Ramsar WORLD WETLANDS DAY 2 February

RAMSAR CONVENTION ON WETLANDS

CARING FOR WETLANDS

an answer to climate change

This publication has been made possible thanks to the Danone/Evian Fund for Water


Extinction
Floods
Global Warming
FOOD SHORTAGE
Climate
Species loss
Water
Crop failure
Mitigation
Adaptation
DROUGHTS
SPECIES LOSS

Caring about climate change *Means* Caring about wetlands *Means* Caring about biodiversity

"Species loss…Food shortages…Climate change… Drought… Crop failure… Water shortage… Adaptation… Floods … Mitigation… Global warming …CO_2 levels … Extinction"

All of these words are in our newspapers, on our television screens and radios. What lies behind the words is a long story of use, abuse and denial of the human impact on our environment; what lies ahead is yet to be determined.

In 1994 the entry into force of the United Nations Framework Convention on Climate Change (UNFCCC) gave recognition to the existence of a climate change problem attributed to human activities. This was especially challenging at a time when the scientific evidence available was much less extensive than today – and even now there are those who do not accept the scientific evidence of global warming. The global convention concerned directly with the world's biodiversity, the Convention on Biological Diversity, launched a campaign in 2002 to significantly reduce the current rate of loss of biodiversity at the global, regional and national level by 2010, the "2010 target", and this year has been declared by the United Nations as the International Year of Biodiversity. Climate change is only one of many, many causes of biodiversity loss.

This World Wetlands Day theme is looking at these two key areas, biodiversity loss and climate change, exploring their relationships and what it all means for wetlands and people. We are looking at the human role in driving the loss of biodiversity and climate change and what we can do to find solutions. Wetlands ARE vulnerable to human-induced climate change but, if we manage them well, wetland ecosystems and their biodiversity also have a role to play in the mitigation of climate change and will be important in helping humans to adapt to climate change through their critical role in ensuring water and food security. As our WWD slogan suggests, caring for wetlands IS a part of the solution to climate change,

Before we focus on wetlands, let's look first at people and what we are doing to the environment. The comparative human impact on our environment across the globe is well represented in WWF's assessment of the human ecological footprint. The graph spanning the centre pages shows our demands on the Earth in terms of the area of biologically productive land and sea required to provide the resources we use and to absorb our wastes. This ranges from almost 10 hectares per person in the wealthiest countries to considerably less than 1 in many developing countries. Please look now at the graph and, of particular interest for this leaflet, look at the differences between countries in the production of greenhouse gases from fossil fuel use. It's a sobering statement on taking responsibility and perhaps reminding ourselves of individual and national responsibilities.

WETLAND BIODIVERSITY - WHERE ARE WE NOW?

What do we mean by biodiversity? For many people, biodiversity is about species, about tigers, polar bears, hippos, and frogs. Less well understood is that biodiversity is not just about species – it's also about ecosystems and genes and thus so too is our World Wetlands Day theme.

All species are parts of functional units: ecosystems, dynamic complexes of plant, animal and micro-organism communities, and their non-living environment (like water, soil, minerals, etc.) interacting as functional units.

There is plenty of evidence that modern living is causing unparalleled loss of species at the global level and that climate change is making this situation much worse. The box opposite shows what we can say in general about wetland dependent species loss. Conclusion? Wetland species are in big trouble. And if wetland species are in trouble, so too are wetland ecosystems, and this is of serious concern for all people, however wealthy or poor they are and wherever they live.

« The world will not reach the target it has set for addressing biodiversity loss. This am-

WETLAND SPECIES UNDER THREAT

(data from the IUCN Red List, BirdLife International, and Wetlands International)

WATERBIRDS

- Of the 826 waterbird species listed by BirdLife International , 17% are considered threatened.
- Of the 1,138 waterbird populations whose trends are known, 41% are in decline.
- Waterbirds are more threatened than all birds and their status has deteriorated faster in the last 20 years.

WETLAND-DEPENDENT MAMMALS

- 38% of the fresh water-dependent species that have been assessed are globally threatened; these include groups such as manatees and river dolphins in which all species assessed are listed as threatened.
- Wetland mammals are more threatened than terrestrial mammals (21% threatened) and waterbirds.

