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Special Feature on the Kyoto Protocol

The Clean Development Mechanism and India: Firm Responses, Baselines, and Development Dynamics

P. R. Shukla,[a] Balasubramaniam Sivaraman,[b] and A. Yajnik[c]

This paper provides an assessment of the Clean Development Mechanism (CDM) from a developing country's perspective with specific reference to activities in India. The CDM has elicited considerable interest from various Indian industries. We analyze here the nature of initial CDM projects in India, sector preferences, scales, and possible contributions to India's development priorities. The issues of technology transfer, transaction costs, baselines, and additionality are discussed with reference to the Indian context. The scope and limitations of the CDM are critically reviewed. Observations and recommendations are made for mainstreaming the climate actions with development dynamics in developing countries in the post-Kyoto architecture.

Keywords: Clean Development Mechanism (CDM), Technology transfer, Transaction costs, Baselines, Development, and Climate.

1. Introduction

Climate change is among the most vital global concerns of the century. A significant step to address the problem was taken in 1992 with the adoption of the United Nations Framework Convention on Climate Change (UNFCCC). India acceded to the convention in November 1994, thus becoming one of the Parties to it. The Kyoto Protocol to the UNFCCC was agreed in December 1997, and India ratified it in August 2002. Article 12 of the protocol envisages the participation of developing countries in emissions reduction of greenhouse gases (GHGs) through the Clean Development Mechanism (CDM), which has the dual objectives of promoting sustainable development in developing countries and assisting the Annex I (developed) countries in meeting their emissions limitation targets agreed under the protocol. Whereas concerns have been raised by studies that the CDM market could be very thin and without depth and breadth (Halsnaes 2002), considerable activities for promoting a carbon market have been witnessed lately with specific interest in emissions credits from CDM projects. Studies such as the assessment of six major developing countries—namely, Brazil, China, India, South Africa, Mexico, and Turkey (Chandler et al. 2002)—have shown that sizable potential for CDM projects exists during the Kyoto Protocol's first commitment period (2008–2012). Some estimates put the total volume of CDM projects to be a third of the emission reductions required by the Annex I countries (Jotzo and

a. Professor, Public Systems Group, Indian Institute of Management, Ahmedabad, India.
b. Doctoral candidate, Indian Institute of Management, Ahmedabad, India.
c. Doctoral candidate, Stanford University Law School, the United States.

Michaelowa 2002). India, having a diversified and fast-growing economy, has good potential for CDM projects in the energy, transport, forestry, agriculture, waste, and industrial sectors (ADB 1998). It is generally felt that the majority of the projects in India would be in the energy sector, and though agriculture and forestry have potential they are unlikely to attract substantial CDM activities because of factors like disaggregated and marginal ownership of cattle and land, high transaction costs, uncertainty about the status of carbon sinks in the Kyoto Protocol, and low awareness in these sectors. Table 1 gives the carbon mitigation potential for India.

Table 1. Carbon mitigation potential in India (2002–2012)

Mitigation option	Mitigation potential (in teragrammes of carbon)	Long-term marginal cost (US$/tC)[a]
Demand-side energy efficiency	45	0–15
Supply-side energy efficiency	32	0–12
Electricity transmission and distribution	12	5–30
Renewable electricity technologies	23	3–15
Fuel switching (from coal to gas)	8	5–20

Source: Shukla et al. 2004c.

[a]US dollars per tonne of carbon.

India has been an active participant in the UNFCCC process. It has undertaken an extensive scientific exercise to prepare its initial national communication, which is at an advanced stage of completion, and it has formed a designated national authority (DNA) for administering CDM activities.[1] The national communication project has developed a comprehensive inventory of GHG emissions in India, conforming to the reporting standards and obligations under the UNFCCC. The DNA, which is the apex body in each host country for CDM project administration, is constituted of an expert panel for initiating wide-ranging consultations on CDM activities in the country.

2. Firm responses

Here we analyze the CDM projects submitted to the government of India before March 2004 in the host country approval process. The proposals show significant awareness and enthusiasm among the project proponents, many of whom had prior experience in proposing mitigation projects, such as under the Certified Emission Reduction Unit Procurement Tender (CERUPT) process for the Netherlands and Finland. There were 15 projects that participated in the CERUPT bid, and after the completion of bidding, five were selected. Of the selected projects, three were wind energy projects and two were biomass-based power generation projects. Though one would have expected CERUPT to be something of a forerunner for estimation of costs of mitigation from CDM projects, costs were not the sole criteria on which the CERUPT projects were selected. Despite prior experience, the project idea note (PIN) and

1. The national communication and DNA are part of the package of requirements that countries which are Parties to the UNFCCC must satisfy.

project design document (PDD) for most CDM projects that we analyzed needed significant improvement in content and form. The selection of project type and technologies was driven more by the preferences of buyers rather than sound criteria like least-cost mitigation and contribution to national development priorities. An examination of the project reports revealed that while many projects had potential for positive contribution to sustainable development, these aspects were not articulated well. Besides, there were few projects that were at best "development neutral" and could have been better structured to contribute to national development priorities. For instance, one project that involved the thermal oxidation (burning) of HFC-23 (a byproduct in the production of HCFC-22) had very high mitigation potential because of its simplicity and low cost, but it contributed little to sustainable development or to knowledge and technology enhancement.[2] A conclusion we draw from these initial projects is that there is a need for capacity building among the project proponents in terms of crafting the project architecture that can best contribute to the dual aims of the CDM exhorted in Article 12 of the Kyoto Protocol.

