

- 03 **AFRICA'S VULNERABILITY**  
**Environmental stress and climate change**
- 10 **GENDER ISSUES**  
**Integrating gender into negotiations**
- 15 **SUSTAINABILITY AND THE CDM**  
**A new method to assess project activities**

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**Health and climate  
in Kashmir** Page 19

## 03 Africa's vulnerability

*Balgis Osman-Elasha* discusses factors that make Africa vulnerable to environmental stress

## 10 Integrating gender issues

*Ulrike Röhr* reports on progress made on integrating gender into the climate treaty negotiations

## 15 Sustainability in the CDM

*Felicia Müller-Pelzer* describes a new method to assess sustainable development in the CDM

## 19 Health and climate in Kashmir

*Rais Akhtar* describes the impacts of climate change on health in the mountainous areas of India

## 24 A global carbon levy?

*Moritz Leuenberger* proposes a global carbon levy for climate change adaptation

## 14 News

## 22 Conferences

## 26 Assessment of climate science

## 28 Climate and disaster reduction

Cover photo: After the floods in the northeast of India in 2004 © EC/ECHO South Asia Office



**Nomads in the Sudan**

Photo: © Mohamed El Gamri

# Africa's vulnerability

**Balgis Osman-Elasha** discusses the many factors that make the African continent so vulnerable to environmental stress and climate change impacts

**A**frica is especially vulnerable to climatic changes and variability. This vulnerability is due to the fact that a large share of its economies depend on climate-sensitive sectors (mainly rain-fed agriculture), widespread poverty, poor infrastructure, high illiteracy rates, over-exploitation of natural resources and tribal conflicts. All these factors, in addition to limited institutional and technological capabilities, have contributed to its low adaptive capacity. The continent's high physical sensitivity to climate change is expected to result in increased average temperatures and more rainfall variability, both of which are going to severely impact people's livelihoods. The knowledge and information base for decision making on expected impacts and the required adaptation measures is also low.

One of the constraints to understanding current and future climate variability is the

lack of observational climate data in Africa. This lack of data limits, for example, regional diagnostic studies, which can identify the structure of dry and wet years, their precursors and their impacts. Such studies use empirical and statistical techniques and need further support in Africa. To address this evident gap, coordinated efforts for capacity building, training, research and development should be emphasized to provide for a continent-wide monitoring network.

Africa has a low level of expertise in climate science, particularly in prediction at longer

time scales. Most predictions are supplied from international centres external to Africa. The continent also lags behind other regions in terms of availability of detailed scientific knowledge of its climate. Little resources are allocated to climate at national levels, since climate is seen as a lesser priority compared to other urgent needs.

## Vulnerability assessment

Africa is, it is clear, already under pressure from climate stresses and this increases the continent's vulnerability to further climate change and reduces its adaptive capacity. Floods and droughts can occur in the same area within months of each other. Droughts in Africa often lead to famine and widespread disruption of socio-economic well-being.

With further climate change, climate in Africa is predicted to become more variable and extreme weather events more frequent and severe. There are likely to be large re-

## MAIN POINTS

- **The author discusses** current understanding of Africa's vulnerability to climate change.
- **She argues that** an information gap

must be addressed.  
● **Nevertheless, there are** many opportunities for strengthening adaptive potential.





**Water crisis in Western Sudan**

Photo: © Mohamed El Gamri

gional differences in changes in rainfall, for example, an increase in the western part of the continent and a decrease for the northern part. Some studies, however, have indicated that these general trends may include hidden variations within regions and countries. For example, southern Africa may be drier in general terms, but some countries of the region

may become wetter than the average.

Top-down climate model scenario-based assessment is a common approach for the assessment of impacts, vulnerability and adaptation to climatic changes in Africa. Recently, though, the bottom-up approach, which places the sensitivity and vulnerability of natural and human systems to the fore,

has been employed, particularly through the National Adaptation Programmes of Action process.

Key sectors and areas are likely to be seriously impacted for Africa as climate change develops.

Millions of people in Africa have no access to potable water. Water scarcity is expected to increase due to greater water demand. Population increases in drought-prone areas could, for example, coincide with future decreases in precipitation. Reduction in water quantity will lead to a reduction in water quality and the associated impacts on sectors such as health and biodiversity. By 2025, it is projected that around 480 million of people in Africa will face either water scarcity or accompanying stress with a subsequent potential increase of water conflicts - almost all of the fifty river basins in Africa are trans-boundary.

The ice-cap on Mount Kilimanjaro has been disappearing due to climate change with serious implications for the rivers that depend on ice melt for their flow. Figure 1 indicates a reduction in the ice-cap of around 82 per cent since it was first surveyed in 1912. Recent projections suggest that if the reduction continues at its present rate the ice-cap may disappear completely within fifteen years. Other glacial water reservoirs such as Ruwenzori in Uganda and Mount Kenya are facing similar threats.

Agriculture is the most important economic sector in most African countries. It

represents approximately 30 per cent of Africa's GDP and contributes about 50 per cent of total export value. Figure 2 shows the food production index in Africa compared to the world's for the period 1961-2001.

Agriculture is mostly subsistence in nature with a high dependence on rainfall (over 95

per cent) for irrigation. As a result, agriculture in Africa is highly vulnerable to changes in climate variability, seasonal shifts and precipitation patterns. The food security threat posed by climate change is great, particularly where agricultural yields and *per capita* food production have been steadily declining and where population growth will increase the demand for food, water and forage. According to a 1996 Food and Agriculture Organization study, Africa's food supply would need to quadruple by 2050 to meet people's basic caloric needs, even under the lowest and most optimistic population projections.

In general terms, the impacts of climate change on agriculture may include:

- a reduction in soil fertility;
- decreased livestock productivity directly (through higher temperatures) and indirectly (through changes in the availability of feed and fodder);
- an increased incidence of pest attacks resulting from an increase in temperature; and,
- the manifestation of vector and vector-borne diseases resulting in negative impacts on human health, which, in turn, affects the availability of manpower.

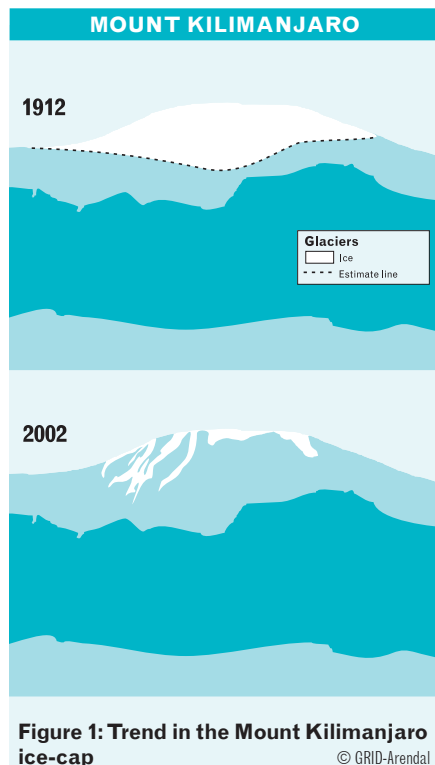
The health effects of a rapidly changing climate are likely to be overwhelmingly negative. It has been noted that the vulnerability of Africa to health impacts is a function of climatic as well as many other non-climatic factors. These factors include poverty, conflicts and population displacement, and ac-

cess, availability and management of health services. In addition, there are other factors such as those related to drug sensitivity of the pathogens and the general awareness and attitude towards preventive measures. Africa is already vulnerable to several climate sensitive diseases such as Rift Valley fever, cholera, malaria and heat stress. It is expected that the range, timing and severity of outbreaks of these diseases will change with a changing climate.

Africa is home to five internationally recognized areas of particularly high species richness and endemism known as 'biological hot spots'. The continent has a large and diverse heritage of flora and fauna. It contains about a fifth of all known species of plants, mammals and birds, and a sixth of amphibians and reptiles. Savannahs, which are the richest grasslands in the world, are the most extensive ecosystem in Africa.

Africa's biodiversity is currently under threat from natural and human pressures. Climate change will be an additional stressor and may lead to changes in habitats causing species migration or extinction for both flora and fauna. Sea-level rise will threaten coastal areas which are already vulnerable because of over-exploitation of coastal resources, over-population and pollution.

An increasing frequency of droughts and floods associated with climate variability and change could have a negative impact on the ecosystems of some areas in Africa. For example, lakes and reservoirs in the African



Sahel could lose part of their storage capacity or completely dry up. Changing rainfall patterns could lead to soil erosion, the siltation of rivers and the deterioration of watersheds. Wetlands of international importance, and wildlife are also under threat from drought in Southern Africa. An increase in temperature could impact the montane biodiversity of east Africa, specifically those species with a

in the Gulf of Guinea, Senegal, the Gambia and Egypt.

