

Climate Change and Community Resilience

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Mani Nepal · Md Rumi Shammin
Editors

Climate Change and Community Resilience

Insights from South Asia

ICIMOD  SANDEE

 Springer

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In Memory of Karl-Göran Mäler (1939–2020)

Karl-Göran Mäler the Visionary

This book is dedicated to Karl-Göran Mäler for his contribution in building research capacity and to the growth of environmental economics in South Asia.

Karl-Göran Mäler became professor in 1975 at the Stockholm School of Economics where he started his activities in building research capacity in economics.

By the end of the 1980s, the Royal Swedish Academy of Sciences wanted to give a new start to one of its research institutes. Members of the academy were invited to write proposals on alternative scientific fields for the new institute. Karl-Göran (Academy Member since 1981) teamed up with Bengt-Owe Jansson (Swedish Ecologist and Member of the Academy), and their proposal was chosen. Thus was born ‘the Beijer International Institute of Ecological Economics’.

Karl-Göran became Beijer’s first director in 1991, and this provided him with a prestigious institutional set-up where he could ground his ideas and foster environmental economics. During his years as Beijer’s Director, he promoted bridge building between disciplines and between scientists. Communication and collaboration between top scientists within economics and ecology have been prized as a major achievement of the institute.

Even more relevant here is his work in *Teaching the Teachers*, the capacity-building programme that played a substantial role in the creation of SANDEE in 1999. Karl-Göran and Professor Sir Partha Dasgupta had met in 1979 and were in close contact ever since. But it was after Partha was appointed Beijer’s first Chairman that their professional collaboration developed, and it became so iconic that a colleague, former student, and friend wrote about them ‘Watson and Crick, Lennon and McCartney, Dasgupta and Mäler’ (S. Barrett).

Teaching the Teachers was designed and implemented by Karl-Göran and Partha. They had already launched the programme in 1991, at the Conference of the World Institute for Development Economics Research (WIDER), in Finland. However, soon after the programme moved with them to the Beijer Institute which hosted and developed it.

Environmental economics had been relatively absent from university courses. *Teaching the Teachers* addressed economics faculties in third world universities and had a comprehensive scope. It included teaching, research, support for publication of research results, and enhancement of libraries in universities where the participants worked. The programme had a limited span of time and sought to ignite teacher's curiosity for environmental economics. The programme deepened participants' information about environmental issues and shared ideas about how to use the economist toolbox to analyse them.

The ultimate aim of *Teaching the Teachers* was to catalyse the creation of regional networks, a space for teachers to continue meeting, investigating, and setting their own priorities and broaden capacity building within each region. *Goal reached! Networks were created in Asia, Africa and Latin America.*

This book reinforces and sheds light on essential issues within environmental economics, from a South Asian perspective. Karl-Göran's own research has been considered foundational, making him a pioneer of this scientific field. He persistently spread his own research and fostered others. He was influential in the creation of SANDEE and came back regularly to give lectures. He supported ongoing research and participated in the advisory board, hardly considering this as 'work', so much as paying a visit to family.

SANDEE, with 21 years of uninterrupted activities today, proves the seed was planted in fertile land.

Sara Aniyar

A Life in Dedication to Environmental Economics

Professor Emeritus Karl-Göran Mäler was a pioneering, leading environmental economist. He was one of the founders of the Beijer Institute of Ecological Economics in 1991 and the institute's first director until his retirement in 2002. He was an intellectual giant, mentor, and dear friend to colleagues around the world.

Karl-Göran's curiosity and continuous desire to understand matters at a deeper level were key to the success of the Beijer Institute's early endeavour to build bridges between disciplines that did not usually collaborate. The Beijer Institute had an inspiring journey with Karl-Göran, searching for new understandings, always focused on the problems, exploring and investigating with an open mind and deep commitment.

Under Karl-Göran's leadership, the Beijer Institute established several regional networks of environmental economists and founded the journal *Environment and Development Economics*, which encourages submissions from researchers in the field in both developed and developing countries. Both have had a great impact on research and policy in developing countries and have been very important to many researchers from the network regions. The South Asian Network for Development

and Environmental Economics started in 1999 and is one of the most influential networks.