2.1. Geographical spread of CDM projects

There are 28 states in India's federal structure, and CDM project proposals originated from a number of them (see figure 1). The majority of initial proposals, though, originated from a few particular states, including Karnataka, Andhra Pradesh, Uttar Pradesh, Maharashtra, Gujarat, and Tamil Nadu. The three most significant factors that prompted projects from these states are the existence of a coastline (suitable for wind power projects), a sugar industry (for bagasse-based cogeneration),[3] and energy-intensive industries (offering efficiency or fuel-switching prospects).

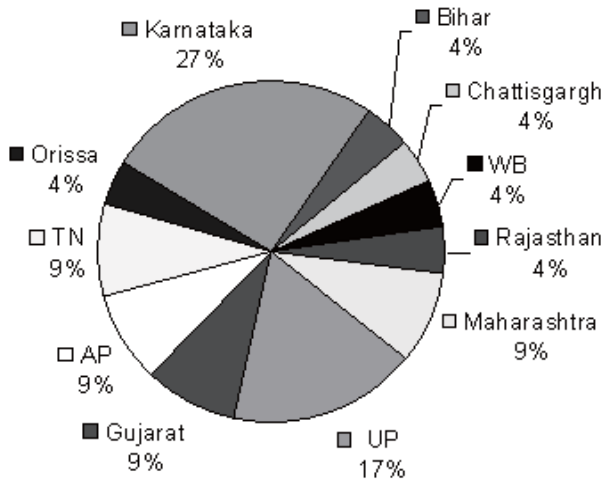

Figure 1. Geographical distribution of proposed CDM projects, by state, as of February 2004

Note: Total number of projects is 23. AP = Andhra Pradesh; UP = Uttar Pradesh; TN = Tamil Nadu.

2. HFC stands for hydrofluorocarbons; HCFC stands for hydrochlorofluorocarbons.
3. Bagasse is a by-product of sugar cane production.

The northeastern part of the country, which consists of many small states in hilly terrain, does not have any representation in these initial CDM proposals, although they have potential for mitigation through forestry and small hydro projects. One apparent reason for inaction in these states could be low awareness of the CDM in these regions. Well-crafted CDM projects in these areas would contribute significantly to sustainable development. Although the sample of initial project proposals is small, it still suggests the need for a more balanced regional spread of projects.

2.2. CDM project types

India, being a socio-economically diverse country, offers a wide range of potential CDM project types. Of the 23 proposed CDM projects, 12 are based on biomass use (including bagasse for cogeneration) (see figure 2). This predominance of biomass is because of the strong presence of the sugar industry in India. Sugar factories need steam and electricity for sugar processing, and the abundant sugarcane waste has good fuel properties. These are suitable conditions for stand-alone co-generation facilities. In the past decade such projects were initiated with support from the government of India through subsidies as well as official development assistance (ODA) grants. The combination of a decade of learning from the execution of these projects and the high growth in the sugar industry has created favorable conditions for the creation of new projects via the CDM route at a time when the former ODA and subsidy regimes have already been terminated. The portfolio of proposed CDM projects is diverse, and this shows the considerable awareness of Indian industry of the Kyoto Protocol and its flexibility mechanisms. There are number of energy efficiency projects in the cement and steel industries focusing on process improvements and waste gas heat recovery. All the projects except two are in the electricity sector, and they all involve using renewable energy or fuel switching. There are no projects proposed in transport, agriculture, or forestry, though some projects from these sectors could be part of the least-cost options for GHG mitigation in the country.

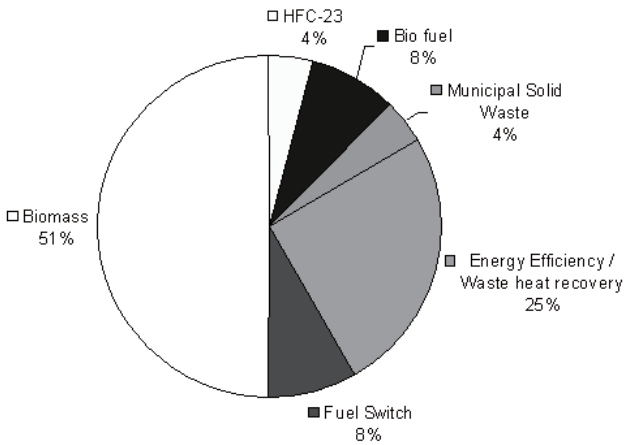

Figure 2. Types of CDM projects proposed, as of February 2004 (total projects = 23)

2.3. Beliefs, expectations, and reality

Indian academia, research institutions, industry, industry associations, non-governmental organizations (NGOs), international consultants, and the policy making apparatus of the government have long been aware of climate change as a problem and have actively followed the UNFCCC processes and Kyoto Protocol issues (World Bank 2004). Moreover, India has had strong policies of promoting renewable energy and has extensive environmental regulations. While, on one hand, there has been quite a bit of enthusiasm, bordering on "irrational exuberance," over expectations of CDM projects,[4] there has also been pessimism arising out of lower CER prices and uncertainty on protocol issues for the period beyond 2012. But there are serious caveats to having high expectations of CDM projects. Such high expectations could lead to non-additional projects being groomed for the CDM route and promotion of additional projects with very low CER potential. This could lead to a high incidence of costs without the expected benefits and, finally, this could give a bad first experience of CDM projects, leading to a lowering of enthusiasm for taking up projects in the future. Hence, a tempering of expectations regarding the CDM is needed in order to have a realistic orientation towards it.

