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Cover photo: "Too much water" - Freetown,
Sierra Leone © Khurshid Alam



Flood waters cascading into the Kroo Bay community, Freetown, Sierra Leone

Photo: © ActionAid Sierra Leone

Flooding and the urban poor

Ian Douglas and co-authors describe how climate change will exacerbate the problems associated with floods in urban areas, with examples from Uganda

Throughout Africa and in many other tropical areas, the urban poor are already forced to live in hazardous places, and climate change is increasing their vulnerability. Many build their homes and grow their food on river floodplains in towns and cities. Others construct their shelters on steep, unstable hillsides, or along the foreshore on former mangrove swamps or tidal flats. Already vulnerable to destructive floods, damaging landslides or storm surges, the poor are facing a worsening situation as the effects of climate change become more marked. Uganda provides a good example of these changes and their effects.

Floods are a natural phenomenon, but damage and losses from floods are the consequence of human action. Even without climate change, urbanisation aggravates flooding by restricting where flood waters can go, covering large parts of the ground with roofs, roads and

pavements, obstructing sections of natural channels, and building drains that ensure that water moves to rivers more rapidly than it did under natural conditions. As people crowd into African cities, these human impacts on urban land surfaces and drainage intensify. The proportions of small stream and river catchment areas that are urbanised increase. As a result, even storms that occur several times a year now produce quite

MAIN POINTS

- **The authors describe** four types of urban flooding and their associated problems, which climate change will exacerbate.
- **They explain** who should manage each type of flooding but comment that while

national or local plans may exist, the ability to implement them is usually weak.

- **They describe** current adaptation activities but call for special assistance to manage climate change impacts.

high flows in rivers because much more of the catchment area supplies direct surface runoff from its hard surfaces and drains. The effects of climate change are superimposed on these people-driven local alterations of the land surface, paths and rates of water flow from storms.

Climate change and flooding

Predictions suggest that the climate in Africa will become more variable with more frequent and severe extreme weather events. The February 2007 Report of the Intergovernmental Panel on Climate Change suggests that while December, January and February rainfall will increase in eastern equatorial Africa, June, July and August rainfall will decrease markedly in both northern and southern Africa. Local variations may, however, be more complex. For example, although southern Africa may be drier in general terms, some countries in the region may become wetter

than the average. The unpredictability of rainfall is shown both by observations, such as the large fluctuations in the levels of Lake Victoria since 1980, and by the experiences of long-term urban slum residents, who report much more frequent storms producing



Inadequate drainage of a squatter settlement on the edge of Lusaka, Zambia

Photo: © Ian Douglas

floods since 1990. Urban areas themselves may help to increase thunderstorm activity because their built-up surfaces attain higher temperatures than surrounding areas and create a local air circulation that produces an 'urban heat-island'. Dust particles caught up in that circulation act as nuclei on which moisture in clouds condenses, so forming rain droplets that may eventually develop into the large rain drops of a major thunderstorm.

Climate change also works in an indirect way to aggravate urban flooding. Droughts and floods in rural areas have left many rural people in such difficulties that they have migrated to towns and cities, often adding large new populations to the existing slum communities. These refugees from the rural areas increase the size of built-up areas and add to the urban activities that increase the speed of flow of rainwater to rivers and thus the intensity of local flooding. If climate change worsens rural drought and flood situations, increasing numbers of displaced rural people may move to cities and indirectly add to the urban flood problem.

Types of urban flooding

Within urban areas, four major types of flooding can be recognised:

- localized flooding due to inadequate drainage;
- flooding from small streams whose catchment areas lie almost entirely within the built-up area;



Sandbags protecting a dwelling from local flooding, Lusaka, Zambia

Photo: © Ian Douglas

- flooding from major rivers on whose banks the towns and cities are built; and,
- coastal flooding from the sea, or by a combination of high tides and high river flows from inland.

Floods of the first and second types are much more frequent than those from major rivers. The fourth type of flooding is particularly frequent where settlements have been built on coastal wetlands and mangrove swamps.

Localized flooding occurs many times a year in slum areas because there are few drains, most of the ground is highly compacted and pathways between dwellings become

streams after heavy rain. Existing drains and culverts are often blocked by waste and plastic debris because the slums lack adequate municipal garbage collection and cleaning services.

Small streams in urban areas rise quickly after heavy rain, but often pass through small culverts under roads. Although adequate to take the flood flows when designed, changes in the urban area and in storm intensity now produce more flows that exceed the capacity of the culverts. The stream channels themselves may have so much debris and urban waste in them that they are effectively smaller than they were in the past. These changes combine to make flooding more frequent.

Major rivers flowing through urban areas are affected by land use changes and engineering works upstream. Dams modify river flows by trapping sediments, sometimes releasing large volumes of water, and by reducing low flows. They have the potential to store floodwaters from upstream, but much depends on how they are operated.

Often natural levees alongside a river provide some protection to the towns and cities through which it passes. However, urban growth has usually expanded over some of the floodplain, making parts of the city below flood level and reducing the area into which floods can naturally overflow. Levees may have been raised artificially, but they can still be breached causing devastating flooding and disruption of large areas of the city for several days or even weeks.

In lowland and coastal cities, wet season flooding may affect some areas for two or more months, because rain and river water combine to raise the levels of water in swamps that would have naturally been inundated at certain times of the year. Dumping of waste beneath dwellings in these areas tends to help raise levels further. Storm waves can also bring flooding to such areas.

Poor people's experiences of flooding

All four types of urban flooding affect the urban poor particularly severely. In Kampala, Uganda, construction of unregulated shel-

witnessed three children dying in the drainage channel. In addition, every year, cholera outbreaks are common in Katanga. The Cholera unit in Mulago Hospital has had to admit a resident of Katanga every year especially when the heavy rains begin. We the poor residents suffer most because floods affect the dwelling units and our water and sanitation. Water costs 100 shillings per 20 litres and every visit to the public toilet costs 100 shillings, which in most cases is not affordable. The Kawempe Division technocrats and political leaders have never visited us. They stay on the tarmac along Bombo Road and

**“‘Nowadays, even a small downpour leads to intense flooding, unlike before when it was only extremely heavy rains that ended into floods’
- urban slum dweller, Kampala, Uganda”**

ters by the poor, in such slums as Kalerwe, Katanga, Kivulu and Bwaise, has reduced infiltration of rainfall, increasing runoff to six times that which would occur in natural terrain. Both the increased storminess due to climate change and the increased covering of the soil with buildings and compacted walkways aggravate flooding.

Kababwezi Keloyi, a 50-year-old resident of the Busia zone in Katanga Wandegeya, who has lived in Katanga for the last 35 years believes that the floods have become severe due to unpredictable rainfall patterns: “I have

summon the local leaders to meet them in safe environments. We are left to survive on our own.” Similar reports come from other African cities, whether inland or coastal. For the residents, floods are getting worse and climate change is contributing to this situation.

Poor people's current adaptation to flooding

People in slums in Kampala, Uganda, deal with floods in a variety of ways: using blocks, stones and furniture to create high places on

which to put their most critical valuables during floods; putting goods on top of wardrobes and in the small spaces between ceilings and roofs; sharing such high places with others who have no similar 'safe' sites; and, temporarily moving away from the area to stay with friends and family during the flood. In addition, some residents undertook collective work to open up drainage channels, some permanent residents temporarily moved to lodges and public places like mosques and churches until the water level receded, many residents constructed barriers to water entry at their doorsteps, and some made outlets at the rear of their houses so any water entering their homes flowed out quickly.

Although people sometimes share protective storage or accommodation on higher ground, essentially these are all individual coping strategies. Spontaneous community action to unblock drainage channels is relatively rare. No coordinated action for emergency shelter or rapid response to flooding appears to exist in Kampala and most other African cities.

Official responses to flooding

Most African governments have national disaster and emergency policies. Some, such as Uganda, have special ministries with responsibility for disaster preparedness and response. The overall objective of disaster preparedness and management in Uganda is to save lives and livelihoods, reduce Uganda's vulnerability to likely disasters (in coopera-

tion with local communities, non-government organizations, local and international donor organizations), and enhance the country's capability to contain or minimise the social and economic effects of disasters. In particular, the Uganda strategy aims at mitigating the impact of hazards in order to avoid disasters. This implies good land use planning and avoiding the placing of dwellings in hazardous locations.

