

Environmental Conservation under the Greater Mekong Sub-region (GMS) Economic Cooperation : The Positive Role of Thailand

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Abstract

Economic cooperation in the Greater Mekong Sub-region through connectivity, competitiveness, and community has led to economic development in the sub-region. The paper focuses on the development impacts, especially of trade on the GMS environment and how Thailand can contribute to the sustainable development in the GMS through her long history and experiences in the reform of public policies and instruments towards conservation and protection of the environment.

I. Introduction

Mekong River Area (MRA) covers 5 countries and one province in China, i. e., Cambodia, Lao PDR, Myanmar, Thailand, Vietnam, Yunan Province. The MRA development strategy is pursued under “the Greater Mekong Sub-region (GMS) Economic Cooperation” with the strong support from Asian Development Bank (ADB) since 1992. The GMS vision is focused on a Mekong sub-region that is more integrated, prosperous and harmonious through 3 Cs : (1) connectivity-economic corridors, (2) competitiveness, and (3) community. Economic cooperation among members in the GMS concerns 9 areas, i. e., (1) transport (road transport network), (2) telecommunications, (3) energy, (4) environment, (5) tourism, (6) trade facilitation, (7) investment, (8) human resource development, and (9) agriculture.

Thailand has played an important role in the GMS with its strategic location and economic advancement by providing technical assistances via Thailand International Cooperation Agency (TICA) (1,500 millions Bath-approximately US\$ 60 millions since 1996), financial assistances via National Economic Development Agency (NEDA) and Bureau of Budget (BoB), Ministry of Finance (7,000 millions Baht-approximately US\$ 175 millions), and other assistances through other ministries, private organizations, private sector, academics and civil society. (Vimolsiri, 2007)

Since economic corridors are considered as ‘a backbone’ of GMS connectivity and regional trade as ‘an engine’ of competitiveness, the environmental impacts from the economic coop-

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eration are a main concern for the sustainable development in the sub-region.

It is the purpose of this paper to focus on how Thailand, the main actor and supporter of the GMS economic cooperation, can provide significant contribution to the environmental conservation and protection towards the sustainable development in the GMS.

The paper will be divided into 4 parts with introduction in the first part. The second part will concern with the economic development and its consequences on the issues of environment in the GMS, while the contribution of Thailand towards environmental conservation and protection will be presented in the third part; and its conclusion in the final part.

II. Economic Development and Environmental Issues in the GMS

2.1 Economic development in the GMS

Six countries in the GMS had been through political change that affected their socio-economic conditions during the 'Cold War' period in the decades of 1960s and 1970s. However the world political change has led to the restructure of economic system towards market-based economy in the socialist countries in the sub-region. Thailand is the only non-socialist country that its economy has not changed and still based on market mechanism and private investment. Since 1992 ADB has been actively in supporting the sustainable development in the GMS. In 2007, the Asian Development Bank disclosed its mid-term review of the GMS strategic framework (2002-2012) (ADB, 2007). All selected macroeconomic indicators of GMS countries in 1992 and during 2000-2005 (Table 1) have indicated their increasing trend. GDP per capita of every member country, except those of Myanmar with no data available, is increasing and its economy is growing at an increasing rate. GDP per capita of Thailand is increasing and considered to be the highest among member countries. However, GDP growth rates of Thailand, despite their positive rates, are not stable due to various external and internal factors that the country has faced during the same period.

The openness ratio (i.e., the ratio of total trade to GDP) indicates that all member countries in the sub-region have opened and expanded their economy to the world. Cambodia and Viet Nam are the most outstanding socialist countries in opening up their economies to the world. It can be seen through the increasing trends of their export growth rates and the value of foreign direct investment (FDI). The numbers of tourists visiting the sub-region are increasing in every country.

However, the consumer price inflations in Lao PDR and Myanmar can be of concerns with the average annual changes during 2000-2005 higher than those of GDP growth rates of the same period. Despite the increasing trends of the Human development index (HDI) of every country, the HDI is not on the high score (around 0.45 to 0.78). The high score HDI reflect the better improvement of healthy and long life, education, and decent living standard.

The assessment of the success in economic development of the GMS countries with direct relations to human life can be considered by the achievement of the United Nation's Millennium Development Goals (MDG). Table 2 indicates the achievement of the selected MDG by

