

Mainstreaming International Climate Agenda in Economic and Development Policies¹

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Abstract	2
Introduction	2
Background	3
Bottom-up Approach to International Climate Change Cooperation: Methodological Issues	4
Aligning Development Pathways and Stakeholder Interests in Climate Change ..	5
Examples of International Stakeholder and Policy Driven Climate-friendly Initiatives.....	7
Technological Development and Diffusion	7
Multilateral Initiative to Mainstream climate change into development policies..	8
Renewable energy	10
Business sector initiatives	11
Stakeholder and Policy Driven Initiatives: Conclusions	12
Development Focused Climate Policies: Developing Country Case Examples.....	13
Climate Implications of Future Development Policies	14
Adaptation and Mitigation Links	15
Mechanisms to Support International Cooperation	16
International SD and Climate Bank	17
Technological Development and Transition Programmes.....	20
Technology Standards and Other Policy Measures	22
Conclusions.....	23

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Abstract

The paper presents a number of ideas on how climate change policy implementation can be supported by alternative international cooperation mechanisms that are based on stakeholder interests and policy priorities that include broader economic and social development issues, and a number of examples of development policies that have climate benign side impacts are given in order to illustrate how such mechanisms can work. It includes a brief review of current development policies, technological research and promotion efforts, and climate change that demonstrates that mutual policy initiatives undertaken by governments and the private sector actually have major positive impacts on climate change without being initiated by this global policy concern. Furthermore a number of examples are given on how future development objectives in Brazil, China, and India jointly can support economic and social goals and global climate change concerns if these goals are taken into consideration and supported by international cooperative mechanisms. The paper proposes a number of international cooperative mechanisms that can support the implementation of integrated development and climate change policies. The mechanisms include an international SD and Climate Finance Mechanism (SDCFM), technology development and transition programmes, technology standards, and other measures.

Introduction

Climate change is increasingly recognized by countries and other stakeholders around the world as a long term common environmental problem that can only be mitigated by worldwide actions with a broad participation. This calls for the establishment of international framework conditions that are firm enough to facilitate climate change mitigation, but which at the same time are also flexible and open enough to make it attractive to a very diverse group of stakeholders to participate, given their different economic, social, and environmental perspectives and interests.

The paper presents arguments and ideas on how future international climate change cooperation can be developed based on a bottom up strategy, wherein as much freedom and initiative as possible are given to countries and other stakeholders. One of the most critical issues in developing such an approach is how to design appropriate framework conditions that can facilitate individual stakeholders to take climate change into consideration in their routine decision making.

The rationale for such a decentralised bottom up strategy for international climate cooperation is that various stakeholders have different incentives to participate, and that the stakeholders should be able to choose the policies and measures that are most attractive to them while still supporting the global common agenda.

The paper argues that a number of current and planned policy initiatives that are not initiated by climate change but which have large synergistic effects across different goals provide a basis for expecting that such a decentralised approach can actually work. This conclusion is based on a review of case examples of current policy initiatives which are initiated by economic concerns, development perspectives, and/or technology oriented perspectives, and it is demonstrated how these initiatives both represent strong stakeholder interests and have significant impacts on climate change mitigation and adaptation. The examples draw from national government

statements, business perspectives, multilateral initiatives, and specific studies of interrelationships between sustainable development (SD), energy, and climate change. The studies included material from Brazil, China, and India.

The paper suggests a number of alternative principles for how stakeholder incentives and global framework conditions can be brought together in international climate change cooperation, and a number of pros and cons of suggested international mechanisms are highlighted in relation to environmental integrity, effectiveness, equity, and well as in relation to various stakeholder positions.

Background

Climate change, differently from many other international environmental problems, is intricately linked to general development pathways and economic growth, and this implies that climate policies will have significant side impacts on other policy areas. Similarly, economic and local environmental policies have large side-impacts on climate change. Given the precedence of economic development goals in the political agenda of nations, climate change needs to be addressed as part of a broader economic development agenda.

The approach to climate cooperation proposed in this paper differs from the style of recent international conventions such as the Montreal Protocol and the Biodiversity Convention which are centred on an environmental goals agenda, whereas this paper argues for a development focused agenda. The “bottom up approach” to international climate cooperation as advocated in this paper is different from the conventional style of international climate negotiations that rather have been focused on a climate centric agenda, aiming to get parties together in a general agreement about GHG emission reduction targets and means for adaptation from a normative environmental perspective.

There are several difficulties in the establishment of international agreements about an environment-centric climate change policy agenda resting on normative principles as pursued under the heading of burden sharing. Some of the difficulties arise since a number of controversial economic and distributional issues are placed on the table when greenhouse gas (GHG) emission reduction targets are negotiated, and this causes conflicts at a point in time, where marginal as well as total emission reduction costs and well as the benefits of avoided climate change are still very uncertain.

The controversial character of burden sharing discussions for example is evident in the negotiations about allocation principles for emission quotas. Any emission quota has a potential economic value determined by the total international emission limit and the emission mitigation supply curves of all countries. Thus, distributing emission quotas is akin to distributing wealth. According to many modelling studies, cost effective global GHG emission reduction markets are likely to imply that a relatively large share of the reductions are traded, and this trade can be more or less beneficial to different buyers and sellers in different parts of the world (Halsnæs and Olhoff, 2005). It is therefore not trivial to agree about emission quota allocations (Ellerman et al, 1998; Weyant, 1999; Lasky, 2002).

A bottom up approach to international climate change cooperation differently will focus on how stakeholder interests can be supported in a way where these integrate GHG emission reduction and adaptation actions into their normal decision making. One way to initiate such an internalisation is to create a market value for GHG emission reductions, which can act as a signal to buyers and sellers and give them freedom to choose if this value makes it attractive to implement GHG emission reductions or not. A crucial issue then, is to consider how such a market value and other incentives for GHG emission reduction can be established while avoiding the many current controversial issues surrounding international climate change negotiations about target setting.

Bottom-up Approach to International Climate Change Cooperation: Methodological Issues

There are several key methodological issues that emerge when considering international climate cooperation, which are both generic to agreements of the Kyoto style and to more bottom up based approaches like discussed in this paper. A central issue is to devise ways and means through which climate change concerns become internalised in economic accounting and other decision making of countries and other stakeholders. In other words the aim is to get a broad set of stakeholders to pay attention to climate change in their routine decisions recognising its global common good character.

The specific problems to be dealt with in order to facilitate that climate change is taken into consideration by various stakeholders and that this leads to actual GHG emission reductions include:

1. Internalisation of the value of avoided climate change impacts requires that some concept of damage values is lying behind the climate change policy efforts as a representative of the goal of the efforts as such. Climate change damages can be described in terms of monetary impacts as well as in the form of broader descriptions of various physical, natural and social impacts (IPCC, 2002).
2. GHG emission reductions have to be “visible” and measurable as a sort of a tangible attribute to given activities, and this i.e. requires that there is an agreed standard for GHG emission measurements. The UNFCCC and the IPCC GHG inventory work and reporting systems provide a good basis for this.
3. An incentive for stakeholders to control GHG emissions needs to be established. Myriad measures for creating incentives can be used including international emission targets, national laws, voluntary agreements, and specific climate finance models.

