CHAPTER 5

Mainstreaming climate change concerns in development: Issues and challenges for Asia

Introduction

Climate change is perhaps the most critical global challenge of the 21st century. Many Asian countries are facing impacts of climate change in the form of frequent extreme events such as droughts, floods, cyclones, and heat waves. In addition, the ecosystems of island and low-lying coastal countries are increasingly threatened by rising sea levels. As Asian countries cover a vast area and are highly diverse with respect to population, size, altitude, climate and economic development, impacts of climate change in each country and among different regions will obviously be diverse. The high vulnerability is related to the heavy dependence of countries on climate-sensitive sectors such as agriculture, forestry, fisheries, and tourism. Indeed, according to one source, Asia bears the brunt of 90 per cent of global climate-related catastrophes with over a half a million lives directly lost in major climate events since the 1970s (DFID, 2004). Future climate change can exacerbate such trends, with catastrophic consequences for Asia's citizens in, for example, food insecurity through disruptions in agriculture from possible shifts in growing seasons, water shortages due to changing monsoon patterns, and poor health due to rapid spread of tropical diseases. Because of this, Asian policy-makers cannot afford to ignore climate change risks in development. Designing and implementing appropriate climate change policies across Asia is, therefore, essential for a sustainable Asia (World Bank, 2003; Simms et al., 2004; Reid and Alam, 2005).

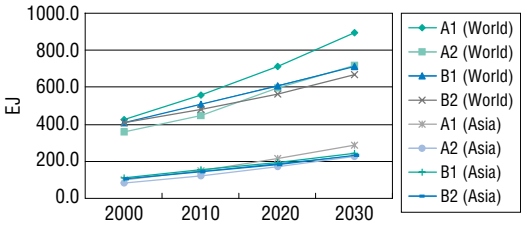
While some uncertainties remain, the collective evidence indicates that the observed changes in temperature and precipitation over the past 50 years can be mostly attributed to human-induced changes in atmospheric greenhouse gas (GHG) concentrations and aerosols (IPCC, 2001). Before the industrial revolution in the eighteenth century, the carbon dioxide (CO_2) level in the atmosphere was steady at around 280 parts per million (ppm) but has increased to 379 ppm in 2004. Successful strategies for the mitigation of and adaptation to climate change will require, however, substantial changes in technological and energy infrastructure, and human behaviour and lifestyles throughout the world. Moreover, rapid economic changes including the globalisation of markets, privatisation and internationalisation of the energy sector, the ascending role of the private sector, and the increasing influence of non-governmental organisations (NGOs) are changing the context in which climate change must be addressed. Many development agencies have asserted that integrating climate issues in the development agenda is a major challenge to be addressed at local, national, regional and global levels (World Bank, 2003). A prerequisite however, is the identification of key entry points for such integration by considering the diverse national circumstances in relation to energy needs, GHG emission profiles and development challenges.

In this chapter, we assess the energy and GHG emission outlook for Asia and examine climate change as a priority issue for policy-making. We provide some background on mainstreaming climate change at both the policy and operational levels with practical examples. We then explore some options to integrate climate concerns in developmental policy with emphasis on both mitigation (with respect to renewable energy promotion and the Clean Development Mechanism [CDM]) and adaptation, and on ways to build a future climate regime that is responsive to Asian aspirations and development goals.

Outlook for energy demand and GHG emissions in Asia

Energy is an essential prerequisite for economic and social development. Various agencies (IPCC 2000, APERC 2002, IEA 2002) agree that energy demand in the Asia-Pacific region is escalating due to the rising population, rapid economic and social transformations characterised by urbanisation, and industrialisation. IPCC projections, for example, show that the global primary energy demand in 2030 could be 895 exajoules (EJ), with Asia accounting for almost one-third of this demand (Fig. 5-1).

Fig. 5-1: Primary energy projection

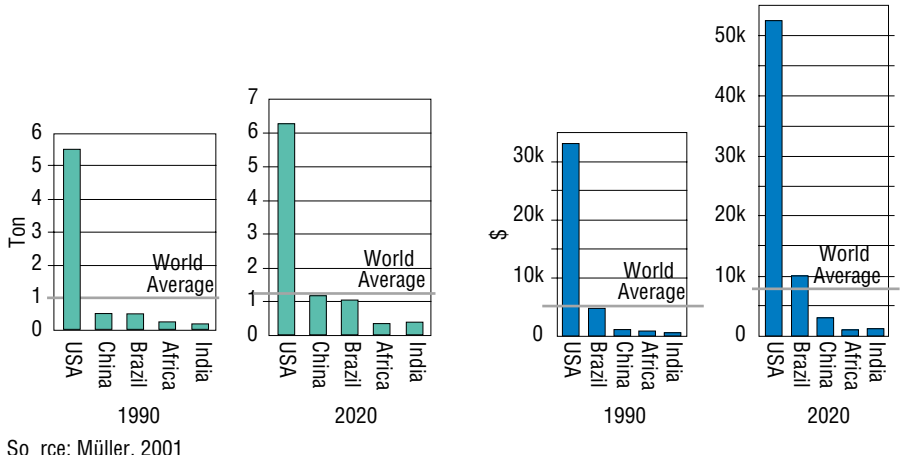


Source: IPCC, 2000 Emission Scenario

The electricity consumption in Asia, for example, is expected to more than double by 2020, while oil consumption is forecast to rise from 19 million barrels per day (bpd) in 2000 to 35 m bpd by 2020. As for individual countries, China's power consumption rose by 15 per cent in 2003, sharply higher than its 9 per cent economic growth. Projections by the Energy Information Administration (EIA, 2002) indicate that oil demand by China, Japan and the Republic of Korea will reach 10.5, 6.4 and 3.0m bpd respectively in 2020. Likewise, The Energy and Resources Institute (TERI) predicts that India's oil demand will rise from 2.1 m bpd in 2004 to 5.6m bpd in 2030, roughly a fifth of OPEC's current output (Financial Times, July 2004). Therefore, the real challenge for sustainable development of Asia is to improve access to reliable and affordable energy services through diversifying energy sources, improving energy efficiency and supporting the transition to the cleaner use of fossil fuels.

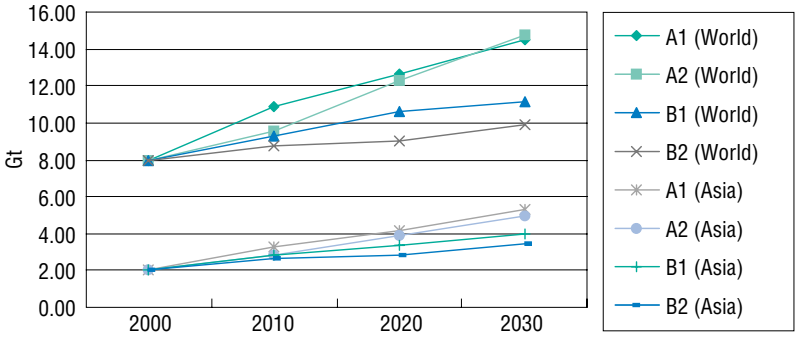
While per capita GHG emissions in developing Asia (1-2 tons) are currently much lower than the world average and 10 to 20 times less than that of the industrialised countries (Fig. 5-2), the total emissions from Asia (which currently account for 20 per cent of the world total) are increasing rapidly. IPCC projections show that Asia may contribute as much as 3-5 giga tons of CO_2 (as carbon) by 2030 (Fig. 5-3). For example, India's GHG emissions are projected to increase from 139 in 2000 to 780 million tons of CO_2 by 2020 (ALGAS, ADB). The use of poor quality fuels such as coal with a high sulphur content, inefficient methods of energy production and use, poor automobile and road conditions, and increasing use of high-energy transportation methods are also contributing to the rise in GHG emissions from the region.

