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Narrowing the Gaps through Regional Cooperation Institutions and Governance Systems

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Abstract

Regional governance systems and national frameworks to address climate change and accelerate green growth in Asia are reviewed and tools to address climate change are outlined. Options for regional level political institutions and financial architecture needed to fulfill voluntary pledges and programs are suggested and potentials, options, and challenges regarding monitoring, reporting, and verification systems are analyzed. In conclusion, policy measures for adaption and mitigation to climate change are provided.

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1. INTRODUCTION

Climate change has become one of the defining and most challenging global issues of the twenty-first century. In the contemporary world, it has become one of the key determinants of humankind's well-being and prosperity. Changing climatic regimes may impact regional stability, causing tensions and conflict between states competing for diminishing natural resources. It can also severely erode economic growth and degrade social development, while potentially becoming the greatest threat to humankind.

The Intergovernmental Panel on Climate Change (IPCC), the scientific advisory body to the United Nations Framework Convention on Climate Change (UNFCCC), has estimated that global emissions reductions of 25–40% of 2000 levels are needed if global temperature fluctuations are to be maintained within a range of 2°C, a level which is generally accepted to sustain life without any irreversible damage. The Stern Review on the Economics of Climate Change¹ has estimated that the cost of inaction could amount to 20% or more of global GDP. By contrast, the cost of acting now to avoid the worst impacts of climate change could be limited to 1% of annual global GDP.

In the continuing negotiations about the need for renewed and urgent action on climate change, the debate about mitigating greenhouse gases (GHG), essentially carbon dioxide (CO₂), is fast turning into a development issue—how much growth each nation can pursue given the constraints on the limiting capacity of atmospheric carbon space. The key argument is that the developed countries, with their historically unfettered industrial growth, have enjoyed these rights and have crowded out the carbon space, which is now limiting the development potential of developing countries, given that they too should have the right to equitable development. This draws attention to the stark reality that the environment cannot be separated from economic growth and social development. Each has to support and complement the other.

Environmental issues do not respect political boundaries: they are unaware of negotiations and timetables, and unconcerned with human health and habitation. Without decisive action many environmental problems will persist or intensify. Research by the IPCC, the United Nations Environment Program's (UNEP) fourth *Global Environmental Outlook*, and other studies confirm the depth of these challenges.

Asia, the world's largest continent—home to 60% of the world's population and accounting for more than 30% of the world's land surface—faces numerous ecological challenges, including widespread deforestation, severe atmospheric pollution, marine and freshwater degradation, rapid industrialization, and innumerable threats from climate change. The region is also diverse, containing 46 countries and a multitude of distinct cultures. Successful construction of networks and the effective improvement of environmental governance across this culturally and geographically diverse region becomes an essential imperative.

The interconnected and trans-boundary nature of environmental issues underscores the necessity for regional cooperation in addressing environmental issues. While some environmental issues are geographically specific, the causes and conditions often spread across many countries and many groups, including government and industry. Many of the environmental problems, such as loss of arable land, smog and ecosystem destruction, cut across economic, social and political barriers. Therefore, there is an increasing need for institutional improvements regarding environmental issues not only at the state level but also in

¹ Stern, N. 2006. *The Economics of Climate Change—The Stern Review*. Cambridge, UK: Cambridge University Press.

the sphere of regional cooperation. Moreover there is a growing need for better, stronger and more proactive regional institutions to support sustainable development and the green economy and to address climate change.

2. REVIEW OF CURRENT REGIONAL GOVERNANCE SYSTEMS AND NATIONAL INSTITUTIONAL FRAMEWORKS TO ADDRESS CLIMATE CHANGE AND ACCELERATE GREEN GROWTH

There are several global international cooperation agreements. Their purpose is to strengthen the position of their members in the globalizing world as well as to reinforce regional stability and economic exchange among member countries. Moreover, such groupings of countries are increasingly used as platforms for the implementation of socio-economic reforms and environmental protection measures. In the contemporary world, where continents are fragmented between large numbers of countries, any unilateral or even bilateral actions to stop natural environmental degradation are doomed to fail. The only solution to regional or broader scope global environmental issues is regional cooperation within well organized and established multilateral structures.

Doubtless, the biggest and most challenging task facing humankind is climate change. It is a global issue which cannot be addressed by separate countries but requires coordinated action. However, it is very difficult and most of the time impossible to apply strict rules on all countries equally to tackle climate change because the world is divided not only politically but also in terms of socio-economic inequalities.

A number of multilateral cooperation arrangements are currently in operation in the Asian region. The biggest of them are the South-Asian Association for Regional Cooperation (SAARC), Asia-Pacific Economic Cooperation (APEC), and the Association of South-East Asian Nations (ASEAN). All three of them recognize climate change as a major threat to their member states and are trying to step up common action to tackle climate change and promote green economic development across the region.

2.1 Regional Governance Systems in Asia

a) South-Asian Association for Regional Cooperation (SAARC)

SAARC is an organization of South Asian nations, founded in December 1985 and dedicated to economic, technological, social, and cultural development and emphasizing collective self-reliance. Its seven founding members are Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka. Afghanistan joined the organization in 2005. Meetings of heads of state are usually held annually and meetings of foreign ministers, twice a year. The 11 stated areas of cooperation are agriculture, education, culture and sports, health, population and child welfare, the environment and meteorology, rural development, tourism, transport, communications, science and technology.

The SAARC environment ministers meeting in Dhaka in 2008 adopted the SAARC Action Plan on Climate Change. The objectives of the plan were to identify and create opportunities for activities achievable through regional cooperation and south-south support in terms of technology and knowledge transfer and to provide an impetus for a regional-level action plan on climate change through national-level activities. The thematic areas of the plan included

adaptation to climate change, actions for climate change mitigation, technology transfer, finance and investment, education and awareness programs, the management of impacts and risks associated with climate change and capacity building for international negotiations.² Another significant development in SAARC's attempts to tackle climate change was the sixteenth SAARC Summit held at Thimpu, Bhutan, in April 2010. The summit declaration was called "Towards a Green and Happy South Asia". The Thimpu Statement on Climate Change, which was adopted during the summit, called for a review of the implementation of the Dhaka Declaration and the SAARC Action Plan on Climate Change. During the summit an agreement was reached to establish an inter-governmental expert group on climate Change to develop clear policy direction and guidance for regional cooperation.³

b) Asia-Pacific Economic Cooperation (APEC)

APEC's response to its regional environmental problems has so far been shaped by a limited focus on joint collective action. APEC was initiated in 1989 as a consultative body whose goal is to foster cooperation on issues of trade and investment in the Asia Pacific region. The founding members are Indonesia, Malaysia, Singapore, Thailand, the Philippines, and Brunei Darussalam (the ASEAN countries) and Australia, New Zealand, Canada, Japan, the Republic of Korea (henceforth, Korea), and the United States (US). Today, APEC is a forum for 21 Pacific Rim countries that seek to promote free trade and economic cooperation throughout the Asia-Pacific region.

APEC was created with the intention of improving living standards and educational levels through sustainable economic growth and cooperation in the common interests of Asia-Pacific countries. Members account for approximately 40% of the world's population, approximately 54% of world GDP and about 44% of world trade. However, diverse cultures, discordant histories, and a lack of experience with multilateral institutions have shaped an organization that is more of an association than an autonomous decision-making body.

APEC members have in recent years made substantial effort to address environmental issues. The organization has launched a number of initiatives and measures to tackle climate change, and progress has been made. In 2007, APEC leaders adopted a climate change program during a meeting in Sydney, agreeing to tackle global warming through improved energy efficiency and forest management. Moreover, APEC has established many working groups to assist economies in meeting climate change goals, including the Energy Working Group, the Asia-Pacific Network for Energy Technology and the Energy Security Initiative, to more broadly promote clean and efficient energy production and use.⁴

In November 2008, APEC ministers adopted the Environmental Goods and Services (EGS) Work Program Framework, which aims to support the development of the EGS sector in APEC and link up the projects related to EGS in separate APEC working groups under a coherent and holistic framework.⁵

² SAARC environment ministers' Dhaka Declaration on Climate Change, 3 July 2008.

³ Thimpu Statement on Climate Change, Sixteenth SAARC Summit, 28–29 April 2010.

⁴ APEC Leaders' Declaration On Climate Change, Energy Security And Clean Development, Sydney, 9 September 2007

⁵ Environmental Goods and Services (EGS) Work Program Framework, APEC Ministerial Meeting, Peru 2008

c) Association of South-East Asian Nations (ASEAN)

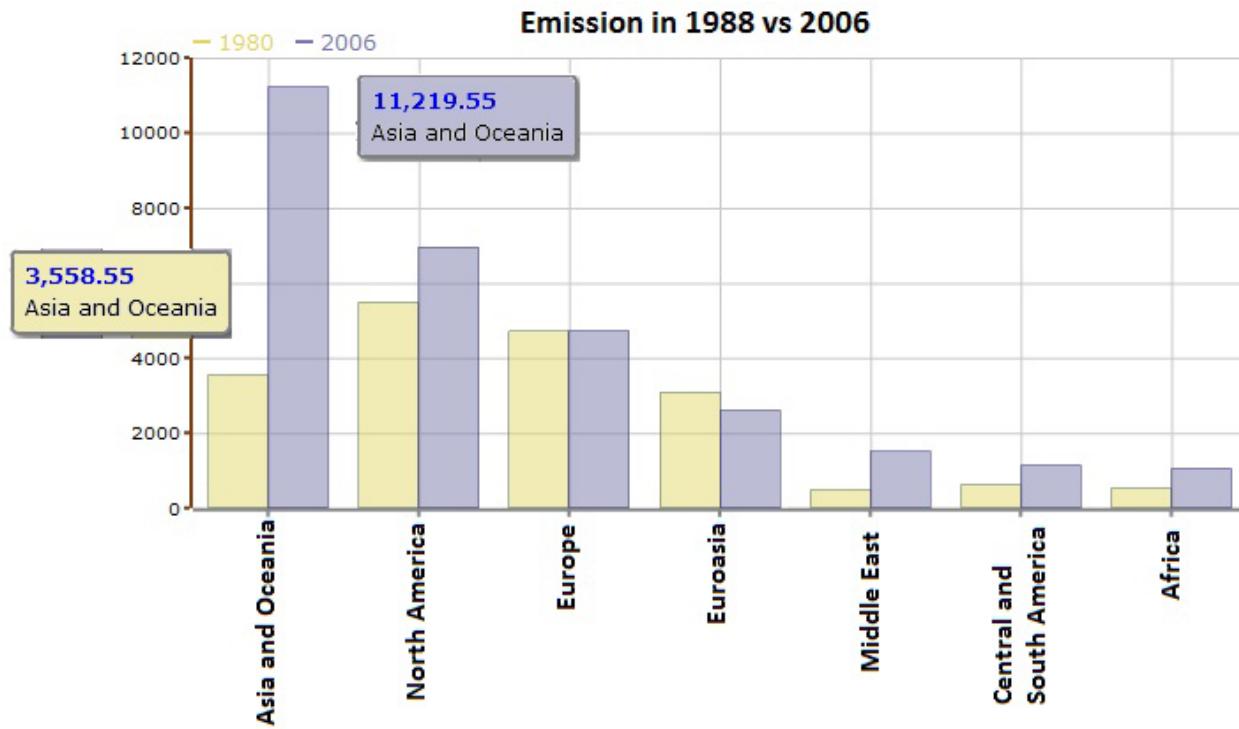
ASEAN is a geopolitical and economic organization of ten countries located in South-East Asia, which was founded on 8 August 1967 by Indonesia, Malaysia, the Philippines, Singapore, and Thailand. Since then, membership has expanded to include Brunei Darussalam, Myanmar, Cambodia, Lao PDR, and Viet Nam. Its aims include: the acceleration of economic growth, social progress, cultural development among its members, the protection of the peace and stability of the region by providing a forum for member countries to discuss differences peacefully. ASEAN covers an area of 4.46 million km², 3% of the total land area of the earth, with a population of approximately 600 million people, 8.8% of the world population. By 2010, its combined nominal GDP had grown to US\$1.8 trillion. If ASEAN were a single entity, it would rank as the ninth largest economy in the world.

ASEAN Leaders have expressed their concern and commitment to ASEAN playing a proactive role in addressing climate change through their declarations to the 2007 Bali and 2009 Copenhagen UN conferences on climate change. They view the protection of the environment and the sustainable use and management of natural resources as essential to the long-term economic growth and social development of countries in the region. The ASEAN Vision 2020 document calls for "a clean and green ASEAN" with fully-established mechanisms to ensure the protection of the environment, the sustainability of natural resources, and the high quality of life of people in the region.

In October 2003, with the aim of turning the ASEAN Vision into reality, the Heads of State/Government of the ASEAN member states declared that an ASEAN Community should be established comprising three pillars: political and security cooperation, economic cooperation, and socio-cultural cooperation. The three pillars should be closely intertwined and mutually reinforcing to ensure the durable peace, stability and shared prosperity of the region. The Roadmap for an ASEAN Community 2009–2015 specifies the goals, strategies and actions to create the ASEAN Community by 2015. Additionally, in 2008 the ASEAN Charter bestowing legal personality upon ASEAN entered into force.

2.2 National Legislation and Institutional Frameworks to Address Climate Change

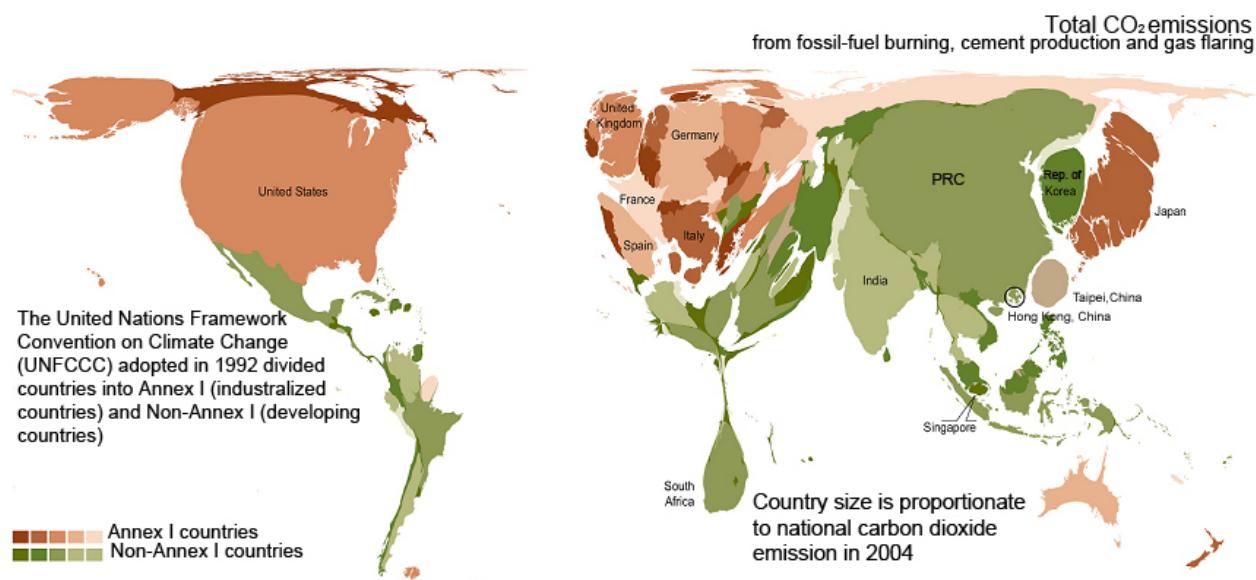
There is an ongoing effort fuelled by the pressure exercised by international public opinion and the scientific community to develop national action plans for climate change mitigation and to strengthen national legislation aimed at counteracting global environmental changes and promoting the green economy both in developed and developing countries. This global trend is also followed by the Asian states which might be severely affected by future changes in climatic patterns and the increasing number of extreme weather events. Asia is the world's fastest developing continent and, at the same time, is becoming the biggest global polluter. Asia's GHG emissions are growing at an alarming rate, as can be observed in Figure 1.