In most African countries, national level disaster management planning is established, but the ability to implement plans is



A resident of Mafalala, Mozambique, removing water after one day of heavy rain

Photo: © ActionAid Mozambique

weak. At regional and local levels there may be structures in place, but there are insufficient resources, both human and financial, to carry out effective disaster mitigation, especially for the poorest communities. Local government's inability to insist that building regulations and local development plans are followed makes the prevention of building in flood hazard zones difficult.

Responsibilities for action on the four types of urban flooding

The principle of local, regional or national action at the appropriate scale applies to managing urban flooding. Where the problems are essentially internal to a specific community, then that community should manage them. Where they lie totally within the boundaries of a single local authority, then the local authority should manage them. Where they cut across many administrations, then national governments, or even international consortia, should manage them.

Local communities themselves should, therefore, undertake management of localized flooding due to inadequate drainage. In this, local voluntary groups, assisted by national or international non-government organizations and with support from both local government and national disaster reduction organizations, could be highly effective. Local communities would benefit from good drainage and rapid water removal from their own areas. Actions could include improving and maintaining drainage chan-

nels, preventing the blocking of waterways and culverts with waste, installing roof rain-water collection tanks for their own use, and avoiding construction on drainage lines. They could also organize local shelter for the community members who are most affected by flooding.

Local authorities are best placed to cope with flooding from small streams whose catchment areas lie almost entirely within the built-up area. They administer the regulations and byelaws concerned with land use planning and should be involved in local disaster management. However, most African local authorities lack the human resources and financial power to carry out such responsibilities effectively. They may be able to form partnerships with non-government organizations, but they need support from national governments and regional agencies to map flood risk areas, maintain urban stream channels, control building in flood channels and on floodplains and provide emergency assistance.

Where major rivers overtop their banks flooding towns and cities, flood protection has to be seen in the context of the entire river basin. This may include more than one country. Where a river basin lies within a single country, integrated river basin management principles should be applied by an agency cutting across ministries concerned with both rural and urban interests to ensure that activities in upstream areas do not worsen the flood situation for towns and cities down-



Flooding in Jakarta, Indonesia

Photo: © David Gil

stream. For large international rivers, river basin commissions are required to manage water resources in the entire basin for the benefit of all communities in the different nations occupying the basin. Such management would include measures to mitigate flooding. Individual urban authorities may

campaign for or build extra flood protection embankments, but such works only serve to direct the floodwaters elsewhere. The natural floodplain should be retained to hold floodwaters and should not be built upon.

Cities faced with coastal flooding from the sea, or by a combination of high tides

ACTIONAID AFRICA AND ACTIONAID INTERNATIONAL

● ActionAid Africa and ActionAid International recognise that vulnerability to climate change is becoming a major issue for Africa's urban poor. They therefore called together an international team, which conducted

detailed participatory vulnerability assessments in six African capital cities. They presented the results at the conference of climate change parties in Nairobi in November 2006 to try to ensure that extra help to adapt to climate

change was directed to the urban poor. This paper explains the issues involved and uses material from the Kampala, Uganda study to illustrate the flood problems that climate change will aggravate.

and high river flows from inland, have to integrate both river basin and coastal zone management, ensuring that the natural wetlands can continue to function as flood storage areas as much as possible. Where settlements already exist, filling such areas to prevent flooding may be desirable, but the implications for adjacent areas need to be considered. Social factors may lead people to move on to other nearby wetlands.

The need for special assistance to manage climate change impacts

Flooding has enormous impacts on the poor in African cities. It affects people's health through waterborne diseases, damage to food, further deterioration of sanitation, increased exposure to disease vectors and temporary reduction of access to healthcare facilities. Many schools are closed during flood periods and poor children have their education interrupted. Some people may not be able to get to work for long periods and hence suffer income and possible job loss.

Flooding thus greatly aggravates poverty. The worsening of the flood situation as a consequence of climate change thus increases poverty. The case for special assistance to help the poor adapt to climate change is therefore clear.

Special assistance is needed to tackle the four types of flooding described above: to help local communities manage their own environments to reduce flood impacts; to help local government manage flooding from local urban streams; to help national and international river basin agencies manage flooding from major rivers; and, to help coastal towns and cities deal with encroachment on the wetlands that should be places for the natural storage of floodwater.

Flooding has to be seen as one of the factors preventing poor people from improving their quality of life. Both climate change and the local causes of flooding need to be tackled. To ignore the role climate change plays in urban poverty is to deny disadvantaged urban people one way of getting a better life. ■

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FURTHER INFORMATION

● **On the Web:** Further details can be found in these two reports: www.actionaid.org.uk/doc_lib/urban_flooding_africa_report.pdf and www.actionaid.org.uk/doc_lib/unjust_waters.pdf. For more general information on the context of this work, visit the ActionAid and United Nations International Strategy for Disaster Reduction websites at: www.actionaid.org and www.unisdr.org.

Climate risk integration

Bert Koenders explains how his ministry is assessing climate risks and describes strategic ways to take account of climate change in programmes and policies

You cannot open a newspaper or turn on the television in the Netherlands these days without seeing something about climate change. In large part we have Al Gore to thank for this. With his book and film he has been able to reach the general public and tell them about the causes and effects of climate change. He says the debate about the link between human activity and atmospheric warming is over. Now it is time for action.

The Intergovernmental Panel on Climate Change report published in February 2007 confirms Gore's assertion. Scientists are now even more certain – 90 per cent certain – that greenhouse gas emissions cause atmospheric warming. We must take action now. The risks of waiting are unacceptable.

The report by British economist Nicholas Stern has also attracted considerable media attention. His main message is that putting

the brakes on atmospheric warming is possible and affordable. He estimates that it will cost one per cent of world Gross Domestic Product to keep the global average temperature from rising more than a couple degrees (with carbon dioxide emissions stabilized at 500 to 550 parts per million). That is not a small change, but we can do it if we are willing. Stern has done us a service by getting

MAIN POINTS

- **The author calls for both mitigation and adaptation to climate change and discusses why it is important for development cooperation.**

- **He highlights Dutch activities to assess climate risks and stresses the im-**

portance of learning from the poor, donor cooperation and developing countries meeting past international policy commitments.

- **He calls for better costing of adaptation and identification of innovative forms of funding.**

economists involved in the climate change debate. The broader the debate the better. The major benefit of the Stern report is that it gives us prospects for action.

But why is climate change getting so much attention now? Since the 1980s there has been talk of atmospheric warming and its link to human activity. Is it all down to Al Gore and new scientific insights? Leaders and scientists make an important difference but there is also significance in what we see happening around us.

Taking action: mitigation and adaptation

The call for action tends to focus on slowing down global warming. This is an important objective and decisions made by the European Union heads of government on 10 March 2007 were pleasing. They agreed that by 2020, carbon dioxide emissions should be 20 per cent lower than in 1990, the Kyoto

reference year, and that 20 per cent of all energy in Europe should come from sustainable resources, such as the sun, wind and water. These agreements are enforceable, which is good.

But even with mitigation efforts, the climate is going to change in the next few decades, and so we also have to adapt. In the Netherlands we are doing just that. We are working to maintain our coastline and have plans to give our rivers more room. The Ministry of Health, Welfare and Sport is also working on a plan to deal with the increased likelihood of heatwaves, which is a pressing concern.

But the issue of adaptation is not exclusive to the Netherlands. It is an even bigger concern in developing countries, which are more vulnerable to human suffering and economic damage.

Significance for development cooperation

The effects of climate change will not be evenly spread. Developing countries – and especially their poorest people – run the greatest risk. Their economies are highly dependent on agriculture, the sector most sensitive to severe weather conditions. Millions of people are vulnerable merely because they live in a place that is not safe. Each year for the last ten years, 300 million people in developing countries have been affected by weather-related disasters.

The climate is changing, and the pace of



change is a serious threat to development and poverty reduction. It is making it more difficult to achieve the Millennium Development Goals (MDGs). According to the World Bank, 40 per cent of its funded projects are under threat from climate change. We cannot ignore a risk of this magnitude. We do not want our efforts to meet the MDGs to fail. We do not want our contributions to produce less than expected. Nor do we want interventions to make people more vulnerable to the adverse effects of climate change.