Impacts of sea-level rise could include:

- reduced productivity of coastal fisheries;
- coral bleaching;
- mass migration of populations from the coast and associated health issues;
- salt water intrusion;
- loss of recreational beach facilities; and,

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**“Africa possesses a wealth of social networks that have enabled people to survive throughout an environment of harsh climatic conditions”**

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limited ability to move up in elevation.

The detrimental effect that climate change is expected to have on natural resources will lead to increased competition for the resources still available. Conflict is a possible outcome.

More than 25 per cent of Africa's population lives within 100km of the coast, and projections suggest that the number of people at risk from coastal flooding will increase from the one million in 1990 to 70 million in 2080. Sea levels around Africa are projected to rise by 15-95cm by the year 2100. Sea-level rise threatens coastal and marine ecosystems such as lagoons and mangrove forests of both eastern and western Africa. It will also impact urban centres and ports, such as Cape Town, Maputo and Dar es Salaam. An estimated 30 per cent of Africa's coastal infrastructure could be at risk including coastal settlements

- a loss of coastal infrastructure such as ports and subsequent negative impacts on the tourism sector.

Africa's desertification is strongly linked to poverty, since poor people have little choice but to over-exploit the land. Extensive agriculture in the drylands of Africa and the heavy dependence of rural people on natural resources for subsistence has largely contributed to land degradation and desertification. This situation could be further aggravated by the impacts of expected climatic changes (precipitation decreases and temperature increases). Projected climate change by the year 2025, associated with a rise in mean temperature, will exacerbate the losses already experienced due to drought. The link between desertification and climate change is an important issue that needs to be better explored. (See *Tiempo*, Issue 61.)

Climate change has the potential to undermine economic development, increasing poverty and delaying or preventing the realization of the Millennium Development Goals. In particular, the lack of effective adaptation to the adverse effects of climate change can jeopardize the achievement of Millennium Development Goal 1, which is the eradication of extreme poverty and hunger, Goal 6, which is the combating of HIV/AIDS, malaria and other diseases and Goal 7, which is to ensure environmental sustainability.

A direct link is obvious between climate change and development. The impacts of climate change could greatly impede development efforts in key sectors. Development strategies and plans could have an impact on capacities to cope with climate change.

In consideration of the fact that the adverse effects of climate change pose an additional burden in meeting development goals, the mainstreaming of adaptation into sustainable development planning and the accommodation of additional climate change risks are issues that are under consideration for support through additional funding. For example, Organization for Economic Cooperation and Development member countries declared in the *Declaration on Integrating Climate Change Adaptation into Development Cooperation* that they will work to better integrate climate change adaptation in development planning and assistance, both within their own governments and in activities undertaken with partner countries.

In 2003, the European Commission produced a communication entitled *Climate Change in the Context of Development Cooperation*, in which it proposed a European Union action plan aimed at integrating climate change concerns into their development cooperation activities. Similarly, the World Bank's progress report on its investment framework for clean energy and development asserts that, "it is essential that the Bank Group, along with other International Financial Institutions, play a leading role in ensuring that maximum impact is obtained from these [climate treaty] funds by mainstreaming appropriate investment and

appropriate risk in the global development portfolio."

Competition for scarce resources, such as freshwater, land or fish resources, brought about by changes in climate can lead to conflict which will impact on the successful achievement of the Millennium Development Goals. The 2001 IPCC Third Assessment Report highlights conflicts over water resources, especially in international shared basins, as an important aspect of Africa's vulnerability to climate change. One such example is that increased pressure on resources deepened tensions between nomads and agriculturalists in Niger during the 2005 crisis. It has also been argued that increased competition over land was one of the triggers of the conflict in Darfur in Western Sudan.

### Adaptation strategies

In spite of the low adaptive capacity of Africa, there are some African communities that have developed traditional adaptation strategies to cope with climate variability and extreme events.

Rural farmers have been practicing coping strategies and other tactics, especially in places where droughts recur, and have developed their own ways of assessing the prospects for favourable household or village seasonal food production. For example, in Senegal and Burkina Faso, locals have improved their adaptive capacity by using traditional pruning and fertilizing techniques to double tree densities in semi-arid areas. These help in

holding soils together, thus reversing desertification. Similar community-initiated projects in Madagascar and Zimbabwe have also been viewed as successes.

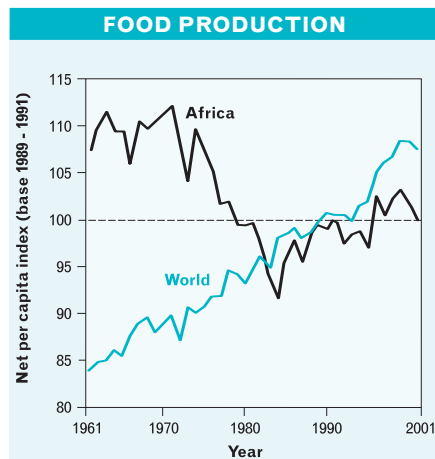
Other examples of coping strategies include:

- diversification of herds and incomes, such as the introduction of sheep in place of goats in Bara Province in Western Sudan;
- reliance on forest products as a buffer to climate-induced crop failure in climatically marginal agricultural areas in Botswana;
- decentralization of local governance of resources (Community-Based Natural Resource Management approaches) to promote use of ecosystems goods and services as opposed to reliance on agriculture in climatically marginal areas for agriculture in Sudan; and,
- manipulation of land use leading to land use conversion, for example, a shift from livestock farming to game farming in Southern Africa.

Experience with these strategies needs to be shared among communities, although it will be necessary to take into account that some of these techniques may need to be adjusted to deal with additional climate risks associated with climate change.

### Opportunities for Africa

In spite of the gloomy picture that climate change is drawing for the future of Africa, the continent possesses some unique character-



**Figure 2: Food production index for Africa (arbitrary units)**

istics that could provide good opportunities for it to emerge stronger and more capable of reducing future climate change impacts.

The following points illustrate positive characteristics that would enable Africa to better withstand climate change impacts.

- Africa is still not heavily polluted and is not considered to be a major source of greenhouse gas emissions. Compared to the industrialized countries of Europe and North America, Africa's contribution to global climate change is not significant.

Fossil fuel carbon dioxide emissions are low in both absolute and *per capita* terms. Its emissions represent only 3.5 per cent of the world's total carbon dioxide emissions and these are expected to increase to only 3.8 per cent by the year 2010. This means that the continent has a good opportunity to follow a sustainable development path.

- Africa is home to some of the greatest wilderness areas in the world, as well as some of the greatest biodiversity hotspots. The great deserts and the Central African

rainforests have huge remaining tracts that show low human impact and development.

- Africa has a population density of 249 people per 1000 hectares, which is low compared to the world average of 442. Population projections show a decline in fertility from 6.1 children per woman in 1995 to 2.9 by 2025. This will be accompanied by a slow and uneven decline in mortality. A positive aspect is that life expectancy is expected to increase from the 50.1 years it was between 1995 and 2000 to 62.1 by 2025.
- Africa has good potential for exploiting its agricultural and range lands in a more productive way through agricultural transformation processes and sustainable use of its rich natural resource base.
- Africa participated fully in the United Nations Conference on Environment and Development in Rio de Janeiro, Brazil, in 1992 and had great expectations from the vision of global cooperation for sustainable development. This promised positive advancement if the African countries would join hands in the implementation of Agenda 21. It is still hoped that the envisioned harmony between economic development and the environment will manifest itself in Africa leading to sustainable development at national and regional levels.
- Africa is pursuing accelerated socio-economic development strategies to eradicate poverty and protect and promote human health. This is being achieved through com-



**Deforestation in arid areas**

Photo: © Mohamed El Gamri



mitments to two main initiatives that have been designed to propel Africa towards achievement of a sustainable development path in the 21st century. The two initiatives are the Poverty Reduction Strategies, which are spearheaded by the World Bank and the International Monetary Fund, and the Partnership for African Development. Further support to strengthen these initiatives is needed through re-thinking and full commitment to development by governments.

- Excellent opportunities exist for Africa to make use of available multilateral funding. For example, there is the Strategic Priority on Adaptation which is part of the Global Environment Facility Trust Fund. There is also both the Special Climate Change Fund and the Least Developed Countries Fund, which are in addition to the Adaptation Fund under the Kyoto Protocol.
- Africa possesses a wealth of social networks that have enabled people to survive throughout an environment of harsh climatic conditions. These networks represent safety nets for many people by compensating for their low financial incomes and helping many maintain their livelihoods. These networks should be built upon and further strengthened.

Approaches that address multiple environmental stresses and factors hold the greatest promise for Africa, particularly given the limitations in capacity, in terms of both human capacity and financial resources. Efforts

to design implementation strategies that address land degradation (which leads to desertification), loss of biological diversity and ecosystem services, as well as adaptation to climate change, such as through enhancing adaptive capacity, will be more likely to succeed than uncoordinated efforts.

