

# Dark Skies, Stormy Waters

Why we need to think about water and climate



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### ***Water***

Over the past 100 years, the world population has tripled, and the amount of water we use increased six fold. Water managers are struggling to meet our ever-increasing demands on the most precious of natural resources. For our food, our industries, our health. Not to mention our ecosystems.

### ***Climate***

There is very compelling evidence that the earth's climate is changing faster than ever before. Global temperatures and sea levels have been rising. Alpine glaciers and polar ice caps have been melting. And over the past 30 years, extreme weather events like floods, droughts and hurricanes have increased in both strength and frequency.

But why should we concern ourselves with something like climate change? After all, climate has always been subject to change. Some years are colder or warmer than others, some seasons wetter or drier.

### ***There are two good reasons***

First, we know more about climate than ever before. We can make better predictions and therefore better prepare ourselves for what's coming. Second, there are more of us humans on this planet than ever before. We are more vulnerable than ever.

We can't think about water without thinking about climate. They're inextricably linked.

**“Is this specific drought (due to) climate change? We don't know. But it is the kind of thing we'd better plan for.”**

*Peter Gleick, referring to the current drought in the United States, as cited in the U.S. News & World Report, May 20, 2002*





# Dark Skies, Stormy Waters

After we turn off the television...

*Most of us are familiar with floods, droughts, hurricanes, and other extreme climate events. The more fortunate among us mainly read about them in newspapers and catch the “highlights” on the evening news. The images can be vivid and the stories of personal loss heartbreaking. We sympathise with those affected, and are thankful for our own comfort and safety. But what happens after we turn to the sports section? After we turn off the television?*

The International Red Cross reports that from 1991 to 2000, over 600,000 people were killed by hydro-meteorological catastrophes alone and that each year, 210 million people are affected by ‘natural’ disasters. The use of the term *affected* does not really do justice to the impact that extreme weather can have on people. It goes well beyond a mere inconvenience, like a temporary loss of electricity or running water. Affected people can lose their possessions, their homes, their livelihoods – even their lives.

## The mother of all El Niños

In 1991-92, during a strong El Niño<sup>1</sup> event, a major drought caught the government of a southern African country off guard. Although the drought had been predicted by climatologists, the government had failed to advise the country’s farmers about the threat to their crops.

In 1997, when word came of another El Niño, everyone was far better prepared. But El Niños<sup>2</sup>, like children, are unique. This El Niño was going to be relatively ‘weak’. For this country, this meant dry conditions late in the summer, but normal conditions earlier in the season, when crops are planted. The government made several efforts to make this information available to its farmers.

Some farmers heeded this warning and planting drought-resistant crops early in the season. Others did not fare as well. They had made their decisions based on stories in the media that had predicted a major drought caused by the “mother of all El Niños”.

Sadly, many of these farmers still do not believe in long-range climate forecasts.

Real Life

<sup>1</sup> An ‘El Niño’ is essentially an above-average warming of surface waters in the Pacific Ocean  
<sup>2</sup> Niño is Spanish for child

Hold on, there's more.

Over the past 30 years, extreme weather events like floods, droughts and hurricanes have increased in both strength and frequency. And the impact has never been felt by so many people. To make things worse, these events – and the suffering and damage they bring – are expected to continue increasing as a result of global climate change.

**“Human societies are very vulnerable to climate extremes (droughts, floods, wind storms). A changing climate would entail changes in the frequency and/or intensity of such extremes. This is a major concern for human health.”**

*World Health Organisation, 2001*

Whether or not climate change is the result of human activity is of little consequence. Whatever the cause, the bottom line is clear: if we don't act now, we'll face daunting scenarios in the future. This brochure describes how we can use what we have recently learnt about climate to make the world a better, safer place for us all.

We will also visit a few places deeply affected by climate and hear from some of the people who are trying to make a difference.

Please join us.