FRESH WATER FISH

- 33% of the world's fresh water fish species have been assessed as threatened.

AMPHIBIANS

- 26% of the world's fresh water amphibian species are considered threatened.
- Overall, amphibians are faring badly: including terrestrial (mainly forest) and fresh water species, globally 29% of species are currently threatened.
- At least 42% of all amphibian species assessed are declining in population; less than 1% of species show population increases.

TURTLES

- 72% of the 90 species of fresh water turtles that have been assessed are globally threatened.
- 6 of the 7 species of marine turtles are listed as threatened. While spending much time at sea, marine turtles use coastal wetlands for breeding and feeding.

CROCODILES

- 43% of crocodilians are threatened although this is based mostly on assessments carried out more than 10 years ago. Recent data (since 2000) indicates that 3 out of 5 species assessed are threatened (60%).

CORALS

- 27% of coral-building species that have been assessed are considered threatened.

bitious aspiration has nevertheless resulted in some important conservation successes as well as a massive increase in awareness about our human dependency on biodiversity and the ecosystem services it provides. »

Jane Smart,
Director, IUCN Biodiversity Conservation Group

Ecosystem services from wetlands

While it has proved difficult to be precise about the impacts of the loss of just one species on how the ecosystem functions, it is broadly accepted that an intact, healthy ecosystem, one that has not been degraded by human impacts, is usually more diverse in terms of its species than a degraded system AND has a higher economic value to humans because of the ecosystem services it delivers. The loss of a species often indicates a deterioration in the ecosystem on which it depended and decreases the **resilience** of ecosystems. Resilience is important for humans because ecosystems whose resilience is protected and maintained can continue to deliver a range of ecosystem services, even though the climatic drivers may be changing.

Ecosystem services:
The benefits people obtain from ecosystems.

Resilience in wetlands:
The ability to maintain particular ecosystem services as conditions change.

The ecosystem services from wetlands – such as water, fish, recharging of groundwater reservoirs, water purification and waste treatment, flood control and storm protection, recreational and spiritual opportunities – are essential for human survival. These services have been valued by some economists at US$14 trillion annually.

Rivers that have been channelised – given a 'concrete straightjacket' – to improve transport systems, or perhaps to control flooding during heavy rainfall periods, have a much lower biodiversity and deliver fewer services than those rivers that are permitted to retain their natural floodplains or at least some of the natural riparian vegetation.

In financial terms, intact mangroves in Thailand have a total net present economic value of at least $1,000 per hectare (and quite possibly very much more than this, maybe even US$ 36,000) and this compares with a value of about $200 per hectare when converted to shrimp farms. The 'value' comes from marketed products such as fish which are available in an intact mangrove, with the additional value of non-marketed services such as storm protection and the sequestration of carbon.

In Canada, areas of fresh water marshes have been estimated as having a value of US$ 5,800 per hectare when compared with US$ 2,400 for drained marshes converted to agriculture. The former will be biologically much more diverse than the latter – and provide more diverse ecosystem services.

We cannot afford for environmental, social or economic reasons to lose wetlands, yet evidence suggests we have been doing just that. From well documented figures in various countries, losses range from 53% (USA) to a staggering 90% (New Zealand) – we can probably assume that we have already lost 50% globally and that we are still losing wetlands, especially in developing countries.

WHAT *DID* WE DO - AND WHAT *ARE* WE DOING - TO CAUSE SUCH LOSSES IN WETLANDS?

What are the key drivers of wetland loss and degradation and, by extension, biodiversity loss:

■ **Habitat loss** through wetlands claimed for agriculture and for urban and industrial development.

■ **Excessive fresh water withdrawals** especially for irrigated agriculture but also other forms of agriculture as well as domestic and industrial water needs; this leads not only to less fresh water availability inland but less fresh water flow to coastal areas from rivers impacting coastal ecosystems and how they function.

■ **Siltation** in coastal areas from the outflow from silt-laden rivers. Too much siltation, through agriculture, deforestation, etc., is a serious problem – but too little can also have negative implications.