2.4. Unilateral projects

Many of the projects were proposed in collaboration with foreign partners who might also be the buyers of certified emissions reduction (CER) credits, as in the case of the CERUPT. The projects having foreign collaboration are often preferred by CER buyers, and this creates a bias in favor of bilateral projects. But there has been a conspicuous presence of unilateral CDM projects promoted by Indian firms. The unilateral initiatives are prompted by the advance of technological capabilities within the country, an untapped market potential for intra-national technology transfers, and lower transaction costs and risks of unilateral projects vis-à-vis international collaborations. While the unilateral projects have the merit of retaining the economic rents of CERs within the country, they could drain the funds away from other investment opportunities, and expose developing country project developers to higher risks; they also lack the technological learning advantages associated with international projects. The policy vis-à-vis unilateral projects needs to balance these contrasting factors. Simultaneously, it should address retention of a reasonable part of value addition from CERs within the country from the projects involving international partners. There are also possibilities of CDM projects under South-South or inter-developing country cooperation. The feasibility and advisability of conducting such projects in the South Asia region is due to the diverse endowment of energy resources among different countries in the region (Shukla et al. 2004c). Despite the significant potential for such projects, there is hardly any activity in these kinds of projects due to political and financial barriers.

2.5. Contribution to sustainable development

The architecture of firms in relation to CDM projects is such that they aim to maximize their own direct benefits. The contribution of projects to sustainable development, an important goal of the CDM as per Article 12 of the Kyoto Protocol, however, is external to most firms' interests. Policies are thus

4. India is one of the very few countries in the world which has a ministry dedicated to the promotion of renewable energy, the Ministry of Non-Conventional Energy (MNES).

needed to further the contribution of CDM projects to sustainable development. India's government and industry associations can work closely to identify CDM projects that have high potential to contribute to national development goals, and they can identify together a positive portfolio of CDM projects. This can reduce the risks and transaction costs for firms and would simultaneously align the CDM projects to national development priorities. In the absence of such an internal mechanism and policies, the CDM projects are likely to be driven by the narrow interests of firms and the needs of the world market for CERs, leading solely to low-cost mitigation projects with little contribution to national priorities.

3. CDM issues in India

Even in the event of the ratification of Kyoto Protocol by Russia,[5] the price of CERs will remain low due to the absence of the biggest potential buyer, the United States, and the inclusion of "hot air" from Russia and some other countries with transition economies. Hence, CDM project proponents cannot expect CERs to provide substantial coverage of project risks. In the initial learning phase, this is making project developers look for smaller-sized projects in order to minimize overall risk exposure. In fact, risk exposure would be higher for the host country developers in the case of unilateral projects that do not have a confirmed buyer of CERs. The scarcity of capital in developing countries is another factor that leads to selecting small projects. This is also prompted by the simplification of procedures for small-scale projects under the Marrakesh Accords,[6] which would reduce the transaction costs and approval time for small projects. Of the proposed CDM and CERUPT projects in India, many that were approved were small-scale projects that fall under the Marrakesh Accord's definition. This predilection for small projects could lead to large-scale projects, which are part of the least-cost options for mitigation, not being undertaken—at least in the initial stages of the CDM process.

The large projects in the areas of fuel-switching in the electricity, industry, and transport sectors and the use of renewable energy are usually within the least-cost option portfolio for mitigation (ADB 1998). These projects have high mitigation potential and could also contribute to sustainable development in a more significant way. How the bias for small projects, which is prompted by the present CDM architecture, could be avoided is an issue that should be dealt with at the host country level or through suitable modifications in signals from the multilateral process. At the host country level there can be a centralized policy for identifying and promoting large projects having high mitigation and sustainable development potential. These projects may receive special attention and support in approvals through the DNA and the CDM Executive Board approval processes.

With the first commitment period of the Kyoto Protocol taking many of the low-cost mitigation projects ("low-hanging fruits"), the apprehension persists in developing countries that they will be left with high-cost mitigation options if and when they eventually join an emissions limitation commitment regime in the future. Moreover, with high transaction costs and low CER prices for CDM projects

5. This is likely to follow, judging from the recent EU–Russian deal on joining the World Trade Organization (WTO) and rartifying the Kyoto Protocol. See http://www.pointcarbon.com/article.php?articleID=3807&categoryID=147&PHPSESSID=cf2a15cbbf9fab41cd40e9faab915c5c.
6. Decision 17/CP.7 of the Marrakesh Accords aims at simplifying procedures for renewable energy projects below 15 megawatts capacity, energy efficiency projects below 15 gigawatts/hour/year, and other activities mitigating less than 15 kilotonnes of CO_2 equivalent annually.

during the first commitment period, developing countries might not get compensated enough for forfeiting low-cost mitigation options upfront.

