



# Time for action

***Dr. Rajendra Pachauri, is one of the world's leading authorities on climate change. Speaking with IAEA Bulletin staff Giovanni Verlini and Ritu Kenn, he said that the world needs to act now to avert catastrophic consequences for the earth's climate.***

**Question:** Climate change is becoming an increasingly prominent factor in the public debate on political, social and economic issues. And yet, there are still controversies regarding its causes and extent. What is the evidence of climate change, and to what extent is this phenomenon the result of human activity?

**Rajendra Pachauri:** The controversies that existed earlier, which to some extent were justified because the evidence was not available, have died out. There is a clear scientific consensus now that establishes the fact that the climate system is changing.

We said clearly in the Fourth Assessment Report (AR4) that it is very likely that the changes that have taken place in the climate over the last half century are the result of human activity. To my mind, we have compelling evidence on the basis of which the world can act.

The extent of warming is clear if one looks at two variables during the 20th century: the average warming was 0.74 degrees

Celsius and the extent of sea level rise was 17 cm. Besides, there has been an increase in extreme precipitation events, heatwaves, droughts and floods. Climate change is not something that is taking place smoothly: there are a number of associated impacts that are intensifying and that will continue. These are all reasons for concern.

**Q:** Carbon dioxide (CO<sub>2</sub>) is often indicated as the main culprit of climate change: is this the case? What are the most important sources of CO<sub>2</sub> and other greenhouse gases (GHGs)?

**RP:** CO<sub>2</sub> is clearly the most important and the dominant form of GHG. But there are other gases as well — methane is one of them — which contribute to climate change.

As far as CO<sub>2</sub> is concerned, the bulk of it comes from the burning of fossil fuels and fuels in general, but there are other sources too — deforestation is one of them. If we look at mitigation measures, the most important area in which we

can make a difference is in the emissions related to the burning of fossil fuels.

**Q:** The approaches to tackle climate change and its effects are often divided into mitigation and adaptation, but in your work you seem to imply that adaptation is not the right answer to the problem, being a marginal one at best. That leaves mitigation on the table. But what is the scale of the measures needed to mitigate the changes occurring in the earth's climate? What are the costs, and can we say that the measures suggested deliver value for money?

**RP:** As far as the impacts of climate change are concerned, we need to make sure that we adapt to changes because even if we were to stabilise the concentration of GHGs today climate change will continue and its impacts will be felt for several decades.

Growing scarcity of water in some parts of the world will require us to treat the management of water resources very differently. The impact on agriculture

will require changes in agricultural practices, even in terms of developing new plant strains that can survive drought conditions, higher temperatures and so on.

Adaptation is going to be essential, but beyond a certain point the measures that we need to take for adaptation will exceed our ability to do so. What we require in the future is a mix of adaptation as well as mitigation policies.

We have not done enough and probably we have wasted a lot of time in bringing about mitigation measures to the level that is required. Evidence of this can be found in the fact that while the Framework Convention on Climate Change came into existence in 1992, it took us another five years to develop the Kyoto protocol, and another decade to ratify it. The world has really lost a lot of time. There are some countries that are not part of the Kyoto protocol, and even those that have ratified it are nowhere near reaching the targets that had been established. Overall, our response to the challenge of mitigation has been extremely weak. One hopes that things now will pick up so that we can minimise the impact of climate change. Otherwise this would have serious implications for all living species.

**Q:** What is the timescale of action? When will we see the first results, and how important is it that mitigation measures are introduced now?

**RP:** It is important to introduce mitigation measures now because this will give us more opportunities in the future to stabilise the earth's climate. If we delay it, then we are also narrowing our future options. Mitigation is urgent and needs to be done at a level that makes a difference.

However, let me add that the inertia in the system is such that you will probably not see visible signs of reduction in climate change for several decades. But if we do not take action now, various elements of climate change will become worse in the future, and that is something that we must do everything to avoid.



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**Q:** What are the technologies that can help reduce CO<sub>2</sub> emissions, and in which areas should the international community focus its attention on? What is the role that nuclear power can play in the effort to curb CO<sub>2</sub> emissions?

**RP:** We have established very clearly that all the technologies that are required for stringent mitigation action are either available today or due to be commercialised very soon.

These technologies include the increase of efficiency in the supply of energy — in power generation for instance — in the design of buildings, and in public transport. In all these areas, we have a range of options that can be adopted and employed if we also have the right mix of policies. This is a critical point: technologies will not work by themselves unless you have the right framework that moves them in the right direction.

An important policy initiative that will be required is to place a price on carbon, because only then will the right technologies be disseminated and used on the right scale. We also need to put in place a mix of policies that relate to regulations in buildings, construction design, and allocation of resources for public transport options. We need policy measures as well as research and development and technology dissemination initiatives.

## IPCC's AR4 Report: some projections

- ➔ Probable temperature rise between 1.8 and 4 degrees Celsius;
- ➔ Possible temperature rise between 1.1 and 6.4 degrees Celsius;
- ➔ Sea level most likely to rise by 28-43 cm;
- ➔ Arctic summer sea ice disappears in second half of century;
- ➔ Increase in heat waves very likely; and
- ➔ Increase in tropical storm intensity likely.

# climate projections

## Prize for Two

# 2007 Nobel Peace Prize

The Intergovernmental Panel on Climate Change (IPCC) and former US Vice President Al Gore were jointly awarded the 2007 Nobel Peace Prize "for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change."

The IPCC assessments are based on peer-reviewed scientific and technical literature, while its reports are written by teams of authors from all over the world

who are recognized experts in their field. These scientists represent relevant disciplines as well as differing scientific perspectives. The global coverage of expertise, the interdisciplinary nature of the IPCC team, and the transparency of the process, constitute the Panel's strongest assets.