Table 1 Selected Macroeconomic Indicators of GMS Countries 1992, 2000-2005

Item	Cambodia	China, People's Republic of	Lao PDR	Myanmar	Thailand	Viet Nam
GDP per capita (current, \$)						
1992	220	415	271	—	1,945	144
2000	288	946	332	—	1,964	402
2001	293	1,038	322	—	1,834	415
2002	310	1,132	331	176	1,997	440
2003	324	1,270	372	—	2,230	484
2004	357	1,486	439	—	2,481	553
2005	393	1,697	491	—	2,727	622
2006	510	1,999	601	—	3,133	724
GDP growth (%)						
1992	7.0	14.2	7.0	9.7	8.1	8.7
2000	8.4	13.3	5.8	13.7	4.8	6.1
2001	7.7	8.3	5.8	11.3	2.2	6.9
2002	6.2	9.1	5.9	12.0	5.3	7.1
2003	8.6	10.0	6.1	13.8	7.1	7.3
2004	10.0	10.1	6.4	13.6	6.3	7.8
2005	13.4	10.4	7.0	13.2	4.5	8.4
2006	10.4	10.7	7.3	—	5.0	8.2
Consumer price inflation (% annual change)						
1992	96.1	6.4	9.9	21.9	4.2	—
2000	-0.9	0.4	8.4	-0.2	1.6	-1.7
2001	0.3	0.7	7.8	21.2	1.6	-0.4
2002	3.3	-0.8	10.7	58.1	0.6	3.8
2003	1.2	1.2	15.5	24.9	1.8	3.1
2004	3.9	3.9	10.5	3.8	2.8	7.8
2005	5.8	1.8	7.2	10.7	4.5	8.3
2006	4.7	1.5	6.8	—	4.6	7.5
Merchandise exports (% annual growth)						
1992	24.5	18.1	37.3	114.1	13.8	21.2
2000	24.1	27.9	9.6	33.8	19.5	25.2
2001	12.1	6.8	-3.3	43.0	-7.1	6.5
2002	12.7	22.4	2.3	-3.9	4.8	11.2
2003	17.9	34.6	21.6	12.6	18.2	20.6
2004	24.1	35.4	11.0	8.2	21.6	31.4
2005	12.4	28.5	31.4	—	15.0	22.5
2006	26.9	26.0	50.9	—	17.4	23.0
Openness ratio ^a (%)						
1992	35.8	27.7	33.8	2.8	64.9	50.8
2000	91.4	38.7	49.9	0.9	106.4	91.5
2001	96.8	37.6	47.3	0.9	107.2	92.7
2002	99.7	41.8	40.9	0.6	102.1	98.0
2003	105.4	50.7	36.8	—	106.7	113.3
2004	116.1	58.4	42.0	—	116.8	125.3
2005	118.4	62.5	48.2	—	128.5	127.6
2006	117.2	65.7	56.7	—	123.3	136.4

Foreign direct investments (in million \$)						
1992	33.0	11,008.0	—	149.0	2,151.0	474.0
2000	149.0	40,715.0	280.0	208.0	3,350.0	1,289.0
2001	149.0	46,878.0	325.0	192.0	3,886.0	1,300.0
2002	139.0	52,743.0	415.0	191.0	3,164.0	2,023.0
2003	74.0	53,505.0	420.0	128.0	4,614.0	1,894.0
2004	121.0	60,630.0	450.0	—	5,786.0	1,878.0
2005	318.0	60,325.0	500.0	—	8,405.0	1,972.0
2006 ^b	—	64,468.0	650.0	—	8,837.0	4,100.0
Gross domestic investments (as % of GDP)						
1992	11.3	36.2	—	1.3	40.0	—
2000	16.9	32.8	—	12.4	22.8	29.6
2001	18.5	34.2	—	11.6	24.1	31.2
2002	19.7	37.9	—	10.1	23.8	33.2
2003	21.5	41.2	—	11.0	25.0	35.4
2004	17.4	43.3	—	—	26.8	35.5
2005	19.5	43.3	—	—	31.5	35.4
2006	20.8	44.9	—	—	27.9	—
Tourist arrival ^c						
1995	219,680	1,015,442	346,460	120,205	6,951,566	1,351,296
2000	466,365	2,230,241	737,208	260,616	9,578,826	2,140,100
2001	604,919	2,398,503	673,823	295,354	10,132,509	2,330,050
2002	786,524	2,666,950	735,662	301,024	10,872,976	2,627,988
2003	701,014	1,650,301	636,361	269,205	10,082,109	2,428,735
2004	1,055,202	2,276,800	894,806	241,938	11,737,413	2,927,873
2005	1,421,615	2,996,272	1,109,833	232,873	11,018,968	3,467,758
2006	1,700,041	3,375,880	1,260,000	208,863	13,821,802	3,583,486
Human development index ^d						
1990	—	0.628	0.451	—	0.717	0.618
1995	0.536	0.685	0.488	—	0.751	0.661
2000	0.545	0.730	0.523	—	0.775	0.696
2004	0.583	0.768	0.553	0.581	0.784	0.709

—=not available, %=percent, GDP, GDP=gross domestic product, GMS=Greater Mekong Subregion, Lao PDR=Lao People's Democratic Republic.

a Openness ratio is defined as the ratio of total trade to GDP at current market prices

b FDI net inflows based on balance of payments.

FDI for the Lao PDR refers to gross FDI.

c Data for the PRC include only tourists arrivals for Guangxi Zhuang Autonomous Region and Yunan Province.

d Human development index (HDI) is a composite index measuring average achievement in three basic dimensions of human development - a long and healthy life, knowledge and a decent standard of living.

Source : ADB 2007. Asian Development Bank Outlook 2007; ADB 2006. The Greater Mekong Sub-region Beyond Borders : Regional Cooperation Strategy and Program Update 2007-2008; and United Nations Development Programme. 2006. Human Development Report 2006

the member countries to meet goals and targets is not an impossible mission. All the selected indicators have been improving since the development strategic framework was established in 1992.

