

Implementation of the Kyoto Protocol

Opportunities and Pitfalls
for Developing Countries

Edited by Prodipto Ghosh

Asian Development Bank

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Abbreviations

AAU	assigned amount unit
ADB	Asian Development Bank
AGBM	AdHoc Group on the Berlin Mandate
AIJ	Activities Implemented Jointly
ALGAS	Asia Least-cost Greenhouse Abatement Strategy
AOSIS	Association of Small Island Countries
AMDT	Amorphous Metal Distribution Transformer
Annex I	Developed Countries listed in Annex I of the UNFCCC
Annex B	Developed Countries listed in Annex B of the Kyoto Protocol
BAPA	Buenos Aires Plan of Action
BBCB	Bubbling Bed Combustion Boiler
BAU	business-as-usual
CDF	Clean Development Fund
CDM	Clean Development Mechanism under Article 12 of the Kyoto Protocol
CDQ	coke dry quenching
CERs	certified emission reduction units
CFBC	circulating fluidized bed combustion
CFL	compact fluorescent lamp
CHP	combined heat and power
CIM	cooperative implementation mechanism
CITES	Convention on Trade in Endangered Species
CO	carbon monoxide
CO ₂	carbon dioxide
COP	Conference of the Parties to the UNFCCC
COP-4	Fourth Conference of the Parties
CSD	Commission for Sustainable Development
CWQ	coke wet quenching
DMC	developing member countries of the ADB
EB	Executive Board of the Clean Development Mechanism
EIT	economies in transition
ERU	Emission Reduction Unit under Article 6 of the Kyoto Protocol
EST	environmentally sound technologies
ET	Emissions Trading
EU	European Union
FSU	Former Soviet Union
GATT	General Agreement on Tariffs and Trade
GEF	Global Environment Facility
GtC	Gigatons of Carbon
GHG	greenhouse gases
GWP	global warming potential
IGCC	Integrated Gasification Combined Cycle
IPCC	Intergovernmental Panel on Climate Change

ISO	International Organization for Standardization
IUCN	International Union for the Conservation of Nature
JI	Joint Implementation under Article 6 of the Kyoto Protocol
KP	Kyoto Protocol to the United Nations Framework Convention on Climate Change
LULUCF	Land Use, Land Use Change and Forestry
MOP	Meeting of Parties to the Kyoto Protocol
mtC	million tons carbon
NGO	nongovernmental organization
Non-Annex I	Developing Country Parties not listed in the first annex of the UNFCCC
Non-Annex B	Developing Country Parties not listed in the second annex of the Kyoto Protocol
ODA	Official Development Assistance
OE	Operational Entities
PCF	Prototype Carbon Fund
PCFB	Pulverized Coal Fired Boiler
ppmv	parts per million by volume
PRC	People's Republic of China
PV	photovoltaic
QELRC	Quantified Emission Limitation and Reduction Commitments
RET	renewable energy technology
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technology Advice
SO ₂	sulfur dioxide
STAP	Scientific Technical Advisory Panel
tce	tons of coal-equivalent
TVE	township and village enterprise
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
USIJI	US Initiative on Joint Implementation
VIR	voluntary independent review
WCED	World Commission on Environment and Development
WTO	World Trade Organization

Foreword

In December 1997, the Third Conference of the Parties (COP-3) to the United Nations Framework Convention on Climate Change (UNFCCC) adopted the Kyoto Protocol. While requiring developed countries to limit their greenhouse gas (GHG) emissions to individual targets inscribed in Annex B of the Protocol by an average of 5.2 percent from their 1990 levels during 2008-2012, the Protocol also provided for three “cooperative implementation mechanisms” (CIMs) to provide for flexibility and cost-effectiveness in the means adopted to meet the targets. Of the CIMs, the Clean Development Mechanism (CDM) is of particular interest to developing countries, as it provides for investment in projects for their sustainable development, while generating GHG abatements which may be transferred for consideration to the developed countries to help meet the latter’s Annex B targets. Since the CDM is driven by the legally binding commitments of the developed countries, which would be translated to their economic agents by means of domestic policy instruments, investments in CDM projects would not encounter the budgetary constraints of donors of official development assistance (ODA), or the resource limitations of multilateral development banks. Moreover, the CDM, unlike its CIM siblings (Emissions Trading and Joint Implementation), may become operational as soon as the Protocol itself comes into force, rather than during 2008-2012, when the targets apply.