But there is more. Adapting to climate change costs money. The price of achieving development goals is going to rise, and we cannot afford to ignore that either. I would like to address these two issues: integration and funding.

Intelligent integration

Climate risk management is not new. No farmer would decide to plant a certain crop without taking rainfall into account. No engineer would build a bridge without considering river currents. And no fisherman would go to sea in a boat that could not handle high waves. So what has changed? It is no longer enough to rely on past experience and historical information. The future is going to be different with more weather-related disasters and changes in the timing of seasons. It will be hard to protect yourself against some of the changes, especially if they are sudden (like hurricanes) or their magnitude is unpredictable (like floods). But casualties and material damage also result from bad planning. This is an area where we can make improvements. For example, a bridge design takes into account a one in a hundred chance that the bridge will be washed out in a flood. But if climate change makes those odds much higher or even threatens the lifespan of the bridge, we can adapt the construction to take that into account.

I can already hear the protests: oh no, not another theme to take into account! Worse yet, developing countries have not asked for

this, and the margins of uncertainty are very large indeed. This may be true, but it does not release us from our responsibilities. It means that we must tread carefully. We do not need to run large-scale, 'top-down' campaigns and assess every cent we spend. What we do need is a number of strategic steps.

My Ministry has already taken one of those steps. We have begun making a quick, rough analysis of the climate risks that programmes in Bolivia, Bangladesh and Ethiopia are exposed to. The aim of the scan is to identify the high-risk activities that can be improved in the short-term. This kind of analysis makes it possible to set priorities at little cost. And it helps us focus on activities that are vulnerable to high risks. The reports from this work contain recommendations for managing these risks better.

For example, the scan identified a new water, sanitation and hygiene programme

ter. As a result of these risks, new latrines could become a source of disease, drinking water could become scarce and wells brackish. The report makes the following concrete recommendations:

- Study all aspects of water availability. Future pattern changes should influence the choices we make today.
- Identify current and future trends, and take this information into account when evaluating the sustainability of the technologies.
- Think of alternatives, such as flood-proof latrines.

This is an example involving a programme. But the reports also address policy matters. Development itself is the key to adapting to climate change. We need to do everything in our power to fulfil all the agreements we made in the past. I am referring to the agreement the international community made in

poverty: agreements on good governance, women's rights and children's rights. This is where it starts. And this is what will make people more resilient to the adverse effects of climate change.

The poor are masters of adaptation. They are no strangers to disaster and extremes. Their methods of self-preservation are a good place to start. It is important to enter into a dialogue with them, and to talk about weather patterns they may be unfamiliar with. Non-government organizations can play a useful role here.

Managing climate risks is an essential part of good, sensible policy at every level (policy, programme and project). Targeted planning and budgeting will abate climate risks.

It is important to cooperate with other donors. The World Bank is working on an investment framework called Clean Energy for Development, which also addresses adaptation. The Organisation for Economic Co-operation and Development is drafting guidelines to instruct donors on how to integrate climate risks into development cooperation. The key is working together.

“ It is no longer enough to rely on past experience and historical information. The future is going to be different ”

in Bangladesh that is set to run until 2010. The programme aims to make a substantial contribution towards the goal of providing access to clean drinking water. The climate risks that could affect this programme are increased: heavier flooding; water drainage blockages; low water in the rivers in winter; and, salinization of surface and ground wa-

ter. Monterrey to meet its commitment to spend 0.7 per cent of Gross National Product on development cooperation. I am referring to the Paris Agenda, where we pledged to make improvements and increase harmonization and integration with the policies of partner countries. And I am referring to other agreements made to help foster growth and fight

Funding

So far I have emphasized the integration of climate change into development. But I cannot ignore the matter of funding. Developing countries will almost certainly face higher recovery costs, and the price of meeting the MDGs is likely to rise by tens of billions of dollars a year, according to World Bank es-

timates. Stern says it is difficult to estimate the cost of adaptation due to the great uncertainties involved, and he has called for more calculations to be done. I feel it is very important to shed light on the costs of adaptation. Why? Because we need a more solid foundation for the debate on costs and funding. We must stop using rough estimates and instead equip ourselves with the best possible calculations. If the World Bank's first estimates are right, new money will be required. We will have to do our best to

find innovative forms of funding such as the climate convention Adaptation Fund, which is financed with a share of the proceeds from the world trade in emissions reductions (like the Clean Development Mechanism). I also believe we should prevent the extra costs from being incorporated only into the development budget automatically. That would be taking money away from the fight against poverty in developing countries and putting it into climate change, a problem caused primarily by the West. ■



Central market in Gulshan, Dhaka, Bangladesh

Photo: © John Soussan

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FURTHER INFORMATION

● **On the Web:** For more information on the Dutch Ministry of Foreign Affairs please visit www.minbuza.nl. The *Stern Review on the Economics of Climate Change* is available at www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm. Please see www.worldbank.org/energyweek for the World Bank Clean Energy for Development framework, and www.un.org/millenniumgoals/ for information on the Millennium Development Goals. Visit www.ipcc.ch/ for information on the Intergovernmental Panel on Climate Change, and www.oecd.org/dataoecd/44/29/36426943.pdf for the 2006 OECD Declaration on Integrating Climate Change Adaptation into Development Co-operation. See www.climatecrisis.net/ for information on Al Gore's film, *An Inconvenient Truth*.

FUNDING CRITERIA

Criteria under the Adaptation Fund were agreed during the latest round of the climate negotiations held in Bonn, Germany, in May. The decision regarding which agency would manage the Fund was held over to the next session.

Though a number of outstanding issues were resolved, there was disappointment that more progress was not made in Bonn. Hans Verolme of the Worldwide Fund for Nature commented that "two weeks of business-as-usual talks leave us wondering what it will take for governments to respond to the alarm bells."

Read more:
www.tiempocyberclimate.org/newswatch/archive/week070527.htm

ADAPTATION

Experts at a United Nations-sponsored meeting in the Cook Islands have called for increased support for adaptation planning and implementation for Small Island Developing States (SIDS).

Cook Islands environment minister Kete Ioane underlined the vulnerability of his nation. "The people in the Cook Islands, like elsewhere in the South Pacific, have witnessed changes such as the increasing salinization of ground water and more frequent flooding. Planning for climate change and adapting now is vital for SIDS to save human lives and livelihoods."

Read more:
www.tiempocyberclimate.org/newswatch/archive/week070408.htm

CARBON MARKETS

The European Union plan to cut emissions by 20 per cent by the year 2020 has strengthened confidence in the future of carbon markets and will increase financial assistance to developing nations.

"We've calculated that if the European Union does this 20 per cent cut and does about half of it through flexibility mechanisms... that could generate an [annual] carbon finance flow of US\$15 billion by 2020," said Yvo de Boer, head of the climate treaty secretariat.

Read more:
www.tiempocyberclimate.org/newswatch/archive/week070422.htm

COASTAL RISKS

One person in ten lives in an 'at risk' zone for flooding and storm damage associated with global warming.

Three-quarters of these people are in Asia. The new assessment comes from a report from the International Institute for Environment and Development. "If you are in that zone you need to take the issues of sea-level rise seriously," warns Gordon McGranahan. "Migration away from the zone at risk will be necessary but costly and hard to implement, so coastal settlements will also need to be modified to protect residents," he said.

Read more:
www.tiempocyberclimate.org/newswatch/archive/week070408.htm

GLOBAL EMISSIONS

The Group of Eight (G8) have agreed to "seriously consider" the goal of halving global emissions by the year 2050. Negotiations on the successor to the Kyoto Protocol will be completed by 2009.

The fact that the United States is now tied into the international response to the climate threat is seen as a major step forward. The G8 leaders acknowledged that considerable funds will be needed to enable the most vulnerable to adapt to climate change.

