

Subregional Development Strategy in ASEAN  
after COVID-19:

Inclusiveness and Sustainability in the Mekong  
Subregion (Mekong 2030)

Economic Research Institute for ASEAN and East Asia



## **Subregional Development Strategy in ASEAN after COVID-19:**

### **Inclusiveness and Sustainability in the Mekong Subregion (Mekong 2030)**

Published by

Economic Research Institute for ASEAN and East Asia

Sentral Senayan II, 5<sup>th</sup> and 6<sup>th</sup> floor

Jalan Asia Afrika No.8, Gelora Bung Karno

Central Jakarta 10270

Indonesia

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Cover design by Ranti Amelia

Published in November 2020

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ISBN: 978-602-5460-30-2

*The report was presented at a briefing by ERIA's Chief Economist, Professor Fukunari Kimura, at the 'ASEAN Forum on Subregional Development – Converging Mekong subregional cooperation with ASEAN goals' held on 14 July 2020. The policy recommendations were highlighted by ERIA President Professor Hidetoshi Nishimura for ASEAN Foreign Ministers at the Special Session of the ASEAN Coordinating Council on Subregional Development held on 9 September 2020.*

## Foreword

ASEAN's process of economic integration is geographically multi-layered and, therefore, sub-regional initiatives are particularly effective to address development gaps, enhance connectivity, and promote international coordination. The Mekong subregion (MSR), with its strategic location, economic dynamism, and abundant water resources, is the centre of many mega-connectivity initiatives compared with the Indonesia–Malaysia–Thailand Growth Triangle and the Brunei Darussalam–Indonesia–Malaysia–Philippines East ASEAN Growth Area. Successful advocacy of Mekong issues will strengthen ASEAN unity and ASEAN's adaptive capability in a changing global and regional environment.

For the past decade, MSR countries have achieved significant socio-economic progress, enjoying high economic growth and remarkable reductions in poverty. Yet, the development gap between the MSR and other ASEAN countries remains sizable. In addition, the MSR is starting to face a series of serious immediate backlashes particularly in energy, water resources management, and the environment. Without robust and effective policy dialogues and coordinated measures, the MSR as a whole may not induce sustainable and harmonious development, which may in turn impede ASEAN's efforts for deeper economic integration and inclusive growth. The MSR therefore needs to search for a new development strategy to ensure that regional and individual economic and social transformations contribute more to inclusive and sustainable development.

This report highlights the importance of MSR development for ASEAN integration and prosperity. It diagnoses the current status of development and cooperation in MSR and proposes a framework for inclusive and sustainable growth. The policy recommendations are structured around four key areas: (i) connectivity, including both digital connectivity and physical connectivity; (ii) industrialisation, which covers industrial upgrading and micro, small, and medium-sized enterprises; (iii) human welfare, including health services and human resource development; and (iv) sustainability – energy, water resources management and the environment. The successful implementation of these four pillars requires strong commitment at the national, subregional, and regional levels.

The report is written at a critical time when the world is facing unprecedented challenges – rising trade conflicts and the return to protectionism, technological advances and job displacement, disruption in the global value chain, and the threat of poverty and increasing inequality due to the COVID-19 pandemic and climate change, amongst others. The new development strategy, therefore, must be able to address these challenges. I believe that this report will provide valuable insights into the obstacles the MSR countries are experiencing and how to overcome them in the new context.

A handwritten signature in black ink, reading "H. Nishimura". The signature is written in a cursive, flowing style with a large initial "H" and a long, sweeping tail.

Professor Hidetoshi Nishimura

President of ERIA

## Acknowledgements

It is my great pleasure to submit the report on the development vision for the Mekong Sub-region requested by the Ministry of Foreign Affairs of Viet Nam as chair of the Association of Southeast Asian Nations (ASEAN) in 2020. On behalf of the Economic Research Institute for ASEAN and East Asia (ERIA), I would like to express my deep appreciation to ERIA's experts and external consultants for their dedicated work, expertise, and contributions, without which producing this report would not have been possible.

The report was prepared under the guidance of ERIA's Chief Economist, Fukunari Kimura, who provided oversight and leadership throughout the development process. It draws on the research and analysis of several background papers prepared by Masahito Ambashi, Venkatachalam Anbumozhi, Salvador M Buban, Lurong Chen, Thu Hang Dinh, Ellen Putri Edita, Hendro Putra Johannes, Shigeru Kimura, Michikazu Kojima, Dian Lutfiana, Dionisius A. Narjoko, Anh Duong Nguyen, Dinh Chuc Nguyen, Han Phoumin, Alloysius Joko Purwanto, Rashesh Shrestha, Minh Thu To, Thanh Quang Trieu, Tri Thanh Vo, Thi Thu Hang Vu and Fauziah Zen. The project was coordinated by Ayumi Kodama, Yasuhiro Yamada, and Ha Thi Thanh Doan. Nadira Priastianda provided able administrative support. ERIA's editing team – Stefan Wesiak, Fadriani Trianingsih, and Rachmadea Aisyah – provided thorough copyediting to ensure the report's readability.

The report was prepared in collaboration with the Government of Viet Nam, in particular through the Ministry of Foreign Affairs of Viet Nam. I would like to express my deep gratitude for the continuous support and valuable inputs from H.E. Nguyen Quoc Dzung, Deputy Minister and ASEAN SOM Leader of Viet Nam; H.E. Nguyen Van Thao, Assistant Foreign Minister and Director General of the Department of Economic Affairs; H.E. Ambassador Nguyen Nguyet Nga, Senior Adviser to the ASEAN 2020 National Secretariat and Viet Nam's representative at the ASEAN Women Peace Registry; H.E. Vu Ho, Director General, ASEAN Department; H.E. Ambassador Tran Duc Binh, Viet Nam's Permanent Representative of the Socialist Republic of Viet Nam to ASEAN; Ms. Tran Bao Ngoc, Deputy Director General, Department of Economic Affairs; and Mr. Nguyen Dong Trung, Director, ASEAN Department.

The subregional approach has proved to be particularly effective for addressing development gaps, enhancing connectivity, and promoting international coordination. ASEAN, through its collective leadership and centrality, is encouraged to continue to apply a multi-layered approach for deeper economic integration and to activate other subregional initiatives. ERIA hopes that the recommendations in the report will help ASEAN Member States with the successful design and implementation of such initiatives – to achieve regional inclusive and sustainable economic development.

A handwritten signature in black ink, reading "H. Nishimura". The signature is fluid and cursive, with a large initial "H" and a stylized "Nishimura".

Professor Hidetoshi Nishimura

President of ERIA

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# Main Report



# Subregional Development Strategy in ASEAN after COVID-19: Inclusiveness and Sustainability in the Mekong Subregion (Mekong 2030)

*Fukunari Kimura*

## **Summary**

*The Mekong Subregion (MSR) has been a model subregional development initiative, having achieved high economic growth and rapid poverty alleviation with extensive and innovative international collaboration over the past 3 decades. The remaining development gaps within the region remain substantial, however.*

*Over the next decade, the MSR will face the challenge of raising the whole region to upper middle-income status. To achieve inclusive and sustainable economic growth, clear policy guidance will be required to upgrade its industrial structure and enhance people's welfare.*

*This report proposes four priority policy areas – connectivity, industrialisation, human welfare, and sustainability – and provides a series of policy recommendations.*

*The subregional approach has proved to be particularly effective for addressing development gaps, enhancing connectivity, and promoting international coordination. The Association of Southeast Asian Nations (ASEAN) is encouraged to continue to adopt a multilayered approach to deeper economic integration and to activate other subregional initiatives.*

## **1. Subregional Development in the Association of Southeast Asian Nations**

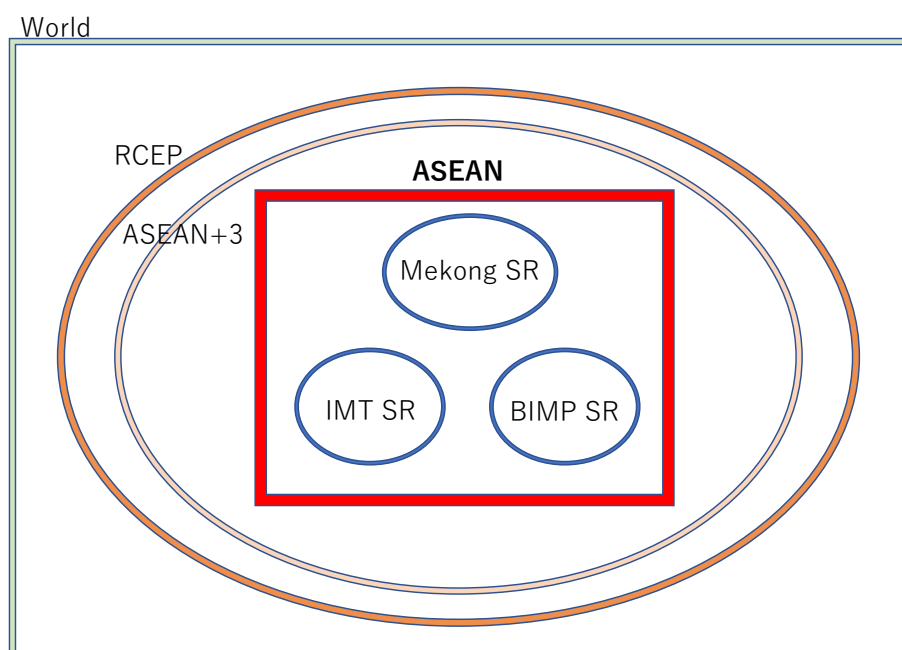
The process of economic integration is geographically multilayered. Whilst national borders set the boundary of jurisdiction and national sovereignty, economic activities follow the law of economic geography. To effectively utilise economic forces for economic development, economic integration in the political sense must be designed as the combination of different layers of policies. The Association of Southeast Asian Nations (ASEAN) has proactively utilised multiple levels of initiatives to promote various aspects of economic integration, placing ASEAN at the centre and setting larger and smaller layers around it (Figure 1).

In the framework of ASEAN integration, subregional initiatives are particularly effective in tackling (i) development gaps, (ii) connectivity, and (iii) international coordination. How to narrow development gaps by strengthening connectivity is a central theme for ASEAN integration, which must be pursued by the whole region and by the subregions. Several sustainability issues are subregional, not just national. The subregional approach is a powerful channel for exploring inclusiveness and sustainability for the whole ASEAN.

Important elements of the approach are well-coordinated policies across national borders and the involvement of international development partners.

Mekong Subregion (MSR) development has been one of the most successful subregional initiatives in the developing world for 3 decades, having achieved rapid economic growth and poverty alleviation. Various international initiatives, particularly the Greater Mekong Subregion led by the Asian Development Bank, have been vigorously promoted. However, huge development gaps remain within the subregion. Lessons must be drawn for other subregional initiatives such as Indonesia–Malaysia–Thailand and Brunei Darussalam–Indonesia–Malaysia–Philippines.

**Figure 1: ASEAN’s Multilayered Structure of Regional Economic Integration**



ASEAN = Association of Southeast Asian Nations, BIMP = Brunei Darussalam–Indonesia–Malaysia–Philippines, IMT = Indonesia–Malaysia–Thailand, RCEP = Regional Comprehensive Economic Partnership, SR = subregion.

Source: ERIA.