■ **Invasive species**, both accidental and deliberate introduction of 'alien' species which disrupt the abundance and survival of native species. Accidental introductions can arrive as 'hitch-hikers' on ship hulls and in ship ballast waters; the aquarium trade and the ornamental plant trade play a role through 'escapes', and escapes from aquaculture are not uncommon. Sometimes species are introduced for agricultural and forestry purposes.

Driver of wetland loss:
Any natural or human-induced factor that directly or indirectly causes a change in a wetland ecosystem.

■ **Pollution** through agricultural runoff introducing pesticides and fertilizers into rivers, through toxic industrial wastes flowing into waterways, through untreated or partially treated human wastes as well.

■ **Overexploitation** through unsustainable harvesting of fish, shellfish and prawns, seaweeds, wetland timber, etc., which reduces the capacity of the ecosystem to maintain functioning wetlands.

■ **Nutrient loading** from nitrogen, phosphorous and other chemicals mostly from agriculture but also from poorly treated domestic waste, affecting inland and coastal wetlands and causing excessive algal growth and the resulting reduction in other species.

■ **Climate change**, largely through human-driven emissions of carbon dioxide and other greenhouse gases as well as land-use change.

According to the recent Millennium Ecosystem Assessment of the impact of all these drivers, NONE of them are declining in impact: ALL are either steady or increasing in intensity. Evidence is mounting that climate change will become a key driver during this decade.

WHAT ABOUT SPECIFIC CLIMATE CHANGE IMPACTS ON ECOSYSTEMS AND SPECIES?

It is accepted by most scientists, even by most politicians, that concentrations of carbon dioxide in the atmosphere are increasing at a faster rate than has been seen in the past million years, temperatures are rising, and weather patterns are changing – collectively putting our ecosystems and their species, and ourselves, at risk.

While currently the number one driver of wetland loss and degradation is habitat change as a result of human development, climate change effects are already being felt across the world. As our understanding of climate change increases, there is a new sense of urgency about the state of wetland species and ecosystems: clearly, climate change will become one of the major drivers of ecosystem loss during this century and will intensify the impacts of the other drivers.

Wetland ecosystems -

here are just **some** of the impacts expected in ecosystems:

■ In general, wetlands found in prairies, tropical and boreal forests, arctic and alpine ecosystems, and coral reefs and mangroves are thought to be especially vulnerable to climate change because they have a limited capacity to adapt to change - damage to these ecosystems may be irreversible.

■ Expected increases in sea surface temperature of about 1-3°C are likely to result in more frequent coral bleaching events and widespread mortality of corals – it's not known if some corals will prove to be adaptable to the temperature change.

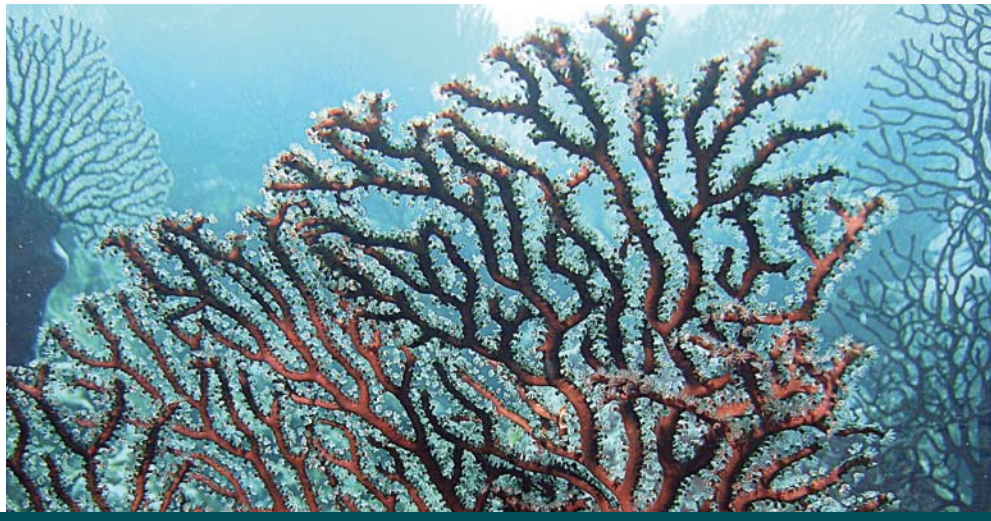
■ Coastal wetlands including salt-marshes and mangroves are likely to be negatively affected by sea-level rise, especially where there are physical barriers on their landward side (such as sea walls, dykes, etc.); increased damage from coastal flooding through storms and tidal surges will take place in many areas.