The value of avoided damages, apropos Item 1, is dealt with differently in environmental target setting agreements vis-à-vis in approaches that are bottom up driven based on diverse stakeholder interests, perspectives and actions. An environment centred agreement often starts with the determination of a global environmental target and the distribution of this among countries. Such an agreement implicitly requires that all parties upfront consider their own valuation climate change

impacts and agree with the overall target and the emission reduction allocation and the implied distribution of costs and benefits.

A bottom up style of cooperation, for example, if it is based on economic principles, differently can focus on a target setting for marginal GHG emission reduction costs, based on what countries are willing to accept as an insurance value against climate change. Such an approach does not offer any certainty about the environmental outcome, and it must be expected that an economic based cooperation probably will imply lower immediate GHG emission reductions than the ambitions of proponents of an environmental target setting approach to climate change. However, only a modest climate change cooperation that is based on a minimum level of common risk perception can attract wider participation right now and get parties to gear up for post 2012 actions. Far reaching worldwide GHG emission reductions can be delivered over time from a modest start enjoying broad support.

Common and agreed emissions measurement standards, as in item 2, are addressed by IPCC guidelines for GHG emission inventories and are applied in the national communications reported to the UNFCCC, (UNFCCC, 1992). Furthermore, CDM project development has included extensive work of GHG emission reduction measurements and baseline determination that have created a fair basis for the establishment of visible emissions reductions.

The creation of an incentive for countries and stakeholders to conduct GHG emission reduction as addressed in item 3 is a key stumbling block in the establishment of climate change agreements and broader forms of collaboration whether the framework is based on environmental target setting or on various stakeholder perspectives. Whereas an environmental style general agreement for emission reductions will imply an incentive for GHG emission reduction in order to meet a binding target, agreements based on a bottom up perspective and starting from different stakeholder perspectives need another sort of framework conditions that makes it attractive to stakeholders to reduce emissions. A possible approach and some illustrations of addressing this challenge are discussed in the following.

Aligning Development Pathways and Stakeholder Interests in Climate Change

A very important framework condition for climate change policies is that these are deeply embedded in general economic development patterns, technological change, global investment flows and trade. The IPCC Synthesis Report of the TAR (IPCC, 2002) along these lines of thinking concluded that “the climate change issue is part of the larger challenge of sustainable development”. Climate policies are thus more effective when consistently embedded within broader strategies designed to make national and regional development paths more sustainable. This occurs on one hand because the impact of climate variability and change, climate policy responses, and associated socio-economic development will affect the ability of countries to achieve sustainable development goals. Conversely, the pursuit of those goals will in turn affect the opportunities for, and success of, climate policies. In particular, the socio-economic and technological characteristics of different development paths will strongly affect emissions, the rate and magnitude of climate change, climate change impacts, the capability to adapt, and the capacity to mitigate.

Many recent international scenario studies have confirmed the very strong relationship between economic growth pathways and climate change. In particular the relationships between GHG emissions and economic growth is examined in studies modeled on IPCC SRES based scenarios (IPCC, 2000, Chapter 2; IPCC, 2001). Some of the major issues in this context are economic structure, welfare measures, technological change, trade, and ancillary benefits.

Also scenario work from emerging economies like India and China shows that economic development pathways constitute a major framework condition for climate change policies, which in terms of extent of the mitigation effort required tend to be much more important than mitigation policies that are considered as marginal changes to specific development pathways (Shukla, 2005; Kejun and Xiulian, 2005).

In conclusion, endogenous development pathways and climate indicators are highly correlated both in IC's and DC's, but the studies have not yet focused on delineating which policy choices within the domain of economics, sustainable development, or environmental perspectives that can counteract or be supportive to integrated economic and climate change policies.

Integrating Sustainable Development and Climate Goals

The establishment of integrated policy regimes is complex since development pathways can be shaped by diverse priorities and stakeholder initiatives that go far beyond a narrow concern about climate change. Climate change issues typically are not kept in sight in development policies, however, GHG emissions and climate change vulnerability are still highly influenced by development policies, and it cannot a priori be assumed that no conflicts will arise between various economic, social and environmental goals.

It is therefore critical to address how climate change concerns can be integrated in policies that influence the development pathways of society. The consequent question is: how simple collaborative mechanisms can be crafted which can appeal to and strengthen the incentives of various parties to take climate change into consideration.

A society's development path among other factors is influenced by a number of key decisions related to investments, natural resource use, consumption and lifestyle, technology choices, and by institutional structures. These decisions draw from country's development conditions, priorities and goals; some emphasizing economic needs and globalization, while others emphasize environmental concerns, green lifestyles and general sustainable development issues.

General sustainable development programs that are adopted by some countries can act as a platform for more specific policies like nature conservation programmes, management of common access resources, recycling of resources, environmental taxes, promotion of organic food and non-material lifestyles, human and institutional capacity building efforts, R&D, financial schemes, and technology transfer. However policy implementation in such areas arise not from general sustainable development policy statements, but is rather based on more specific objectives like air quality, food security, health issues, employment, or promotion of green technologies. Accordingly, integration of climate change goals with more general economic development goals

requires that climate policies are linked to specific policies like those previously mentioned.

Many developing countries are at present undertaking air pollution control programs that are closely interlinked with GHG emissions. An example of this is the India urban air pollution initiative, where significant reductions in SO₂, NO_x, and particulate emissions in New Delhi have been achieved through the introduction of LPG fuels for public transport and taxis. This option will also reduce GHG emissions, in absence of potential leakages at gas stations. The conjoint emissions reductions such as SO₂ and CO₂ from electricity plants will generate stronger economic signals for mitigation (Menon-Choudhury and Shukla, 2005). The implementation of similar programs in other urban areas and other countries can be hastened and increased in scope if the joint GHG emissions can attract additional project finance due to the value of avoided climate change, but some economic mechanism will be needed to facilitate this.

Examples of International Stakeholder and Policy Driven Climate-friendly Initiatives

In practice, the climate change consequences of implementing more general development policies among other things depend on stakeholder interests and on how institutions and regulations support or counteract the climate goals⁴. Noticeably, despite the expressions of disappointments about the progress of international climate negotiations and GHG emission reductions, there are numerous ongoing activities that promise broader stakeholder participation in GHG emission reduction efforts although all initiatives are not solely driven by climate change concerns.

The discussion next illustrates some examples from the current initiatives that potentially can have large impacts on climate change, though these do not originate from environmental target setting in multilateral climate change agreements. The examples include government initiatives related to technological development and diffusion, multilateral development initiatives and Overseas Development Assistance (ODA), and business initiatives.

Technological Development and Diffusion

Technologies used in production and consumption activities are among the key drivers of greenhouse gas emissions. Energy technologies, especially those on the supply-side, are long-lived and interface with complex infrastructures. Greenfield as well as renewal projects for these technologies offer eminent opportunities for technology choices that can alter the emissions pathway. These opportunities are prominently visible in emerging developing countries where infrastructures related to energy supply and use are in construction. Transfer of efficient and cleaner technologies to developing countries will enlarge choices and produce cross-enhancements which can deliver significant positive spillovers for climate change.