Many African countries have ratified the international conventions on biodiversity, climate change and desertification. Support is still needed, though, from their development partners to ensure effective implementation of their emerging strategies and plans, as well as to fully exploit the opportunities that could be achieved.

There is also a need for employing an integrated and synergetic approach among national level development partners for addressing sustainable development. Currently, various national institutions have enacted environmental action plans to address environmental degradation. Several strategies and plans have been formulated in a number of countries including national environmental action plans, forestry management plans, biodiversity plans, coastal management plans and wetland conservation strategies.

In conclusion, it is clear that although Africa is highly vulnerable to changing climate conditions and to environmental stress, with a full commitment to cooperation and utilization of the many mechanisms that are available, the continent can take positive advantage of adaptation opportunities to ensure a sustainable future. ■

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## FURTHER INFORMATION

● **In the Cyberlibrary:** The Tiempo Climate Cyberlibrary maintains a listing of key websites covering climate change and Africa at [www.tiempocyberclimate.org/portal/t57web.htm](http://www.tiempocyberclimate.org/portal/t57web.htm).

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## ACKNOWLEDGEMENTS

● This article is based on the *Background Paper on Impacts, Vulnerability and Adaptation to Climate Change in Africa*, prepared for the African Workshop on Adaptation (Accra, Ghana, September 2006) by Balgis Osman-Elasha (Team Leader), Mahmoud Medany, Isabelle Niang-Diop, Tony Nyong, Ramadjita Tabo and Coleen Vogel. The paper was commissioned by the Climate Change Secretariat and is available at <http://tinyurl.com/yrou3f> (1.1Mb download).

# Integrating gender issues

## Ulrike Röhr reports on the current state of progress made on integrating gender issues into climate treaty negotiations

In 2003, at the United Nations Framework Convention on Climate Change (UNFCCC) Ninth Conference of Parties (COP9) in Milan, Italy, an informal network of women and some men was formed composed of individuals interested in integrating gender issues into climate change policies and negotiations. We all brought to the network different interests and areas of work from various regions of the world, but were united in our commitment to ensure that women's voices were heard in the climate change debate.

Since then, our network has organized side events during the annual UNFCCC Conferences of the Parties. At these events, we have informed participants about the linkages between gender and climate change at our exhibition stands and held women's meetings during the Conferences as well as submitting statements in the Plenary Sessions. Compared to gender-related activities before

COP9, that's a lot! Although compared to our goal of mainstreaming gender concerns into the climate change debate, progress is still moving at a snail's pace.

Progress is being achieved very slowly and is mainly constrained by two realities. First, there are too few women and men participants whose main focus is on gender issues and who are also willing to lobby for gender mainstreaming. Second, there is a huge lack of sex-disaggregated data and gender-aware research in the area of climate change and cli-

### MAIN POINTS

- **The author discusses** progress in placing gender issues on the climate agenda.
- **Examples of positive developments**, including an important research project,

are presented.

- **While gender concerns** are increasingly present in the climate negotiations, the issue still requires greater emphasis.

mate protection, a fact that limits the quality of discussions that can be held at a negotiation level.

A first step has recently been undertaken which aims to close this gap. The network on gender, environment and sustainability, genanet, is a project of the organization LIFE - Women develop ecotechnology, based in Berlin, Germany. LIFE/genanet is conducting a research project to review, analyse and assess existing research in order to develop a comprehensive overview of data and knowledge relevant to gender aspects of climate change in mitigation and adaptation, including identifying strategically important knowledge gaps. The review will consider research done under the heading of "gender and climate change" as well as research in other disciplines and fields linked to climate change policy. In addition, the project aims to consolidate contacts and networks within the research community and develop

a database of experts on gender and climate change. The project is being conducted in cooperation with, and is funded by, the Food and Agriculture Organization of the United Nations. The first results of the project were presented during a side event at COP12 in Nairobi, November 2006.

At the side event, Yianna Lambrou, senior officer at the Food and Agriculture Organization explained the commitment of her organization to mainstreaming gender issues in all of its work, such as on energy, agriculture, fisheries and forestry, and emphasised the importance of also pursuing gender

easily be done. This was the initial assumption of the researchers but, unfortunately, reality proved otherwise. Since the beginning of the project in August 2006, preliminary findings indicate that there are more case studies than we expected, but there is very little large-sample quantitative research.

Minu Hemmati from LIFE/genanet outlined the five steps undertaken so far to develop an analytical framework on gender in climate change:

- 1 Identify climate change topics. That is, identify sectoral and cross-sectoral issues that are impacting the climate and/or are

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**“the inclusion of gender concerns is becoming increasingly present when looking at climate change from a human rights, justice and equity perspective”**

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equality in climate change. She introduced preliminary results of the literature review on the gender aspects of climate change and invited participants to provide feedback and inputs so that the final result will be as comprehensive as possible.

After a brief explanation of the terms ‘gender’ and ‘gender roles’, this article’s author highlighted the observation that an underlying assumption of the project was that there might be more data in existence than originally thought, especially when looking at climate policy, energy, agriculture, water or biodiversity. Such data might not be linked directly to climate change yet - but this could

impacted by climate change, and/or are results of climate change.

- 2 Identify the gender aspects of the topics identified in the first step such as known facts and open questions.
- 3 Identify the dimensions that are involved in looking at the gender aspects identified in the second step, and in which disciplines the relevant research is being done and/or should be done.
- 4 Identify what research exists, and where there are gaps. What do we know that needs to be integrated into climate policy making and what don’t we yet know that needs to be addressed in future research?

- 5 Identify priority issues for future research.

Currently, the project has identified 609 individual sources, 215 of those of immediate relevance. Next steps to be undertaken include continuing the research review by interviewing researchers who are working directly on gender and climate change issues, examining additional scientific databases, and applying the analytical framework to all sectoral and cross-sectoral issues as well as to the effects of climate change on gender equality. A report identifying available knowledge and gaps will be published by the Food and Agriculture Organization midway through 2007.

The project is searching for further data on gender and climate change and looking for publications and projects that may have been missed, as the data collection process ended in January 2007. Relevant materials can be sent to the author. At this stage of the project, we will not be able to integrate new materials into the final report but they will be included in the database that the project has created.

Discussion at the side event that followed the speakers’ presentations noted that additional research and issues should be taken into account. For example, who decides about the purchase of energy efficient stoves in rural households and is the consent of men required for women to utilize the stoves? It was noted that decision-making power is gender-based - a key issue for the UNFCCC negotiations on technology transfer. Another

challenge raised during the discussion was how to interest more men in committing themselves to applying gender mainstreaming strategies in climate change work.

Though progress in the field of data collection, as well as in the overall sensitization on gender issues, has been at snail's pace, there are some positive signs. Environmental organizations have been especially resistant in the past to incorporating gender issues in their work. But, with time, we have seen that the inclusion of gender concerns in their policies and approaches is becoming increasingly present, particularly when looking at climate change from a human rights, justice and equity perspective. For example, Friends of the Earth International and its members are combining advocacy for environmental protection with human rights and justice arguments.

An example of a recent initiative is a position paper prepared by the Global Forest Coalition entitled *Biofuels: A Disaster in the Making* which has been endorsed by more than one hundred organizations and individuals. The paper calls upon the Parties to the UNFCCC to immediately suspend all subsidies and other forms of inequitable support for the import and export of biofuels and calls especially upon industrialized countries to recognize their responsibility for destroying the planet's climate system.

The paper describes the harmful effects of rapidly increasing demands for crops like corn, palm oil or soy as a source for biofuel,



**Women's Caucus, COP12**

such as increased land competition leading to marginalization of small-scale agriculture. The paper also explains that arable land used to grow food is now being used to grow fuel, leading to staggering food prices and causing hunger, malnutrition and impoverishment among the poorest sectors of society. It points out the destruction of traditions, cultures and values of indigenous peoples and rural communities. The paper highlights that these effects have particularly negative impacts on women and indigenous peoples who are economically marginalized and who are most dependent on natural resources like water and forests.

The increasingly present and growing voice of young people who are involved in the UNFCCC negotiations should also be highlighted. These young people are much more aware of gender inequalities than most other constituencies, emphasizing in their communiqués and other formal interventions the importance of taking into account gender equity and following up with concrete action.

We hope that more environmental organizations will take note of these examples and will be encouraged to integrate gender into their own communiqués and position papers.



What is still greatly lacking is building a nexus between gender knowledge in climate change and the concrete issues of the negotiations in detail, as well as a linkage to the implementation of the Kyoto Protocol and the UNFCCC.