Figure 1: Increase in GHG Emissions between 1980 and 2006

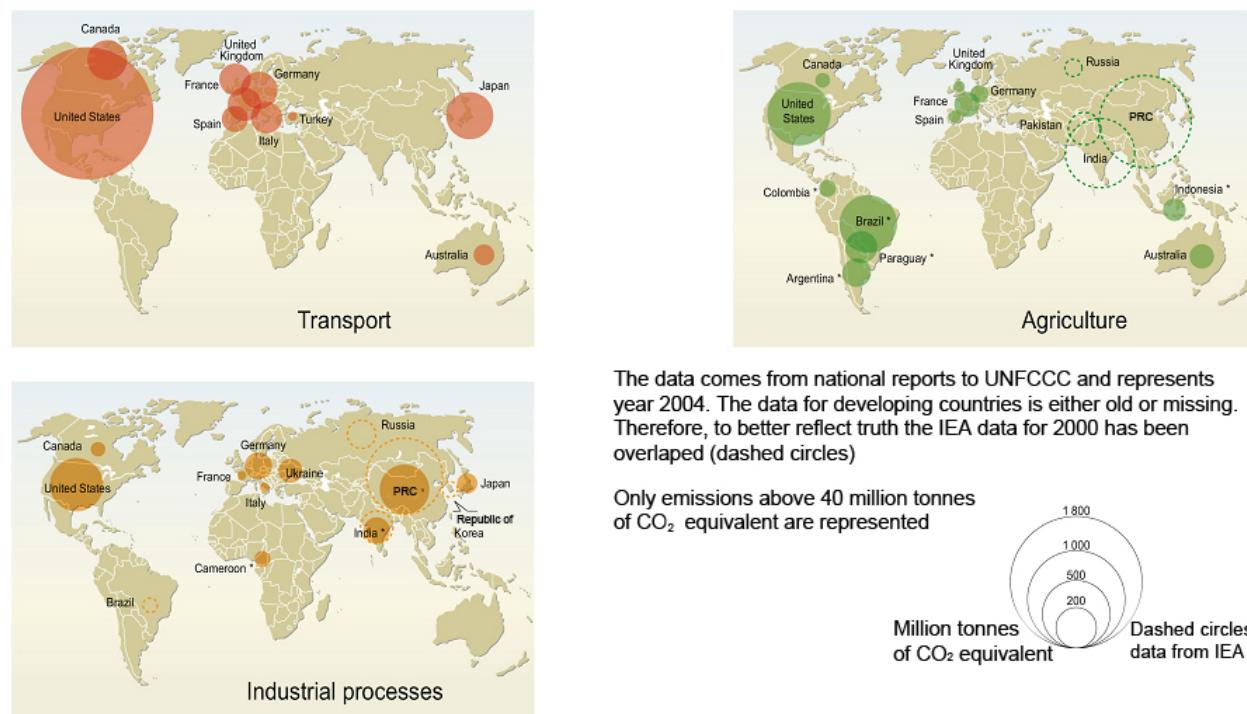
Note: All values are in million tons of CO₂. Source: [U.S. Energy Information Administration](#)

Source: U.S. Energy Information Administration 2012

As can be clearly seen, the Asian region is producing more GHG emissions than other parts of the world. This trend is increasing as the whole continent is rapidly industrializing but GHG per capita is still very low in comparison with industrialized countries. Therefore, there is an urgent need to take action to reduce emissions from existing industry and promote clean technologies to slow down this rapid growth in GHG release. However, the Asian continent is not equally developed and the total increase in GHG emissions mostly comes from a few developing and developed countries, namely the People's Republic of China (PRC), India, Japan, the Republic of Korea as well as ASEAN countries (see Figure 2 and Figure 3).

Figure 2: Total CO₂ Emissions divided by Annex 1 and Non-Annex 1 Countries in 2004

Source: UNEP/GRID-Arendal.

Figure 3: GHG Emissions from the Three Largest Emitters by Sector

Source: UNEP/GRID-Arendal.

In order to slash this alarming rapid growth in GHG emissions, most of the countries in the Asian region prepared National Action Plans on Climate Change (NAPCC). These are compilations of actions and legislation supporting climate change mitigation measures and promoting green economic growth.

a) The PRC

The PRC's stance in combating climate change is developing fast, currently focusing mainly on energy-related legislation. Climate change was first officially referred to in legislation or regulations by the Chinese government in the PRC's National Climate Change Program of 2007, and repeated in the PRC's Policies and Actions for Addressing Climate Change 2008. In 2009, the National People's Congress passed a comprehensive Climate Change Resolution. All of these are not strictly laws but policy documents guiding legislation.⁶

Although there is not yet a comprehensive climate change bill in the PRC, Congressman Wang Guangtao (Chair of the Environment Protection and Resources Conservation Committee of the National People's Congress) announced on 7 November 2010 that the PRC would begin work on a comprehensive climate change law. It is expected that the law will take one or two years to develop. In the meantime, the PRC's domestic climate-related laws are dominated by a focus on energy-saving, reflecting the need for the country to improve energy efficiency to enable it to keep pace with energy demand as the economy grows strongly.⁷ In that context, the PRC has already passed the Energy Conservation Law of the People's Republic of China (Energy Conservation Law), and the 2005 Renewable Energy Law of the People's Republic of China (Renewable Energy Law) and is planning a new Energy Law of the People's Republic of China. The draft energy legislation contains provisions on the promotion of clean energy and energy efficiency. The goals are relatively vague with clearer targets expected to be set by ministries, including the National Development and Reform Commission (NDRC), the Ministries of construction, agriculture and transport, the Bureau for Tax and others.⁸

More recently, March 2011 saw the publication of the PRC's 12th Five-Year Plan. The plan includes a target to reduce the carbon proportion of its GDP by 40–45% from 2005 levels by 2020, to increase the number of pollutants included in the 'total emissions control' system and to set new targets for energy consumption in relation to GDP (a reduction of 16% by 2015), the percentage of non-fossil fuel energy (to increase to 11.4% by 2015 from 8% in 2011) and an increase in forest coverage by 21.6%. The specific policies and mechanisms required to implement these targets will be developed by ministries and provinces.⁹

b) India

India is the world's fourth largest economy and the fifth largest GHG emitter, accounting for about 5% of global emissions. India's emissions increased 65% between 1990 and 2005 and are projected to grow a further 70% by 2020. India is a non-Annex I country under the Kyoto Protocol and thus has no binding target for emissions reduction. The country is an active

⁶ PRC Department of Climate Change. 2009. National Development and Reform Commission. URL: <http://www.ccchina.gov.cn/en/>.

⁷ Townshend, T., S. Fankhauser, A. Matthews, C. Feger, J. Liu, and T. Narciso. 2011. GLOBE Climate Legislation Study. Global Legislators Organization for Balanced Environment. The Grantham Research Institute on Climate Change and Environment.

⁸ PRC National Development and Reform Commission. 2011. Policy Release. URL: <http://en.ndrc.gov.cn/>

⁹ PRC's 12th Five-Year Plan. 2011

participant in the Clean Development Mechanism (CDM) established by the protocol. Indeed, it has more than 520 registered CDM projects as of 30 August 2010. India has a number of policies that, while not driven by climate concerns, contribute to climate mitigation by reducing or avoiding GHG emissions. Rather than integrative binding legislation, India is developing a policy process to specifically address climate change.¹⁰ India adopted its first National Action Plan on Climate Change (NAPCC) in 2008, outlining existing and future policies and programs directed at climate change mitigation and adaptation. The plan outlines eight “national missions” running up to 2017. These missions include the National Solar Mission, the National Mission for Enhanced Energy and Efficiency, the National Mission on Sustainable Habitat, the National Mission for a Green India aimed at increasing forest cover and the National Mission on Strategic Knowledge, aimed at establishing a research fund. In addition, it contains adaptation missions such as the National Mission for Sustaining the Himalayan Ecosystem to help protect India’s water supply from the Himalaya or the National Mission for Sustainable Agriculture. In June 2010, the Indian government’s Ministry of Environment and Forests (2010) released a document called *India: Taking on Climate Change—Post Copenhagen Domestic Actions*. In addition to evaluating the progress of the policies announced in the 2008 NAPCC, it stated that India would henceforth be the first developing country in the world to publish its emissions inventory in a two-year cycle. It started by publishing its 2007 inventory. In addition, India has also announced a levy—a clean energy tax—on coal, at the rate of around US\$1 per ton, which will apply to domestically produced and imported coal. This money will go into a National Clean Energy Fund that will be used for funding research, innovative projects in clean energy technologies, and environmental remedial programs. The Government of India has also set up an expert group on low-carbon strategy for inclusive growth. The group has been given the mandate to develop a roadmap for India for low-carbon development. The group’s recommendations will become a central part of India’s 12th Five-Year Plan from 2012. As regards forestry, a technical group has been set up to develop methodologies and procedures to make assessments and monitoring of the UN’s Reducing Emissions from Deforestation and Forest Degradation Plus program (REDD+). Additional to action at the federal level, state governments are preparing state-level action plans on climate change. They draw upon India’s national action plan in order to put in place state-level measures in mitigation and adaptation. Delhi has already completed and launched its action plans.¹¹

India has made important efforts in the last two decades to reduce its energy consumption. Factors contributing to the decline in energy consumption include improved energy efficiency, increased use of renewable and nuclear power, expanded public transport, and energy pricing reform. The Electricity Act of 2003 sought to better coordinate development of the power sector in India. As an objective, it seeks to promote efficient and environmentally benign policies, among other things. The act recognized the role of renewable energy in the country’s national electricity policy (issued by the government in 2005) and contains key provisions relating to renewable energy. This act was supplemented by a 2006 tariff policy that stipulates that State Electricity Regulatory Commissions (SERCSs) must purchase a minimum percentage of power from renewable sources. The 2006 Integrated Energy Policy, that received cabinet approval in 2008, has the broad objective of meeting energy demand “at the least cost in a technically efficient, economically viable and environmentally sustainable manner”. It contains a number of policies that contribute to reducing GHG emissions. In 2007, India’s cabinet made a series of announcements regarding ethanol production and proposed an indicative target of 20% blending of biofuels, both for bio-diesel and bio-ethanol, by 2017.

¹⁰ Townshend et al. 2011.

¹¹ India’s National Action Plan on Climate Change. 2008. Prime Minister’s Council on Climate Change.

In addition to these framework policies, there are an important number of regulation and incentive instruments promoting energy efficiency and the use of renewable energy, at the federal and the state level. These include a revision in 2007 of the Energy Conservation Building Code that sets minimum requirements for building envelope components (the outer shell of the building which helps maintain the indoor environment), lighting, HVAC (heating, ventilation and air conditioning), electrical system, water heating and pumping systems. Solar and wind power are strongly promoted as well through solar and wind power generation-based incentives. As announced by the NAPCC, the National Solar Mission is a large-scale solar energy program that runs from 2010 to 2022 and promotes electricity generation from both small and large - scale solar plants. Presently, wind farm projects qualify for accelerated depreciation under the Income Tax Act and also a “tax holiday” as infrastructure projects. Lots of local projects are also being implemented such as a solar-photovoltaic program, a solar-water heating system program, and a village electrification program.¹²

c) Japan

The Japanese government formulated an action plan to reduce global warming in October 1990 just before the Second World Climate Conference held in Japan in 1990. The plan aimed to stabilize CO₂ emissions at 1990 levels by 2000. This CO₂ stabilization target was released in the run-up to the International Negotiating Committee (INC) for a Framework Convention on Climate Change, which started its work at the beginning of 1991. This first government action plan focused on CO₂ reduction through structural change in urban and regional structures, energy supply systems, traffic systems, production processes, and the lifestyles of citizens. In 1993, the Environment Agency—which became the Ministry of the Environment in 2001—formulated a Guideline for Measures to Prevent Global Warming (National Guideline 93) to provide guidance to regional and local governments on measures they should take to meet national goals. It also provided local and regional governments with subsidies they could use to formulate individual local climate change action plans. Some regional and local governments started their climate change policies at this time. Since the mid-1990s, many regional and local governments, especially those with activist governors or mayors, have made global warming one of their top political priorities.¹³

After the adoption of the Kyoto Protocol, the Japanese government formulated an outline for the promotion of measures to cope with global warming to achieve the Kyoto targets. This outline, distinct from an action plan, focused on CO₂ reduction mainly through the construction of an additional 21 nuclear power plants by 2010. Also in 1998, amendments were made to legislation on the rational use of energy (the Energy Conservation Law) and legislation concerning the promotion of measures to cope with global warming (the Global Warming Law). An amendment to the Energy Conservation Law established a program called Top-Runner, which requires manufacturers to improve the energy-efficiency of electrical appliances and cars by adopting, within a given time frame, the standards used by the most energy-efficient appliances. This regulation is the most effective of all measures found in Japan's national climate change policy.¹⁴

¹² Pew Center on Global Climate Change. 2008. The Energy and Resource Institute (TERI). *Climate Change Mitigation Measures in India*, International Brief 2, New Delhi.

¹³ Japanese Ministry of the Environment. 2011. URL: <http://www.env.go.jp/en/>

¹⁴ International Energy Agency. 2011. *Relations with member countries — Japan*. URL: http://www.iea.org/country/m_country.asp?COUNTRY_CODE=JP

Article 4 of the Global Warming Law sets out the responsibilities of local authorities in relation to developing climate change countermeasures: “Local governments shall promote policies to limit GHG emissions and to enhance sinks in accordance with the natural and social conditions of their areas.” The Global Warming Law also mandates that local and regional governments formulate reduction plans for government-related activities. As a consequence of the Global Warming Law, a growing number of local governments began formulating local action plans.¹⁵

In response to the protocol coming into effect in 2005, the Kyoto Protocol Target Achievement Plan was established. In 2007, a revised Act on the Promotion of Global Warming Countermeasures provided that a study shall be conducted concerning the targets and programs prescribed in the Kyoto Protocol Target Achievement Plan and that any changes to the plan should be promptly enacted if found necessary based on the results of the study. The plan was completely revised in March 2008. More recently, a new Japanese bill, the Basic Act on Global Warming Countermeasures, was approved by the cabinet on 12 March 2010, and submitted to the national parliament. The bill puts into legislation emissions reduction targets of 25% below 1990 levels by 2020 and 80% below 1990 levels by 2050 and would set up a national cap-and-trade scheme as the major delivery mechanism. The draft bill also includes a target to produce 10% of primary energy supply from renewable sources by 2020, including the introduction of a feed-in tariff.