The Beijer Institute also organised a series of teaching and training workshops in the network regions aiming to teach economics teachers in universities so that they could themselves start teaching environmental economics. Karl-Göran Mäler and Sir Partha Dasgupta led the work, while other leading ecologists and economists were part of the teaching teams. Karl-Göran regarded this work as one of the most important accomplishments in his career and probably the one he cherished the most. It was in one of the teaching workshops, in Jamaica, that he met his beloved wife Sara.

Many of Karl-Göran Mäler's former students and workshop attendees testify to his genuine interest in sharing his knowledge and in learning from his pupils. He would dive into the technicalities of a student's draft paper to discuss underlying assumptions, alternative approaches, potential improvements, or previous publications that this work related to. One could tell that he really enjoyed those conversations.

Christina Leijonhufvud, Office Manager at the Beijer Institute, who organised the teaching workshops and courses and often travelled with Karl-Göran, says:

'Karl-Göran was very much appreciated among the participants with his straightforwardness, patience and support. He showed such interest in people and ideas and loved to discuss things from different angles. He shared his wisdom and encouraged everyone to think, dig deeper and never give up. His broad and deep knowledge about the most diverse matters was impressive and his love for Nature was remarkable'.

Above all, Karl-Göran was kind, a helping soul who had amazing stories, jokes, and laughs to share. The stories were often about the people he met in his travels, mixed with the experiences of Nature and scientific discussions they had enjoyed together. He was an inspiring role model and father figure. He will be deeply missed, not least by those of us who had the privilege of working under his leadership for many years.

Carl Folke, Professor
Director of the Beijer Institute of Ecological Economics

Anne-Sophie Crépin, Associate Professor
Deputy Director of the Beijer Institute of Ecological Economics

Remembering Karl-Göran Mäler

Karl-Göran Mäler helped create and build the South Asian Network for Development and Environmental Economics (SANDEE). In the 1990s, as Director of the Beijer Institute of Ecological Economics, Dr. Karl-Göran Mäler, along with Sir Partha Dasgupta, who was the institute's Board Chair, envisioned the growth of a new type of scholarship in environment and development economics. The Beijer Institute is a 'boundary' organisation that works at the frontier of ecology, economics, and

other disciplines. It examines global changes, understanding that humanity both is embedded in and shapes the biosphere. While this systems approach is integral to the institute's work, with Karl-Göran Mäler as Director, the institute took a big step towards strengthening enquiry into the role of economic development in shaping humanity's continued interactions with earth systems.

The partnership between Karl-Göran Mäler and Sir Partha Dasgupta was enormously productive and opened the world of environment and ecological economics to many scholars in developing countries. Together, these two friends envisaged a need for environment and development economics, a discipline that would be grounded in economic theory but build on a lived understanding of the synergies and trade-offs between economic development and environmental change. They rightly saw the importance of research and a body of evidence driven by scholars from low- and middle-income countries, so that problems were correctly identified, and solutions were home grown. This belief, his confidence in the usefulness of economic thinking for solving global problems, and his passion for the environment led Prof. Mäler to help create a number of environmental economics networks around the world—SANDEE in South Asia, LACEEP in Latin America, and CEPA and RANESA in Africa. Each of these networks has played an important part in many low- and middle-income countries in building the capacity of researchers to think about, collect data, and analyse environmental problems. Professors Mäler and Dasgupta also helped launch the journal *Environment and Development Economics*, which continues to build evidence on the nexus between environment and development.