Species will of course have to deal with the changes in the ecosystems where they live. Changing temperatures, changing water conditions, changes in abundance of other species can be expected. Faced with this, a species has three options:

1. "Move" - change its geographical distribution in response to climate change; already happening in some species but clearly not possible for all affected species;

2. remain in the same place but adapt to the new conditions by perhaps a change in behaviour (e.g., a shift in the time of breeding to better match food availability for young) or a change in genetic response (perhaps a population would show more heat tolerant individuals);

3. die!



■ Changes in the timing and volume of fresh water run-off from inland wetlands will affect salinity, nutrient availability, and moisture regimes in coastal ecosystems – all of which will have an impact on coastal ecosystem functions.

■ Certain invasive species that already are of concern in wetlands may well expand their geographical range of influence. For example, two wetland invasives, *Eichhornia* and *Salvinia,* are projected to expand their ranges polewards with increasing temperatures.

■ Many low-lying islands, particularly those in the Pacific, Indian and Atlantic Oceans and the Caribbean Sea, are likely to be at risk of being submerged.

We can also look at ecosystem impacts

in terms of fresh water availability:

■ Changes in rainfall intensity and variability are expected to increase flooding and drought in many areas. In general, precipitation increases are expected in high latitudes and parts of the tropics and decreases in some sub-tropical and lower mid-latitude regions (some of these latter areas are already water-stressed). The scale of this? Some climate models predict that by 2050, annual average river runoff and water availability are projected to increase by 10-40% at high latitudes and in some wet tropical areas, and decrease by 10-30% over some dry regions at mid-latitudes and in the dry tropics.

■ Water supplies stored in glaciers and snow cover are projected to decline during this century, reducing water availability in regions supplied by meltwater from major mountain ranges - more than one-sixth of the world's population currently live in such areas.

■ Higher water temperatures and extreme weather events (such as floods and droughts) are projected to affect water quality and to intensify many forms of water pollution – pollutants such as high nutrient levels, pathogens, pesticides, salt, etc.

While these predicted impacts have far-reaching consequences, presented in this way they seem impersonal, and it is only on a country-by-country basis that the impacts become 'reality', the future for each of us and our families. While it is not possible to explore this adequately here, much more detailed information IS available (see references at the end).

WHAT DOES THIS ALL MEAN FOR PEOPLE?

We are all dependent in some way on the ecosystem services provided by wetlands – whether it's the fish they supply, the fresh water, the building materials, the protection from flooding and so on. Of course, those most affected by the loss of wetland ecosystem services are the poorest communities, particularly communities that are directly dependent on wetlands for their livelihoods.

What matters the most to most people? Undoubtedly, the availability of food and water, the basics for human survival.

Water scarcity and limited access to fresh water already affect 1-2 billion people – inland wetlands of course are a key source of fresh water (along with underground aquifers, some of which are linked directly to wetlands). With their capacity to hold, filter and de-toxify water they are essential to the provision of fresh water for human use. Water demand is unlikely to diminish at a global level with increasing population, economic growth and lifestyle changes, yet overall, climate change effects will see decreased water availability and increased risks of drought and desertification in specific regions.