The two oil crises of the 1970s led to the creation of the Law Concerning the Rational Use of Energy in 1979, which aimed to promote energy conservation to reduce total energy demand. The legislation has been amended six times, most recently in 2008. In order to implement energy policy in a comprehensive and consistent manner, the National Fundamental Law on Energy was enacted in June 2002. This law sets out the basic principles regarding energy policy with regard to:

1. Energy security;
2. Adaptability to the environment;
3. Utilization of market mechanisms based on the careful consideration of these points.

According to these principles, the Japanese government was directed to draft and publish a basic energy plan to promote policies aiming at increasing of energy demand and supply efficiency in a long-term, comprehensive, and strategic manner.¹⁶

d) Republic of Korea

The Republic of Korea's flagship climate law is the Framework Act on Low Carbon Green Growth, passed on 29 December 2009. It builds on Korea's “Green New Deal” stimulus package of 6 January 2009 together with the National Strategy for Green Growth announced in August 2008 and the Five-Year Plan for Green Growth released in July 2009. On 6 April 2010, the government adopted the Enforcement Decree of the Framework Act on Low Carbon during its 15th cabinet meeting. Both the law and its enforcement decree came into effect on 14 April 2010. The law creates the legislative framework for mid- and long-term emissions reduction targets, cap-and-trade, carbon tax, carbon labeling, carbon disclosure, and the expansion of new and renewable energy. It includes a system of mandatory reporting of carbon emissions by all carbon and energy-intensive industries and provides a basis for the creation of a carbon

¹⁶ Townshend et al. 2011.

trading system. The law mandates a cap on emissions, but leaves operational structures such as the allocation of emissions permits, sectorial coverage and other details for implementing laws to determine.¹⁷

The Framework Act takes precedence over other acts in relation to low-carbon, green growth in Korea. Other related acts include the Rational Energy Utilization Act, the Electricity Business Act, the Act on the Promotion of the Purchase of Environment-friendly Products, and the Energy Basic Law etc. These acts shall, whenever any such acts is enacted or amended, be brought into conformity with the purposes and basic principles of the Framework Act. The implementation of climate-related legislation in Korea is mainly through administrative plans and policies that the state and each local government establish pursuant to related acts and subordinate statutes. All of them aim to be in harmony with the basic principles for the promotion of low-carbon, green growth under Article 3 of the Framework Act and the national strategy for low-carbon and green growth under Article 9 of the Framework Act. In November 2010, the Korean government released draft legislation to establish a domestic emissions trading scheme. The proposal, closely modeled on the EU's Emissions Trading Scheme (EU ETS), is scheduled to begin with a first phase from 2015.¹⁸

3. EXAMINING THE TYPES OF REGIONAL-LEVEL POLITICAL INSTITUTIONS AND FINANCIAL ARCHITECTURE NEEDED TO FULFILL VOLUNTARY PLEDGES AND PROGRAMS

There is increasing need for strong regional political organizations and financial institutions in Asia to safeguard political stability, guide its transition to a greener economy, and promote sustainable development. Only strong regional cooperation aimed at tackling issues related to climate change can ensure that appropriate measures regarding GHG emissions reduction will be successfully implemented. The urgent need for measures on climate change mitigation cannot be guaranteed by global agreements on GHG emission reductions because they do not take into consideration the complexities of countries, and the interactions between states within different regions. Therefore, regional forums are the most appropriate mechanisms to evaluate and encourage the most suitable mitigation actions.

There are few regional organizations in Asia addressing climate change issues. APEC, ASEAN and SAARC have adopted action plans on climate change including attempts to reduce fast-rising CO₂ emissions by acknowledging the importance of improvements in energy efficiency and through a commitment to the deployment of renewable energy sources. However most of these pledges are non-specific as there is no mechanism for their enforcement.

Apart from regional cooperation between the states, numerous international organizations strongly support reducing carbon use by Asian states. However, there is an ongoing need for strong regional financial organization to coordinate investment in clean energy production and energy efficiency projects. Indeed, the Asian Development Bank would be well suited to such a task, given the complexity of the Asian continent.

At present there are a large number of bilateral and international initiatives promoting investments in GHG reduction throughout the Asian continent. Nevertheless, many of the

¹⁷ Townshend et al. 2011.

¹⁸ Republic of Korea's Presidential Committee on Green Growth. 2011. *Green growth Korea*. URL: <http://www.greengrowth.go.kr/english/>

measures are not coordinated and often overlap with other measures. Coordinated action would be more efficient and beneficial for both the people and the environment of the Asian region.

3.1 International Efforts to Reduce GHG Emissions

Negotiations held as part of the United Nations Framework Convention on Climate Change (UNFCCC) in Copenhagen in December 2009 fell short of global expectations. In the end, the negotiations failed to produce a new international treaty with binding emissions targets, although they did produce a non-binding political accord. The Copenhagen Accord (2009) lays out an aspirational goal of limiting global warming to two degrees Celsius but does not specify global targets or define national actions that would be needed to achieve this goal.

The ongoing international negotiations aiming for a global cap on GHG emission are proceeding with a slow pace. Even after the decade and a half of negotiations since the Kyoto protocol was signed in 1997, there is still a lack of consensus regarding equality and different levels of responsibility between developed and developing countries. On the one hand developed countries are constantly trying to push for global emission limits, but on the other hand developing countries are expressing their empathy for any binding emission reductions. It is understandable that emerging countries are guarding their rights to economic growth arguing that developed countries were not constrained by any limits at the time when they were building their economic supremacy. Nevertheless, in the long-run developing countries will be the most severely damaged by climate changes and they also need to take actions to mitigate this global issue. In recent years the approach to GHG emission reduction has changed and is mostly supported by unilateral voluntary pledges to reduce emissions. There are a number of Asian countries which have made promises to cut their emissions by 2020 (see Table 1) as parties to the Copenhagen Accord under UNFCCC.

Table 1: Voluntary Pledges for GHG Emission Reductions Presented by Asian States to the Copenhagen Accord of UNFCCC

Country	Action	Reduction by 2020	Emission Reduction/Rise From 1990 Level	Share of World's Total GHG's
PRC	Endeavour to lower its CO ₂ emissions per unit of GDP compared to 2005 levels. Increase the share of non-fossil fuels in primary energy consumption at around 15% by 2020. Increase forest coverage by 40 million hectares compared to 2005 levels	40 – 45%	Between -15% and + 204%	16.64%
India	Endeavour to lower its CO ₂ emissions per unit of GDP compared to 2005 levels	20–25%	Between +87% and +277%	4.32%
Indonesia	Submitted a list of seven voluntary mitigation actions to achieve an emission reduction below 'business as usual' projection	26%	+22%	4.73%
Japan	Committed to reduce its GHG emissions from 1990 levels	25%	-25%	3.14%
Kazakhstan	Its reduction represents - 7.4% from 1990 levels but an increase of 22.7% from 2005 levels	15%	-7.4%	0.48%
Maldives	Declared intention to become climate neutral	100%	-100%	0.00%
Singapore	Reduction target below 'business as usual' projection	16%	+292%	0.11%
Republic of Korea	Reduction target below 'business as usual' projection	30%	+63.9	1.3%

Source: Fransen and Hatch 2011.

The eventual impact of the Copenhagen Accord's voluntary mechanism depends on whether governments stick to their pledges, which is in the end a political question. Some analysts suggest that if countries follow through on their pledges and intensify mid-term actions, the two degrees Celsius goal is within reach. However, meeting this goal is ultimately dependent on domestic politics in each country that may sustain or hinder fulfilling these pledges and may push or restrain governments from pursuing more ambitious targets in the future.

3.2 Regional Political Institutions in Asia Involved in Climate Change Mitigation

The inability of countries to resolve the most contentious issues surrounding global action on climate change raises the question of whether the UNFCCC framework will work as the main negotiating forum for achieving further progress on global climate change. Achieving ultimate consensus among such a diverse group with divergent interests may be a bridge too far.

Alternatively, other frameworks at the regional or global level may be better suited to forging consensus on key issues, such as emissions targets and an equitable distribution of obligations among countries. One such forum might be ASEAN which is the most successful Asian grouping of ten cooperating countries namely: Indonesia, Malaysia, Philippines, Singapore, Thailand, Brunei Darussalam, Myanmar, Cambodia, Lao PDR, and Viet Nam. They are actively working to integrate their economic policies but also regulations regarding climate change. Other potentially useful organizations might be APEC and SAARC which have also signaled their interest in climate change mitigation.

a) ASEAN

ASEAN is a leading political organization in Asia in terms of integration, harmonization and cooperation. The organization's main aim is to achieve political, economic, social and environmental integration inspired, to a certain extent, by European Union (EU) achievements. ASEAN still has a long way to go in order to achieve such a high level of integration as the EU and there are still many problems to overcome. Nevertheless, there is no better alternative and model for regional cooperation in South-Eastern Asia. Moreover, a continuing wish to pursue greater cooperation is expressed in the actions and statements of ASEAN representatives as well as regional leaders.

The ASEAN Leaders have expressed their concerns about and commitment to ASEAN playing a proactive role in addressing climate change through their declarations to the 2007 Bali and 2009 Copenhagen UN Conferences on Climate Change. They view the protection of the environment and the sustainable use and management of natural resources as essential to the long-term economic growth and social development of countries in the region. The ASEAN Vision 2020 calls for "a clean and green ASEAN" with fully-established mechanisms to ensure the protection of the environment, the sustainability of natural resources, and the high quality of life of people in the region.

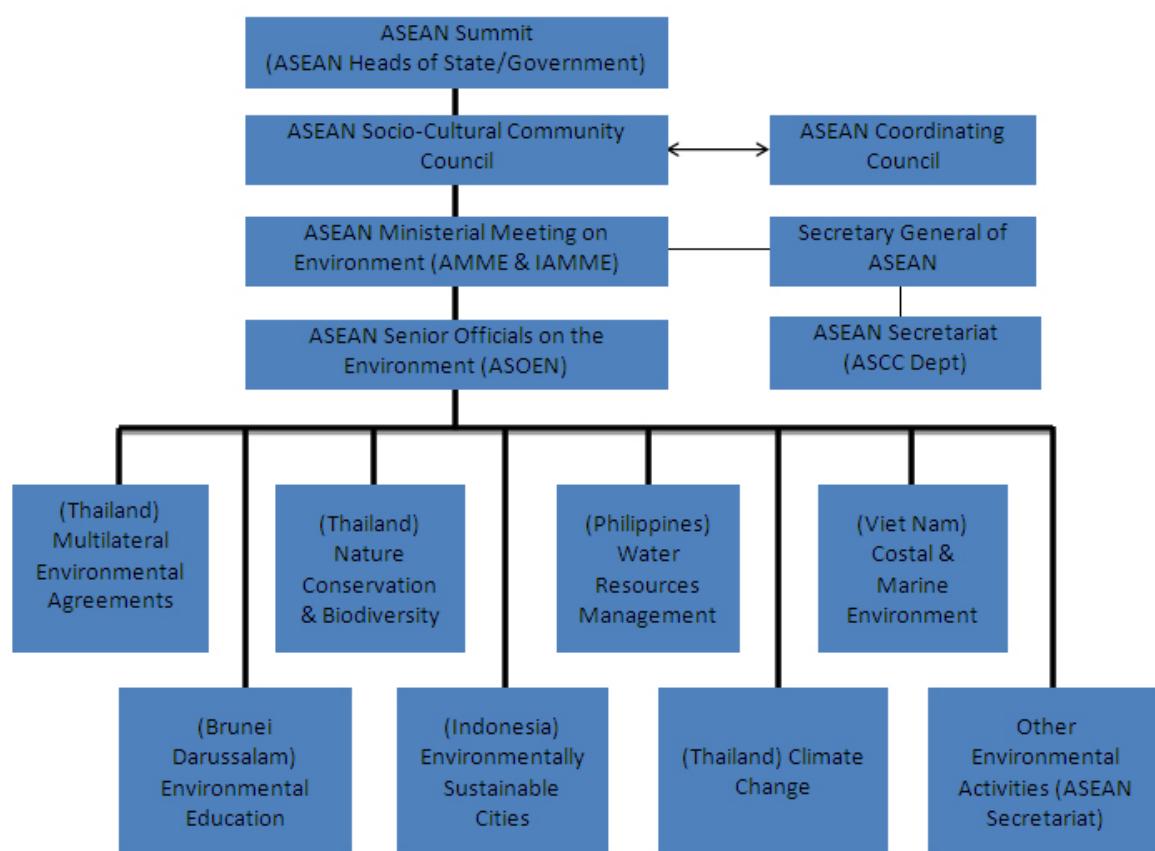
In order to realize the ASEAN Vision, the Heads of State/Government of ASEAN member states in October 2003 declared that "an ASEAN Community shall be established comprising three pillars, namely political and security cooperation, economic cooperation, and socio-cultural cooperation that are closely intertwined and mutually reinforcing for the purpose of ensuring durable peace, stability and shared prosperity in the region" (Declaration of ASEAN Concord II, 2003). The Roadmap for an ASEAN Community 2009–2015 called The ASEAN Charter (2008) lays out the goals, strategies and actions to put into effect the ASEAN Community that is politically cohesive and peaceful, economically integrated and vibrant, and socially responsible

and caring. The ASEAN Charter entered into force on 15th December 2008. The Charter bestowed a legal personality upon ASEAN, which for the past 42 years has operated as a coalition of nations emerging from the Bangkok Declaration of 1967.

The ASEAN Charter, while rationalizing and maintaining existing institutions, has created several new institutions to better coordinate enhance and streamline the work of the various sectoral bodies. The ASEAN Summit, the supreme policy-making body of ASEAN, now meets twice a year in addition to having special or ad-hoc meetings. The ASEAN Leaders provide the vision and broad thrust for cooperation in various sectors, including cooperation on environment.

ASEAN environment ministers meet on a formal basis once every three years and, since 1994, have also been meeting on an informal basis annually. ASEAN Senior Officials on the Environment (ASOEN) meet annually and are responsible for supporting ASEAN environment ministers in terms of formulation, implementation, and monitoring of regional programs and activities. ASOEN comprises heads of environmental ministries, departments or agencies that are responsible for environmental matters in their respective countries. ASOEN is assisted by six subsidiary bodies, namely the ASEAN Working Group (see Figure 4).