3.1. The Indian context

India being a large and diverse country raises many special issues for implementation of the CDM. In India's federal democratic framework, the rights and obligations of framing and implementing policies are shared between the central and state governments. Key sectors such as electricity and forestry belong to the concurrent list. The federal setup presents various complications for CDM projects because of the multiplicity of agencies that could be involved at the state and central levels. For instance, electricity sector policies such as subsidies are decided by each state, though these have serious implications for additionality and baselines for CDM projects.[7] The markets in India are also fragmented in the sense that, while the urban centers function predominantly in the market domain, the formation of markets in rural India is incomplete. Almost all modern technologies can be found in the industrial sectors in India, with the technology stock varying from World War vintages to the most modern ones. In rural India, traditional agricultural practices continue to use technological stocks and practices from the pre-modern era. Hence, fixing additionality for CDM projects in such a diverse socio-economic milieu is far from easy.

3.2. Institutions and capacity

The Government of India has constituted a DNA and placed it within the Ministry of Environment and Forests at the center. This is an expedient arrangement, with little commitment of resources or long-term institutional strategy in terms of the independence and professionalism that would be the key to the DNA's effective functioning. The continuance of the DNA within the ministry would be fraught by hazards such as "red tape," professional incompetence, and even regulatory capture when large public-owned companies start proposing CDM projects. There is, therefore, a case to build a DNA that could ultimately become an autonomous institution vested with adequate expert support and financial independence. The success of the DNA and the overall CDM process will also hinge on the support it gets from industry associations, which, by being close to their industry, can bridge the information gap and provide for informed decision-making with respect to CDM projects. This would also facilitate increasing awareness of the CDM in industry and ensure expectations are realistic. Though awareness of the CDM among industries is high in India, this has unfortunately not translated into good documentation in CDM proposals. The lacuna needs to be overcome through capacity building for prospecting, documenting, and implementing CDM projects. Consulting firms can play a role here, although their capacities are far from adequate given the size of the task. As well, the involvement of financial institutions in developing CDM projects is vital. Up to now only a few financial institutions in India have committed limited resources for developing capacity to develop and support CDM projects, though their capacity is too limited to tap the full market potential. A strategy is needed to integrate the consulting and financing needs of project proponents to lower the transaction costs. Some Annex I

7. For joint implementation and Clean Development Mechanism projects, emissions reductions must be additional to those that would otherwise occur. *Additionality* is a positive difference between the emissions that occur in the baseline scenario and the emissions associated with a proposed project.

countries, such as Canada, have started to institute mechanisms to fund identification and development of CDM projects in India, but a more concerted way of building capacity would be to develop nodal institutions in India which would oversee and coordinate such activities.

3.3. Baselines

Though there are aggregate baseline studies on business-as-usual (BAU) scenarios in India and others, largely based on the Intergovernmental Panel on Climate Change's (IPCC) Special Report on Emissions Scenarios (SRES) typology (Shukla 2004c), these still fall far short of addressing the short-term and project-level issues that need to be sorted out for the accounting of CERs from CDM projects. There can be no standardization with respect to methodology for baseline determination, since studies have shown that slight variation of the parameter for baseline fixation could lead to significant differences in baseline emission rates and mitigation potential for projects (Sathaye et al. 2001). The issue of fixing baselines is going to be a thorny one in the absence of cooperative rule-making that balances the need for high environmental integrity by the system vis-à-vis the demand for low transaction costs and risks from project proponents. A detailed study of the bagasse-based cogeneration plants in India's sugar industry (USAID 2000) shows the complexities involved in deciding on the baselines. The sugar industry here is variegated with different vintages of technology and sugar cultivation practices, resulting in wide variation in economics and technology. Moreover, varying state-level policies for purchasing electricity from sugar industry cogeneration plants add to the difficulty in having high commonality in baseline methodology. While a project-specific baseline would give very high environmental integrity, it also has relatively high transaction costs. A multi-project baseline methodology like the ones based on technology or geography, or a baseline at the sugar industry level, might reduce transaction costs but will not give as high a level of environmental integrity as a project-specific baseline. Moreover, with the kind of diversity in India's sugar industry it is difficult to have multi-project baselines. It is also going to be difficult to balance the trade-off between having a robust baseline and keeping the transaction costs of CDM projects low. Hence, it would be prudent for India's government to propose a task force or committee to look into the aspects of baseline fixation and recommend methodologies for implementation.

Recent studies of India's power sector (Shukla et al. 2004a, 2004b) have shown that the marginal baselines for power plants are more appropriate than ones based on average emission rates of generation. The average baseline approach is based on the weighted average emissions of all the generation in the system, while the marginal baseline approach considers only the marginal plants. A marginal baseline takes the power plant built at the margins, hence it could be a viewed as a good reflection of what kind of generation a new plant would displace for ascertaining additionality and fixing baselines (see figures 3 and 4).