## No voice, no choice

Those most vulnerable to extreme climate events are the poor. On a global scale, the world's most disaster-afflicted areas also happen to be the least developed. Droughts in Ethiopia, floods in Bangladesh, hurricanes in the Dominican Republic. When these events happen, when the suffering and hardship reach a newsworthy level, the effects are felt around the world. Relief efforts are mobilised, public figures such as actors and musicians help raise funds, and international goodwill organisations fly in much-needed aid and assistance. Disasters can be very effective fund-raisers.

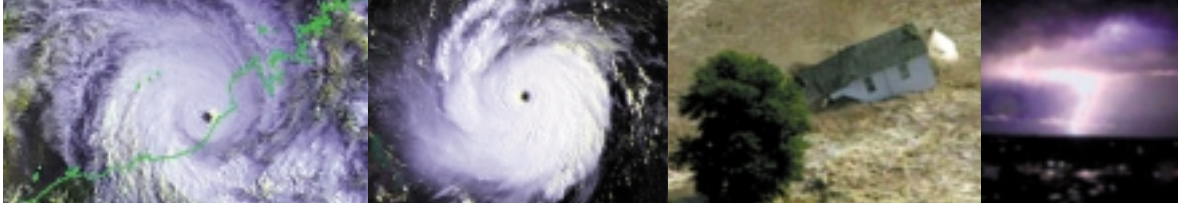
Clearly, post-disaster recovery efforts are good deeds guided by good intentions. But such efforts are costly and nearly always temporary. What if we could take steps to alleviate some of the suffering *before* it happens? We obviously can't prevent floods, droughts or hurricanes. But can we better prepare ourselves *before* they happen?

The answer to both these questions is: **Yes, we can.**

The tougher question, the true question facing you and me, and the politicians that represent us, is 'are we willing to pay the price?'. Those who are most affected have an answer, one they've been trying to tell us for some time. It just seems that nobody's listening.

The Dialogue on Water and Climate is trying to get politicians to listen.





## Roberto Lenton – Argentina

“Water is vital to life, and potentially our most serious threat to development. An example: In Northeast Brazil – a poor, dry region in Brazil, periodic droughts have a devastating effect on the economy and population. However, these droughts are beginning to be predictable using climate modelling techniques. Our institute has been working with the Government of Ceara State for the creation of an early warning system that will help government agencies and local authorities to implement drought-alleviation policies – providing guidance to farmers on drought-resistant crops and when to plant them, limiting water consumption in towns and cities, and so on. Experience with recent droughts in the state has shown that early warnings can help in significantly reducing the impacts of drought.

What is the potential of early warning systems for helping poor countries cope with climate variability? Given the greater vulnerability of the poor to climate variability, developing countries could benefit disproportionately from the use of climate information and forecasts. But appropriate institutions and policies will be needed to ensure that the poor gain access to this information.

Greatest awareness of the need to conserve water only will come about when the situation hits home. Take the drought in the Northeast of the US this winter and early spring. New York City launched campaigns urging people to conserve water, and the city's inhabitants reacted accordingly. Many crises are blessings in disguise; in the end you need some kind of warning bell that signals to people that they should not take water for granted. The difficult thing is to make sure that when the crisis ends, good water conservation practices are sustained rather than abandoned.”

*Dr Lenton is Executive Director of the Secretariat for International Affairs and Development at the International Research Institute for Climate Prediction*

## Living on the edge

Of course, we all experience the effects of climate variability no matter where in the world we live, even in most developed countries. This past spring, water reservoirs around New York City were filled to less than 40% of capacity. New Yorkers, though, can adapt to drought – they have the means. They may not be allowed to wash their cars or water their lawns, but they will still have clean drinking water for months to come.

But when droughts affect large cities in developing countries, the impact is much more threatening. And the people that suffer the most are the poor, those living in shantytowns on the edges of the cities, those who have no choice but to get whatever water they can find in polluted ditches.

