

## Talking climate change

MOHAMMAD REAZUDDIN

**H**UMAN activities are increasingly altering the Earth's climate. These effects add to natural influences that have been present over Earth's history. Scientific evidence strongly indicates that natural influences cannot explain the rapid increase in global near-surface temperatures observed during the second half of the 20th century.

The climate system is relentlessly changing, and change may be rapid. The immediate causes of this change are the emissions of greenhouse gases from energy production and consumption, agriculture, transport and ecological processes. Behind these sources of greenhouse gas emissions are broader driving forces related to economic transformations, prospects for alternative energy pathways and equity across regions and populations. For many, emissions of greenhouse gases are necessary for survival; for others, they result from luxury consumption and lifestyles.

The last few centuries have seen startling transformations in human history and, especially, how we use our environment. The Industrial Revolution led to vast improvements in livelihoods and a rapid growth in greenhouse gas emissions as fossil fuels, beginning with coal, were used more intensively. With the internal combustion engine and transportation, new technologies fed demand and welfare, and further accelerated emissions. Technological capabilities

and growing populations contributed to changing land use and deforestation.

Historically, industrialised nations relying on fossil fuels have played a major role in increasing concentrations of carbon dioxide, and they remain the key emitters today. Focusing on energy needs for economic development, rather than for sustainability, industrialised countries invested heavily in carbon-intensive technologies, such as coal-fired power plants, massive road systems, and electrical grids. Globalisation has made extensive transportation of goods and services the norm, and access to foreign markets crucial for economic growth.

Our future is partly dependent on the path established by past developments. With some greenhouse gases remaining in the atmosphere for centuries, historical emissions have guaranteed the inevitability of climate change for several decades, regardless of policy responses. And the burden of impacts is likely to be most serious in developing countries, even though they have contributed little to historical emissions. This imbalance between responsibility for the current causes of climate change and its impacts creates an enduring global inequity. While the economies of developing countries such as China and India are growing rapidly, leading to greater energy use and higher living standards, other countries cannot afford national electricity grids, much less energy-intensive luxuries.

For the last few years, Bangladesh has been able to exert itself as the 'spokesman' for 49 LDC countries. At Nairobi, Bangladesh on behalf of the LDCs, submitted a conference room paper outlining principles and modalities for operationalisation of the Adaptation Fund. The meeting accepted this paper as basis for discussion during negotiation and finally proposals put forward in the conference room paper by Bangladesh were agreed upon by the parties with minor amendments. This has been a major achievement and recognition for Bangladesh in the climate negotiation arena.

The strength and momentum of these driving forces, the entrenched commitment to carbon-intensive economies, and the relationship between luxury consumption and basic needs are all part of the challenges in achieving reduction in emissions.

### Responding to change

The challenges of mitigating and adapting to climate changes are unprecedented, but not insurmountable. There are key elements and institutions to build upon; equally there is much to be done and delay will result in higher future costs. The scale of reduction in greenhouse gas emissions to safer levels requires truly international cooperation. A twin goal must be to facilitate adaptation among those least able to protect themselves from climate impacts.

The recent release of the Stern Report on the economics of climate change is the latest call to action. The day approaches when humanity no longer has the option of staying as far below 2 degrees global warming as possible. Business as usual will mean even greater warming and risk up to 20 per cent of the value of the global economy. The cost of taking action

will be far less than the cost of impacts.

The UN Framework Convention on Climate Change (UNFCCC) aims to stabilise greenhouse gas emissions at a level that would prevent dangerous anthropogenic [human-induced] interference with the climate system.

This level should be achieved within a time-frame that allows ecosystems to adapt to climate change, ensures that food production is not threatened, and enables economic development to proceed in a "sustainable manner". Agreed in Rio in June 1992, the Convention came into force in March 1994.

The Convention places the initial onus on the industrialised nations and 12 economies in transition to reduce their emissions, and finance developing countries' search for strategies to limit their own emissions in ways that will not hinder their economic progress.

The Convention is a flexible framework, clearly recognising that there is a problem. The first addition to the treaty, the Kyoto Protocol, set targets for reductions in emissions. Adopted in 1997, it came into force in February 2005. The USA and Australia have signed the Convention but not the

Protocol, creating uncertainty around the next steps.