For developing a baseline, power generation was projected econometrically using the past data of generation based on fuel type and technology. As can be seen from figures 3 and 4, the baselines for states differ considerably. While the baseline for the state of Gujarat shows a declining emissions trend, the baseline for Andhra Pradesh shows an increasing one. This divergence in baseline trends between states is due to the increased use of natural gas in Gujarat, which has resulted in declining emission

intensity as the use of gas has penetrated a predominantly coal system; whereas in Andhra Pradesh a change in rainfall patterns and unsustainable water use upstream of hydro dams have led to a fall in electricity generation from hydropower sources, leading to an increase in emissions intensity. The diversity of baselines across states would make it politically impossible to agree on a common approach. Besides, employing such an approach would be imprudent from the perspective of environmental integrity. Practical approaches are therefore needed to reconcile the relevant project-level baselines, state-level baseline trends, and their national-level aggregation. In the fast-changing dynamics of developing countries, it would be impossible to find theoretical solutions that give accurate baseline estimates under counterfactual assumptions. What is needed is to generate practical signals that are agreed under a cooperative regime. A common signal could be what the firms would need to consider in their project assessments, rather than each committing resources to articulate its own signal—an approach that would remain disputable and therefore pose higher risks.

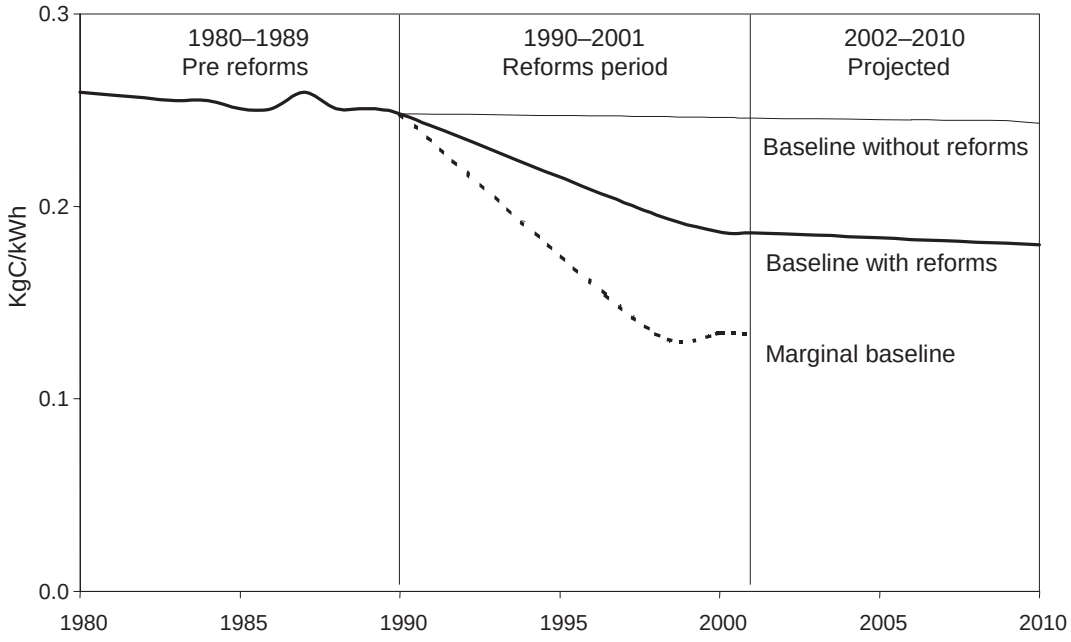

Figure 3. Electricity sector baselines for the state of Gujarat in India, in kilograms of carbon per kilowatt-hour

Source: Adapted from Shukla et al. 2004a.

The practical approach is also mandated by the complexities of real life and the diversity of systems. For instance, the generation and consumption of electricity is dependent on the extant dispatch practices in the electricity market. Hence, in the absence of a dispatch-based baseline, it is difficult to ascertain whether a CDM project displaces a base load or a peak load plant, and so the actual mitigation potential is also uncertain. This is particularly significant in a situation such as in India, where the electricity market is making the transition from monolithic, vertically-integrated utilities with centralized dispatch

to being more disaggregated and market-driven. Some future policies such as integrated resource planning (IRP), if implemented, could also change the electricity market dynamics and hence affect the choice of what could be a good baseline methodology (R. M. Shrestha and R. Shrestha 2004). Moreover, most electricity and energy markets in developing countries are being reformed (Heller and Victor 2004), and hence are in a very fluid situation, making it difficult to develop baseline scenarios. To create a baseline scenario based on actual dispatch, we would need data on dispatch, which might not be available uniformly for all states in India, and the dispatch-based baseline can be arrived at only by using a complex simulation based on generator and grid characteristics. Moreover, in the evolving liberalization of the electricity market, any pooling arrangement or trading scheme where confidentiality of price is assured, there will be an impediment in getting the data required for developing the baseline based on actual dispatch.