Figure 4: Institutional Framework of ASEAN for Environmental issues

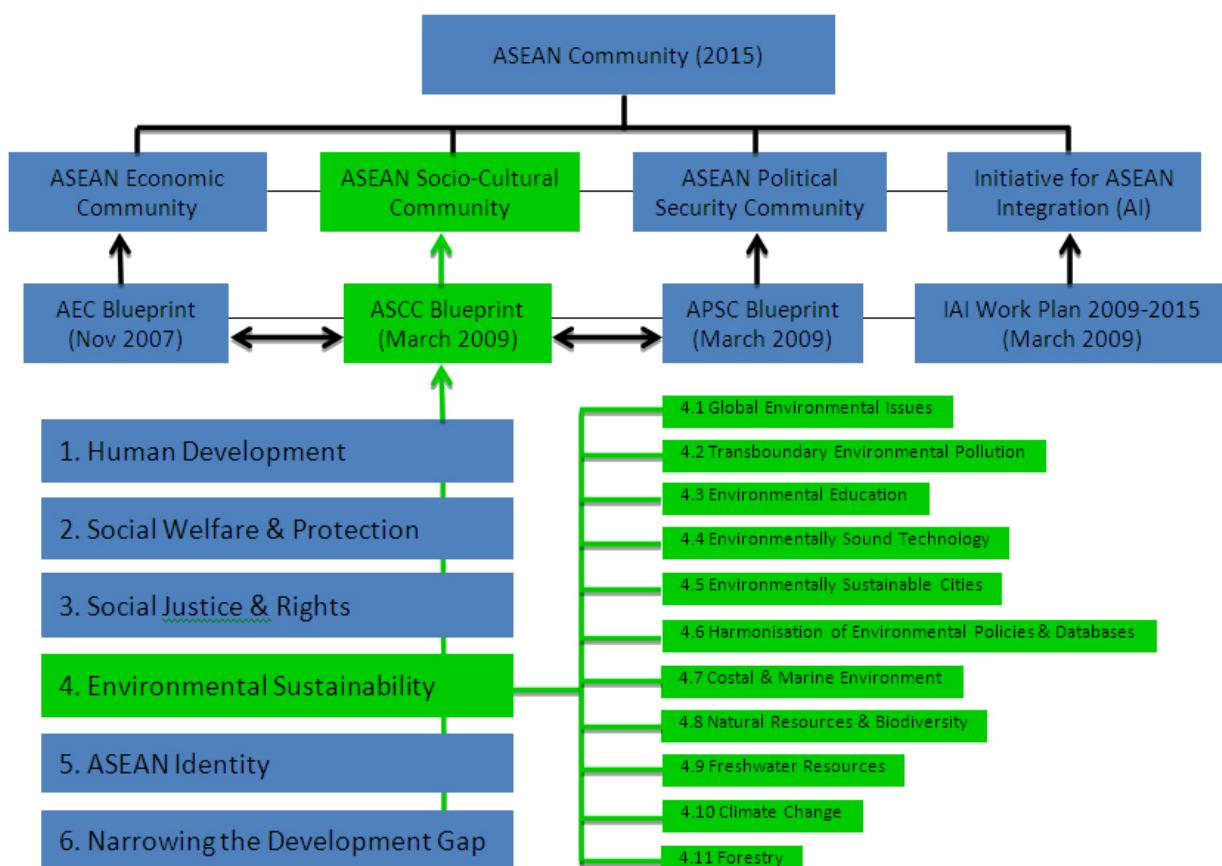


Abbreviations: AMME (ASEAN Ministerial Meeting on Environment), IAMME (Informal ASEAN Ministerial Meeting on the Environment), ASCC (ASEAN Socio-Cultural Community), ASOEN (ASEAN Senior Officials on the Environment)

Source: Letchumanan 2010.

In recognition of the importance of environmental cooperation for sustainable and regional integration, ASEAN has, since 1977, cooperated closely in promoting environmental cooperation, focusing on ten priority areas of regional importance as reflected in the ASEAN Socio-cultural Community Blueprint 2009–2015 that is presented in Figure 5.

Figure 5: Structure of ASEAN Legislation on Environmental Issues



Abbreviations: AEC (ASEAN Economic Community), ASCC (ASEAN Socio-Cultural Community), APSC (ASEAN Political Security Community), IAI (Initiative for ASEAN Integration)
Source: Letchumanan 2010

The ASEAN Blueprint (2009) provides priority actions in responding to climate change and addressing its impacts. The blueprint's main strategic objective is to enhance regional and international cooperation to address the issue of climate change and its impacts on socio-economic development, health and the environment in ASEAN member states through the implementation of mitigation and adaptation measures, based on the principles of equity, flexibility, effectiveness, common but differentiated responsibilities, respective capabilities, as well as reflecting on different social and economic conditions. The same section identifies 11 priority actions responsive to climate change issues which will be implemented and pursued by ASEAN Member States from 2010–2015:

- Encourage a common ASEAN policy on climate change issues and, where possible, engage in joint efforts and common positions in addressing these issues;
- Encourage efforts to develop an ASEAN Climate Change Initiative;

- Promote and facilitate the exchange of information/knowledge on scientific research and development, deployment and transfer of technology and best practice on adaptation and mitigation measures;
- Encourage the international community to participate in and contribute to ASEAN's efforts in afforestation and reforestation, as well as to reduce deforestation and forest degradation;
- Develop regional strategies to enhance capacity for adaptation, a low-carbon economy, and promote public awareness to address effects of climate change;
- Enhance collaboration among ASEAN member states and relevant partners to address climate-related hazards, and scenarios for climate change;
- Develop a regional observation system to monitor the impact of climate change on vulnerable ecosystems in ASEAN member states;
- Conduct regional policy, scientific and related studies, to facilitate the implementation of a climate change convention and related conventions;
- Promote public awareness and advocacy to raise community participation on protecting human health from the potential impact of climate change;
- Encourage the participation of local government, private sector, non-governmental organizations, and community to address the impacts of climate change;
- Promote strategies to ensure that climate change initiatives lead to an economically vibrant and environment-friendly ASEAN Community.

Climate change has increasingly become an important element in energy policy in ASEAN. More attention has been given to the need to adopt integrated approaches to energy policy making by taking into account climate change issues to achieve greater energy security in the future. In fact, at the 27th ASEAN Ministers on Energy Meeting (AMEM) held in Mandalay, Myanmar in July 2009, the new ASEAN Plan of Action for Energy Cooperation 2010–2015 was adopted. The three key initiatives of the ASEAN energy security policy within which environment and climate change appear as important elements in the next five years include:

Energy Efficiency and Conservation (EE & C) goals which include:

- pursuing the aspirational goal of reducing regional energy consumption by at least 8% by 2015, based on the 2005 level;
- achieving higher end-use energy efficiency for all sectors through regulatory and market approaches;
- enhancing institutional and human capacity;
- encouraging private sector participation, especially financial institutions to support EE & C investment and implementation.

Renewable Energy (RE) goals

In 2004-2009, ASEAN met its 10% target to increase RE-based power generation capacity. For the 2010–2015 period, ASEAN is committed to the principle that renewable energies are crucially needed to increase the diversity of energy supply and to reduce the environmental impact of energy use in the region. The strategic goals include:

- achieving a collective target of 15% for regional renewable energy in the total power installed capacity by 2015;

- strengthening of regional cooperation in the development of renewable energy and alternative energy including hydropower and bio-fuels;
- promoting the development of centers of research and development for renewable energy in the region;
- promoting open trade, facilitation and cooperation in the renewable energy sector and related industries as well as investment in the requisite infrastructure for renewable energy development.

Coal and Clean Coal Technology goals which include:

- promoting and increasing cleaner coal use and trade for regional energy security;
- encouraging the use of clean coal technologies through regional cooperation
- encouraging the perception of coal as a cleaner fuel as a result of clean coal technologies.

ASEAN has adopted a comprehensive integration approach which should serve as an example for similar ventures in the Asia-Pacific region. It has brought together several countries determined to develop common policies and regulations in the interests of development, better living standards and the welfare of its citizens. Moreover, ASEAN has clearly demonstrated its commitment to environmental issues and climate change which should not be viewed from a narrow perspective but a broad one. Therefore, ASEAN is committed to pursuing a broad approach, to play its role in taking voluntary and appropriate mitigation actions as well as adaptation measures enabled by technology transfer. It is also committed to the provision of concessionary financial assistance and capacity building to address climate change issues in a proactive and responsible manner.

b) South-Asian Association for Regional Cooperation (SAARC)

SAARC might be another regional political organization in Asia which can influence countries within the region to adopt climate change mitigation measures. It was created as a platform promoting economic, technological, social and cultural development among the countries within the region. The eleven stated areas of cooperation are agriculture, education, culture and sports, health, population and child welfare, the natural environment and meteorology, rural development, tourism, transport, science and technology, and communication.

However it is a loose organization without any legal personality. Decisions agreed upon during the meetings and summits are not binding and serve only as guidance for national legislatures. Nevertheless SAARC could be used as a forum for promoting a low-carbon economy and sustainable development within the region. The organization has already recognized natural environmental degradation and climate change as one of its priorities and undertaken stapes to mitigate these urgent threats.

The SAARC environment ministers meeting in Dhaka in 2008 adopted the SAARC Action Plan on Climate Change. The objectives of the action plan were to identify and create opportunities for activities achievable through regional cooperation and south-south support in terms of technology and knowledge transfer, to provide impetus for a regional-level action plan on climate change through national level activities and to support the global negotiation process of UNFCCC through a common understanding or elaboration of the various negotiating issues to effectively reflect the concerns of SAARC member states. The thematic areas of the action plan included adaptation to climate change, actions for climate change mitigation, technology transfer, finance and investment, education and awareness programs, management of impacts and risks associated with climate change and capacity building for international negotiations.

Moreover the sixteenth SAARC Summit held at Thimpu, Bhutan, in April 2010 was dedicated to the theme of climate change. The summit declaration, which coincided with SAARC's silver jubilee, was termed "Towards a Green and Happy South-Asia". The Thimphu Statement on Climate Change adopted at the summit meeting called for a review of the implementation of the Dhaka Declaration and the SAARC Action Plan on Climate Change and ensures its timely implementation. There was an agreement to establish an Inter-governmental Expert Group on Climate Change to develop clear policy direction and guidance for regional cooperation as envisaged in the SAARC Plan of Action on Climate Change. It was resolved that the Inter-governmental Expert Group on Climate Change meet at least twice a year to periodically monitor and review the implementation of this statement, make recommendations, and submit its report to SAARC environment ministers.

The Thimpu Statement committed to continue to pursue comprehensive regional self-reliance efforts and agreed to:

- Undertake advocacy and awareness programs on climate change, among other things, to promote the use of green technology and best practice to promote the low-carbon, sustainable and inclusive development of the region;
- Commission a study to explore the feasibility of establishing a SAARC mechanism which would provide capital for projects that promote low-carbon technology and renewable energy and the establishment of a Low-carbon Research and Development Institute at a South-Asian University;
- Incorporate science-based materials in educational curricula to promote better understanding of the science and adverse effects of climate change;
- Plant ten million trees between 2010 and 2015 as part of a regional afforestation and reforestation campaign;
- Establish institutional links among national institutions in the region in order to, among other things, facilitate the sharing of knowledge, information and capacity building programs in climate change related areas;
- Commission a SAARC Inter-governmental Marine Initiative to strengthen the understanding of shared oceans and water bodies in the region;
- Commission a SAARC Inter-governmental Mountain Initiative on mountain ecosystems, particularly glaciers and their contribution to sustainable development and livelihoods;
- Commission a SAARC Inter-governmental Monsoon Initiative on the evolving pattern of monsoons to assess vulnerability due to climate change;
- Commission a SAARC Inter-governmental Climate-related Disasters Initiative on the integration of Climate Change Adaptation with Disaster Risk Reduction.

c) Asia-Pacific Economic Cooperation (APEC)

APEC is an organization which brings together 21 countries in the Pacific region. It has aspirations to become the leading regional organization and the biggest free trade market in the world. APEC's economies account for over 50% of global GDP. APEC is a non-binding organization without any legal personality based fully on voluntary implementation of decisions. APEC acknowledged that climate change is emerging as a threat to its members and global stability. The organization is trying to address this issue mainly through mitigation measures aimed at increasing cooperation in the energy market (APEC Yokohama Declaration 2010).

In 2007, APEC Leaders proposed a regional goal to reduce energy consumption by at least 25% by 2030. To this end, APEC ministers determined to improve energy efficiency and support the use of cleaner and more efficient energy technologies by setting individual goals and action plans; collaborating with the International Energy Agency (IEA) to develop energy efficiency indicators; sharing information on energy efficiency policies and measures; and encouraging APEC economies to contribute to and utilize the APEC Energy Standards Information System (ESIS).

Member states are held accountable through the APEC Peer Review Mechanism on Energy Efficiency. This peer review is also a vehicle for economies to share their respective policies, experiences, information and ultimately to improve energy efficiency.

APEC helps member states to meet their climate change goals. For example, many of the established APEC working groups assist member states to address their climate change goals through:

- **The Energy Working Group** informs energy policymakers, draws advice from the business community and industry experts, and collaborates with other international bodies, including the IEA, the Renewable Energy and Energy Efficiency Partnership and the Energy Charter Secretariat;
- **The Asia-Pacific Network for Energy Technology** enables economies to collaborate in energy research in the region, particularly in areas such as clean fossil energy and renewable energy resources;
- **The Energy Security Initiative** comprises short-term measures and long-term policy responses to address the challenges facing the region's energy supply.

The Environmental Goods and Services Work Program

During the meeting held in Singapore in July 2009, as APEC trade ministers prepared for economic recovery, they recognized climate change as “one of the biggest challenges confronting the world” and determined to “ensure that economic growth is consistent with environmental sustainability.”(Statement of the Chair 2009)

In order to support the development of the Environmental Goods and Services (EGS) Sector and to coordinate relevant APEC projects, the EGS Work Program comprises four main components:

1. Developing new and better environmental goods and services through innovation, research and development;
2. Focusing efforts and investment to increase the supply of cleaner and more energy efficient technologies;
3. Supporting projects that facilitate and liberalize trade in environmental goods and services;
4. Create incentives for the market to increase research and development and investment in environmental goods and services.

3.3 Regional Financial Institutions Involved in Climate Change Mitigation in Asia

The financing needs for climate change mitigation and adaptation are uncertain and large. Reflecting the uncertainties associated with potential climate change scenarios and their likely impact, various estimates of financing needs for climate change mitigation and adaptation show

wide diversity. According to UNFCCC, mitigation measures needed to return GHG emissions to current levels by 2030 require investment and financial flows of US\$200 billion to US\$210 billion per annum (World Bank 2008). Investment needs for adaptation in developing countries in 2030 are estimated at US\$28 billion to US\$67 billion. Estimates made by other agencies add to the diversity.