Technology transfer depends on three vital factors – endogenous capacity, enabling environment and mechanisms for technology transfer. New technology transitions imply social transformations and capacity of people and organizations to continuously

⁴ An example of an institution that influences GHG emissions are energy markets where prices and tax structures directly are determinants of GHG emission reduction costs.

adapt to changing circumstances and to acquire new skills. Governments can create enabling environments through myriad measures like well-enforced regulations, taxes and standards and removal of subsidies. Other measures include reforming legal system to reduce regulatory risk, protecting intellectual property rights, encouraging financial reforms, competitive and opening of national capital markets and international capital flows that support FDI. A number of mechanisms for technology transfer exist such as the National System of Innovations, ODA, GEF, Multilateral banks, Kyoto Protocol Mechanisms and other bilateral and multi-lateral initiatives.

The recently announced 'Asia-Pacific Partnership on Clean Development and Climate Change' (China Daily, 2005) is an example wherein technology co-operation is agreed by industrialized countries USA and Australia who have not ratified the Kyoto Protocol, Japan who has emissions limitations under the Kyoto Protocol, and developing countries China, India and South Korea who have ratified the Kyoto Protocol but have no emissions limitation commitments. The technology transfer pathway in this case will follow different routes and means compared to the Kyoto Protocol wherein carbon price signals are an important incentive for technology transfer.

Although USA has no binding emission limitation commitment, some GHG emission reduction activities are still going on in the USA as part of state and federal programs (RGGI, 2005), carbon sequestration projects, energy tax initiatives, voluntary company actions, etc, and similarly Australia has a number of GHG emission reduction initiatives (Australia, 2002).

Technological research and innovation are very important components of the climate activities of USA. A large national and international initiative focuses on the development of new technologies including carbon storage, hydrogen, nuclear energy, methane recovery, renewable energy, energy efficiency, and fusion energy. In the long term, the US climate policy perspective is focused on technological development initiatives, recognising current uncertainties about future climate change impacts and costs, rather than on setting more ambitious targets for GHG emissions (Watson, 2004).

Acceleration of R&D efforts is vital to the ultimate success of climate policies; however in the absence of economic signals an a priori selection of a basket of technologies can be far from cost-effective. A "technological push only" model such as the genome or fusion (ITER) project can work for large scientific ventures which generate basic scientific knowledge and centralized learning. It will not be effective when innovations are to be diffused and deployed in numerous end-use services operating in very diverse contexts. Moreover, there is no guarantee that such advanced technologies will not be used as a mean of economic and political power or that multi-player and climate centric technology R&D will internalize national priorities of developing countries. The voluntary initiatives like the six country 'Asia-Pacific Partnership for Clean Development and Climate' can lower these risks if countries can make technology choices that suit own national objectives like energy security and air quality.

Multilateral Initiative to Mainstream climate change into development policies

A number of OECD countries and international organisations are actively involved in a discussion about mainstreaming of climate change into development policies. Climate change vulnerability and adaptation have been the starting point of the efforts and one of the early activities was the establishment of an interagency initiative in involving agencies like UNDP, UNEP, FAO, World Bank, ADB, AfDB, GTZ, DFID, OECD, EC, and a number of national governments.

The agencies have worked collaboratively on a mainstreaming report entitled 'Poverty and Climate Change: Reducing the Vulnerability of the Poor through Adaptation' (ADB *et al*, 2003). The report includes a general conceptual discussion about linkages between poverty and climate change vulnerability, which illustrate the many specific ways in which climate change issues are embedded in development pathways like discussed previously in the paper.

On a more permanent basis, the interagency working group continues the work on the conceptual and operational aspects of how adaptation can be streamlined into development assistance, and a number of ODA's take an active role in this work. Some countries including the UK, Germany and Denmark currently are in the process of implementing specific guidelines for their development programmes.

Seen from a more conceptual point of view a mainstreaming approach to vulnerability and adaptation changes the focus of climate change to be more on economic and social development issues relatively to an environmental centred approach, and this implies that new possibilities open for integrated studies of how adaptation and mitigation policies are linked to development issues. This conception is also articulated in the discussions about the institutional and developmental context of climate change mitigation and adaptation policies in the IPCC's Third Assessment Report (TAR) (IPCC, 2001). One of the conclusions therein is that the outcome of specific mitigation and adaptation policies depends on manmade, natural, and social capital assets and institutions, i.e. markets and other information sharing mechanisms, legal frameworks, and formal and informal networks. Following that, the TAR introduced a discussion about the concepts of mitigative⁵ and adaptive capacity and their commonalities and links to development and institutional policies.

A number of developing countries have in a more concrete way considered linkages between development policies and climate change. India has articulated a policy perspective on climate change, where the achievement of the Millennium Development Goals (MDGs) includes an assessment of how these goals address climate change. India submitted its initial communication on Climate change to the UNFCCC in June 2004, where it is stated that "the Indian planning process and global climate change concerns are intricately linked" (India, 2004 p. 193). Examples of these linkages can be seen in relation to the MDGs. The first MDG on poverty eradication, for instance, is shown to link with climate change since higher income enables cleaner fuel choices, slows population growth rate, and enhances the adaptive capacity. The MDG target on environmental resilience is shown to link with carbon

⁵ The IPCC, 2001 defines mitigative and adaptive capacities as under:

Mitigative capacity: Social, political, and economic structures and conditions those are required for effective *mitigation*.

Adaptive capacity: Ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantages of opportunities, or to cope with consequences.

sequestration, nature preservation and enhanced adaptive capacity due to improved water supply and better health conditions. The 8th MDG goal on global partnership for development is assumed to imply technology transfer, job creation, market development and a further integration of India in the global economy, which will enhance both the mitigative and adaptive capacity.

In summary, a number of key elements in the sustainable development based climate change strategy of India are captured in innovations in technology and institutions, economic reforms, regional cooperation, targeted technology and investment flows, and alignment of stakeholder interests. India has initiated a number of climate friendly initiatives including demographic policies, transportation projects, land use options, and various energy programmes including both energy efficiency, savings, and new fossil and renewable energy technologies (India, 2004).

The Chinese climate change policies, like in the case of India, are also embedded in general sustainable development policies. China adopted a sustainable development plan with specific goals in 2003 (Xu, 2004). Following this, China seeks to integrate climate policies into development policies and gives special emphasis to technological development, innovation and deployment, and to public awareness and educational activities. China submitted its first National Communication on Climate Change to the UNFCCC Secretariat in October 2004 (Government of China, 2004), which in addition to an inventory of GHG emissions and sinks, includes a detailed report of policies and measures that the Chinese government in accordance with its own priorities have implemented with the aim to support economic growth and energy efficiency, which have also contributed to climate change mitigation. These policies and measures include energy efficiency and conservation measures, market reforms, promotion of renewable energy options, industrial options, transport policies, and a host of policies related to waste management and the forestry sector. The Chinese chief climate negotiator Mr. Gao Fang stated (China Daily, 2004) in connection with the submission of the national communication that there is a strong need for investments in climate change mitigation and adaptation, and considers the CDM as a major breakthrough.