In Nairobi, it was noticeable that the social aspects of climate change and climate protection were often addressed in side events and debates. This might be due to the venue of the conference: for the first time, a UNFCCC conference was held in sub-Saharan Africa, putting the whole continent at the centre of the world's attention. The impacts of climate change and their linkages to poverty reduction were put on the agenda, particularly in the context of Africa. Unfortunately, gender aspects were only rarely taken into account in these debates. Nevertheless, the broadening of the debates with the inclusion of social and inequity aspects in discussions otherwise focusing mostly on the economic, technical and natural science dimensions of climate change is an encouraging, strong entry point for gender perspectives as well.

The hope for greater emphasis on gender mainstreaming in climate protection and climate change is nourished by several good examples that came up in Nairobi. The CARE Brazil Social Carbon Fund, a partnership between CARE Brazil and global brokers CO2e was launched at the conference. In the presentation of the Fund, it was discussed how local women's projects might benefit. The methodology was based on a strong gender

approach. It was agreed to carry out a pilot project, aimed at identifying options at both ends, for women's projects and for seeking donor funding.

During the meetings of the Women's Caucus at COP12, a first draft of a lobbying paper, identifying connections and entry points for strengthening the gender aspects in some of the issues negotiated in Nairobi and beyond, was discussed. The paper addresses, amongst other things, adaptation, the Clean Development Mechanism, capacity building, public awareness and information, and market-based approaches in general. It protests that the main victims of market-based approaches to environmental protection are those who do not have the cash to buy their water, fuel wood and medicines. They include women, indigenous peoples, landless farmers and the cash-poor in general. These same people also lack formal land titles, marketing skills, investment capital and the technical information needed to compete in the environmental services markets. In view of this, the Women's Caucus called for a careful analysis of positive and negative effects on all potential market actors for all market-based approaches.

We hope that results of the LIFE/genanet and Food and Agriculture Organization research review will put these activities on a more substantiated base, supported by the literature, in the future. ■

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## ABOUT THE AUTHOR



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## FURTHER INFORMATION

● **In the Cyberlibrary:** The Tiempo Climate Cyberlibrary maintains a listing of websites on gender and climate at [www.tiempocyberclimate.org/portal/t56web.htm](http://www.tiempocyberclimate.org/portal/t56web.htm).

● **On the Web:** The genanet ([www.genanet.de/unfccc.html](http://www.genanet.de/unfccc.html)) and FAO ([www.fao.org/gender/](http://www.fao.org/gender/)) websites contain information and resources on the issue of gender, climate and development. Any individual or organization who wants to join the genanet network or wishes to participate in the mailing list on gender and climate change, should contact the author by mail at the address above. Further information about the CARE Brazil Social Carbon Fund is available at [www.caresocialcarbon.com](http://www.caresocialcarbon.com).

## UK CLIMATE BILL

**The United Kingdom is proposing legislation to set binding limits on domestic greenhouse gas emissions. The draft Climate Change Bill defines five-year carbon budgets, leading to a 60 per cent cut in emissions by the year 2050.**

"This bill is an international landmark," environment minister David Miliband said. "It is the first time any country has set itself legally-binding carbon targets. It is an environmental contract for future generations." There will be annual, transparent reporting on progress to the parliament.

*Read more:*  
[www.tiempocyberclimate.org/newswatch/archive/week070325.htm](http://www.tiempocyberclimate.org/newswatch/archive/week070325.htm)

## EU COMMITMENT

**The European Union (EU) has agreed to adopt a binding target for renewable energy as part of its climate change strategy.**

By 2020, 20 per cent of EU energy will be generated by renewable systems such as wind and solar power, contributing to an overall goal of a 20 per cent reduction in greenhouse gas emissions. Targets for individual nations within the EU will be set according to national circumstances. "We can say to the rest of the world, Europe is taking the lead, you should join us in fighting climate change," commented European Commission president José Manuel Barroso.

*Read more:*  
[www.tiempocyberclimate.org/newswatch/archive/week070318.htm](http://www.tiempocyberclimate.org/newswatch/archive/week070318.htm)

## G77 EMISSIONS

**The G77 group has hit back at proposals that developing countries accept emissions constraints. "Most environmental degradation has been historically caused by the industrial world," said Munir Akram, G77 chair.**

"China, India and others are at the stage where they are now taking off and it's quite natural that their emissions of carbon are increasing. Unless the North comes to grips with its responsibility it will be difficult to come to an international consensus by which all of us can contribute to halting the degradation of the environment", he continued.

*Read more:*  
[www.tiempocyberclimate.org/newswatch/archive/week070311.htm](http://www.tiempocyberclimate.org/newswatch/archive/week070311.htm)

## CHINA AND INDIA

**China and India reaffirmed their commitment to act on climate change at the World Economic Forum held in Davos, Switzerland.**

China intends to follow the Kyoto Protocol, said Zhang Xiaoqiang of the National Development and Reform Commission, although it is not legally bound by the agreement. Montek Ahluwalia of India's Planning Commission reported that nuclear power will play a part in reducing national greenhouse gas emissions. "It's clear that business as usual is not going to work," he said.

*Read more:*  
[www.tiempocyberclimate.org/newswatch/archive/week070211.htm](http://www.tiempocyberclimate.org/newswatch/archive/week070211.htm)

## FLOOD RISKS

**About 60 million people in the developing world would lose their homes as a result of a three-foot rise in sea level, according to a new World Bank report.**

In Egypt, much of the Nile Delta would be flooded. Large parts of Vietnam, including the Mekong Delta, would become submerged, with ten per cent of the economy destroyed. Report author Susmita Dasgupta said that "knowing which countries will be most affected could allow better targeting of scarce available resources and could spur vulnerable nations to develop national adaptation plans now and avoid big losses later."

*Read more:*  
[www.tiempocyberclimate.org/newswatch/archive/week070225.htm](http://www.tiempocyberclimate.org/newswatch/archive/week070225.htm)

# Sustainability in the CDM

**Felicia Müller-Pelzer** describes a new method to assess how Clean Development Mechanism project activities contribute to sustainable development

**T**he Clean Development Mechanism (CDM) is one of the three 'flexibility mechanisms' under the Kyoto Protocol of the United Nations Framework Convention on Climate Change. CDM project activities generate carbon credits that can be sold. The CDM has two main goals: cost-effective additional reductions in greenhouse gas emissions, and sustainable development in non-Annex I countries (developing countries). These two goals are, however, not awarded equal attention.

As the reduction of greenhouse gas emissions is closely linked to the fulfilment of the Kyoto Protocol, an external accredited entity, the 'Designated Operational Entity', evaluates each CDM project with regard to emission reductions. No such evaluation system has been established for the sustainable development component of project activities.

A systematic approach is needed to help

CDM project developers formulate and implement their sustainable development strategy. This article describes the 'Sustainability Management Approach', which has been refined following dialogue (in early 2006) with project developers of three Peruvian case studies.

## MAIN POINTS

- **The author explains** why the sustainable development goals of Clean Development Mechanism projects are best defined at the project level.

- **She describes** the 'Sustainability Management Approach', which helps assess how projects contrib-

ute to sustainable development in host countries.

- **The Approach helps companies define** sustainability and develop self-set goals and indicators. It helps communicate the definition of sustainability and can be used to evaluate projects.

## Defining sustainable development

Each host country must decide whether a project activity contributes to sustainable development. But the process is not transparent because many 'Designated National Authorities' have not published information on their approval criteria. In addition, project activities rarely provide sufficient information in their Project Design Documents. It is, therefore, hard to assess how a project activity contributes to sustainable development in the host country. It is assumed that the Designated National Authorities and the project participants have a clear concept of how to achieve sustainable development and that projects are implemented accordingly. But long-term experience with development aid suggests that this assumption is weak.

Due to the many trade-offs, conflicting interests of stakeholder groups and diverging definitions of sustainable development, choosing projects that contribute most to

sustainable development of the host country can become ethically problematic. Equally pressing needs would have to be set against each other and all stakeholders may not perceive the result as fair. It may be better to try to satisfy all needs, with projects achieving minimum standards on certain criteria.

Sustainable development cannot be operationally defined at an international or national scale because it is highly context-specific and the unique conditions of each project activity should be taken into account. Top-down selection can also enhance transaction costs and carries the risk of policy failure. To achieve high stakeholder acceptance, sustainable development should be defined in a bottom-up manner, at the project level with the involvement of all stakeholders.

### **Why are sustainable development criteria lacking?**

Designated National Authorities are in a dilemma: the absence of sustainable development criteria, or presence of lax criteria, may attract investment and lead to more project activities in the country, but sustainability benefits could then be few or none. International competition for CDM project activities drives this 'race-to-the-bottom' in the quality of sustainable development activities. Strict criteria may prevent unsustainable project activities, but they may also be perceived as prohibitive by project investors. And the accompanying monitoring systems can create bureaucratic problems.