In sum, it can be concluded that the economic development conditions of the member countries in the GMS have been improving to some extent after the formulation of the

Table 2 Achievement of Selected Millennium Development Goals of GMS Countries: Comparison between Benchmark or Earliest Year and Latest Year

Selected Goal/Target/Indicator	Earliest/Benchmark		Latest	
	Value	(Year)	Value	(Year)
Goal 1. Eradicate extreme poverty and hunger				
Target 1. Halve, between 1990 and 2015, the proportion of people whose incomes are less than \$1 per day				
Indicator 1. Proportion of population below the national poverty line (%)				
Cambodia	39.0	(1993)	34.7	(2004)
China, People's Republic of	31.3	(1990)	16.6 ^a	(2001)
Lao PDR	48.0	(1990)	32.7	(2003)
Myanmar	—		26.6	(2001)
Thailand	27.2	(1990)	9.8	(2002)
Viet Nam	58.1 ^a	(1993)	24.1 ^a	(2004)
Indicator 2. Poverty gap ratio (%) ^b				
Cambodia	9.2	(1993)	6.5	(1999)
China, People's Republic of	0.4	(1990)	0.7	(1998)
Lao PDR	12.0	(1990)	8.0	(2002)
Myanmar	—		6.8	(2001)
Thailand	8.0	(1990)	2.4	(2002)
Viet Nam	18.5	(1993)	4.7	(2004)
Goal 2. Achieve universal primary education				
Target 3. Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling				
Indicator 6. Net enrollment ratio in primary education (%)				
Cambodia	87.0	(2001)	91.9	(2005)
China, People's Republic of	97.4	(1990)	98.7	(2003)
Lao PDR	63.0	(1991)	81.8	(2003)
Myanmar	65.7	(1990)	84.5	(2005)
Thailand	70.1	(1992)	80.4	(1998)
Viet Nam	86.0	(1990)	97.5	(2005)
Indicator 8. Youth literacy rate (%)				
Cambodia	82.0	(1999)	83.4	(2005)
China, People's Republic of	95.3	(1990)	97.9	(2001)
Lao PDR	78.5	(1991)	78.5	(2001)
Myanmar	80.9	(1990)	96.5	(2005)
Thailand	98.2	(1990)	98.0	(2000)
Viet Nam	94.1	(1990)	94.5	(2002)
Goal 7. Ensure environmental sustainability				
Target 9. Integrate the principles of sustainable development into country policies and programs and reverse the loss of environmental resources				
Indicator 25. Proportion of land area covered by forest (%)				
Cambodia	60.0	(1991-2002)	—	
China, People's Republic of	13.0	(1990)	18.2	(2004)
Lao PDR	47.0	(1990)	41.5	(2002)
Myanmar	56.0	(1990)	52.1	(2000)
Thailand	28.0	(1990)	33.4	(2000)

Viet Nam	27.0	(1990)	37.0	(2004)
Indicator 26. Ratio of area protected to surface area (%)				
Cambodia	17.0	(1994)	—	
China, People's Republic of	8.0	(1994)	14.8	(2004)
Lao PDR	11.9	(1993)	16.0	(2004)
Myanmar	1.1	(1990)	3.8	(2005)
Thailand	12.4	(1990)	17.6	(2001)
Viet Nam	6.7	(2001)	8.0	(2004)
Indicator 28. CO2 emissions and consumption of ozone-depleting CFCs				
a. CO2 emission per capita (metric tons per capita)				
Cambodia	0.0	(1990)	0.0	(2002)
China, People's Republic of	2.1	(1990)	2.7	(2002)
Lao PDR	0.1	(1990)	0.2	(2002)
Myanmar	0.1	(1990)	0.2	(2002)
Thailand	1.8	(1990)	3.7	(2002)
Viet Nam	0.3	(1990)	0.8	(2002)
b. Consumption of ozone depleting CFCs (ODP tons)				
Cambodia	—		96.7	(2003)
China, People's Republic of	41,829.0	(1990)	22,809.0	(2003)
Lao PDR	4.0	(1992)	35.3	(2003)
Myanmar	16.0	(1992)	43.5	(2002)
Thailand	6,660.0	(1990)	1,857.0	(2002)
Viet Nam	303.0	(1991)	244.0	(2003)
Target 10. Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation				
Indicator 30. Percentage of population with sustainable access to safe drinking water				
a. Urban				
Cambodia	60.0	(1998)	75.8	(2005)
China, People's Republic of	87.0	(1990)	88.8	(2004)
Lao PDR *	39.0	(1990)	67.0	(2005)
Myanmar	38.0	(1990)	89.2	(2000)
Thailand	96.5	(1990)	97.0	(2000)
Viet Nam *	48.0	(1990)	58.7	(2004)
b. Rural				
Cambodia	24.0	(1998)	41.6	(2005)
China, People's Republic of	31.0	(1990)	58.0	(2003)
Lao PDR *	39.0	(1990)	67.0	(2005)
Myanmar	30.0	(1990)	65.8	(2000)
Thailand	76.4	(1990)	91.0	(2000)
Viet Nam *	48.0	(1990)	58.7	(2004)
Indicator 31. Percentage of households with access to improve sanitation				
a. Urban				
Cambodia	49.0	(1998)	55.0	(2005)
China, People's Republic of	56.0	(1990)	69.0	(2000)
Lao PDR *	11.0	(1990)	48.3	(2005)