Read more:
www.tiempocyberclimate.org/newswatch/archive/week070617.htm

Adaptation targets

Ian Tellam calls for improved mainstreaming of climate change adaptation into development planning and proposes ways to measure adaptation and set targets

Donor agencies are currently taking two main approaches to climate change adaptation. One is 'climate proofing', which involves taking steps to reduce the risk that current and future overseas development assistance (ODA) investments will be negatively impacted by climate change. Specifically, this involves integrating climate change as a risk factor into already existing, or planned human development projects that are climate sensitive: usually coastal zone projects, water management projects, agriculture projects and human health projects.

The second is the 'stand-alone project' approach. This is at an early stage and involves donor agencies gaining operational experience in pilot adaptation projects. An example of this approach is the National Adaptation Plans of Action (NAPAs), which are intended to identify the most urgent and immediate steps that must be taken by the Least Devel-

oped Countries to adapt to climate change. Further examples are stand-alone adaptation projects supported under the Strategic Priority for Adaptation (SPA) under the Global Environmental Facility. The problem with this approach is that it is unclear how to define a particular initiative as an 'adaptation project' because any climate adaptation intervention that focuses on livelihoods is impossible to

MAIN POINTS

- **The author describes** two donor agency approaches to climate change adaptation: 'climate proofing' and 'stand-alone projects'.

- **He warns** that neither can completely solve adaptation problems and proposes improved

mainstreaming into development planning and the setting of measurable adaptation targets.

- **He proposes** vulnerability analyses as a basis for this, building on experience from the field of disaster risk management.

distinguish from a 'normal' human development project that is impacted by regular climate variability. This is making it difficult for donor agencies to proceed in a consistent manner so the approach in this area tends to be *ad hoc*.

Both of these approaches are valuable, but neither offers a complete solution to the problem of adapting to climate change. Climate proofing ODA is worthwhile but only covers existing or planned ODA investments. Total ODA is US\$100 billion per year while the World Bank estimates that the total costs of adapting infrastructure to climate change in developing countries will be US\$4 to 40 billion per year. This cost shortfall also means that the stand-alone adaptation approach is not a complete solution because it relies on new sources of finance being found to cover the additional costs of new projects. New funds for adaptation are being developed under the United Nations Framework Con-

vention on Climate Change but it seems unlikely that these will ever deliver the amounts needed to fully address the problem.

Moreover, these approaches are inconsistent. Climate proofing ODA aims to avoid stand-alone projects, while the NAPAs and the SPA, for example, aim to promote them. This schism in the way climate change adaptation is being handled is recognized in recommendations to mainstream climate change adaptation into countries' national development planning as a whole, at the highest level, and to focus particularly on changing the priorities of 'spending ministries', such as Finance and Planning.

This more structural interpretation of climate adaptation mainstreaming is probably the most effective way to deal with the problem and offers the largest hope of a long-term solution. But it is currently making very little progress.

Some of the reasons for this are political. Even though climate change is rising on the political agenda, there is still a great deal of apathy concerning the issue, even in countries that rely largely on economic sectors that are fragile in the face of normal climate variability. This is partly a result of a misunderstanding about the magnitude of the problem and partly because developing countries are in a constant state of crisis management in any case: climate change comes as just one more of many shocks to a system that is already struggling to cope. There is little incentive to invest in planning

for climate change when it is not clear that sufficient funding will be available to implement such plans.

In addition, there are methodological issues. Measuring vulnerability can only be done when impacts are known. But measuring the impact of climate change at a country level depends on the downscaling and calibration of global climate models, which is still an immature science. This means that very little is understood about what adapting to climate change actually means in terms of technologies, costs, and institutional and governance arrangements.

It's a goal!

Measurement is presently a hot topic in development circles, with the Millennium Development Goals (MDGs) providing the general direction. The Netherlands, for example, has already translated this approach into time-bound targets for improvements in water and energy services. It aims to provide 20 million people with access to water for

sanitation, and 10 million people with access to modern energy services by 2015.

To date, climate adaptation has been linked to the MDGs mainly in a negative sense: as a problem that will make them more difficult to achieve. This is correct, but it may also be possible to make a positive linkage. The strength of the MDGs is that they focus attention on measurable targets. Could this strength be applied to climate adaptation? Could national governments or other agencies set measurable targets that would aim for a certain number of people by a certain date being less at risk from climate change? And could these targets be incorporated into development plans?

Such an approach would lead directly to the central issues: which technologies are needed; how should the process of adapting be organized; and, what institutional arrangements would be effective. It would also help efforts to determine the economics of adaptation by detailing the costs of interventions in specific circumstances. In short, a targets approach could assist governing agencies to quickly agree on which adaptation measures to take and how best to allocate resources.

But a key question remains. Setting quantifiable targets implies the measurement of something specific. In the case of targets for water and energy this is relatively simple. Water can be measured in litres; energy can be measured in kilowatt hours or the calorific value of various fuels. Which quantifiable in-



Ulan Bator, Mongolia

Photo: © David Gil

dicators could be used to measure reduction of vulnerability to climate change?

There is already a body of research in the area of vulnerability indicators, with vulnerability defined as a function of a range of biophysical and socioeconomic factors, of which climate change is only one. Also, a number of studies have been carried out on indicators of adaptive capacity, which is defined, for example by the Intergovernmental Panel on Climate Change, as a function of

agement. Work in the area of disaster risk has been ongoing for much longer than the relatively recent attention to climate change adaptation. Within the disaster risk community, vulnerability is a key concept and vulnerability indicators have been in use for some time. In disaster risk reduction projects, vulnerability analyses are constructed, baseline studies are completed, and these are then used to determine specific actions needed to reduce risk. There are also lessons

“The strength of the MDGs is that they focus attention on measurable targets. Could this strength be applied to climate adaptation?”

certain key factors, such as wealth, technology, education, skills, infrastructure, access to resources, stability, management capabilities and trade.

But in relation to climate change adaptation such indicators have been used primarily to construct vulnerability maps using geographic information systems that give broad indications of vulnerability levels. Such maps help to identify likely vulnerability ‘hotspots’ and to produce broad general recommendations but do not lead to an understanding of what specific steps must be taken to reduce vulnerability.

The measure of all things

Climate change adaptation overlaps thematically with the field of disaster risk man-

to be learned from other areas of development planning. This means that a methodological basis for a target approach to climate adaptation already exists. The challenge is to take this methodological basis and to overlay climate change impacts and sensitivity to these impacts in a way that would be both scientifically robust and translatable into measurable policy targets.

It sounds plausible in theory, but could it work in practice? This is being investigated under the Netherlands Climate Assistance Programme and projects are underway, led by local partners, to explore the applicability of climate adaptation targets in Bangladesh, Bolivia and Mongolia. ■

ABOUT THE AUTHOR



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FURTHER INFORMATION

● **On the Web:** for more information on the Netherlands Climate Assistance Programme, visit www.nlcap.net.

Community-based adaptation

Roger Jones and Atiq Rahman report on a community-based adaptation workshop and describe how to fit assessments into broader development processes

Many assessments of climate change impacts have linked the size of the impact to potential vulnerability. Food and fibre production, water resources, biodiversity, human health and the coastal zone are all highly sensitive to climate change. This is true for developing and developed countries, and for cold, temperate and tropical regions. The size of the response shows high spatial variation, meaning that specific impacts will be local in nature. For example, only some areas are flood prone, and health risks will vary from one place to another. Thus, it has been tempting for scientists mapping climate impacts to concentrate on how biophysical responses vary, and equate this with vulnerability.

This, however, is only half the story where human welfare is concerned. Vulnerability to climate change is strongly influenced by the adaptive capacity of communities who

are exposed to its impacts. Often differences in adaptive capacity are a stronger determinant of the distribution of vulnerability than differences in the biophysical response. This holds for both developed and developing countries. Community-based adaptation to climate change (CBA) is therefore a process that recognises that the ability of local communities to respond to climate change is a

MAIN POINTS

- **The authors explain** that vulnerability to climate change is influenced by the adaptive capacity of communities who are exposed to its impacts.
- **They explain that** community-based adaptation (CBA) is a process that recog-

nises the contribution of local adaptive capacity to adaptation.

- **They report on** a recent CBA workshop in Dhaka, Bangladesh, and describe a roadmap to fit CBA assessments into broader development processes.

key determinant of adaptation.