Fig. 5-2: Per capita emissions and GDP projections in selected countries Asia and the world



So rce: Müller, 2001

Fig. 5-3: CO_2 emission projection in Asia and the world



Source: IPCC Emission Scenario

In order to decouple the current direct linkage between economic output and energy consumption, the development of infrastructure that is less dependent on fossil fuels is often advocated as one of the means to tackle climate change. Such infrastructure obviously requires innovative technologies (e.g., a further shift to natural gas, nuclear energy, renewable energy, carbon capture and storage, advanced vehicle technologies), energy efficiency measures and policy frameworks. Although the Asia-Pacific region hosts several global hubs of technological innovation, development and deployment of climate-friendly technologies has been limited so far due to political, technical, financial and other structural barriers.

In most Asian countries, people continue to rely on biomass for cooking and heating, which is a major source of GHG emissions (as biomass has not been replenished properly). Despite some indications of a switch to alternative fuels in recent years, projections by IEA indicate that biomass use would continue to dominate in the region in 2030. In South Asia, for example, the share of biomass use is expected to remain high, at nearly 70 per cent in 2030 (IEA, 2002). Biomass scarcity due to urbanisation and industrialisation will worsen living conditions in poor neighbourhoods, by forcing residents to use lower-quality waste as cooking fuel, which in turn will enhance GHG emissions. Indeed the non-sustainable use of biomass worldwide in 2000 added 1Gt of carbon emissions to the atmosphere, for the production of only 50EJ of non-commercial final energy (WBCSD, 2004). Development of more efficient biomass technologies with reduced GHG emissions is, therefore, vital.

Competing policy priorities: Is climate policy a marginal issue?

Policy-makers in most Asian countries acknowledge that combating global climate change is vital but they believe that such efforts should not prevent the achievement of other objectives for development, most notably, economic growth. A series of climate policy dialogues held by IGES in India, China, the ROK, Thailand, Viet Nam and Cambodia revealed that climate change is not yet a high priority as compared to the pressing issues of food security, poverty, natural resource management, energy access, and urban transport (IGES, 2002). In China, for example, climate change is not included in the top 10 priority projects for funding in the National Environment Action Plan of the tenth five-year plan. Similarly, climate change is not explicitly considered in the Poverty Reduction Strategy Papers (PRSPs) of several Asian countries such as Cambodia, Lao PDR, Pakistan and Viet Nam (Bojo and Reddy, 2003).

Many Asian countries have recently begun to create institutional mechanisms to address climate issues in different ministries, such as the environment, agriculture, energy and industry. In order to utilise international market mechanisms such as the Clean Development Mechanism (CDM) of the Kyoto Protocol, sev-

eral countries have established a Designated National Authority (DNA) comprised of representatives from various ministries. However, these institutions face many constraints due to inadequate funding and lack of qualified human resources, which, in turn, is due to the lack of adequate attention to climate issues by decision-makers in high-ranking ministries such as finance, external affairs, trade and industry and education. In view of this, it would be fair to conclude that climate change is not yet mainstreamed in the development plans and policies of different Asian countries irrespective of their economic status and potential adverse impacts of climate change on their development.

Mainstreaming climate concerns in developmental policy

Despite the fact that several key drivers of economic and social development in many Asian countries are adversely impacted by climate change, policy-makers in the region have not yet paid much attention to climate change as a priority topic. Indeed many Asian policy-makers appear to have not yet realised that climate change impacts will undermine long-term economic well-being, increase poverty and damage human security. Moreover, current policies (e.g., land use policies that encourage or force the poor to live on flood plains and fragile coastal zones, and water or forestry policies that reduce access of the poor especially in times of extreme climate events) in several countries are unknowingly exacerbating vulnerability to climate change. In view of this, climate policies must be "development-oriented," if they are to receive the necessary political support. How to identify and design incremental interventions to integrate climate concerns in development, and then implement them across many sectors is a serious challenge for Asian policy makers.

Mainstreaming of climate issues in sectoral development planning (land use planning, natural resource management, energy, transport, coastal management, building codes, etc.) can be done at both the policy-level and operational-level to achieve the objectives of climate change mitigation and adaptation. Both "top-down" institutional mainstreaming and "bottom-up" community-level mainstreaming are possible. Policy-level mainstreaming refers to the incorporation of climate concerns into other development policies, sectoral plans and programmes, managements systems or decision structures that are not necessarily concerned with climate change. Developing water management policies based on projected impacts of climate change on precipitation in 20 or 50 years is an example of policy-level mainstreaming. Germany's policy of enhanced focus on renewable energy (RE) as a means to reduce GHG emissions and create new jobs may offer a good model for policy-level mainstreaming in Asian countries (Box 5-1), as such measures can benefit both the environment and development.

Some efforts are underway in Asia to mainstream climate issues in development planning at the policy level. In India, for example, the federal government's decision to create an exclusive ministry for renewable energy sources that would enable the development of climate-friendly technologies may be considered as one way to mainstream climate issues. In Bangladesh, the formation of a new Climate Cell in the Ministry of Environment with the support of the UNDP and the DFID is another example for mainstreaming at the policy level. The objective of the Climate Cell is to work closely with other ministries, NGOs and communities to raise awareness of climate change issues and to develop tools to help various agencies to take climate change into account. The concept of mainstreaming climate change has recently emerged as a crucial element of ADB's operations in the region (ADB, 2003). However, much more needs to be done.

To achieve policy-level mainstreaming, strengthening local institutional networks and raising capacity of policy-makers at national and local levels are crucial. Strengthening the links and coordination between government departments and other stakeholders working on sustainable development and climate change policies is also vital to ensure effective policy level mainstreaming.

Box 5-1: The shift of policy control on renewable energy in Germany

Backed by the resounding victory at the federal elections in September 2002, the Greens gained negotiating power in the coalition government with the Social Democratic Party and succeeded in shifting the policy control of renewable energy (RE) from the Ministry of Economic Affairs and Labour to the Ministry of Environment, Nature Protection, and Nuclear Safety. This enabled the government to revise and strengthen the Renewable Energy Sources Act (RESA).

Germany promoted RE through the Electricity Feed-in Act of 1991, which set feed-in tariffs for electricity from RE sources not owned by utilities and an obligation for grid operators to purchase electricity from RE sources. Together with direct subsidies provided by the federal government, the Act contributed to an increase of wind power capacities by a factor of around 42 times from 1990 to 1998. Policies to promote RE also contributed to the conservation of resources and improved air quality besides creating new jobs and offering prospects for trade and industry. RESA was enacted as a revision of the Feed-in Act on March 29, 2000, which in turn led to an increase in gross electricity generation from RE sources from 25049 Gwh in 1990 to 56856 GWh in 2002 (IEA 2003) and the creation of around 120,000 jobs (UBA 2004). In August 2004, the RESA was again revised so as to increase the share of RE in total electricity supply to at least 12.5 per cent by 2010, and to at least 20 per cent by 2020. To achieve this, significant improvements were made to the policy framework. The revised RESA is expected to avoid emissions of over 40 million t CO_2, and around 80 million tonnes in total. In 2003, RE sources contributed 44 terawatt-hours (TWh) and the RE share increased from 5.4 per cent in 1998 to 7.9 per cent.

Source: BMU, 2004

Operational level mainstreaming, on the other hand, refers to the process of critically analysing and addressing climate concerns in actual implementation of activities that national and local governments plan to conduct. It is often referred to as "climate-proofing" of development. "Climate-proofing" does not mean to suggest that whole communities and countries can be completely protected against the impacts of climate change; instead it refers to the need for increased resilience to be at the heart of development work. "Climate-proofing" of infrastructure development, for example, is not only beneficial to improve economic efficiency but also the long term sustainability of a project. A pilot study on mainstreaming climate change in the road design in Kosrae Island of the Federated States of Micronesia showed that climate proofing of road design could be highly cost-effective with an internal rate of return above 10 per cent (Box 5-2).

Likewise, the construction of dams and other water works by adequately considering the near and distant future impacts of climate change can save enormous resources in several Asian countries. Incorporating long-term risks such as sea level rise and changes in cyclone intensity in coastal zone management plans conducted in the Philippines and Bangladesh is another form of operational-level mainstreaming.