*The policy recommendation on over-arching issues and international collaboration is as follows:*

- a) Facilitate domestic economic reforms to address weaknesses of socio-economic development. Maintain a regular review of the status of the MSR as a whole and individual countries relative to other countries in the region (ASEAN, China, etc.) to recommend appropriate policy recommendations. Promote a better balance between economic and social targets via scoping of inclusive and sustainable development.
- b) Encourage greater cooperation amongst member countries in undertaking economic promotion activities, accelerating the development of economic corridors,



connectivity, cross-border trade, and investment, etc. Promote effective consultations with individual member countries to better understand their reform process and their need for assistance in order to develop more suitable assistance and/or cooperation programmes. New areas of economic development (such as information and telecommunications technology [ICT], circular economy, etc.) should be prioritised. Adopt a more proactive approach to planning and the management of trade-offs between sectors and countries.

- c) Promote synergies and complementarities between the current MSR cooperation programmes and other global and regional initiatives for the development of a sustainable, integrated, and prosperous subregion. From this perspective, rethinking of institutional arrangements for regional cooperation at both the national and subregional/regional levels may be considered in order to facilitate the participation of a more representative set of stakeholders in the prioritisation of activities and to ensure synergies between the various initiatives.
- d) Foster the development a long-term, diversified, and sustainable financing system, enhancing financial infrastructure connectivity and encouraging development financial institutions to play active roles in subregional cooperation.
- e) Facilitate a regional and open approach for addressing new challenges and taking advantage of opportunities for the most sizeable benefits of all participating countries and social groups. Collaboration with external international institutions and donors will help promote the effectiveness of the assistance programmes, especially subregional ones. A cooperation mechanism between MSR countries, with financial/technical support provided by a more advanced country/international institution, needs to be encouraged.

## **2. COVID-19 and the new normal**

The MSR countries have so far managed to block the coronavirus disease (COVID-19) pandemic at national borders. However, the pandemic may have second and third waves before vaccines are readily available, and developing countries are generally fragile in the face of pandemics. Human life is of the utmost importance, and policies to help healthcare systems keep the pandemic under control should be prioritised.

Formulating an exit strategy requires understanding the COVID-19 pandemic's economic shocks. The pandemic first caused a supply shock and a demand shock.<sup>1</sup> In January and February, ASEAN Member States (AMS) perceived a temporary negative supply shock in the form of a supply shortage of intermediate inputs from China and an abrupt positive demand shock for medical and emergency goods. After the pandemic's arrival, social distancing froze part of supply and demand. Because the containment of the disease is uneven across countries and regions, the removal of restrictions on people's movements, both domestic and cross-border, seems to take time. In addition, the trough of recession

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<sup>1</sup> For example, see Baldwin (2020).

in Europe and North America looks deep and prolonged so that a negative demand shock is likely to block a V-shaped recovery (Kimura, 2020). Therefore, macroeconomic policies, both monetary and fiscal, must be implemented to save severely affected sectors and people and to stimulate demand, whilst carefully considering long-term fiscal health (Zen and Kimura, 2020).

MSR countries must make efforts to retain international production networks during the low-demand period and become more internationally competitive by improving location advantages and upgrading connectivity to strengthen their position in Factory Asia. Even before COVID-19, some positive trade and investment diversion started in the form of China Plus One, and the MSR countries attracted some economic activities from China due to rising wages in China and the United States–China trade war. The trend seems to be accelerating with COVID-19. ASEAN Member States must act in concert to revive the regional economy and deepen economic integration (ERIA, 2020).

Big slumps in the transportation and tourism sectors are likely to continue, and the income from remittances will stay low for several years at least. This may force some people's income levels down below the poverty line. Some alternative job creation and industrial activities, in addition to mitigation policies, may be needed.

COVID-19 will accelerate the application of information and communication technology, which will lead to a new normal. The MSR countries must catch up with technological transformation.

The policy framework for the exit strategies in MSR countries and ASEAN Member States is summarised in Table 1.

**Table 1: Policy Framework for Overcoming COVID-19 by ASEAN Member States**

	Emergency responses	Exit policies	Policies for the new normal
Health policy	<ul style="list-style-type: none"> <li>• Conduct social distancing</li> <li>• Provide testing</li> <li>• Keep medical treatments within capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Carefully remove social distancing</li> <li>• Set medical services back to normal</li> <li>• Develop international collaboration to exit (medical supply, vaccines, quarantine)</li> </ul>	<ul style="list-style-type: none"> <li>• Establish long-term healthcare system</li> <li>• Disseminate health insurance</li> <li>• Develop international cooperation for future pandemic prevention</li> </ul>
Macroeconomic policy	<ul style="list-style-type: none"> <li>• Stabilise exchange rates and avoid a collapse of asset markets</li> <li>• Provide mitigation to help businesses and people at risk</li> </ul>	<ul style="list-style-type: none"> <li>• Provide macroeconomic stimulus (monetary, fiscal)</li> <li>• Develop international macro policy coordination</li> </ul>	<ul style="list-style-type: none"> <li>• Resume fiscal health and address inclusiveness and sustainability</li> <li>• Develop macro policy coordination framework</li> </ul>
Policies for IPNs	<ul style="list-style-type: none"> <li>• Keep IPNs and related industries (logistics, transportation, SMEs, local firms) alive with social distancing</li> </ul>	<ul style="list-style-type: none"> <li>• Keep IPNs and related industries alive with worldwide recession and some restriction on people's movements</li> <li>• Strengthen location advantages and reduce service link costs (connectivity, trade and investment liberalisation/facilitation)</li> </ul>	<ul style="list-style-type: none"> <li>• Better positioning in IPNs with competitive location advantages (human capital, infrastructure, institutions) and reduced service link costs</li> <li>• Make Asia-Pacific as a competitive region to attract innovative IPNs</li> </ul>
Policies for digital economy	<ul style="list-style-type: none"> <li>• Remove bottlenecks for teleworking and other digital connectivity</li> </ul>	<ul style="list-style-type: none"> <li>• Utilise IT and CT to strengthen international competitiveness in IPNs</li> <li>• Apply IT and CT in traditional industries and government services</li> <li>• Encourage digital-related businesses</li> <li>• Establish domestic and international policy discipline for the free flow of data and data-related businesses</li> </ul>	<ul style="list-style-type: none"> <li>• Effectively utilise IT and CT for economic/social development</li> <li>• Develop innovation hubs to promote the application of IT and CT</li> <li>• Establish a secure policy environment for free flow of data</li> <li>• Further develop the ASEAN Digital Integration Framework, E-commerce Agreement, and other initiatives</li> </ul>
Economic situation	<ul style="list-style-type: none"> <li>• Forced halting of economic activities for social distancing</li> </ul>	<ul style="list-style-type: none"> <li>• Prolonged recession in the world</li> <li>• Slow recovery of the cross-border movement of people</li> </ul>	<ul style="list-style-type: none"> <li>• The new normal</li> <li>• More efficient/thick value-added PNs</li> <li>• More penetration of digital technology</li> </ul>

COVID-19 = coronavirus disease, IPN = international production network, IT = information technology, CT = communications technology.

Note: Items in red font are international initiatives for Asia–Pacific.

Source: Kimura (2020).

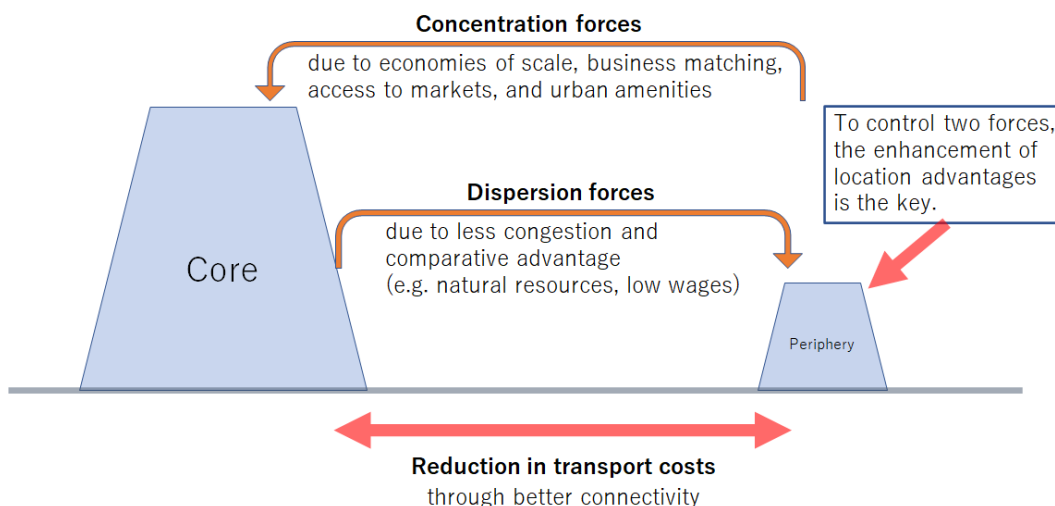
### 3. New Development Strategies for the Mekong Subregion

#### 3.1. Connectivity for Inclusive Growth

How can we utilise connectivity for inclusive growth? The new economic geography will provide a workable conceptual framework.

The basic framework is presented in Figure 2. There are a core and a periphery in a geographical distance. The core is an agglomeration or a cluster of economic activities and/or populations whilst the periphery is a less concentrated location. The core and the periphery may represent developed and developing economies, a newly developed country and a lagging country, or an urban or suburban and a rural area. A key idea of the new economic geography is that reduced transport costs between the core and the periphery generate 'concentration forces', which attract economic activities and people to the core, and 'dispersion forces', which move such elements to the periphery (Fujita, Krugman, and Venables, 1999; Baldwin et al., 2003). Typical theoretical equilibria between advanced countries are characterised by the domination of concentration forces; the periphery may lose economic activities and people through reduced transport costs. However, when comparative advantage is strong due to different development stages of the core and the periphery, dispersion forces may become strong. To avoid the loss of economic activities and population and utilise dispersion forces effectively, location advantages at the periphery must be boosted and connectivity improved. To make economic growth rapid and inclusive, the two forces must be controlled (ERIA, 2010; 2015).

**Figure 2: The Core–Periphery Structure and Reduction in Transport Costs**



Source: ERIA (2010).

In a subregional setting such as the MSR, huge gaps still exist between development stages and income levels within national borders and beyond. Suppose that the core is a subregional centre such as the Bangkok Metropolitan Area, Ha Noi, or Ho Chi Minh City,

whilst the periphery is the rest of the MSR. Based on the new economic geography, to ensure inclusiveness, the income and welfare of people in the periphery can be raised through three major channels by strengthening connectivity (Figure 3). First, production activities, particularly labour- or natural resource-intensive ones, may move to the periphery and increase the income of the people there. Second, people in the periphery may move to the core to work and send money home. Third, better connectivity reduces the price of goods and services or makes them available in the periphery, thus enhancing people's welfare.

To attract production activities to the periphery (channel [i], Figure 3), improvement of connectivity must be balanced by reinforcement of location advantage. Otherwise, production activities and people will move out of the periphery. Labour-intensive industries such as garment and footwear, and labour-intensive production blocks in machinery industries may be a choice if a certain mass of labour resides in the periphery and wage gaps with the core are large enough. Otherwise, some natural resource-based industries such as agriculture, fishery, mining, cottage industries, and tourism are a possibility.

