The Greater Mekong Subregion (GMS) is developing rapidly in the context of an emerging global economy. Consequently, education and training systems in GMS countries are under increasing pressure to provide the human resources needed to sustain continued growth; health systems are struggling to meet expanding demands for health care in the face of increasing income inequality; and cross-border labor migration is growing rapidly to exploit income-earning opportunities and to meet labor shortages within the GMS. In addition, the cross-border transmission of communicable diseases (some emerging, some existing) and human and drug trafficking are increasing concerns in the subregion. There is also growing concern about the social and health impact of rapid growth and subregional integration in border areas, many of which are inhabited predominantly by highly vulnerable ethnic groups.

Although GMS economic growth has been rapid (averaging over 6% per annum in recent years), it has also been unbalanced within the subregion. There are still substantial differences in levels of income and earnings among GMS countries and in the degrees of development of their social sectors. For example, per capita gross domestic product (GDP) ranged from $742 to about $5,000 among the six GMS countries in 2010, while values of the Human Development Index ranged from 0.483 to 0.682 in 2011. These differences provide a strong rationale for subregional cooperation.

However, the gaps also make effective cooperation difficult to achieve in some areas. There is a risk that subregional cooperation can result in an unequal distribution of the benefits of GMS human resource development (HRD) cooperation among countries, as well as within countries between the poor and the nonpoor, if effective countermeasures are not adopted.

There is an urgent need to reform, strengthen, and harmonize GMS vocational and technical training standards, and to harmonize labor migration policies in order to meet labor demand across the region and provide skilled and unskilled workers.
with cross-border employment opportunities. However, cross-border labor migration increases the risk of spreading infectious diseases, such as tuberculosis and HIV/AIDS, from one country to another. These risks are heightened by the fact that there are large differences among GMS countries in the prevalence of such communicable diseases. Migrants also have difficulties accessing education and health services while residing in another country. The absence of systematic information about labor markets in the subregion makes it more difficult for GMS countries to provide appropriate training and information to their populations to enable them to exploit cross-border opportunities in skilled employment.

HRD involves various activities that provide vital inputs to a growing economy, including education and training, and health and nutrition services that enhance productivity or prevent catastrophic disease outbreaks that can lower economic growth. The main instruments of HRD are (i) investments in education, health, labor and migration, and social development that improve people's productivity in an equitable manner; and (ii) national, regional, and international policies to support that goal. Because HRD increases people's productivity (creates human and social capital), a more equitable distribution of HRD outcomes both between and within countries contributes to poverty reduction, political stability, and national security. HRD provides opportunities for ethnic groups, women, and other vulnerable segments of the population. Finally, HRD contributes directly to human welfare. For example, most people place a very high value on good health, literacy, personal security, and social inclusion. HRD contributes to these by not only reducing income poverty but also satisfying basic human needs.

Opportunities for Human Resource Development Cooperation

The GMS consists of a group of geographically contiguous countries, which are increasingly linked along several transport corridors that provide unique opportunities for economic cooperation and integration in such sectors as agriculture, energy, transport, and tourism. These opportunities extend well beyond the areas immediately bordering the Mekong River and are not available in either smaller or larger regional and international groupings, such as the Mekong River Commission, the Association of Southeast Asian Nations (ASEAN), or Asia-Pacific Economic Cooperation.

A GMS Human Resource Development Strategic Framework and Action Plan (2009-2012) was approved in 2009. HRD cooperation and integration within the GMS will (i) contribute to broad economic growth and sustainable social development, (ii) address problems and needs growing out of increased regional connectivity and integration in other sectors, and (iii) help the process of further integration. HRD cooperation is viewed as an important way to support economic growth and social development, and ensure that the benefits of regional cooperation and integration reach the poor. For example, cross-border labor migration has the potential to yield substantial economic benefits to GMS sending and receiving countries and to promote poverty reduction by providing higher income-earning opportunities for the poor.

Harmonization. Different national HRD regulations, standards, policies, and procedures are in some cases a constraint to further GMS integration and economic growth. In these cases, subregional harmonization can assist the cross-border flow of investments, goods and
services, workers, and students. Examples are (i) standardization of labor regulations (e.g., minimum conditions of employment and regulation of child labor); (ii) food and drug regulation; (iii) border health certification; (iv) cross-border migration regulations and procedures (e.g., registering cross-border workers, employment contracts, ensuring migrants’ access to social services, and regulating the activities of private recruitment companies); (v) standardizing teacher training in key areas, such as technical training, language, portability of educational and training qualifications across borders (e.g., the transfer of credits among GMS universities); and (vi) mutual recognition of skills and qualifications in key occupations to facilitate cross-border migration of skilled workers. Although the potential benefits from harmonization in these and other HRD areas are large, they may take considerable time to achieve.