Many of the changes required in the transition to mainstreaming may not be costly in financial terms but require changes in existing institutions, policies, and infrastructure design. Currently, several political (inter-departmental conflicts, issues of "territoriality," lack of guiding principles and understanding by policy-makers), technical (lack of understanding of cross-sectoral issues, information, impact assessments etc.), and cultural factors act as barriers to achieve mainstreaming in Asia. In many Asian countries, synergies between climate change and sectoral development have not been identified or built on, partly since climate change policies tend to come under environmental or natural resource protection ministries, and due to the lack of climate change expertise in development-oriented ministries. Institutional divisions are also reinforced by the

fear that climate change policies will prejudice economic development. Measures to overcome such barriers through more effective international and institutional support in the short to medium term would be vital.

Other mechanisms for mainstreaming climate change include the incorporation of climate concerns into the National Strategies for Sustainable Development (NSSD), National Environmental Action Plans (NEAPs), National Action Plans on Adaptation (NAPAs) and national Poverty Reduction Strategy Papers (PRSPs). A survey of PRSPs of several Asian countries revealed that climate change is not discussed adequately (Bojo and Reddy, 2003), although Cambodia's PRSP includes a significant component devoted to disaster risk management. It is, therefore, vital that PRSPs should explicitly mention basic social services (e.g., energy supply, education, drinking water, health) necessary to achieve poverty reduction goals and potential means to overcome impacts of climate change. Improving the management of climate change knowledge, especially the dissemination of good practice tools and methodologies to policy-makers, civil society and other stakeholders, is also vital.

Box 5-2: "Climate-Proofing": A Road infrastructure project in Kosrae, Federated States of Micronesia

The infrastructure development plan for Kosrae includes the completion of a sixteen kilometre gap in the circumferential road to provide all-weather land access to the remote Walung community in the southwest. Completion of this link allows easier access to the presently undeveloped interior of the island along the western coast, providing scope for agriculture and new settlements. There are also plans to construct power lines along the road. The road construction will convert the present 'radial' configuration of the power distribution system in Kosrae to a more reliable ring-main, with benefits for the whole island. The drainage works for the original road design (both built and yet-to-be-built sections) were based on an hourly rainfall of 178 mm, intended to be the hourly rainfall with a return period of twenty-five years. An analysis of more reliable data indicated an hourly rainfall with a return period of twenty-five years is 190 mm. But by 2050 the hourly rainfall with a twenty-five-year return period will have increased to 254 mm as a consequence of climate change.

A recommendation that the design of the road be modified so the drainage works could accommodate an hourly rainfall of 254 mm was accepted by the state government of Kosrae and a "climate-proofed" design was prepared with cost estimates by state employees. The incremental cost of "climate-proofing" the road design and construction for the yet-to-be-built section is in the vicinity of US$500,000. While the capital cost of the "climate-proofed" road would be higher than the case in which the road was constructed to the original design, the accumulated costs, including repairs and maintenance, would be lower after only about fifteen years. This is due to lower repair and maintenance costs for the "climate-proofed" road. The internal rate of return was found to be 11 per cent.

A 3.2 kilometre portion of the road section has already been constructed, including the drainage works. The design for these was also based on an hourly rainfall of 178 mm for a twenty-five year recurrence interval. Analyses show that it is more costly to "climate-proof" retroactively - US$776,184 for a 3.2 kilometre section of existing road (US$243,000 per km) as opposed to US$511,000 to "climate-proof" 6.6 kilometre of new road (US$77,000 per km). But a cost benefit analysis revealed that the retroactive "climate-proofing" is still a cost-effective investment, with an internal rate of return of 13 per cent. In any case, "climate-proofing" during early stages of planning can save enormous resources.

Source: Hay et al., 2004.

Opportunities for mainstreaming climate concerns in Asian development

In several Asian countries, efforts are underway to mitigate climate change through measures such as improvements in energy efficiency and introduction of climate-friendly technologies and advanced forms of renewable energy. To tackle climate change comprehensively while promoting development more proactive efforts are necessary. In this section, some opportunities for mainstreaming climate concerns are discussed in relation to mitigation, adaptation and future regime. Insofar as mitigation is concerned, renewable energy (RE) promotion and the Clean Development Mechanism (CDM) are considered appropriate means to integrate climate change in developmental policy.

Renewable Energy Promotion

Many communities in Asia lack access to reliable energy services. For instance, more than 50 per cent of India's population does not have access to a reliable supply of electricity. The provision of energy based on fossil fuels, however, increases GHG emissions. From this perspective, RE promotion is one of the most promising policy options which would contribute to GHG mitigation in developing countries with several co-benefits, such as job creation and reduced dependence on fossil fuels, and the creation of a decentralised energy system (Sawin, 2004). According to an analysis submitted to the Californian Public Utilities Commission, ancillary benefits of solar photovoltaic (PV) systems can be worth as much as 22.4 US cents per kWh. However, these benefits will be much higher if the international standard ISO 13602-1 for the calculation of all external effects is applied, as this includes an assessment of the full costs of health hazards, bio degradations and global warming. An assessment of the full cost picture of all options proves that mineral energy systems with their inefficiencies are much less competitive than clean RE systems (ISEO, 2005). RE can also provide a cost-effective way of electrifying remote villages where a grid connection would be impractical.

Asia shared only 23.7 per cent of the world's total primary energy supply in 2002 but 46 per cent of the world's RE supply is from Asia. From that viewpoint, Asian countries are already leading suppliers of RE. However, the largest RE sources in Asia are combustible wastes including solid biomass, which is mainly used for heating and cooking, and most of the biomass is often inefficiently used.

Current status and barriers for renewable energy promotion in Asia

While some Asian countries such as Japan, the ROK, India, and China have already established policy frameworks for RE promotion, others are yet to develop such frameworks, including setting targets for RE development and utilisation, and the creation of incentives and institutions. For example, the share of renewable sources in the ROK's primary energy supply is expected to be increased from 1.5 per cent in 2003 to 5 per cent in 2011, while Japan has set an annual target of 12.2 Twh of power from RE in 2010, and a national Renewable Portfolio Standard of 1.35 per cent by 2010. Thailand has set the target of increasing RE share from 0.5 per cent in 2002 to 8 per cent in 2011. Four Asian countries (China, Indonesia, Japan and the ROK) formulated RE laws while countries such as India, the Philippines, Thailand, Mongolia and Viet Nam are considering the introduction of such laws. Several Asian countries, such as Sri Lanka, Thailand, Indonesia, India (3 states) and the ROK, adopted a feed-in tariff policy. On a sub-regional basis, the 22nd ASEAN Ministers of Energy Meeting decided to increase the share of RE in power generation in ASEAN to at least 10 per cent by 2010. In view of increasing urbanisation and associated waste disposal issues, Asian cities must be proactive in recovering energy from landfills, which can simultaneously reduce GHG emissions. Utilising solar, wind and geothermal energy (in volcanic islands of the Philippines and Indonesia) are other options with significantly lower CO_2 emissions than fossil fuels. In Sri Lanka, for example, rural solar home systems have become an explicit part of the RE promotion strategy.

Despite such positive developments, there are many institutional, information, technical, financial and market obstacles to promote RE in Asia. The lack of a comprehensive regional policy framework on RE is one major factor. On a country level, barriers include the inertia of institutional and fiscal infrastructures, lack of access to the grid at reasonable prices, high initial cost compared to conventional energy sources, widespread lack of awareness about the scale of resources available, slow pace of technological development, lack of coordination between organisations in technology dissemination, and economic disadvantages of RE as compared with fossil fuels. Insofar as RE technologies are concerned, several of them are immature and costly. Technological development has not focussed so far on the efficiency of conversion and the stability of systems for the delivery of electricity. Moreover, technology packages for site-specific conditions and their demonstration are lacking. The lack of technical know-how and trained manpower is also serious in countries such as Cambodia. The current status and major barriers for RE promotion in selected Asian countries are given in Table 5-1.

Recommended policy options for renewable energy promotion in Asia

Table 5-2 lists suggested policy measures for promoting different types of RE. An example of biomass-based energy project from India suggests how community-based initiatives are crucial in the promotion of RE (Box 5-3).