Renewable energy

A number of EU countries have actively promoted the establishment of an international agreement or some other cooperation mechanism that is to be targeted towards renewable energy technology implementation. One of the rationales for this has been renewable energy's contribution to GHG emission reductions.

It was proposed in the WSSD in Johannesburg, 2002 to adopt a specific target for renewable energy shares for countries, but the target was not adopted. However, a number of follow up activities, including the Bonn Renewables 2004 Action Program, include specific proposals for how renewable energy targets and other goals like GHG emission reduction can be combined (DEA, 2004). The Bonn action program includes targets for a doubling of the global installed renewable energy capacity, a target for investments, CO₂ emission reductions of 1.2 bill tons carbon per year in 2015, targets for donor finance, and for access to electricity in rural areas with the aim that up to one billion people can be given access to energy services from renewable energy by 2015 compared to about 50 million today.

An alternative to the target setting approach of the Bonn action plan can be to try to establish an economic value of avoided negative externalities of renewable energy as a basis for combining renewable energy finance and carbon markets. This should facilitate that renewable energy by the market actors can be considered as a technology with several externalities including GHG emission reduction, local air emission reductions, noise, risk, and other impacts. In this way, a specific market based GHG emission offset value can then act as a subsidy jointly with values of other positive and negative externalities of renewable energy.

Studies in developing countries shows significant greenhouse gas emissions reduction through development actions motivated by poverty alleviation, local environmental protection and energy security. The six developing countries (Brazil, China, India, Mexico, South Africa and Turkey) reduced their GHG emissions over the past three decades by approximately 300 million tons a year (Chandler et al., 2002). The emissions for these six countries, excluding these measures, would have been 18% higher in the year 2000. Renewable energy technologies were prominent among the portfolio of options in these countries. These programmes were undertaken not keeping in view climate objectives, though their performance is benign to the climate cause.

In Brazil (Government of Brazil, 2004), under the National Alcohol Program (PRO-ALCOOL), around 5.6 million vehicles running on hydrated alcohol were produced from 1975 to 2000. In addition, in this period, ten million gasoline-fuelled gasoline vehicles were substituted with 25% of alcohol. The alcohol produced using sugarcane as the feedstock off-set 550 million barrels of oil saving \$11.5 billion foreign exchange and avoided 400 million tons of CO₂ emissions. Sugarcane feedstock for alcohol production also delivered a waste by-product bagasse which is used as a fuel in power and steam cogeneration plants. In the year 2000, nearly 1000 MW bagasse based cogeneration capacity was deployed which saved 3.6 million ton of CO₂ emissions. In South Africa, besides existing renewable energy contribution of nearly seventy thousand billion kilowatt-hours per year, the Energy White Paper (Government of Republic of South Africa, 1998) sets a target of 10000 Giga Watt hours for renewable energy contribution to final energy consumption by 2012. In India's case the renewable energy programme with substantial wind power capacity has saved nearly 10 million ton of CO₂ emission over the decade from 1995 to 2004.

Business sector initiatives

An increasing number of international companies are active in formulating their own climate change policy strategies. Some of the company initiatives are carried out voluntarily without any relation to regulatory frameworks or government directions. Other initiatives to an extent are inspired by - and connected to - mandatory GHG emission reduction policy regimes. Examples of such policy regimes are the Emission Trading Directive of the EU that assigns emission quotas to energy intensive industries and the UK Emission Trading Scheme, where companies on a voluntary basis can get an energy tax reduction if they join emission trading (CF, 2004). A number of US states have also adopted GHG emission reduction goals, which i.e. in the first stance are implemented through emission trading among large emission sources such as power plants despite the federal government not having ratified the Kyoto Protocol (rggi, 2005).

Some examples of company initiatives undertaken voluntarily and initiatives that are supported by regulatory framework are discussed below. Several companies have as part of their corporate strategy voluntarily defined goals that reflect social responsibilities and environmental concerns including GHG emission reduction targets which go beyond traditional company obligations. Several international coordination networks are promoting such activities, including the World Business Council on Sustainable Development (WBCSD), the Climate Biz network, and the Climate Group (WBCSD, 2004). These initiatives work as platforms for cooperation between companies, NGOs, governments and other stakeholders.

The WBCSD, 2004 states in its objectives of the energy and climate change programme that “increasingly, companies will need to understand and manage their GHG risks in order to:

- Maintain their license to operate
- Ensure long-term success in a competitive business environment
- Comply with national or regional policies aimed at reducing corporate GHG emissions
- Identify risks and cost-effective reduction opportunities in the value chain
- Set internal targets and measure and report progress
- Develop process/product innovations”

Thus, the WBCSD is pre-empting the future expectations about mandatory GHG emission policies and conveying that it is prudent for companies to identify climate policy risks and to initiate a process of monitoring GHGs. The monitoring of GHGs by the companies are supported by a guidebook for accounting that follows IPCC Guidelines of GHG emission inventories; setting very detailed standards for company level emissions accounting (WBCSD and WRI, 2004). In addition to this, the WBCSD also emphasizes that GHG emission accounting is important in showing eco-efficiency and in creating the image of transparency and accountability. Another benefit that companies can get out of following the standard for GHG accounting, according to WBCSD, is that they can get access to GHG trading markets.

In the USA, the Chicago Climate Exchange Board (CCX) has started carbon trading activities with a particular focus on voluntary commitments taken by American, Canadian, and Mexican companies. CCX states: “It is clear that the demand to reduce greenhouse gases will grow over time. Taking action to limit greenhouse gas emissions and create value for these reductions makes good business sense. However, these emerging markets, and an international market linking them, are still in their infancy.” CCX mentions barriers like unclear commodity definition and verification standards, and lack of organized markets which result in large transaction costs and market inefficiencies.

The trading system of the Chicago carbon exchange board relies on voluntary targets that companies define in relation to a baseline level in a given period and the GHG emissions of the registered member is measured in relation to this level in order to determine the offset. The companies have set targets for the 2003-2006 period. The approach can both be used for companies that directly emit GHGs as well as for companies that only indirectly emit GHGs through their energy consumption.

Stakeholder and Policy Driven Initiatives: Conclusions

Many governments and stakeholders around the world are already taking climate change into consideration beyond what is mandated by formal international climate policy commitments. The initiatives arise from different objectives and vary according to stakeholder incentives and the different values stakeholders assign to avoided impacts and related economic and social losses. Successful international climate change mechanisms that aim at attracting wide participation of countries and stakeholders must accommodate such diverse set of perspectives and support varied approaches, initiatives and actions. This brief review of current initiatives and activities confirms that climate goals can be supported by varied incentives aimed at furthering general economic interests, business and market opportunities, technological change and penetration and also more general concerns and goals of sustainable development.

Development Focused Climate Policies: Developing Country Case Examples

There are numerous examples of development policies that have already been implemented or which are parts of future plans in developing countries which have profound impacts on climate change vulnerability, adaptation, and mitigation despite climate change is not a major policy priority in their design. A number of examples of such policies are discussed below with the aim of articulating how international cooperative mechanisms can enhance the scope of combined development and climate change policies.