An extensive architecture on financing for climate change mitigation and adaptation has started to develop at the global level, although the earmarked funds fall far short of the requirements. The main dedicated sources of financing for mitigation at the global level include the Clean Development Mechanism (CDM) and various dedicated funds managed by the Global Environment Facility (GEF) and the World Bank. In 2007, the value of primary CDM transactions was US\$7.4 billion, which is estimated to have leveraged US\$36 billion of flows to developing countries. GEF had about US\$250 million per annum in grants available for mitigation during 2006–2010. The Adaptation Fund (financed through a 2% levy on revenue generated by the CDM and through voluntary contributions), is a key fund dedicated to climate change adaptation and is estimated to be US\$80 million to US\$1 billion per annum by 2012. Other important adaptation funds include UNFCCC Special Funds (about US\$270 million) and a portion of the GEF Trust Fund (US\$50 million until 2010). The Global Facility for Disaster Risk Reduction, with US\$48 million during 2007–2008, is another source of financing for adaptation. Dedicated funds that support both mitigation and adaptation include the World Bank's Climate Investment Funds (about US\$6 billion) and the European Commission's Global Climate Change Alliance (GCCA). In addition to these dedicated funds, most global multilateral development organizations and several bilateral agencies have started to emphasize climate change mitigation and adaptation in their regular operations, which is making available more funds for relevant activities. Similarly, many other international organizations—such as the Consultative Group on International Agricultural Research (CGIAR), the World Health Organization (WHO), the United Nations Development Program (UNDP), and the World Meteorological Organization (WMO)—have or are developing programs mainly to finance climate change adaptation in the areas pertinent to their activities. Governments in many countries have also started to provide financial support for climate change mitigation and adaptation activities within their territories. These are resulting in national programs and activities, which are the key building blocks of the global collective fight against climate change. However, national and global efforts alone are not sufficient to address the climate change challenges comprehensively.¹⁹

Regional institutions and regional financing arrangements play a critical role in the collective global fight against climate change. Indeed, financing measures to combat climate change have started to develop at the regional level. However, as climate change is a global public good, the current global debate on the subject seems to be paying inadequate attention to the important role that regional financing arrangements will have in this area.

The establishment of regional financing arrangements for climate change adaptation and mitigation in the Asia and Pacific region has started well, but the process is still at a nascent stage. The process needs to be nurtured and supported as part of the larger push for sustainable development in the region.

Other than the ADB, there are no significant financing arrangements on climate change in the Asia and Pacific region, including subregional organizations such as the Greater Mekong Subregion (GMS), ASEAN, CAREC, and SAARC. The ADB provides a good example of regional financing arrangements on climate change. In addition to its regular financing as a regional development bank with increasing emphasis on climate change, the ADB has several

¹⁹ Sharan, D. 2008. Financing Climate Change Mitigation and the Adaptation Role of Regional Financing Arrangements. Sustainable Development Working Paper Series. Manila: ADB.

dedicated funds for financing climate change mitigation and adaptation in the Asia and Pacific region (ADB 2009). They perform a variety of functions, including mobilizing concessional resources, catalyzing private capital, and maximizing market mechanisms. All these funds are regional in coverage (with activities limited to the Asia and Pacific region), and based on a mixture of regional and global financing.

The first of the following funds covers both mitigation and adaptation. The following three focus mainly on mitigation efforts. The last two are ADB regional funds that are increasingly being used to finance climate change related activities.

Climate Change Fund (CCF)

The CCF was established in May 2008 to provide grant financing for projects, research, and other activities to address the causes and consequences of climate change in ADB's Developing Member Countries (DMCs). The CCF invests in projects that lead to reducing GHG emissions or adapting to climate change. It seeks to address climate change by scaling up DMC mitigation and adaptation activities in diverse areas including forest and land-use management. ADB provided an initial contribution of US\$40 million to the CCF. The fund is open to further contributions from countries, development organizations, foundations, the private sector, and other sources.

3.3.1 Clean Energy Financing Partnership Facility (CEFPPF)

The CEFPPF was established in April 2007. It provides grant financing to ADB's DMCs for improving energy security and transitioning to low-carbon economies through cost-effective investments in technologies and practices. In addition, the facility resources finance policy, regulatory, and institutional reforms that encourage clean energy development. With a target size of US\$250 million, CEFPPF donor commitments from Australia, Japan, and Norway amounted to US\$83.5 million as of August 2008. Discussions with other donors are at an advanced stage, and more contributions are expected as DMCs identify new projects for financing.

3.3.2 Asia-Pacific Carbon Fund (APCF)

The APCF was established as part of ADB's carbon market initiative (CMI) in May 2007. The fund provides ADB's DMCs with additional financial resources for clean energy projects. The fund provides "upfront" finance for projects eligible for CDM in return for a proportion of certified emissions reduction to be generated until 2012. The APCF has received funding commitments of US\$151.8 million from seven European countries — Belgium, Finland, Luxembourg, Portugal, Spain, Sweden, and Switzerland.

3.3.3 Future Carbon Fund (FCF)

The ADB recently established the FCF for projects that will generate carbon credits after 2012. The fund will enable clean energy project developers to benefit even for post-2012 GHG reductions, thereby leveraging more investments into energy efficiency and renewable energy. The FCF was approved on 4 July 2008 and became operational in early 2009. The initial target size of the FCF is US\$100 million but it may be increased to US\$200 million if there is sufficient demand. The fund is receiving indications of commitments from potential donors.

3.3.4 Water Financing Partnership Facility (WFPPF)

The WFPPF provides financial resources and technical support in the key areas of rural water services, urban water services, and river basin water management, including adaptation to

climate change. For 2007/2008, the WFPF secured donor commitments totaling US\$26 million from Australia, Austria, The Netherlands, and Norway.

Poverty and Environment Fund (PEF)

The PEF is a US\$3.6 million multi-donor trust fund administered by the ADB that promotes the mainstreaming of environmental considerations including climate change considerations into development strategies, plans, programs and projects.

However, the future of non-binding, voluntary pledges is as uncertain as the precise effects of the climate change. Concerns that the targets will not be achieved in Asian countries mirror the situation of other international issues that fell short of results in the region and a subject that has already been debated for at least three decades is the status of Weapons of Mass Destruction (WMD). Despite a large majority of Asian countries accepting the goals of universal disarmament and the curb of WMD transfer in the region, the continent is still home to WMD technologies and systems such as nuclear weapons, missiles, chemical and biological weapons (Kondapalli 2008). Like the status of WMD, climate change is an issue of great complexity and uncertainty and this essential characteristic makes it difficult to deal with, increasing the chances of failure and encouraging short-term thinking. An example is the exploitation of peat land in Indonesia, resulting in the tremendous release of greenhouse gas emissions accompanied by loss of habitat, loss of biodiversity, subsidence and the contamination of underground water channel (Ansari 2011). Demographics, land and natural resources are also common challenges in the region and there is a need for more cooperation among Asian states, so that adopting a common approach on global issues is a first step towards the success of non-binding, voluntary pledges, including those for climate change.

4. ANALYSIS TO DETERMINE THE POTENTIAL, OPTIONS, AND CHALLENGES ASSOCIATED WITH REGIONAL-LEVEL MONITORING, REPORTING, AND VERIFICATION (MRV) SYSTEMS

MRV stands for Monitoring, Reporting and Verification. The concept was first introduced in the Bali Action Plan (BAP) under the United Nations Framework Convention on Climate Change (UNFCCC). The BAP envisages MRV of nationally appropriate mitigation commitments or actions for developed countries, MRV of nationally appropriate mitigation actions (NAMAs) for developing countries and MRV of financial and technical support for NAMAs.

Later, the 2009 Copenhagen Accord provided a broader vision of the overall scope and main goal of the MRV procedures to be created: "Non-Annex I Parties to the Convention will implement mitigation actions [...] Mitigation actions taken by Non-Annex I Parties will be subject to their domestic measurement, reporting and verification the result of which will be reported through their national communications every two years. Non-Annex I Parties will communicate information on the implementation of their actions through National Communications, with provisions for international consultations and analysis under clearly defined guidelines that will ensure that national sovereignty is respected. Nationally appropriate mitigation actions seeking international support will be recorded in a registry along with relevant technology, finance and capacity building support [...]. These supported nationally appropriate mitigation actions will be subject to international measurement, reporting and verification in accordance with guidelines adopted by the Conference of the Parties" (Paragraph 5).

The general terms of the Copenhagen Accord as described above do not provide a clear understanding of how the MRV system will function and how its requirements will be implemented. It allows, however, the narrowing down of the key issues the Asian region has to address when thinking ahead and preparing for the establishment of an MRV system for climate policy.

When it comes to regional level MRV, the situation becomes more complex. Any such system has to be built from the bottom up. It is not possible to maintain a well-functioning MRVs on a regional scale if it does not operate properly at the national and local levels. There is an increasing need for integrated regional systems which would allow the verification of voluntary pledges already in place and also an increasing need to plan for better future strategy to mitigate the damaging impacts of climate change.

4.1 Revision of Currently Functioning Regional MRV systems

The only fully operating regional MRV scheme is the EU's Monitoring Mechanism Decision (MMD) introduced in 2004 which provides a mechanism for the monitoring of EU greenhouse gas emissions and for the implementation of the Kyoto Protocol. The experience gained through the implementation of the Kyoto Protocol and the various UNFCCC requirements has shown that the current monitoring and reporting system, although it has many merits, needs to be improved in order to provide more integrated, more reliable and more easily accessible data on the entire region. Envisaged revisions or additional provisions in the report prepared for the EU's Directorate-General for Climate Action ("DG CLIMA"), recommend improvements of the legal text in the following areas:

- An improved specification of means and processes of submission for requested information and reports (e.g., electronic vs. paper means);
- Mandatory electronic reporting templates (e.g., related to projections and policies and measures);
- A requirement that reports detail relevant methodological issues related to the reporting of projections, policies and measures.
- Harmonization of the main modeling parameters used by the member states for their projections (fuel price, carbon price);
- The establishment of a new set of indicators for both annual and projected emissions;
- A mandate to establish enhanced methodological requirements for the monitoring of the effect of policies and measures on greenhouse gas emission projections;
- A requirement to establish national systems by member states for the reporting of projections, policies and measures.

The problems identified through the implementation of the MMD also relate to the need to increase the synergies in reporting under different directives. The MMD touches on overlapping areas with the reporting under the EU Emission Trading Scheme (EU-ETS), with the reported information in the European Pollutant Release and Transfer Register (E-PRTR), with the Directive on National Emission Ceilings for certain atmospheric pollutants (NEC Directive) and the F-Gas Regulation. While reorganizing of substantial reporting requirements will depend on

modification of the individual legal instruments, the use of consistent data is an area in which the report proposed revisions to the MMD.²⁰

4.2 Potential and Options for Integrated Regional MRV systems

There could be several different aims of any MRV provisions on GHG emissions and actions included in the regional MRV structure. These aims could include:

- Generating a more timely and comprehensive picture of regional/national or sectoral GHG emissions trends (e.g., in order to assess if global action on GHG mitigation needs to be enhanced);
- Collecting qualitative or quantitative information on what GHG mitigation actions different regions/countries are taking (e.g., in order to provide international recognition for these actions);
- Quantifying the GHG impact of such actions (i.e., calculating the difference between performance and baseline);
- Identifying promising areas for future GHG mitigation action in the regional sphere;
- Building trust, by providing information for an MRV system that will inform the factual state of GHG mitigation actions, reflecting the actions/commitments that different countries have agreed to;
- Allowing the exchange of information about applied actions and their performance in GHG emission reductions regarding regional conditions.

While these options are not all mutually exclusive, they do differ from each other, sometimes substantially. The design of any regional MRV systems may therefore vary, depending on which of the above aims they are trying to fulfill. These aims are all potentially valid and agreement on which of them will be fulfilled by the MRV provisions will need to be made during the negotiation process.

The process of carrying out MRV of mitigation actions can also vary. Thus, countries may need to agree on specific issues such as:

- **measurement:** countries could agree to guidelines, rules and best practice to be followed when estimating the impacts of measures that mitigate GHG emissions. Agreement will also be needed on whether measurement/monitoring requirements should vary, for example according to the type of action. Alternatively, country and action-specific estimation methodologies and processes could be used;
- **reporting:** countries could agree to a common reporting format and common reporting guidelines outlining how actions are reported, such as which language, what units, what timing, where reports are collected, what should be reported and when reporting should take place;
- **verification:** agreement will be needed on the type of verification body or bodies (national or international), what the verification process should look like, how results should be reported, and how to make any necessary adjustments in reports on GHG mitigation.

²⁰ Herold, A., H. Acker, J. Busche, J. Graichen, B. Gugele, H. Hermann, S. Oberthür, S. Seum and K. Seuss. 2011. Review of Decision No 280/2004/EC (Monitoring Mechanism Decision) in view of the agreed Climate Change and Energy Package, Report prepared for Directorate General CLIMA, Berlin.

Agreement will also be needed on the consequences of problems raised at the verification stage.

Countries may also need to agree on some more general issues, such as whether measurement, reporting and verification issues should be considered separately.

The types of actions/commitments considered by the regional MRV can also differ (UNFCCC 2009). These vary from “soft” actions (non-binding) to “hard” actions (binding national targets), with each presenting different MRV-related challenges. These actions can be grouped into five major categories:

- National emission targets (binding or non-binding);
- Other forms of national commitments or actions (e.g., GHG-intensity or energy consumption targets);
- Sectorial emissions targets (binding or non-binding);
- CDM and/or other crediting mechanisms;
- Domestic policies and measures or other non-crediting approaches.

In order to assess progress of the different types of actions/commitments, varying requirements for MRV will be needed both between and potentially also within categories.

4.3 Challenges Associated with Regional-level MRV Systems

There are several challenges associated with regional MRV systems. One of the biggest issues is the transparency of data and its reliability. Another constraint is related to institutional capacity on the national level. Estimating a country’s emissions needs some country-specific activity data (i.e., energy use). Obtaining the activity data, and potentially also country-specific emission factors, requires both time and resources. The resource cost of establishing a country’s emissions inventory can vary widely depending on the country and its economy. For example, developing Brazil’s GHG inventory for its initial national communication involved 150 entities (research centers, NGOs, industry organizations and government institutions) and approximately 700 experts (Paciornik 2008). Moreover, Malawi has pointed out that a huge increase in human capacity is needed to address all of its obligations under the UNFCCC. The country stressed that developing national communications, national adaptation plan of actions, and attending a large number of meetings present a big challenge (UNFCCC 2007). Furthermore, Indonesia, while being among the international front-runners when it comes to climate change mitigation with a voluntary emission reduction target of 26–40% by 2020, in order to gain international recognition for mitigation actions, needs to establish a MRV system. The main gaps and barriers identified for Indonesia to move forward on MRV, NAMAs and low-emissions development in the report²¹ prepared for the European Commission are related to:

- Policy planning at all levels and implementation at the provincial and local level;
- Institutional structure with roles and mandates for MRV and mitigation not clearly defined;
- Technical expertise and capacity to measure existing and estimating future emissions not present in the key institutions;
- Lack of data, data management and quality procedures;

²¹ MacDonald, M. 2010. Scoping study: Developing countries monitoring and reporting on greenhouse gas emissions, policies and measures—Country Report Indonesia. Euroconsult report prepared for the European Commission, Brussels.