Both UNFCCC and Kyoto Protocol are now under implementation. UNFCCC for 12 years and Kyoto Protocol for two years. Implementation of the Commitment with regard to emission reduction, technology transfer and capacity building under UNFCCC and Kyoto Protocol still remains a far cry. Few fund namely Least Developed Countries Fund (LDCF) and Special Climate Change Fund (SCCF) under UNFCCC for meeting the adaptation need of the developing countries, in particular the Least Developed Countries (LDCs), have been established. Vulnerable countries are yet to get benefit with support from this fund as size of the fund don't match with the requirement of adaptation needs of the vulnerable countries. Bangladesh has prepared its "National Adaptation Plan of Action" to fulfill the primary conditionalities for accessing funds from these two sources.

### Nairobi meeting

The Twelfth Conference of the Parties and Second Meeting of the Parties to the Kyoto Protocol (COP 12 and COP/MOP) was held in

Nairobi from 6 to 17 November 2006. It was a crucial meeting for discussing the issues like deeper cut emission reduction in the industrialised countries in coming years, adaptation needs of the Developing Countries, in particular the Least Developed Countries (LDC), and how to bring back USA and Australia under the Kyoto process including meaningful participation of bigger economies in developing countries in emission reduction. The first challenge was to agree on the principles and modalities for the "Adaptation Fund", the only fund established under the Kyoto Protocol, from 2 per cent levy on Clean Development Mechanism (CDM) projects which is going to be the principal fund for meeting adaptation needs of the developing countries, and to move forward adaptation negotiation from the planning and assessment stage to implementation & practical action. This challenge has been met. Principles and modalities of the adaptation fund have been agreed by the Parties with one country one vote in the governance of the fund and an executing agency for operationalisation of the fund to work under the direct authority and

guidance of COP/MOP. The five-year programme of work on adaptation on concrete activities has also been agreed upon. On Transfer of Technologies and the Clean Development Mechanism, the main vehicle for implementation of the Kyoto Protocol, the outcome is discouraging. Though institutional and technical capacity building needs of the LDCs for CDM have been agreed upon but without an agreement on concrete measures with regard to technology transfer. On emission reduction commitments for the developed countries and to build incentives for synergy between sustainable development and climate change mitigation, discussions have not much progressed. The negotiators need to work hard in future meeting to find a way forward for an equitable and effective future climate change regime that evades us to stabilise atmospheric concentration of greenhouse gases while at the same time allowing economic development to proceed in a sustainable way.

### Score card of Bangladesh

For the last few years, Bangladesh has been able to exert itself as the spokesman for 49 LDC countries. At Nairobi, Bangladesh on behalf of LDCs, submitted a conference room paper outlining principles and modalities for operationalisation of the Adaptation Fund. The meeting accepted this paper as basis for discussion during negotiation and finally proposals put forward in the conference room paper by Bangladesh were agreed upon by the parties with minor amend-

ments. This has been a major achievement and recognition for Bangladesh in the climate negotiation arena. Bangladesh also demanded compensation for climate victims, including immediate adaptation needs of the millions and raised the issue of Climate Refugees to be addressed in future commitments. Bangladesh has also proposed to draw on additional resources including levies on other flexible mechanisms such as Joint Implementations and Emission Trading and on International Aviation for Adaptation Fund for generation of more fund for adaptation needs.

Bangladesh has also made a plea that climate change adversely affects the poorest most and hence adaptation activities through country participation with the help of microfinance could be a way forward to address their woes. In the high level segment, the leader of Bangladesh delegation in his statement stated that "Bangladesh has made significant progress in microfinance, and this is also demonstrated in the recent recognition given to Dr. Mohammad Yunus and the Grameen Bank by awarding the Nobel Peace Prize this year. This achievement clearly establishes the ground to explore for new opportunity to service our needs and requirement through microfinance and insurance.

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## The planet in peril

JIM HANSEN

(This is the second and concluding part of the article. The first part was published on November 24)

**T**HE threat to the planet from global warming is clear. Fortunately, so are the solutions. Despite what naysayers claim -- that energy-use patterns cannot be altered to any great extent -- real change is possible given the political will to enact it. If such change is not enacted, however, pessimistic prophecies become self-fulfilling, especially with government subsidies and intensive efforts by special-interest groups to prevent the public from becoming well-informed.