Adaptation by people to climate change is a process that develops out of adaptive capacity – the ability of a community to adjust to change. The starting point of CBA is therefore the community, rather than any specific risk of climate change. But the feature that distinguishes CBA from other development approaches is the inclusion of changing climate risks as part of the assessment process.

In recent years interest in CBA has grown, as illustrated by a recent CBA workshop held, fittingly, in Bangladesh: a country that suffers at times from too much water or too little. This Second International CBA Workshop in Dhaka was an initiative of the Bangladesh Centre for Advanced Studies, the International Institute for Environment and Development and the Regional and International Networking Group. Over 120 delegates from around the world attended. Most immersed themselves in rural Bangladesh for two-day

fieldtrips before the conference. There they saw great poverty and signs of immense changes emerging, along with great optimism and hope.

As for any new development that fulfils a crying need, CBA attracts a great deal of goodwill on the one hand, but a great deal of uncertainty on the other. How does this new activity fit in with other, more established development activities (such as community-based development and disaster planning) that have track records and their own ways of working? What makes CBA different to other forms of adaptation to climate change?

Over the course of the workshop, we heard many suggestions addressing these and numerous other issues. A number of points about CBA attracted wide agreement.

- CBA operates at a community level.
- The workshop was about vulnerable communities but CBA can be applied in any community.
- CBA is about the community making choices, not having them imposed from outside.
- CBA should enhance the ability of the community to have a wider range of choices in the future.
- Adaptation responds to climate risks assessed in a developmental framework, rather than to 'dangerous' anthropogenic climate change as defined by the United Nations Framework Convention on Climate Change. The definition of climate and CBA's sphere of operation in relation

to climate is therefore broader than that defined under the convention.

- Change processes such as environmental degradation, weak governance and poor access to land and resources, often exacerbate risks faced by communities from climate-related causes.
- CBA complements both the development and disaster research communities, and it adopts methods and tools from these communities.
- Likewise, development and disaster communities are trying to learn more about incorporating climate adaptation into their own activities.
- The different languages of the climate adaptation, development and disaster communities need to be translated and shared.
- CBA is a process that evolves over time, not a set of static assessments.
- Action-oriented research that investigates CBA at all levels is required rather than passive research.
- A wide range of tools can be used for

creative communication within projects, including drama, video, multi-media, intermediate technology, art and storytelling.

- Because of the rapidly growing interest in climate change, the CBA agenda needs to be better defined, and communicated as widely and comprehensively as possible.

This list of topics shows that discussion was rich but, as with any new activity, lacking in structure. For example, there was some uncertainty and discussion about what constituted a community, but this seemed to be more a problem of definition rather than operation. The following simple definition may suffice: a community is a group of people that are directly linked to each other through a common identity, activity or interest. How that identity, activity or interest interacts with climate can serve as the entry point for an assessment.

The lack of structure surrounding CBA poses a problem for practitioners, funding bodies and other interested parties, who require signposts to distinguish good practice.



CBA workshop in Dhaka, Bangladesh, February 2007

Photo: © BCAS

What follows is a simple roadmap to show how individual assessments may fit into a broader structure, which will hopefully show how other forms of community-based development can build climate change into their activities. The roadmap separates CBA projects into three stages that (1) concentrate on addressing current climate risks within a development context, (2) monitor progress and look outward, and (3) assess future development options under climate change.

Stage 1: Ship-building

This stage addresses climate-related vulnerability by adapting to current climate risks, especially those that are shown to be consistent with future projections. These risks are most often exacerbated by other human activities. This stage may have lots in common with current disaster or development projects and need not have a very strong emphasis on climate change as long as adapting to current climate risks remains a central focus.

Stage 2: Map-making

This stage monitors progress at the local level and brings in data and information from outside. It is mainly a reflexive stage where adaptation may continue but monitoring ongoing change (such as environmental and social change) so that the causes and management of risks become better understood, also occurs. Progress of adaptation options can be quantified.

Stage 3: Exploring new horizons

This stage investigates how risks may change and be managed over time. The primary aim is to give local communities a greater choice in their future. Projections of climate change risks and development pathways may be investigated. Exploring new horizons does not imply that communities must move location or change activities, but if they continue along their 'business as usual' pathway, they do so with a full understanding of what the alternatives may be.

This simple structure provides a roadmap that may well play out differently to the historical development of wealthy countries, but in doing so, presents communities with the opportunity to seek sustainable outcomes using very different approaches than those applied in the past. Practitioners do, however, need to recognise that many political, financial and social barriers will hamper this process. These barriers need close examination so as not to prevent progress.

One key element of CBA is that of improving the capacity of individuals and communities to make choices about their own futures. For example, even if flooding and sea-level rise threaten the livelihoods of the many millions of people that currently live on the floodplains of Bangladesh, if the worst comes to the worst and they are forced to move because of inundation, the choice of where they move to and what they do there should not be limited by a lack of adaptive capacity. ■

ABOUT THE AUTHORS



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Fax: +880-2-8851417

Email: atiq.rahman@bcas.net

FURTHER INFORMATION

● **On the Web:** Information about, and presentations from, the Second International CBA Workshop in Dhaka (24 to 28 February 2007) can be found at www.bcas.net/2nd-CBA/index.html. A workshop summary (by IISD reporting services) is available at www.bcas.net/2nd-CBA/Documents/CBA-WP-enb%20summary.pdf.

CONFERENCES

EVENTS

Third International Conference on Climate & Water

Helsinki, Finland:

03-09-2007 to 06-09-2007

Conference aims to look at the increasing problems surrounding the hydrological cycle under climate change. Will provide an opportunity for hydrologists, water managers and decision makers to exchange research results, ideas and concerns on impacts, adaptation and mitigation in the water sector, within the constraints of climate change.

Details: Congresson, Halahdenkatu 22A, 00210 Helsinki, Finland.

Fax: +358-9-58409555.

Email: climate-water@congreson.fi

On the Web: www.environment.fi/de_fault.asp?contentid=226839&lan=EN

10th International Conference on Environmental Science & Technology

Kos Island, Greece:

05-09-2007 to 07-09-2007

Conference focuses on a synthetic and integrated approach to protection and restoration of the environment, including economic and social aspects with a view to adopting sustainable solutions to contemporary problems. Main themes include: environmental dynamics; ecosystems management; health and the environment; air pollution and control; water resources and river basin management; and, environment restoration and ecological engineering.

Details: CEST2007 Secretariat, Univer-

sity of the Aegean, 30 Voulgaroktonou str., GR 114 72 Athens, Greece. Fax:

+30-210-6492499.

Email: cest2007@gnest.org

On the Web: www.gnest.org/cest

2007 International Workshop on Environmental Changes & Sustainable Development in Arid & Semi-Arid Regions

Inner Mongolia, China:

10-09-2007 to 17-09-2007

Conference will focus on presenting case studies and theories relating to land degradation and sustainable development in arid and semi-arid as well as sub-humid regions of various continents. Themes include comparisons of regional-scale reconstruction of Late Quaternary changes in deserts of various climate zones and natural and human impacts on the landscape in various climate zones.

Details: Xiaoping Yang, Institute of Geology and Geophysics, Chinese Academy of Sciences, PO Box 9825, Beijing 10029, China. Fax: +10-62032495.

Email: xpyang@263.net.cn

On the Web:

www.igggcas.ac.cn/jiw07/index.htm

2nd International Symposium on Environmental Management

Zagreb, Croatia:

12-09-2007 to 14-09-2007

Symposium is intended to look at the current state of play regarding the control and management of environmental systems and discuss avenues for development of these systems.

Main topics include: energy and environment; transboundary pollution, transmission and prevention; information systems in environment; trends, results and challenges of environmental management; education and the environment; and, environment in the negotiation process.

Details: Symposium Organizer, SEM2007, PO Box 177, Zagreb, Croatia. Fax: +385-1-4597143.

Email: info@sem-eco.com.hr

On the Web: www.sem-eco.com.hr

14th German Dam Symposium & 7th ICOLD European Club Dam Symposium

Freising, Germany:

17-09-2007 to 19-09-2007

Organized by the German National Committee on Large Dams. Working theme of the symposium is "Dams in Europe - Tasks and Challenges". Presentations and working group discussions will be in both German and English with simultaneous translation. Will provide an overall European view of dam-related issues and the benefits, risks and economic value of dams, large hydraulic structures and hydropower.