Box 5-3: Biomass energy project in rural India

The assessments of the bioenergy potential in India show that a biomass strategy based on "sustainable forestry – biomass gasifiers – biogas systems" can meet all rural energy needs with significant local and global environmental benefits. Based on the UNDP surveys on energy demands conducted in a group of villages in Karnataka, three biomass energy technologies – leaf litter-based biogas, dung-based biogas and biomass gasifiers – were identified for meeting the villagers' energy needs. Although the proposed technologies are technically feasible, they could not be propagated without active participation of local communities. Four components of the biomass energy project are:

1. Demonstration of the technical feasibility and financial viability of bio-energy gasification technologies,
2. Capacity-building and development for appropriate mechanisms for project implementation,
3. Development of financial, institutional and marketing incentives and strategies, and
4. Dissemination of bio-energy technology information packages.

The project has been implemented since 2003 based on India's Tenth Five-Year Plan (2002-2007) and the Electricity Act (2003), which stresses the need for expansion of local energy supply options.

Source: UNDP, 2004

Table 5-1: Current status and barriers for the promotion of renewable energy sources in selected Asian countries

	National policies and targets	Major barriers
Japan	• Special measures law concerning the use of new energy by electrical utilities (RPS [Renewable Portfolio Standards] Law) was enacted in June 2002 and came into effect in April 2003. • It is aimed at furthering the use of RE by annually imposing an obligation on electricity retailers to deliver a certain amount of electricity from RE based on the amount of their retailing electricity in order to ensure the stability and suitability of energy supply.	• Limited availability of space to build new RE power stations. • Lack of incentives to reduce energy consumption and/or to shift to RE. • Lack of policy coordination, e.g., between building/housing construction sector and RE promotion.
China	• Established the Renewable Energy Law (feed-in tariff) in 2005, which will enter into force in January 2006. • The national RE development target is to ensure that 10 per cent of all electricity to come from RE by 2020. • Wind power concessions approach including tax incentives for project developers.	• High cost as compared with conventional fuels such as coal. • Lack of clear, consistent and streamlined framework for RE promotion. • Inadequate regulatory conditions and absence of political support. • Lack of effective investment incentives for large scale RE commercialisation.
India	• Establishment of an independent Ministry of Non-Conventional Energy Sources in 1992, and India Renewable Energy Development Agency for RE promotion and development • Formulation of the Renewable Energy Policy containing foreign investment policy, industrial policy, state government policy, and financial/fiscal incentives. • A target of 10 per cent share for RE or 10,000 MW in power generation capacity was set for 2012.	• Low awareness of benefits of RE and high cost of RE as compared with conventional sources due to high subsidies for the latter. • Inadequate financial resources and incentives for commercialisation of RE. • Complex institutional arrangements for RE promotion and lack of market-support infrastructure. • Slow progress in rationalisation of tariff structure for fossil fuels and RE sources.
Indonesia	• Ministerial Decree no. 0002 of 2004 concerning policy on RE development and partnership programme. • Feed-in law was passed and small Independent Power Producers (IPP) programme was launched in 2002 to create small power purchase tariff and pre-electrification programmes, and promote local manufacturing capability.	• High investment cost and lack of competitiveness of RE. • Lack of sense of urgency and synergies among governmental organisations dealing with RE. • Limited RE market support infrastructure. • Lack of adequate financial incentives to promote RE.
Philippines	• RE Power Programme (1993) provides financing for Independent Power Producers (IPPs). • The 2003 Philippines Energy Plan set a long-term goal to double the installed capacity from RE sources to approximately 4,700MW by 2013. • The Plan provides tax duty redemption/ reduction, investment priority incentives, and commitment to the Green IPPs (e.g., Mini-hydro Electric Power Incentive Act).	• Complex topography and geography for development of RE infrastructure. • Lack of market awareness and acceptance. • Absence of a one-stop-shop market service centre for RE. • Inadequate incentives and investment in RE.

Table 5-2: Recommended policy options for promoting renewable energy sources

Energy Type	Policy Options	Examples
Solar	Provision of financial/fiscal incentives for developers/users/manufacturers Support for further technical development for stable power supply	India has one of the largest solar photovoltaic markets, driven by government programmes of subsidies, tax and financial incentives that began in 1980s. Loans and financing schemes supported the private sector sales, while subsidies were provided for installation of solar home systems.
Wind	Provision of financial/fiscal incentives for developers/users/manufacturers Investigation of potential wind energy (Wind Power Mapping) Support for further technical development for stable power supply	The Chinese government introduced a wind power concessions approach in late 2001. The local government invites international and domestic investors to develop 100 MW wind farms on a potential wind farm site, through a tendering procedure so as to bring down the cost of wind-power generation. A new concept of mega-wind farms owned by the private sector is being tested in India to increase the penetration of wind power, and invite greater participation from the private sector.
Biomass	Policy measures for effective biomass conservation, management & utilisation such as long-term feed-in tariffs, grants and subsidies Support for further technical development for efficient use of biomass energy	The Energy Conservation Law of 1992 in Thailand mandated the RE Small Power Producers Programme, which gives power purchase assurance, price assurance and subsidies. Under this programme, a Thai company is developing power plants using rice husk as a biofuel.
Hydropower	Investigation and development of hydropower resources Water resource management including appropriate sharing rights with other sectors Policies for addressing social issues (resettlement, compensation, etc.) Support for further technical development for efficient power generation by small/micro scale generators	Lao PDR is developing a hydroelectric power plant in collaboration with Thailand. As Thailand needs a large quantity of electricity at competitive rates; both Lao PDR and Thailand are expected to benefit from sharing available RE.
Geothermal	Investigation, development and management of geothermal resources	The government of Indonesia bears the risk of geothermal resource development, and prepared a standard form of "Take-or-Pay" based steam supply agreement and energy purchase contract.

The general policy imperatives to promote RE in Asia include the following:

1. Establishing a general RE policy and legal framework for its implementation,
2. Setting binding, significant and growing targets for each type of RE resource,
3. Setting high priority to integrate RE development into the national development policy,
4. Providing stable and predictable investment/financial/technological incentives and creation of other market development mechanisms,

5. Providing subsidies and/or governmental equity for RE while reducing subsidies for fossil fuels (other measures may include creating market mandates, granting soft loans, giving direct producer payments, tax incentives and tax exemptions and encouraging capital offset) (Charey et al., 2003),
6. Promoting the utilisation of RE for rural on-grid/off-grid electrification, and
7. Building local RE industry capacity through promoting community commitment and support.

In addition, the role of private power sector companies is crucial in issues such as:

- ➢ Standards for power purchase agreement for RE sources,
- ➢ Grid access assurance in case of on-grid connection,
- ➢ Power price assurance, and
- ➢ Fuel supply assurance in the case of geothermal energy.

Overseas agencies can play a catalytic role in promoting RE through creating energy market funds in Asia. For example, the Renewable Energy and Energy Efficiency Partnership, together with its Finnish partner Emerging Power Partners, has recently set up the 50 million Euro Private Energy Market Fund 2, which aims to reduce between 20-30 MT of CO_2 emissions in the ASEAN nations, India and China, through mobilising equity financing for 10-15 RE projects with a total cost of 200-400 million Euro. Likewise, international organisations like the UNIDO and the UNEP are playing a critical role in establishing an international bioenergy network and creating data archives for the Solar and Wind Energy Resources Assessment (SWERA). Similar efforts are necessary at both the regional and national levels in Asia.

Notwithstanding the number of co-benefits, desirable policy options to promote RE may vary with each country, considering the diversity in energy resource endowment and development situation. Therefore, policy-makers need to develop a RE strategy with some quantitative targets based on a least-cost and employment maximising supply model. In addition, various financial, legal and regulatory instruments must be worked out as part of the enabling framework to support the promotion of RE, with full consideration of the country's economic, social and resource situations.

Clean Development Mechanism (CDM)

The entry into force of the Kyoto Protocol on 16 February 2005 raised expectations for flexibility mechanisms, such as the CDM in Asia. The CDM has the dual objective of GHG emissions reduction and sustainable development in developing countries, while enabling flows of technology and finance from developed countries in return for the acquisition of carbon credits by them. If the CDM is effectively implemented, it has the potential to be one of the effective tools to mainstream climate change concerns in development policy in Asia.