**Cross-border Issues.** There is an important cross-border dimension to many HRD issues affecting the subregion. Some of these issues have become more urgent as the result of growing subregional connectivity. An important example is the control of infectious diseases. Some communicable diseases (e.g., HIV/AIDS, tuberculosis, and severe acute respiratory syndrome [SARS]) are easily transmitted across borders by migrants and travelers. Avian influenza, an important emerging disease with potentially devastating economic and health impacts, can be transmitted by infected poultry traded across borders. Some vector-borne infectious diseases, such as malaria and dengue fever, cannot be effectively controlled in border areas unless they are controlled on both sides of the border. Other important cross-border HRD issues include (i) the illegal drug trade, which is the main channel of HIV/AIDS infection in some GMS countries; (ii) cross-border trade in fake drugs; (iii) cross-border trafficking of women and children; and (iv) cross-border travel to obtain medical care. Although much of the effort needed to address these problems is national, regional cooperation is also needed. Several GMS projects have already been implemented to address such cross-border issues, including regional projects to control communicable diseases and to study the problem of cross-border human trafficking.

**Additional Value through Subregional Cooperation.** Some HRD activities involve significant economies of scale or public goods or provide other opportunities that can be most effectively exploited through subregional cooperation. Examples include (i) regional disease surveillance, (ii) various types of specialized training or research, (iii) information and communication technology initiatives in education and health (e.g., use of distance learning technologies in training institutions), (iv) quality testing of pharmaceuticals and the manufacture of vaccines, (v) provision of regional labor market information, and (vi) cooperation in developing information and communication materials for ethnic groups (e.g., educational radio programs for ethnic groups in cross-border areas). Development management training for GMS government officials under the Phnom Penh Plan for Development Management is a highly successful example of the additional value that can be obtained through subregional activities. In this case, the value comes from (i) developing a common GMS approach to problem solving (by exposing GMS government managers to a common curriculum), (ii) developing foreign language skills.
among government management participants that can lead to improved communication among GMS government managers in a given area, and (iii) forging personal ties between GMS managers that can contribute to cooperative problem solving.

Exchange of Information and Experience. Most GMS countries face many common HRD challenges (or have faced them in the recent past), such as the need to strengthen priority public health and basic education services. It is clearly useful for GMS countries and strategic partners to share their experience and approaches to dealing with these problems. Examples include (i) strengthening education and health systems, (ii) improving access to education and health services in remote areas, (iii) food and drug controls, (iv) noncommunicable disease control (including road safety), (v) quality assurance in education and health services, (vi) governance reforms in education, (vii) national planning and results monitoring in education and health, (viii) decentralizing education and health services, (ix) developing social security systems and other social protection mechanisms, and (x) public administration reform. Information, good practices, and experience can be exchanged through meetings and forums, strengthened institutional links and networks, training, and related activities under the Phnom Penh Plan, and by using advanced information and communication technologies to disseminate information.

HRD Thrusts Under the GMS Strategic Framework 2012–2022

The GMS Strategic Framework 2012–2022 includes activities that contribute to meeting the HRD goals of the GMS countries through subregional programs on education and skills development, and labor and health issues. One major accomplishment has been the Phnom Penh Plan for Development Management to build capacity among GMS government officials. A second major accomplishment has been carrying out projects on the prevention and control of communicable diseases, including HIV/AIDS. A GMS Human Resource Development Strategic Framework and Action Plan was approved in 2009. During 2003–2011, a total of 1,698 persons from the GMS countries received training that covered some 89 learning programs and themes.

GMS strategies in other sectors have frequently cited the need for complementary investments in HRD. The GMS Tourism Strategy, for example, estimates that 2.5 million personnel will need to be trained in tourism during 2006–2015. Similarly, the benefits from improved connectivity in the transport sector depend critically on the education levels of the population residing along transport corridors.
GMS National HRD Achievements and Plans

Cambodia. Cambodia has made significant achievements in education, health, labor and migration, and social development. The country’s priorities for subregional HRD cooperation are harmonization of standards in education and skills training, skills assessment for migrant workers, harmonization of labor migration policies to meet subregional labor demand, provision of cross-border employment opportunities for skilled and unskilled workers, formulation of instruments to implement the ASEAN Declaration on Protection and Promotion of the Rights of Migrant Workers, enhancement of health promotion activities on disease prevention and epidemic preparedness, and prevention of child labor and human trafficking.

People’s Republic of China. The PRC has made significant progress in HRD cooperation. In health, the PRC hosted the 2nd GMS Public Health Forum in 2009 and conducted cross-border health cooperation and capacity building programs. In education, the PRC provided scholarships to neighboring GMS countries, conducted short-term training and exchange programs, and continued financial support to the Phnom Penh Plan for Development Management. Seminars were held to promote cooperation in labor and migration. Challenges relate to the negative impact of subregional connectivity and globalization on communicable diseases, irregular migration, and issues relating to women and ethnic minorities. Continued support from the Asian Development Bank and other GMS member countries on health concerns, creation of educational cooperation platform, and training for immigration officers will be stressed in future work plans.

Lao People’s Democratic Republic. The Lao People’s Democratic Republic (Lao PDR), in collaboration with its development partners, has made significant progress in key areas of education and health development. In education, the country faces a lack of practical skilled teachers, expertise in curriculum reform, and competency standards for teachers, among other problems. In health, dengue has become a major public health issue, HIV/AIDS is on the increase, and so are noncommunicable diseases and road traffic-related injuries. Future activities in HRD could include competency-based training/assessment and development of competency standards; implementation of the GMS qualification framework; trialing a GMS skills and qualification recognition system; initiatives to address the burden of noncommunicable diseases, injuries, and mental illness; and control of communicable disease outbreaks expected as a result of climate change.
Myanmar. Myanmar has made significant achievements in promoting higher education, improving access to education in border areas, safe labor migration and anti-trafficking, social protection for disadvantaged groups (women, people with disability, elderly, and children), and disease prevention and control. Myanmar’s priorities for HRD cooperation are developing partnerships and resource networking; collaboration in research and faculty development; mutual recognition of technical skills; improvement of technical teaching skills; establishment of quality assurance systems; improved legal, labor migration management; strengthening of labor market information systems; enhanced social protection for migrant workers; strengthened collaboration in communicable disease control; and exchange of knowledge and experience.