## Arun Kashyap – India

"The urban areas in India face serious water shortages every summer. Water is only available for limited hours in the morning and evening. Every year on a global level a large number of children and poor die from a lack of potable water. Quite frankly, I think it's a shame for us all. I'm afraid that problems will be more extreme because of climate changes. Steps are needed, especially in the area of environmental governance. While the world has sent expeditions to Mars, in search of water, we cannot get our act together here on earth. We have to do this very quickly. At all levels people must do something: in the private sector, policy makers, civil society, and individuals.

We will be in deeper trouble if we continue to ignore the need to preserve ecological and environmental integrity in the development processes.

We must contemplate what we will leave our children. Awareness of the problem is a first step. We as citizens of the world need to know what's lying ahead and what our options are. We must remind our leaders and policy makers that we are worried about the quality of life of the poor and disadvantaged, of our children. That we are worried about environmental problems like climate changes and about the water crisis. The situation is urgent. If we do not act now, all of us will have to pay a higher price in the future."

*Dr Kashyap is Climate Change & Clean Development Mechanism Policy Advisor for the United Nations Development Programme*

As the global population increased over the last century, more and more people have been forced to live on the fringes of society. They struggle to survive, living in the places that are most vulnerable to natural disasters. In shantytowns, in flood plains, on mountainsides. Not only are they the most vulnerable and the most affected, they are the least capable of doing anything about it.

**"Poverty... plays a big role in keeping people vulnerable to disasters. And in the same fashion, disasters keep the poor in poverty by consistently wiping out the few resources they have"**

*World Bank, 2000*

## Taking chances

From tourists vacationing in the Canary Islands to farmers in Kenya preparing to harvest the season's crops, we regularly plan our activities around weather forecasts. We choose to be informed because we are aware of the risks of *not* knowing what the weather is expected to be. Sometimes forecasts are a little off the mark, sometimes completely wrong, but we use them anyway because they are the best information available to us.



Daily weather forecasts are said to be 'probabilistic'. They provide us with a picture of what the weather is likely to be at a certain time in the future. In the past, it was virtually impossible to predict weather more than 4 or 5 days in advance. But there are now ways of forecasting what the climate might be several months in advance. For instance, if there is an El Niño developing, there might be a 70% chance of drought in East Africa or a 65% chance of increased rain in Southeast Asia that could lead to flooding.

## David Scott - New Zealand

"Changes in rainfall patterns associated with the El Niño Southern Oscillation (ENSO) have significant impacts throughout the Small Island Countries of the South Pacific. Drought conditions experienced during the 1997-98 El Niño were extreme in many parts of the region and particularly affected those small islands which have no surface-water resources and a limited capacity to sustain groundwater resources. In the Ha'apai Group in the Kingdom of Tonga drought conditions were so severe that it became necessary for emergency water supplies to be shipped to some of the very small islands in the Group. A post-emergency groundwater survey has concluded that the combination of remoteness and smallness makes the development of a groundwater resource very problematic, even if it already exists. The survey confirmed the need to rely on tank storage of roof water with backup to emergency supplies being provided by ship. In extreme drought conditions island inhabitants may even have to temporarily migrate to other parts of the country. Early warning of impending climate anomalies will allow more effective management of these drought episodes. I hope that recent advances in understanding and monitoring climate patterns will allow better drought management for the people living in the Ha'apai Group and in other small, remote islands throughout the region."

*Mr Scott is a groundwater hydrologist for the South Pacific Applied Geosciences Commission (SOPAC)*

close up

In the last decade, our capacity to predict climate, even several months in advance, has increased dramatically. And the predictions becoming more accurate every day. This is due in part to better knowledge of *El Niño* and other phenomena that influence climate, and in part to better models and more powerful computers. Like our daily weather forecasts, they will never be 100% accurate. But we can use them to make better decisions about how we manage our water and prepare for natural disasters.

Yet in order to do this we need to understand how to interpret long-term forecasts, and learn how these insights can be applied.