Climate Benefits of Already Implemented Programmes

There are many examples of policies in the energy sector, industry and land use that have been implemented in developing countries over the last decade that have implied reduced GHG emissions. Well known and often cited examples of this are the alcohol transportation programme in Brazil, and various energy efficiency measures and renewable energy promotion in China and India.

The National Alcohol Program (PRO-ALCOOL) in Brazil, which was launched in 1975 promoted ethanol production as a substitute to gasoline and was at the same time an important support to the domestic sugar industry (Government of Brazil, 2004). Over three decades, it delivered direct mitigation benefits as well as indirect benefits in terms of local employment, energy security, and foreign exchange savings. The biomass plantations located in surplus and waste lands furthermore delivered several spillover benefits like income to forest dependent communities, employment to surplus agriculture labor and land conservation, and also enhanced the adaptive capacity of local communities (Planning Commission, 2003).

In China the growth in primary energy consumption has stagnated recently despite high economic growth rates (IEA, World Energy Outlook, 2002, p. 239). From 1996 to 2000, China's GDP grew by more than 7% annually, according to official government data, while commercial energy consumption grew by only 0.8% annually. At the same time there has been some substitution away from coal use, which has further reduced GHG emissions. The reasons for the deceleration in China's energy demand include the closure of inefficient coal power plants, and reduced coal consumption in industry and in the residential sector due to more efficient technologies and fuel substitution. In the same period, oil demand has continued to

climb due to increased motorisation and substitution of non-commercial fuels in the residential sector.

In India, various programs such as those supporting renewable technologies and energy efficiency, led to nearly 111 million tons of emissions mitigation in the decade of 1990's (Chandler et al, 2002). India's Initial National Communication (India's INC) to the UNFCCC (Government of India, 2004) enumerates numerous initiatives undertaken for sustainable development reasons and which have accrued climate benefits in addition including population control measures, investments in enhancing road quality, metro railway in large cities, conversion of fleet of public vehicles to CNG in Delhi, support to energy conservation and efficiency programs, advanced coal technology, incentives for renewable energy technologies, investment in water conservation practices, resource recycling and afforestation and land restoration. India's INC also notes the climate-friendly contribution of legal, institutional and financial reforms like the enactment of Energy Conservation Act, 2001 and Electricity Act 2003; establishment of regulatory authorities; and rationalization of tariffs and reductions of subsidies to fossil energy and electricity.

Climate Implications of Future Development Policies

Looking into the future there seems to be many opportunities for synergized development and climate change policies. Among the most important development choices with relevance to climate change are those made in the energy sector. Energy services are crucial for development and for providing adequate food, shelter, clothing, water sanitation, medical care, schooling and access to information. Increased access to safe energy and energy services at the same time can have several consequences for climate change, dependent on the pathway.

During the early phases of development, countries make investments in back-bone assets, i.e. infrastructure and energy supply on which additional investments are made in assets for manufacturing and delivering goods and services. These investments can create lock-ins and inflexibilities, in terms of the potential for integrating more climate friendly behaviours and technologies if the climate perspective is not integrated right from the beginning. In order to overcome such problems, development indicators, energy use patterns and GHG emission pathways should be considered as a basis for large scale investments.

Other policies that can significantly influence future energy use and consequent emissions are urban development, settlement structure, and transportation options. The following results from a study of South-Asian regional energy markets is an example of the magnitude and character of joint development, energy and climate change impacts (Nair et al., 2003 and Heller and Shukla, 2004).

The South Asian region comprising of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka holds quarter of the global population, a significant fraction of which is poor. Their energy resource endowments are diverse - coal in India, gas in Bangladesh, hydro potential in Bhutan and Nepal, and a strategic location of Pakistan in relation to transit routes that can link South-Asia with the vast gas and oil resources of Central Asia and the Middle East. The Maldives and Sri Lanka, as small island nations face energy security and scale economy concerns, besides having unique adaptation

needs. Despite diverse potential comparative advantages, there is little energy and electricity trade in the region.

The analysis of stylized regional energy cooperation regimes (Heller and Shukla, 2004) shows substantial direct, indirect and spill-over benefits via economic efficiency, energy security, water security and environmental policies. Efficient energy trade in South-Asia will yield direct economic benefits due to energy savings from improved and enlarged fuel and technology choices and reduced investments in energy supply due to lower demand. The benefits are valued at US\$319 billion for the period 2010-2030, implying a regional increase in the GDP growth rate of 1% per year, benefiting an overwhelming number of the world's poor.

Besides direct benefits, South-Asia regional cooperation can deliver significant climate and local air quality benefits. The cumulative carbon mitigation for the period 2010-2030 will be 1.4 billion-ton of carbon (or 5.1 billion-ton of CO₂); or 70% of the global mitigation target for the Kyoto Protocol, including the USA. The energy changes will also reduce 2.5 million ton of SO₂ emissions each year, amounting to 30% of total emissions. In addition, balanced hydro development will yield spill-over benefits that are synergistic with adaptation needs in relation to enhanced water supply and flood control, and the cooperation can help to remove barriers to rational management of common biological resources and to awareness and disaster management of hurricanes.

On a smaller scale many countries also have concluded that a mechanism like the CDM can offer combined sustainable development and climate change benefits. This is for example the view of the government of China that sees the CDM as an opportunity to attract investments in new technologies that at the same time support global concerns and national development goals. Many international studies have included an estimation of the Chinese CDM potential, and a recent conclusion from the National Strategy Study (NSS) of the World Bank is that the annual potential in 2010 will be around 70 million ton C equivalents for a carbon price of about 20\$ per t. of C (NSS, 2004, table 5.14).

The NSS study has also assessed macroeconomic implications of CDM implementation in China by taking financial flows, technology transfer and progress, and increased productivity in the machinery sector into consideration. The study assumes that CDM credits will continue after 2010 but at a lower level until it is phased out in 2030. It is concluded that CDM on average will increase the annual GDP growth rate with 0.022% over the period 2005-2030 which equals in total a 0.68% in GDP from 2005-2030 (NSS, 2004, table 6.9). In addition to these impacts, CDM project implementation in China will also contribute indirect benefits from air quality and health improvements.

Adaptation and Mitigation Links

Global climate policies have traditionally focused on mitigation issues. There is a growing recognition of the significant role that developing countries can have in integrated mitigation and adaptation policies since this combination of different climate change perspectives can make it more attractive for developing countries to participate in international mitigation efforts (Müller, 2002). There is a growing recognition that development through its common determinant of mitigative and adaptive capacities can

be a framework for such integrated policies, and further development of these capacities can be an important element in meeting developing countries demand for supportive measures to adapt to climate change (Yohe and Moss, 2000).

National communications from several countries (Government of Republic of South Africa, 2000; Government of Brazil, 2004; Government of India, 2004) have acknowledged the co-benefits of linked mitigation and adaptation actions. Recent studies have highlighted co-benefits from investments in human development, technology cooperation and transfer as well as in local initiatives and have proposed policy frameworks for harmonizing climate change mitigation and adaptation responses (Burton et al., 2002; Dang et al., 2003; Kapshe et al., 2003; Shukla et al. (eds.), 2003). Significant conjoint adaptation and mitigation opportunities exist in land-use, water and energy sectors whose benefits can be realized by integrated policies and actions.