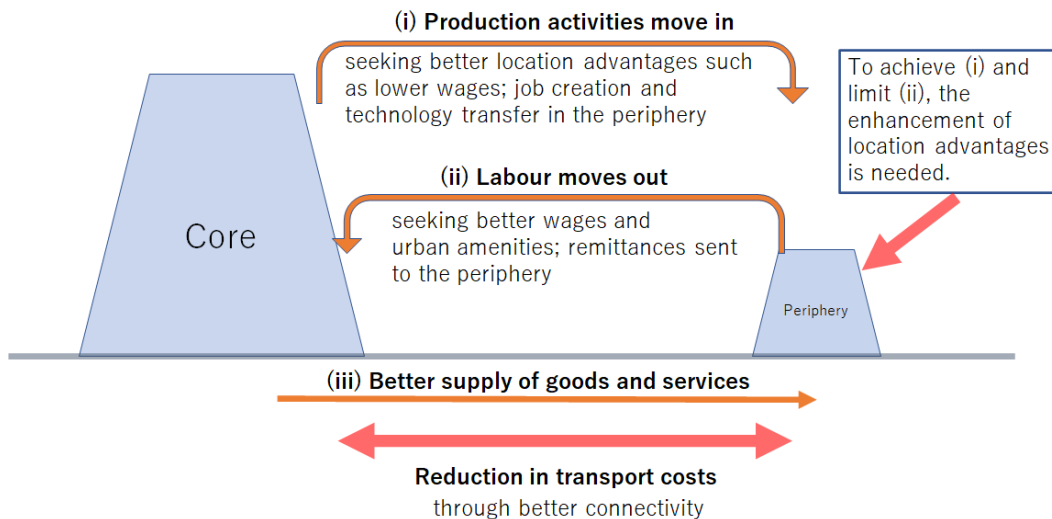
Labour movements from the periphery to the core are a powerful tool for raising the welfare of rural people (channel [ii], Figure 3). Massive labour movements have been occurring in the MSR since the mid-2000s, within and across national borders. Some labour movements to the core within national borders are necessary for the core to have a critical mass of labour for efficient industrial agglomeration. In the last couple of decades, the MSR has witnessed considerable movements of labour across national borders, which have become an important source of income for some rural people. However, policymakers may want to avoid overreliance on cross-border movements of labour, particularly of unskilled labour. To keep cross-border labour movements at a controllable level, latecomers must generate good jobs at home.

Better supply of goods and services (channel [iii], Figure 3) due to improved connectivity can boost people's welfare. Through upgraded physical connectivity, rural people can more easily access food and other consumption goods. Transport costs for food and other consumption goods borne by rural people are not at all negligible. Some parts of the costs are reflected in retail prices at a village market whilst the cost for rural people to come to the market is an additional cost. The availability of a variety of goods and services is another element of raising people's welfare. Although it is not easy to quantitatively measure the effect of enhancing connectivity on rural people's welfare, it will certainly be significant in the development of road networks and other logistics infrastructure in MSR countries.

Related to channel (iii), digital technology expands the scope of connectivity. Digital connectivity is different from traditional physical connectivity and both are partially substitutable and largely complementary (Figure 4). Through physical connectivity, goods and people become mobile. Through digital connectivity, data, information, and digitalised services become mobile. Distance penalises physical connectivity whilst it does not matter much for digital connectivity. Once digital connectivity is established,

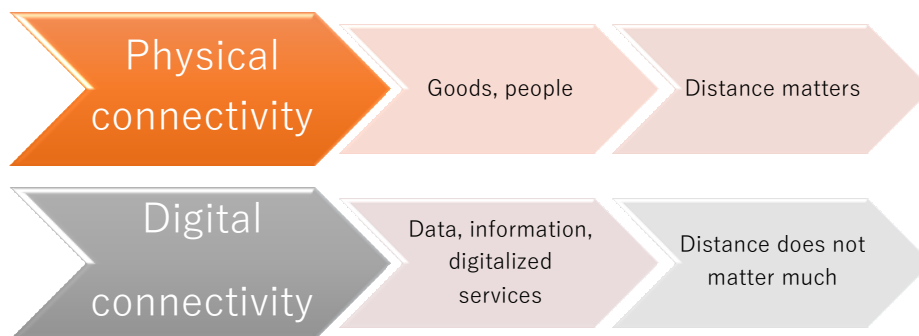
information gathering at a distance becomes much easier, and some services, including educational, medical, and government services, can be mobile for people in rural areas. Service outsourcing for channel (i) may become one of the major economic activities for people in the periphery. By overcoming a possible digital divide, MSR countries may aggressively take advantage of digital connectivity.

**Figure 3: Three Channels for Connectivity to Achieve Inclusiveness**



Source: ERIA (2010).

**Figure 4: Differences between Physical and Digital Connectivity**

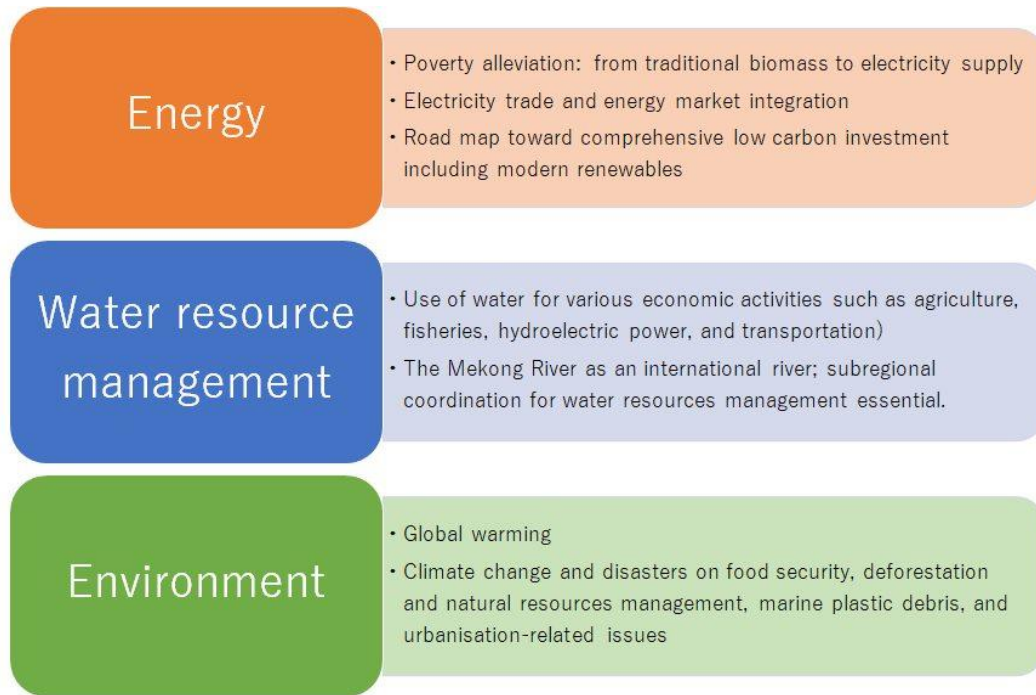


Source: ERIA.

### 3.2. The Subregional Approach to Sustainable Growth

Sustainability is an important long-term aspiration set by the United Nations in the form of the Sustainable Development Goals. The MSR is starting to face a serious development backlash, particularly in energy, water resource management, and the environment. Solving this challenge is not just a long-term issue but also an urgent one.

**Figure 5: Sustainability Issues in the Subregional Approach**



Source: ERIA.

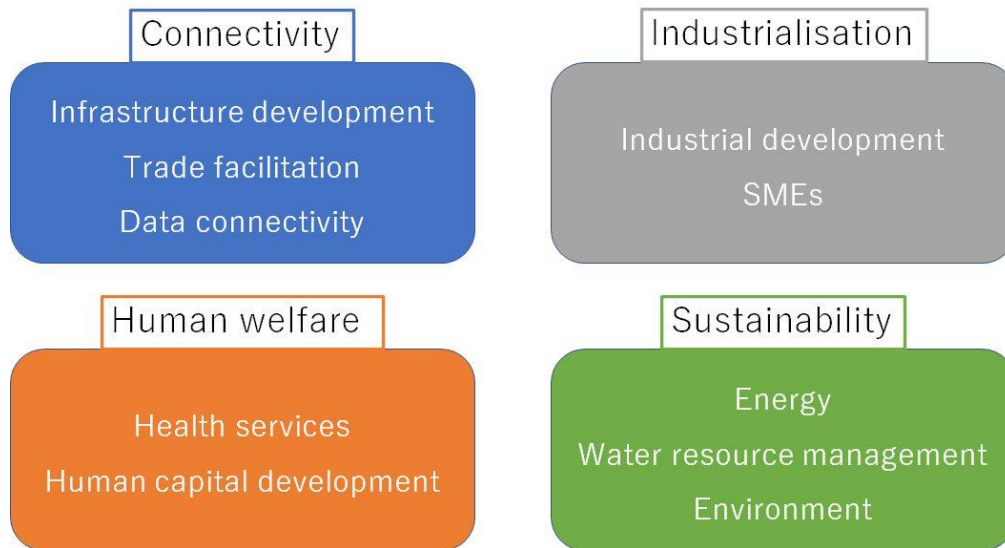
Several important sustainability issues are subregional, and the subregional approach to policy coordination is inevitable (Figure 5). An immediate issue is the transition from traditional biomass to electricity supply, which is deeply linked with poverty. The region has already developed some electricity trade, and further energy market integration is in the scope of subregional development. A comprehensive road map for a low-carbon economy must be drawn up to meet rapidly increasing energy demand with hydro and renewable energy. Water resource management is subregional. In the MSR, water is utilised for economic activities such as agriculture, fisheries, hydroelectric power, and transport. The Mekong River is an international river, and subregional coordination for water resource management is essential. International cooperation initiatives including international development partners can be developed for the subregion. Various issues besides global warming require a subregional approach, notably climate change and food security, deforestation and natural resource management, marine plastic debris, and urbanisation-related issues.

## 4. The Mekong Subregion Policy Framework for Inclusiveness and Sustainability

### 4.1. Four Priority Policy Areas

To achieve inclusive and sustainable growth, four policy areas must be emphasised in the MSR's development strategy: (i) connectivity, (ii) industrialisation, (iii) human welfare, and (iv) sustainability (Figure 6). These areas are deeply intertwined in order to address inclusiveness and sustainability. Policies for connectivity and industrialisation are needed to realise inclusive growth in the MSR on the basis of the new economic geography. Policies for sustainability not only work as a back-up for economic growth but also promote inclusiveness. Human welfare is a foundation of economic growth.

**Figure 6: Four Prioritised Policy Areas**



Source: ERIA.

To achieve all of the above, international cooperation and collaboration must be extended within the region and with international development partners to exploit the strength of a subregional approach to achieving inclusive and sustainable growth.

## 4.2. Connectivity

Connectivity will enhance people’s welfare in lagging regions by attracting economic activities, mobilising people, and making goods and services more available. Physical and institutional connectivity as well as digital connectivity must be further developed. The required connectivity depends on the sort of international division of labour promoted. Applying the concept of unbundling by Baldwin (2016), we can summarise the key elements for infrastructure development, trade facilitation, and digital connectivity (Table 2). The first unbundling is the industry division of labour; most operations in traditional industries, including agriculture and food, mining, labour-intensive ones such as garment and footwear, and tourism, fall into this category. The level of connectivity for the first unbundling is modest; medium-grade logistics and logistics services suffice. The second unbundling is a more sophisticated division of labour in terms of production processes or tasks. Typical industries are machinery and others operating in tight global value chains. Required connectivity is more demanding; high-grade logistics and logistics services as well as urban and suburban development for industrial agglomeration are prerequisites. Trade facilitation and e-customs are of particular importance at this stage. The third unbundling is the person-wise division of labour, in which cross-border service outsourcing may become a major form of international division of labour, backed by digital technology. All sorts of unbundling are going on in parallel, with different weights depending on locations, industries, and corporate strategies.