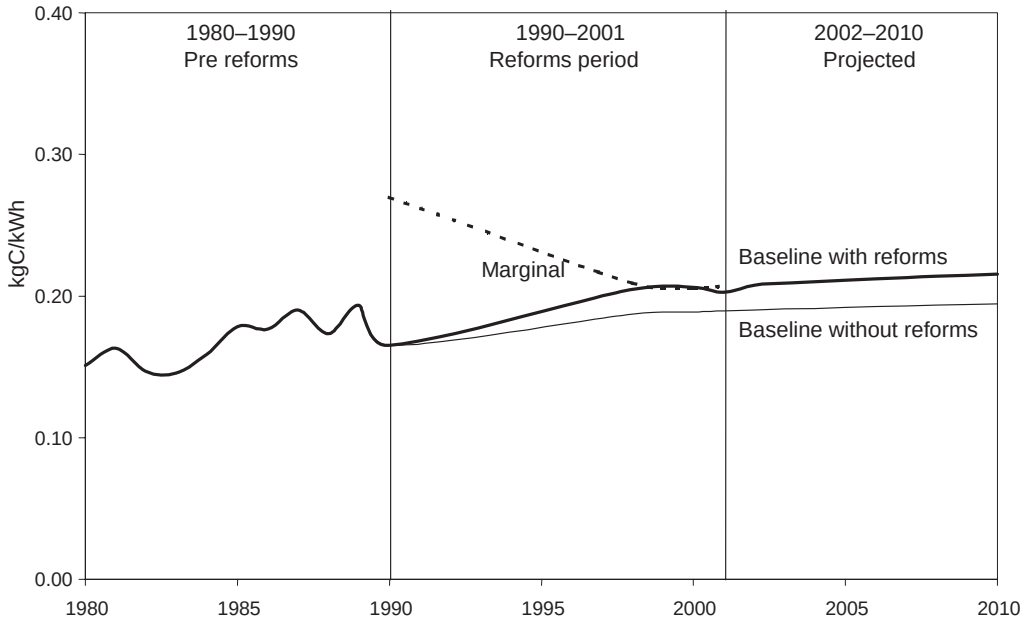

Figure 4. Electricity sector baseline for the state of Andhra Pradesh, in kilograms of carbon per kilowatt-hour (kgC/kWh)

Source: India adapted from Shukla et al. 2004b.

The CDM projects with high mitigation potential and that support sustainable development significantly, such as the fuel-switching projects in the transportation and energy sectors, seem to be mired in issues of additionality and baselines. These projects, therefore, may get side-lined, while projects with little contribution to sustainable development but that provide clear mitigation baselines are very likely to be promoted. Baseline identification is the basis of the CDM—and also its curse. The success of the CDM hinges on how baseline complexities are demystified through cooperative and practical approaches that accommodate the dynamics of the real world, or at the minimum, reward

"good conduct" such as is done by the "off-set" method, rather than conducting a futile chase for pristine estimates in a stylized, counterfactual world that is far removed from the rapidly changing realities of developing countries.

3.4. Technology transfer

Article 11 of the Kyoto Protocol envisages the transfer of technology from developed countries to developing countries. In the CDM and CERUPT projects so far proposed in India, however, there is little technology transfer potential, and even in the very few projects where new technology is being introduced, the acquisition of technology is through the conventional route of open-market procurement rather than technology transfer being an inherent part of the project initiative. Moreover, in large developing countries like India, the best technology available globally can be found in some advanced firms servicing export markets. The question thus is not whether an advanced technology exists in the country somewhere, but to what extent it could penetrate the market. Hence, technology penetration rather than singular technology transfer is of greater significance.

In the case of the least developed countries (LDCs), however, technology transfer would be a significant issue, and CDM projects could be important harbingers of technology transfer from developed countries. There is also significant scope in developing countries like India for transferring technology to LDCs at lower cost, and this might be more effective, since technology adaptation could be made easier due to similarity of institutional and infrastructure environments. But these South-to-South technology transfers and the consequent CDM projects have not been given serious consideration. What the South-to-South technology transfers often lack is not the technological capacities but the meager investment resources needed and the funds, similar to the case of ODA that has been used extensively to transfer new technology from developed to developing countries. But with the Marrakesh Accords, by agreeing to not divert or disguise ODA funding for CDM purposes, there is an added complexity in determining the additionality of projects funded by overseas funds.[8] Though the funding country can account for the ODA and the CDM funds in a separate manner to help identify additional projects or some proof that ODA funds are not being diverted, these are not foolproof ways of ascertaining ODA additionality, and all of them suffer from one shortcoming or another. Rather than proposing a new procedure or mechanisms for deciding ODA additionality, an implicit understanding should be developed in the comity of nations not to divert ODA funds for CDM purposes. This would be a more amenable and implementable proposition, rather than beginning with mistrust and then finding violations when precisely codifying each transaction, and ending up with misunderstandings, inflexibilities, and conflicts.

3.5. Transaction costs

Though policy for small CDM projects has been liberal, their transaction costs can be a real threat to their viability, because transaction costs for small projects can be a significant part of the overall project costs. Irrespective of project size, transaction costs can act as a barrier for many good projects. Hence,

8. Decision 17/CP.7 *emphasizes* that "public funding for Clean Development Mechanism projects from Parties in Annex I is not to result in the diversion of official development assistance and is to be separate from and not counted towards the financial obligations of Parties included in Annex I."

dual strategies are needed: one aimed at reducing transaction costs and a second to bundle the small projects together for CDM assessment. In India, we find that international consulting firms charge upwards of US$10,000 for preparing a report for host country approval. Such reports usually include neither the robust assessment of baselines nor address the risks of expected future CER streams. On host country approval, the subsequent reports would cost much more. There is a great need to standardize the host country report format, develop standard methodologies, provide guidance to small project proponents, and register local consultants who can provide standardized services at competitive rates and build their capacity. For pooling of projects there should be some institutional support for identifying similar small projects and preparing independent but generally identical reports at little incremental cost.