In reality, an alternative scenario is possible -- and the US could take the lead. In response to oil shortages and price rises in the 1970s, the US controlled its energy use by requiring an increase from 13 to 24 miles per gallon in the auto-efficiency standard. Economic growth was decoupled from growth in the use of fossil fuels, and the efficiency gains were felt worldwide. Global growth of CO2 emissions slowed from more than 4 percent each year to between 1 and 2 percent growth each year.

The US maintained the slower growth rate despite lower energy prices. Yet the US is only half as efficient in energy use as Western Europe, which encourages efficiency by fossil-fuel taxes. China and India, using older technologies, are less energy-efficient than the US and have a higher rate of CO2

emissions.

Available technologies could improve energy efficiency, even in Europe. Economists agree that the potential could be achieved most effectively by a tax on carbon emissions, although only strong political leadership could persuasively explain the case for such a tax to the public. The tax could be revenue-neutral. Consumers who make a special effort to save energy could gain; well-to-do consumers who insist on three Hummers would pay for their excess.

Achieving a decline in CO2 emissions faces two obstacles: the huge number of vehicles that are inefficient in using fuel, and continuing CO2 emissions from power plants. Automakers oppose efficiency standards, prominently advertising their most powerful vehicles, which yield the greatest short-term profits. Coal companies want new coal-fired power plants built soon, assuring their long-term profits.

The California legislature passed a regulation requiring a 30 percent reduction in automobile greenhouse gas emissions by 2016. If adopted nationwide, this regulation would save more than \$150 billion annually in oil imports. By fighting it in court, automakers and the Bush administration have stymied the California law, which many other states stand ready to adopt.

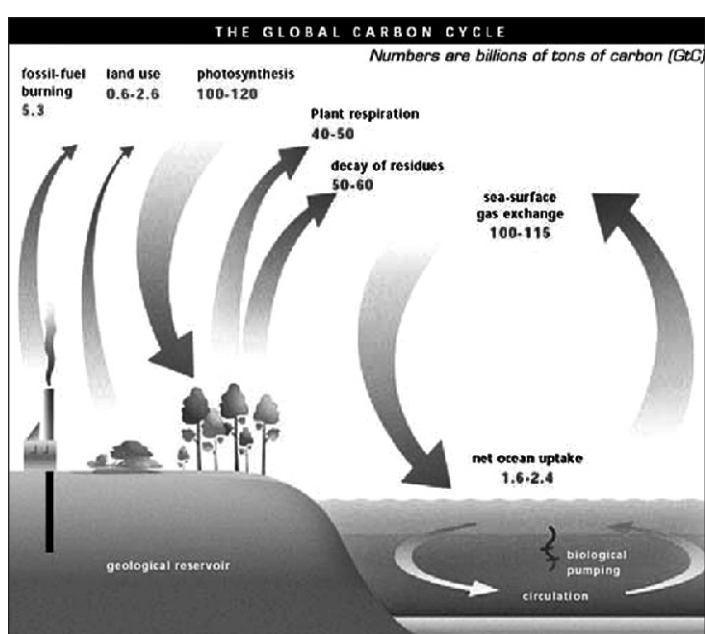
The world must delay construction of new coal-fired power plants until the technology needed to sequester CO2 emissions is available. In the interim, new electricity

The world needs politicians with courage to explain what is needed. Indeed, Al Gore, with his movie and book of the same name, "Inconvenient Truth," was prescient. For decades he maintained that the Earth teeters in the balance, even when doing so subjected him to ridicule. By telling the story of climate change with striking clarity, Gore may have done for global warming what "Silent Spring" did for pesticides.

requirements should be met with renewable energies. Much could be done to limit emissions by improving fuel-efficiency standards in buildings and appliances. Such improvements are entirely possible, but require strong leadership.

The Kyoto Protocol encouraged developed countries to decrease emissions slowly early in this century and extended help to the developing countries for adopting "clean" energy technologies that limit the growth of their emissions. Delays in that approach -- especially US refusal to participate in Kyoto and improve vehicle and power-plant efficiencies -- and the rapid growth in the use of dirty technologies resulted in an increase of 2 percent per year in global CO2 emissions during the past ten years. If such growth continues another decade, emissions in 2015 will be 35 percent greater than they were in 2000.