Myanmar	40.0	(1990)	87.0	(2000)
Thailand	99.0	(1990)	99.5	(2000)
Viet Nam *	29.0	(1990)	52.6	(2004)
b. Rural				
Cambodia	8.6	(1998)	16.4	(2005)
China, People's Republic of	8.0	(1993)	51.0	(2003)
Lao PDR *	11.0	(1990)	48.3	(2005)
Myanmar	35.0	(1990)	82.0	(2000)
Thailand	83.1	(1990)	97.0	(2000)
Viet Nam *	29.0	(1990)	52.6	(2004)
Goal 8. Develop a global partnership for development Target 18. Incorporation with the private sector, make available the benefits of new technologies, especially information and communications technologies Indicator 47. Telephone lines and cellular phone subscribers per 100 population				
Cambodia	0.04	(1990)	3.78	(2003)
China, People's Republic of	0.59	(1990)	49.74	(2004)
Lao PDR	0.16	(1990)	4.82	(2004)
Myanmar	0.17	(1990)	0.96	(2004)
Thailand	2.54	(1990)	55.15	(1994)
Viet Nam	0.15	(1990)	18.29	(2004)
Indicator 48. Personal computers and internet users per 100 population				
a. Personal computers				
Cambodia	0.05	(1995)	0.26	(2004)
China, People's Republic of	0.04	(1990)	4.08	(2004)
Lao PDR	0.11	(1996)	0.38	(2004)
Myanmar	0.11	(1999)	0.60	(2004)
Thailand	0.42	(1990)	6.0	(2004)
Viet Nam	0.01	(1992)	1.3	(2004)
b. Internet users				
Cambodia	0.01	(1997)	0.28	(2004)
China, People's Republic of	0.01	(1996)	7.23	(2004)
Lao PDR	0.01	(1998)	0.36	(2004)
Myanmar	0.01	(2000)	0.12	(2004)
Thailand	0.05	(1994)	11.25	(2004)
Viet Nam	0.01	(1998)	7.12	(2004)

-- = not available, CFC = chlorofluorocarbon, CO₂ = carbon dioxide, GDP = Gross domestic product, ODP = Ozone depleting potential

* = The values include the proportion in both urban and rural areas

a Figure for PRC refers to rural population below \$1 per day while figure for Viet Nam is an internationally comparable measure of the percentage of the population that cannot afford a threshold consumption basket which includes food (2,100 calories/day/family member) and nonfood items.

b Refers to the mean distance separating the population from poverty line (with the non-poor being given a distance of zero), expressed as a percentage of the poverty line)

Source : Selected from Goals/targets/indicators in Asian Development Bank, 2006. The Greater Mekong Sub-region Beyond Borders : Regional Cooperation Strategy and Program Update 2007-2008. Manila : ADB

development strategic framework. People in this sub-region are being richer in terms of monetary income and live in a more opened and sanitary economy.

2.2 Environmental Issues in GMS Development

GMS development strategic framework has not only affected the economy and people's life as shown in the above section, but also impacted on environment in the sub-region. The impacts of development on environment in the GMS can be explained as followed:

- (1) The strategic framework of development through trade will have significant impacts on environment both negatively and positively. Trade, as an engine of growth via increase in productivity and volume of economic activity, has several environmental linkages:
 1. Scale effects: the increased scale of economic activities results in increased raw material use, and an increased amount of process-related pollution. The more economic activity, the more environmental damage, other things being equal. This can be negative impact of trade on environment in the subregion.
 2. Structural effects: the changes in production structure as a result of comparative advantage. If the new economic structure has a greater share of low-polluting sectors and a lower share of polluting sectors, the structural effect is environmentally positive, and vice versa. The impact of trade on environment in this case is inconclusive.
 3. Technology effects: the increase in production efficiency can come through the importing of new technologies, through FDI, or through domestic innovation. If new technologies can lead to less use of raw materials and/or less waste and pollution created in the production process, the technology effects is considered environmentally positive. The impact is inconclusive.
 4. Direct effects: the direct result of trade itself, i. e., the pollution from transporting traded goods (e. g. air pollution from trucks and ships), invasive species of pests transported with traded goods (e. g. on fruits and vegetables or in packing materials), trade in endangered species, and other forms of illegal trade. This, clearly, brings about negative impact on environment.
 5. Regulatory effects: the impacts on environment caused by trade-induced regulation. The most positive type of the impacts comes from higher environmental standards. The negative impacts result when the provision of investment law allows environmental regulations to weaken. In this case, the impact on environment is inconclusive.
- (2) Economic cooperation activities in GMS with potential negative impacts on the environment (i. e., more forest and natural resources to be exploited) are the following:
 1. Transportation system to facilitate trade and investment, i. e., road, railways, waterways
 2. Energy development, i. e., hydropower, bio energy, natural gas
 3. Tourism with increasing number of tourists
 4. Trade and investment with increasing volume of traded goods, wastes and pollutions
 5. Agriculture in the forms of contract farming, energy-based plantation
- (3) The economy as well as the environment of the GMS will be transformed as the

economic corridors are constructed over the next decade. The ADB has indicated some trends to show the dependence of productivity in the following sectors on 'linked natural systems' (ADB, 2006)