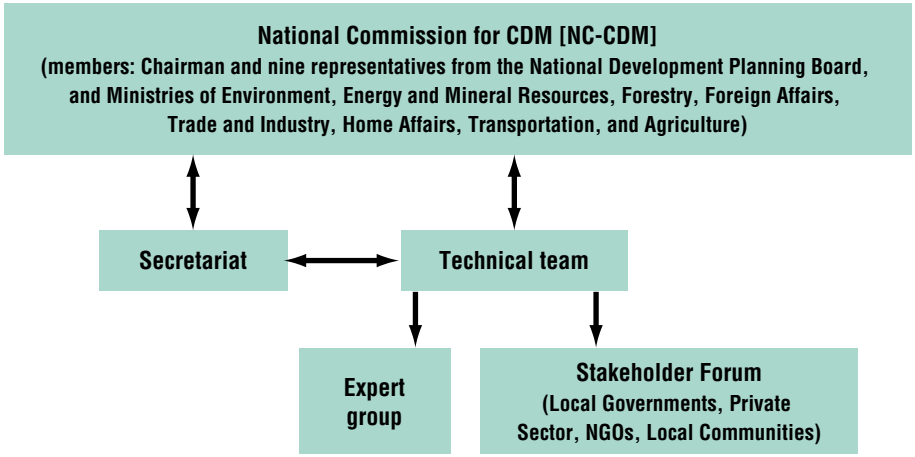
Of late, however, serious concerns have been expressed about the CDM implementation (e.g., ineffectiveness of the CDM Executive Board, lack of streamlined procedures, and uneven geographical distribution of projects). Several people argue that the CDM in its current form is not meeting its mandate of promoting sustainable development in developing countries, as it failed to finance projects related to the energy sector of developing countries in their long-term transition towards RE technologies. A large share of the projects approved to date, accounting for nearly 75 per cent of the Certified Emission Reductions (CERs) in the pipeline, relate to landfill methane recovery, capture or destruction of gases with high global warming potential like methane, nitrous oxide and hydrofluorocarbons (such as HFC-23) at existing facilities. The fear is that such an enormous supply may drive down CER prices such that CDM projects with higher sustainable development benefits will be difficult to implement.

There is also a concern about the lack of CERs from sectors such as energy efficiency and small-scale CDM projects. Of the 25 large scale methodologies approved by the CDM Executive Board by October 2005, only five address energy efficiency while 10 address fugitive methane emissions. As of April 2005, the RE projects are generating only about 11 per cent of all carbon credits through the CDM, which amounts to around 32 million CERs in total. This is less than the credits resulting from the two HFC-23 projects amounting to 40 million CERs and about one half the credits that will be generated by a nitrous oxide project in the ROK which is 70 million. Likewise, up to 2012, fifteen landfill gas projects are claiming 28 million credits while 52 RE projects are claiming 25 million credits (Pearson, 2005). Another concern about the current CDM is its poor geographic representation. Among the thirteen least developed countries in Asia as defined by UNFCCC, only three (Bangladesh, Bhutan and Cambodia) have one registered CDM project each. Besides addressing the above concerns, several barriers need to be overcome for effective CDM implementation in Asia.

Current status, barriers and countermeasures for CDM implementation in Asia

As of May 2005, 19 countries in Asia established the Designated National Authority (DNA) to implement the CDM. All countries in the Pacific except Fiji are yet to establish a DNA. Since the DNA must ensure that the proposed CDM projects have accommodated stakeholder comments, some countries included NGOs in their DNA membership. In the Philippines, for example, the Inter-Agency Committee on Climate Change (IACCC) was formed and included representatives from an NGO called "the Philippine Network on Climate Change." In Indonesia, on the other hand, a special meeting of a stakeholder forum with representatives of local governments, the private sector, NGOs and local communities is arranged by the National Commission on CDM only when necessary (Fig. 5-4).

Fig. 5-4: Structure of Designated National Authority (DNA) for CDM in Indonesia



In Malaysia, the National Committee on CDM consists of an NGO (Currently, the Centre of Environment, Technology and Development), and a few representatives from the private sector. In countries such as China, Thailand and Viet Nam, however, no such formal representation of NGOs exists in the DNA but stakeholder views on potential CDM projects are taken informally.

Despite rapid progress in establishing institutional structures, capacity for identifying and designing sustainable development-oriented CDM projects and for mainstreaming the CDM into other sectoral develop-

ment policies seems to be still limited in many countries. The major region-wide and country-specific barriers identified through IGES surveys and workshops (IGES-UNESCAP, 2004) are summarised below:

- *Political and Institutional barriers*: Major differences in expectations of Annex 1 and developing countries, and the lack of strong political will in both groups seem to impede the progress of the CDM in Asia. In China, for example, the CDM is considered secondary to attracting FDI, while in India, CDM has been looked suspiciously in some circles that it might be used by developed countries as a ploy to enforce binding commitments on developing countries. In many Asian countries, the approval process of CDM projects is lengthy and not transparent enough to attract private investments. The lack of a legal framework and poor institutional capacity to support the CDM at the local level are other barriers to be overcome, especially in large countries such as Indonesia. While several countries indicated that they use sustainable development criteria for approving a potential CDM project, relevant guidelines are not yet clear to many project proponents. The CDM project approval process by the DNA within host countries and by the CDM Executive Board in the international arena is also considered bureaucratic and complex.

- *Technical barriers*: In several Asian countries, the limited understanding on how to set baselines and prove additionality of CDM projects is a major barrier to be overcome in realising CDM projects. While the CDM is intended to promote technology transfer, very few projects to date involved transfer of technologies due to concerns such as lack of adequate protection of intellectual property rights in host countries and other risks.

- *Financial and legal barriers*: High transaction costs of CDM projects are a major barrier to be addressed all over Asia. Since sustainable development-oriented CDM projects tend to be small and have lower paybacks, high transaction costs may disproportionately penalise such projects. While it is generally agreed that ODA funds will not be directly used for purchasing CERs in CDM projects, ODA may be used to lower transaction costs to some extent. The low price of CERs is also unattractive to many project developers at this stage. Limited awareness of the legal risks of CDM projects and limited institutional means to deal with such risks are also barriers in several Asian countries.

Besides the general barriers, each country has its own barriers for implementation of the CDM. Through organising an Expert Level Training on the CDM in cooperation with the UN-ESCAP, IGES identified such barriers and potential measures to overcome them in selected Asian countries (Table 5-3). It seems that information exchange or establishment of a platform among Asian DNAs in terms of decision-making structure, basic issues such as additionality, baselines and methodologies, and practical issues, such as bundling and financing, are beneficial to maximise the probability of CDM implementation in Asia.

Developed countries, and bilateral and multilateral development organisations can support Asian countries in building their capacities to attract CDM projects by providing underlying finance while upholding environmental and development standards. In addition, they can assist project proponents by bearing transaction costs upfront.

Table 5-3: Major barriers for CDM implementation and options to overcome them in selected Asian countries