The IPCC was created in 1988 in response to growing concern about the risk of anthropogenic climate change. The General Assembly of the United Nations asked the two UN bodies most engaged in the issue, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP), to set up this Panel to provide balanced, objective policy advice.

The First Assessment Report of 1990 was submitted to the UN General Assembly, which responded by formally recognizing that climate change required global action and launched the negotiations that led to the adoption of the 1992 UN Framework Convention on Climate Change.



Photo: Norwegian Nobel Institute

**Q:** What is the significance of the agreement reached at Bali and what can we expect from the Bali Roadmap?

**RP:** Bali represented a step forward because the parties came up with a very clear intention to bring about deep cuts in emissions and laid down the plan for a new agreement by the time the 15th Conference takes place in Copenhagen in 2009. I believe it is extremely important that the agreement that comes into place after 2012 is robust and strong enough to be able to make a difference in the emission of GHGs.

In one of the scenarios that we have examined at the IPCC, if we were to stabilise the earth's climate to a temperature increase of 2 to 2.4 degrees Celsius, we would have only seven years left within which we can allow emissions to increase. Beyond 2015, those emissions

will have to decline. Of course the more rapid the decline, the greater the effect in preventing the impacts of climate change in the future.

**Q:** Traditionally, one of the most pressing issues concerning the fight against climate change is the question of who should bear the burden of action, whether the developed or the developing world. What is your view on this issue?

**RP:** The Framework Convention on Climate Change clearly lays down the provision of common but differentiated responsibility. Climate change is a common responsibility for all countries, but it is differentiated on the basis that the developed countries are largely responsible for having caused the concentration of these gases because, cumulatively, they are the ones that are responsible for emissions in the past. Consequently,

action should come first from the developed countries.

Of course, the developing countries are also expected to put in place certain measures, but the developed countries are required to provide financing as well as technology transfer to assist them in the actions they have to take.

Having said so, there are a number of local reasons which might require the developing countries to take a somewhat different path. This arises from the fact that there are a large number of co-benefits from mitigation measures, including energy security, lower local pollution levels and jobs creation in rural areas.

**Q:** As a scientist, what do you think it is the public perception of the climate change problem? Are issues like climate

change itself, its consequences and ramifications properly understood by the public?

**RP:** I think the public today understands these issues far better than it was the case some years ago. This has been largely because the findings of the IPCC's AR4 have been disseminated on a wide scale.

Public awareness today is at an unprecedented level, and this gives us the confidence for taking measures that are required for tackling the problem.

**Q:** What can we expect for the future? Will mankind win the fight against climate change?

**RP:** I hope that we have the wisdom and sense to take the right steps because if we don't, then we could have abrupt and irreversible changes in our climate. If these changes take place, the extent of damage would be enormous. One example is the melting of the Greenland and the West Antarctic ice sheets. If that were to occur, you could get sea level rise of several metres. That would damage several parts of the globe and make it very difficult for some societies to survive. We also know that there is a threat to the extinction of 20-30% of the species if we get temperature increases of 1.5-2.5 degrees Celsius and above.

With these prospects, I think it makes sense for human society to take urgent

steps: firstly to adapt to climate change, and, more importantly, to mitigate the emissions of GHGs. If we don't do it, then we are certainly asking for trouble, and I hope human society has the wisdom and enlightenment to take the right steps.



*Dr. Rajendra Pachauri is Chairman of the Intergovernmental Panel on Climate Change.*

*Website: [www.ipcc.ch](http://www.ipcc.ch)*



*For a podcast of this interview, visit [www.iaea.org/podcasts](http://www.iaea.org/podcasts)*

## Helping Along the Road

**During the course of a two-week conference** on climate change held in Bali, Indonesia from 3-15 December 2007, 187 countries agreed on a so-called Bali Roadmap — a framework of a new agreement — to reduce global GHG emissions.

The countries called for continued action to address the negative effects of climate change. This includes implementing methods to reduce GHG emissions, identifying and deploying climate-friendly technology, and allocating funds for more climate change mitigation and adaptation measures. Organized by the United Nations Framework Convention on Climate Change (UNFCCC), the Bali conference brought together high-level government representatives with observers from intergovernmental and non-governmental organizations.

The IAEA acted as a UN observer during the conference, serving as a resource for delegations during the talks on a variety of issues. The Agency, through

its laboratories, its Department of Nuclear Energy, and Department of Nuclear Science and Applications, supports and contributes to climate change studies and assessments on mitigation of GHG emissions. It also advocated its position that nuclear energy could play an important role in future strategies to reduce emissions.

"In the context of the UN climate change discussions, we have presented nuclear power as having strong potential for reducing future carbon emissions," said H. Holger Rogner, IAEA Head of Planning and Economic Studies. "Nuclear power presents a relatively carbon-free energy option, but has its own bag to carry in terms of finance, waste disposal and political acceptance."

The Agency also hosted a side-event in Bali on how the IAEA can aid Member States in the development of their own peaceful nuclear power programmes. Entitled *Nuclear Power Prospects and IAEA Assistance for Interested Developing*

*Countries*, the presentation touched upon nuclear programme implementation for States interested in launching a nuclear power programme. Indonesia's National Nuclear Energy Agency (BATAN) also participated in the side event and gave a presentation on the country's developing nuclear power programme. Over 120 people attended the IAEA event.

The Bali talks represent the first in a series of meetings planned to take place over the next two years. The discussions were the first steps that parties hope will lead to a follow-up agreement to the Kyoto Protocol (which includes emission reduction obligations for industrialized countries), and many of the more contentious issues are expected to be worked through later in the process.

A deadline of 2009 has been set for an end to negotiations, with a plan to bring a new agreement into force by 2013. The Kyoto Protocol expires in 2012.