Any responsible assessment of environmental impact must conclude that further global warming exceeding 2 degrees Fahrenheit is dangerous. Yet because of the warming bound to take place, from continuing long-term effects of greenhouse gases and energy systems now in use, the world will exceed the 2-degree limit unless a change in direction begins this



decade. The public can act as our planet's keeper. The first human-made atmospheric crisis emerged in 1974, when chemists reported that chlorofluorocarbons (CFCs) might destroy the stratospheric ozone layer that protects the Earth from

the sun's ultraviolet rays. How narrowly we escaped disaster was not realised until years later.

Production of the useful aerosol propellant, fire suppressor and refrigerant fluid increased 10 percent per year for decades. If this business-as-usual growth of CFCs

had continued just one more decade, it would have caused a larger greenhouse effect than CO2.

Instead, the media reported chemists' warning, and consumers boycotted frivolous use of CFCs as propellants for hairspray and deodorant. Annual growth of CFC usage plummeted to zero. The principal CFC manufacturer developed alternatives. When the use of CFCs for refrigeration began to increase and a voluntary phaseout of CFCs proved ineffective, the US and European governments took the lead in negotiating the Montreal Protocol to control CFC production. Developing countries received financial assistance to construct alternative chemical plants. As a result, CFC use is decreasing. The ozone layer will recover.

Yet the same scientists and political forces that succeeded in controlling the threat to the ozone layer now fail in controlling the global-warming crisis. There is plenty of blame to go around: Scientists present facts about climate change clinically, failing to stress that business-as-usual will transform the planet. The media, despite overwhelming scientific consensus concerning global warming, give equal time to fringe "contrarians" supported by the fossil-

fuel industry. Special-interest groups mount disinformation campaigns, sowing doubt. The government fails to provide leadership.

Leaders with a long-term vision would place value on developing efficient energy technology and sources of clean energy. Rather than subsidising fossil fuels, the government should provide incentives for companies to develop alternatives. Instead, politicians cast policies that favour short-term profits of energy companies as providing jobs, in the best economic interests, taking no account of the mounting costs of environmental damage or future costs of maintaining the fossil-fuel supply.

Today's leaders won't pay for the tragic effects of a warming climate. If we pass the crucial point, history will judge harshly the scientists, reporters, special interests and politicians who failed to protect the planet. But our children will pay the consequences.

The US has heavy legal and moral responsibilities for global warming -- and cannot claim to be ignorant of the consequences. Of all the CO2 emissions produced from fossil fuels so far, the US is responsible for almost 30 percent. Runners-up China and Russia each have less than 8 percent.

By refusing to participate in the Kyoto Protocol, the US delayed implementation and weakened its effectiveness, undermining international attempts to slow emissions of developed countries.

It is not too late. The world has at most ten years to alter the trajectory of global greenhouse emissions. If

we follow an energy-intensive path of squeezing liquid fuels from tar sands, shale oil and heavy oil, and do so without capturing CO2 emissions, climate disasters are unavoidable.

A good energy policy, economists agree, is not difficult. Fuel taxes should encourage conservation. With slow, continual increases of fuel cost, energy consumption will decline without harming the economy. Quality of life need not decline.

The world needs politicians with courage to explain what is needed. Indeed, Al Gore, with his movie and book of the same name, "Inconvenient Truth," was prescient. For decades he maintained that the Earth teeters in the balance, even when doing so subjected him to ridicule. By telling the story of climate change with striking clarity, Gore may have done for global warming what "Silent Spring" did for pesticides. He is under attack, but the public now has the information needed to distinguish our long-term well-being from short-term special interests.

Perhaps the country came close to having the leadership it needed to deal with a grave threat to the planet, but did not realise it.

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## IMPROVING WATER PRODUCTIVITY

# How can we get more crop per drop?

MD SAIFUL HAQUE writes from Stockholm

**A**GRICULTURE currently consumes 70 percent of the world's developed freshwater supplies. If current trends continue, the water crisis -- which is already beginning to rear its head in many countries through depleted groundwater aquifers, dried-up rivers and wetlands, and frequent water shortages -- will indeed become a global problem.