The Dialogue on Water and Climate is seeking ways to make this information available.

## The shrinking Island of Tuvalu

Tuvalu, a little island chain between Australia and Hawaii, suddenly becomes world news. It's an example of local change abruptly wrought by the Internet 'bubble'. The official abbreviation of Tuvalu is 'TV', and in Internet jargon this means big money. This little island group of 10,600 people was offered \$50 million for the sale of the extension 'TV' after the dot on Internet addresses. All at once there are new roads, hospitals and schools in sight for the quiet islands of Tuvalu. But there's a flip side: The sea level is rising, and it's only a matter of time before Tuvalu sinks into the sea. Climate change is casting its shadow over this tropical island. Technological progress, ironically, made Tuvalu rich and at the same time might lead to its demise. In September 2000 Tuvalu used some of its dot-TV money to join the United Nations. It is now the job of its UN ambassador, Enele Sopaga, to disseminate news of global warming on the world stage.

It might be too late to save Tuvalu, but there are other treasures worth protecting.

## Talking, learning, understanding

Water managers, from dam and reservoir operators to city disaster managers – not to mention farmers – are particularly likely to benefit from climate forecasts, be they daily, weekly or seasonal. So why haven't people in the water sector been using seasonal forecasts as we do daily forecasts?

Part of the answer is that the water and climate communities haven't really been communicating. The accuracy of long-term forecasts has only recently enabled climate scientists to offer something useful to water resource managers. As a result, water resource managers don't necessarily know what type of climate forecasting information is available or how to use it. Climate scientists, on the other hand, may not be entirely sure what type of information water managers need.

## Roland Schulze – South Africa

"South Africa is very fortunate in the sense that it has a sound legislative foundation in the 1998 National Water Act. We're talking about a dry country with a relatively high level of development, lots of industry. There's enough water for some, too little for others. Our goal is to create enough water for every sector, using the slogan 'some for all, not all for some'. The biggest difference can be made in agriculture, if we learn to use water more effectively there. The government is making people more 'water aware', also by charging levies.

My biggest hope for the future is that we can create properly integrated water resources, not only covering engineering aspects. We have a great water law; now we have to effectively apply it. The problem is a lack of human resources, in capacity-building and training; finding the right people and getting them interested. Our goal is indigenous capacity-building, training our own people with our own people to solve our own problems.

My biggest fear is that after doing a lot of talking, we won't do enough 'doing'. People should get the feeling that sustainability is essential, that it is our future."

*Dr Schulze is professor of hydrology at the School of Bio resources Engineering & Environmental Hydrology, University of Natal*

## An ounce of prevention

So the knowledge needed to better predict climate is out there. And it's developing quickly. But how does this help the poor farmer in the Sahel who's just about to plant a crop of maize? Well, if he is aware that this year's rainy season may not be very wet, he can try to plant a drought-resistant strain that his government, having been alerted to the probable drought, has made available to him and his neighbours.

Close Up



Knowing that a flood or drought is likely to happen is one thing, but preparing for it is another matter entirely. Why should we even wait for an extreme weather event to be predicted before we start doing something about it? Although we don't know exactly when the next hurricane will strike Honduras or when the next major flood will hit Mozambique, we do know these events are more likely to happen sooner or later. So why haven't we started preparing?

Because it's expensive, it's that simple.

## Ainun Nishat – Bangladesh

Close Up

'In Bangladesh the lean, dry season is from November to April. In order to grow boro rice we need irrigation. The population is rising, so in order to keep up with growing demand we have to grow more food. However, climate variability will have a direct impact on the harvest. With the arrival of a drought we have no alternatives. We cannot use ground water because pumps are not operative. In general the demand for water will go up. During the monsoon the problem reverses. Due to climate variability we have more rain than usual, leading to serious floods. The area around Dhaka is surrounded by a river network. Because there are no pumps, when the water level in these rivers rises the population in Dhaka is in acute danger. To translate this into simple figures: in 1991 a quarter of Bangladesh was flooded and 138,000 people died. If the sea level rises one meter, 25 million people will be affected.