Thailand. Thailand’s key achievements in HRD include work on skills development and mutual recognition of vocational skills, bilateral agreements with other GMS countries (Cambodia, Lao PDR, Myanmar, and Viet Nam) in strengthening cooperation against human trafficking, and agreements on HIV prevention at cross-border areas in the GMS. With regard to policy issues and emerging challenges in HRD, Thailand’s priorities are prevention and control of communicable diseases, setting up competency standards in preparation for the liberalization of the ASEAN labor market, and combating human trafficking. Under its bilateral country assistance programs, Thailand has extended soft loans and provided short-term training and scholarship programs on various topics in health and skills development to other GMS countries.

Viet Nam. Viet Nam has a master plan on vocational training, which targets 1 million rural workers up to 2020. The 2008 economic crisis affected vulnerable groups, especially workers in small and medium-scale enterprises and temporary and women workers. To recover and prepare for future productivity growth and competitiveness, there is a critical need for short-term yet sustainable measures to improve employability of retrenched workers and to invest in their re-training and re-skilling. The plan is to develop vocational training systems at all levels and invest in facilities for these workers. The country is concentrating on poverty reduction and gender mainstreaming in order to help workers, especially vulnerable workers, gain access to social and information services. While the quality of the country’s workforce has been improving, the ability of its overseas workers to secure higher paying jobs still faces challenges.
The Greater Mekong Subregion (GMS) has almost 5% of the global population and produces less than 2% of global energy-related fossil fuel emissions; per capita emissions ranking among the lowest in the world. With the exception of the People’s Republic of China (PRC), greenhouse gas (GHG) emissions per capita from energy use in all the GMS countries (0.2–4.19 tons of carbon dioxide per capita) were lower than the global average of 4.76 tons per capita in 2008. However, in terms of land-use change, the subregion accounts for close to 6% of forestry-related greenhouse gas emissions even though it has only 3% of the world’s forest area. All the GMS countries grow rainfed and/or irrigated rice and rice fields are a major source of atmospheric methane, which has 21 times more global warming potential than the same quantity of carbon dioxide. Methane emissions need to be monitored in the GMS countries.

Climate change has important implications both for economic development in the GMS and ecosystem services. It will affect infrastructure, such as energy and transport, in addition to life, property, and other assets across the GMS. Extreme weather events have a significant impact on GMS countries and are likely to increase. Across the subregion, temperatures have risen by 0.5–1.5°C in the past 50 years. Wet season rainfall will increase while dry season rainfall will decrease.

The Intergovernmental Panel on Climate Change (IPCC) projections indicate a sea level rise of 0.6 meters or more by 2100, and this would accelerate if the present rate of ice melt from Greenland and Antarctica increases. Beyond 2100, sea level could rise by up to 7 meters. Major GMS investments in energy and transport, particularly in the Mekong Delta and coastal areas, are likely to be vulnerable to changes like sea level rise. Preliminary studies suggest that several billions of dollars worth of ongoing and planned GMS transport and energy projects are located partially or fully in areas most vulnerable to a sea level rise of 1 meter.
The cost of climate change could reach nearly 7% of GDP per year by 2100 in Thailand and Viet Nam, significantly higher than the global average. In Cambodia, the 2011 floods alone caused an estimated $451 million in damage and $174 million in losses. Between 1966 and 2000, Lao PDR experienced about 30 extreme flood events, with one in 2008 causing a loss of $58 million. All the GMS countries are particularly vulnerable to climate change because their populations are largely agrarian and agriculture contributes more than a third of regional GDP; rural communities in the GMS depend directly on natural resources: crops and livestock, forests, water, biodiversity, and other ecosystem services.

Climate change projections for Cambodia, using global climate models developed by the Center for Climate Systems Research and Centre for Australian Weather and Climate Research, show an increase in temperature of between 1.3–2.5°C by 2100 and a 3%–35% increase in annual rainfall.

Cambodia’s agricultural production system depends on the annual flooding and recession of Tonle Sap and is, therefore, particularly sensitive to potential changes in local climate and monsoon regimes. If global GHG emissions remain high, projections suggest that the rainy season will start later although wet season rainfall will increase, dry season rainfall will decrease, and extreme weather events will become more frequent. These changes may lead to more intense flood pulses and damage agriculture, infrastructure, and floodplain vegetation as well as reduce the fertile land area suitable for agriculture. For example, in Cambodia’s Koh Kong Province, rainfall in four main river basins is predicted to increase by 2%–15%, increasing water flow by 2–10 cubic meters per second.

Temperature increase alone will reduce rice yields. The International Rice Research Institute has found that rice yields decline by 10% for each 1°C increase in growing-season minimum (night-time) temperature. In Cambodia, projections show that continuing high global GHG emissions will result in a fall in rice yields by 5% by 2020, 25% by 2050, and 45% by 2080 compared to current levels. Cambodia’s rice exporting ability would be severely affected after 2020.