- Lack of consistency in methodologies for estimating future emissions.

The above-mentioned issues that appear at the state level could potentially affect any regional MRV institution. It will require a lot of effort and time to create such a body and even more time to make it efficient. It would also require broad regional consensus on the need to create such an external institution. Nevertheless, some countries could perceive the creation of such an institution as a threat for various reasons and refuse to share data or to have data verified by independent international experts.

Another challenge which has to be addressed by the regional institution is data integrity. National targets relevant to GHG mitigation can be expressed in terms other than simply absolute GHG emission levels. For example, national energy efficiency objectives which have been established under the EU Energy End-use Efficiency and Services Directive require that EU member states should achieve energy savings of 1% per year from 2008 to 2017. Other forms of national targets can include energy-intensity or carbon intensity goals. For example, the PRC has established energy intensity goals. The PRC's 12th Five-Year Plan, established a goal of reducing energy intensity, by 16% between 2010 and 2015. The plan also includes a target to reduce the carbon intensity of its GDP by 40–45% from 2005 levels.

The energy savings or reduced energy and carbon intensity resulting from the above targets could also be translated into GHG mitigation terms, such as quantitative emission reductions. For example, the United Kingdom (UK) intends to routinely estimate the carbon savings resulting from the measures outlined in its energy efficiency action plan, and has developed guidance to do so (the UK's Department for Environment, Food and Rural Affairs (DEFRA) 2007). However, because there are currently no specific MRV-related provisions under the UNFCCC for national targets in terms other than absolute GHG emissions, there is a strong need for such a decision to be made. The need for such regulations was highlighted in the 2010 Cancun Accord which stipulates that:

“Internationally supported mitigation actions will be measured, reported and verified domestically and will be subject to international measurement, reporting and verification in accordance with guidelines to be developed under the Convention.” (Para. 61)

The establishment of a MRV institution having a regional scope would be a huge task facing multiple problems and challenges. The biggest issues would appear at the national and regional level as most of the countries in Asia do not have experience with data collecting, processing and sharing. It would also require broad regional consensus on the creation of such body. Moreover, an MRV system covering large number of countries could also face enormous organizational challenges regarding timing, data reliability and consistency.

The best platform for introducing a regional MRV system in Asia would certainly be ASEAN. The biggest advantage of ASEAN is that it has already established international structures and ongoing harmonization of policies. There is also broad understanding among the member states regarding climate change issues and related threats.

Additionally, there is an opportunity for greater involvement of the ADB in the establishment of a regional MRV scheme among its members. The ADB could encourage and support its members in developing national MRVs and try to use regional platforms such as CAREC to promote data collection in a transparent, consistent and integrated way. As one of the main founding institutions of CAREC, the ADB is in a very good position to develop projects leading to the establishment of a regional MRV system for the Central Asia region.

Challenges Related to the Well-functioning of MRV Systems in Asia

An analysis into the Nationally Appropriate Mitigation Actions based on a case study from the PRC concluded that MRV systems might be credible where procedures are encoded in explicit rules that are transparently communicated, include provisions for quality control and quality assurance and are based on institutional arrangements that provide accountability in ways appropriate to the national context. It was suggested that climate MRVs should be based on pre-existing MRVs, such as the ones from agriculture, so as to reduce the costs for both MRV readiness and implementation in developing Asian countries²²).

Another report on monitoring, assessment and reporting systems in the forest resources sector carried out by the Food and Agriculture Organization (FAO) focused on the situation in two Asian countries: Cambodia and the Lao People's Democratic Republic (PDR). The study found that knowledge of ICT and English is poor in both countries and a crucial role is played by the undeveloped ICT infrastructure in both countries. However, forest administration in the Lao PDR is better organized than in Cambodia and more open to using technology. Recommendations included improved access and expertise in the use of the internet and software, increase training, and to decrease dependence on governmental funds as well as self-evaluation (FAO, 2010)

MRVs also have to be treated carefully when it comes to their coverage area, as some important sectors might be omitted or considered together with other branches and this would, to a certain extent, distort facts such as GHG emissions and would increase the likelihood of ignoring factors that might prove crucial not only for their impact on climate but also on the environment and people—for example the transport system.²³

5. SUPPORT SYSTEMS FOR LOW-INCOME COUNTRIES AND CARBON-INTENSIVE SECTORS

Asia-Pacific is a fast-growing region and the developing countries of Asia are changing at a fast pace. While most of the Asian countries are low-income, some of them are considered to be in a transition period while others are seen as under-developed. Consequently, there is a need to address climate change issues with regard to the particularities of each country.

5.1 Low-income Countries

First of all, one should bear in mind that people from under-developed countries suffer the most from climate change. The agricultural techniques practiced are more often than not rudimentary. As a consequence, communities are highly affected by climate change that can easily lead to harvest losses either through unpredictable weather events (storms, longer draught periods) or through modifications to the biodiversity of ecosystems (climatic conditions become favorable for harmful organisms). The lack of economic diversification and the predominance of agriculture raise the degree of vulnerability for people in low-income countries. In this case, costs are very high and relate not only to the spread of the phenomenon and the number of people affected but also to the technical and financial resources of the country itself, which are very limited.

²² Wilkes, A., S. Wang, T. Tennigkeit, and J. Feng. 2011. Agricultural Monitoring and Evaluation Systems: What can we learn from the MRV of agricultural NAMAs? ICRAF Working Paper No. 126. Beijing: World Agroforestry Centre.

²³ ADB. 2009. Rethinking Transport and Climate Change. Manila: ADB.

Although a logical solution at the national level would be the implementation of measures to encourage development of industry and the service sector, this is a difficult task for several reasons and one of them is the financial pressure resulting from the Polluter Pays Principle and other international agreements that limit the industrial capabilities of low-income countries. While international aid often has only a limited impact in low and middle-income countries, there is first of all a need for reform and transparency (WB 2002). In low-income countries, private sector actions and the activities of some non-governmental organizations (NGOs) often lead to be success stories, for example the work of the Grameen Bank in Bangladesh, which provided incentives for local people to use or develop their skills and channel their efforts towards economic diversification, which has also proved to be sustainable.

According to the IPCC: "Citizen groups play a significant role in stimulating sustainable development and are critical actors in implementing sustainable development policy. Apart from implementing sustainable development projects themselves, they can push for policy reform by awareness-raising, advocacy and agitation. They can also pull policy action by filling the gaps and providing policy services, including in the areas of policy innovation, monitoring and research. Interactions can take the form of partnerships or be through stakeholder dialogues that can provide citizens' groups with a lever for increasing pressure on both governments and industry for these sectors to gradually reduce their negative impact."²⁴

Women and education also play a major role in stimulating sustainable development and investing in education means that in the long term, new generations will be aware of the importance of global issues such as climate change and how they can tackle them in a manner that matches the resources and particularities of their country. Therefore, support systems that could be created within low-income countries are:

- An administrative authority that would encourage and supervise the activities of private parties and NGOs. At the same time, these actors should be granted protection and support under national legislation (e.g., tax relief);
- Creation of an innovative national department dealing with sustainable economic diversification in order to make people less vulnerable to climate change;
- Involvement of an independent organization that would ensure transparency in the management of funds;
- Education campaigns that would, at an appropriate stage in the learning process, draw attention to the implications of climate change and how to tackle this issue;
- Development of low-carbon, niche industries (e.g., biofuel industry).

5.2 Carbon Intensive Sectors

Carbon intensive sectors need a different approach and are influenced to a greater extent by national policies and to a lesser extent by private or non-governmental initiatives. According to the ADB, 75% of the total GHG emissions in South-East Asia were due to changes in land use and forestry, 15% to energy and agriculture was responsible for 8% as for year 2000.

a) Forestry

It is therefore a matter of urgency to address the forestry sector, as this sector holds the key to mitigation and adaptation to climate change in the region. Many programs have been

²⁴ IPCC. 2007. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. URL: http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml

implemented in the region primarily to protect forests against further degradation and to prevent further loss of biodiversity and enhance the storage of carbon. This process is broadly described in the ADB report *The Economics of Climate Change* (2009).

Indonesia has reduced pressure on its forests by introducing permanent agriculture systems to farmers practicing shift cultivation. In 2003, the government launched a program known as the National Movement for the Rehabilitation of Forests and Lands, aiming to rehabilitate about five million hectares of forest land by 2009. There were also a number of planting movements conducted by the community, local governments, and the private sector, which by May 2008 had planted about 100 million trees.

In 1998, the Viet Nam National Assembly adopted an ambitious two million ha Reforestation Program (5MHRP) that aimed to establish and restore two million ha of protected forests and three million ha of production forests, and to increase the total forest cover to 43% of the country by 2010, while ensuring environmental protection requirements were met. As of 2003, the 5MHRP had achieved the restoration of about two million ha, largely protected and special use forests.

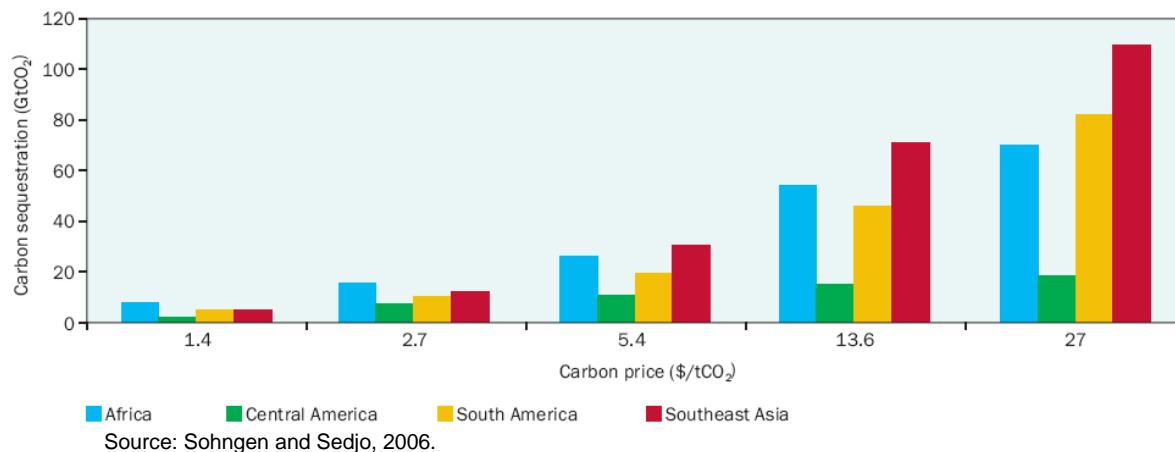
Thailand is also implementing forest protection and reforestation measures for GHG reduction and enhancement of carbon sequestration. Almost every local administration has tree-growing projects for combating climate change. The Bangkok Municipal Authority's signing of a memorandum of understanding in 2007 to cooperate with 35 national agencies to combat climate change is a high-profile example.

These mitigation measures, however, require large investments. The land allocated for this type of mitigation activity will depend mainly on the price of carbon as compared to the financial returns from existing or other land use alternatives. On the other hand, the co-benefits from implementing this type of mitigation are very substantial. Afforestation and reforestation will improve the quality of the environment, reduce soil erosion and degradation, and enhance water quality and availability.

Research carried out by Sohngen and Sedjo (2006)²⁵, calculated the potential of South-East Asia to sequester carbon through avoided deforestation. The relative competitiveness of different regions as a source of carbon sequestration varies with the carbon price (Figure 6). A carbon price above US\$5.4/tCO₂ would make Southeast Asia the most competitive source of carbon storage in all the regions considered, an advantage that grows as the carbon price increases. A carbon price of US\$27/tCO₂ is sufficiently high to make it financially attractive to halt deforestation in the region. Over 50 years, this would mean a net cumulative sequestration of 278 GtCO₂ relative to the baseline and an additional 422 million ha of forests.

²⁵ Sohngen, B., and R. Sedjo. 2006. Carbon Sequestration in Global Forests under Different Carbon Price Regimes. *Energy Journal* 27: 109–126.

Figure 6: Projected Cumulative Carbon Sequestered Through Avoided Deforestation by 2050, by Tropical Region under Various Carbon Price Scenarios



In the case of mitigation through afforestation and reforestation, a review of the existing studies by IPCC (2007) indicates that, for a carbon price up to US\$20/tCO₂, South East Asia is likely to have the potential to mitigate about 300 MtCO₂ per year by 2040, rising to 875 MtCO₂ when the carbon price increases to US\$100/tCO₂.

Deforestation in developing countries, the largest source of emissions from the forestry sector, has remained at high levels since 1990 (FAO, 2005). The causes of tropical deforestation are complex, varying across countries and over time in response to different social, cultural, and macroeconomic conditions. Broadly, the three major barriers to enacting effective policies to reduce forest loss are:

- profitability incentives often run counter to forest conservation and sustainable forest management;
- many direct and indirect drivers of deforestation lie outside of the forest sector, especially in agricultural policies and markets;
- limited regulatory and institutional capacity and insufficient resources constrain the ability of many governments to implement forest and related sectorial policies on the ground.

Despite these challenges, national forest policies designed to slow deforestation on public land in some of the Asian countries scored a success. The PRC government has significantly reduced deforestation rates in response to experiencing severe environmental and public health consequences to forest loss and degradation. In India, the Joint Forest Management program has been effective in partnering with communities to reduce forest degradation²⁶. These examples indicate that strong and motivated government institutions and public support are key factors in implementing effective forest policies.

Options for maintaining forests on private lands in developing countries are generally more limited than on public lands, as governments typically have less regulatory control. However, significant potential may exist for developing a Payment for Environmental Services (PES), which is the most recent approach that provides a direct financial incentive to private forest owners in developing countries for the restoration and retention of forest cover. Governments may also enter into joint management agreements with communities, so that both parties share

²⁶ Bhat, D., K. Murali, and N. Ravindranath. 2001. Formation and recovery of secondary forests in India, with particular reference to western ghats in South India. *Journal of Tropical Forest Science* 13(4): 601–620.

the costs and benefits of plantation establishment. Incentives for plantation establishment may take the form of afforestation grants, investment in transportation and roads, energy subsidies, tax exemptions for forestry investments and tariffs against competing imports (Cossalter and Pye-Smith 2003). The financing mechanisms to fund it include both carbon market-based instruments (Stern 2006) and non-market based channels, for example, through a dedicated international fund to voluntarily reduce emissions from deforestation.

b) Energy

While forestry policies are a priority, the fast-growing sector of energy should not be neglected. The energy sector is the biggest source of global GHG emissions, accounting for more than half of the total. Asia is the fastest-growing contributor to these emissions and according to projections it will increase from 31% of global share in 2007 to nearly 45% by the year 2030. It is projected that under a business-as-usual scenario, many of the South-Eastern Asian countries are likely to rely on fossil fuel in the energy sector. Therefore, the energy efficiency measures should be considered as key solutions in the mitigation of CO₂ emissions, and could account for 40% of CO₂ emission reductions.