Karl-Göran Mäler loved being an economist. His Ph.D. thesis became, *Environmental Economics—A Theoretical Inquiry*, a much-cited book that examines and builds the conceptual underpinnings for studying a range of environmental problems. By developing the methods for undertaking a monetary evaluation of changes in environmental quality, the book helped grow the now large body of the literature on environmental valuation. Karl-Göran continued to focus on solving complex problems and is best known for his work on acid rain, inclusive wealth accounts, and pollution in small lakes. His research on comprehensive wealth (inclusive of natural capital), as an indicator of sustainable development, is another productive area of work with Sir Partha. Many of us have fond memories of KGM discussing the importance of wealth and natural capital or drawing graphs to show us how lakes could switch from being just polluted to plain dead. Karl-Göran for many years was also part of the committee that selected recipients of the Nobel Prize in Economics. His love for knowledge, however, far exceeded the bounds of economics. He could possibly surpass Google with his ability to present minute historical facts on all sorts of topics. His was an utterly curious mind, wherein perhaps lies the explanation for his wealth of knowledge and his deep scholarship on linked human and environmental systems.

To Karl-Göran Mäler, it was important to understand and honour the magical complexity of the natural world. As Director of the Beijer Institute, he brought many ecologists and economists together to synthesise and draw lessons from different

strands of science. He was also an avid birdwatcher and carried his binoculars everywhere he travelled. In fact, the very first time I met him, he convinced all the conference participants at a meeting in Malta to climb up a steep cliff and lie down on top to look over the edge for birds. This was how persuasive he could be when it came to birds. I also vividly remember many stories of his safaris and his reverence for the wildlife he encountered in Africa. This awe for biodiversity extended to all of life. The many regional dances that we watched on our trips to Nepal simply reinforced for Karl-Göran the importance of diversity.

Professor Mäler spent many years teaching and nurturing SANDEE. For the first several years of SANDEE's evolution, Karl-Göran served as a research advisor. Scholars from South Asia will never forget his many questions, which sometimes seemed simple, but were always foundational. As SANDEE matured, so did Karl-Göran's relationship with the network. He took on more teaching and was always willing to join SANDEE's summer workshops in Bangkok, which gave him an opportunity to teach, ask questions, and share his intellectual interests with his many SANDEE friends. It meant a great deal to Karl-Göran to see SANDEE grow and its members publish and thrive. He was deeply interested in the many local economic problems presented. Perhaps, his single most important contribution was to push everyone to think carefully about the complexities underlying these problems. '*Think harder*' was his mantra, the key that would open all doors.

Karl-Göran lived a good life. His wonderful sense of humour helped, and he was ever willing to crack a joke, hum a song, or raise a toast. He showed us, by example, how to enjoy both the pursuit of intellectual activity and the friendships that come along the way. Building trust and creating institutions was important to Karl-Göran Mäler. Social capital, the relationships, and networks we accumulate as we move through life were his secret sauce to living the good life. He built the Beijer Institute with this recipe, making it easier for all of us from SANDEE to follow in his footsteps.

Thank you, Prof. Mäler—for being our mentor, our guru, and our friend.

Priya Shyamsundar
Lead Economist, The Nature Conservancy

Foreword by Sir Partha Dasgupta

Economics, like I imagine other scientific disciplines, normally moves in incremental steps and always without a central guide. Much like practitioners of other disciplines, we economists work with models of those features of the world we want to study in detail. That involves keeping all else in the far background. Models are thus parables, and some say they are caricatures, which is of course their point.¹

Economics is also a quantitative subject. Finance ministers need estimates of tax revenues if they are to meet intended government expenditure; environment ministers today cannot but ask how much farmers should be paid to set aside land for ‘greening’ the landscape, and whether fossil fuel subsidies should be eliminated; health ministers look to convince cabinet colleagues that investment in health is good for economic growth; and so on. Which is why economic models are almost invariably cast in mathematical terms.

Which is also why the models that appear in economics journals can appear esoteric, unreal, and even self-indulgent. Many would argue as well that to model human behaviour formally, let alone mathematically, is to tarnish the human experience, with all its richness. And yet, economists in governments, international organisations, and private corporations find those models and their adaptations essential for collecting and analysing data, forecasting economic trajectories, evaluating options, and designing policy. Perhaps, then, it should be no surprise that those same models go on to shape the conception we build of our economic possibilities. In turn, our acceptance that the economic possibilities those models say are open to us encourages academic economists to refine and develop them further along their tested contours. And that in turn further contributes to our beliefs about what is achievable in our economic future. The mutual influence is synergistic.²

¹ The reflections here have been adapted from *The Dasgupta Review on the Economics of Biodiversity*, prepared at the invitation of the UK Treasury and published in February 2021.