Sea level rise would affect coastlines around the GMS, particularly in Cambodia and Viet Nam, where large parts of the Mekong Delta would be severely affected. For example, a rise in sea level of 1 meter would put 44 square kilometers of Cambodia’s Koh Kong Province (0.4% of total provincial area) permanently under water and contribute to the flooding of about 56% of settlement areas. In addition to the profound damage to the coastal...
Cambodia - Areas Affected by the 2011 Flood

Right: Mangrove walkway in Peam Krasaob, Koh Kong, Cambodia, part of a community initiative to protect and restore local mangrove forests.
Coastal communes like Peam Krasaob in Koh Kong Province require infrastructure adaptation measures, such as development of flood protection dikes that assist in regaining land for rice cultivation and reducing seawater intrusion, cement water tanks to harvest rain for community and household supply of potable water, introduction of short-period, salt-tolerant rice varieties in areas affected by seawater intrusion, and community mangrove restoration.

Viet Nam’s annual average surface temperature has increased by approximately 0.5–0.7°C over the past 50 years, while the sea level along its coastline has risen by approximately 20 centimeters. By the end of the century, rising sea levels in the Mekong Delta, where nearly half of Viet Nam’s rice is grown, may inundate about half (1.4 million hectares) of the delta’s agricultural lands. A sea level rise of 1 meter would inundate a quarter of Ho Chi Minh City, home to more than 6 million people.

Transport is one of the causes of GHGs and was responsible for 12% of GHGs globally in 2007. Transport was responsible for 9% of GHG emissions in the subregion in 2005; various projections show
Land-use change and deforestation in the GMS countries were responsible for 26% of their GHG emissions in 2005. Enforcement of protection in protected forest areas would help avoid much of these emissions by halting deforestation. In some areas, regeneration and replanting is, however, contributing to increasing carbon stocks. Additional environmental benefits will accrue from water conservation, reduced soil erosion, and improved biodiversity conservation, all of which will also enhance potential tourism value.

At present, the GMS is poorly equipped to cope with the impacts of climate change. Addressing climate change in social and economic development plans is the most serious challenge facing the GMS. However, the impacts of climate change are broadly common to all the countries. Thus, there are benefits to be gained for all the peoples of the subregion in exchanging knowledge, experience, approaches on planning, and implementation of adaptation to climate change.

There is a need to conserve energy and raise energy efficiency so that carbon emission per unit of GDP decreases. Development of renewable energy sources to increase the share of non-fossil fuels needs to be vigorously tackled. And there is a need to increase carbon sequestration in forests by increasing protection and reforestation. Developing a green economy fostering a low-carbon and recycling economy and popularizing environmentally-friendly technologies will go a long way to maintain emission levels and meet targets of reducing GHGs in the GMS.

**Natural Disasters**

The GMS is vulnerable to forest fires, landslides, flashfloods, earthquakes, and typhoons. Each year, millions of people are affected by such hazards in the subregion.

In Cambodia, damaging floods have occurred in the last decade: in 2001, 2002, 2006, 2010, and 2011, the 2011 flood being the worst, as the Mekong River and Tonle Sap overflowed, affecting over 1.5 million people, displacing 214,000, and causing the loss of 247 lives. The floods also damaged over 400,000 hectares of paddy fields,
as well as transport and agricultural infrastructure, including irrigation systems.

In Guangxi Zhuang Autonomous Region, rising temperatures, changed rainfall distribution, and increasing frequency and intensity of extreme weather events have led to massive flooding, landslides, and drought, causing damage to property and human life. There has also been an increase in rock desertification, degradation of forests, and damage to coastal marine resources.

Myanmar has experienced many natural disasters in recent years, including typhoons, earthquakes, floods, and fires. Major events include the Taungdwingyi earthquake in 2003; the Indian Ocean tsunami in 2004; typhoon Mala in 2006; and typhoon Nargis in 2008—Nargis caused the loss of 84,537 lives, with 53,836 persons missing and $4.1 billion damage to property. However, fires are the most frequent disasters, accounting for 71% of all disasters within the country; storms and floods account for 11% and 10% of the disasters, respectively; while other events, including earthquakes, and landslides account for the remaining disasters.

In Thailand, the Indian Ocean tsunami of 2004 and the disastrous floods of 2011 affected large parts of the country, with many losses in lives, property and production output, affecting the economy seriously. Relative sea level has increased 13–150 millimeters per year in the Chao Phraya Delta.

The El Niño and La Niña phenomena have caused increasingly adverse impacts on Viet Nam. Natural
disasters, especially storms, floods, and droughts, have been increasing in frequency and intensity. These have caused great loss of life, property, and socioeconomic and cultural infrastructure, as well as environmental degradation. During 1980–2009, the losses from these sources included 15,917 deaths, over 69 million affected people, and damage of approximately $7.3 billion.

Land subsidence from groundwater abstraction and sediment losses due to upstream dams are already causing the region’s deltas to sink and sea level rise is exacerbating the problem.
Economic development and environmental protection are highly complex and intertwined issues. A development strategy has to rest on productivity improvements while ensuring that the environment and natural resources continue to benefit the people of the subregion. Protecting the environment alone is not sufficient; development is necessary to lift the subregion out of poverty. The emphasis must be on sustainable development and the corresponding trade-offs that this entails, and on ensuring that development is equitable and benefits all segments of society.