A recent study by the International Food Policy Research Institute (IFPRI) and International Water Management Institute (IWMI) projects that if present trends continue, by 2025 competition from growing cities and industry worldwide will limit the amount of water available for irrigation, causing annual global losses of 350 million metric tons of food production. The environment will also sustain further damage, as water from this already thirsty sector is diverted to agriculture, households and industry. And if levels of investment in sustainable water policy and management decrease over the next 20 years, the result will be major declines in food production, thereby skyrocketing food prices.

By improving the productivity of water used for agriculture by 40 percent, it's possible to reduce the amount of additional freshwater withdrawals needed to feed the world's growing population to 0. Research done over the past decade shows that by improving the productivity of water on irrigated and rain-fed lands, we can have enough water for cities, industry and nature. But this requires a commitment to institutional and management reforms, and substantial investment in crop research, capacity building,

technology and infrastructure.

Agriculture is the mainstay of the economy of Bangladesh though in recent years, emphasis has been given on industrialisation to accelerate economic growth. Crop production is the largest activity within the agricultural sector, which accounts for about 62 percent of the country's total labour force.

Three major rivers of the world, the Ganges, the Brahmaputra and the Meghna, having a combined catchment area of 1.72 million sq. km. flow to the Bay of Bengal through Bangladesh, a land that constitutes only about 7 percent of the catchment area of these rivers. These, along with other cross-border rivers bringing about 1060 billion cubic metre (BCM) of water into the country. However, the dry season flow (November to April) from these cross-border rivers amounts to only 159 BCM. In the critical dry month of March when the water demand is at its peak, the river flows reduce to a mere total of 18 BCM, which is far below the total demand.

On top of all, due to building dams and barrages unilaterally in the major transboundary rivers in the upstream by neighbouring India, the whole northern region of Bangladesh, the lowest riparian of these rivers, is being desertified. Conversely, siltation of river beds caused by huge sediments carried by rivers from upstream countries decelerates drainage and accentuates the intensity of floods. Moreover, lack of governance coupled with inefficiency and rampant corruption in our public life has been aggravating the situation.

There's a further complication that as the country is mostly flat the storage possibility in the country is virtually non-existent. Joining in these, rivers aren't dredged properly,

Increases in water productivity are necessary to solve many of the problems of the water crisis, but they're not sufficient. It's imperative that these be accompanied by a poverty focus to help the poor reap the gains of increases in water productivity.

Furthermore, ingress of salinity due to reduced upland flows during the dry season affects about two million hectares of land in the southern belt of the country. And groundwater recharge is about 22 BCM annually. But, the incidence of arsenic contamination of groundwater now calls for very restricted use of this resource. Also, rainfall in the dry season is very erratic and negligible.

The highest demand for consumptive (withdrawing) use of water is from the agricultural sector while huge amount of water is needed in-stream too for navigation, fish and above all, environmental protection. Present demand for potable supply and industrial use is smaller relatively.

Improving the productivity of water used in agriculture is the key to solving many of the problems, as well as managing water as a resource. Getting more crop per drop enhances food security and makes more water available for nature, industry and domestic users. It enables us to reduce the need for investments in new water storage and irrigation infrastructure -- investments many countries like Bangladesh can't afford. By improving the productivity of water on rain-fed lands, we can contribute to the food security and incomes of the poorest people. Many people associate water saving with municipal water use -- encouraging domestic users to practise water conservation and cities to plug up leaking supply systems. While these efforts have localised benefits,

it's important to realise that cities actually consume very little of the world's water. Even in developed countries where most households have easy access to municipal water supplies, a person uses less than 150 litres of water a day. Compare this to the 2,000 to 5,000 litres of water required to produce enough food to feed one person one day and you begin to understand why finding ways of getting more crop per drop is vital to not only the country's future but also the world's future.

### Improving productivity

What actions are needed? There are a variety of interconnected paths that can improve the productivity of water. No single path holds the answer. To be successful we must develop integrated strategies tailored to the needs of our country, the region and river basins.

Crop breeding: Crop breeding over the last century has indirectly increased the productivity of water by increasing yields without increasing crop water demand. It's only in the decade that attention has turned to producing crops that can yield more with less water, withstand water scarce conditions, and thrive on low-quality (saline/alkaline) water. Scientists have already identified traits and genes for drought- and salt-tolerance in a number of crops.