**Table 2: Connectivity and International Division of Labour**

	The first unbundling	The second unbundling	The third unbundling
International division of labour	Industry-wise (production and consumption are unbundled)	Task-wise (an industry is unbundled)	Person-wise (a task is unbundled)
Typical industries	Traditional industries: agriculture/food, mining, labour-intensive industries, tourism	Machinery industries and industries in global value chains	Service outsourcing
Infrastructure development [physical connectivity]	Medium-grade logistics infrastructure, infrastructure services	High-grade logistics infrastructure, urban/sub-urban development	
Trade facilitation [institutional connectivity]		Quick and reliable customs clearance, transport and traffic facilitation, TBT	SPS, standards and conformance
Digital connectivity [both physical and institutional]		e-customs	ICT infrastructure, free flow of data with trust

Source: ERIA.

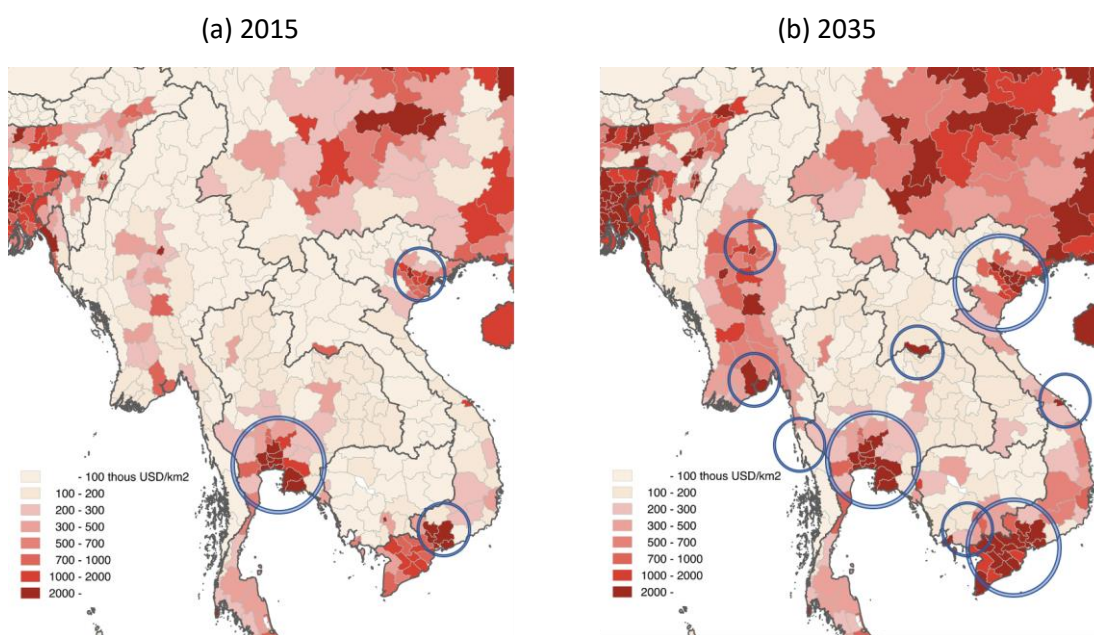


The MSR must continue to emphasise infrastructure development, although substantial improvements have been made over the past 3 decades

*The policy recommendation on infrastructure development is as follows:*

- a) In the coming years, the formation of efficient industrial agglomerations will be crucial for further industrialisation. The MSR may want to aggressively deepen its involvement in global value chains when COVID-19 forces the private sector to reorganise production networks. In the coming decade, Ha Noi and Ho Chi Minh City will become large industrial agglomerations, in addition to the Bangkok Metropolitan Region. Midsize industrial agglomerations are likely to develop in Phnom Penh, Vientiane, and Yangon. Depending on the industrialisation strategy, Danang, Mandalay, Dawei, and some border cities may become industrial clusters. Logistics links connecting large and midsize industrial agglomerations must be expanded (Figure 7).

**Figure 7: Industrial Agglomerations in ASEAN: 2015 and 2035**



ASEAN = Association of Southeast Asian Nations, km<sup>2</sup> = square kilometre, thous = thousands, USD = United States dollar.

Source: ERIA–IDE-GSM team.

- b) Medium-grade logistics infrastructure is still needed in rural areas, particularly in Myanmar. Connectivity will provide people with new business opportunities as well as enhance their access to goods and services.
- c) It is important to establish a mechanism that shares the benefits of infrastructure development and fairly distributes the cost burden of infrastructure construction amongst the MSR countries.

- d) The consultation system needs to be reinforced in existing international collaboration frameworks such as the Mekong River Commission (MRC), the Ayeyawady–Chao Phraya–Mekong Economic Cooperation Strategy (ACMECS), and the Lower Mekong Initiative to push forward intergovernmental agreements, burden sharing of infrastructure construction and maintenance costs, public–private partnerships, and others.
- e) The MSR countries may agree on a mechanism to assess the impacts of infrastructure development on economies, environments, and societies; and present recommendations to avoid or mitigate possible negative effects of infrastructure development.
- f) The MSR countries may need to increase reliance on private sector investment. There is an urgent need for workable mechanisms to facilitate public–private partnerships, since many countries will spend their budgets on huge stimulus packages to address the COVID-19 pandemic.

Trade facilitation is becoming a bottleneck for enhancing connectivity after the development of physical infrastructure. Although the MSR has developed a cross-border transport system in formal and informal agreements, the implementation is still an issue.

*The policy recommendation on trade facilitation is as follows:*

- a) It is vital to simplify cross-border trade procedures, e.g. single-stop inspection or single-window service regarding customs clearance. A common control area must be introduced as soon as possible in border checkpoints along economic corridors.
- b) It is important to accommodate both the operations and regulations of the Cross-Border Transport Facilitation Agreement, which still has some complications with trilateral driving licenses.
- c) The MSR countries must fully implement existing subregional and ASEAN-wide transit and transport agreements such as the Cross-Border Transport Facilitation Agreement, the ASEAN Framework Agreement on the Facilitation of Goods in Transit, and the ASEAN Framework Agreement on the Facilitation of Inter-State Transport – including ratification, amendments to relevant domestic laws and regulations, and the establishment of implementing mechanisms/institutions.
- d) The MSR countries must ensure regular updating of their National Trade Repositories for the transparency of laws, regulations, and measures; and exchange best practices on regulatory management.
- e) Priority may be placed on investing in ICT infrastructure and building the capacity of officials so that all government agencies can issue all trade-related documents (e.g. the ASEAN Trade in Goods Agreement [ATIGA] Form D) through the National Single Window and ASEAN Single Window.

- f) The MSR countries may coordinate border procedures (e.g. integrated risk management, joint time release studies, and others) to reduce the time cost for traders at common checkpoints.

Digital connectivity provides a different dimension in connectivity. Many services will move online, including some medical, educational, financial, and governmental services. Universal e-identity and e-bank accounts have already been implemented in developing countries such as India, and some ASEAN Member States are considering introducing them. Although the digital divide is a concern, digital connectivity could offer another channel of inclusiveness.

*The policy recommendation on digital connectivity is as follows:*

- a) Subregional cooperation in ICT infrastructure building and related logistic construction is vital. Improving digital connectivity requires substantial efforts on improving connectivity infrastructure in both the physical world and cyberspace, rule setting to support a development-friendly ecosystem for digitalisation, and combining countries' national strategies and regional collaboration in eliminating institutional barriers.
- b) Public–private partnerships in capacity building and mitigating market inefficiency are important. To overcome obstacles in data connectivity and digital infrastructure, the public sector needs to take the lead to initiate and drive the increased supply of public goods in both quantity and quality. Private sector involvement will be equally important to make the development sustainable.
- c) Information sharing, in support of production sharing and economic cooperation, will be a new component of MSR cooperation to realise the free flow of data with trust and establish an integrated digital ecosystem that facilitates trade and investment effectively and accelerates digital adoption in the region.

### **4.3. Industrialisation**

Industrialisation strategy can be organised according to type of unbundling or international division of labour (Table 3). Industrial development might not automatically follow improved connectivity. Some intentional effort is often required to gain international competitiveness in the first unbundling and strengthen location advantages in the second.

**Table 3: Industrialisation Strategy**

	The first unbundling	The second unbundling	The third unbundling
Industrial development	<ul style="list-style-type: none"> <li>- Utilise comparative advantage and gain international competitiveness by productivity growth and medium-grade logistics</li> <li>- Apply IT and CT to rejuvenate industry [feedback]</li> </ul>	<ul style="list-style-type: none"> <li>- Deepen the involvement in production networks by enhancing location advantages and reducing service link costs</li> <li>- Develop mid-size industrial agglomeration, encouraging local firms to get involved</li> <li>- Introduce IT and CT to better position in production networks [feedback]</li> </ul>	<ul style="list-style-type: none"> <li>- Engage in service outsourcing [leap-frogging]</li> </ul>
MSMEs	<ul style="list-style-type: none"> <li>- Take care of small players in traditional industries</li> <li>- Well-disciplined workers needed</li> </ul>	<ul style="list-style-type: none"> <li>- Foster supporting industry to take part in production networks</li> <li>- Engineers and managers in demand</li> </ul>	<ul style="list-style-type: none"> <li>- Incubate start-ups</li> <li>- Programmers and entrepreneurs required</li> </ul>

CT = communication technology; IT = information technology; MSMEs = micro, small, and medium-sized enterprises.

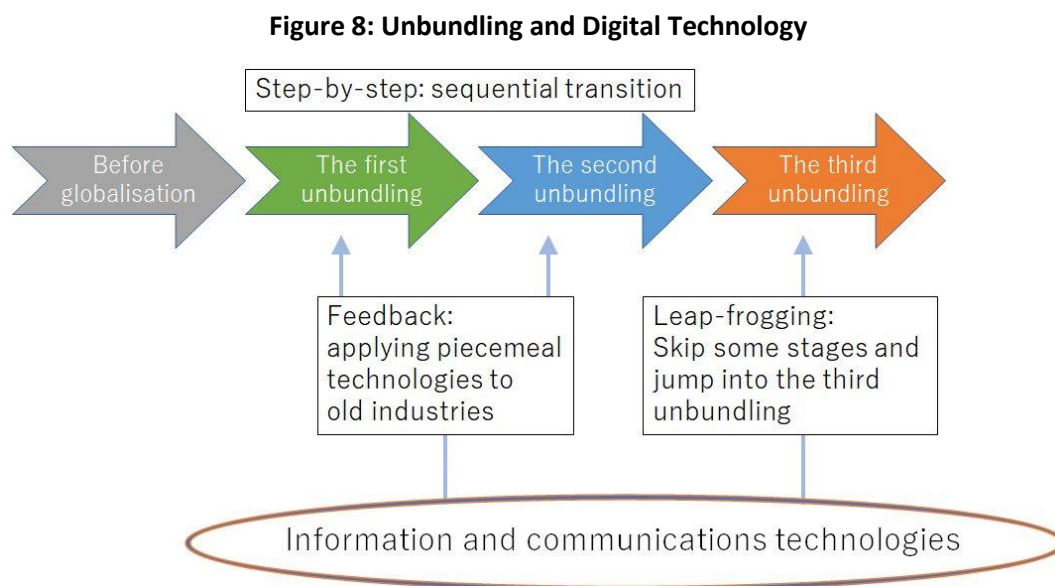
Note: Items in red indicate that they are related to IT and/or CT.

Source: ERIA.