Gross domestic product (GDP) in the subregion has grown at over 8% per year on average during the past 2 decades or so, real per capita incomes have more than tripled during the same period, poverty incidence in Greater Mekong Subregion (GMS) countries based on national poverty lines has declined substantially, and GMS countries have made major progress in meeting the other Millennium Development Goals. GMS economies have also become much more open, as measured by the increase in the trade-to-GDP ratio and the stock of foreign direct investment. Research shows that the pace and distribution of poverty reduction in the GMS have resulted from growth in the services sector rather than the agriculture and manufacturing sectors as in the past.

However, balancing economic growth with environmental sustainability is a tough challenge. Economic growth and development impacts over the past decade in the GMS underline the importance of conserving the natural capital base for sustaining ecosystem services necessary to maintain water flows for food production and energy security, health, and general well-being and prosperity of the peoples in the GMS.

The food-water-energy nexus provides a coherent framework for charting a new course of action for subregional ‘green’ economic development. Based on current projections, planned hydropower development in the GMS will be less
than 10% of its potential; agriculture capacity is similarly unrealized with average crop yields at 25%–30% of their potential. Water is at the heart of the nexus. As a critical resource for energy and food security, it underpins the shift toward green and pro-poor development pathways. With much of the subregional economies dominated by low-income and rural populations, there is a danger that GMS countries may become stuck in a 'low investment' trap, with limited capacity to raise revenues and scarce public funds to invest in developing water infrastructure for effective irrigation and energy generation.

Balancing energy needs with water infrastructure as part of a long-term investment strategy to stabilize and apportion water resources effectively will be critical. Accelerating regional integration can catalyze much required private investments and provide the benefit of extended supply chains and market access.

With regard to food security, the combination of increasing commoditie prices, energy demand, and costs of inputs is influencing market prices, while supply factors, including land and water resource constraints, are affecting production, trade, and access. The predominant use of water is for agriculture (70%–80%), and there is large wastage in the process of growing, transporting, and storing food and food products (up to 50%). Even under the most optimistic scenario of technology improvements, water demand for agriculture is projected to increase by 20%–30% by 2050. 'Business as usual' will not suffice—innovations and technology investments in crop productivity and water-use efficiency will be necessary to address the impacts of higher prices and water availability.

Environmental and social externalities and risks will have to be managed effectively to realize agriculture and hydropower-driven economic growth potential. In the energy sector, opportunities for strategic long-term energy planning and integrating environmental and social objectives need to be pursued. Environmental criteria could define the limits and opportunities in ways to increase energy production and improve energy efficiency; this would increase flexibility in energy supply and optimize the share of renewable energy sources.

The GMS is poised to grow at 7.5% over the current decade, doubling its economic output by 2020. However, increasing resource constraints, in particular finite land and (renewable) water resources, suggest that sustainable resource management and increasing resource efficiencies will need to underpin future development. External private and public sector investments are essential to stimulate increased agricultural productivity and water resources management, and to unlock the energy potential for power development.
Transboundary Challenges

Water Resources. The use of water resources is one of the most sensitive subregional issues. The GMS countries will be affected by construction of dams on the Mekong main stem and its tributaries. The specific concern from a subregional point of view is the alteration of the natural hydrological cycle; the impact this may have on downstream water levels and sedimentation; and the disruption of fish productivity, fish migration, and fish catches. Further development of the agriculture sector will depend significantly on increasing the area of cropland under irrigation to intensify production. Irrigation schemes invariably mean dams and water diversions with consequent impact on fish and fish habitats. The alternative is to rely on groundwater, with much uncertainty about long-term sustainability. The danger is that water volume in the lower Mekong River will decline if deforestation trends continue and water from the river and its tributaries is used for big irrigation schemes. This problem would be exacerbated by impacts of climate change, such as intense and prolonged dry periods.

Cross-border Energy Trade. Vast energy resources in Yunnan Province of the PRC and in the Lao PDR are currently under development or have already been commissioned. Myanmar also has vast potential for hydropower development, with many projects now at the planning and construction stage. Most of this energy will likely be exported to Thailand and Viet Nam. Economic and political stability in the subregion, as well as harmonious intercountry relations, is prerequisite to allay importers’ concerns about the security of supply and to minimize exporters’ risk as regards the viability of long-term contracts. However, much of the social and environmental impact associated with the development of hydropower projects will be borne by the exporting countries: their people will be resettled, their lands will be inundated, and their fisheries will be disrupted.

Cross-border Trade in Forest and Wildlife Products. Although the six GMS countries all have their own forests, trade in logs, timber, and wildlife products is transboundary. As one of them takes steps to conserve its forest resources, the pressure to harvest in others increases. The illegal cross-border trade in wildlife and rare and endangered species complicates efforts to protect biodiversity. Another problem is the geography of ecoregions. Although they are the appropriate entities for conservation planning, they rarely fall neatly within international boundaries. A major step has been establishment of Biodiversity Conservation...
Corridors around the subregion, discussed below. Protection of forest resources and wildlife requires enhanced collaboration between GMS countries in tackling illegal trade in forest and wildlife products.