### **Minimum standards and self-set goals**

An alternative to this approach is to allow companies to set their own sustainable development goals in agreement with project stakeholders but to require them to meet minimum standards. Minimum standards allow assessment of improvements achieved by a project activity. There are three ways in which minimum standards can be applied:

- 1 Existing country legislation can form minimum standards. In cases where national legislation is neither operational nor enforced, these types of minimum standards are virtually absent.
- 2 A positive list of obligatory sustainable development criteria can set minimum standards. These are, however, open to interpretations of sustainable development that may not suit all project activities. The Designated National Authorities should guide project developers, but should be careful not to exclude valuable project ideas by limiting the scope too much. In addition, the business community may feel inhibited by obligatory criteria.
- 3 'Knock-out criteria' are negative criteria which define what the host country considers unsustainable and what should be prevented. Such criteria act as an 'emergency brake'.

Allowing companies to set their own sustainable development goals is not just a voluntary commitment because companies have to present a strategy. They can, however,

determine the most appropriate and cost effective way to contribute to sustainable development with their stakeholders. This gives them the freedom to develop innovative solutions that complement their business plan. If a company sees opportunities in sustainable management it may be able to identify new opportunities and risks, stimulate innovation, increase customer satisfaction and increase its social standing.

Whilst companies set their own sustainable development goals and are responsible for the outcomes, minimum standards, guidelines and final selection of projects allow the Designated National Authority to shape the definition of sustainable development. To ensure there are incentives for compliance, achievements must also be monitored and verified externally.

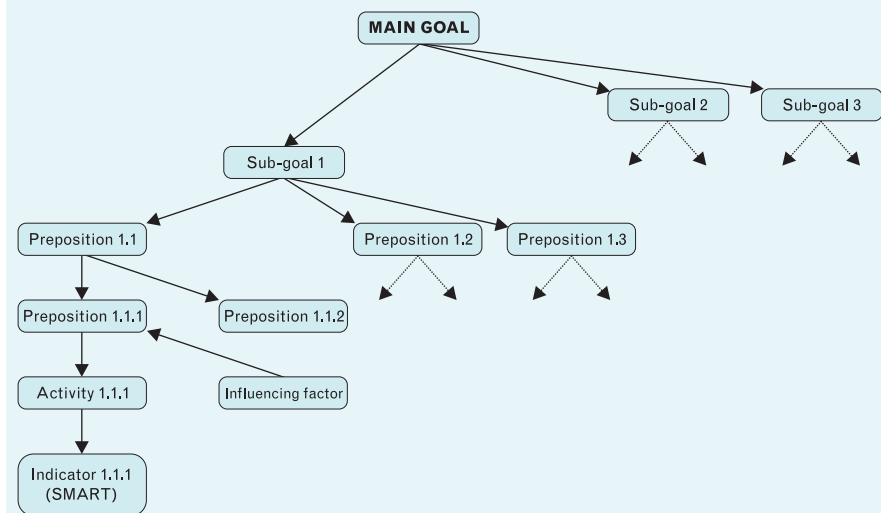
### **Guidelines to prevent arbitrariness**

Self-set sustainability goals run the risk of arbitrariness because the concept of sustainable development is open to interpretation. To prevent activities that are not in line with the host country's development priorities, guidelines to define sustainable development must be identified. Project developers should then avoid activities that do not comply with these guidelines.

Stakeholder involvement is a key component of developing a thorough sustainability strategy. Indeed, stakeholder consultation is already a core component of current CDM procedures. This article proposes a set of



## THE SUSTAINABILITY MANAGEMENT APPROACH GOAL HIERARCHY



guidelines and an approach for project developers to define a sustainability strategy for their project activities.

### The 'Sustainability Management Approach'

The Sustainability Management Approach is a guide for companies to help them define sustainability and develop self-set goals and indicators. It is a systematic approach to operationalize goals and clarify planned activities and indicators. Its pictorial elements and group discussions facilitate communication

of the definition of sustainability, which is especially useful during stakeholder consultations. The monitored outputs, outcomes and impacts can be used to support feedback processes and communicate achievements. Regular audits by external certifiers (such as the Designated National Authority or a Designated Operational Entity) are facilitated.

The Approach consists of the following elements:

**Policy analysis:** International and national development priorities can help identify sustainable development priorities. Conven-

tions and treaties such as the Rio Convention and the Millennium Development Goals specify international priorities. National priorities can be defined by local policies and regulations and, in some countries, Designated National Authority guidelines.

**Stakeholder analysis:** Stakeholder groups have different and often conflicting needs, which is why their understanding of sustainable development is likely to differ. Sustainable development must, therefore, be analysed from different perspectives. Stakeholder groups can be identified in a brainstorming session. During this exercise, the project developer must remember that organizations might not represent all stakeholders. Inhabitants who are affected both positively or negatively by the project activity should be included. Later, stakeholders and their needs will be analysed in greater depth in the stakeholder consultation that forms part of the CDM process.

**Defining resources and inputs:** Available resources and inputs have to be specified when planning actions to contribute to sustainable development. Some activities, such as a social plan for the area, may require additional funding (for example from the sale of project carbon credits). This will need to be determined from the start. Other sustainable development benefits will emerge from project activity implementation.

**Defining the goal hierarchy:** The goal hierarchy (see diagram above) connects goals and sub-goals and helps identify what contrib-

utes to sustainable development. It depicts the concept the project developer has of sustainability and incorporates the results of the policy and stakeholder analyses.

*Defining activities:* Activities are actions that contribute to goals, which help achieve higher goals, until the main goal of sustainable development is reached. After developing the goal hierarchy, the project developer can determine criteria that he can influence. Activities can either be an integral part of the project activity (for example, job creation) or additional to the project activity (for example, equipment provision for a local school).

*Defining indicators:* Indicators are needed to demonstrate whether a goal has been achieved or not. Indicators have to be Specific, Measurable, Action-oriented, Realistic and Timed (SMART). They must be discussed and agreed with the stakeholders during the consultation process.

### Underlying assumptions

Each project developer's sustainable development strategy will be based on underlying assumptions. These need to be questioned using discursive analysis to identify possible gaps, errors and weak points. At least two groups should be formed: one supporting and one opposing the planned strategy. Each group develops assumptions to support its viewpoints. The assumptions describe how stakeholders will behave. To identify which assumptions are pivotal, groups rank them according to which assumptions are most

certain and most important. Assumptions of high importance but low certainty can show a strategy's weak points. Assumptions of low importance should be discarded from the list.

Finally, each group presents and defends its strategy (based on the pivotal assumptions). The aim is to make all participants understand each group's arguments. To achieve consensus, the assumptions are negotiated between the groups and then reformulated. As a result, a (partial) agreement or disagreement is achieved. If no agreement is achieved, further steps to overcome these differences are needed.

### Strengths in short

The Sustainability Management Approach helps formulate, operationalize and implement self-set sustainability goals, activities and indicators. It facilitates regular audits by external certifiers and promotes accountability. The monitored outputs, outcomes and impacts can be used to support feedback processes and inform interested stakeholders. The elements of the Approach which involve stakeholders match well with the stakeholder consultation which is an integral part of the CDM process. Knowledge sharing, cooperation and improved mutual understanding are fostered. Project developers are encouraged to move from a compliance strategy to a pro-active strategy. ■

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### ABOUT THE AUTHOR



● **Felicia Müller-Pelzer** is a PhD student at the department of Environmental Economics and Economic Policy at the Technical University, Berlin, Germany.

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### FURTHER INFORMATION

● **In the Cyberlibrary:** The Tiempo Climate Cyberlibrary maintains a listing of websites on the Clean Development Mechanism at [www.tiempocyberclimate.org/portal/t53web.htm](http://www.tiempocyberclimate.org/portal/t53web.htm).

# Health and climate in Kashmir

## **Rais Akhtar** describes the impacts of climate change on health and subsequent adaptation strategies in mountainous areas of Kashmir, India

**T**he mountainous region of Kashmir in India is known for its amazing beauty and rich biodiversity, but changing environmental conditions, mostly of anthropogenic origin, have increasingly threatened this biodiversity. Pressure comes from the human need for cement and iron for construction, and commercial cultivation has caused land degradation and has adversely affected water supplies. Human encroachment into mountainous areas has reduced vegetation cover, which has increased soil moisture evaporation, erosion and siltation. This has had adverse effects on the quality of water and other resources. A changing climate has exacerbated these problems.

### **Climate change in Kashmir**

The most clearly discernible impact of climate change in Kashmir has been the change of seasons. For more than a decade, Kashmir

has not experienced a 20- to 30-day long season called 'tsonth', which for centuries occurred between the end of the winter snow and spring. Tsonth started around the first of March and ended in the first week of April. It was characterized by torrential rains followed by bright sunshine, which melted the icicles and snow producing lots of slush. The days were cold but pleasant.

Temperature rises have also been observed

### **MAIN POINTS**

- **Rais Akhtar describes** observed changes in climate in Kashmir, India, and explains the impacts these are having on local people.