Country	Barriers	Recommendations
India	• Lack of integration of CDM policy in different sectors, • Lack of policy and fiscal incentives for project developers, • Lack of coordination between different ministries; Limited awareness of other relevant ministries, municipality and local governments, • Lack of awareness of financial institutions, India-specific carbon fund is yet to become operational, and • Energy Act does not require businesses to report GHG emissions.	• Planning commission should ensure each ministry to prepare annual action plans on the CDM; Income from the CDM may be treated as income from exports and policies for tax exemption may be extended. • Ensure adequate representation of all ministries in DNA. • Strengthen capacity of financial institutions and local governments. • Expedite the process of designing IDFC (Infrastructure Development Financing Company) as a base institution for operating carbon funds. • Amend energy act to ensure obligatory reporting of GHG emissions.
Indonesia	• Outdated national framework on climate change with inadequate arrangements for stakeholder consultations, • Lack of policy framework to promote the CDM, • Lack of coordination of CDM policy within energy sector, and • No financial incentives for project developers (especially to assist with high project transaction costs).	• Update the national framework on climate change to respond to actual and current issues. • Design a national policy for the CDM. • Ensure better coordination of CDM policies across important sectors. • Create incentives (Both Annex 1 and host countries can do so by making upfront payments to cover part of transaction costs).
Cambodia	• Lack of national action plan on the CDM and inability to integrate the CDM in the existing development programmes, • Lack of awareness of the CDM among policy-makers of ministries other than the focal point government agency, and • Poor coordination among agencies.	• Promote cooperation by involving other ministries in the formation of action plan and integrate CDM projects into National Investment Policy. • Strengthen capacities of stakeholders through CDM campaigns and high level policy dialogue to promote inter-ministerial collaboration. • Integrate experience of other countries with established DNA.
Thailand	• Lack of comprehensive policy on the CDM and weak linkages of the CDM to the national development plan, • Low level of awareness on the CDM and lack of information dissemination mechanism, • Unclear structure of DNA with weak sustainable development criteria/indicators, and • Poor coordination among agencies and stakeholders.	• Strengthen capacity to integrate the CDM into national development plan. • Formulate policy framework and translate CDM guidelines, methodologies and other documents into local language; Establish networks to disseminate information. • Develop clear terms of reference for DNA with clear mandate of relevant agencies; Develop sustainable development criteria for CDM project approval. • Establish a coordination body involving diverse stakeholders.
Philippines	• Lack of national action plan on the CDM and weak linkages of the CDM to the national development plan, • Low level of awareness on CDM policies and procedures among policy-makers and stakeholders, and • Poor coordination among agencies.	• Encourage cooperation by involving other ministries in the formation of action plan and integrate CDM projects into a national investment policy. • Strengthen capacities of stakeholders through CDM campaigns and high level policy dialogues to promote inter-ministerial collaboration. • Integrate experience of other countries with established DNA.

Source: IGES-UNESCAP Expert Level Group Training on Clean Development Mechanism, 2004

Adaptation

Climate policy dialogue has so far focussed on mitigating GHG emissions, with relatively limited discussion of policies to facilitate adaptation to climate change. Adaptation refers to adjustments (through policies, actions or other initiatives) in ecological, social, and economic systems in response to impacts of actual or expected climatic stimuli. Indeed adaptation, sustainable development and equity are mutually reinforcing (IPCC, 2001). In Asia, adaptation has become an urgent challenge because of the region's high vulnerability characterised by large and relatively poor populations with low adaptive capacity besides technological, resource and institutional constraints. Although some adaptation measures, such as building flood defences in low-lying areas of Bangladesh, refugee planning for island states such as Maldives, improved water management practices, changing crop types and location, are now taken up, more needs to be done to cope with future climate change. Asian countries will have to individually and collectively facilitate adaptation at both local and national levels in order to promote sustainable development. Some challenges and potential ways to facilitate adaptation in Asia are discussed below.

Local level:

Adaptation measures are largely site-specific with substantial benefits to individuals and communities. For example, restoration of mangroves along the cyclone-battered coasts of Viet Nam not only re-establishes degraded ecosystems and increases physical protection against storms, but also enhances aquaculture production which generates income for local communities. Such a combination of a secured natural resource base, along with reduced exposure to natural hazards and diversified livelihood activities increases adaptive capacity. Moreover, it is clear that individuals and communities have been adapting to climate change throughout history and accumulated valuable knowledge that helps in understanding human-environment relationships for optimum utilisation of resources and to regulate human environmental impacts (Kempton, 2001).

Adaptation plans in Asia, however, largely neglected the micro-spatial scale in favour of national and regional scales. Vulnerability assessments in many countries, for example, are based on top-down scenario-based approaches rather than bottom-up community approaches. It is vital to promote the latter, which start by identifying key vulnerabilities of communities to climate, consider local adaptive strategies, and then link adaptive management options to decision processes already in place. Adaptation strategies built on community-based approaches and local knowledge and based on active involvement of local stakeholders are likely to succeed better than those followed using top-down approaches.

Several community-based initiatives to cope with climate extremes exist in various Asian countries (Hossain, 2005). For example, using salt-tolerant germplasm of trees, fodder and vegetables and community-level pond protection schemes in sea level-prone areas of Bangladesh are common adaptation strategies. Likewise, strong reciprocal obligations among people from the same areas – the Wantok system of Papua New Guinea, the Solomon Islands and elsewhere, - help people cope with climatic and other disasters (Handmer, 2003). In Bangladesh, efforts are underway to learn from past and current indigenous flood coping strategies (Box 5-4) and integrate such knowledge in disaster management plans so as to minimise adverse impacts of floods. Using information collected across flood-prone districts of Bangladesh, a field manual on community-based flood management strategy was recently prepared (Bangladesh Unnayan Parishad, 2004).

Based on a perusal of case studies collected by IGES across the Asia-Pacific region, the following general recommendations may be made to facilitate adaptation at the local level:

(a) All countries in the region need to step up their efforts to facilitate proactive micro-adaptation through the creation of an enabling policy environment and the promotion of dynamic adaptation measures (as it is unlikely that there will be one solution for all time).
(b) Key adaptation strategies by local communities are developed largely in response to climate variability and

extreme climate events rather than climate change. Therefore, strategies to cope with variability provide a good starting point for addressing future adaptation needs in the context of sustainable development.

(c) It is impractical to specify adaptation practices without detailed knowledge of the community or locality for which the adaptation is intended. Focussing on vulnerability as seen by the vulnerable communities leads to approaches that are relevant and context-specific.

(d) Current mechanisms for adaptation funding (except the Small Grants Programme of GEF) do not support community-based initiatives. Development agencies and donor governments can play a catalytic role through preferential allocation of funds to adaptation measures at local level.

(e) Improving adaptive capacity and building social capital (the networks and relationships between individuals and social groups that facilitate adaptation) through appropriate capacity-building of local policy-makers and communities to integrate climate concerns in local development plans are crucial.

Box 5-4: Community level adaptation strategies in Bangladesh

Bangladesh is a prime example of a country that is extremely vulnerable to climate change. With a low-lying coastline, high population density, and an economy highly dependent on agriculture, the lives and livelihoods of people are threatened by frequent floods, cyclones and the associated effects, such as salt-water intrusion that render agricultural lands unproductive. The IPCC Report mentioned that half a metre sea-level rise will permanently inundate about 11 per cent of its territory. Between 1974 and 2004, the country experienced as many as 10 major floods.

Participatory rural appraisals, focus group discussions, inter-generational dialogues and semi-structured interviews with local people and key informants in the Mankiganj district of Bangladesh showed that indigenous coping strategies remain the dominant form of response to floods. The frequency of use of different local coping strategies in various flood years is shown in the table below. It appears that raising the plinth of homes is the most common form of response in terms of improving housing conditions, and dietary changes accompanied by reduced food intake and using local methods of dry food storage were the most common strategies to survive in periods of flooding. As most people don't own boats, the main form of transport is rafts lashed together with trunks of banana trees. The planting of reeds, known as catkins (*Saccharum spontaneum*), an indigenous species well suited to sandy soils, is another local coping strategy to prevent soil erosion. While these methods appear inadequate and primitive, they are still considered the most effective by local people. Therefore, the local governments in Bangladesh are beginning to integrate such knowledge in disaster management plans.

Historical matrix of coping strategies in times of flood, Manikganj, Bangladesh

Coping strategy	**2002**	**1998**	**1988**	**1981**
1. Improvement of housing conditions				
(a) raising the plinth of homes	OOO	OO	OOOO	OOO
(b) constructing "*manchans*"	OO	O	OOO	O
(hanging bamboo platforms inside houses)				
2. Taking shelter in elevated grounds	O	O	OO	O
3. Selling land	O		OOO	O
4. Fuel storage	OO	O	OO	OO
5. Storing dry foods	OOO	OOO	OO	OO
6. Diet changes and reducing food intake	OOO	OO	OOOO	OOO
7. Banana plantation and bamboo propagation				
(to be used as floating platforms and rafts for movements)	OO	O	OOO	OO
8. Growing catkin in sandy lands to prevent erosion	OOO	OO	OO	OO

Key for frequency: OOOO very high, OOO: high, OO: moderate, O: low, Blank: not used

Source: Srinivasan, 2004.