*The policy recommendation on industrialisation is as follows:*

- a) To deepen involvement in international production networks in the second unbundling, strengthening location advantages is crucial, together with reducing service link costs (Jones and Kierzkowski, 1990). Improving the business climate and providing industrial estate services are amongst the ways to upgrade location advantages. Forming efficient industrial agglomerations stabilises the industrial structure, encourages local firms to participate in production networks, and accelerates technology transfer and spillover (Kimura and Ando, 2005).
- b) The MSR countries are encouraged to eliminate obstacles to businesses, industrialisation, and technological upgrading. There is much room for improvement in the conditions for starting a business and attracting foreign direct investment.
- c) Industrial estates and special economic zones are often effective in encouraging local and multinational companies to tap into global and regional markets and helping to upgrade the industrial and export structure. In addition, industrial policies should lend support for innovation conducted by private firms.
- d) The economic corridor concept is effective in coordinating various policy modes for industrialisation. For example, the MSR and neighbouring countries may want to promote the Mekong–India Economic Corridor to generate industrialisation that connects Ho Chi Minh City, Bangkok, and Dawei in Myanmar. The Mekong–India Economic Corridor has great potential for becoming a major manufacturing corridor because the transit time of cargo going to India, the Middle East, and European Union countries will shorten without circumventing the Malay Peninsula, based on the planned deep seaport in Dawei.

- e) The use of digital technology will add a new dimension to development. A step-by-step transition through the stages of unbundling is a way to steadily upgrade industries but may not be the only choice for developing countries after digital technologies become available (Kimura, 2018) (Figure 8). Some stages can be skipped and a new type of international division of labour, service outsourcing or the third unbundling (leapfrogging) explored. Traditional industries in the first and second unbundling benefit by introducing piecemeal digital technologies or ‘feedback’.



Source: ERIA.

Micro, small, and medium-sized enterprises (MSMEs) must be given special attention because their development augments international competitiveness and achieves inclusive growth. MSMEs range from small players in traditional industries to parts producers in supporting industries to high-tech start-ups. Their human capital requirements differ. The policies applied may need to be adapted depending on the nature of the MSMEs.

*The policy recommendation on MSMEs is as follows:*

- a) Further liberalisation of investment and trade is required in lagging member states in the region, especially Myanmar, the Lao People’s Democratic Republic (PDR), and Cambodia.
- b) The MSR countries may maximise the role of business development services in MSME development.
- c) Governments may provide more training for MSMEs, especially to improve entrepreneurial skills in micro and small enterprises.
- d) Governments may invent workable programmes that can establish the linkage between small and medium-sized enterprises and all actors in industrial clustering to deepen industrial agglomeration. This is especially pertinent for the linkage between

MSMEs and large corporations/multinational enterprises which are typically engaged in international production networks.

- e) The MSR countries may open up digital-related sectors – including telecommunications, retail, and logistics services – to increase the participation of MSMEs in e-commerce and in the IR4.0 model.

#### **4.4. Human welfare**

Health services and human capital development are central to human welfare as well as the foundation of rapid and inclusive growth in the long run. The MSR still has substantial disparities in human welfare, across countries and within each country. Much remains to be done. Digital technology will be one of the novel tools to improve human welfare.

Health services will draw particular attention due to the COVID-19 pandemic. Cambodia, the Lao People's Democratic Republic, and Myanmar are still struggling to provide quality universal healthcare. Health insurance systems are being developed but face various difficulties in most countries. Public and private initiatives require fine-tuning. International collaboration in advanced medical services has just started. Many issues need solving in individual countries and amongst countries.

*The policy recommendation on health services is as follows:*

- a) The MSR countries may want to upgrade their ability to respond to a potential contagious disease, which includes developing a system of medical laboratory facilities.
- b) It is important to enhance the access of vulnerable groups, including immigrants, to universal healthcare services by expanding the coverage of health insurance. It is vital to enrich nutritional interventions to reduce mortality, especially mortality under age five, ending all forms of malnutrition, diet, and diet-related non-communicable diseases. We need to promote public awareness about nutrition and health care, especially for disadvantaged and vulnerable populations in each of the MSR countries.
- c) MSR countries should commit to strengthening exchanges of the Greater Mekong Subregion Health Cooperation Strategy, 2019–2023, which includes three pillars: health security as a regional public good, health impacts of connectivity and mobility, and health workforce development.
- d) A high-level exchange on healthcare must be developed amongst MSR countries, including organising annual conferences and exchanging information amongst high-level leaders in healthcare. In addition, the quality of human resources in the healthcare sector can be upgraded through cooperative training, sharing experiences, and skill-sharing programmes.

- e) COVID-19 will accelerate the application of e-medicine throughout the world. The MSR must catch up with this trend to utilise a novel way of overcoming distance. In addition, the introduction of e-identity and e-insurance should be seriously discussed, considering privacy and data protection and government codes of conduct.

Human capital development is an element of location advantage, attracting economic activities. It is the basis of long-term economic growth and people's welfare. The disparities in human capital development across the MSR countries and within them are huge. Although enrolment ratios of primary and secondary education have been substantially enhanced in the past 2 decades even in lagging countries, quality needs substantial upgrading. The higher education sector is still small in some countries. Informal education, including vocational training, is not yet well organised.

*The policy recommendation on human capital development is as follows:*

- a) Policies aimed at educational achievements should include (i) reducing the learning gap in each country by focusing on learning outcomes, skills, and competencies so that students are able to adapt their skills, critical thinking, and collaboration in their work; and (ii) harmonising technical and vocational education and training standards.
- b) Cooperation mechanisms in student and academic exchanges, technical and vocational education, and training, as well as a mechanism for managing migrant labour amongst countries, should be identified. Regulations must be harmonised.
- c) Building databases and sharing information systems on education amongst MSR countries are required.
- d) The MSR countries are encouraged to enhance the attraction of private resources for the development of educational systems and facilitate the flow of investment capital amongst MSR countries.
- e) COVID-19 will accelerate the application of e-education as an important complement for on-site education throughout the world. The MSR should catch up with this important trend and start applying such methods at all levels of education.

#### **4.5. Sustainability**

Of development initiatives in the developing world in the last 3 decades, the MSR has been the most successful in achieving high economic growth with rapid poverty alleviation. The MSR can be a model case for sustainability for three reasons.

**First**, the link between economic growth and sustainability is salient in the MSR. Growth and sustainability are not always trade-offs; they are often complementary. The Sustainable Development Goals claim that sustainability can be achieved without giving up growth. The MSR can present several cases that prove that it is possible.

**Second**, subregional initiatives are imperative in the MSR. Policies for sustainability tend to be domestic and sometimes even strategic from a single country's viewpoint. The MSR shows that such an approach may not be optimal. Although effective collaboration in a subregion is not at all easy, the MSR will provide valuable lessons for the rest of the world.

**Third**, the MSR has enough intellectual resources to implement effective subregional cooperation. Energy, water resource management, and the environment are topics about which the MSR and ASEAN have accumulated knowledge from research and experience.

*The policy recommendation on energy is as follows:*

- a) The MSR must secure sufficient energy to drive economic growth in the coming decades. Enhancing hydropower-driven energy trade amongst the MSR countries through grid connectivity will not only help them to secure adequate supply but also help to achieve environmental goals. This necessitates conducting an overall assessment, optimisation, and adjustment of planned cross-border power connectivity plans, establishing technical standards, and improving institutional capacities to meet the goals.
- b) A bold vision of a regionally integrated energy market is needed to bring together all the demand and supply solutions at a national level. The MSR must find ways to develop a comprehensive low-carbon energy investment roadmap as a strategy to show leadership in removing the barriers to clean energy integration and to make new cross-border investments more cost-effective through effective regulations, replacing subsidies with incentives for energy efficiency, and financial innovations.
- c) Investment in new digital technology and communication infrastructure is needed to maintain robustness and competitiveness. The MSR must prioritise the integration of these technologies to modern renewables such as solar and wind, clean coal technologies, and hydrogen fuel, to make the conventional energy mix cleaner and more efficient. The related set of actions at multiple fronts needs earmarked financial resources.

*The policy recommendation on water resources management is as follows:*

- a) Riparian and partner countries should promote more rule-based governance of water management in regional cooperation by (i) encouraging riparian countries to adhere to international water law; and (ii) establishing common standards and rules for integrated water resources management, such as a code of conduct for the Mekong River Basin.
- b) The MSR countries should embrace the implementation of the 1995 Mekong Agreement through the five procedures and their technical guidelines, as they will provide an integrated water resources management rule-based system for water resources development, to provide the most benefit with minimum environmental and social harm.
- c) Members and partners should help strengthen the role and capacity of the MRC as a hub for water management and coordination amongst other mechanisms in the field of water management, and strengthen the above-mentioned implementation of MRC procedures and technical guidelines. Data sharing, not only in the rainy season but also in the dry season, is crucial for equitable water resources management as well as disaster prevention and management.



- d) Riparian countries should coordinate to promote synergy amongst Mekong regional cooperative mechanisms so that they can be complementary and help address the interests of riparian countries. ASEAN can play a more central role in the development of the MSR and facilitate the policy coordination process, paving the way for elevating water governance and diplomacy in the Mekong River Basin to the regional agenda.
- e) Looking at the bigger picture, riparian countries can find alternative development opportunities which are less dependent on hydropower and extensive water-use production. We can promote cooperation amongst Mekong riparian countries regarding equitable and sustainable use of the Mekong River's resources.
- f) Transboundary issues/conflicts should not always be looked upon as negative – they can be healthy when managed effectively. Healthy conflict management can lead to growth and innovation, new ways of thinking, and additional management options. It is important to understand transboundary conflict clearly so that it can be managed effectively by reaching consensus amongst all stakeholders.
- g) Ensuring transparency and providing for public consultation are amongst the keys to the success of transboundary issues. This would help to create an enabling environment for community participation, especially to enhance the role of women.
- h) The MSR countries should envisage the changes that will have significant impacts on water resources management in the Mekong basin, especially what the changes will be, how the patterns of spatial distribution will change, and the extent to which these changes will benefit people through effective state, community, and private sector action to ensure food security for the poor.
- i) Finally, water diplomacy – bilaterally and multilaterally – should be promoted on the basis of transparency and goodwill.

*The policy recommendation on environment is as follows:*

- a) The MSR is more vulnerable to climate risks than any other subregion. Adaptive capacity has to be implemented at two levels. Community-level strategies such as climate-smart agriculture, payment for ecosystem services, income diversification through afforestation, etc. must be put in place to reduce the risks by strengthening early warning systems. At the national level, policy response could include designing a contingency fund within national budgets to provide aid when a climate-induced natural disaster takes place.
- b) The Mekong River is regarded as a major source of marine plastic debris. Monitoring of plastics flowing in the river should be conducted to measure actual leakage and design an effective plastic waste management system. Governments should reduce single-use plastic, provide waste collection services, dispose of waste properly, and promote recycling of plastic waste, through regionally coordinated activities.

- c) Cities are where some of the MSR's sustainability challenges are concentrated: unsustainable resource consumption, air pollution, and water-borne diseases. Transforming cities into smart cities, based on the principles of a low-carbon and circular economy, provides opportunities to promote economic growth, offers equitable social benefits, and minimises environmental risks. Numerous instruments for sustainable cities are available and have been tested at the ASEAN level, but need to be applied in a tailored, context-specific way, with appropriate application of IoT technologies for the MSR.

## 5. Concluding Remarks

The path to raising all MSR countries to upper-middle-income status will require substantial upgrading of the industrial structure and enhancement of people's welfare. To achieve rapid, innovative, inclusive, and sustainable economic growth, the MSR is encouraged to place its policy priorities on connectivity, industrialisation, human capital, and sustainability.

