

## Preface

‘In the tragic situation which confronts humanity, we feel that scientists should assemble in conference to appraise the perils that have arisen [...]’

These are the opening words of the Russell-Einstein Manifesto, which was issued in London on 9 July 1955. At the advent of the nuclear age, the eleven signatories of this historic document – all pre-eminent scientists and intellectuals, ten of them Nobel laureates – called for the scientific community to take responsibility and participate in the struggle for peaceful solutions. In their concluding statement, they urged the governments of the world to acknowledge the existential threats posed to humanity by the development of nuclear arms and to find peaceful means for the settlement of conflict. In response to the Manifesto, innumerable scientists from all over the world joined the public debate on the perils arising from weapons of mass destruction – independent of political persuasion. During times of the Cold War and until the present day, they have contributed decisively to developing strategies for disarmament and peace.

Today, at the beginning of the twenty-first century, humanity is similarly faced with an unprecedented threat. Dwindling energy sources, degrading terrestrial and marine ecosystems, accelerating climate change, and ongoing population growth could drive civilization to the brink of collapse. Migration and conflict on a massive scale could follow from our neglect and unpreparedness to change and to stop excessively exploiting the planet. The threat arising from approaching the limits of nature’s capacities and resources must be confronted in a situation of currently one billion people in deep poverty. A strategy for managing climate change which runs counter to our attempts to fight poverty in the next few decades cannot build the coalition necessary to succeed. All of human ingenuity and imagination is needed to find solutions to this major crisis, and set the world on a path towards global sustainability, including a decent life for all on our crowded planet.

In this spirit, the Potsdam Nobel Laureate Symposium brought together some of the world’s finest minds – Nobel laureates in physics, chemistry, medicine, economics, and peace, as well as leading scientific experts from various disciplines, top-level political actors, and important representatives of civil society. The meeting – under the banner of ‘Global Sustainability: A Nobel Cause’ – took place in autumn 2007, close to the locations that Albert Einstein and many other important scientists and intellectuals of his time frequently visited. For three intense days, the

participants of the symposium conducted lively debates on climate stabilization and sustainable development, on energy security, on institutional and economic incentives, and on the responsibilities of the scientific community in these troubled times.

This publication aims at reflecting those discussions, placing them in the context of the year 2009 – the year of the Copenhagen Conference that could go down in history either as the moment humanity started putting words into action on climate change and sustainable development, or as another missed opportunity to change course. Acknowledging the importance of conveying scientific knowledge to the wider public, this compilation of essays invites a broad audience to take part in the stimulating and instructive debates of the symposium. In keeping with the course of the original discussions, it contains commentaries, in which various authors react to the statements of their colleagues with endorsement as well as with criticism.

Rather than providing detailed reading instructions here, we would like to let the texts speak for themselves. Each of the essays, even the commentaries, can stand alone and be read independently. The table of contents and the following ‘walk through the hall of fame’ will provide a minimum of guidance to help readers find their bearings within this intertwined debate.

The publication starts out with introductory remarks by the German head of government, Angela Merkel, who attended the symposium in 2007 – the year in which Germany held the EU and G8 presidencies, and when she was dubbed the ‘Climate Chancellor’ for her commitment to climate change issues. Ian McEwan, the acclaimed British author and screenwriter, then takes the reader on a flight over the last vast empty spaces of the planet and down into the boot room of an Arctic research vessel to contemplate the fate of the Earth and the humble nature of man.

Well prepared by this cognitive journey, the reader will encounter some of the greatest authorities in science and society – the **Nobel laureates** who enrich the debate with their expertise and experience. Taking a comprehensive view of the problem, **Murray Gell-Mann** spells out the transitions needed if the world is to switch from present trends to greater sustainability, involving all facets of society: politics, economics, education, culture, and morality. Central to his thoughts is an interdisciplinary, holistic approach to science – what he calls ‘a crude look at the whole’ (CLAW). Like the other authors of the opening section, entitled *The Great Transformation*, he touches upon many of the challenges and responses related to sustainability that are discussed in greater depth in the subsequent sections.

The first topical section on *Climate Stabilization and Sustainable Development* builds upon the insight that the battle against climate change cannot be won without overcoming extreme poverty on this planet. As one of the first to bring the concept of a ‘global deal’ to the table of negotiations, Nicholas Stern discusses this

cornerstone of international efforts for addressing the dual challenge posed by global warming and under-development. **Rajendra Pachauri**, Chairman of the Intergovernmental Panel on Climate Change (IPCC), which was awarded the Nobel Peace Prize in 2007, highlights crucial aspects of climate change mitigation and adaptation, with a special focus on the countries in the South. In a commentary to his essay, **Mario Molina**, who was among the first scientists to describe the chemical reactions depleting the stratospheric ozone layer, draws on his experience during the ozone-hole crisis and his recent involvement in efforts to combat climate change and contain air pollution in the developing world. **Wangari Maathai** shares her insights on climate change and development gained during decades of leadership in the women's tree planting initiative Green Belt Movement, for which she received the Nobel Peace Prize in 2004.

The following section on *Economic and Institutional Incentives* allows readers to take a closer look at proposed solutions to the global sustainability challenge. Putting a price on carbon emissions needs to be a salient feature of any effective solution, as most economists would agree. However, whether this price should arise through a cap-and-trade system for emission permits, through a tax on carbon, or through other innovative instruments is a controversial key policy issue. Some arguments of the debate are examined and discussed by **James Mirrlees**, who was awarded the Nobel Prize in economics for his analysis of incentives under imperfect information.

*Technological Innovations and Energy Security* is the topic of the closely related following section. **Walter Kohn** and **Alan Heeger**, who together produced the documentary film 'The Power of the Sun', write about renewable energy use and technology from different perspectives, but each with an intriguingly personal tone. In a general approach, Walter Kohn explores the possibility of powering the world entirely by wind and solar energy, while Alan Heeger highlights a specific renewable technology, expressing his enthusiasm about the prospects arising from efficient and low-cost plastic solar cells.

The overarching theme of the Potsdam Symposium – and also one of the main motivations for producing this publication – was to involve the scientific community in an educational effort that will enable individuals worldwide to contribute to finding sustainable solutions. This and related issues of democracy and participation are raised in the wrap-up section on a *Global Contract between Science and Society*. **John Sulston** powerfully makes the point that trust – a *sine qua non* if global sustainability is ever to be achieved in a world where incentives to free-ride persist – is impossible without open access to information and sharing of knowledge.

The book concludes with the *Potsdam Memorandum*, which was adopted by the participants of the Potsdam Symposium and which calls for a 'Great Transformation'.

This ubiquitous change in the human-environment interaction on Earth, introduced in the opening chapters of the book, is the unifying point of reference that binds this collection of essays together.

At this point, we would like to refer back to Bertrand Russell and Albert Einstein, who towards the end of their Manifesto observe:

‘[...] what perhaps impedes understanding of the situation more than anything else is that the term *mankind* feels vague and abstract. People scarcely realize in imagination that the danger is to themselves and their children and their grandchildren, and not only to a dimly apprehended humanity.’

These sage words were valid back then and are perhaps even more valid today. We dearly hope that with this unique compilation of essays we can encourage readers to see themselves as part of this endangered humanity – this humankind which, for the first time in history, is acting as a truly global force, threatening the integrity of the Earth; but also possesses the power of comprehension and the ingenuity to save our precious planet.

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