National level:

Despite widespread recognition that adaptation is a necessary policy response even with a strong and cohesive mitigation strategy, many Asian countries have undertaken limited efforts to date largely due to the lack of adequate and reliable information on the vulnerability and capacity of communities to adapt to climate change. The lack of practical knowledge on adaptation options is another reason. The National Communications submitted by Asian countries to the UNFCCC, for example, refer to vulnerability and adaptation but discussion on policies to facilitate adaptation to cope with current and future climate change is extremely limited. The UNDP National Communications Support Unit, therefore, designed the Adaptation Policy Framework (APF) to provide guidance for developing and assessing adaptation policies and measures, and to facilitate the incorporation of adaptation into national development strategies. Despite the lack of the APF at the national level, several Asian countries have begun to facilitate adaptation in various sectors with varied success. In Bangladesh, for example, efforts to mainstream adaptation to climate change into national planning and activities have been relatively successful for the agricultural sector but not in other sectors (e.g., water resources) (Huq et al., 2003).

While many Asian policy-makers recognise the need to mainstream adaptation concerns in national development plans, they face several challenges. The limited insight into the economic ramifications of climate change impacts as well as the cost-benefits of adaptation measures and limited awareness of ways to mainstream adaptation at national level are some barriers. However, a few examples of mainstreaming adaptation in national planning, such as the one in Kiribati (Box 5-5), can become models for other Asian countries to follow.

Box 5-5: Kiribati National Adaptation Programme

Kiribati is one of the most vulnerable countries to the effects of climate change and sea level rise. Most of the land is less than three metres above sea level; the island has an average width of only 450 meters, rendering retreat adaptation options untenable. The islands are exposed to periodic storm surges and droughts, particularly during El Niña years, although they lie outside the cyclone path. Kiribati is becoming increasingly vulnerable to climatic events due to its high population concentration, accelerated coastal development, shoreline erosion, and rising environmental degradation. By 2050, if no adaptation measures are undertaken, Kiribati could face economic damage of US$8-$16 million a year, equivalent to 17-34 per cent of its 1998 GDP due to climate change and the rise of the sea level.

Using established risk management tools developed by the South Pacific Geoscience Commission (SOPAC), the Kiribati Adaptation Programme (KAP) held two major national consultations which gradually built awareness of, and commitment for adaptation and climate change. The National Consultations were closely coordinated with the formulation of the 2004-2007 National Development Strategy (NDS). Meetings on adaptation were immediately followed by discussions on the NDS, involving many stakeholders. As a consequence, adaptation issues are well integrated into the NDS. In national consultations, representatives from each island identified key challenges over the past 20-40 years, and proposed coping mechanisms. Adaptation options are classified into four categories and options for which government assistance was necessary were allocated to the responsible ministries. Adaptation options were then divided into five groups according to the nature of the response required (viz., changes to government policies, changes to laws and regulations, information to communities, formal engineering and construction works and informal works by households and communities). Mainstreaming at the operational level in each ministry is being enhanced, therefore, on the basis of outputs of the national consultations.

Source: Teem, 2004.

Strengthening adaptive capacity directly contributes to sustainable development. Adaptation policies at the national level, therefore, must be made sensitive to culture- and place-specific characteristics of adaptive capacity. Efforts are also necessary to ensure that adaptive capacity is more equitably distributed within the nation in terms of both sharing and transfer of technologies for adaptation.

Post-2012 Climate Regime

With the entry into force of the Kyoto Protocol in February 2005, the attention of the international community has moved to a discussion of steps to address climate change beyond 2012. The future international climate regime has significant implications for Asia for at least two reasons. Firstly, the future regime should include far deeper and broader efforts of mitigation than provided for under the Kyoto Protocol. It means that the new regime is likely to necessitate deeper GHG emission cuts by Annex 1 countries and new emission control pledges by major developing countries. Secondly, since the design of any future regime has significant implications for sustainable development in the region, Asian countries must be proactive in shaping it so that their genuine concerns are adequately addressed. Major concerns on the future climate regime from an Asian perspective can be classified into five categories: economic, developmental, negotiation-related, market mechanisms, and adaptation (Table 5-4). Specific concerns obviously vary reflecting diverse national circumstances.

In order to make the future climate regime sensitive to the above concerns and aspirations, the following aspects deserve attention. They are mostly related to: (i) synergies between climate-related measures and sustainable development, (ii) ways and means to promote GHG mitigation, (iii) restructuring of the CDM, and (iv) facilitation of adaptation.

(i) Synergies between climate-related measures and sustainable development

- Discussions on the future regime must be in the context of sustainable development framework, taking into account diverse national circumstances regarding energy access, food security, etc.
- Annex 1 countries should consider supporting the initiation of policy networks among Asian countries, aimed at facilitating information exchange and improved understanding of climate change issues in relation to sustainable development.
- Since climate change affects all aspects of development, discussions on policies at the national level and negotiations at the international level must include representatives from ministries and agencies of climate-sensitive sectors, besides the focal agency for the environment. Especially, synergies of climate policies with other sectoral development policies must be fully exploited.
- Future national communications should attempt to evaluate potential co-benefits (e.g., reduction in air pollution, employment generation) of mitigation and adaptation policies and their contributions to local sustainable development.

(ii) Ways and means to promote GHG mitigation

- In order for the global climate regime to be successful and convincing to most, if not all, parties to the UNFCCC, Annex 1 countries should take the lead in demonstrating the progress in GHG mitigation efforts and in meeting the commitments made to date in financial and technological transfers.
- The Annex 1 countries, which refused to ratify the only international agreement to curb GHG emissions due to various economic and equity-related concerns, should show leadership in designing GHG mitigation strategies that would directly address those concerns. Major developing countries, which share similar concerns, can then be convinced to be involved more comprehensively.
- Necessary mechanisms should be set up to objectively register and document efforts of developing countries in climate and development. Simultaneously, a formal UNFCCC process (e.g., voluntary

Table 5-4: Major concerns on the post-2012 climate regime from an Asian perspective

Concerns	Description
Economic	• Fear of harm to economic development and loss of market competitiveness due to additional costs from climate mitigation measures • Perception of the private sector in industrialised countries regarding technology transfer as a costly process with potential risks to intellectual property rights • Concern of developing countries about institutional and financial barriers for effective transfer of climate-friendly technologies
Developmental	• Belief among many Asian developing countries that tackling climate change diverts attention/resources from more urgent priorities on economic and social development • Concern that climate regime does not adequately address issues such as energy access, food security, etc. within the framework of sustainable development. • Lack of effective synergies with other conventions concerned with sustainable development (e.g., biodiversity, desertification) • Inadequate attention to reconciling pressures from globalisation and climate change
Negotiation-related	• Inadequate consultations with developing countries in climate negotiations, especially in decisions on emission reduction allocations • Lack of progress in procedural equity (e.g., limited participation and contributions of NGOs from Asia) (Ashton and Wang, 2003) • Lack of demonstrable progress by Annex I countries in emissions reduction, technology transfer, and financial support • Refusal of major Annex 1 countries (e.g., United States and Australia) to ratify the Kyoto Protocol, the only international agreement to reduce GHG emissions • Inadequate recognition of developing countries' efforts (e.g., emissions growth in China was reduced by about 250 MtC per year over the past 3 decades – Chandler et al. 2002)
Market Mechanisms	• Predominance of CDM projects based on landfill methane recovery and destruction of gases with high global warming potential, which contribute little to local sustainable development • Complex bureaucratic approval process of the CDM • Poor geographic representation of CDM projects from LDCs • Limited domestic institutional capacity in many countries to effectively engage in market-based approaches (Srinivasan, 2003)
Adaptation	• Inadequate discussions on adaptation in current negotiations • Lack of adequate international mechanisms to address adaptation (funding, technology transfer, capacity-building) • Complex bureaucratic approval process for funding (in terms of requirements to demonstrate "global environmental benefits" and "incremental costs") of adaptation projects • Concern that countries that contributed least to the climate change problem (SIDS and LDCs) are the ones that need to adapt foremost • Limited domestic capacity for adaptation • Complex procedural linkages between adaptation and adverse impacts of mitigation measures (e.g., impacts of reduced demand of fossil fuels on oil exporting economies)

pledge and review mechanism) of crediting mitigation policies by developing countries may be developed.