Biomass and land use policies have large synergies and substantial co-benefits for climate change mitigation and adaptation. In the forestry sector, opportunities for linking mitigation and adaptation exists in afforestation and reforestation projects like commercial bio-energy, agro-forestry, forest protection and forest conservation through sustainable management of native forests (Masera et al., 2001). Numerous country specific case studies emphasise these options (Fearnside, 2001; Ravindranath et al., 2001; Asquith et al., 2002). Projects that help contain deforestation and reduce frontier expansion can deliver mitigation benefits. In addition, they accrue developmental and adaptation benefits, such as from decreasing migration of young rural population to cities, protection of biodiversity and watershed and soil conservation.

An area where mitigation and adaptation are directly linked is in the change of future energy consumption resulting from incremental changes in temperature and precipitation from climate change. The projection of India's future energy demand under the climate change shows higher demand for primary energy and electricity due to incremental changes in space cooling and water supply needs (Kapshe et al., 2003). The increase in aggregate energy demand adds to carbon emissions, creating a vicious circle of climate change. National development policies such as instituting building codes and water conservation can reduce energy demand and emissions and will also benefit adaptation.

Mechanisms to Support International Cooperation

The stakeholders, globally, are already undertaking policies and activities in multifarious spheres that have major implications on climate change. First are those that explicitly internalize climate change. Second, policies and activities oriented towards achieving economic or social development goals or business interests including corporate social responsibility can have major indirect benefits on climate change. International agreements can gain multiple dividends by aligning the two kinds of policies and activities through the establishment of a price signal of GHG emission mitigation and/or other institutional arrangements that facilitate sharing of information and coordination of actions among different stakeholders.

The discussion next outlines how alternative international mechanisms can align development and climate goals through policies and coordinated stakeholder activities. The discussion distinguishes between measures that can support climate

change mitigation in a short term perspective and measures that support the creation of longer term climate policy frameworks. The discussion on short term measures focus on how to create market value of carbon. The discussion on the longer term, in addition, considers how technological change and penetration programmes can be created and supported. Such initiatives are key elements in the implementation of GHG stabilisation policies that in a longer time frame will require significant emission reductions. There are various reasons for this difference in measures and time frame. A significant increase from the current low carbon market price is needed if an appropriate signal for technological development is to be created, but such an increase will require that very large emission reductions were committed for a long time frame for Annex I countries as well as for and non-Annex I countries, which is an unlikely scenario. How short and longer term cooperation mechanisms can be developed, recognising the current difficulties in establishing grandiose global climate change agreements with wide going reduction targets, is discussed next.

International SD and Climate Bank

As previously argued, many development policies⁶ unrelated directly to climate change have impacts on GHG emissions, which can be positive as well as negative. GHG emission reduction objectives in many cases can be integrated at a low incremental cost. How an international SD and climate finance mechanism can create a basis for integration of GHG emission reduction costs in broader development policies is outlined below. Before dwelling into SD and climate finance mechanism (SDCFM), a few remarks are first made about the flexibility mechanisms of the Kyoto Protocol which to some extent has established a preliminary basis for more general carbon market and finance mechanisms.

The Kyoto Protocol includes three international flexibility mechanisms for emission reductions namely emission trading, Joint Implementation (JI) and the Clean Development Mechanism (CDM) (UNFCCC, 1997). The scope of emission trading is defined by the emission limitation (i.e. caps) committed by the industrialized (Annex I) countries. The fungibility across the three Kyoto mechanisms, under ideal market conditions, can ensure global cost-effectiveness. More importantly, the key achievement of the flexibility mechanisms is that they have facilitated broad stakeholder participation in emission mitigation despite USA and Australia, two key Annex I countries, not having ratified the Kyoto protocol. The participation in carbon market has evolved with multiple models having multilateral, bilateral, and private sector actors.

The post-Kyoto agreement can create more effective and larger carbon markets through:

1. The establishment of a closer link between general development policies and investments and GHG emission reductions, where finance related to different areas can be combined.
2. Integration of a broader range of countries in GHG emission reduction efforts including Annex I as well as non Annex I countries.
3. Low transaction costs, risks and distortions limiting trade and competitiveness.

⁶ Policies should be understood in a broad sense and include government programmes, business sector initiatives, ODA, FDI and many other activities.

The UNFCCC and the Kyoto Protocol explicitly advocate integrating sustainable development and climate change goals. However, in practice there are barriers separating development and climate objectives. The flexibility mechanisms do not automatically align these and may even operate to counteract the two types of goals. For instance, the additionality criteria of CDM will exclude crediting the GHG emission reductions from the activities that are undertaken through general SD policies designed as a part of national plans. In practical terms for instance, the national policies for renewable energy or energy efficiency, which have positive impact on GHG emissions, will become part of the national baseline and therefore act as barriers to CDM projects in these areas. The CDM then can create disincentives for countries to adopt energy policies, though these are vital to sustainable development and climate change goals. Such barriers will also discourage stakeholders like business sectors to develop projects that align their investment portfolio and technology choices with the requirements of climate change financing mechanisms.

The transaction costs, risks and distortions are vital to stakeholder involvement, whereas policies to manage these will generate wider participation with positive feedback to further reduce transaction costs and distortions. The experiences with CDM show the need in practice to balance the rigor of environmental integrity which needs very restrictive management and verification rules versus the desire for “light” procedures that are expected to attract more stakeholder involvement but will carry a risk to dilute the emission reduction cap.

The key objective of SDCFM is to create market value for GHG emission reductions. The “ideal” technical solution is for countries to agree on GHG emission caps and to trade the emission rights. Politically though, it is infeasible to decide caps for diverse nations using normative criteria such as emissions per capita or intensity targets or carbon taxes. First, because of different history and socio-economic status among diverse set of nations, any normative rule cannot deliver emissions caps that can be accepted as universally “fair”. Second, inherent to allocations of emissions caps is the wealth distribution, which works against arriving at a stable cooperative equilibrium. Third, the uncertainties of the drivers of future emissions act as a continuous threat to any agreement resting on normative historical basis. Alternative models for SDCFM are discussed next, which propose principles for overcoming these obstacles to sustained and fair signal for GHG emission offset value.

The emerging carbon market some key information about stakeholder interests and incentives. The current carbon market operates under the overall umbrella of Annex I emission commitments, while also include other activities initiated by business interests in green profiles, and by voluntary agreements from various States in United States of America and some other parties. The legal verification of GHG offsets rests with the executive board of the CDM under Kyoto Protocol procedures; in practice though bilateral arrangements between parties also exist where rules and procedures are agreed without being part of this formal general international system. The more informal decentralised verification procedures lower transaction cost, though have larger uncertainties about the GHG emission reduction achieved. The outcome of different GHG emission reduction mechanisms depends both on the unit costs per GHG reduction and on the quantity reduced. More general mechanisms like SDCFM can very likely attract more activities and as well have lower transaction costs than

mechanisms like CDM that require strict accounting vis-à-vis a counterfactual baseline. SDCFM, as a broader development oriented mechanism can facilitate a functioning market that can deliver higher emissions reduction, regardless of higher uncertainty associated with softer emission reduction verification. More importantly, the stakeholders' risks under such a market will be lower compared to those in a climate centric market, due to accrual of multiple dividends from achievement of other sustainable development goals.

