“In Puget Sound, 13 different federal agencies have formed a caucus to coordinate federal projects aimed at Puget Sound restoration. There is buy-in at the highest levels for this coordination effort,” said Mr Townsend. “To some extent, this creates synergy and collaboration between agencies and replaces redundancy and inefficiency.”

The case of restoration in the Puget Sound demonstrates that legislators can profoundly influence the success or failure of large-scale

restoration programmes. Legislators can actively promote the importance of stewarding natural capital, they can work with Executive Agencies that allocate funding, and they can also pass legislation to ensure long-term finance for restoration. Chris Townsend added, “Legislators can also support the use of innovative sources of funding that are not typically thought of as ecosystem recovery funds, but which could be used to achieve priority actions”.



**Figure 11: Aerial view of the Puget Sound.**

Puget Sound is a complex estuarine system of interconnected marine waterways and basins fed by 19 watersheds. It is more than 160 kilometres long with more than 4,000 kilometres of shoreline. The complex tangle of the sound's waterways is visible in this aerial view of northern Washington State, to the southeast of Vancouver Island and Juan de Fuca strait. The light blue area offshore is a phytoplankton bloom. Algal blooms, which are associated with increased nutrients from both onshore and seafloor sources, can have serious health consequences if toxic species are present. Harmful algal blooms have been reported with increasing frequency and intensity in recent years.

[earthobservatory.nasa.gov/IOTD/view.php?id=1813](http://earthobservatory.nasa.gov/IOTD/view.php?id=1813)

## Insights for legislators on natural capital

These diverse case studies have shown just a snapshot of what investing in better management of natural capital can achieve in key areas of public policy, as well as some of the major challenges. Below, we present a short summary of the key political insights for legislators based on the experiences with these projects and pieces of legislation.

These messages are intended to be neither static nor exhaustive. We hope that legislators attending the 'Parliamentarians and Biodiversity' forum held in parallel to the negotiations at the 10<sup>th</sup> Conference of the Parties (COP10) to the Convention on Biological Diversity (CBD) will add their insights to those listed below. This will augment a growing body of knowledge held by legislators on sustainable management of natural capital. The final version of this report will incorporate ideas advanced at the forum.

### **Include natural capital in national accounts**

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Natural capital should be included in national income accounts, alongside other forms of capital. The UN and the World Bank (in collaboration with a number of other organisations) are currently updating the international standardised framework for environmental accounting, which will be completed in 2012. The incorporation of natural capital into national income accounts will be aided by the creation of Parliamentary Select Committees on Natural Capital. It is critically important that finance ministries and the treasury should be involved.

The Global Legislators Organisation (GLOBE) is advancing a Natural Capital Action Plan, to be launched at CBD COP10, which will address some of the political steps that need to be taken to fully incorporate the value of natural capital into national accounts and political decisions<sup>84</sup>. A copy of the Action Plan accompanies this report.

### **Evaluate economic benefits**

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Closely related to the inclusion of natural capital in national accounts is the need to undertake thorough cost-benefit analyses of policy options, which take into account the real economic effects of policies that affect the natural environment. Some investments may no longer make sense after such an analysis, when the real long-term costs of development are compared against short-term profits. Legislators can do this by requiring that new projects undertake cost-benefit analyses that explicitly evaluate the effect of development on the value of environmental services over the short and long term.

### **Mobilize political support for natural capital**

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Political support at a high level was critical to the implementation and success of many of the programmes profiled in this report. Parliamentarians can act as champions for innovative ideas that use natural capital as part of a broader policy approach to address multiple challenges (such as unemployment, water scarcity, and declining agricultural productivity). It may not always be necessary to pass new legislation, but providing support and secure funding to government departments and community groups that are involved in these projects is essential.

### **Involve local communities**

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Community involvement and support was critical to the success of many of the projects and legislation profiled in this report. Local communities whose livelihoods are closely linked with the state of the environment are invariably interested in how plans for the management of natural capital will affect them. Consultation with the local community and with indigenous peoples must be an integral part of any new initiative on natural capital. This will not only ensure political support, but will also likely improve the sense of ownership that communities have over their lands and futures.

## **Invest in green jobs and infrastructure**

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Improving the stewardship of natural capital can involve job creation. When designing stimulus and spending packages, legislators should consider channelling funding towards natural capital initiatives that will not only create jobs, but will also add economic value at a longer time frame. This could include increasing carbon sequestration through land management, increasing investment in renewable energy, or using 'green infrastructure' as part of managing flood risk.

## **Build on existing models and mechanisms**

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Legislators can rapidly advance the integration of natural capital thinking with mainstream public policy by building on existing financial and governance mechanisms, and by adapting existing models that have proved successful.