- **He voices concerns** over the possible spread of malaria to Kashmir and the

subsequent impacts this would have on the region.

- **The adaptive capacity** of people in Kashmir is low, but adaptation responses have already been observed. Some of these are described.

in Kashmir over the last few years. This has caused early melting of snow during the warmer winter period when little water is required. But as there are few water conservation facilities this leads to drought during summer and contaminated water supplies.

Scientists have noted the changing climate in Kashmir, particularly in mountainous areas. Analysis of meteorological data by the Department of Environment and Remote Sensing of Jammu and Kashmir revealed appreciable differences in mean maximum and minimum rainfall quantities and mean maximum and minimum temperatures from 1901 to 1998. The 1990s experienced particularly pronounced temperature rises, and 1997 surpassed all previous temperature records. Changes have been most apparent in Srinagar in Kashmir Valley (at 1660 metres) where temperature rises have been greater than in the foothill region of Jammu (at 370 metres) and Delhi (at 180 metres).

## Climate change impacts

In the Hindu Kush, glacial melt, and glacial lake outburst floods will cause flash floods. Some regions will experience reduced water supplies and droughts. More landslides and infrastructure damage are expected.

Whilst higher carbon dioxide levels and temperatures may increase grain yields in some regions, rice yields may decline. Warmer water threatens fish farms and irregular monsoon patterns will delay rice planting. Aquatic biodiversity decreases due to salinization and water pollution are expected. Forest fires and pest levels will increase. Wildlife will move up to higher altitudes or down towards urban areas. Heat related illnesses, wa-

larial plasmodium, *Plasmodium falciparum*, has been reported at altitudes up to 2500 metres. This poses a major challenge for any malaria eradication programme. Both *Plasmodium vivax* and *Plasmodium falciparum* have been reported at altitudes much higher than the Kashmir valley.

Malaria could increase in Kashmir as a result of global warming, much as it has in other global highlands. In Ecuador an outbreak of malaria and dengue fever killed at least 14 people and infected more than 14,000 others in the year 2000. The situation could be quite serious for Kashmir. The tourism industry is an important contributor to the Kashmir economy, and the region is also

## Adaptation

Adaptation is necessary because humans are either unwilling or unable to collectively change their behaviour in order to mitigate human-induced climate change. Resources should, therefore, be focused on 'hardening' affected systems so that they can better withstand increased stresses resulting from climate change. Successful adaptation requires technological advances and transfer; supportive cultural, educational, managerial, institutional, legal and regulatory arrangements, both domestic and international; the availability of financing; and, exchange of information.

Adaptation activities could involve migration and resettlement, changed cropping patterns and early warning systems to help with disaster forecasting. Community-based disaster preparedness land use and farming practices may also need to change.

Some systems and geographic locations have more adaptive capacity than others. Vulnerability to change increases as adaptive capacity decreases. The level of economic and institutional resources in a community or region influences its capability for adaptation. Less developed countries, more likely to be lacking such resources, are more vulnerable to negative climate change impacts. The Intergovernmental Panel on Climate Change has rightly stated that the effects of climate change are expected to be greatest in the developing world especially in countries reliant on primary production.

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## “malaria could increase in Kashmir as a result of global warming”

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ter borne diseases, malaria and cholera could increase, but temperature increases may have caused respiratory diseases to decline.

### Malaria in Kashmir

Vectors and the diseases they carry, such as malaria and dengue, are being reported at higher altitudes in Africa, Asia and Latin America, than at any time during this century. Chloroquine resistant parasites exist at up to 2500 metres in Bolivia and Kenya, up to 2000 metres in Afghanistan and Ethiopia, up to 1800 metres in Papua New Guinea and Tanzania and up to 1500 metres in China, Ecuador and Peru. The most dangerous ma-

politically important.

Several other factors have reduced national capacity to prevent and control the disease, but the distribution and population dynamics of malaria are probably governed more by abiotic than biotic factors. Of these abiotic factors, temperature and rainfall (which affects humidity) are the most important. The relationship between changing temperatures, precipitation and relative humidity are complicated and more research to determine the likely impacts of climate change on the incidence of malaria in Jammu and Kashmir is needed. A study of climate change impacts on health is urgently required.





**Aid for people affected by the conflict in Jammu and Kashmir**

Photo: © EC/ECHO South Asia Office

The adaptive capacity of human systems in Kashmir is low due to a lack of economic resources and technology. Vulnerability is high due to poverty (especially in rural areas), frequent droughts, floods and heavy reliance on rain-fed agriculture and imported food items. Adaptation in Kashmir should involve increasing the robustness of infrastructure design and long-term investments, and improving social awareness and preparedness for future climate change.

## Adaptation to health impacts

Adaptation strategies to cope with temperature increases occur at individual, community and government levels. Various adaptation responses have already been observed amongst the people of Kashmir when trying to cope with climate variability.

People drink water more frequently and consume more soft drinks. They use electric fans or air conditioners, ventilate their homes, build larger windows, use bed nets and insecticides more frequently, increase their water storage capacity, use electric blankets and insulate their houses better. At a community level, people spend more time in their gardens, particularly at weekends. Some families have shifted their kitchen to the first floor of their homes, and other communities have installed tube wells.

At the government level, changes in office hours have been applied. Efforts have been made to provide adequate electricity supplies, which are currently poor. Water supplies also need improving. Strengthening healthcare infrastructure with special focus on the treatment of diseases resulting from hot and cold weather conditions has also been important. But government measures such as disease surveillance are very weak. Preventative measures are also poor and much healthcare is both grossly inadequate and inequitable. ■

## ABOUT THE AUTHOR



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## CONTACT

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## FURTHER INFORMATION

● **In the Cyberlibrary:** The Tiempo Climate Cyberlibrary maintains a listing of websites on climate change and health at [www.tiempocyberclimate.org/portal/t63web.htm](http://www.tiempocyberclimate.org/portal/t63web.htm).

● **On the Web:** The United States Environmental Protection Agency provides an overview of the health impacts of climate change at [www.epa.gov/climatechange/effects/health.html](http://www.epa.gov/climatechange/effects/health.html).

# CONFERENCES

## EVENTS

### 3rd International Green Energy Conference

**Vasteras, Sweden: 18-06-2007 to 20-06-2007**

A multidisciplinary international conference on the use of energy with no or reduced environmental impact. Will provide a forum for the exchange of latest technical information, for the dissemination of high quality research results, for the presentation of new developments in energy and environment, and for debate and discussion on shaping future directions and priorities.

*Details: Secretariat of IGEC 111, Mälardalen University, Department of Public Technology, Box 883, SE 721 23 Vasteras, Sweden. Fax: +46-21-101370. Email: info@igec.info  
On the Web: www.igec.info*

### Analysis of Regional Climate Change & Response Options Nadi, Fiji: 20-06-2007 to 22-06-2007

Organized by the Intergovernmental Panel on Climate Change Task Group on Data and Scenario Support for Impact and Climate Analysis. The expert's meeting will focus on climate-society-environment interactions that are important to understanding climate change and its potential implications. Overall aim is to explore and stimulate innovative research on connections and feedbacks across space, time and systems at scales appropriate to mitigation and adaptation decision making.

*Details: Neil Leary, International*

*START Secretariat, 2000 Florida Avenue NW, Suite 200, Washington DC 20009, USA. Fax: +1-202-4575859.*

*Email: nleary@agu.org*

*On the Web: www.start.org / www.aiac-project.org*

### Environmental Protection into the Future

**Czestochowa, Poland: 25-06-2007 to 27-06-2007**

Main working themes of the conference will be: energy, renewable energy sources, power generation, clean coal; wastewater management, sewage sludge and waste utilization; environmental engineering - new approaches; economics and policy; education; and, micro-pollutants in human environment. Conference will also hold the 10th anniversary of the Faculty of Environmental Protection and Engineering.

*Details: Ewa Neczaj, Faculty of Environmental Protection and Engineering, Czestochowa University of Technology, ul. Brzeznicza 60a, 42-200 Czestochowa, Poland. Fax: +48-34-3721303.*

*Email: enecz@is.pcz.czest.pl*

*On the Web: www.is.pcz.czest.pl/konferencje/epf2007/epf\_en\_php*

### 4th World Environmental Education Congress: Learning in a Changing World

**Durban, South Africa: 02-07-2007 to 06-07-2007**

Organizers hope to extend creative opportunities for dialogue, reflection and evaluation in the growing field

that is currently engaging with the outcomes of the World Summit on Sustainable Development and the implications of the United Nations Decade on Education for Sustainable Development. Aimed at individuals involved in education, community organizations, businesses and government.