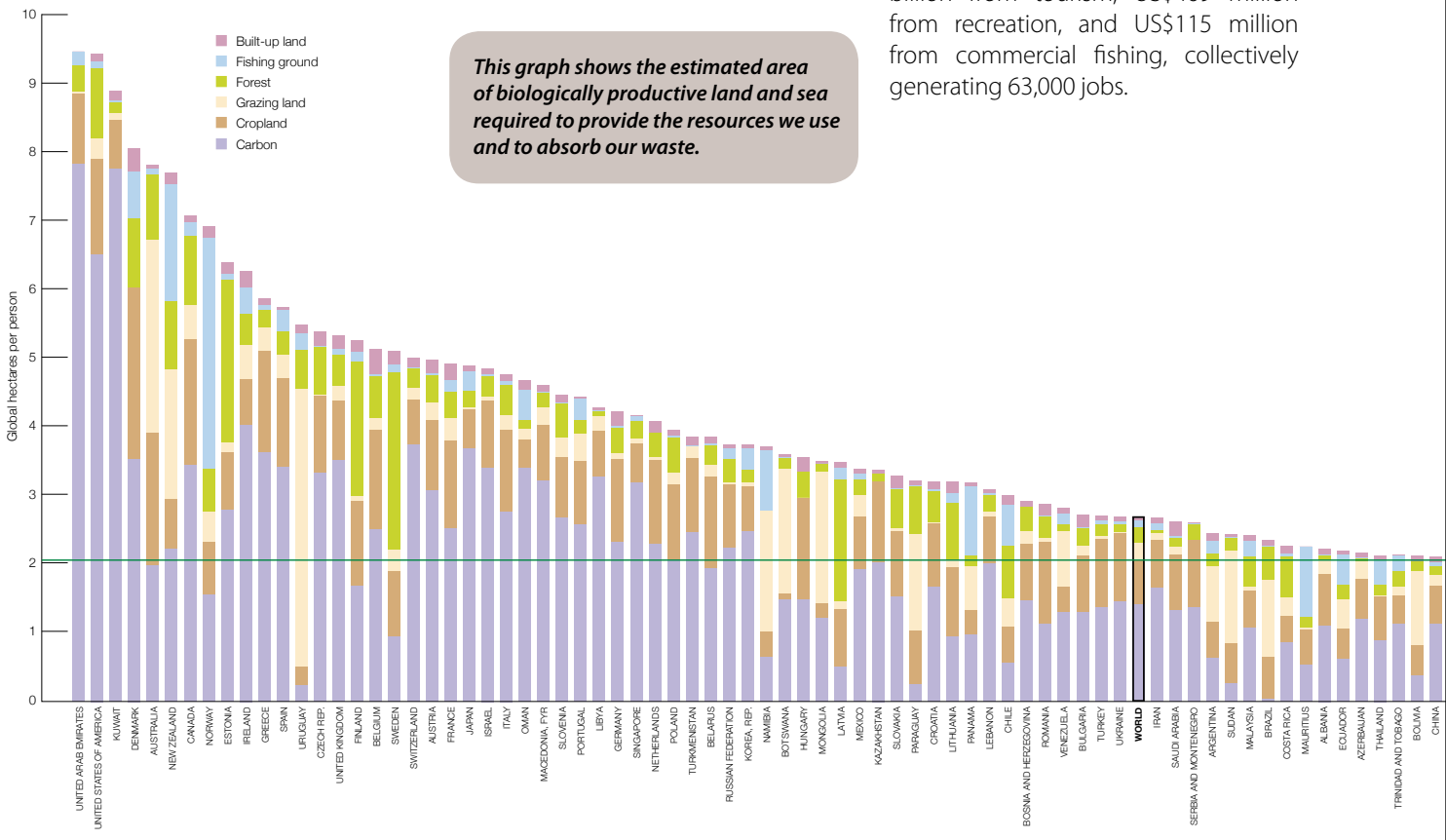
Fresh water plays a critical role in the production of food worldwide. With 80% of our global agricultural land rainfed, there is particular concern about production levels as a result of reduced precipitation in arid and semi-arid regions in the tropics, sub-tropics, and Mediterranean-type regions in Europe, Australia and South America. Of course excessive rainfall and the unpredictability of rainfall will also have serious impacts on food production. Additionally, food production frequently requires water not only from precipitation but also from available water resources for irrigation – irrigated agriculture is critical to global food production, currently accounting for 18% of agricultural land area but responsible for almost 50% of the world's grain supply. Presently, 850 million people remain undernourished, so we are already challenged in terms of food production; climate change is likely to add to that challenge with decreased food security and increased vulnerability of many rural farmers.