The larger scale and scope of SDCFM justifies management by a relatively soft GHG emission reduction verification procedure. In the case, where GHG offsets are agreed in a bilateral agreement that includes a specific verification procedure set up by the parties, the offsets to some extent can be seen as a sort of registered voluntary contribution⁷, of which only a part of the reductions may count towards formal emission reduction requirement, e.g. for example some percentage share. The voluntary element in such a system shall reduce the value of the GHG offsets. However, a partly voluntary GHG emission reduction system has advantages of greater transparency and simplicity and in its anchoring of stakeholder interests. The added incentives will tend to make GHG emission reduction efforts more attractive to a broader group of stakeholders and also enhance the scale of the activities

The GHG emission accounting and verification can be carried out in different ways. The SDCFM can take the form of an ex post accounting system, where countries and private stakeholders can submit proposals that document how GHG emission reductions have been implemented as part of various programmes that have been running over a timeframe of for example 5-10 years. The documentation can be given in different forms, including free formats where countries agree to use the best available arguments in terms of official energy plans, statistics, and other information.

GHG offset buyers can buy the specific proposals and offer to pay a price for the reductions based on a judgement of the value of the activity seen in relation to climate change objectives, SD perspectives and other issues that are considered to be important to the buyer. The buyer can make his own judgement about the form and quality of the information given by the supplier. The offset buyer then can register the voluntary contribution with an international data base, and this eventually can involve a procedure whereby a few other stakeholders are asked to submit their specific objections.

The advantage of *ex post based accounting* is that verification can be relatively simple, it only needs to be done once or only a few times, and it can follow a rather free format since the offsets are already implemented. The risk of buyers in this way is limited. The disadvantage of such a system, however, is that the GHG emission offset provider has to supply upfront finance without knowing the probability of ex post financial support, and this imposes high risk. Such risks can be mitigated if offset suppliers can enter into some general cooperation agreements with buyers for example in terms of industrial joint ventures, ODA projects or similar.

⁷ The terminology registered voluntary emission reduction is here used to describe a case, where individual countries or other stakeholders on a voluntary basis "play out" with a GHG emission reduction that they will like to inform the international community that they intend to implement. Non-compliance is not subject to any international law, but are more an issue of international trust and political acceptance by other parties.

A GHG emission offset market can also be organised around ex ante submission of proposal to an international SDCFM in line with the principles suggested above on the ex post based mechanism. In this case, verification can be more complicated and offset buyers will have a higher risk. One way out of these problems can be that buyers and sellers upfront agree about a minimum expected offset quantity, which eventually can be supplemented with more offsets during the policy implementation period.

An alternative to a more general international SDCFM is to create different financial systems, where stakeholders can collaborate about specifically defined policies and measures. Such mechanisms for example can be used to finance renewable energy and/or energy efficient appliances or industrial equipment. In such systems, buyers in some cases can be willing to pay a relatively high GHG offset price as a reflection of their own interest in promoting a technology, as well as of their interest in climate change and SD. The disadvantage of creating such technology or policy oriented niche markets however is, that they can be in conflict with global cost effectiveness that most easily is achieved with large and homogenous GHG emission reduction markets.

Technological Development and Transition Programmes

Technological change and transitions are key determining factors for the cost and potential of GHG emissions reductions as demonstrated by many international climate change scenario studies (IPCC, 2000; GTSP, 2001). There is therefore an eminent case for the creation of climate policy promotion mechanisms aimed at inducing technological change. Technological development and transitions are the result of a complex interrelationship between various economic factors, research and development, human and organisational capacity, governance and market development; and technology focused climate change mechanisms can best operate through these factors. The dedicated technology development programmes such as for wind turbines, PV, biogas technologies etc. have delivered rapid technology advancements over the past couple of decades. Though these programmes originated apart from climate change policies, the progress with these climate-friendly technologies have enlarged the GHG emissions mitigation options and reduced the cost and risk of mitigation. Further progress in renewable energy technologies, e.g. as expected by IEA will likely reduce the capital costs of renewable energy technologies such as wind turbines, solar thermal, and biomass by 20% and 30% between 2000 to 2030 (IEA, 2002, figure 2.18).

Since technological change is driven by diverse factors, the financial mechanisms to support development and deployment of climate friendly technologies must include diverse elements like:

1. Research and development grants, demonstrations and applications of new technologies.
2. Financial mechanisms targeted to support the implementation of specific technologies.
3. Joint venture agreements between experts, companies and eventually governments in different countries about research, innovation, penetration, licenses, maintenance, and all other elements in technology transitions and market development.

4. Agreements between companies or governments about technology implementation programmes including the energy sector, transportation, industry and other sectors. Such implementations can be promoted by favourable prices and/or by various sorts of side-payments in relation to ODA, international trade negotiations, and investments.

As in case of SDCFM, “technology development measures” will require creating appropriate incentives for stakeholder participation. Technological development in its own right is a major interest of governments and other stakeholders. They might for example find technology centred “solutions” to environmental problems more attractive than instruments like taxes or GHG emission targets since such solutions can have lower implementation costs and implications that are confined to a few locales or sectors. Furthermore, technology policies can help to develop new industry and fresh business opportunities. For instance, the indigenous wind power industry in India developed with capital subsidies and institutional support from the Government. Now, this industry is expanding with additional support from the carbon market and with rising domestic and export demand. Other technology oriented programmes like joint venture agreements where the private sector takes an active role will need more market based support and linking with official procedures for registration and verification of GHG emission reductions.

Technology research and development are under supplied by private stakeholders due to its public good character. In case of GHG emissions mitigation, the uncertainties about carbon prices as well as about costs and potential of carbon friendly technologies will tend to further reduce R & D spending. The technology programmes accessible to a broad set of stakeholders and aligned to general development goals and mitigation market will generate multiple dividends and therefore justify national and international support from governments and international agencies. Technology oriented climate mechanisms can be designed as multi-country cooperation vehicles; they can include focused technology initiative like a portfolio of technologies, e.g. for the energy system, that is sought promoted based on various economic and business interests and on local and global environmental agendas. The cooperation is robust as it rests on wider foundation that include other non-climate or energy related interests that the parties agree on as a sort of side payment to the climate activity. If for example renewable energy introduction is more expensive than conventional power supply the host country can be willing to pay the additional cost if the other party undertakes other large investment programmes such as infrastructure or promise political support in areas like energy security and trade.