Urban and Industrial Pollution. Water and air pollution in the subregion tends to be localized, but raises significant issues. Poor sanitation because of inadequate sewage and solid waste management affects water quality in adjacent water bodies, which leads to contamination of groundwater. The basic sewage and drainage systems in many of the subregion’s larger urban areas have not been well maintained. The rapid growth of the industrial and agroindustrial economy has created serious pollution problems in the air, on the surface, and in the groundwater in major metropolitan areas. This is compounded when coal-fired power plants generate local and subregional sulfur dioxide pollution. Similarly, the growing industrial sector is creating new challenges for the disposal of industrial effluents and management of industrial solid wastes, in particular, hazardous waste.

Avian Flu and Other Epidemics. The outbreak of avian flu in developing Asia in late 2003 to early 2004, following the scare caused by severe acute respiratory syndrome (SARS) in early 2003, attracted attention from policymakers, the international community, and the media. Since then, the lessons of SARS control have been internalized, and by and large, there has been little panic over avian flu, an important reason being avian flu has so far been largely confined to poultry. However, two important scenarios need to be monitored: (i) avian flu is confined to animals, leading to production and income losses; or (ii) the avian flu virus (H5N1) mutates into a human virus, which could then result in escalation into a SARS-type crisis. The Regional Communicable Diseases Control project in Cambodia, Lao PDR, and Viet Nam helps develop comprehensive national surveillance and response systems in the three countries and develop community-based models for controlling outbreaks of emerging infectious diseases and selected endemic diseases. This model needs expanding across the region.

HIV/AIDS. Increased connectivity and regional integration in the GMS have improved the quality of people’s lives, but have also created opportunities for the spread of HIV and other communicable diseases within and across the GMS borders. Although the HIV epidemics vary within and between countries, they are centered on common risk behavior, namely, unprotected sex and the sharing of contaminated needles and syringes by injecting drug users. Newfound freedoms, disposable income, and sometimes exploitation or abuse faced by migrant and mobile populations, such as road transport workers, may lead some to engage in such high-risk behavior. The GMS countries have signed a Memorandum of Understanding for Joint Action to Reduce HIV Vulnerability Related to Population Movement that includes a commitment to allocate 1% of construction costs to fund HIV prevention initiatives. However, the GMS countries need to continue to press for strengthened commitments from development partners, as well as private and public contractors, to scale-up HIV prevention and mitigation efforts associated with infrastructure projects.

Migrant Labor. The magnitude, scope, and scale of regional migration are not fully known because much of it is undocumented or underground. Around 1 million Burmese and 180,000 workers each from Cambodia and the Lao PDR work in Thailand, mostly entering illegally to find “3D” (dirty, difficult, and dangerous) jobs that Thai workers would rather not do. Many migrants from the PRC (particularly Yunnan) and Viet Nam are found in the Lao PDR and Cambodia. Migration within the GMS is characterized by informal flows of unskilled labor for economic rather than any other reasons. Governments of the GMS countries will be in a better position to make sound policy on labor migration and employment planning if they have common information and understanding of current problems. The situation may get worse with climate change-induced migration that is highly likely as global warming takes its toll on low lying coastal areas, deltas, and drought stricken areas in the GMS.

Human Trafficking. Trafficking of persons is a worldwide crime affecting countless numbers of people. A significant proportion of this trafficking affects the GMS countries of Cambodia, Lao PDR, Myanmar, Thailand, and Viet Nam. Trafficking is distinguished from illegal migration and people smuggling by the exploitation and abuse that is its end result. Coercion, deception, threats, or use of force characterize the trafficking process, resulting in its victims being subjected to exploitation.
and abuse. Trafficking has a particularly severe impact on children who are the most vulnerable members of society. The overwhelming majority of trafficking victims surveyed are girls aged between 12 and 18 years of age and most of them end up in forced prostitution. Most victims come from rural areas, although some are from extremely remote areas or from situations of severe poverty. The countries of the GMS need concerted efforts to combat human trafficking.

Global Context

In tackling these subregional and transboundary challenges, the GMS countries have many ‘models’ from which to draw solutions, since most challenges are not unique to the subregion but rather are common topics of global and regional development as seen in the following.

**Rio + 20.** The need for economic development to proceed in a way that does not compromise the sustainability of the planet’s environmental and resource endowments was highlighted at a major world conference in 1992—the United Nations Conference on Environment and Development, or Earth Summit, attended by governments of 178 nations and held in Rio de Janeiro, Brazil. Agenda 21, a wide-ranging blueprint for action to achieve development worldwide, was one of the main outcomes of the conference. Twenty years later, another United Nations Conference on Sustainable Development, popularly known as Rio + 20, with representatives from 191 UN member states and observers, including 79 heads of state or government, took place in Rio de Janeiro in June 2012. One outcome from this conference was a document entitled “The Future We Want.”

Among other things, the document calls for a 10-year framework of programs on sustainable consumption and production, options on an effective sustainable development financing strategy, and a mechanism to promote the development, transfer, and dissemination of clean and environmentally sound technologies. The agreement considers the green economy one of the important tools; each country should choose an appropriate approach to resource efficiency, equitable growth, and job creation. Governments, private sector, civil society, multilateral development banks, and other groups made financial commitments toward a green economy but the conference did not identify significant means of implementation or establish concrete targets or a “roadmap” for such an economy.