² It will be asked who is represented in the collective ‘we’ and ‘our’ I am using here. It is not everyone in the world and certainly not restricted to those who agree with the claims I am making about the mutual influence of academic economic models and a general reading of economic possibilities. The group I have in mind is not fixed by designation but through invitation—for example, people who read this volume of essays—to consider why and how we need to break the cycle and revise the conception we hold of humanity’s place in the biosphere.

That has had at least one unintended and costly consequence. Not so long ago, when the world was very different from what it is now, the economic questions that needed urgent response could be studied most productively by excluding Nature from economic models. At the end of the Second World War, absolute poverty was endemic in much of Africa, Asia, and Latin America, and Europe needed reconstruction. It was natural to focus on the accumulation of produced capital (roads, machines, buildings, factories, and ports) and what we today call human capital (health and education). To introduce Nature, or *natural capital*, into economic models would have been to add unnecessary luggage to the exercise.³

Nature entered macroeconomic models of growth and development in the 1970s, but in an inessential form.⁴ The thought was that human ingenuity could overcome Nature's scarcity over time and ultimately (formally, in the limit) allow humanity to be free of Nature's constraints. But the practice of building economic models on the backs of those that had most recently been designed meant that the macroeconomics of growth and development continued to be built without Nature's appearance as an essential entity in our economic lives. Historians of science and technology call that feature of the process of selection 'path dependence'.⁵ That may be why economic and finance ministries and international organisations today *graft* particular features of Nature, such as the global climate, onto their models as and when the need arises, but otherwise continue to assume the biosphere to be *external* to the human economy. In turn, the practice continues to influence our conception of economic possibilities for the future. We may have increasingly queried the absence of Nature from official conceptions of economic possibilities, but among economists at large, the worry has been left for Sundays. On weekdays, our thinking has remained as usual.

Nature has features that differ subtly from produced capital goods. The financier may be moving assets around in his portfolio, but that is only a figure of speech. His portfolio represents factories and ports, plantations and agricultural land, and mines and oil fields. Reasonably, he takes them to be immobile. In contrast, Nature is in large measure mobile. Insects and birds fly, fish swim, the wind blows, rivers flow, and the oceans circulate. Economists have long realised that Nature's *mobility* is one reason the citizen investor will not take the market prices of natural capital to represent their social worth even when markets for them exist. The wedge between the prices we pay for Nature's goods and services and their social values (their social values are called 'accounting prices') is usually studied in terms of what economists call 'externalities'. Over the years, a rich and extensive literature has identified the institutional measures that can be deployed for closing that wedge.

But in addition to mobility, Nature has two properties that make the economics of biodiversity markedly different from the economics that informs our intuitions about

³ I am referring to the evolution of economic thinking in the West. However, to the best of my knowledge the economic models that shaped state policy in the Soviet Union, and the ones developed by prominent academics in Latin America, also did not include Nature.

⁴ See, for example, the special issue in the *Review of Economic Studies* (1974) on the economics of exhaustible resources.

⁵ A clear statement is in P. A. David, 'Clio and the Economics of QWERTY', *American Economic Review*, 1985; 75(2), 332–337.

the character of produced capital. Many of the processes that shape our natural world are *silent* and *invisible*. The soils are a seat of a bewildering number of processes with all three attributes. Taken together, the attributes are the reason it is not possible to trace many of the harms inflicted on Nature (and by extension, on humanity too) to those who are responsible. Just who is responsible for a particular harm is often neither observable nor verifiable. No social mechanism can meet this problem in its entirety, meaning that no institution can be devised to enforce socially responsible conduct. Ultimately, we each will have to serve as judge and jury over our own conduct. That can happen only if we felt impelled to account for the personal impact we have on Nature. The economics of Nature, like the economics of so much else, ranges from the (global) macro- to the (very local) micro-reasoning.