There are existing financial mechanisms that support the implementation of specific technologies. An example of this is the Renewable Energy Financing Mechanisms in the Mediterranean Region that is a type II activity of the WSSD which is implemented by Italy, IEA, the Observatoire Méditerranéen de l'Energie (OME), the Mediterranean Association of the National Agencies for Energy Conservation (MEDENER), and UNEP. The objective of the mechanism is to identify and implement targeted financial support to renewable energy technologies. The mechanism operates through different instrument like seed or private capital funds, interest rate subsidies, and investment advisory support facilities. This is supported by parallel activities in order to help financiers to become more aware of the renewable energy investment

opportunities, to streamline and lower the transaction costs, and to assess and manage the risks and returns associated with the deployment of clean energy technologies.

Technology Standards and Other Policy Measures

A company that will like to develop and promote new and more efficient technologies that are climate benign might need support to innovation and to shape a niche market for environmentally friendly, but more expensive products. The firms who have comparative strengths in innovation and whose business strategy rests on technology leadership can develop competitiveness in domestic niche markets on the way towards becoming global technology leaders. One way to develop niche markets for advanced technologies is through technology standards and other policy measures that aim at targets like energy efficiency or pollution. Such measures are used extensively in the automobile industry in the US, Europe and in Japan, when the policies are designed and implemented in close cooperation between manufacturers and governments.

In some cases, local environmental policies and standards also deliver climate benefits. In India, policy for mandatory use of CNG in public vehicles has contributed to carbon mitigation. A complementary measure of introducing EURO equivalent norms for local emissions control in all new car stocks (Mashelkar et al, 2002) and time-table phasing out of old vehicle stocks have enhanced the competitive advantage of fuel efficient vehicle technologies. In Beijing, the local pollution control policy to curb the use of coal by households has created market for natural gas and incidental reduction in carbon emissions.

Regardless of the pledges in the UNFCCC to provide “new and additional” resources to developing countries for promoting transfer of climate-friendly technologies, no specific targets or schedule for technology and investment flows exist. The paucity of funding is a chronic source of friction between developed and developing countries in the climate negotiations. The funding reported by the developed countries in their national communications is limited to capacity building, reporting and development projects and little for projects delivering concrete climate benefits. The GEF funding for “agreed full incremental cost” to developing countries has remained very low. The “incremental cost” approach has also contributed to the direction of the small GEF funds to high cost technology push projects like solar photovoltaic and fuel-cell vehicles in developing countries. These technologies have found little penetration even in developed markets and there is a risk that a lot of the learning costs of developed country firms are passed onto the developing country account via the global mechanism.

The three new funds, established under the Marrakech accords, to support technology transfer, capacity building, adaptation planning and other needs in developing countries, have not delivered on the promise of “new and additional” resources.

In the meanwhile, large scale funding is channelled to developing countries through foreign direct investments. Massive investment, amounting to 16 trillion US dollars by 2030, is expected in the energy sector alone, a sizeable fraction of which will be invested in developing countries. These new investments offer historic opportunities for redirecting the technology flows, which are bypassing the current climate regime. The climate regime offers no assurance for significant or stable assistance to developing

countries for climate friendly technology transfer or investments. It will be prudent then to focus on the massive technology development, transfer and deployment occurring in the mainstream development context.

In the meanwhile, large-scale funding is channeled to developing countries through foreign direct investments. Massive investment, amounting to 16 trillion US dollars by 2030, is expected in energy sector alone, a sizable fraction of which will be invested in developing countries. These new investments offer historic opportunities for redirecting the technology flows, which are bypassing the current climate regime. The climate regime offers no assurance for significant or stable assistance to developing countries for climate-friendly technology transfer or investments. It will be prudent then to focus on the massive technology development, transfer and deployment occurring in the mainstream development context.

Conclusions

The paper has presented a number of ideas on how climate change policy implementation can be supported by alternative international cooperation mechanisms that are based on stakeholder interests and policy priorities that include broader economic and social development issues, and a number of examples of development policies that have climate benign side impacts are given in order to illustrate how such mechanisms can work.

The basic principle is that countries and stakeholders are given as much freedom as possible in pursuing what they want to do, but a number of short and longer term measures facilitate that it is attractive to take climate change into consideration. The principle best provides the flexibility and rests initiative with the countries and stakeholders, which is essential for cost-effective implementation, given the diversity of national circumstances and priorities. In the near term, a focused measure to align the different perspectives is to develop a GHG emission offset market; in the longer term larger GHG emission reductions further can be supported by various measures that promote technological development and deployment.

A brief review of current development policies, technological research and promotion efforts, and climate change shows that mutual policy initiatives undertaken by governments and the private sector actually have major positive impacts on climate change without being initiated by this global policy concern. This suggests that there is a scope for the development of international mechanisms that can help to promote integrated policy views and which can engage a broader group of stakeholders in post 2012 activities beyond the climate centric view that could limit options solely within or around the architecture of the Kyoto Protocol.

Studies for developing countries including Brazil, China and India include numerous examples of integrated development, environmental and climate policies that are attractive from many perspectives and contribute to multiple national priorities, and a number of these are summarised. The energy sector includes several examples of joint development and climate policies including large power system, infrastructure, efficiency, and renewable energy, and studies have demonstrated that these policies both applied to domestic systems as well as to regional energy cooperation with very

large potential energy and cost savings and related GHG emission reduction as discussed for the South-Asian energy market.

A number of land use policies related to water resource management, food security, and biomass use for energy use, including transportation have also have been identified as areas, where development policies and climate change adaptation and mitigation can be captured simultaneously. Such policy implementation requires that climate change finance can be combined with more general investments and development finance.

The paper proposes international cooperative mechanisms that can support the implementation of integrated development and climate change policies. The mechanisms include an international SD and Climate Finance Mechanism (SDCFM), technology development and transition programmes, technology standards, and other measures.

The idea of the SDCFM is that such an international finance mechanism can support collaboration between two or more parties about trading GHG emission reduction offsets. Recognising current political opposition to the institution of large binding GHG emission reduction targets for Annex I and non-Annex I countries after 2012, it is considered how a SDCFM can work on a more decentralised and voluntary basis, where different countries or other stakeholders agree on GHG emission reduction efforts. It is suggested to include a voluntary registration system for GHG emission reductions, where trust and political will are the guiding principles in policy implementation rather than international law and liability. The systems can be based on verification through ex post accounting related to already implemented policies or on ex ante accounting of expected GHG emission reductions from planned actions.

Furthermore a number examples on how private companies, eventually supported by government research and innovation subsidies, can participate actively in the development of new climate benign technologies. Many ongoing initiatives for example research and development by international car manufacturers show that there is a potential for industry to take a lead in innovation of greener technologies. It is in this context suggested that technology standards and other measures can promote green investments and thereby can increase the private sectors interests in climate benign technologies.

The underlying GHG emission reduction activities are purposely suggested to be broad and development oriented, so the mechanism can draw multiple dividends from energy efficiency programmes, renewable energy and other measures that are high priorities of development programmes, and it is recommended that there are no strict criteria about measuring the additionality of GHG emission reductions. It is argued that it is better to avoid additionality issues since they can create a “wall” between development policies and climate change which will limit the scope and the number of actors. It is recognised that this will impose a risk to environmental integrity, but contrary it can broaden the perspective of climate change so much over time that the final result is larger GHG emission reduction efforts.

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