1. Forestry — increasing forest product demand with increasing cost of production and 50 per cent decline in resource base;
 2. Fisheries — increasing effort but decreasing catch per unit effort (due to the decline of stocks in coastal and freshwater systems);
 3. Hydropower — increasing demand and investment in electricity supply, and increasing real cost per unit of energy (due to a failure to fully account for watershed maintenance and other environmental services);
 4. Agriculture — increasing production costs (due to soil loss, chemical inputs, and fluctuation in water supply);
 5. Industry — increasing cost of water supply and treatment (due to reduced water quality and access), and
 6. Nature-based tourism—rapidly increasing demand and investment, leading to diminishing quality of 'products.'
- (4) State of the environmental problems indicates the potential environmental destruction and degradation in the following issues (ADB, 2007).
1. Air pollution: The air pollution in the GMS is a localized though nonetheless serious, threat. The rapid growth of the industrial and agro-industrial sectors, as well as the transport and energy sectors, are major sources of air pollution. Overall, the GMS is still not a major emitter of CO₂. However, Carbon intensity is rising in most countries.
 2. Land degradation: Forest loss and poor agricultural practices have been the main causes for soil and water erosion.
 3. Water allocation: The GMS as a whole does not suffer from a lack of water. The region has substantial, though unevenly distributed, water resources. However, rapid urbanization and infrastructure development are putting pressure on existing water and sanitation systems, causing localized water shortages and pollution.
 4. Biodiversity: Across the region, the biodiversity faces serious threat from human activities and from natural changes caused in part by humans. There are 2 main reservoirs of biodiversity in the GMS, i. e., forests, and wetlands and other aquatic ecosystems. The loss of forests over the past two decades from uncontrolled logging, land clearance, road building and other activities has had a substantial impact on population of flora and fauna. Besides the threats from habitat loss, native species are also threatened by hunting and the wildlife trade, and by the spread of some invasive alien species. Wetlands face threats from habitat degradation, pollution, uncontrolled exploitation and agricultural encroachment. The largest wetland in the GMS, and the largest lake in Southeast Asia, is Tonle Sap Lake in western Cambodia. Population growth is a key driver of biodiversity loss, through impacts such as land clearance, over-fishing and illegal hunting for food and income. The links between population

growth and biodiversity are crucial to the GMS, since the region's biological diversity — both natural and agricultural — supplies the main source of livelihood for much of its rural population.

2.3 GMS Mitigation Policies and Efforts

Member countries have established policies and efforts in mitigating the environmental problems arising from economic development strategies. The key environmental priorities focus on the following issues.

- (1) Controlling land degradation : rehabilitation of degraded cropland and establishment of appropriate land management policies and practices (e. g. banning harvesting in natural forests, shifting the emphasis of forest production to plantations) have been suggested. In addition, the cooperation in regional and international initiatives aimed at controlling land degradation and desertification, for example the signatories of all countries in GMS to the Convention to Combat Desertification (CCD), was encouraged. However, in reality, there are problems to be solved in all member countries :
 1. A consistent problem to reverse land degradation has been the inability to reorient economic planning systems or the dominant sectoral approaches to land management ; the completing influences of fiscal and market incentive programs ; and the under-pricing of resources and subsidizing of agricultural inputs such as fertilizers.
 2. Major policy failures leading to land degradation have included insecure land tenure and misjudged attempts to reform land tenure patterns by encouraging fixed settlement and cultivation in upland areas.
- (2) Balancing demands on water resources : Water resources management is the subject of numerous sub-regional initiatives and agreements.
 1. A framework for cooperation in Mekong river governance already exists in the form of the Mekong River Commission (MRC). The MRC has established initiatives on Watershed Management Project and Basin Development Plan aiming to strengthen the links to local governments and communities and to improve sub-regional growth through integrated Water Resources Management (IWRM).
 2. Besides MRC's initiatives, there exist other multilateral initiatives such as the Working Group on Water Resources Management of the Association of South-East Asian Nations (ASEAN), and the environmental aspects of the GMS Economic Cooperation Program (financed by the Asian Development Bank).
- (3) Protecting and managing biodiversity :
 1. Establishing legal instruments, both national and international : All of the GMS countries are signatories to the Convention on Biological Diversity and the Convention on International Trade in Endangered Species of Wild Fauna and Flora
 2. Establishment of protected areas : Across the region, however, protected areas face threats from illegal logging, hunting, encroachment and human activities.
 3. Transboundary cooperation : the creation of transboundary protected areas to provide opportunities for promoting biodiversity conservation and sustainable use across ecosy-

stems and landscapes divided by national borders, while at the same time encouraging collaboration and management in information sharing.