Nearly 2 billlion people already live in areas of high flood risk, often as a result of destruction of floodplain wetlands and reclamation for agriculture and urban development; further losses of wetlands in these areas, along with the impact of climate change in certain latitudes, increases this vulnerability. The impacts of floods are many – quite aside from the immediate effects of human mortality, there is the risk of infectious diseases, and there is evidence of equally negative impacts of climate-related effects on mental health, resulting in long-term depression and anxiety. Flooding and heavy rainfall may also lead to contamination of water through chemicals and other hazardous substances.

The negative impacts of climate change on coastal wetlands are also likely to impact human populations significantly. Around 50% of the world's people live along the coast and the density of populations in coastal area is three times higher than the global average. Many of the world's poorest communities are coastal dwellers and rely on mangrove and reef-based fisheries for food security. In developing countries, coral reefs contribute about a quarter of the annual fish catch, providing food for about one billion people in Asia alone; in Indonesia, for example, some 60% of the population is dependent on marine and coastal fishing resources for food

and livelihoods. The Great Barrier Reef contributes a total of US$ 4.5 billion to the Australian economy, with US$3.9 billion from tourism, US$469 million from recreation, and US$115 million from commercial fishing, collectively generating 63,000 jobs.

ECOLOGICAL FOOTPRINT PER PERSON, BY COUNTRY, 2005



This graph shows the estimated area of biologically productive land and sea required to provide the resources we use and to absorb our waste.

WHAT CAN BE DONE FOR WETLANDS?

Broadly there are a number of key responses that can be made to resolve the loss of wetland biodiversity and the additional impacts of climate change on those losses:

1 Maintain the health of our intact wetlands;

2 redouble efforts to address the key drivers of wetland loss and degradation (habitat loss, pollution, excessive water withdrawals, invasive species, overexploitation, etc.);

3 continue to identify vulnerable species and ecosystems, and plan and implement species and ecosystem action plans for recovery;

4 prioritise and plan wetland management and restoration programmes for a changing and more variable climate; managers will have to adapt their planning to take account of these changes with the aim of maintaining as far as possible the delivery of ecosystem services;

5 continue to restore degraded wetlands, since healthier wetlands are more resilient than degraded ones;

AND urgently address the additional impact of climate change on wetland species and ecosystems through:

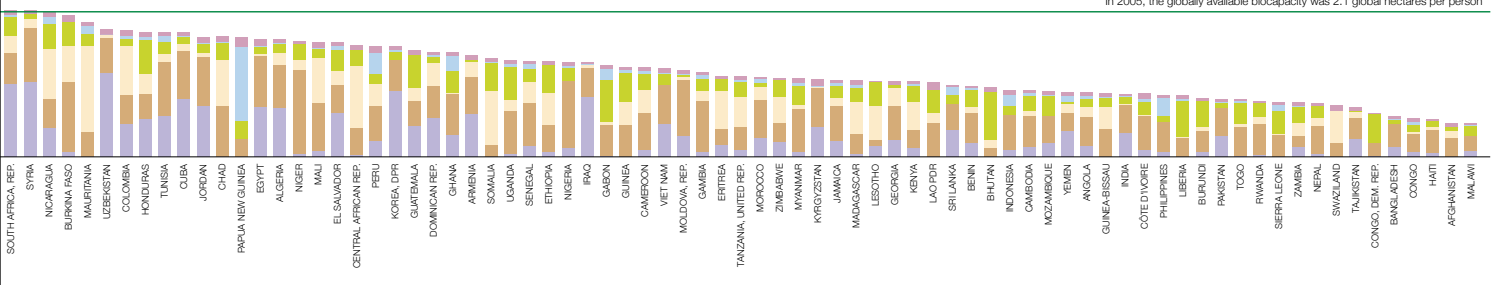
6 climate change **mitigation** actions;

7 appropriate climate change **adaptation** strategies.

Mitigation requires us to reduce greenhouse gas emissions and to encourage the removal of such gases already in the atmosphere, 'trapping' them in soils and vegetation. There is no question that the key culprit globally in CO_2 emissions is our use of fossil fuels. But we can also have a real impact on emissions by the way we manage our environment. Especially significant are the continuing rapid rates of deforestation of wetland and other forests and the draining of peatlands.