*Details: Nina Freysen Pretorius, The Conference Company, PO Box 47156, Greyville 4023, South Africa. Fax: +27-31-3039856. Email: nina@confco.co.za  
On the Web: www.weec2007.com*

### Conserve-Vision 2007

**Hamilton, New Zealand: 04-07-2007 to 07-07-2007**

Conference goals will include consideration of future challenges for conservation agencies and how existing models might be strengthened or adapted to meet them, and to assess the ways in which conservation agencies might best achieve their goals for conservation outcomes in 2050 and beyond. Will also celebrate 20 years of integrated conservation management in New Zealand.

*Details: Brenda Hall, University of Waikato, Geography, Tourism and Environmental Planning, Private Bag 3105, Hamilton, New Zealand. Fax: +64-7-8384300. Email: bhall@waikato.ac.nz  
On the Web: www.waikato.ac.nz/wfass/Conserv-Vision/*

### 17th World Conference on Disaster Management

**Toronto, Canada: 08-07-2007 to**

### 11-07-2007

Organized by the Canadian Centre for Emergency Preparedness, the International Association of Emergency Managers and the Disaster Recovery Institute. Numerous sessions include over 80 educational sessions, 16 half day seminars as well as panel discussions. Focal topics include: real events/real lessons learned; future trends in disaster management; the human element; emergency health; technical issues and threats; and, principles and practices.

*Details: No mailing address details available. Fax: +1-416-9791819. Email: coord@wcdm.org  
On the Web: www.wcdm.org*

### International Conference on Mitigation & Utilization of Greenhouse Gases

**Kingston, Canada: 08-07-2007 to 12-07-2007**

Coorganized by Chemical Research Applied to World Needs and International Conferences on Carbon Dioxide Utilization. Conference topics include: the carbon balance in nature; greenhouse gas mitigation; policy and frameworks; and, utilization of carbon dioxide.

*Details: Philip Jessop, Department of Chemistry, Queens University, Kingston, Ontario K7L 3N6, Canada. Fax: +1-613-5336669. Email: jessop@chem.queensu.ca  
On the Web: www.chem.queensu.ca/greenhouse*

### Progress & Prospects on Water: Striving for Sustainability in a Changing World

**Stockholm, Sweden: 12-08-2007 to 18-08-2007**

An annual event for meetings, discussion, workshops and special activities arranged by the Stockholm International Water Institute (SIWI). Workshop themes include: international targets and national implementation; sustainable water technologies in industry; building capacity for future challenges; managing future consumer demands; and, progress for better services.

*Details: Katarina Andrzejewska, Stockholm International Water Institute (SIWI), Drottninggatan 33, SE-111 51 Stockholm, Sweden. Fax: +46-8-52213961. Email: sympos@siwi.org*  
*On the Web: www.worldwaterweek.org*

### 2007 International Conference on Water

**Taupo, New Zealand: 20-08-2007 to 22-08-2007**

Conference intends to focus on scientific and research advancements in the water environmental field. Programme will include discussion and presentation of new initiatives by participants. Will feature interactive workshops, keynote addresses and technical presentations. Aim is to provide opportunities for professionals to talk and exchange information and ideas in both plenary and social situations thereby strengthening the sector through shared knowledge.

*Details: Ainsley Button, Events Division Ltd, PO Box 24 505, Manners Street, Wellington, New Zealand. Fax: +64-4-4736209. Email:*

*ainsley@eventsdivision.co.nz*

*On the Web: www.water2007.com*

### 10th International Meeting on Statistical Climatology

**Beijing, China: 20-08-2007 to 24-08-2007**

Intent of the international meetings is to facilitate networking and exchanging of ideas and problems between climatologists and statisticians. The 2007 meeting will focus on the analysis and understanding of climate systems and advances in relevant statistical techniques. Sessions will cover: climate extremes and sensitivity; seasonal to decadal forecasting; climate reconstruction; storm and wave analysis; and other related themes.

*Details: Xuebin Zhang, Climate Research Division, Environment Canada, 4905 Dufferin Street, Toronto, Ontario M3H 5T4, Canada. Email: xuebin.zhang@ec.gc.ca*

*On the Web: http://jlimsc.iap.ac.cn/10imsc*

### Effects of Climate Change on Marine Ecosystems

**Kiel, Germany: 27-08-2007 to 31-08-2007**

This will be the 42nd in the European Marine Biology Symposia. Discussions will focus on the effects of changing temperature, pH and CO<sub>2</sub> on marine organisms and ecosystems.

These will cover topics such as: climate change impacts; invasion ecology; ecosystem consequences of biodiversity change; trophic interactions; chemical interactions; and, interaction webs. Student participation is encouraged with some financial support available.

*Details: Gabriele Barth, IFM-Geomar, Dusterbrookweg 20, 24105 Kiel, Germany. Fax: +49-431-6004402. Email: office@embs42.de*

*On the Web: www.embs42.de*

### 3rd Australia-New Zealand Climate Change & Business Conference

**Brisbane, Australia: 30-08-2007 to 31-08-2007**

Conference will focus on the impact of climate change on businesses, especially in terms of risks and opportunities as well as exploring opportunities in other markets including Japan, China, India and other south east Asian countries. Working theme is "finding common ground among business and policy makers to drive action" encompassing how business can manage the risks arising from climate change.

*Details: Elizabeth Edmonds, Conference Organizer, PO Box 375, Collaroy NSW 2907, Australia. Email: e.edmonds@climateandbusiness.com*  
*On the Web: www.climateandbusiness.com*

### 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, environmental restoration and ecological engineering, amongst others.

*Details: CEST2007 Secretariat, University 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*

### 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.  
*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*

# Proposing a global carbon levy

**Moritz Leuenberger** proposes a global carbon levy for climate change adaptation

Climate change is happening, here and now. We are tied together by melting glaciers in Africa and in Europe, by floods in America and in Asia, and by droughts and shortages of fresh water in Australia and Africa. And we are tied by a joint responsibility to combat climate change around the world and help those affected by it.

In Rio and Kyoto we committed ourselves to fighting the causes of climate change. We have indeed made some progress – but unfortunately not enough. For that, we have waited too long and our fight to get to grips with the problem has been too feeble and uncoordinated.

With damage from major disasters increasing by the day, we have to talk about adaptation: about how we can protect ourselves against the threats of climate change here and now. For we know that, even if we began today to take every conceivable action

the world over, the trend will not be reversed immediately. Today, we are no longer called upon only to tackle the causes, but also to protect against imminent harm. Where that is not possible, we must bear the consequences and arrange for compensation. This is why we must combine measures to prevent future climate change with efforts to tackle the effects of today's weather-related disasters.

## MAIN POINTS

- **Moritz Leuenberger argues** that we must tackle the causes as well as bear the consequences of climate change and arrange for compensation where appropriate.
- **He proposes** a global carbon levy

based on the 'polluter pays' principle to increase financial resources for this.

- **Such a levy** would address the causes and effects of natural disasters and help redress the injustice of climate change.

## A global carbon levy for adaptation

In order to increase the financial resources for this, I propose a global carbon levy. Based on the 'polluter pays' principle, it would be paid by each individual and each business in proportion to their carbon emissions. The revenue from this levy would then be directed towards adaptation measures worldwide.

This levy would address both the causes and effects of natural disasters. It would serve a dual purpose: it would encourage major emitters to reduce their emissions, and it would provide sufficient and reliable resources to finance adaptation measures. It would also redress the injustice of climate change, given that it is precisely those who so far have contributed least to the cause who are the most severely affected by the impacts of climate change. The Nairobi Climate Conference was able to advance the issue of financing and management of an adapta-

tion fund, which has been a major step in the right direction.

### Post-2012

Adaptation and emission mitigation are both matters of urgency. They are the two sides of the same problem: climate change. We must conclude by 2009 the negotiations on the commitments we are willing to take on after the present Kyoto targets expire in 2012 – because we have to ensure the continuity of our efforts.

Kyoto has put a price on carbon, and it has the particular merit of aligning economic

alone, because climate change with all its consequences – such as migration and refugees – knows no borders, not even those of the largest nations. We are, therefore, all dependent on one another, north and south, large and small.

When I speak of an alignment of interests, I am also referring to business. By tackling climate change head on, business can protect the grounds for its future prosperity. Sir Nicholas Stern's recent *Review on the Economics of Climate Change* has made clear that the costs of damage due to climate change are 1000 times higher than the costs of preven-

**“Kyoto has put a price on carbon, and it has the particular merit of aligning economic and environmental interests”**

and environmental interests. An international carbon levy to fund adaptation measures would fit in perfectly with this price mechanism.

This alignment of interests covers all of us – even the rich and richest nations. Anyone who, for whatever reason, took the decision not to ratify the Kyoto Protocol must, at the very least, finally carry out what they promised to do on their own. If this is not done, then they risk being accused of having deliberately allowed the disaster to happen. It is never too late to reconsider, to learn from mistakes. Even the most powerful of countries cannot brave the climate disaster

tive action. So there is every argument in favour of action now.