**International Organizations.** The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) is responsible for regional cooperation and integration in the Asia-Pacific region. In the area of environment and sustainable development, ESCAP contributes to strengthening national capacities to design and implement policies and strategies. Its initiatives include a two-phase project to integrate environmental and socioeconomic planning and to involve stakeholders through national councils for sustainable development.

The United Nations Development Programme (UNDP) cooperates closely with ESCAP to promote and implement the UN agenda. UNDP’s projects are funded under the Global Environment Facility and assisted by the Capacity 21 Program, which was key to the creation of numerous local and national sustainable development strategies under Agenda 21.
The United Nations Environment Programme (UNEP) is very active in sustainable development. UNEP has supported projects in the subregion in partnership with regional organizations and other institutions, including the Asian Development Bank (ADB). Its Regional Resource Centre for Asia and the Pacific worked closely with ADB, ESCAP, and UNDP for the World Summit on Sustainable Development in 2002, involving preparation of subregional and regional sustainable development platforms. UNEP has been co-implementing projects under the GMS program (see below) and is supporting the formulation of national sustainable development strategies in the subregion.

Multilateral Development Banks. The GMS Program of Economic Cooperation was set up with assistance from ADB. Both the World Bank and ADB are active in all six countries of the GMS and collaborate on multilateral programs, such as the Climate Investment Funds, as well as on projects funded by the Global Environment Facility. Current partnerships include the Pilot Program for Climate Resilience, Forest Investment Program, and Sustainable Forest Management in the GMS. Through their individual country programs, the two banks are involved in many multisectoral programs, including climate change and natural resource management.

Regional Cooperation

The case for economic cooperation among countries with shared borders has long been recognized as contributing to creation of larger markets for national producers and consumers and to allow for economies of scale by reducing barriers to trade, capital, and labor. Regional cooperation is particularly relevant for land-locked countries, enabling them to integrate with external markets. Cooperation is also necessary to deal effectively and in a consistent manner with the many transboundary challenges that affect their economy, environment, and productivity.

Increased recognition of regional cooperation is manifest in the evolution of regionalism both within Asia and more broadly. New institutions have emerged while others have become more vigorous. The GMS Economic Cooperation Program itself is a prime example. Also, GMS countries are members or observers of one or more ‘regional’ organizations, such as the Asia-Pacific Economic Cooperation, Association of Southeast Asian Nations (ASEAN), ESCAP, East Asia Summit, MRC, and South Asian Association for Economic Cooperation. There are program complementarities and synergies to be explored between the GMS countries within this expanding Asian regionalism.
ASEAN. All the countries except the PRC are members of ASEAN, and the PRC is part of the ASEAN + 3 network. The ASEAN Vision 2020 calls for “a clean and green ASEAN with fully established mechanisms for sustainable development to ensure the protection of the region’s environment, the sustainability of its natural resources and the high quality of life of its peoples.” ASEAN has set up a number of Ministerial Meetings and working groups to help achieve this vision.

Mekong River Commission. The MRC (see Chapter 6) provides a mechanism for coordinated and cooperative efforts to utilize, manage, and conserve the water and related resources of the lower Mekong River Basin. It provides scientific information and policy advice and has three core programs: the Basin Development Plan, the Water Utilization Program, and the Environment Program that together cover all aspects of use of the Mekong River and its linkages to other components of the natural environment.

GMS Economic Cooperation Program

The GMS (Chapter 1) Economic Cooperation Program has been operating since 1992 and has achieved noteworthy successes in fostering regional cooperation in a region that, at the commencement of the program, was emerging from a period of prolonged regional conflict. By the end of its second decade, the program had implemented 55 investment projects with a total cost of about $14 billion, involving subregional road, airport, and railway improvements; hydropower projects for cross-border power supply; tourism infrastructure development; and communicable disease control. The GMS program has built a reputation as a flexible results-oriented project-delivering vehicle for promoting regional cooperation and contributing to economic growth and poverty reduction as well as meeting the needs of regional public goods. Its strategic framework for 2012 to 2022 is “increased economic growth, reduced poverty, and environmental sustainability across the GMS.” The GMS program will continue to focus on a broad range of sector and multisectoral priorities, including support for human resources development initiatives that will help GMS integration while addressing any negative consequences of greater integration.

Economic Corridors. An important feature of the GMS program is the development of economic corridors passing through two or more of the countries to stimulate the growth of investment and production facilities in various areas. The corridors, centered on a number of transport corridors (see Chapter 13), are planned to contribute to improving agriculture, industry, and service sector development and trade, and the overall promotion of GMS cooperation to help realize the region’s potential. For each corridor, there is a need for carefully planned investments in urban development, improving the network of feeder and rural roads, and developing other transport modes. Further development of the corridors must also take due account of food and energy security and climate change concerns. This will require scaling-up the management of natural resources, including biodiversity, land management, and integrated water resources management through river basin, watershed, and landscape approaches.

Environment and Biodiversity Conservation

The GMS includes a Working Group on Environment that oversees implementation of the GMS Core Environment Program. GMS countries have identified three priority issues for cooperation:

- **Biodiversity conservation and poverty alleviation.** With infrastructure and other development as major drivers of ecosystem fragmentation and destruction and with poverty alleviation at the core of the GMS countries development efforts, it will be important to expand biodiversity conservation and pro-poor activities, especially among the vulnerable upland communities and as a means of ensuring biodiversity conservation.