However, before the CDM, or indeed any of the other CIMs, can become operational, a number of issues regarding their institutional features need to be resolved by the COP. These comprise the majority of some 140 items listed in the Buenos Aires Plan of Action (BAPA), adopted at COP-4. The precise resolution of these issues has immense implications for the size of the global market for GHG abatements from the CIMs, the implicit or explicit price of the GHG abatements, how the rents or surplus from their generation and trade are distributed between the parties to the respective transactions, the “share of proceeds” realized for an Adaptation Fund, and whether and to what extent CDM projects actually help realize sustainable development in the host countries. There are also, important subtle, technical issues related to the determination of “additionality”, as well as “real, measurable, and long-term benefits” in respect of reduction in GHG emissions and climate change mitigation.

Shortly after the adoption of the Kyoto Protocol, the Asian Development Bank (ADB) undertook a significant capacity building exercise for a number of its developing member countries (DMCs), in relation to implementation of the Kyoto Protocol and the CDM¹, by way of a regional technical assistance. A first step in the exercise was the commissioning of several research papers, by established scholars in the field, from within the region and outside, besides ADB staff. These papers covered a broad terrain, ranging from analyses of the BAPA issues in terms of international environmental law; meta-analyses of various studies (including of the ALGAS² study of the ADB and GEF-UNDP) to estimate supply and demand of GHG abatements implied by the Protocol; simple partial equilibrium economic analyses of key proposals in the BAPA; analysis focussing on the political economy of the CIMs and the climate change regime; and a theoretical and empirical enquiry into formulating baselines for CDM and Joint Implementation projects. These assembled papers constitute this book.

These papers also comprised the main course material for a regional capacity building workshop for policymakers from Asian countries concerned with formulating national approaches to the BAPA at Bangkok in October 1999, in collaboration with UNEP, and the Hanns-Seidel Foundation. A unanimous recommendation of the participants was that similar national and subregional workshops should be held to generate awareness of the issues among a broader group of stakeholders. Accordingly, the ADB, in collaboration with UNEP's Regional Office for Asia and Pacific (ROAP), UNEP Collaborating Center for Energy and Environment, Riso, Denmark, the Institute for Global Environment Strategies, Japan, and the Hanns-Seidel Foundation, developed a plan for conducting a number of such national and subregional workshops. Financial support for the workshops was also received from the Danish International Development Agency, and Global Energy and Environment for the 21st Century.

Eventually, 11 more workshops were held during July-October 2000. These were at Manila, Islamabad, Colombo, Pattaya, Hanoi, Kuala Lumpur, Kathmandu, Dhaka, Jakarta, Seoul, and Bangkok (for economists). Of these, the workshops at Pattaya and Seoul were subregional, and at Bangkok, regional. In all, 14 Asian countries participated in the workshops. The workshops, for the most part, generated intensive discussions, and a number of constructive comments on the papers were also received. Several resource persons from the region, ADB and UNEP (ROAP and Riso) staff, besides some of the authors, helped conduct the workshops during July-October 2000 phase.

The success of the collaborative capacity building program strengthens our conviction that important synergies may be reaped by various development agencies working in concert for common goals. Such collaboration, will, accordingly, be actively pursued in ADB's future environmental activities.

The present volume addresses the need of policymakers and stakeholders in climate change issues in the Asian region for accessible, but analytically rigorous and unbiased literature, from different disciplinary perspectives, on implementation of the Kyoto Protocol, and in particular the CDM. It is representative of what is now an established tradition in the ADB, of generating thoroughly researched policy analytical literature, mainly by experts from the Asian region, on climate change issues. The ALGAS project, in its turn, yielded 11 country reports, a regional summary, and a portfolio of GHG abatement project profiles, besides a wealth of technical documentation available on a dedicated website (<http://www.uxdmz03.asiandevbank.org/oes0019p.nsf>). The ADB, in partnership with the Government of the Netherlands, and likely other partners, will shortly embark on a new major capacity building regional technical assistance, for promotion of renewable energy, energy efficiency, and GHG abatement. I am confident that the new program too, will result in significant accretions to the literature in this frontier area of global policy making.