Reducing land degradation: Land and water degradation constrain efforts to improve water productivity. Soil erosion, for example, reduces not only soil's depth but also its

capacity to hold water and the amount of nutrients it contains. There is a common misperception that degradation of the agro-ecosystems is a slow process that can be always reversed with adequate inputs such as fertilizer. But ecosystems are resilient only up to a certain threshold, and can collapse when pushed too far. In many cases, farmers need incentives to make long-term investments in soil conservation practices -- particularly when results from such investments do not have a direct or significant impact on their incomes. Social and institutional factors, such as land tenure, also affect farmers' willingness to invest.

Low-cost technologies: Various forms of precision irrigation -- mainly sprinkler, drip irrigation systems and dead-level basins -- can increase yields over good but ordinary irrigation systems by 20 to 70 per cent, depending on the crop and other conditions, and they do so with much less water diverted to the crop.

Improved irrigation management practices: Perhaps the most important basic principle in irrigation is to deliver a reliable supply of water. In an uncertain environment, farmers will not invest in seeds, fertilizers, and land preparation, and consequently yields and water productivity will suffer.

A second basic principle has to do with timing. At various times in a crop's growth cycle, water stress can be particularly damaging.

Groundwater arsenic poisoning has gripped almost all the 64 districts

of Bangladesh. That's why the nation is desperately looking for an alternative source of water. And there's no other source of water but surface water. Unfortunately, the country's surface water almost everywhere is extremely polluted by free-flowing toxic industrial effluents. The industrialists here are highly influential in society, by virtue of having links with corrupt ruling high-ups. So, nobody dares speak against them, let alone the poor farmers. And here's our major national crisis, which is holding back continuously all our growth.

Integrating recycling and reuse into basin and irrigation management: Water reuse is already becoming an integral part of water management in many water-scarce areas. For example, it's common practice for farmers in Egypt and North China to place small pumps in drainage ditches to reuse water. The irrigation agency supports this reuse strategy by blending drainage water with freshwater to increase the useable supplies.

Many farmers in peri-urban settings rely on wastewater from cities for their crops. Irrigating with low quality water is often the only option; but even when farmers do have access to canal irrigation, many prefer wastewater because they're guaranteed a constant supply, and the nutrients the water contains allow them to save on fertilizer. Pollution and health risks should be considered when crafting reuse strategies. In Bangladesh, wastewater from cities and towns is "openly and freely" mixed with toxic

industrial effluents not caring a damn about environmental and health hazards and laws, most often under the patronage of ruling bigwigs.

### Where more research needed

- Crop breeding for drought tolerance, water conservation, and ability to thrive on low-quality water.
- Understanding the interaction between water management practices at different levels -- field, system, basin.
- Co-managing water for agriculture and the environment.
- Appropriate pro-poor technologies and practices for improving water productivity at field and system levels.
- Policies and incentives needed to implement water-saving technologies and practices.
- How to manage irrigation water for multiple uses -- crops, domestic, other income-generating activities.
- Tools and models to support responsible decision making for valuing the productivity of water in its various uses.

### Policy, institutions and incentives

For any of these strategies to work requires the right set of incentives and support for all the actors involved -- a function of policies and institutions. And capacity building along with social participation is a crucial factor for effective management of water and river basins. Existing institutions for water management must be more efficient and sincere in offering services that will support improvements in water productivity. The country's poor farmers need incentives and subsidies to adopt technologies and practices to make the most of the

water they use.

As competition for water is becoming more intense, how water is managed in one sector often impacts its availability in others. Laws, regulations and organisations should be well defined to encourage water management from a basin perspective.

Another area which should be targeted for reform is subsidies and pricing. In many cases, poorly designed subsidies coupled with corrupt system can actually discourage farmers from getting the most crop per drop.

Increases in water productivity are necessary to solve many of the problems of the water crisis, but they're not sufficient. It's imperative that these be accompanied by a poverty focus to help the poor reap the gains of increases in water productivity. Attention needs to be given to establishing and maintaining access to water for domestic uses and income generation, and affordable water-productivity-enhancing technologies, and giving the poor a voice in water decisions.

Whose responsibility is it? Increasing water productivity requires the coordinated set of actions from a range of people: policy makers, recourse managers, farmers, fishermen, and water managers; researchers from agronomy, water resources, irrigation, and natural resources management; and in fact all of us who care about influencing policies about how water is used. Finally, a good regional cooperation is essential for sustainable water management from a basin perspective.

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