- Incentives (e.g., favourable financing terms) for effective transfer of climate-friendly technologies, which are most relevant to Asian circumstances, must be designed. Such technologies include, but are not limited to, clean coal technologies, wind power, solar power, biofuels and carbon capture through effective forest management. Simultaneously, measures to protect intellectual property rights in cooperation with the World Intellectual Property Rights Organization are necessary.
- More proactive efforts to use project-based mechanisms that contribute to local sustainable development are necessary. In this connection, prospects for designing new mechanisms, like debt-for-nature swap (an agreement in which a proportion of a country's debts are written off in exchange for a commitment by the debtor country to undertake climate mitigation and adaptation policies), must be explored.
- Subsequent to the launch of the EU emissions trading system, there is growing interest in domestic emission trading schemes, especially in Japan and the ROK. Prospects for allowing companies in non-Annex 1 countries to participate in international emission trading schemes may be explored as a way to promote their understanding of market mechanisms and GHG reduction policies. At the beginning, multinational companies located in Asian developing countries can initiate such efforts.

(iii) Restructuring of the CDM

- Restructuring of the current CDM, for example, through enhancing its scope by including sector-based and/or policy-based CDMs, is crucial to promote sustainable development benefits of CDM projects in the future regime. The criteria for the additionality of small-scale projects and projects with significant development benefits may be relaxed.
- The relationship between ODA and CDMs should be further explored, especially in support of projects that provide clear sustainable development benefits. Options for creating innovative risk management specifically targeted for CDM investors in Asia must be examined.

(iv) Facilitation of adaptation

- Given the growing importance of adaptation, the future regime should make adequate provisions for facilitating adaptation, including the negotiation of an optional protocol on adaptation, if necessary.
- Prospects for increasing the share of the CDM proceeds (currently 2 per cent) to support adaptation in the most vulnerable countries must be explored without reducing the attractiveness of CDMs.

The way forward

Climate change considerations have been transformed from a predominantly long-term and global issue to include immediate and local challenges as its implications are more specifically understood than before. Since climate change affects virtually all aspects of development and as the Asia-Pacific region is highly vulnerable to its impacts, policy-makers in the region need to consider climate change more seriously than before and begin to integrate concerns of climate change in development policy through the identification of both *strategic* (areas/sectors through which such integration is achieved) and *operational* (instruments, mechanisms and tools to achieve integration) entry points. Failure to integrate climate risks in development policy can indeed thwart sustainable development and attainment of the Millennium Development Goals (MDGs) in Asia. Raising the policy profile of climate change within the context of sustainable development is a crucial first step in this direction. Further, national and local policy-makers must be informed of the importance of policy coherence (within climate policies, between climate and other environmental policies, and between climate and development policies) in finding "win-win" solutions and preventing "mal-adaptations."

Mainstreaming options:

While mainstreaming climate change in all developmental programmes is vital in the long run, it is important to initiate such efforts first in sectors that are most sensitive to climate change. These include agriculture, water resources, tourism, etc. As there are several technical, institutional, social and political and economic challenges associated with mainstreaming, considerable capacity-building and creation of incentives are crucial. Future efforts in Asia must utilise both policy-level and operational-level mainstreaming options by making changes in existing institutions and infrastructure. Inter-ministerial task forces at national and provincial levels could make a significant contribution towards mainstreaming. Mainstreaming climate concerns in the daily practices of business, NGOs and donor agencies is also crucial.

Sustainable ways to meet to energy demands in Asia:

Owing to growing energy and fossil fuel needs, GHG emissions in the region are expected to grow considerably. Considering that large populations across the region do not have adequate access to affordable energy, it is important for policy-makers to look at win-win options that would reconcile growing energy demands without substantially enhancing GHG emissions from the region. One of the key pillars of future energy strategies for Asia, therefore, must be cost-effective energy efficiency improvements and energy savings particularly through employing RE sources, which are abundant in Asia, and effective use of other non-fossil fuel technologies. Development, adoption, and transfer of technologies for the effective use of RE are considered crucial, and should be promoted through policy frameworks that can sustain inter-institutional linkages in the region.

It is important to bear in mind, however, that RE promotion alone is not going to solve the problem of energy demands in Asia, or for that matter, any region in the world. Consideration must be given to using nuclear and other forms of energy in countries such as India and China where the capacity to handle nuclear power plants is moderate to high. As transportation is a growing sector in virtually every Asian country, efforts to reduce GHG emissions through strengthening public transport by means of, for example, public-private partnerships are critical. Since deforestation continues to be the main source of GHG emissions from countries such as Indonesia, CDM projects aimed at forest conservation must be preferentially approved in view of their considerable global benefits. In addition, attention to responsible tree planting across the region to enhance carbon capture is vital.

As air pollution is a major concern in many Asian cities, opportunities for structural integration of air and climate policies must be assessed. In this connection, prospects for designing an "Asian Partnership on Sustainable Energy and Climate and Air Policy" may be explored. In the long run, major Asian contributors to GHG emissions should consider taking certain mitigation obligations in return for target-oriented financial and technology transfers from Annex 1 countries. Such obligations could be in the form of both quantitative and non-quantitative approaches, which could involve: fixed binding targets, dynamic binding targets with price caps, technology agreements, and carbon taxes.

Restructuring of the CDM:

As mentioned earlier, there are serious concerns about the current form of the CDM in relation to its sustainable development benefits. Experiences to date suggest that a large and rapidly growing portion of the CDM project portfolio has few direct environmental, economic and social benefits other than GHG mitigation. Indeed non-CO_2 CDM projects involve opportunistic end-of-pipe reduction in non-energy related sectors. Appropriate restructuring of the CDM in the future regime is vital to support CDM projects capable of delivering more environmental and developmental benefits. Premium quality CDM projects with wide-ranging benefits for sustainable development should be considered to accumulate double or triple the normal amount of credits, mainly as an incentive for private investors from both Annex 1 and developing

countries to initiate such projects. If necessary, innovative financial and technology transfer mechanisms besides the CDM must be designed to facilitate transfer of climate friendly technologies. It is recommended that Annex 1 countries apply much stricter project selection criteria to favour projects that have a strong sustainable development orientation. Such restructuring can indeed make the CDM an effective tool to mainstream climate issues for sustainable development in Asia.

Adaptation:

Future emphasis in adaptation must be given to the livelihoods, places and sectors that are highly vulnerable, and to national strategies that affect large numbers of people, such as poverty alleviation policies. Efforts to mainstream adaptation in development planning must be encouraged at both the local and national levels. On an international level, donors and development agencies must ensure that their investments in infrastructure in the vulnerable regions of Asia are based on a comprehensive assessment of climate risks. The effectiveness of delivery of ODA must be improved especially in programmes aimed at facilitating adaptation. Since adaptation to climate change requires enormous resources, opportunities for funding adaptation must be explored both within and outside the framework of the UNFCCC. If adaptation issues are to be dealt with effectively under the UNFCCC, it is important for Asian negotiators to argue for the creation of sufficient institutional flexibility.

Design of a future climate regime:

As the design of a future climate regime beyond 2012 has important implications for sustainable development, Asian policy-makers and negotiators must actively engage in designing the climate regime to reflect their countries' aspirations and concerns on equity, economics and development. Asian negotiators must be prepared to propose "a variable geometry" in the future regime that would permit emissions control approaches that would vary from one country to another based on national circumstances. The capacity strengthening of climate negotiators from the region is necessary through, for example, creation of mechanisms for facilitating mutual learning and regular policy dialogues. Furthermore, options to increase the policy coherence between the future climate regime and a number of climate relevant policy areas and sectors (the so-called "non-climate policy track") must be explored. Bottom-up mitigation and adaptation policies and measures are likely to become more important in the post-2012 climate regime discussions. Asian countries, having accumulated rich experiences in such approaches, must be proactive in discussions that would ultimately contribute to realising the vision of a sustainable Asia.