A host of market intermediaries, such as international consultants and NGOs, are becoming active in India in developing PINs and PDDs for project proponents. While these intermediaries bring experience and knowledge from other markets, it is questionable whether the additional value they bring justifies the substantially higher transaction costs being observed at this stage. Moving towards a revenue-sharing mode of arrangement between project proponents and consultants could lead to a more balanced contract, which will alleviate moral hazard issues that arise when project consultants are paid upfront.

3.6. Project risks

The diversity of India and its unique political economy pose unique risks to projects involving international transactions. Under the federal framework, there are overlapping regulations designed separately by the central and the state governments. The legal risks to a CDM project would thus vary depending on its location. Moreover, there are considerable political risks due to opposing views held by different political entities on matters concerning the environment. The sweeping powers of judicial review of administrative actions and the oft-used practice of public interest litigation for challenging the administration's actions in court pose additional risks to projects. The enormous delays in the processing of judicial matters accentuates the risks from legal actions. Since the CERs are a new "commodity" that does not have precedence in India's legal system, the early projects may have to face risks from delays and problems in the process of systemic learning. Every new technology brings its own risks. In CDM projects, there are the added risks of satisfying sustainability criteria and dealing with rapidly shifting baselines and operating environments.

CDM projects will need bilateral or multilateral contracts relating to generation and sharing of CERs. Central to the sharing of risks are the contracts made between the CER generators in India and CER buyers. The weakness of contract enforcement in the developing country environment is another source of risk. With the legal status of CERs not being clear, CDM contracts would be inherently more risky. As well, the official CER market remains uncertain without ratification of the Kyoto Protocol by Russia. Without an official CER market, the price signals that are very necessary for the evolving CDM market will be missing. Under these circumstances, the present market dynamics are governed primarily by the policies of the European Union (EU) and EU trading arrangements. The price signals from EU initiatives have been the singular largest contributing factor for the early start of the CDM, and EU policies have been central to the creation of a CDM market because they have reduced the market risks.

4. Development and climate

As noted earlier, an essential objective of the CDM is to contribute to sustainable development in the host countries. CDM projects aligned with the host nation's development priorities would have greater acceptability and, therefore, lower transaction costs and risks arising from social resistance. Thus, host countries should delineate the policies and measures needed to encourage projects that would make a large contribution to mitigation as well as to development priorities. Aligning development and climate actions is vital to the effective operation of the CDM.

4.1. Development dynamics

Most developing countries are at best partly market-driven and can be called "hybrid states," where a part of the economy functions in the realm of markets and the rest functions outside. Moreover, many sectors such as electricity are undergoing drastic changes that are not readily predictable. Hence, rather than orienting actions under the protocol that are hinged on assumptions about a counterfactual future and market mechanisms, efforts should go into finding a more cooperative and effective way of ensuring mitigation. Output-oriented and market-driven policies often falter in the developing countries where the markets are incomplete, and they may not align outputs with national priorities. Alternatively, it is feasible and pertinent to craft policies and measures that provide the inputs that support "good conduct" aligned to the achievement of national goals (Heller and Shukla 2003). Note that key to the success of the CDM is its alignment with the development dynamics of these countries.

4.2. Beyond Kyoto

Studies across major developing countries have shown that economic development need not be climate unfriendly (Chandler et al. 2002). In fact, economic development may provide the necessary technologies and capital for overcoming unsustainable practices. As can be seen from figure 5, the energy intensity of gross domestic product (GDP) for India shows a declining trend during the past decade—without the nation being part of any emissions reduction commitment agreement. The economic reforms in this period allowed technological and fuel transitions by providing access to global markets. The reforms not only prompted higher economic growth but also facilitated the transfer of cleaner technologies and fuels that reduced the carbon intensity of India's economy. A key question before Indian policy makers, therefore, is how to further decouple economic growth and carbon emissions. The Kyoto mechanisms can be used as instruments for such decoupling. The present architecture of the CDM, however, is biased to promoting smaller, isolated CDM projects rather than wider development-oriented activities that are inherently climate friendly. The CDM Executive Board's reluctance to give consent on methodological issues for larger projects (Heller et al. 2003) makes it very unlikely for CDM processes to support sustainable development in developing countries in a significant way. The present regime architecture is based on ideal market assumptions and is not very pragmatic in eliciting the sustained interest of developing countries. The incentives for developing country participation are jeopardized by not explicitly aligning the actions and interests of the private project players to the national developmental goals in host countries.

The architecture of the Kyoto regime has made projects to address climate change peripheral to mainstream development activities in developing countries. Climate policies and actions have thus acquired an image of being unfriendly to development, leading to apprehension and rigidities in developing countries' proactive participation in the post-Kyoto regime. Thus, instead of continuing with a regime that is focused on outputs (i.e., reducing GHG emission levels), which has made many governments shy towards proactive participation, the new regime should concentrate on giving adequate incentives and the wherewithal to align the economies of developing countries along rapidly declining emission intensity pathways. This could be done by retargeting ODA to assist the least developed countries in adaptation, supporting other developing countries or regions in major mitigation activities, and through supporting development of national and regional markets that would enlarge energy and technology choices for sustainable development (Heller and Shukla 2003).