4. A growing trend is for public participation in biodiversity protection: There are several drivers, i. e., the growing recognition that communities which depend on biodiversity for their livelihoods can be partners and allies in conservation efforts. GMS countries are introducing measures for public participation and consultation, mostly as part of policies for environmental impact assessments of development projects. At the local level, a growing number of communities is involved in managing activities in the multi-use or buffer zones around and outside protected areas.
- (4) Since the 10th GMS Ministerial Conference in Yangon, Myanmar in November 2001, the Strategic Framework for the GMS to achieve the sustainable development goals (i. e., poverty reduction and environmental protection) has been established:
 1. Flagship programs in 11 key areas were implemented (i. e., transportation/economic corridors, telecommunications and energy interchanges, cross-boarder trade and investment, support for greater private sector participation in development, development of human resources, joint initiatives for the management of sub-region's shared environment and natural resources, and tourism development).
 2. The flagship program on Strategic Environment Framework (SEF) is to help integrate environmental considerations in economic development planning. The flagship program includes:
 - i. Identifying opportunities for improving environmental management in GMS,
 - ii. Building awareness and capacity in regional environmental assessment,
 - iii. Enhancing public participation in GMS decision making, and
 - iv. Defining a set of environmental parameters and mechanisms to initiate an environmental monitoring program.
 3. The flagship program complementing the initiatives of the Mekong River Commission (MRC) for flood control and water resource management, includes 4 major groups of floodplain management measures:
 - i. Land use planning, to minimize risks to people living in vulnerable floodplain areas;
 - ii. Structural measures, such as building platforms for dwelling and making roads flood-proof to minimize hazards to people living in floodplains, and construction of flood mitigation structures such as dams and embankments to reduce flood damage to urban settlements;
 - iii. Flood preparedness, to strengthen institutional capacities to prepare for floods; and
 - iv. Flood emergency, to build capacity for responding to flood emergencies.
- (5) The Environment Ministers' Meeting (EMM) of the countries of the GMS was the policy formulating institution with the first meeting assembled in Shanghai, PRC in May, 2005 to pursue the common GMS vision for sustainable and inclusive economic growth.
- (6) The 2nd EMM in January 2008 in Vientiane, Lao PDR, reaffirmed to follow the guiding principles for GMS cooperation and to focus on poverty alleviation as the core of EMM's

developmental efforts as well as on promoting sound environmental management through

1. the Core Environment Program/Biodiversity Conservation Corridors Initiative (CEP/BCI):
 - i. The Working Group on Environment (WGE) and Environment Operations Center (EOC) were established to expand and accelerate the pro-poor activities of CEP/BCI especially among the socio-ecological vulnerable upland communities to ensuring biodiversity conservation.
 - ii. Increased activities by WGE and EOC, projects and programs to focus on the participation of young generation in enhancing environmental management performance and nature conservation in the sub-region
 2. Clean technology, knowledge, and finance in improving the environmental management performance and preparedness for addressing the emerging challenges of climate change. Clean Development Mechanism (CDM) would be explored to address climate change issue.
 3. GMS universities and civil societies in supporting the GMS CEP/BCI
- (7) The Vientiane Plan of Action for GMS Development, 2008-2012 resulted from the GMS Leaders Joint Summit Declaration, Vientiane, Lao PDR during March 30-31, 2008, has focused on making substantial and early progress on the following measures on transport, energy, telecommunications, agriculture, tourism, human resource development, trade facilitation, investment, and environment. Specifically, the making progress in reducing environmental risks to local livelihoods and GMS development plans, including those posed by climate change, and calling for strengthening the cooperation among member countries for the protection of forestry in the GMS.
- (8) The project "National Environmental Performance Assessment (EPA) and Sub-regional Strategic Environment Framework (SEF II) is a regional technical assistance (RETA) by ADB, in collaboration with the Global Environmental Facility (GEF), the United Nations Environment Programme's Regional Resource Center for Asia and the Pacific (UNEP RRC. AP), the Institute for Global Environmental Strategies (IGES), and the National Institute for Environmental Studies of Japan (NIES). In 2007 the first series of publications on EPA were disseminated.

III. The Environmental Conservation Experiences of Thailand

From the selected macroeconomic indicators and the achievement of selected MDG, Thailand can be considered as the most developed country in the GMS. In terms of environmental conservation and protection, Thailand has also a longer history and more experiences with more policy tools or instruments available than any other countries in the GMS. The policies and experiences on environmental conservation and protection of Thailand can be shared by other member countries to conserve and protect the environment in GMS. The Thai policies and experiences have been formed and reformed in various aspects as followed:

3.1 Many Regulations and Regulators towards a More Unified One

The national institutional endowment on environmental conservation policies includes the national economic and social development plans, the national environmental quality laws and regulation that regulate the practices at the ministerial and local government agencies as followed:

- (1) The National Economic and Social Development Plans since 1961: The plans have integrated the environmental considerations into the development vision and policy. The 9th NESD Plan (2002-2006) stated the direction of natural resource and environmental management including:
 - a. Natural resource management that allows for greater local participation,
 - b. Heightened public awareness regarding environmental quality,
 - c. More efficient enforcement of environmental laws,
 - d. Development of databases at the local level to facilitate efficient monitoring and evaluation,
 - e. Continued support for protection and demarcation of protected areas,
 - f. Formulation of a master plan for the rehabilitation of Thai coastal and marine environments,
 - g. Greater attention to biodiversity conservation in any new natural resource strategies,
 - h. More efficient utilization of water resources,
 - i. Restoration of soil fertility to boost agricultural productivity,
 - j. More efficient utilization of energy, and
 - k. Greater attention to matching land use to land capability.
- (2) The National Environmental Quality Act (NEQA) of 1992: The main umbrella of national environmental conservation and protection law to be enforced by all ministries concerned.
- (3) The Integrated National Forest Management Strategic Plan has been endorsed in 2004. The plan was under the Decade for Natural Resources and Environment Rehabilitation (2003-2013), a policy to solve the problem of natural resources degradation. Relevant government agencies have to set up strategic plans accordingly. However, Ministry of Natural Resources and Environment (MONRE) is the main agency in operating the strategic plan.
- (4) Four 5-year 'Environmental Quality Management' and the 'Provincial Environmental Quality Management Action Plan' have been formulated under the Policy and Prospective Plan for Enhancement and Conservation of National Environmental Quality (1997-2016). It was approved in 1996 and has remained an environmental policy guide for the top environmental body, i. e., the Ministry of Natural Resources and Environment (MONRE). The Policy and Perspective Plan consists of 6 sets of policies: a. natural resources, b. pollution, c. natural and cultural environments, d. community environment, e. environmental education and promotion, and f. environmental technology. The Policy and Prospective Plan also quantifies several key natural resource and environmental objectives: By 2006, Thailand is to:

- a. Have at least 25% of the country area under protected forests;
- b. Have at least 1.25 millions rai (200 km²) of mangrove areas;
- c. Reduce the area prone to soil erosion to no more than 9.7% of the country's total land area;
- d. Bring the area degraded (acidic, saline, other) soils to no more than 9.5% of the country's total;
- e. Ensure that all main rivers have the level of dissolved oxygen at least 2 mg/l;
- f. Collect and treat at least 50% of all hazardous waste generated;
- g. Properly dispose of at least 50% of solid waste generated in the provinces;
- h. Recycle at least 30% of the total solid waste generated;
- i. Bring air quality in all urban area to within existing (and quantified) air quality standards.

Besides the NEQA of 1992, other environmental legislations exist under different government agencies. This includes :Factories Act of 1992, Hazardous Substances Act of 1992 under Ministry of Industry; Public Health Act of 1992 under Ministry of Public Health; Energy Conservation Promotion Act of 1992 under Ministry of Energy; Forest Reserve Act of 1964, National Park Act of 1961, Forestry Act of 1947 under MONRE; Fishery Act of 1945 under Ministry of Agriculture and Agricultural Cooperatives. There are no fewer than nine major laws relating to water pollution, at least four to solid waste management, five to toxic contamination, six to land degradation, four to water resources and six to forest resources.

The environment conservation and protection plans and policies in Thailand are also in coherence with international agreements signed and ratified by the Thai Government (e.g. Convention Concerning the Protection of the World Cultural and Natural Heritage, United National Framework Convention on Climate Change, Ramsar Convention, Convention on Biodiversity, Vienna Convention for the Protection of the Ozone Layer, Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal).

Thus, the Thai environmental practice is complicated by this complex legislation, gaps of coverage, and dispersion of supervision responsibilities across different agencies.

3.2 Better Environmental Conservation and Protection Governance

The administrative structure to reflect the governance for managing the environmental conservation and protection is organized as followed :

- (1) National Environmental Board (NEB) :To overcome the dispersion of authority over natural resources, the National Environmental Board (NEB) has been established since 1975, chaired by the Prime Minister. The sectoral ministries whose activities impinge upon the environment, the heads of the relevant government boards and the private sector have been brought together to the NEB as a way to foster inter-agency communication and policy coherence. Besides its national policy formulating, the NEB's powers include changes of environmental standards, amendment of environmental laws, and prescribed changes in monitoring by the State of environmental compliance. The Permanent Secretary of MONRE serves as the Secretariat of NEB.

- (2) Pollution Control Committee: The committee is under MONRE's chairmanship with representation by 10 Directors General of key environment-linked departments, the Secretary General of ONEP and the Permanent Secretary of BMA was established to control pollution problems.
- (3) Fiscal and administrative decentralization: Integration of environmental decisions at lower levels of government has been part of a much wider effort by Thailand to change governance. It is considered that effective decentralization is the key to improve environmental performance in areas such as wastewater management, as well as natural resource management. The 1997 Constitution provides for substantial fiscal and administrative decentralization. However, the process of converting into action has been relatively slow. The incomplete and slow decentralization has probably had an adverse effect on performance especially on environmental service activities (such as wastewater treatment, solid waste management) that require clarity regarding the pattern of local cost recovery.
- (4) Pollution Control Areas (PCAs): Under the NEQA, NEB can declare locations experiencing serious pollution 'Pollution Control Areas.' Such areas then qualify for a possible support by the Government of mitigation measures and result in additional obligations placed on the relevant local government (e. g. to draw up a suitable remedial action plan).
- (5) Conservation and Environmentally Protected Areas: Similar arrangements apply to environmentally fragile areas that can be declared 'Conservation and Environmentally Protected Areas'.
- (6) Restructuring the environment ministry: In October 2002 the latest restructuring of the environment ministry was completed to further reduce the overlap of responsibility and authority among government agencies. The former MOSTE was reorganized as MONRE around the following units: Office of Natural Resource and Environmental Policy and Plan (ONEP); Pollution Control Department (PCD); Department of Marine and Coastal Resources; Department of Mineral Resources; Department of Water Resources; Department of Natural Parks, Wildlife and Plants; Department of Environmental Quality Promotion.
- (7) Environmental financing: In order to help local government organizations, private sector, and nongovernmental organization to conserve and protect environment, the Government provides financial assistance through the annual general budget. Environmental Fund was established in 1992 to support efforts to solve urgent environmental problems, in particular the provision of air pollution and wastewater treatment and waste disposal facilities, with participation of all stakeholders.
- (8) Participation by the private sector as a response to government pollution control policy as well as under voluntary programs such as ISO 14001 has been stimulated.
- (9) Access to information and public accountability: The Official Information Act of B. E. 2540 (1997) compels all public bodies to make information (except security information) accessible to the public. This also includes MONRE with its website at <http://www.monre.go.th>. The State of the Environment Reports (prepared by ONEP) and State of

the Pollution Reports (prepared by PCD) are prepared annually, and after submission to the Cabinet, are placed in the public domain.