Mitigation strategies are available in both the energy supply and demand sectors. On the supply side, major options include efficiency improvements in power generation, fuel switching from coal to natural gas, and the use of renewable energy including biomass, solar, wind, hydro and geothermal resources. On the demand side, the key sources of GHG emissions are residential and commercial buildings, industry, and transport sectors, with several key options for emission reductions, such as:

- *Residential and commercial building sector:* Use of more efficient lighting and electrical appliances, energy efficiency standards and rating programs, improved insulation, and behavioral change;
- *Industry sector:* Use of energy efficient technologies, improved management practices such as energy auditing and benchmarking, heat and power recovery, fuel switching, and material recycling;
- *Transport sector:* Switching to biofuels, introduction of strict emission levels on cars, use of hybrid/electric vehicles, better traffic management, popularization of rail and public transport systems, promotion of non-motorized transport, and better transport infrastructure planning.

The implementation of measures leading to the reduction of CO₂ emissions is costly and requires extensive planning and research effort. The possible improvements are often subject to economical and institutional constraints. Nevertheless, some Asian states stepped up their efforts to mitigate their emissions and this was extensively described in a 2009 report from the ADB²⁷.

In the power generation sector in Indonesia more efficient technologies such as the circulating fluidized bed combustion system and the coal-integrated gasification combined cycle have already been introduced. Similarly, increased energy efficiency has been obtained in oil refineries through revamping and reduced gas flaring. Indonesia has also set the goal of increasing the share of renewable energy to 15% of its primary energy mix by 2025. Moreover, the government has mandated Indonesia's national public utilities to purchase renewable energy generated from small- and medium-scale installations. Apart of efforts to increase its share of clean energy production, Indonesia considers the development of mass rapid transport (dedicated bus lines and mono rail) an important measure to reduce CO₂ emissions in urban

²⁷ ADB. 2009. The Economics of Climate Change in South-East Asia: A Regional Review. Manila: ADB.

areas. The government has also introduced plans for the use of alternative fuels (liquefied natural gas and liquefied petroleum gas for public transport and taxis), inspection and maintenance programs, and stronger vehicle emission standards.

In Singapore, the Energy Efficiency Singapore Program is a key strategy in mitigating GHG emissions and addressing climate change for the various end-use sectors. The program focuses on supporting research and development, raising awareness, promoting the adoption of energy efficient technologies and measures, as well as building capabilities and expertise in this area. For example, the Residential Envelope Transmittance Value (RETV) has been developed and incorporated into the Code on Envelope Thermal Performance for Buildings in 2008. Moreover, the Building and Construction Authority introduced Green Mark standards for both residential and non-residential buildings in early 2008. Singapore has shifted towards the use of less carbon intensive fuels, principally natural gas. Singapore's first liquid natural gas terminal should be completed sometime in 2012. Efforts to promote renewable energy sources such as biomass and solar energy are currently focused on research and development. Singapore is also one of the few countries in the world that incinerates almost all of its solid waste. The electricity from the incineration plants contributes 2–3% of Singapore's energy supply. Moreover, Singapore is increasing the energy efficiency of its transport sector by improving and promoting the use of public transport. The government plans to achieve its overall target of 70% of commuters using public transport during rush hour by 2020. A vehicle quota system and electronic road pricing are already used to reduce traffic congestion. A green vehicle incentive scheme to encourage the use of hybrid and compressed natural gas vehicles introduced a discount of 40% for the purchase of new vehicles.

In Thailand, financial incentives for promoting improvements in energy efficiency are being undertaken through a subsidy program for energy efficiency investments based on concessionary loans and tax incentives. The government promotes energy efficiency related information services such as handbooks, e-learning programs in energy conservation, energy clinics, and energy display centers. The Thailand Greenhouse Gas Management Organization initiated eco-labeling, which gives carbon labels to industrial products. Thailand has also developed the Alternative Energy Development Plan, which covers a wide range of power generation and heat from renewable energy sources, including biofuels. The government target is to increase the share of renewable energy to 25% by 2021. There is also an active biofuel program and a target for biomass energy of 3630MW by 2021. Policies in Thailand to mitigate CO₂ from transport include the development of a master plan for large cities, promotion of the mass transit system (e.g., in Bangkok) as well as the use of economic incentives to encourage mode switching, retrofitting and the improvement of engine efficiency, and the promotion of the use of natural gas in vehicles.

Apart from government initiatives to mitigate climate change and pursue green growth, there is also a significant contribution from international institutions. The biggest and most active regional organization supporting green economic development on the continent is the ADB. Its wide portfolio of green projects across the continent was published in ADB's Climate Change Program in 2010. The ADB's projects range from energy efficiency and renewable energy schemes through to investments in emission reductions from transport, waste disposal and conventional power plants.

ADB supports the Philippine Energy Efficiency Project, the first Asian nationwide program to replace incandescent bulbs with Compact Fluorescent Lamps (CFLs) and marks the first time an Asian country has received carbon market credits for the replacement of CFLs. The expected benefits from the CFL replacement scheme are impressive: saving the country US\$100 million in annual fuel costs, and allowing it to save a further US\$450 million in new power plant construction costs. National CO₂ emissions will be reduced by 300 KtCO₂ a year,

enabling the Philippines to receive approximately 300,000 tons of certified carbon market credits annually. The Philippine initiative should be straight forward to replicate in other countries across the region. Efforts are currently underway in Viet Nam to adapt the project design to country conditions.

The bank also supports projects aiming at propagating the use of appropriate technologies for heating and cooling in buildings, which has for many years improved the pattern of energy use in cities. District Energy Systems (DES) are a prominent example of such technologies. The DES involves connecting a large number of buildings to centralized thermal energy plants that are economically viable and environmentally-friendly. If combined heat and power is used for such centralized plants, energy efficiency is further improved through the use of waste heat. In the PRC, ADB provides a credit line to support the investment plan of Dalkia, a leading energy services company that operates more than 700 DESs throughout the world, to rehabilitate and expand DESs across the country in partnership with municipalities. Energy savings from DESs provide opportunities to reduce GHG emissions and may generate carbon credits under the Clean Development Mechanism (CDM).

Working on a goal to provide 100 million people in the region with a clean and modern energy supply by 2015, ADB's Energy for All Initiative (E4ALL) has taken renewable energy development to off-grid, poor communities. In Orissa and Maharashtra, India, E4ALL has given a grant to 43 village entrepreneurs to set up battery-charging stations for solar lanterns which are rented out to villagers for a nominal daily fee. In Bhutan, 35 semi-literate women were trained in PV panel installation, in order to install and maintain the solar panels provided to 504 poor households in 46 remote villages. In Negros Occidental, Philippines, eight far-flung and poor communities are now enjoying electricity from a small hydraulic pump that also irrigates their farms and restores their dry wells.

The PRC launched a three-phase, eight-year clean coal power generation program, Greengen, which will continue until 2013. ADB is co-financing the ongoing construction of the Tianjin Integrated Gasification Combined Cycle (IGCC) Power Plant, the cornerstone of Greengen's first phase. Plants using IGCC technology turn coal into a synthetic gas, removing impurities before burning the gas in a gas turbine. Combined with a carbon dioxide capture and storage function, IGCC technology is now the lowest-cost option to cut carbon emissions from coal-fired power plants by up to 90%.

Rail transport in much of developing Asia has seen a declining market share. The major exception is the PRC, which has steadily expanded its railways and reformed its railway institutions, resulting in a 60% increase in route length since 1980, and a 17,000 km high-speed passenger network under construction. The PRC's ongoing railway projects are co-financed by ADB, including the Lanzhou–Chongqing, Chongqing–Lichuan, Yichang–Wanzhou, and Taiyuan–Zhongwei railway projects. Taken together, the first three projects will reduce the country's carbon emissions by more than 17 MtCO₂ by 2032–2034. They will also result in significant fuel savings. Apart from the PRC, which accounts for two-thirds of ADB's recent rail portfolio, Bangladesh, India, and Uzbekistan have also invested in railway development, with support from ADB.

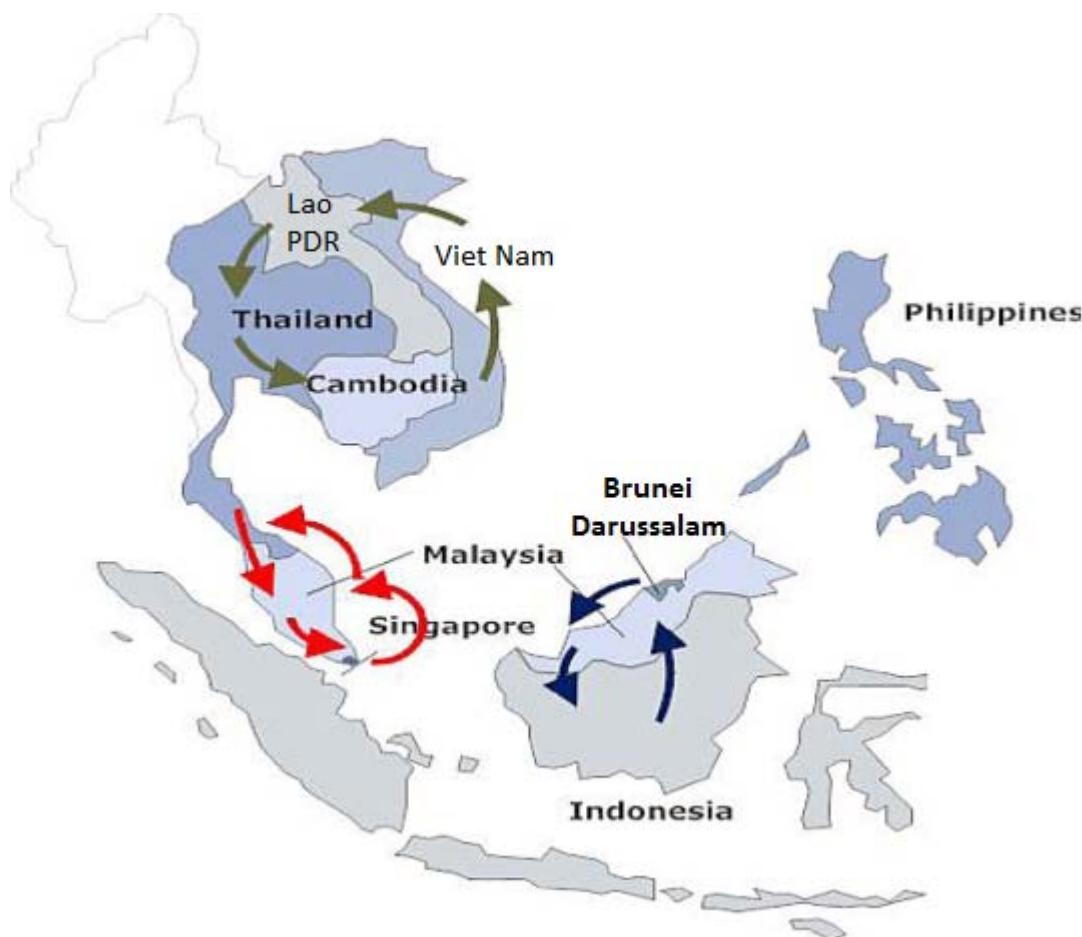
In cities throughout Asia, solid waste is disposed in dumpsites, generating GHGs that contribute to climate change. In Rajasthan, India, ADB is promoting organic waste composting in several urban areas. This will reduce the release of methane into the atmosphere at landfill sites while providing business opportunities for the marketing of compost. The project will also help avoid ground seepage of toxic and contaminated leachate. The project is expected to slash 20 to 28 KtCO₂ emissions annually from 17 towns. It is being developed as a programmatic CDM project, and the carbon revenue can be used to operate and maintain the composting plant.

Apart from the actions mentioned above there is also an unquestionable need to create or extend regional collaboration in the field of trans-boundary energy trade. Market liberalization and privatization has been promoted as a viable policy option for developing countries mainly because increased competition and improved market structures should stimulate further investments.

While it is inevitable that each country pursues its national interests, efforts are also needed to avoid an undue scramble for resources. As such, energy cooperation programs have been accelerated across the Asia in recent years. Collaboration with the neighbors will strengthen the domestic energy reserves and improve energy security through diversification of resources. One example is Singapore, which has maintained strong relations with neighboring countries in energy related programs and on climate change. Japan has established joint energy collaborative projects such as the Energy Silk Road project (with the PRC, Japan, and Turkmenistan) and a trans-Asian gas pipeline network. The trans ASEAN gas pipeline and the ASEAN power grid projects have been set up to ensure complete regional access of the gas reserves and promise greater stability and security of energy supply within ASEAN. Developing a network connecting all ASEAN countries with high-voltage transmission lines (Figure 7) should not only resolve problems of energy shortage, but also bring revenues from the cross-border sale of electricity. Such a scenario may also lead to low CO₂ emissions in the ASEAN region.²⁸ Power grid interconnection in ASEAN is technically possible, but challenging. Technical and political barriers have to be overcome to make such interconnection a reality.

²⁸ Thavasi, V., and S. Ramakrishna. 2009. Asia energy mixes from socio-economic and environmental perspectives. *Energy Policy* 37: 4240–4250.

Figure 7: ASEAN Regional Power Grid Connectivity Opportunities.



Source: Thavasi and Ramakrishna 2009.

Another study²⁹ concentrated only on the Greater Mekong Sub-region countries. However, the PRC was excluded from the analysis. The study found that unrestricted energy resource development and trade within the region would reduce total regional energy system costs by 18% and would reduce total CO₂ emissions by 5% compared to the base case. All five countries, with the exception of Myanmar, would benefit from the expansion of regional energy resources integration in terms of lower energy system costs and an improved environment.

A new concept that could be embraced in the region is the “win-win-win” policy, which seeks to strengthen the fiscal strength of a country, while ensuring life quality today and promoting a sustainable path for the future. Connected to climate change policies, this concept would be a solution for non-performing economic sectors, where production is far below actual potential. What the whole region needs, is to integrate adaptation and mitigation in its processes for sustainable development, poverty reduction and policymaking. Consequently, it is only through a holistic approach that the GHG sector can be managed sustainably in Asia. Nevertheless, such strategies require great administrative capability and very good coordination at both national and international levels and therefore imply the creation of institutional mechanisms that would safeguard the good functioning of the implementation process as well as monitor, analyze and provide feedback. This would not only make policies more efficient but would also

²⁹ Watcharejyothin, M., and R. Shrestha. 2009. Regional energy resource development and energy security under CO₂ emission constraint in the greater Mekong sub-region countries (GMS). *Energy Policy* 37: 4428–4441.

make the state look trustworthy. What the state needs are experts that would make sure climate policy decision are taken in accordance with other national and regional development choices. It is widely held that climate change is influenced not so much by actual climate change policies, but by the policies and reforms that are followed at a national level, mostly for the purpose of economic development. Hence countries from the Asia-Pacific region must understand that putting their economic policies on a sustainable path is the only way to tackle climate change. The Asia-Pacific region needs to take full advantage of its complexity and diversity not only in resources but also in human capital and culture. Hard as it may seem, integrating knowledge from all participants would be the best way to combat climate change in the region and would set an example on the global stage.