ASEAN could accelerate its multilayered approach to deeper economic integration. A subregional approach is particularly effective for bridging development gaps, advancing connectivity, and promoting international coordination. Using the MSR as a model case, ASEAN could reactivate other subregional initiatives for the prosperity of the whole ASEAN.

## References

- Baldwin, R. (2016), *The Great Convergence: Information Technology and the New Globalization*. Cambridge, MA: Belknap Harvard University Press.
- Baldwin, R. (2020), 'The Greater Trade Collapse of 2020: Learnings from the 2008-09 Great Trade Collapse', VOX CEPR Policy Portal, 7 April.
- Baldwin, R.R. Forslid, P. Martin, G. Ottaviano, and F. Robert-Nicoud (2003), *Economic Geography and Public Policy*. Princeton, NJ: Princeton University Press.
- Economic Research Institute for ASEAN and East Asia (ERIA) (2010), *The Comprehensive Asia Development Plan*. Jakarta: ERIA. <https://www.eria.org/RPR-2009-7-1.pdf>
- ERIA (2015), *The Comprehensive Asia Development Plan 2.0 (CADP 2.0): Infrastructure for Connectivity and Innovation*. Jakarta: ERIA. <https://www.eria.org/ERIA-RPR-FY2014-04.pdf>
- ERIA (2020), 'COVID-19 and Southeast and East Asian Economic Integration: Understanding the Consequences for the Future', *ERIA Policy Brief*, No. 2020-01. Jakarta: ERIA. <https://www.eria.org/uploads/media/policy-brief/COVID-19-and-Southeast-and-East-Asian-Economic-Integration.pdf>

- Fujita, M., P. Krugman, and A.J. Venables (1999), *The Spatial Economy: Cities, Regions and International Trade*. Cambridge, MA: MIT Press.
- Jones, R.W. and H. Kierzkowski (1990), 'The Role of Service in Production and International Trade: A Theoretical Framework', in R.W. Jones and A.O. Krueger (eds.), *The Political Economy of International Trade: Essays in Honor of Robert E. Baldwin*. Oxford, UK: Basil Blackwell, pp.31–48.
- Kimura, F. (2018), 'Unbundlings' and Development Strategies in ASEAN: Old Issues and New Challenges', *The Journal of Southeast Asian Economies*, 35(1), pp.15–23.
- Kimura, F. (2020), 'Exit Strategies for ASEAN Member States: Keeping Production Networks Alive Despite the Impending Demand Shock', *ERIA Policy Brief*, No. 2020-03. Jakarta: ERIA. <https://www.eria.org/uploads/media/policy-brief/Exit-Strategies-For-AMS-Keeping-Production-Networks-Alive-Despite-The-Impending-Demand-Shock.pdf>
- Kimura, F. and M. Ando (2005), 'Two-dimensional Fragmentation in East Asia: Conceptual Framework and Empirics', *International Review of Economics and Finance*, 14(3), pp.317–48.
- Zen, F. and F. Kimura (2020), 'Maintaining Fiscal Sustainability during the Pandemic Crisis', *ERIA Policy Brief*, No. 2020-04. Jakarta: ERIA. <https://www.eria.org/uploads/media/policy-brief/Maintaining-Fiscal-Sustainability-during-the-Pandemic-Crisis.pdf>





# Background Papers



# Mekong Subregion: Development and Cooperation Status

*Nguyen Anh Duong, Dinh Thu Hang, and Vo Tri Thanh*

## 1. Introduction

The Mekong River flows through five mainland countries – Cambodia, the Lao People’s Democratic Republic (Lao PDR), Myanmar, Thailand, and Viet Nam – which shape the Mekong Subregion (MSR). Since 1992, the MSR countries have embarked on various subregional economic cooperation mechanisms to enhance their economic relations. These have put each country and the MSR as a whole in a dynamic but complex web of economic links, in the broader context of regional and plurilateral integration in the Asia-Pacific region in the past two decades.

In recent years, MSR countries have witnessed significant socio-economic achievements. However, the development gap between the MSR and other ASEAN Member States (AMS) remains sizeable. Rapid economic growth in MSR countries has not always been accompanied by improved well-being of their citizens. The MSR therefore needs to search for a new cooperation mechanism to ensure that regional and individual economic and social transformations contribute more to inclusive and sustainable development. Such a new cooperation mechanism must also be effective in the new regional and international context (with major aspects such as the Fourth Industrial Revolution (IR 4.0), Society 5.0,<sup>1</sup> trade conflicts amongst major economies, geopolitical tensions in many regions, and non-traditional security challenges such as climate change, infectious diseases, etc.). For such a new cooperation mechanism, reviewing the state of economic development and cooperation mechanisms amongst MSR countries would be essential to help identify major objectives and characteristics.

This chapter aims to provide a review of the current development status of the MSR. It focuses on (i) comparative analysis of economic growth in the MSR vis-à-vis the Association of Southeast Asian Nations (ASEAN), with emphasis on the importance of the

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<sup>1</sup> In Japan’s 5th Science and Technology Plan, Society 5.0 is defined as ‘a society that can be expected to facilitate human prosperity. Such a society is capable of providing the necessary goods and services to the people who need them at the required time and in just the right amount; a society that is able to respond precisely to a wide variety of social needs; a society in which all kinds of people can readily obtain high-quality services, overcome differences of age, gender, region, and language, and live vigorous and comfortable lives’ (Government of Japan, 2016).

wwMSR for regional development and inclusive growth; and (ii) ongoing mechanisms for economic cooperation in the MSR.

The remainder of the paper is structured as follows. Section 2 provides a comparative analysis of inclusive development-related aspects of MSR countries. Section 3 then elaborates on inclusive development of the MSR countries. Section 4 concludes with some recommendations.

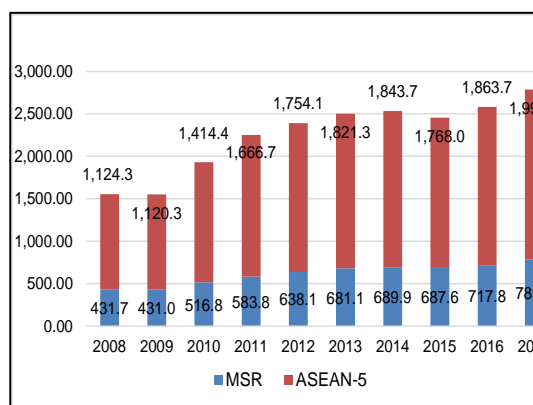
## 2. Inclusive Development in Mekong Subregion: A Comparative Analysis

### 2.1 Economic Growth

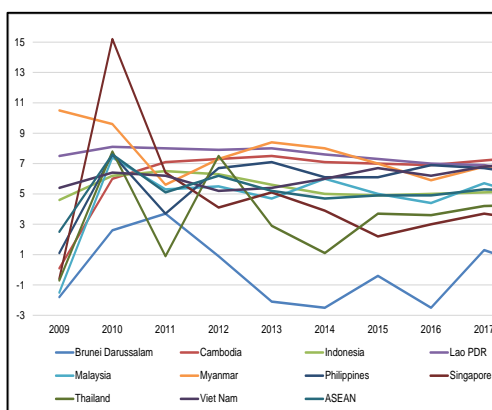
As a whole, ASEAN witnessed a high gross domestic product (GDP) growth rate during 2010–2018, averaging 5.4% per year (Figure 2). Cambodia, the Lao PDR, Myanmar, and Viet Nam (CLMV) grew at a faster pace than the rest of ASEAN. The economic size of the MSR countries has more than doubled in 10 years, from \$431.7 billion at current prices in 2008 to \$866.1 billion in 2018 (Figure 1). This impressive result was partly attributed to the low GDP base of most MSR countries (i.e. the catch-up effect).

By economic sector, the GDP structure of CLMV countries saw a modest shift to a higher share for industry (an improvement of about 2–3 percentage points over 2015–2018). Thailand reflected the opposite, with a decreased proportion for the industry sector in GDP (34.7% in 2018 vs. 36.4% in 2015).

**Figure 1: GDP at Current Prices in ASEAN, 2008–2018 (\$ billion)**



**Figure 2: GDP Growth Rate in ASEAN, 2009–2018 (%)**



ASEAN = Association of Southeast Asian Nations, GDP = gross domestic product, Lao PDR = Lao People’s Democratic Republic, MSR = Mekong Subregion.

Note: MSR countries include Cambodia, the Lao PDR, Myanmar, Thailand, and Viet Nam. The ASEAN 5 includes Brunei Darussalam, Indonesia, Malaysia, the Philippines, and Singapore.

Source: ASEAN (2019).



**Table 1: GDP Structure by Economic Sector in ASEAN, 2015–2018 (%)**

Country	2015				2018			
	Agriculture	Industry	Services	A+I+S	Agriculture	Industry	Services	A+I+S
Brunei Darussalam	0.9	63.4	37.6	101.9	0.8	62.9	38.0	101.8
Cambodia	22.2	32.1	39.6	93.9	16.3	32.1	43.1	91.6
Indonesia	13.0	41.0	42.8	96.8	12.5	39.8	43.6	96.0
Lao PDR	16.5	32.2	41.3	89.9	14.5	35.7	39.6	89.8
Malaysia	8.3	38.4	52.0	98.8	7.3	37.5	54.0	98.8
Myanmar	28.9	30.0	41.1	100.0	24.6	32.1	43.2	99.9
Philippines	9.5	33.5	57.0	100.0	8.1	34.1	57.8	100.0
Singapore	0.0	24.3	65.7	90.0	0.0	25.1	64.4	89.5
Thailand	6.4	36.4	56.8	99.6	6.1	34.7	58.7	99.5
Viet Nam	15.3	32.5	36.4	84.2	14.3	35.6	38.8	88.7

A = agriculture, ASEAN = Association of Southeast Asian Nations, GDP = gross domestic product, I = industry, Lao PDR = Lao People's Democratic Republic, S = services.

Notes: (i) agriculture comprises fishing and forestry; (ii) industry comprises mining and quarrying, manufacturing, construction, and utilities; (iii) services comprise wholesale and retail trade, transportation and storage, accommodation and food services, information and communications, finance and insurance, business services, and other service industries; and (iv) the sum of GDP shares of A+I+S may not equal 100% in some ASEAN countries, mainly due to the separate treatment of GDP associated balancing items from the total GDP, including items on taxes, and subsidies on particular products and services.

Source: ASEAN (2019).

Despite the downward trend in the share of GDP, agriculture, forestry, and fishing still exhibited positive growth in terms of value added for all AMS (Table 2). During 2011–2018, value added from the agriculture, forestry, and fishing of MSR countries grew at an average rate of 1.8% per year. In terms of growth rate, however, Viet Nam and the Lao PDR were amongst the countries with the highest growth rates of agriculture, forestry, and fishing value added (2.9% per year and 2.7% per year, respectively, in 2011–2018).