Brazil's ICMS-Ecológico builds on the existing tax regime, which has led to low transaction costs and limited additional bureaucracy. Mexico's national scheme of payment for environmental services provides payments mostly to communities, rather than individual landowners, again lowering entry and transaction costs. The suite of programmes that have built on the success of South Africa's Working for Water Programme bear testament to the idea of adapting successful models to new sectors.

## **Advocate for integrated regional planning**

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There is a distinct need to move beyond the sectoral approach to environmental management, and increase links across ministries of agriculture, forestry, fisheries, environment, finance, education, defence and health. This can involve streamlining environmental management, as has occurred for the new US National Ocean Policy <sup>85</sup>, and the UK Marine Policy Statement (currently in development). Integrated, ecosystem-based planning and management will require dedicated high-level task forces and extensive community and expert consultation to bring into effect.

## **Use natural capital for future challenges**

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Addressing the future challenges of climate change, water scarcity, food security and biodiversity loss will require active investment in natural capital. Parliamentarians can help to align policies to address these challenges with sustainable environmental management by setting up expert advisory commissions, parliamentary standing committees, and commissioning research on policy options.

**You cannot adjust the ecological dependence of your economies or cities within a week or a year, but need to plan decades ahead. We do this in other domains: education, transportation, infrastructure and defence. We need to employ longer-term thinking just as vigorously in the resource domain.**

Mathis Wackernagel, Founder and President of the Global Footprint Network

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## Websites and reports on case studies

### **Australia: Managing the Great Barrier Reef**

Great Barrier Reef Marine Park Authority:

<http://www.gbrmpa.gov.au/>

Overview of the Representative Areas Programme in the Great Barrier Reef Marine Park:

[http://www.gbrmpa.gov.au/corp\\_site/management/representative\\_areas\\_program](http://www.gbrmpa.gov.au/corp_site/management/representative_areas_program)

### **Brazil: Tax revenue and ecological criteria**

Report on fiscal incentives for biodiversity conservation: the ICMS-Ecológico in Brazil:

<http://www.iied.org/pubs/display.php?o=8119IIED>

Ecosystem marketplace webpage on Brazilian initiatives:

[http://www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page\\_id=6524&section=home](http://www.ecosystemmarketplace.com/pages/dynamic/article.page.php?page_id=6524&section=home)

### **Cameroon: Restoration for rural livelihoods**

IUCN report on the Waza Logone Project:

<http://www.atl.org.mx/files/WaterPublications/ParaCuencas/6.pdf>

Lake Chad Basin Project webpage on Waza Logone Pilot Project:

<http://lakechad.iwlearn.org/about/dp/wlpp/waza-logone-pilot-project>

### **China: Government incentives at scale**

Report on markets for ecosystem services in China:

[http://www.forest-trends.org/documents/files/doc\\_2317.pdf](http://www.forest-trends.org/documents/files/doc_2317.pdf)

World Bank Project website on Loess Plateau Watershed Rehabilitation.

<http://go.worldbank.org/RPDAURT290>

### **Denmark: From farmland to National Park**

Danish Ministry of Environment page on Skjern River Restoration:

[http://www.skovognatur.dk/Ud/Beskrivelser/Vestjylland/SkjernEnge/Skjern\\_River\\_Wetlands.htm](http://www.skovognatur.dk/Ud/Beskrivelser/Vestjylland/SkjernEnge/Skjern_River_Wetlands.htm)

### **Europe: Managing coastal zones**

European Commission webpage on integrated coastal zone management:

<http://ec.europa.eu/environment/iczm/home.htm>

### **Indonesia: Reducing carbon emissions**

Kalimantan Forests and Climate Partnership:

[http://www.climatechange.gov.au/government/initiatives/international-forest-carbon-initiative/~media/publications/international/kalimantan.ashx](http://www.climatechange.gov.au/government/initiatives/international-forest-carbon-initiative/~/media/publications/international/kalimantan.ashx)

### **Japan: Legislation on restoration**

River Bureau of the Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT):

<http://www.mlit.go.jp/en/river/index.html>

Ministry of the Environment report on nature restoration projects in Japan:

[http://www.env.go.jp/en/nature/npr/nrp\\_japan/pdf/full.pdf](http://www.env.go.jp/en/nature/npr/nrp_japan/pdf/full.pdf)

### **Mexico: National payments for ecosystem services**

Summary of Mexico's Payments for Hydrological Services programme:

[http://www.watershedmarkets.org/casestudies/Mexico\\_National\\_PSAH\\_eng.html](http://www.watershedmarkets.org/casestudies/Mexico_National_PSAH_eng.html)

### **South Africa: Poverty alleviation through restoration**

Department of Water Affairs and Forestry page on Working for Water programme:

<http://www.dwaf.gov.za/wfw/>

### **USA: Marine and coastal restoration at scale**

Puget Sound Partnership:

<http://www.psp.wa.gov/>

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