

Foreword to '*Cents and Sustainability*', by Dr Rajendra Pachauri



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It gives me great pleasure to contribute this foreword to *Cents and Sustainability* and to support a response by our next generation to the seminal publication *Our Common Future*, following its recent 20th anniversary. The book, *Our Common Future* (also known as the Brundtland report), will forever be remembered for its early enunciation and popularization of the concept of 'Sustainable Development'. This leading work has paved the way for numerous efforts, such as the 1992 Earth Summit, in Rio de Janeiro where the UN Framework Convention on Climate Change (UNFCCC) was first launched. However, the importance of considering sustainability in development policies and practice has not been widely realised till recently. As is often the case it is only the occurrence or the threat of a crisis that spurs human society to unusual actions and changes in pathways.

In the case of sustainable development, I think the wake-up call has really come from the sudden growth in awareness and understanding of the scientific concerns regarding human induced climate change. Along with a comprehensive assessment of a range of issues set to challenge mankind, *Our Common Future* overviewed a range of findings related to climate change in 1987 and clearly outlined the growing scientific consensus at the time that:

After reviewing the latest evidence of the greenhouse effect in October 1985, the World Meteorological Organisation (WMO), the UN Environmental Program (UNEP) and the International Council of Scientific Unions (ICSU), (which three years later formed the IPCC) scientists from 19 industrialised and developing countries concluded that climate change must be considered a 'plausible and serious probability'. They estimated that if present trends continue, the combined concentration of CO₂ and other greenhouse gases in the atmosphere would be equivalent to a doubling of CO₂ from pre-industrial levels, possibly as early as the 2030s, and could lead to a rise in global mean temperatures greater than any in mankind's history. Current modelling studies and experiments show a rise in globally averaged surface temperature, for such a doubling, of somewhere between 1.5 and 4.5 degrees Celsius.

This remarkable work outlined in detail the risks and potential responses to mitigate and adapt to climate change, covering areas such as energy efficiency opportunities, renewable energy, biomass and policies to price carbon dioxide emissions in detail. *Our Common Future* was one of the first works to demonstrate that through implementing such climate change mitigation solutions economic growth could cost effectively be decoupled from greenhouse gas emissions.

As *Our Common Future* stated

During the past 13 years, many industrial countries saw the energy content of growth fall significantly as a result of increases in energy efficiency averaging 1.7 per cent annually between 1973 and 1983. And this energy efficiency solution costs less, by savings made on the extra primary supplies required to run traditional equipment... The costs of improving the end-use equipment is frequently much less than the cost of building more primary supply capacity. In Brazil, for example, it has been shown that for a discounted, total investment of \$4 Billion in more efficient end-use technologies (such as more efficient refrigerators, street lighting, or motors) it would be feasible to defer construction of 21 gigawatts of new electrical supply capacity, corresponding to a discounted capital savings for new supplies of \$19 Billion in the period 1986 to 2000.

Our Common Future concluded that with the right mix of policy and a carbon price signal to further encourage, 'the design and adoption of more energy efficient homes, industrial processes and transportation vehicles,... [and] investments in renewables... within the next 50 years, nations have the opportunity to produce the same levels of energy services with as little as half the primary supply currently consumed.' During the time the UN Brundtland Commission was drafting *Our Common Future*, tragedies such as the African famines, the leak at the pesticides factory at Bhopal, India, and the nuclear disaster at Chernobyl, USSR helped to focus world attention on *Our Common Future's* main messages. Also from 1987 through to 1999, scientists investigating ice core samples from Antarctica discovered that atmospheric carbon dioxide and methane levels had already exceeded the 'natural' peak atmospheric levels for the last 400,000 years. The 1987 Vostok ice core results also showed that humanity is actually adding man-made greenhouse gases to a peaking of the natural cycle of CO₂ and CH₄. CO₂ levels in the atmosphere are now over 380 parts per million. The growing awareness of the seriousness of this situation led to the formation of the Intergovernmental Panel on Climate Change (IPCC) in 1988 by the UN Environmental Programme (UNEP) and World Meteorological Organization (WMO) to provide objective information about climate change to the public and to policy-makers. The IPCC was established in 1988 through a resolution of the UN General Assembly. One of its clauses was significant in having stated,

Noting with concern that the emerging evidence indicates that continued growth in atmospheric concentrations of 'greenhouse' gases could produce global warming with an eventual rise in sea levels, the effects of which could be disastrous for mankind if timely steps are not taken at all levels.

The IPCC's first report was published in 1990 and it broadly agreed with the conclusions about climate change outlined three years earlier in *Our Common Future*. It warned of the risks of inaction, called for a 60 per cent reduction of greenhouse gas emissions, and outlined ways to mitigate climate change. In many ways *Our Common Future* in 1987 laid a foundation which helped world leaders to embrace the first IPCC report in 1990. In 1990 Margaret Thatcher, then Prime Minister of England, stated the following about the IPCC's first report:

Today with the publication of the report of the Intergovernmental Panel on Climate Change, we have an authoritative early-warning system: an agreed assessment from some three hundred of the world's leading scientists of what is happening to the world's climate. They confirm that greenhouse gases are increasing substantially as a result of man's activities,

that this will warm the Earth's surface with serious consequences for us all... There would surely be a great migration of population away from areas of the world liable to flooding, and from areas of declining rainfall and therefore of spreading desert. Those people will be crying out not for oil wells but for water.