**Table 2: Added Value of Agriculture, Forestry, and Fishing in ASEAN, 2000–2018**  
(2010 constant prices, \$ billion)

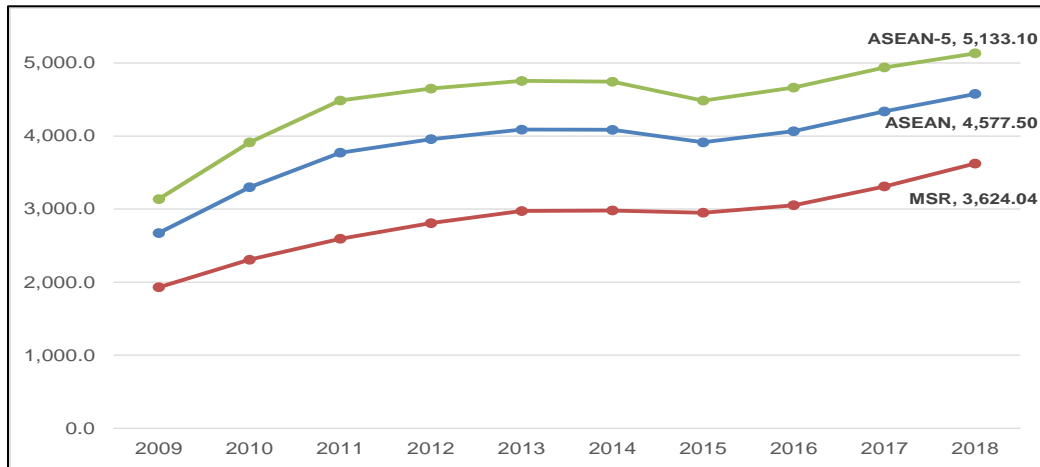
Country	2000	2010	2011	2012	2013	2014	2015	2016	2017	2018
Brunei Darussalam	0.08	0.10	0.10	0.11	0.10	0.11	0.12	0.11	0.11	0.11
Cambodia	2.32	3.81	3.93	4.09	4.16	4.17	4.18	4.23	4.33	4.37
Indonesia	74.83	105.18	109.33	114.34	119.15	124.20	128.87	133.21	138.37	143.78
Lao PDR	1.13	1.61	1.62	1.66	1.71	1.78	1.84	1.90	1.95	1.99
Malaysia	19.28	25.73	27.49	27.76	28.31	28.89	29.31	27.79	29.79	29.66
Myanmar	9.15	18.26	18.14	18.44	19.11	19.64	20.31	20.22	20.47	20.73
Philippines	18.55	24.58	25.22	25.93	26.22	26.66	26.70	26.37	27.41	27.66
Singapore	0.12	0.09	0.09	0.09	0.10	0.10	0.10	0.09	0.09	0.09
Thailand	29.04	35.90	38.16	39.19	39.47	39.36	36.89	35.99	38.23	39.59
Viet Nam	15.18	21.31	22.21	22.86	23.46	24.27	24.85	25.19	25.92	26.89
ASEAN	169.68	236.56	246.28	254.48	261.79	269.18	273.15	275.09	286.68	294.87

ASEAN = Association of Southeast Asian Nations, Lao PDR = Lao People's Democratic Republic.  
Source: <https://data.worldbank.org/indicator/NV.AGR.TOTL.KD> (accessed 10 April 2020).

**GDP per capita** mostly showed an uptrend in AMS during 2009–2018 (except Brunei Darussalam). The GDP per capita of the individual MSR countries witnessed significant increases (1.8–2.9 times during 2009–2018, Figure 3), but remains far below that of the remaining ASEAN 5 (Brunei Darussalam, Indonesia, Malaysia, the Philippines, and Singapore). Notwithstanding efforts to narrow the income gap between the MSR and the rest of ASEAN, progress was slow and insignificant. APO (2019) showed that the annual catch-up rates<sup>2</sup> to the United States (US) of Singapore, Malaysia, Thailand, and Viet Nam during 1970–2017 were relatively unremarkable (2%–3% per year), while the progress of Cambodia, the Lao PDR, and Myanmar was slower.

<sup>2</sup> The catch-up rate to the US of country X is defined as the difference in average annual growth rates of per capita GDP between country X and the US.

**Figure 3: GDP per Capita in ASEAN, 2009–2018**  
(\$)



ASEAN = Association of Southeast Asian Nations, GDP = gross domestic product, Lao PDR = Lao People's Democratic Republic, MSR = Mekong Subregion.

Note: MSR countries include Cambodia, the Lao PDR, Myanmar, Thailand, and Viet Nam. The ASEAN 5 includes Brunei Darussalam, Indonesia, Malaysia, the Philippines, and Singapore.

Source: ASEAN (2019).

## 2.2 Infrastructure

### Transport and Utility Infrastructure

Viet Nam outperformed other MSR countries in terms of utility infrastructure, with more than 98% of the population having access to electricity. Cambodia and Myanmar performed relatively poorly in this area. For example, only 89.0% of Myanmar's urban population and 39.8% of its rural population had access to electricity (ADB, 2018). Meanwhile, the gap between CLMV and the ASEAN 6 (Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, and Thailand) in water supply and quality is narrowing over the years, although significant room for improvement remains. In the World Economic Forum's Global Competitiveness Index 4.0 2019 rankings (World Economic Forum, 2019), the CLMV ranked very low (87th–107th) in utility infrastructure – far below Singapore (5th) and Brunei Darussalam (45th).

**Table 3: ASEAN Infrastructure Rankings, 2019**

Indicator	BRN	KHM	IND	LAO	MYS	PHL	SGP	THA	VNM
<b>Pillar 2: Infrastructure</b>	<b>58</b>	<b>106</b>	<b>72</b>	<b>93</b>	<b>35</b>	<b>96</b>	<b>1</b>	<b>71</b>	<b>77</b>
<b>2A Transport infrastructure</b>	<b>77</b>	<b>96</b>	<b>55</b>	<b>87</b>	<b>29</b>	<b>102</b>	<b>1</b>	<b>53</b>	<b>66</b>
Road connectivity	93	107	109	126	133	125	n.a.	54	104
Quality of road infrastructure	32	97	60	89	19	88	1	55	103
Railroad density	n.a.	n.a.	85	n.a.	63	91	1	55	58
Efficiency of train services	n.a.	n.a.	19	n.a.	13	88	5	75	54
Airport connectivity	91	58	5	88	20	26	23	9	22
Efficiency of air transport services	62	113	56	104	25	96	1	48	103
Liner shipping connectivity	104	93	36	n.a.	5	59	1	35	19
Efficiency of seaport services	69	91	61	115	19	88	1	73	83
<b>2B Utility infrastructure</b>	<b>45</b>	<b>107</b>	<b>89</b>	<b>97</b>	<b>51</b>	<b>96</b>	<b>5</b>	<b>90</b>	<b>87</b>
Electricity access	71	115	95	96	87	103	2	2	84
Electricity supply quality	28	89	54	n.a.	38	53	2	31	62
Exposure to unsafe drinking water	28	99	98	108	63	105	25	107	95
Reliability of water supply	55	86	74	93	49	77	7	60	81

ASEAN = Association of Southeast Asian Nations, BRN = Brunei Darussalam, IND = Indonesia, KHM = Cambodia, LAO = Lao PDR, MYS = Malaysia, n.a. = not available, PHL = Philippines, SGP = Singapore, THA = Thailand, VNM = Viet Nam.

Note: Myanmar was excluded from the ranking list.

Source: World Economic Forum (2019).

In terms of transport infrastructure, air transport in ASEAN as a whole and individual AMS in particular has progressed over the last 2–3 decades to support flourishing tourism, international trade, investment, and business activities in the region. According to the World Bank (2020), Viet Nam experienced the highest annual growth rates of passengers carried by air transport (17.37%) and air transport freight (9.21%) during 2000–2018. Viet Nam also made impressive progress in rail transport, ranked 2nd in ASEAN in terms of goods transported, at 3,190 million ton-kilometres in 2016. Container port traffic expanded most rapidly in Myanmar (21.9% per year) in the 10-year period from 2009 to 2017, followed by Viet Nam (12.1% per year). With these improvements, CLMV rankings in the 2019 Global Competitiveness Index 4.0's transport infrastructure were relatively positive, in particular Viet Nam (ranked 19th in liner shipping services and 22nd in air connectivity). However, in terms of the quality of transport means, CLMV performed very poorly, with low rankings in efficiency indicators for all types of transport.

#### ICT Infrastructure

The quality of information and communication technology (ICT) infrastructure in CLMV was generally far behind that of the ASEAN 6. However, CLMV moved very fast in mobile communications and internet access, and has been closer to ASEAN 6 level. This trend was in line with the decline in fixed telephone subscribers in all AMS. According to the World Development Indicators, during 2010–2018, fixed broadband subscribers in the Lao PDR grew at the fastest annual pace (31.9%), followed by Myanmar (22.9%), Cambodia (21.7%), and Viet Nam (15.7%). Such a rapid pace may be promising for the MSR, as developing countries may not necessarily be latecomers in digital economy development (Pacific Economic Cooperation Council, 2018).

**Table 4: ASEAN's Ranking and Value of Access to ICT, 2019**

Indicator	BRN	KHM	IND	LAO	MYS	PHL	SNG	THA	VNM
<b>Rank</b>									
<b>Pillar 3: ICT adoption</b>	<b>26</b>	<b>71</b>	<b>72</b>	<b>102</b>	<b>33</b>	<b>88</b>	<b>5</b>	<b>62</b>	<b>41</b>
Mobile-cellular telephone subscriptions	41	65	64	134	31	84	16	5	14
Mobile-broadband subscriptions	13	56	52	111	19	79	6	26	76
Fixed broadband internet subscriptions	70	111	97	117	81	98	43	66	63
Fibre internet subscriptions	38.0	77.0	63.0	82.0	44.0	n.a.	8.0	51.0	26
Internet users	12	103	104	117	38	82	24	90	66
<b>Value</b>									
Mobile-cellular telephone subscriptions (per 100 population)	131.9	119.5	119.8	51.9	134.5	110.1	145.7	180.2	147.2
Mobile-broadband subscriptions (per 100 population)	130.0	82.8	87.2	42.0	116.7	68.4	145.7	104.7	71.9
Fixed broadband internet subscriptions (per 100 population)	11.9	1.0	3.3	0.6	8.6	3.2	25.9	13.2	13.6
Fibre internet subscriptions (per 100 population)	6.3	0.5	1.5	0.4	4.6	n.a.	22.3	2.4	9.9
Internet users (% of adult population)	94.6	40.0	39.8	25.5	81.2	60.1	88.2	56.8	70.3

BRN = Brunei Darussalam, ICT = information and communication technology, IND = Indonesia, KHM = Cambodia, LAO = Lao PDR, MYS = Malaysia, n.a. = not available, PHL = Philippines, SGP = Singapore, THA = Thailand, VNM = Viet Nam.

Note: Myanmar was excluded from the ranking list.

Source: World Economic Forum (2019).

### 2.3 Poverty Reduction

AMS achieved remarkable progress in poverty reduction. During 2000–2015, the figure was almost halved, reaching 14.0% in 2015. CLMV made a significant reduction in poverty, as measured by the national poverty line, as the population under the national poverty line in Viet Nam and Cambodia was cut by about two-thirds. However, CLMV still have a long way to go in poverty reduction efforts.

**Table 5: Population Under National Poverty Line in ASEAN, 2000–2017 (%)**

Country	2000	2005	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Brunei Darussalam	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Cambodia	36.0	33.0	29.9	22.9	21.1	19.8	18.9	16.0	13.5	13.5	13.5	13.5
Indonesia	19.0	16.0	15.4	14.2	13.3	12.5	12.0	11.4	11.3	11.2	10.9	10.6
Lao PDR	36.0	30.0	27.6	n.a.	24.0	n.a.	n.a.	23.2	n.a.	24.0	23.2	23.4
Malaysia	9.0	6.0	n.a.	3.8	n.a.	n.a.	1.7	n.a.	0.6	0.6	0.4	0.4
Myanmar	n.a.	n.a.	n.a.	n.a.	25.6	23.6	n.a.	n.a.	n.a.	19.4	32.1	24.8
Philippines	26.0	26.0	n.a.	26.3	n.a.	n.a.	25.2	n.a.	n.a.	22.0	21.6	21.6
Singapore	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Thailand	21.0	10.0	20.5	19.1	16.9	13.2	n.a.	n.a.	10.5	7.2	8.6	7.9
Viet Nam	29.0	16.0	14.5	n.a.	14.2	12.6	11.1	9.8	8.4	7.0	7.0	9.8
ASEAN	25.0	18.0			15.0					14.0		

- = not available, ASEAN = Association of Southeast Asian Nations, Lao PDR = Lao People's Democratic Republic, n.a. = not applicable.