Humanity is embedded in Nature, and we are not external to it. Nature's goods and services are essential for our existence (the air we breathe and the water we drink are immediate examples), of direct use as consumption goods (fisheries), of indirect use as inputs in production (timber and fibres), and for our emotional well-being (green landscape and sacred sites). Many have multiple uses (forests, rivers, the oceans). And there are parts of Nature communities regard as sacred.

But like so much academic economics, the economics of Nature until relatively recently addressed life in the affluent West. Unknowingly, that acted as a constraint on the development of environmental and resource economics. For example, until relatively recently influential writers on economic development saw Nature's goods and services mostly as luxuries. An unnecessary debate took place between those who expressed environmental concerns in low-income countries and those who saw the need for economic growth there above all else. Well-meaning writers tried to reconcile the two viewpoints. An editorial in the UK's *Independent* (4 December 1999), for example, observed that '... (economic) growth is good for the environment because countries need to put poverty behind them in order to care', and a column in *The Economist* (4 December 1999: 17) insisted '... trade improves the environment, because it raises incomes, and the richer people are, the more willing they are to devote resources to cleaning up their living space'.

Given this background, it is hard to overemphasise the significance of SANDEE. Since its inception, the network has seen natural capital as both ends and a means to human ends, and it has studied Nature from the vantage point of both rural communities and urban citizens of South Asia. In a remarkable collection of essays, SANDEE scholars provided quantitative estimates of externalities that are embedded in the production and consumption of a wide range of natural assets, ranging from wetlands to urban airsheds.⁶ The estimates were understood as being the wedge between their market prices and their accounting prices. I know of no comparable set of studies on the local natural resource base in the developing world. The studies have proved invaluable for the review on the economics of biodiversity that I have had occasion to prepare recently (see Footnote 1).

⁶ A. K. E. Haque, M. N. Murty, and P. Shyamsundar, eds. (2011), *Environmental Valuation in South Asia* (Cambridge: Cambridge University Press).

In an earlier and equally remarkable collection of essays, SANDEE scholars reported a variety of ways in which communities in South Asia have managed their local ecosystems.⁷ To be sure, there was in hand a well-known literature that had uncovered myriads of communitarian institutions that had served well to protect spatially localised ecosystems (woodlands, water sources, threshing grounds, coastal fisheries) from excessive use. What made the SANDEE collection striking was that it uncovered a variety of unexpected institutional channels through which good intentions can be thwarted. I do not know of any other publication that has so systematically uncovered ‘systems failure’ even in a world where no one intends to do harm. The moral is revealing: humanity’s engagement with Nature can be best understood if institutions are modelled as systems with well-defined links among their components. The studies also cautioned us that our understanding can only be incremental, because every system will have links among its components no one has imagined are there or will arise if the system is perturbed. The studies in that collection have also proved invaluable for my review on the economics of biodiversity (see Footnote 1).

The present collection reflects SANDEE’s move towards a new class of issues: humanity’s propensity to discover ways to meet ecological problems by inventing new ways to do things. The context of the studies is global climate change, and the authors identify ways to mitigate an increased variability of rainfall and other ecological services as well as explore technological possibilities that move away from activities that are intensive in their emissions of carbon. As ever, the focus on South Asia has uncovered a remarkable range of findings, for ‘technology’ does not have to mean men in hard hats substituting produced capital for natural capital. It can mean rerouting natural capital in appropriate ways (e.g. water harvesting technologies). Modernisation of life has involved new technologies, but it has also meant forgetting old technologies that could come to our rescue. The possibility of reviving forgotten technologies that relied on Nature to avoid natural disasters—today they are called ‘Nature-based solutions’—the shift from macro- to micro-focus and from high-income to low-income societies have together altered our common understanding of humanity’s engagement with the natural world. SANDEE has been pivotal in that shift.

Partha Dasgupta
St John’s College
Cambridge, UK

⁷ R. Ghate, N. S. Jodha, and P. Mukhopadhyay, eds. (2008), *Promise, Trust and Evolution: Managing the Commons of South Asia* (Oxford: Oxford University Press).