November 2000

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Chief

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1 RETA 5861: *Capacity Building for Implementation of the Kyoto Protocol and Clean Development Mechanism.*

2 RETA 5592: *ALGAS: Asia Least-cost Greenhouse Gas Abatement Strategy*

Preface

It is possible that coming generations will regard the Sixth Conference of the Parties (COP-6) to the UNFCCC at The Hague in November 2000, as a defining event in the global transition to sustainable development. Unfortunately, on the other hand, the outcome of COP-6 may just as easily be an agreement on institutional arrangements for implementation of the Kyoto Protocol on climate change that are unworkable, or are based on faulty premises, and would thus not bring significant benefits to the participating countries, in particular developing countries.

The Parties to the Convention have, since COP-4 at Buenos Aires (1998), been strenuously engaged in negotiations under the Buenos Aires Plan of Action (BAPA), which is largely aimed at resolving practical issues in implementation of several CIMs included in the Protocol. Of the CIMs, the CDM, in particular, may facilitate significant transfers of financial resources and technology to developing countries to hasten their sustainable development. The issues involved in ensuring such outcomes, are however, complex, and unfortunately, have frequently been subject to ill-informed rhetoric and caricature. The ADB, with its mandate of promoting development in Asia and the Pacific, and with an overarching objective of poverty reduction, was accordingly, persuaded that policy makers and stakeholders in its DMCs should be presented with serious, dispassionate analyses of the key issues involved in BAPA by eminent scholars, besides ADB professional staff, drawn from the perspective of diverse, relevant disciplines. Such analyses would, it was hoped, facilitate the search at the Conference of the Parties and the Subsidiary Bodies, for equitable, and mutually beneficial solutions to the BAPA issues.

Accordingly, the ADB commissioned several scholars, both from within and outside the Asian region, to prepare analyses of salient issues in the BAPA from the perspectives of international environmental law, economics, political economy, and technology. These analyses were also subjected to formal peer review. The present volume is the outcome of the effort. Several of the papers then comprised part of the training material for a series of 12 regional, subregional, and national capacity building workshops in ADB DMCs, where the participants were drawn from policymakers, researchers, industry representatives, media persons, NGO representatives, and other stakeholders in the COP outcomes.¹

The first paper, *A legal review of the key provisions and background to the Kyoto Protocol and the Buenos Aires Action Plan* by Chad Carpenter, Charles DiLeva, and Kilaparti Ramakrishna, presents a detailed background to the evolution of the Kyoto Protocol, its key features, limitations, and the adoption of the BAPA. It refers to several concerns of developing and developed countries, and suggests a means whereby all Parties may enhance their confidence that each is doing its share to implement the UNFCCC. It next proceeds to detailed discussion of key provisions of the BAPA, summarizing various proposals which have been made towards their resolution by different Parties or groups. These include issues common to all cooperative implementation mechanisms, i.e. complementarity, fungibility, adaptation fund/share of proceeds, relationship to joint fulfillment, and relationship to World Trade Organization; Emissions Trading, Joint Implementation, Clean Development Mechanism, and related issues in each mechanism; compliance measures, including discussion of such measures in other global environmental agreements; and financial mechanisms. A postscript updates the narration to the devel-

opments at the 13th Meeting of the Subsidiary Bodies (SB-13) to the UNFCCC at Lyon, September 2000. The update covers issues of compliance; land use, land use change, and forestry; the Kyoto mechanisms; policies and measures; technology transfer, financial and administrative issues, capacity building and “adverse effects”. The update underscores the divergence in the position of Parties and groups that remain, and that the COP-6 negotiators face a formidable challenge. The overall message of the paper is that while addressing climate change will eventually require legally binding commitments by all Parties, the participation of developing countries in such a regime would depend on resolution of issues of fairness. The paper was peer reviewed by John Boyd and Prodipto Ghosh.

The second paper, *Estimation of the global market potential for the cooperative implementation mechanisms under the Kyoto Protocol* by Kirsten Halsnaes (which includes material from a paper by Zhong Xiang Zhang also specially commissioned for this study), evaluates the potential demand of GHG abatements by Annex B countries in light of their Kyoto Protocol commitments, as well as the potential supply of such –C under CIMs. Estimates of GHG emissions in 2010 from Annex B countries in terms of their national communications to the UNFCCC, and also from global energy modeling studies are presented, as are emissions projections from developing countries based on country studies, including the ALGAS² study of the ADB and GEF-UNDP, and UNEP studies. These are supplemented by global IPCC emissions scenarios, based on a number of global models. A range of –C demand estimates (in 2010) result from the exercise, ranging between a low of 400 mtC to a high of 1312 mtC. The potential for supply of –C from developing countries is based on an evaluation of the cost curves generated by the ALGAS and UNEP studies. It seems likely that 400-520 mtC of –C generated by CDM projects in the energy sector may be supplied by developing countries, being 10-15% of their projected GHG emissions from the energy sector in 2010, to meet the Annex B demand at marginal abatement cost below \$25 per ton CO₂ (i.e. \$91 per ton of carbon). The paper was peer reviewed by Neha Khanna, Naoki Matsuo, and Prodipto Ghosh.