Details: Conventus Congressmanagement & Marketing GmbH, Jana Radoi, Markt 8, 07743 Jena, Germany. Fax: +49-3641-353321.

Email: talsperre@conventus.de

On the Web:

www.conventus.de/talsperre

International Symposium on Mitigation & Adaptation of Climate-change-induced Natural Disasters

Hue, Vietnam:

20-09-2007 to 21-09-2007

Co-organized by Hue University of Sciences, Hanoi University of Science and Ibaraki University. Main topics include: lessons learned from previous disasters; traditional and innovative techniques for coping; human and social sciences aspects; and, remediation, rehabilitation and aftercare of damaged sites.

Details: Symposium Secretariat, Department of Geotechnics, Hanoi University of Science, 334 Nguyen Trai, Thanh Xuan, Hanoi, Vietnam. Fax: +84-4-8583061.

Email: ducgeo@gmail.com or murakami@mx.ibaraki.ac.jp

On the Web: www.hus.edu.vn or www.civil.ibaraki.ac.jp

First International Development Conference (IDC2007)

Toronto, Canada:

20-09-2007 to 23-09-2007

Organized by the Centre for Agricultural Resources and International Development (CEFARD). Major aim of the conference is to focus on the mandate of the Millennium Development Goals. Topics include agriculture and rural development; education and human development; research and development for poverty alleviation; economic and social aspects of development; implementing sustainable development programmes; and,

urban-rural linkages.

Details: CEFARD Secretariat, 14 Autumn Glen Circle, Toronto, Ontario M9W 6B4, Canada.

Fax: +1-416-2130372.

Email: info@cefard.org

On the Web: www.cefard.org

9th Annual BIOECON Conference on Economics & Institutions for Biodiversity Conservation

**Cambridge, UK:
20-09-2007 to 21-09-2007**

Conference is organized in association with the University College London, UK-DEFRA, FAO, IUCN and UNEP-WCMC. Aimed at all researchers and policy makers interested in or working in the management and conservation of biodiversity. As well as sessions on specific themes there will also be a forum for discussion on the issue of development of mechanisms for making payments for environmental services.

Details: Mare Sarr, 9th BIOECON Conference, Dept of Economics, University College London, Gower Street, London WC1E 6BT, UK

Email: m.sarr@ucl.ac.uk

On the Web: www.bioecon.ucl.ac.uk

European Sustainable Energy Seminar & One-day Tour

Samsø Island, Denmark:

01-10-2007 to 05-10-2007

Seminar is open to all those researchers, workers and scientists interested in sustainable energy. Topics for discussion will include how to turn the

EU to sustainable energy, using and improving the new EU energy policies; visions for sustainable energy futures; and, NGO activities to raise awareness on sustainable energy issues, politically, in education, and publicly. The one-day tour will show how Samsø works as a renewable-energy island.

Details: Seminar Organizer, Samsø Energy & Environment Office, Energitjenesten, Museumvej 1, Tranbjerg, DK-8305 Samsø, Denmark

Email: ove@inforse.org

On the Web: www.inforse.org/europe/seminar07_samso.htm

6th Conference on Wastewater Reclamation & Reuse for Sustainability

**Antwerp, Belgium:
09-10-2007 to 12-10-2007**

Intends to provide a forum for exchange of ideas and experiences in water reuse from dry and wet climate areas, industrialized to rural areas, and from high and low income countries. Debates will cover: risk management; water quality; water reclamation in industry; sustainable use of reclaimed water; and, high-tech versus low-tech. Three main themes are rationale for sustainable water use, advances in techniques and implementation and operation of reuse schemes.

Details: Conference Secretariat, Bart De Heyder, Eev Breugelmans, Aquafin NV, Dijkstraat 8, B-2630 Aartselaar, Belgium. Fax: +32-3-4504444.

Email: info@wrrs2007.org

On the Web: www.wrrs2007.org

8th Session of the Conference of the Parties to the UN Convention to Combat Desertification (COP-8) Spain: 01-11-2007 to 09-11-2007

Exact dates and city of location in Spain have not yet been determined. Delegates will review a number of institutional items, amongst which will be an assessment of the 2006 International Year of Deserts and Desertification. Other items include a review of the implementation of the Convention, programme and budget for 2008-2009 and an assessment follow-up to the World Summit for Sustainable Development.

Details: UNCCD Secretariat, PO Box 260129, Haus Carsanjen, D-53153 Bonn, Germany. Fax: +49-228-8152898.

Email: secretariat@unccd.int

On the Web: www.unccd.int

International Conference on Agriculture, Education & Environment Nueva Ecija, Philippines: 04-11-2007 to 07-11-2007

Conference is a regular event hosted by the Asia Pacific Association of Educators in Agriculture and Environment (APEAEN). Working theme of this year's event is "Preparing for the Future: Rethinking Higher Agriculture Education and Environment in the Asia Pacific". No further details on themes etc. available.

Details: Conference Secretariat, APEAEN, PO Box 35012, UPLB Post Office

College, Laguna 4031, Philippines.

Fax: +63-49-5368028.

Email: apeaen_080597@yahoo.com

On the Web: apeaen080597.blogspot.com/2007/04/3rd-international-conference.html

Impacts of Extreme Weather & Climate on Socio-economic Development in Africa

Akure, Nigeria:

11-11-2007 to 15-11-2007

Conference aims to bring together seasoned researchers from around the world who have been working on African weather and climate and the impacts of extreme weather and climate events for a focused, informed and in-depth discussion on these issues. Sessions will address impacts on agriculture, water resources, health, tourism, transportation and mitigation and adaptive strategies.

Details: Jerome A Omotosho, Nigerian Meteorological Society, P.M.B. 1215, Oshodi, Lagos Nigeria.

Fax: +234-1-4526904. Email: TBA

On the Web:

www.nmets.org/conference/index/htm

A roadmap for adaptation

Gary Yohe discusses the conclusions on impacts, adaptation and vulnerability from the Fourth Assessment of the Intergovernmental Panel on Climate Change

Thereport of Working Group II (WGII) to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) on *Impacts, Adaptation and Vulnerability* was approved in Brussels on April 5th 2007. To understand what that means, it is important to understand how IPCC reports are created.

Work on this latest report began more than three years ago when nations that have signed the United Nations Framework Convention on Climate Change nominated scientists to serve as authors for each of the 20 chapters of the prescribed outline. These authors, more than 200 in number from all six continents, then took up the task of assessing the recent scientific literature on the impacts of climate change in their specific regions or sectors. They argued among themselves as they scoured their shelves and experience for sources of new knowledge. They ham-

mered out language with which they could all agree.

Their work appeared in four separate drafts, and each subsequent version was subjected to expert and government review from hundreds of other scientists and interested parties (including climate sceptics). In every round, they responded to thousands of comments. Review editors for each chapter made certain that each and every comment was adequately considered and a record of each and every response to each and every review

MAIN POINTS

- **The author defines** the main conclusions from the latest IPCC climate impacts assessment.
- **The report shows** that climate change will impede progress towards the Millenni-

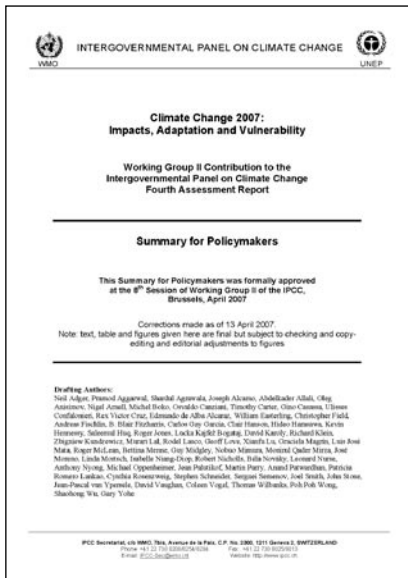
um Development Goals.

- **It provides** a guide to ensuring that climate is on the agendas of finance ministers around the world.

comment is on file at the IPCC Secretariat.

At the same time, the convening lead authors of the 20 chapters were writing the *Technical Summary* of the major results from the evolving chapters as well as a draft version for what is termed the *Summary for Policymakers*. Both of these documents went through the same multiple draft and review process and the final version was ultimately submitted to the IPCC plenary in Brussels.