Foreword by Pema Gyamtsho

It is my privilege to introduce the edited book *Climate Change and Community Resilience: Insights from South Asia*. This is a timely publication that highlights local initiatives on climate change adaptation and resilience building in South Asia, which is one of the most vulnerable regions of the world to climate change impacts.

ICIMOD is committed to the process of knowledge generation with a focus on livelihood enhancement, sustainable resource management and use, and integrating indigenous knowledge and culture into solutions. We organise our work in regional programmes, which build on ICIMOD's deep history of engagement and are formulated to deliver strategic results; promote transboundary cooperation; meet capacity-building needs in the region; and support long-term testing, piloting, and monitoring of innovative approaches. Adaptation and resilience building at the grass-roots level are central to ICIMOD's mission and vision.

Using a narrative style, this book draws on stories and examples from seven South Asian countries—Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka—to highlight how communities in South Asia are building resilience to climate change. A total of 58 authors have contributed to this volume, and I am delighted that most of them are from the South Asian Network for Development and Environmental Economics (SANDEE) representing all the seven South Asian countries, five of which are from the Hindu Kush Himalayan region. The 29 chapters in the book are organised under six themes: concepts and models; traditional knowledge and sustainable agriculture; technology adoption; disaster risk reduction; urban sustainability; and alternative livelihoods. These chapters highlight stories of creativity, community engagement, and locally applicable solutions. They are powerful and instructive. They offer valuable lessons for researchers, practitioners, and policy-makers.

I applaud the editors—A. K. Enamul Haque, Pranab Mukhopadhyay, Mani Nepal, and Md Rumi Shammin—for dedicating this book to the memory of Prof. Karl-Göran Mäler, one of the co-founders of SANDEE, with a foreword by his friend and SANDEE Co-founder Sir Partha Dasgupta. The book also includes reflections on Prof. Mäler from his wife Sara Aniyar, along with a short recollection by Priya Shyamsundar, SANDEE's Founding Director, and Carl Folke, Director of the Beijer Institute of Ecological Economics, which Prof. Mäler founded and where he served

as Funding Director. Interestingly, the writing of the book was undertaken from start to finish during the COVID-19 pandemic and is indicative of the resilience of the network that Prof. Mäler and Prof. Dasgupta helped establish 20 years ago.

ICIMOD is honoured to sponsor open-access publication of the book to make it widely accessible and offer assistance with language and style editing. This collection is likely to have a broad impact on advancing knowledge and lessons on community-based climate adaptation initiatives in South Asia and other developing countries around the world. We expect it to be widely read and used as a reference for policy-making and programme development that will make a difference in people's lives—especially the marginalised population that are often left behind—by helping them embark on a path to resilience.

Pema Gyamtsho
Director General, International Centre for
Integrated Mountain Development (ICIMOD)
Patan, Nepal

Acknowledgements

This book was conceived and given life during the COVID-19 pandemic. We editors met every week, mostly on Mondays, online from March 2020 to September 2021 often testing the patience of our families as these meetings lasted several hours at night or early morning since we were working from different time zones. We are grateful to them for their support without which this book could not have taken shape. We are thankful to all the contributors who agreed to participate in this project—including the family, friends, colleagues, and mentees of Karl-Göran Mäler and SANDEE associates.

Once the contributors came on board with the revised manuscripts after receiving comments from the reviewers, we organised a four-day online writeshop bringing together all contributing authors from seven South Asian countries and beyond with more than ten different time zones. The writeshop turned into an excellent peer review platform for all the manuscripts included in the volume, where participants provided critical and open feedback that helped improve the quality of the chapters. We thank Oberlin College for the use of their Zoom platform for the writeshop and all meetings of the editors and contributors throughout the process. We are grateful to the South Asian Network for Development and Environmental Economics (SANDEE) at the International Centre for Integrated Mountain Development (ICIMOD) for making it possible to publish this volume as an open access resource. Aunohita Mojumdar helped us with language editing, and Neesha Pradhan provided logistical support.

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