Adaptation:
Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.

Mitigation:
An intervention to reduce the anthropogenic forcing of the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks.



Credit : WWF *Living Planet Report 2008.*

Peatlands, though covering only 3% of global land area, have long been recognized as an important carbon sink, and their drainage and conversion for other uses as an important source of emissions. There is also increasing evidence of the role of mangroves, saltmarshes and other wetlands as carbon sinks, and thus there is an urgent need to restore and secure the management of these wetlands as well.

But whatever can be done in terms of mitigation, we cannot do enough for this to be the only solution. Even if we started tomorrow with a global agreement on reducing emissions and the financial support to do this, it would not be enough: climate change is already having an impact, and so we also need adaptation strategies to deal with them.

Sink:
Process, activity, or mechanism that removes a greenhouse gas from the atmosphere.

Source:
Any process, activity or mechanism that releases a greenhouse gas into the atmosphere.

Governments tend to look at climate change **adaptation** measures in terms of the various sectors likely to be impacted, such as agriculture, forests, fisheries, energy, infrastructure (buildings, transport, water), tourism, human health, marine and coastal ecosystems, and water resources. This approach misses the opportunity to consider the linkages between sectoral adaptation measures and it risks adaptive measures being made in one sector that negatively affect another. For example, the need for increased water diversion for irrigation for food production could negatively impact the quality of coastal wetlands, reducing the nursery areas for fish, or the ability of inland wetlands to support aquaculture and fisheries.

There is encouraging evidence the some governments are dealing with climate change in a more holistic way, making the link between ecosystem management (which cuts across sectors) and climate change adaptation. Some positive words come from the European Union's white paper on adapting to climate change, where it is noted that *"Strategies focused on managing and conserving water, land and biological resources to maintain and restore healthy, effectively functioning and climate change-resilient ecosystems are one way to deal with the impact and can also contribute to the prevention of disaster . . . Evidence suggests that working with nature's capacity to absorb or control impact in urban and rural areas can be a more efficient way of adapting than simply focusing on physical infrastructure."* Although this statement still regards the holistic ecosystem approach as just "one way"

to deal with the current situation, it is a step forward in the recognition of the key role of ecosystems in dealing with climate change, in addressing the economic and social as well as ecological consequences of climate change, and in presenting the opportunity to place wetlands, water and their management centre stage.

Ecosystem-based adaptation to climate change delivers this holistic approach. For inland wetlands, it requires actions to:

- reduce the degradation of river basins by deforestation;
- increase afforestation;
- maintain and restore riparian wetlands and floodplains along rivers so that they can provide better protection from flooding;
- improve management of wetlands and water at the basin level;
- restore "green infrastructure" wherever possible: the natural flood defence system provided by inland wetlands will help to ensure that the other ecosystem services provided by wetlands are maintained.

Ecosystem-based adaptation in coastal ecosystems requires actions to:

- reduce the loss and degradation of, mangroves, saltmarshes, sand dunes, coral and shellfish reefs and other coastal wetlands, and restore them where possible, to produce ecosystems more resilient against sea level rise;
- minimize "hard" infrastructure developments against coastal floods in favour of green infrastructure wherever possible;
- remove artificial barriers on the landward side of mangroves and saltmarshes so that they may be able to migrate landwards as sea levels rise.

Green infrastructure:
A term reflecting the role the natural environment can play in land use planning. True of both inland and coastal wetlands.

EXAMPLE OF GREEN INFRASTRUCTURE

Before restoration

After restoration

COMMUNICATING THE WETLAND MESSAGE

"To think is easy. To act is difficult. To act as one thinks is the most difficult of all."

Johann Wolfgang von Goethe

We ALL have a role to play in actually dealing with climate change and its impacts. There is no doubt that at a personal level, especially in the developed world, there are lifestyle decisions to be made – our current use of water and energy, our current eating habits and so on, are not sustainable, and it does not take much thought to make the links between our lifestyles and their impact on wetlands. 'Walking the talk' is a personal challenge for us all – and a way of communicating the wetland message as individuals. What can 'wetland people', people who are active in wetland conservation and wise use, do?