This is not a fight against nature. It is a battle against shortsighted egoism, a fight against unreasonableness and blindness. It is a fight for global solidarity to find a common way forward, which rises above our differing economic and narrow national interests to reduce the threat to our planet. We need to address this common challenge urgently. If we fail to do so, we and our children will all pay the price. ■

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### FURTHER INFORMATION

● This article is an authorised English version of the high-level opening statement to the Nairobi United Nations Climate Change conference in December 2006.

● 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](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm).



# Assessment of climate science

## LATEST REPORT

**The first volume of the Fourth Assessment of climate science and policy by the Intergovernmental Panel on Climate Change was published in February 2007. Newswatch editor Mick Kelly reports.**

The latest report by the Intergovernmental Panel on Climate Change (IPCC) on the science of climate change concludes that it is “very likely” - a probability of greater than 90 per cent - that the rise in global air temperature since the mid-1900s has been caused by human activity.

The report predicts that the average world temperature may rise by about three degrees Celsius by the end of the century. Sea level could rise by as much as 59 centimetres over that period, and some projections indicate the complete disappearance of summer sea ice in the Arctic by the year 2100. Heatwaves and periods of heavy rainfall are “very likely” to become more frequent but tropical cyclones, though more intense, may occur less often.

The report, the first volume of the IPCC's Fourth Assessment, was released on February 2nd in Paris, France. “Any notion that we do not know enough to move decisively against climate change has been clearly dispelled,” said Yvo de Boer, head of the Secretariat of the United Nations Framework Convention on Climate Change. “The big message... is the strength of the attribution of the warming to human activities,” said Claudia Tebaldi of the National Center for Atmospheric Research in Boulder, Colorado, in the United States. United Nations Secretary-General Ban Ki-moon pointed to the “scientific consensus regarding the quickening and threatening pace of human-induced climate change” and called for the global response “to move much more rapidly as well, and with more determination.”

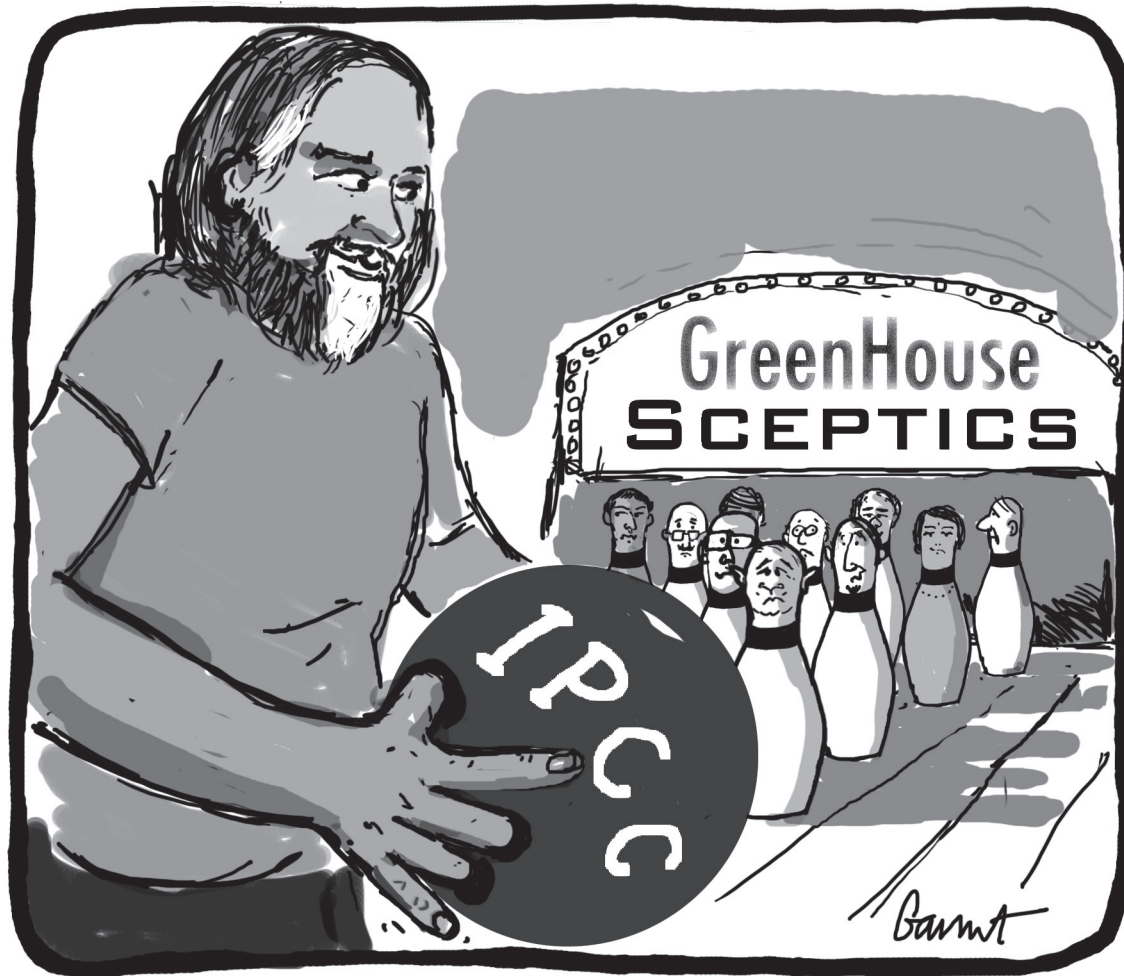
IPCC Chair, Rajendra Pachauri, said that the report contained “significant advances” over the previous 2001 Assessment. Nevertheless, though the overall message is clear, some uncertainties remain in the detail. The role of clouds in reinforcing or offsetting greenhouse warming is not well-established, neither is the future of Antarctica. The report

indicates that the Antarctic ice sheet may well remain too cold for widespread surface melting and could gain in mass as snowfall increases. The possibility of net loss cannot, however, be ruled out.

The report sparked a range of comments. “The world's scientists have spoken,” said Timothy E Wirth of the United Nations Foundation. “It is time now to hear from the world's policy makers. The so-called and long-overstated ‘debate’ about global warming is now over,” he continued. “Faced with this emergency, now is not the time for half measures. It is the time for a revolution, in the true sense of the term,” concluded French President Jacques Chirac.

There were dissenting voices. In the United States, Oklahoma Senator James Inhofe described the IPCC assessment as “the corruption of science for political gain.” William O’Keefe of the George Marshall Institute said that predictions of a “climate catastrophe in this century are unjustified.” ■

● **Further information:** The Summary for Policymakers can be downloaded (2.2Mb file) at [www.ipcc.ch/SPM2feb07.pdf](http://www.ipcc.ch/SPM2feb07.pdf)



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# Climate and disaster reduction

In a recent article (*Tiempo*, Issue 62, January 2007), Newswatch editor Sarah Granich usefully reviewed declared statements of international organizations concerning disaster reduction, gently deploring a certain lassitude of comprehensive adaptation to climate change. The same could be said, just now, of most national governments, so it is not surprising if the international bodies representative of their participation make no advance.

Already sixteen years since the 1991 Intergovernmental Panel on Climate Change report, much of the response to the 2007 Fourth Assessment report is as if the process had just started. Why do such great divides persist between specialist findings and policy implementation?

The regrettable split between the two camps of 'disasters' and 'development' has been a cause of persistent divisions and a reason why policies for disaster reduction remain too narrowly focused to cope with cli-

mate change and all of its associated hazards. The Davos 2006 recommendations, calling on the international community to adopt an integrated, participatory approach to coping with disasters and risks, are a major step forward. Yet their substance has been part of disasters literature since 1999 and before,

## THE FINAL WORD

**James Lewis**  
**comments on the**  
**narrow focus and**  
**lack of innovation**  
**in international**  
**programmes for**  
**disaster reduction**

it has been restricted, constrained and made piecemeal by which camp it belonged to, impeded in the formation of an "integrated participatory approach" for all disasters, all risks and most crucially - all vulnerabilities.

Strategies for vulnerability reduction in developmental contexts would serve the potential victims of all the extremes of a changing climate; social vulnerability to one thing being very often social vulnerability to another. But understanding of the causes of vulnerability has not been helped by globalized and institutionalized conceptions of disasters in distant places. Vulnerability is pervasive in local, community and domestic contexts, and our insights

into its often invidious processes have to be achieved at similar levels of application.

Most disaster programmes remain impeded by overly narrow focus on what happens in and after the event. They focus insufficiently on what has taken place before, and what is continuing to take place before subsequent events; too often brought about by inappropriate, socially - and environmentally - insensitive, and even corrupt, 'development'.

Hazards are not a comfortable topic. Though it is more amenable to implement measures for a more acceptable future than to take action for a fearfully hazardous present, the bullet is there to be bitten. The problem must be recognised for the ultimate achievement of comprehensively advantageous vulnerability reduction.



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