The third paper, *A simple economic analysis of some issues included in the Buenos Aires Plan of Action* by Prodipto Ghosh, furnishes (mainly) graphical, partial equilibrium analyses of several key issues in the BAPA of concern to both developing and developed countries. The paper starts with a discussion of what is the precise equity issue involved in the BAPA, a subset of equity issues in the overall context of the climate change regime. Analyses of specific BAPA issues accordingly address this delineated equity issue, i.e. the distribution of surplus (or rents) between different Parties and economic agents arising from alternative approaches to issues relating to the institutional features of the CIMs. The analysis is preceded by an explanation of some concepts and analytical tools to facilitate understanding of the actual analyses that follow. The issues of concern which are analyzed include the conditions for “price fixing” (or buyer’s side cartelization) of CDM by Annex B buyers; “market segregation” of CDM/JI suppliers by Annex B buyers; whether “supply side cartelization” of the –C market by sellers is possible; the effect of “taxing” CDM but not the other CIMs; effects of imposing quantitative “supplementarity” requirements; effects of permitting supply of “hot air”; and how developing countries may resolve their dilemmas regarding timing of the use of their low cost GHG abatement options (or “low hanging fruit”). The perspective of the paper is that careful analysis is essential to reveal both pitfalls and opportunities in the institutional design of the CIMs, that rhetorical approaches can seriously mislead, and that the simple analytical tools presented can convey important insights across a wide range of issues. The paper was peer reviewed by Anil Markandya and Neha Khanna (who also contributed an Appendix).

The fourth paper, *The Clean Development Mechanism and sustainable development:*

an economic analysis by Tariq Banuri and Sujata Gupta, relates the Kyoto Protocol, and in particular the CDM, to the issue of progress towards sustainable development, i.e. “First, that human beings should be able to enjoy a decent quality of life; second, that humanity should become capable of respecting the finiteness of the biosphere; and third, that neither the aspiration for the good life nor the recognition of global biophysical limits should preclude the search for greater equity in the world”. The paper accordingly relates GHG emissions and economic growth, including correlations between per capita carbon emissions and incomes across countries. A discussion of the central features of the CDM is followed by sources of concern about the mechanism, including possible distortions of development that may arise. Alternative perspectives on evaluating the net benefits of CDM projects include neo-classical welfare analysis, which emphasizes gains from trade, although the practical record (in the context of globalization) is mixed. One source of distortions are “value chains”, which redistribute rents in favor of the stronger partners in the chain; accordingly, CDM projects may not help the poor in developing countries, even if the country as a whole gains. A political economy analysis looks at whether or not the CDM can contribute to the following “spaces” needed by developing countries for sustainable development, i.e. ecological (carbon entitlements); financial (whether inflows will actually be “new and additional”); technological (increased access to and reduced cost of clean technologies); and social (whether benefits will accrue to ruling elites rather than the poor and whether loss of opportunity will be borne mainly by future citizens). Further, the paper discusses the implications of possible alternative CDM structures i.e. multilateral fund; bilateral arrangements; and unilateral. Several other issues are also discussed, in both theoretical and practical aspects, from the overall perspective of CDM’s potential contribution to sustainable development. The authors’ broad verdict on the concerns expressed in relation to the CDM is that “at their root, however, is not an irremediable defect in the CDM itself, but rather the lack of credible analysis and information on the long-term consequences of CDM projects”. The paper was peer reviewed by Anil Markandya, Neha Khanna, and Prodipto Ghosh.