Wetland scientists, wetland decision-makers, and wetland communicators must deliver strong messages to other sectors and to government planners about wetlands, climate change and impacts on biodiversity.

■ Maintaining wetland biodiversity helps to reinforce the resilience of wetland ecosystems to changes and pressures, both natural and human-induced.

■ Wetland biodiversity, ecosystems and species are indeed under threat from the impacts of climate change, but proper management of wetlands can reduce these impacts.

■ Climate change **mitigation** is all about ***carbon*** while climate change **adaptation** is all about ***water***.

■ There is no doubt that water dominates the impacts of climate change. Water and food security are key items on any government's agenda, and thus the water sector and water managers are likely to play a key role in adaptation strategies. The central message for this sector is that wetland ecosystems offer a natural infrastructure to strengthen climate change adaptation. Flood exposure can be reduced by restoring floodplain function, especially when this is combined with effective land-use planning. This also restores and secures the ecosystem services from wetlands –

a win-win for people! Similarly, protection from sea level rise can be achieved at least to some extent by managing coastal wetlands, such as mangroves and saltmarshes – providing climate change mitigation through carbon storage AND climate change adaptation AND securing ecosystem services. In both cases natural solutions will be better for wetlands, biodiversity and people than will any engineered infrastructure.

■ Wetlands and their biodiversity can help in mitigation efforts through carbon storage and local weather/precipitation effects.

■ Misguided adaptation policies can damage wetlands and their biodiversity. Policies that divert more water for irrigation for food in water-short areas might reduce the ability of inland wetlands to support aquaculture and fisheries. Improving food production in one area and accidentally reducing it in another is not effective adaptation policy. Ecosystem-based adaptation strategies and policies can help to avoid the potential negative effects of sectoral approaches to adaptation.

All of us,

in developing and developed countries, and especially our children and grandchildren, are facing serious challenges from the effects of uncontrolled climate change and loss of biodiversity. But the situation is not hopeless, and we can all help.
'Wetland people' in particular are in an excellent position to spread the word to the public and the other sectors about the enormous contributions we can make to global solutions by

caring for our wetlands.

Ramsar WORLD WETLANDS DAY 2 February

CARING FOR WETLANDS

an answer to climate change

Useful references to learn more about climate change and biodiversity loss:

■ **Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate.**
www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_synthesis_report.htm

■ **Wildlife in a Changing World: An analysis of the 2008 IUCN Red List of Threatened Species.**
http://data.iucn.org/dbtw-wpd/edocs/RL-2009-001.pdf

■ *Millennium Ecosystem Assessment, 2005.* **Ecosystems and Human Well-being: Wetlands and Water Synthesis.**
www.millenniumassessment.org/documents/document.358.aspx.pdf

■ *Ramsar COP10 DOC.25:* **Additional information on climate change and wetland issues.**
www.ramsar.org/pdf/cop10/cop10_doc25_e.pdf

■ **The Natural Fix: the role of ecosystems in mitigation.**
www.grida.no/_res/site/file/publications/natural-fix/BioseqRRA_scr.pdf

Ramsar's mission is:

"The conservation and wise use of all wetlands through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world".

To find out more about the Ramsar Convention and its work, visit the Ramsar website, managed by the Ramsar Secretariat and updated daily:
www.ramsar.org

Please send your report on your World Wetlands Day activities to:
wwd@ramsar.org

Ramsar Convention Secretariat
Rue Mauverney, 28
1196 Gland, Switzerland
Tel : +41 22 999 0170
Fax : +41 22 999 0169
email : ramsar@ramsar.org

Creation by Pepper studio © Photos : P. Lebedinsky, Y. Perchenanciet L. Clément, E. Beracassat, M. Evdokunin, G. Bigorgne, S. Carnbon, C. Lips, Y. Gretak, A. Cordin, Thierry Clavé, Samantha ROCHE, Bilderbox, AustralianDream, Humafarma, Olivier Callarizo, Morris White - Fotolia / David Rogers / Service de renaturation des cours d'eau - DT Genève — 09-2009