In my opinion the answer is not building bigger and higher dikes. I feel we have to rely on traditional knowledge. Using a variety of crops during a short growing period, for instance. We have to warn the local people in advance in a language they understand. El Niño means nothing to a poor farmer in Bangladesh. Raising dikes creates a false sense of security. We have to take steps that are appropriate for a specific region. Chittagong is hilly, Dhaka is flat, and they each need a different approach. In the coastal area there are water surges of seven meters. What we have done is to create shelters in the form of schools. In normal times they are used for education; in an emergency they can be a shelter for the whole village. I am not pessimistic about the future. People are resilient all over the world. If we know what problem is coming, we can help the people concerned.'

*Dr. Nishat is Bangladesh's Country Representative for IUCN, The World Conservation Union, and Professor of Water Resources Engineering*

Yet it is not as expensive as the costs of relief and recovery. Raising funds for relief may be much easier after a disaster, but for many of those affected, the aid comes too late. By investing now and investing wisely, we are not only giving people a chance to lessen their suffering, we are saving the money we would eventually have to spend on disaster recovery.



## Just a matter of time

Uncertainty is often cited as a reason to delay action on climate change: Why take steps to deal with something we know so little about? But the truth is, we act upon uncertainty every day. When we buy insurance, for example. We know that the climate is changing, and that extreme weather events are increasing. Stronger hurricanes, more severe floods, longer droughts. We don't know exactly when or where the next disasters will strike, but we know it's just a matter of time.

The Dialogue on Water and Climate encourages us to prepare for uncertainty.

**“Lifting people out of poverty is the best way to reduce the number who have to be pulled out of the mud, flood waters or drought when disaster strikes. Investment in local-level economic recovery is better at creating disaster-resilient communities than investment which depends on dams, dikes and concrete.”**

*International Red Cross, 2001*

## Antarctic Ice Sheet

The biggest cinema hit of the '90s was *Titanic*. It is a movie about men against nature, about thousands drowning because an 'unsinkable' ship sank. These days the tables are turned. No longer do the mountains of ice threaten humans. Mankind, whether through global warming or another environmental transgression, is affecting the ice caps of Antarctica.

'A vast mass of ice in the Antarctic Peninsula has collapsed and broken into thousands of icebergs in the biggest such event in 30 years. Scientists at the *British Antarctic Survey* said they had expected the 220-meter-thick (720-foot-thick) floating ice sheet to disintegrate eventually, but the speed at which it had done so was "staggering", according to David Vaughan, a British expert on glaciers.' (*International Herald Tribune*, March 20, 2002)

Just one of the effects of this is that thousands of penguins are forced to travel more than 30 miles daily to find fish and other nourishment for themselves and their young. Scientists are confused: 'It was hard to believe that 500 billion tons of ice have disintegrated in less than a month.'

Real Life

The Dialogue on Water and Climate is an international effort to bridge the information gaps between the water and climate communities. Through participatory activities around the world, the Dialogue is raising awareness about these issues and identifying ways of coping with and adapting to climate variability and change.

Dialogue activities are ongoing throughout the world, including:

Countries	Basins	Regions
Bangladesh	San Juan (Costa Rica/Nicaragua)	South Asia
Russia	San Pedro (Mexico/USA)	Central America
USA	Thukela (South Africa)	Caribbean Islands
Netherlands	Lena (Siberia)	Pacific Islands
	Murray-Darling (Australia)	West Africa
	Yellow River (China)	Southern Africa
	Nagoya (Japan)	Mediterranean
		Aral Sea (Central Asia)

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The International Steering Committee of the Dialogue includes FAO, GWP, IPCC, IUCN, IWA, NWP, UNESCO, WWC & WWF<sup>3</sup>, and the World Bank.

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