- (10) Environmental awareness and education: Environmental education (EE) has been part of the curriculum of Thai primary and secondary schools since 1970s with elements of conservation awareness introduced. The Ministry of Education developed an EE action program in the early 1990s, with a target of 60% of students and the public to become aware of environmental conservation by 1996. After 2002, EE was introduced into nonformal and informal education. There are 55 environmental education centers (called the Provincial Environmental Education Centers-PEEC) supported by DEQP. PEECs' partners are local administrative organizations, national agencies, schools and teachers, women's groups, monks, NGOs and the private sector. PEECs organize and conduct capacity building programs (e.g. training of teachers, local government staffs) and also serve as discussion centers.

3.3 More Economic Incentives Introduced

'Economic' or 'market-based' instruments as opposed to the 'command-and-control' instruments of environmental management policy have been an attempt by the Thai government to make them realized: for example, resource pricing, user charges for wastewater treatment, municipal solid waste disposal, hazardous waste disposal. Currently, other economic instruments such as tax and price differentiation, green taxes, voluntary compliance mechanism and clean production initiatives are explored. The Ministry of Finance is working on drafting the 'Economic Instruments for Environmental Management Act, B.E....'

3.4 Supporting the GMS Environmental Flagship Program

Towards the GMS cooperation, the Thai Government has provided the full support in all flagship programs including the flagship program on environment with its institutional endowment accumulated from long experiences in environmental conservation and protection domestically. Under the Strategic Environment Framework (SEF) aiming at the sustainable development by improving information system, indicators, and strategic cooperation framework on environment by considering the impacts on environment and society from the various investment programmes and focusing on Biodiversity Corridor, the Thai Government has provided policy responses as followed:

- (1) During 2004 - 2006, Department of Environmental Quality Promotion (DEQP), MONRE, was the focal point to implement the National Performance Assessment and Sub-regional Strategic Environment Framework for the Greater Mekong Sub-region: SEF II)
- (2) During 2007-2009, the Office of Natural Resource and Environmental Policy and Plan (ONEP), MONRE, is the focal point to monitor the Greater Mekong Sub-region-Core Environment Programme Component 3-Environmental Performance Assessment: GMS-CEP3-EPA.
- (3) Thailand offers guidelines to comply with climate initiatives to help reduce greenhouse

gas emission in the area of deployment of clean coal technologies and reduce GHG from other activities of concern.

- (4) The national policy and strategy on climate change has been approved by the Thai Government.
- (5) The “Thailand Greenhouse Gases Management Organization (TGO)” has been established to cope with global warming issues. TGO offers to establish a training center to support the work on addressing climate change and reducing greenhouse gas emissions.
- (6) To enhance the diversity of the country’s rich and valuable bio-resources, Thailand will cooperate with the CEP Biodiversity Corridors Initiative. Lesson-learned from the CEP BCI implementation will help strengthen the institutional and human capacity for managing biodiversity and enhancing the other environmental cooperation in this region in the long run.
- (7) Thailand has proposed the establishment of the Research and Training Center on nature conservation in GMS region as a “Knowledge Hub” of the region to develop and facilitate the dissemination of information and techniques for management of protected area and biodiversity conservation.
- (8) Recently, the issue of biodiversity conservation and implementation of the forest connectivity in the Western Corridors in Thailand has been acknowledged by the Thai Cabinet. The sustainable management of these forest complexes needs cooperation, participation and action of all stakeholders/partners including government sectors, NGOs, private sectors, local communities, as well as universities and schools. As the year 2003-2013 is the Decade for Natural Resources and Environment Rehabilitation in Thailand, the Thai Government has given the mandate to MONRE to promote sustainable development with the participation of all stakeholders. This will integrate all knowledge and experience from relevant peoples including local wisdom and spirit of human relationship for conservation of nature and biodiversity.
- (9) Thailand also urge GMS countries to develop relevant measures to help mitigate trans-boundary environmental issues on haze and forest, as well as integrated water management, avian flu and other communicable diseases.

IV. Conclusion

GMS economic cooperation has enhanced the well-being of people in the area to a certain extent with more environmental concerns. The role of Thailand in the GMS economic cooperation is quite intensive in development through trade, infrastructure, and energy sources. However, in terms of environmental conservation and protection, Thailand has keen interests in taking the lead through its long experiences in and introduction of various policy tools or instruments for the domestic environmental management.

Thailand’s sustainable development path has run from the concept of ‘grow first, clean up later’ to ‘grow with quality of life and environmental conservation and protection’. Various

policy measures and instruments have been introduced: Now the concepts of 'Polluter Pays principle-PPP', 'Extended Producer Responsibility-EPR', 'Corporate Social Responsibility-CSR', 'Economic or Market-based Instruments' are better understood by the Thai public. The drafting of a new legislation on environmental taxes by the Ministry of Finance under the administrative decentralization is a big step for Thailand to use economic incentives to manage the environmental quality. The institutional restructure and reform of the relevant legislations and agencies since the 1990s should be valued as an appropriate example for environmental management in the GMS.

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