The final paper, *Baseline determination for greenhouse gas abatement by the Clean Development Mechanism and Joint Implementation under the Kyoto Protocol* by Liu Deshun and Peter Rogers (with significant inputs by Chris Nielsen and Guo Jingfei), presents theoretical and empirical considerations from the perspectives of technology and economics, on the determination of baselines in CDM and JI projects, to establish that GHG abatements are “additional” to what would have occurred otherwise, besides being “real, measurable, and long-term”. Three broad approaches are the project-by-project approach; the technology-based approach; and the “top-down” normative approach. These approaches also relate to evaluation of indirect effects of CDM projects on GHG emissions, including the possibility of emissions leakage; feasibility of dynamic rather than static baselines; ex-post correction of baselines; and incentives for “gaming” or cheating by the transacting agents. Several practical examples of the project-by-project, and technology benchmark approaches are presented.³ A tentative assessment of the different approaches is that transaction costs may be relatively high in the project-based approach at the investor level, and in the technology-benchmark approach at the system level, while they are uncertain at the national level in the top-down approach. Uncertainties in data and assumptions are present in all three approaches. Additionality of GHG abatements are very difficult to prove in the project-based approach due to possibilities of leakage, but possibly less so for the other two approaches. The potential for “gaming” is relatively less in the project-based approach, but increases at the system and national levels for the technology-based and top-down approaches respectively. Overall, the au-

thors view the technology-based approach as most likely to lead to simplification of baseline setting, and less likely to incur political objections by developing countries than the top-down approach. The paper was peer reviewed by Kirsten Halsnaes, Naoki Matsuo, Christian Azar, and Prodipto Ghosh.

All the papers benefited from the discussions at the various capacity building workshops at which they were presented. Their reception at these workshops by the participants vindicated our initial belief that stakeholders in developing countries needed access to rigorous and credible analyses of the BAPA issues. The present publication is aimed at making the analyses available to a still wider audience.

November 2000

Prodipto Ghosh

Editor

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- 1 This series of workshops was organized collaboratively among the ADB, UNEP Regional Office for Asia and Pacific, UNEP Collaborating Center on Energy and Environment, Riso, Denmark, DANIDA, Institute for Global Environmental Strategies (IGES), the Hanns-Seidel Foundation, Global Energy and Environment for the 21st Century (GEE21), and the Governments of the participating developing countries.
 - 2 ALGAS: Asia Least-cost Greenhouse Gas Abatement Strategy.
 - 3 Only one example of the top-down approach is available in the literature, without details of the methodology.

Acknowledgments

During the course of preparation of the papers included in this book, and the 12 capacity building workshops in the Asian region in which these papers were presented, the project team at ADB received help, guidance and assistance from many quarters. It is unlikely that we would be able to mention them all, let alone express our gratitude adequately.

First and foremost, we are grateful to the authors of the papers, who took up the challenge of making a genuine advance in the professional literature in the field with dedication, skill, and commitment. We have no doubt that their efforts will be amply reflected in the way their professional colleagues and the policy-making community receive this work. Several peer reviewers, named in the Preface, provided incisive feedback and comments to ensure that the final products can withstand searching professional scrutiny. Graham Dwyer and Segundo dela Cruz formatted the publication and designed the layout.

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A number of resource persons – Brady Coleman, Maria Cecilia Dalupan, Bharat Desai, Sujata Gupta, Kirsten Halsnaes, Neha Khanna, Myung-Kyoon Lee, Camilo Lim, Jyoti Painuly, and Govinda Timilsina, took up the major burden of making presentations at the capacity building workshops, with competence and dedication. Several other experts participated as panelists in two regional workshops. They include Brenda Jay Angeles, Maria Rebecca Campos, Chow Kok Kee, Thierry Lefevre, Maria Socorro Manguiat, Anil Markandya, Jin-Gyu Oh, and Ramprasad Sengupta. John Boyd also participated in a number of workshops as panelist and resource person. Naoki Matsuo of the Institute for Global Environmental Strategies, Japan, prepared additional training material for the capacity building workshops, and also participated in two workshops as presenter and panelist.

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Finally, the efficient management of the task of preparation of the publication, and conduct of the capacity building workshops owes a great deal to the indefatigable and dedicated Annie Idanan, and the ever-patient Lillyanne Buenaventura who also provided considerable help in various tasks.

The usual disclaimer applies. The ideas, concepts, and methods presented in this publication are the work of the authors, peer reviewers, and ADB staff who prepared the papers, and do not represent the official policies or positions of the ADB, or the institutions or organizations with which they are affiliated.

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