Since 1990, the IPCC has published three more assessments. By 2007, when the IPCC published its 4th Assessment, the scientific work had advanced to the point where we, the IPCC, could say that there is absolutely no doubt that we, the human race, have substantially altered and are continuing to alter the Earth's atmosphere.¹¹ As stated in the Fourth Assessment Report, 'warming of the climate system is unequivocal', and 'most of the global average warming over the past 50 years is very likely due to anthropogenic greenhouse gases increases'. Eleven of the warmest years since instrumental records have been kept occurred during the last twelve years. In the 20th Century the increase in average temperature was 0.74 degrees centigrade; sea level increased by 17cm and a large proportion of the Northern Hemisphere snow cover receded. Particularly worrisome is the reduction in the mass balance of the glaciers of the Himalayas which provides the water source for one-sixth of humanity. For instance, the gross per capita water availability in India is projected to decline from 1820 cubic metres per year in 2001 to 1140 cubic metres per year in 2050.²²

Many aspects of the climate science are far better understood today such as the science of abrupt climate change which has found that anthropogenic factors can lead to some impacts that are abrupt or irreversible, depending on the rate and magnitude of climate change. For instance, the rapid melting of the arctic sea ice, which is another amplifying effect as it allows more solar energy to be absorbed, could imply metres of sea level rise. Other such positive feedbacks which are also of great concern to the IPCC and need to be better understood by decision makers are overviewed in Chapter 1 of this book. The increased evidence of abrupt changes in the climate system, the fact that CO₂ equivalent levels are already at 455ppm, plus the current high rate of annual increases in global greenhouse gas emissions reinforces the IPCC's 4th Assessment finding that humanity has a short window of time to bring about a reduction in global emissions if we wish to limit temperature increase to around 2°C at equilibrium. The IPCC's 4th Assessment calls for global greenhouse gases to peak no later than 2014-15 and to rapidly decrease after that to 80 per cent below 1990 levels by 2050 to achieve this.

This is a significant and historic challenge but the team from The Natural Edge Project show in this book that a wide range of research, investigations and practice now exist that show it is achievable. In this book the authors will update the Climate Change related material in *Our Common Future* and show that there is now a wealth of studies and empirical evidence to show the substantial potential to significantly and rapidly decouple economic growth from greenhouse gas emissions cost effectively. For example, the *Stern Review* found that the costs of inaction on climate change would range from 5-20 per cent of GDP leading to a global recession. Conversely the IPCC found in the 4th Assessment Report that achieving equilibrium (using best estimate climate sensitivity) of around 2.0–2.4°C would lead to a reduction in average annual GDP growth rate of less than 0.12 per cent up to 2030 and beyond up to 2050.

¹ IPCC (2007) Climate Change 2007: The Physical Sciences Basis, Contribution of the Working Group I to the 4th Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, see 'Global climate projections'.

² Pachari, R. (2007) 'Coping with Climate Change: Is Development in India and the World Sustainable?', 2007 K R Narayanan Oration, ANU.

In this publication The Natural Edge Project builds on from the *Stern Review* and the IPCC 4th Assessment to explain succinctly why the costs of mitigation have been misunderstood and exaggerated in the past. They show that economic modelling has shown for almost 20 years that the costs of action are relatively small compared to the costs of inaction. This book shows that one of the reasons why the costs of action are relatively small is that there are multiple co-benefits for actions that reduce emissions of greenhouse gases at the local level in terms of economic development, poverty alleviation, employment, energy security, reduced air pollution, better biodiversity outcomes and local environmental protection. The book provides a detailed overview of how best to reduce the costs of mitigation and for the first time brings together an overview of those countries leading in implementing strong climate change policy globally from which other countries can learn.

Still some decision makers fear that if their government or business commits to ambitious short term targets by 2020 this may harm their economies or profits or reduce their business competitiveness. This book, and others like it, show that this does not need to be the case. The authors show, that energy efficiency, smarter building codes and regulations, retrofitting buildings, better demand management and avoided deforestation (plus reforestation and soil sequestration), and smarter approaches to sustainable transport can provide significant reductions rapidly within the next 5-12 years while maintaining strong economic and jobs growth.

Complementing this book, The Natural Edge Project have published a comprehensive 600 page online textbook entitled *Sustainable Energy Solutions For Climate Change Mitigation* which provides technical detail to compliment the IPCC's 3rd Working Group's publications on Climate Change Mitigation. TNEP's online textbook is a comprehensive resource to assist and empower people globally to play their part to reduce greenhouse gas emissions. I also highly recommend it for the University sector and for Professional groups such as engineers and architects who have a key role to play in helping business and government to reduce their emissions.

Finally, I am also very pleased that the authors discuss how poverty reduction and climate change mitigation strategies can be combined to help countries escape the poverty trap. Perhaps the greatest challenge of the 21st Century is how to end extreme poverty while also achieving environmental sustainability. There are 1.6 billion people who do not have access to electricity, and there are similar numbers who have no access to clean water and live in a state of environmental security. The Natural Edge Project is to be commended for tackling this vitally important issue and highlighting where in the world already communities, regions and nations are creating solutions to this great challenge of our time.