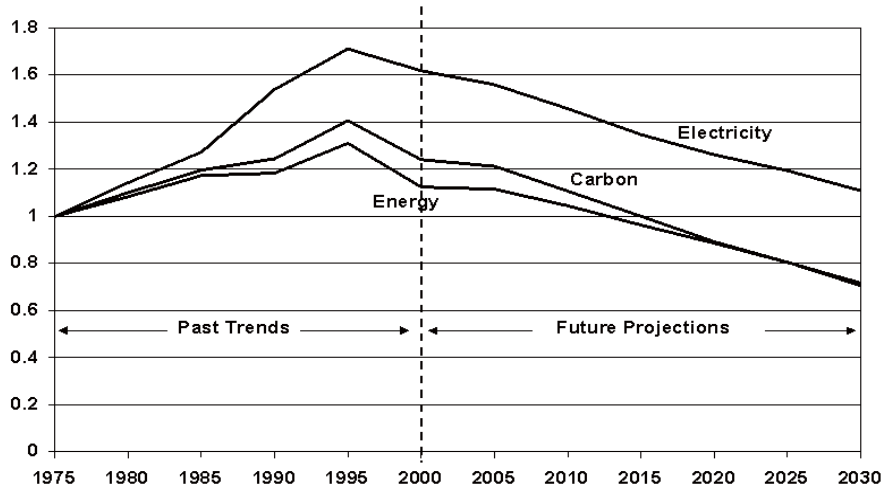

Figure 5. Energy, electricity, and carbon intensities for India

Source: Shukla 2004c.

5. Conclusion

India has a classic "dual economy," where a growing modern sector and persistent traditional sector co-exist. For a decade its economic policies have been driven by market-oriented reforms aimed at integrating the national economy with global markets. We note that the country's development policies, aimed at reducing widespread poverty, regional imbalances, and enhancing the quality of people's lives, remain the key focus of India's policy agenda. The country's policies vis-à-vis global environmental issues are sewn within this overall context. As India is among the countries with lowest per capita GHG emissions, the emissions pathways that compromise development are, therefore, neither feasible nor sellable as stand-alone propositions. Development along sustainable pathways remains the national priority. This is the key anchor and platform for devising activities that are both development- and

climate-friendly. The dual objectives of the CDM offer the possibility of developing projects that are synergistic with climate and development goals. As a mechanism resting on a counterfactual future, however, the CDM regime could get lost in great uncertainties that shroud the future pathways of developing countries.

As the CDM enters the practical phase, the initial euphoria among project proponents is slowly giving way to realism because of the complexities revealed in delineating additionality along with baselines and the risks associated with CER prices and the post-Kyoto regime. Price expectations in the CDM market now hinge on the EU greenhouse gas emissions trading scheme (EU ETS), and speculations on Russia's ratification of the Kyoto Protocol add to the near-term uncertainties. Whereas Russia's ratification can increase the credibility, authenticity, and confidence in the Kyoto mechanisms, CER prices may be adversely affected by the "hot air" entering the market with Russia's participation. These uncertainties, compounded by low price expectations due to the non-participation of the United States in the protocol, provide very little cushion for covering the risks for projects that have to be non-additional to begin with. The CDM projects that are currently proposed in India are therefore all small in size. Hopefully, larger projects may be prompted after the initial learning process nears completion.

The CDM has the potential to give a good start to cooperative efforts between developed and developing countries in addressing climate change. A main threat to the CDM, however, is the complexities that can mystify and lock-in the operation of the mechanism. The clauses relating to issues such as additionality and baselines, unless implemented with a sense of realism and practical acumen, can become the cause of costly and unresolvable disputes. One of the key challenges that needs addressing is to demystify the inherent complexities of the mechanism resting on a counterfactual foundation. What should be aimed at is to employ the practical methodologies that approximate the dynamics of the real world and to implement these cooperatively, rather than committing resources to finding pristine estimates in a stylized, counterfactual world that is far from the rapidly changing realities of developing countries.

The uncertainties and low price expectations for CERs in the near term make it mandatory to have very low transaction costs and risks if the mitigation potential in developing countries is to be tapped via the CDM. The transaction costs originate from the protocol processes, intermediaries, and the configuration of national systems. Establishing robust methodologies, building capacity in developing countries, and institutionalizing national responses would all contribute to keeping transaction costs and risks low—measures that are so essential for maximizing the mitigation contribution of the CDM.

The CDM was plugged into the Kyoto Protocol without it having gone through extensive prior discussions. The grey areas that could not be addressed at the strategic stage of negotiations thus need to be addressed during the post-protocol operational stage. In any case, one must keep in mind that the CDM is but an initial step in a long process. The mechanism was not designed from a long-term perspective. The architecture of the CDM, as it is now, keeps it at the margins and not within the mainstream of the development dynamics of developing countries. A key challenge for negotiators for the period beyond Kyoto is how to align climate actions in developing countries with their development priorities. This alignment shall not only help to tap the enormous mitigation potential in developing

countries but shall also mainstream climate actions within development policies. Until the next stage of political bargaining finds the instruments to mainstream climate in the development dynamics of developing countries, the CDM will remain the principle vehicle for cooperative actions between developed and developing countries for technology transfer, capacity building, and institution building, as well as for harvesting the low-hanging fruits of mitigation opportunities in developing countries so as to reduce the burden of developed countries in meeting their emissions limitation commitments agreed under the Kyoto Protocol.

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