6. DISCUSSION ON PRAGMATIC NATIONAL-LEVEL POLICY ACTIONS

Asia has in recent years taken promising steps to adapt to the impact of climate change and to mitigate GHG emissions. Many Asian countries have developed national plans or strategies for climate change, established a ministry or agency as the central point to deal with climate change and its impact, and implemented numerous programs to support adaptation and mitigation activities. But there are still multiple gaps which need to be addressed by national legislations. In particular, there is an urgent need to raise awareness of climate change impacts and risks, to incorporate climate change in development planning and policy making and to create an effective institutional framework for better policy coordination. Moreover, there is an increasing need to invest more resources in climate adaptation and mitigation and to eliminate market distortions which hinder implementation of such actions. Furthermore, Asian states need to strengthen international and regional cooperation in knowledge, technology and financial transfers as well as undertaking more research to fill knowledge gaps on climate change related challenges and solutions at local levels, on their way towards sustainable development and the mitigation of climate change related threats.

6.1 National Policy Measures Regarding Adaptation to Climate Change

Asian states should continue their efforts to strengthen climate change resilience by working on improving adaptive capacity and taking technical and non-technical adaptation measures in climate sensitive sectors. A country's resilience to climate change depends principally on its adaptive capacity, which is subject to the state's economic, social, and human development activities, such as:

- income, inequality, poverty, literacy, and regional disparity;
- capacity and governance of public institutions and public finance;
- availability or adequacy of public services including education, health, and social protection;
- capacity for economic diversification, especially at local levels.

In all these sectors, there are extensive variations between Asian countries and regions as well as significant gaps between the entire region and the developed world. Eliminating these gaps

by supporting strong economic growth and making development sustainable will require a lot of time and effort on Asia's path towards improving its adaptive capacity.³⁰

Strengthening adaptive capacity also requires incorporating climate change adaptation in development planning. Indeed, adaptation should be considered an integral part of sustainable development and poverty reduction strategies with the following priorities:

- stepping up efforts to raise public awareness of climate change and its impact;
- undertaking more research to better understand climate change, its impact, and solutions, especially at the local level;
- providing better access to information and knowledge;
- enhancing policy and planning coordination across ministries and different levels of government for climate change adaptation, including linking climate change adaptation with disaster risk management;
- adopting a universal approach to building the adaptive capacity of vulnerable groups and communities and their resilience to shocks, including developing their capacity to diversify local economies, livelihoods, and coping strategies;
- developing and adopting more proactive, systematic, and integrated approaches to adaptation in key sectors that are cost-effective and that offer durable and long-term solutions.

(ADB 2009)

Many sectors have adaptation needs but water, agriculture, forestry and health require particular attention. Adaptation action has been taken in a number of key sectors where the damaging impacts of climate change across the Asia are the most visible. However the adaptation measures have suffered several market failures. Those market failures arise from ambiguous information associated with large-scale, long-term investments such as climate proofing of building and defensive infrastructure and the need for coordination among large numbers of stakeholders. As a result, private sector actors are not taking a leading role in the provision of adequate adaptation actions. The main measures need to be driven by public policy and government interventions and there is an urgent need to bring pressure on Asian governments to develop and adopt more proactive, systematic, and integrated legislation on adaptation in key sectors. These policies should lead to cost-effective, durable and long-term solutions, as well as focus on the specific country's circumstances in the following sectors:

- Water resource policies should concentrate on improving existing good practice in the field of water conservation/management and apply more widely integrated water management, including flood control prevention schemes, early warning flood systems and irrigation improvements;
- Agriculture policies should strengthen local adaptive capacity by improving public services in the field of climate change forecasts, research and development on heat-resistant crops, early warning systems, efficient irrigation systems, and promote risk-sharing instruments such as insurance schemes;
- The Forestry sector requires policy development to enhance early warning systems and awareness-raising programs to improve local communities' capacity to cope with increasing risk of forest fires due to shifting climatic patterns. Moreover there is an urgent need to implement aggressive public-private partnerships for reforestation and afforestation;

³⁰ ADB. 2009. Rebalancing Asia's growth. *Asian Development Outlook*. March.

- As regards coastal and marine resources consideration should be given to the implementation of integrated coastal zone management plans, including mangrove conservation and planting;
- The health sector needs to focus on expanding or establishing early warning systems for disease outbreaks, health surveillance, awareness-raising campaigns, and infectious disease control programs;
- The infrastructure sector needs policy regulations to implement the climate proofing of transport-related investments and infrastructure.

(Brömmelhörster 2010)

6.2 National Policy Measures Regarding Mitigation of Climate Change

The Asian region plays a crucial role in global attempts to stabilize GHG concentrations in the atmosphere. While the response of the largest GHG-emitting developed economies under the UNFCCC is key to a successful global solution, Asian governments should also start to play an important role in the global solution given that its rapid economic and population growth will likely cause its GHG emissions to grow further, and because a low-carbon growth path brings significant economic benefits. Based on the contribution of different sectors, mitigation should target land use change, the forestry and energy sectors, and agriculture.

The forestry sector is one of the largest contributors to GHG emissions in Asia, and should be paid special attention to in national policies aiming for successful emission reduction. Major mitigation measures for the forestry sector include maintaining or increasing forest areas through REDD standards implementation and improving forest management. Reducing and preventing deforestation has the greatest potential for mitigation actions in the short run.

Asian governments should step up efforts to reduce deforestation, support reforestation and afforestation, and enhance national and provincial governance systems for sustainable forest management. These require policy reforms appropriate to national and local circumstances, such as:

- monitoring and controlling illegal logging;
- increasing governmental rent received for forest concessions;
- lengthening concession cycles and lease security;
- increasing competition in accessing concessions.

Since forests are also home to many indigenous communities, policies must be designed to fully recognize and respect their rights and priorities, and ensure their participation in the design and implementation of REDD policies.

(Yasmi et al. 2010)

Mitigation in the energy sector can be achieved at a relatively low cost or even a negative net cost. Asian states have significant mitigation potential in both the energy supply and demand sectors.

- On the supply side, major mitigation options are policies promoting efficiency improvement in power generation, fuel switching from coal to natural gas, and use of renewable energy including biomass, solar, wind, hydro and geothermal resources.

- On the demand side, the key tools to reduce GHG emissions are policies regulating the improvement of energy efficiency in the most energy intensive sectors such as residential and commercial building, industry and transport.³¹

There are many “win-win” mitigation options for Asia, with cost savings from mitigation exceeding expenses. Energy efficiency improvement measures fall into this category. However there are numerous binding constraints to the adoption of these options. Such binding constraints could be overcome by balanced state legislation aimed at:

- addressing information, knowledge, and technology gaps;
- reducing market and price distortions;
- easing policy, regulatory, and behavioral barriers;
- resolving deficiency in the necessary finance for investments in the energy sector.

Moreover policies aimed at increasing climate change mitigation in the energy sector should also address a prominent market distortion in the energy sector which is present in many Asian countries, related to general subsidies for fossil fuels and electricity generated from such fuels. Governments should gradually reduce general fuel subsidies and provide targeted subventions only to the poor and vulnerable.

Given its rapid economic and population growth Asia's energy demand is likely to continue to expand, and new sources of energy supply will have to be found in the long term. With the support of existing financial transfer and technology cooperation mechanisms Asian governments should step up their efforts in developing and switching to clean, renewable, and low-carbon energy sources as well as clean and sustainable transport systems. Governments should support the greening of energy and transport industries by putting in place or further strengthening appropriate policy frameworks, creating appropriate financial and tax incentives, and supporting research and development. Public sector energy investment should incorporate the negative effects of GHG emissions in cost benefit analysis.³²

The Asian continent has great potential for carbon sequestration in agriculture. Major mitigation options which should be considered by policy and legislation makers include:

- improved crop and grazing land management;
- restoration of organic soils (including peat land) that are drained for crop production, and restoration of degraded lands;
- livestock management;
- manure and bio-solid management, and bioenergy use.

(IPCC 2007)

Such measures can lead to a reduction of fertilizer and methane related emissions, reversal of emissions from land use change, and increased sequestration of carbon in the agro-ecosystem. However, development and implementing of such measures in Asia has so far been very slow.

Measures for reducing GHG emissions from the agriculture sector could be explored through a combination of market-based programs, regulatory measures, voluntary agreements, and

³¹ ADB. 2009. Rebalancing Asia's Growth. *Asian Development Outlook*. March.

³² Renewable Energy and Energy Efficiency Partnership. 2008. Renewable Energy Regional Policy Analysis Report. Washington International Renewable Energy Conference (WIREC). URL: <http://www.reeep.org/128/publications.htm>

international programs. Examples of market-based programs are taxes on the use of nitrogen fertilizers, and reform of agricultural support policies. Regulatory measures could include limits on the use of nitrogen fertilizers and cross compliance of agricultural support to environmental objectives. Voluntary agreements on better farm management practices could be promoted, alongside labeling of organic products. International programs could support technology transfer in agriculture.

Although it has been suggested that factors such as political culture and electoral politics are neutralizing the negative impact of corruption in Asia, the reality is that corruption strongly undermines trust in the democracies of the region (Chang and Chu 2006). It is often the case that the bureaucratic and political elites carry out reforms with the purpose of safeguarding their own interests and the ultimate outcome is different from the initial plan (Cheung 2005). Another element that hinders straightforward reforms and adaptation policies is the insufficient staff training. In the developing countries of Asia, reforms are usually developed by international agencies and citizens are often left outside the decision-making process and cannot understand or adopt the appropriate course of action. What is more, reform packages are often based on assumptions valid for developed countries, but are often, to a greater or lesser extent, irrelevant to the developing country that it is aimed at (Bowornwathana and Wescott 2008). Asian countries are diverse and need a careful approach that takes into account the specifics of every country, otherwise the result is unsatisfactory. This has to take place not only at the local and national level, but also at the regional level, and countries need to better understand the needs and constraints of their neighbors and be ready to make balanced compromises. In this regard, electoral prospects, pressure-groups and inefficient, loose parliamentary debates are still great challenges for Asian countries. Finally, a problem regularly encountered in Asia is the superficial approach of reforms that are mostly conducted at a fast pace in offices, leading for the most part to failure because the necessary structural improvements are implemented more slowly.

5. CONCLUSION

Despite evidence of increased economic integration and expanding regional cooperation, Asia's diverse geography, culture, and political norms have complicated progress toward a single architectural arrangement comparable to the EU or the North American Free Trade Agreement. Countries in Asia are divided by the world's tallest mountains, most treacherous seas, and deepest jungles. They are further divided by different religious, ethnographic, and cultural identities. Politically, they range from democracies to autocracies. Moreover, a long history of cultural rivalry continues to cast a shadow over a region marked by jarring shifts in the balance of power.

Unlike Europe, which has integrated its defense capabilities to deal with external threats in the shared conviction that state rivalry must be replaced by regional cooperation, Asia does not have a natural set of organizing principles that could drive the continent toward political integration. Indeed, with Asian peace and security largely guaranteed by the US presence in the Asia-Pacific region even after the end of the Cold War, one might argue that neither concerns over internal friction nor those over external challenges are much of a catalyst for integration.

A focus on the EU as a potential model for Asian integration is probably inappropriate: conditions that would favor such a structure are not present at this time. Given the diverse threat perceptions, political norms, and levels of economic development, the process of integration in Asia will likely remain fluid and unbalanced for some time to come. Indeed, where European integration was largely initiated through a top-down design by a handful of visionaries originating from German and French elites who shared a common vision for the future, Asian integration is

much more likely to result from a networking of multilateral cooperation from the bottom-up—often in spite of rivalry and competition among the region's leaders.

Climate change is a major challenge for Asia not only because of the number of emitters and the contradictory national motivations for mitigation and adaptation strategies but also because Asia is projected to be significantly affected by the consequences of climate change. Areas with a high population density, relatively low economic development and geographical sensitivities place a disproportionate burden on Asia in dealing with the impacts of climate change. The melting of the Himalayan glaciers due to global warming could cause floods followed by water shortages and land degradation that would affect a population of one billion. In Central and South-Asia, crop yields could decrease by 30%, creating food insecurity in predominantly agricultural economies. Today, 1.4 billion people live in low-lying regions of Asia. With rising sea levels, these populations face the acute threat of permanently losing the coastal land where they live and make their livelihoods. These projections make combating the adverse effects of climate change an urgent issue. The way Asia addresses the interconnected problems of energy, climate change, disaster relief, and growth will have profound implications for the region and the world.

Although regional organizations have begun to serve as consensus builders on the desirability of addressing climate change, they have yet to develop much of a profile in creating common policies or response mechanisms. Because Asia does not have a single dominant institutional superstructure, this consensus-building role is spread over a variety of organizations and discussion channels with different degrees of authority and varied membership.

Regional organizations have been less effective as mobilizers, and their role when it comes to climate change has been noticeably less concrete and operational than, for example, their role in disaster relief. If one argues that the vigor and effectiveness of regional organizations derive from their track record in bringing together officials and leaders with a common purpose, the climate change issue may help advance that dynamic. Based on the experience of the past decade, Asian institutions are likely to intensify their consensus-building role and expand their work in developing practical approaches to specific problems or sectors. However, they are not likely to transform their climate change work over the next 10 years such that significant progress is made, for example, in the fields of regulatory harmonization or collective standard setting.

Discussions of international cooperation with regard to climate change operate at two very different levels. The one most often in the headlines is the effort to establish global norms and targets for mitigating climate change, controlling emissions, adapting to change that is already inevitable, and paying for both mitigation and adaptation. Those efforts are the focus of the United Nations Framework Convention on Climate Change (UNFCCC) and of the major conferences of its member states, including the Bali conference in December 2008 and the Copenhagen conference in December 2009. Thus far, regional organizations in Asia have played a relatively small role in these negotiations, in spite of an effort by ASEAN and the Asia-Pacific Economic Cooperation forum (APEC) to organize its members' preparations for Copenhagen.

The most developed regional cooperation in Asia takes place within ASEAN. This organization is on the way towards close integration and cooperation in both economic and social affairs but also pays close attention to environmental issues which are closely interconnected with the development and wellbeing of its citizens. ASEAN could serve as the best example and model on regional integration for the rest of the continent, which could learn from its successes and mistakes. There are also other organizations such as SAARC and CAREC which have great potential to play a crucial role in integrating Asian countries in regional groupings serving as a

platform for pursuing green development and strengthening the Asian voice in the international arena. The process of integration in Asia is progressing slowly and it will be sometime before it can be considered successful.

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