Because countries, and not the scientists, are ultimately responsible for the Summary for Policymakers, the final draft provided by the original authors was reworked in Brussels sentence by sentence, and sometimes word by word. And because the plenary is a consensus body, each word had to achieve unanimous approval. The point of this sometimes incredibly tedious process is not to change the science to fit political agendas. It is, instead, to make certain that the message conveyed to policymakers accurately communicates



the appropriate level of confidence from the science community and that the supporting material from the scientific literature was accurately located in the underlying chapters and *Technical Summary*. Finally, once the *Summary for Policymakers* has been approved, the *Technical Summary* and underlying chapters follow in quick order.

What major messages from the science author team survived this intense scrutiny? The new assessment confirms a conclusion of the *Third Assessment Report* that developing nations will be most vulnerable to climate change because of high exposure to

potential impacts and low capacity to adapt. After noting that climate has been changing faster than previously anticipated, the new assessment also makes the case that the risks associated with crossing thresholds of “dangerous anthropogenic inference” with the climate system (however they are defined in the political sphere) are larger and closer than forecast only five years ago.

The details behind this conclusion can be found most easily in the *Technical Summary*. For example, numbers that were removed from the sectoral table when it was approved in the *Summary for Policymakers* record that:

- an additional one degree Celsius of warming is now projected to increase the number of people facing water scarcity by 0.4 to 1.2 billion people worldwide and put as many as 30 million additional people at risk of hunger;
- for another degree of warming, it is now projected that one to two billion people would face water scarcity, but the number at risk of hunger could actually fall; and,
- for even more warming, identified risks would accumulate at an accelerated rate while potential benefits would disappear.

The *Summary for Policymakers* synthesizes these and a wide assortment of other results in a series of fundamental conclusions:

- vulnerability to climate risk will be amplified in areas that already confront multiple stresses (for example, from land degradation, globalization and exposure to disease);

- adaptation is unavoidable because the planet would be committed to more warming even if emissions of greenhouse gases were halted today;
- a portfolio of adaptation and emissions controls will be required if the world’s people are to cope with climate risk because, of course, emissions will not end tomorrow; and,
- even these combined actions may be overwhelmed by the turn of the century.

Everyone has his or her own view of what is most important among these far-reaching conclusions. For me, the fundamental bottom line that delegates decided to take home to their governments is that climate change will impede progress toward meeting Millennium Development Goals (MDGs) across the world.

This stark and succinct assessment of the future, along with the recognition that adaptation and mitigation will be necessary, is certainly troubling, but the silver lining behind the growing storm cloud is an enormous opportunity. The WGII Report emphasizes that strengthening many of the factors that support the capacities of communities to adapt to climate risk is entirely consistent with making progress toward achieving the MDGs over the next half century. To be more specific, investments already planned or anticipated to help eradicate extreme poverty and hunger, provide primary education, promote equity, combat HIV/AIDS and other diseases and ensure environmental sustain-

ability can be essential components of an effective climate policy.

To my eyes, therefore, the new WGII Report thereby offers a roadmap by which climate change can find its way onto the planning and implementation agendas of finance ministers all around the world. Instead of being yet another problem that complicates their lives, the coincidence of goals noted by the WGII Report shows why coping with climate risk can be yet another good reason for them to do what they have been trying to do all along - to promote sustainable development.

The route to the highest levels of government is illuminated, for any country that wants to pick up the idea, when the WGII Report calls for the adoption of a risk management perspective in assessing impacts, adaptation and sustainable development. The language of risk management is a language with which finance ministers are quite familiar. The IPCC now sees that risk-based portraits of impacts, net of the effects of alternative adaptations, can, when inserted into alternative development pathways at specific locations, offer decision-makers simultaneous insight into a multiplicity of climate risks. A policy portfolio designed to reduce climate risk should take advantage of two different policy tools: reducing exposure through mitigation and reducing sensitivity through adaptation.

The ramifications of concluding that adaptation alone will not be able to accommodate

unabated climate change should also be understood, even though IPCC reports cannot be policy prescriptive. For some developing countries, and particularly for the least developed countries whose emissions are small, the need for mitigation may not be a serious issue over the near term. The story is, however, different for other countries, like China, India and Brazil, where substantial industrial development has already taken place. Current and anticipated near-term emissions of greenhouse gases are more significant for these countries, and they need to take notice of a change in the 'policy climate' that should emerge as the import of the *Fourth Assessment Report* is recognized around the world. More vigorous mitigation is on the way.

Countries such as China, India and Brazil have historically been reluctant to commit to emissions standards, of course, and that was an understandable position in a world where the largest contributors to atmospheric contributions, like the United States and Australia, pursued only voluntary programmes at the federal level. In a future where significant mitigation policies will likely be in place more ubiquitously, though, neglecting vigorous greenhouse gas mitigation policy will lead to development plans that are unsustainable - indeed, as unsustainable as development plans designed without taking climate risks into account. ■

ABOUT THE AUTHOR



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FURTHER INFORMATION

● **On the Web:** The IPCC *Summary for Policymakers* can be downloaded (0.5Mb file) at www.ipcc.ch/SPM6avrr07.pdf. The full text of the report will be available on the IPCC website, www.ipcc.ch.

The Fourth Assessment

SECOND REPORT

The latest reports of the Fourth Assessment of climate science and policy by the Intergovernmental Panel on Climate Change (IPCC), covering climate impacts, adaptation and vulnerability and emissions mitigation were finalized in April and May 2007

“It’s the poorest of the poor in the world, and this includes poor people even in prosperous societies, who are going to be the worst hit,” said Rajendra Pachauri, chair of the Intergovernmental Panel on Climate Change, as the second report of the latest IPCC assessment was released in April. Government officials and scientists had met in Brussels, Belgium, to finalize the text of the IPCC Working Group II review of climate impacts, adaptation and vulnerability. Martin Parry, working group co-chair, reported that there was now real evidence that climate change was having direct impacts. “For the first time, we are no longer arm-waving with models; this is empirical data, we can actually measure it.”

“Don’t be poor in a hot country, don’t live in hurricane alley, watch out about being on the coasts or in the Arctic, and it’s a bad idea to be on high mountains with glaciers melting,” said Stephen Schneider from Stanford University in the United States. The report projects that 75 to 250 million people across Africa could face water shortages by 2020. Crop yields could increase by 20 per cent in East and Southeast Asia, but decrease by up to 30 per cent in Central and South Asia. Agriculture fed by rainfall might drop by a half in some African countries by 2020. Twenty to 30 per cent of all plant and animal species are at increased risk of extinction if temperatures rise between 1.5 and 2.5 degrees Celsius. Gla-

and government representatives argued over the final wording. There was, for example, disagreement over the inclusion of a table indicating likely impacts for every degree of global warming and over the inclusion of a statement explicitly linking cause and effect. Objections to the text came mostly from the United States, China and Saudi Arabia. Some scientists walked out at one point and a number said that they would not be involved in the IPCC process in future. Parry acknowledged that “certain messages were lost,” but insisted that “the report was not watered down in the broad thrust.”

Responding to the report, Yvo de Boer, Executive Secretary of the United Nations

“For the first time, we are no longer arm-waving with models; this is empirical data, we can actually measure it”

ciers and snow cover are expected to decline, reducing water availability in countries supplied by melt water.

Controversy developed during the run-up to the release of the report as scientists

Framework Convention on Climate Change, said that the “projected impacts tell us that we urgently need to launch an agreement on future international action to combat climate change, as well as look for effective

ways to generate the funds needed for adaptation.” “Our current sources of funding are insufficient to cover... adaptation needs,” he continued. “So the international community needs to investigate new and innovative sources of finance, not least through the carbon market, in order to ensure that the most vulnerable communities are able to cope.”

Achim Steiner, head of the United Nations Environment Programme, called for action at the national level “to mainstream ‘climate proofing’ into all areas of economic life so that countries and communities... have a chance to adapt and thus a chance to avoid some of the more extreme impacts.” “This further underlines both how urgent it is to reach global agreement on reducing greenhouse gas emissions and how important it is for us all to adapt to the climate change that is already under way,” said European Environment Commissioner Stavros Dimas.