- **Climate change adaptation and mitigation.** GMS countries are also concerned about potential weakening of food and energy security due to climate change. Increasing weather variability is also likely to affect ecosystem services and consequently the poor communities that depend on them.
Furthermore, major destruction of biomass in recent years from the subregion’s forests is frustrating efforts to control greenhouse gas emissions.

**Capacity development.** Greater knowledge, skills, and awareness in environmental matters are needed throughout the GMS. This will be addressed through Biodiversity Conservation Corridor projects and the environmental education network, involving the participation of young GMS national researchers, with support from GMS universities and civil society.

The Biodiversity Conservation Corridors Initiative is the flagship activity under the GMS Core Environment Program. It seeks to address strain on biodiversity landscapes resulting from nearby economic corridor development that has caused ecosystem fragmentation and biodiversity loss. The approach is to undertake forest protection and rehabilitation measures with alternative livelihood development. This integrated approach seeks to improve habitat connectivity and ecosystem functionality while at the same time reducing rural poverty. There are eight pilot sites (see map).

About 1.3 million hectares are now under the corridor sustainable management regime, resulting in improved natural, social, physical, human, and financial assets of communities living in these areas. These outcomes required, at different governance levels, new policies, strengthening institutions and capacities, promoting participatory methods on conservation practices, and developing livelihood opportunities to reduce dependence on forest resources. Local instruments included community development funds, community protected areas, and participatory land-use planning. These efforts will be expanded at a landscape level across the GMS.

**Agriculture.** Under the GMS Core Agriculture Support Program, GMS countries have agreed on a new strategy to address emerging regional challenges to agricultural development, including ongoing trade liberalization, changing market demands, degradation of natural resources, the contribution of agriculture to climate change, the impact of climate change on the sector, and global concerns about food security. The three pillars of the strategy are:

- **Pillar 1: Building global competitiveness in food safety and modernizing agricultural trade** by promoting agricultural trade and agribusiness investment in the GMS economic corridors through harmonized food safety standards based on international standards, traceability systems and e-commerce, and a community-based participatory approach.

- **Pillar 2: Promoting climate-friendly agriculture and natural resource management** by supporting climate-resilient farming systems; a weather-based insurance system; and control of transboundary invasive species, pests, and animal diseases.

- **Pillar 3: Promoting agriculture as a leader in rural renewable energy technology and eco-friendly cross-border supply chains** through a regional bioenergy regulatory framework and harmonized standards, biomass technologies and fertilizers for carbon credit, and ecolabeling systems for market access.

The agriculture sector is still seen by experts as providing the best opportunity to optimize climate mitigation and adaptation linkages. Innovative agricultural technology, and ‘energy-smart’ and ‘climate-friendly’ agriculture that can enhance yields and improve energy efficiency while strengthening climate resilience need to be promoted. The private sector has a big role to play in such development.

**Transport.** Transport will remain at the forefront of the GMS program and is guided by a strategy that focuses on the development of priority road transport, specifically by:

- encouraging multimodal systems, particularly road and rail;
- improving road safety and addressing the broader social dimensions;
- considering climate change issues (such as controlling greenhouse gas emissions through freight traffic management);
- addressing the nonphysical barriers (such as policies) to cross-border transport; and
- promoting the development of economic corridors.

**Energy.** Given the widespread energy poverty of the GMS and recent global developments—such as financial turmoil, fluctuating energy prices, pressures on the environment,
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Geopolitical uncertainties of energy supply, and interconnectedness of global energy markets—GMS countries have never felt a stronger need than now for an integrated approach to delivering sustainable, secure, and competitively priced energy. Priority regional initiatives for both hardware and software improvements across the energy sector have been identified as part of a GMS ‘Energy Road Map’ and include (i) promoting environmentally sustainable regional power trade planning, coordination, and development; (ii) improving energy efficiency through demand-side management and energy conservation; (iii) promoting the development of renewable energy resources, such as biogas, solar, wind, hydro, and geothermal, and clean fuels such as compressed natural gas; and (iv) promoting policies toward renewable energy development and energy efficiency.

Tourism. The overall aim of GMS tourism cooperation is to “develop and promote the Mekong as a single destination, offering a diversity of quality and high-yielding subregional products that help to distribute the benefits of tourism more widely; add to the tourism development efforts of each GMS country; and contribute to poverty reduction, gender equality and empowerment of women, and sustainable development, while minimizing any adverse impacts.” The spatial strategy has been revised to focus more directly on segments of the Mekong River tourism corridor and linked circuits. The GMS Tourism Working Group reviews the progress of priority programs and projects, exchanges lessons learned from projects, coordinates with development partners, and reports to the GMS tourism ministers and senior officials. It also interacts with GMS working groups in other sectors.

Human Resources Development. Sustainable development cannot be achieved without capacity building and skills transfers. The GMS program’s strategic framework and action plan for human resource development aims to (i) support human resources development initiatives that directly assist subregional cooperation and integration, such as managing labor migration and harmonizing labor standards; and (ii) address cross-border issues directly linked to GMS integration, such as cross-border transmission of communicable diseases and human trafficking.