The third report of the Fourth Assessment was released in May in Bangkok, Thailand. The Working Group III review covers means of limiting the rise in atmospheric concentrations of greenhouse gases. It concludes that the cost of climate-control measures can be relatively small and might even benefit the economy, but warns that emissions must start declining by the year 2015 to prevent global temperature rising more than two degrees Celsius above the pre-industrial baseline. “The time to act is now,” Chartree Chueyprasisit of Thailand’s Ministry of Natural Resources and Environment told govern-

ment officials and scientists as they met to finalize the text.

The IPCC assessment notes that a wide range of technological options, already available and under development, can be deployed to limit global warming. “The most important thing is to improve energy efficiency,” commented Jean-Pascal van Ypersele, a member of the Belgian delegation. “There is a lot of energy wasted everywhere in the world,” he continued. Other options include converting from coal to natural gas, greater use of renewable energy and the safe deployment of nuclear power. The report also advocates making buildings more energy-efficient and motor vehicles more fuel-efficient, reducing deforestation and tree planting to absorb carbon. Hans Verolme of the Worldwide Fund for Nature said that “the IPCC has delivered a roadmap for keeping the planet safe. Now it’s the turn of politicians to do more than pay just lip service.”

In the United States, the Bush administration welcomed the range of climate mitigation options defined by the report, but did express serious reservations about the more expensive scenarios that could cut world gross domestic product by three per cent. “There are measures that come currently at an extremely high cost because of the lack of available technology,” warned James Connaughton, head of the White House Council on Environmental Quality. “Well, that would of course cause global recession, so that is something that we probably want to avoid,” he continued.

There had been considerable debate over the final wording of the report. “It’s especially troubling that the Bush administration was seeking last-minute changes to play down the report’s conclusion that quick, affordable action can limit the worst effects of global warming,” said Larry Schweiger, President of the National Wildlife Federation. Chinese delegates had been “masters of deception and the art of interpretation,” according to a German environment ministry official, in arguing that it would cost more and be much harder to reduce greenhouse gas emissions than the draft report suggested.

The review’s endorsement of nuclear technology was strongly opposed by some environmentalists. “Nuclear power threatens humans and the environment. It is not necessary to combat climate change,” said Brent Blackwelder of Friends of the Earth. Greenpeace accused the IPCC of underestimating the impact of the Chernobyl nuclear accident. “Denying the real implications is not only insulting to the thousands of victims, but it also leads to dangerous recommendations,” said Greenpeace’s Ivan Blokov.

● **Further information:** The *Summary for Policymakers* and the full text of all Fourth Assessment reports are available on the IPCC website at www.ipcc.ch. Earth Negotiations Bulletin reports on the debate surrounding the finalization of the reviews by the IPCC Working Groups are at www.iisd.ca/process/climate_atm.htm.

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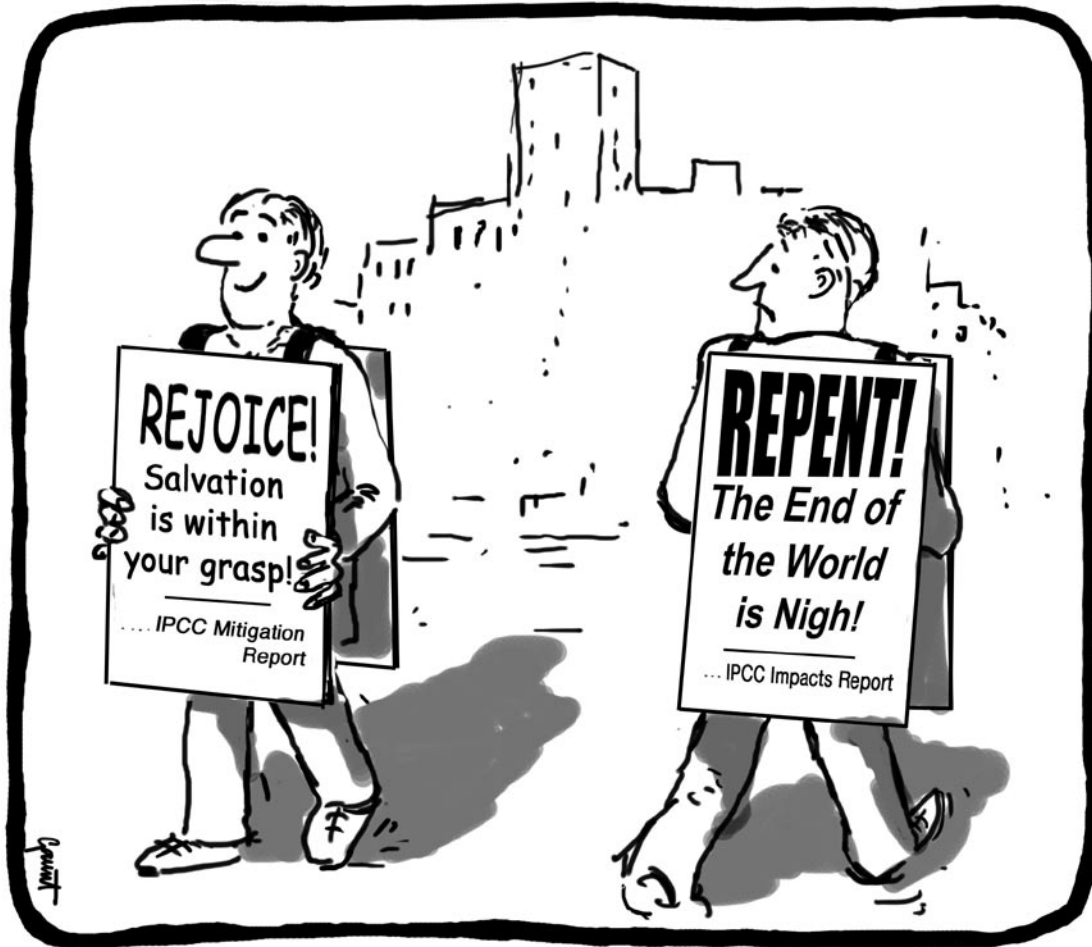
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Climate change and pastoralism

Climatic fluctuations are a defining characteristic of dryland areas in Africa. Pastoralism is a livelihood system that enables dryland people to cope with these fluctuations. But pastoral systems depend on maintaining a delicate balance between

pastures, livestock and people. Central to this is livestock mobility - moving herds to areas with better grazing conditions, particularly in dry periods.

Most climate change models predict rising temperatures and decreasing rainfalls in many African dryland areas. Rainfall will be increasingly erratic and more extreme weather conditions, such as droughts, are expected. This could undermine the delicate balance on which pastoral systems depend. Decreases in pasture quality and quantity, due to low rainfall, mean pastoralists could lose their livestock and face destitution. Livestock are also more than economic assets - they are cultural and spiritual

assets and define social identity.

Scarcer resources and demographic growth are likely to increase competition for natural resources - possibly resulting in conflict and loss of livestock and livelihoods. In northwest Kenya, several years of low rainfall have recently resulted in the death of

many livestock, and in a major food crisis among the Turkana pastoralists.

Negative perceptions of pastoral systems have resulted in unfavourable policies in the past, particularly policies constraining herd mobility, damaging common property regimes under which many pastoralist systems operate and supporting agricultural

encroachment. Pastoralists have, therefore, become more 'sedentary'. But in a changing environment, herd mobility will become even more important. Experience shows that where pastoralists cannot move to refuge areas in times of crisis, the little available pasture and water attracts more livestock and people.

This exacerbates environmental degradation around water points and leads to declining livestock health and productivity.

Tackling these issues requires action at local, national and international levels. Long-standing negative perceptions of pastoralism must be replaced by recognition of the rationale of such systems in dryland areas. Key areas of policy intervention include: enabling herd mobility while securing rights to critical pastures and water resources; supporting pastoral livelihoods through better water access, service provision and support for livelihood diversification; building robust conflict management institutions and effective drought mitigation systems, including early warning and insurance; and, strengthening pastoral group capacity to engage in policy debates.

THE FINAL WORD

Ced Hesse describes the challenges facing African pastoralists and key areas of policy intervention needed to help them cope with climate change



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