Notes: The figures for Malaysia and Viet Nam are the percent number of households. The Philippine figures use regional poverty estimation methodology.

Sources: ASEAN (2017c; 2019).

### 2.4 Human Development

Human development witnessed an impressive improvement in CLMV, and the gap between CLMV and other nations in the region gradually narrowed. CLMV moved faster than the ASEAN 6 in the Human Development Index (HDI) value over 1990–2018, but the average annual HDI growth during 2010–2018 was slower than during 2000–2010 (UNDP, 2020). Still, the HDI of CLMV remained at the bottom of the AMS. Globally, CLMV stayed in the 'medium human development' group, with Viet Nam ranked 118th out of 189 countries, while Cambodia, the Lao PDR, and Myanmar were ranked below 140th.

**Table 6: Human Development Index in ASEAN, 2009–2018**

Rank in 2018	Country	HDI value								Change in rank	Average annual HDI growth (%)			
		1990	2000	2010	2013	2015	2016	2017	2018	2013–2018	1990–2000	2000–2010	2010–2018	1990–2018
9	Singapore	0.718	0.818	0.909	0.923	0.929	0.933	0.934	0.935	-1	1.31	1.07	0.35	0.95
43	Brunei Darussalam	0.768	0.805	0.832	0.844	0.843	0.844	0.843	0.845	-6	0.47	0.33	0.19	0.34
61	Malaysia	0.644	0.724	0.773	0.787	0.797	0.801	0.802	0.804	-1	1.18	0.66	0.49	0.80
77	Thailand	0.574	0.649	0.721	0.731	0.746	0.753	0.762	0.765	12	1.24	1.05	0.74	1.03
106	Philippines	0.590	0.631	0.672	0.692	0.702	0.704	0.709	0.712	3	0.67	0.62	0.73	0.67
111	Indonesia	0.525	0.604	0.666	0.688	0.696	0.700	0.704	0.707	0	1.40	0.99	0.74	1.07
118	Viet Nam	0.475	0.578	0.653	0.673	0.680	0.685	0.690	0.693	-1	1.99	1.23	0.74	1.36
140	Lao PDR	0.399	0.466	0.546	0.579	0.594	0.598	0.602	0.604	-2	1.55	1.60	1.28	1.49
145	Myanmar	0.349	0.424	0.523	0.551	0.565	0.571	0.577	0.584	2	1.94	2.13	1.39	1.85
146	Cambodia	0.384	0.419	0.535	0.555	0.566	0.572	0.578	0.581	-1	0.89	2.46	1.05	1.49
	East Asia and the Pacific	0.519	0.597	0.691	0.714	0.727	0.733	0.737	0.741	—	1.42	1.48	0.87	1.28

ASEAN = Association of Southeast Asian Nations, HDI = Human Development Index, Lao PDR = Lao People's Democratic Republic.

Source: UNDP (2020).

### **Quality of Health**

With regards to the quality of health, CMV (except the Lao PDR) outperformed the ASEAN 6 in health spending as a share of GDP in 2016. The highest share was in Cambodia (6.1%), followed by Viet Nam (5.7%) and Myanmar (5.1%). However, the Lao PDR saw a significant decline in health expenditure. All AMS (except Cambodia) performed relatively well in the lost health expectancy sub-indicator and were in the top third amongst 189 countries in the 2019 HDI. However, CLMV were generally at the bottom of the AMS in most indicators, such as the number of physicians and hospital beds.

**Table 7: Quality of Health and Health Expenditure in ASEAN**

Country	Lost health expectancy (%)	Physicians (per 10,000 people)	Hospital beds (per 10,000 people)	Health expenditure (% of GDP)	
	2017	2010–2018	2010–2015	2000	2016
Brunei Darussalam	12.1	17.7	27	2.5	2.3
Cambodia	13.2	1.7	8	6.4	6.1
Indonesia	12.3	3.8	12	2.0	3.1
Lao PDR	12.0	5.0	15	4.7	2.4
Malaysia	11.6	15.1	19	2.4	3.8
Myanmar	12.6	8.6	9	1.8	5.1
Philippines	12.5	12.8	10	3.2	4.4
Singapore	12.5	23.1	24	3.4	4.5
Thailand	12.3	8.1	21	3.2	3.7
Viet Nam	11.7	8.2	26	4.4	5.7

ASEAN = Association of Southeast Asian Nations, GDP = gross domestic product, Lao PDR = Lao People's Democratic Republic.

Note: Three-colour coding is used to visualise partial grouping of countries and aggregates by indicator. For each indicator, countries are divided into three groups of approximately equal size (terciles): the top third (green), the middle third (yellow), and the bottom third (orange).

Source: UNDP (2020).

### **Quality of Education**

Increasing public spending on education has always been the focus of all AMS. During 2013–2018, the top three countries in ASEAN with the largest education expenditure to GDP were Viet Nam (5.7%), Malaysia (4.7%), and Thailand (4.1%). Although the share of education expenditure to GDP for Cambodia and the Lao PDR showed an upward trend, the figures remained lower than those of other countries. According to the UNDP (2019), the quality of education in CLMV was reflected by very poor performance in such indicators as (i) the ratio of pupils per teacher (particularly in Cambodia – 42 pupils per teacher); (ii) the ratio of schools with internet access; and (iii) students' capacity in math, science, and reading (Programme for International Student Assessment (PISA) scores). Only Viet Nam performed very well, with scores above the Organisation for Economic Co-operation and Development (OECD) average for mathematics and science (493 and 490, respectively).



**Table 8: Quality of Education and Education Expenditure in ASEAN**

Country	Pupil–teacher ratio, primary school	Primary school teachers trained (%)	Schools with access to the internet (%)		Programme for International Student Assessment (PISA) score			Government expenditure on education (% of GDP)
			Primary schools	Secondary schools	Reading	Science	Science	
	2013–2018	2010–2018	2010–2018	2010–2018	2015	2015	2015	2013–2018
Brunei Darussalam	10	85	n.a.	n.a.	n.a.	n.a.	n.a.	4.4
Cambodia	42	100	n.a.	n.a.	n.a.	n.a.	n.a.	1.9
Indonesia	16	n.a.	n.a.	51	386	397	403	3.6
Lao PDR	22	97	n.a.	n.a.	n.a.	n.a.	n.a.	2.9
Malaysia	12	99	100	100	n.a.	n.a.	n.a.	4.7
Myanmar	23	98	0	5	n.a.	n.a.	n.a.	2.2
Philippines	29	100	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Singapore	15	99	n.a.	n.a.	564	535	556	2.9
Thailand	16	100	99	97	415	409	421	4.1
Viet Nam	20	100	n.a.	n.a.	495	487	525	5.7

n.a. = Not available; ASEAN = Association of Southeast Asian Nations, GDP = gross domestic product, Lao PDR = Lao People’s Democratic Republic.

Note: Three-colour coding is used to visualise partial grouping of countries and aggregates by indicator. For each indicator, countries are divided into three groups of approximately equal size (terciles): the top third (green), the middle third (yellow), and the bottom third (orange).

Source: UNDP (2020).

The educational level of the CLMV labour force has improved significantly. However, Cambodia, the Lao PDR, and Viet Nam were the least competitive in terms of workforce skills (Table 9). Those countries performed relatively poorly in almost all the important sub-indicators, such as skills of the current workforce, quality of vocational training, graduate skillsets, digital skills amongst the population, and ease of finding skilled employees.

**Table 9: ASEAN Rankings of Labour Force Skills, 2019**

Indicator	BRN	KHM	IND	LAO	MYS	PHL	SGP	THA	VNM
<b>Pillar 6: Skills</b>	<b>59</b>	<b>120</b>	<b>65</b>	<b>104</b>	<b>30</b>	<b>67</b>	<b>19</b>	<b>73</b>	<b>93</b>
<b>6.A Current workforce</b>	<b>70</b>	<b>127</b>	<b>73</b>	<b>114</b>	<b>32</b>	<b>40</b>	<b>13</b>	<b>91</b>	<b>100</b>
Mean years of schooling	81	126	92	120	59	69	32	96	97
Skills of current workforce	44	111	36	73	8	19	3	68	103
Extent of staff training	63	76	33	69	8	18	4	48	73
Quality of vocational training	49	112	37	97	12	29	6	74	102
Skillset of graduates	38	104	37	55	17	20	4	79	116
Digital skills amongst population	35	112	52	74	10	22	5	66	97
Ease of finding skilled employees	89	123	45	67	11	13	9	86	96
<b>6.B Future workforce</b>	<b>42</b>	<b>118</b>	<b>64</b>	<b>101</b>	<b>44</b>	<b>88</b>	<b>22</b>	<b>57</b>	<b>83</b>
School life expectancy	66		80	102	78	85	27	42	
Skills of future workforce	23	121	40	79	13	81	28	64	82
Critical thinking in teaching	45	76	29	68	17	24	21	89	106
Pupil-teacher ratio in primary education	10	124	54	85	19	105	48	56	75

ASEAN = Association of Southeast Asian Nations, BRN = Brunei Darussalam; IND = Indonesia, KHM = Cambodia, LAO = Lao People's Democratic Republic, MYS = Malaysia, PHL = Philippines, SGP = Singapore, THA = Thailand, VNM = Viet Nam.

Note: Myanmar was excluded from the ranking list.

Source: World Economic Forum (2019).

## 2.5 Gender Equality and Empowerment

With regards to gender equality, Myanmar, the Lao PDR, and Cambodia were at the bottom in ASEAN, while Viet Nam had a slightly higher ranking. Nevertheless, women's empowerment in CLMV was remarkable, reflected by the relatively high shares of women in parliament in Viet Nam and the Lao PDR (26.7% and 27.5%, respectively). The share of female graduates from science, technology, engineering, and mathematics (STEM) programmes in tertiary education rose to 64.9% in the Lao PDR – the highest amongst the AMSs – and approximately doubled the figure for Viet Nam. About one-third of senior and middle management in CLMV were female. However, in MSR countries, women had fewer job and educational opportunities than men.

**Table 10: Gender Inequality and Empowerment in ASEAN, 2018**

Country	Gender Inequality Index		Share of seats in parliament (% held by women)	Population with at least some secondary education (% aged 25 and older)		Labour force participation rate (% aged 15 and older)		Share of graduates in STEM programmes at tertiary level, female (%)	Share of graduates from STEM programmes in tertiary education, female (%)	Female share of employment in senior and middle management (%)
	Value	Rank		Female	Male	Female	Male			
	2018	2018	2018	2010–2018	2010–2018	2018	2018	2008–2018	2008–2018	2010–2018
BRN	0.234	51	9.1	69.5	70.6	58.2	71.7	23.6	51.9	37.0
KMH	0.474	114	19.3	15.1	28.1	75.2	87.6	6.0	16.7	n.a.
IND	0.451	103	19.8	44.5	53.2	52.2	82.0	15.4	36.5	n.a.
LAO	0.463	110	27.5	35.0	46.0	76.8	79.7	47.3	64.9	31.5
MMR	0.458	106	10.2	28.7	22.3	47.7	77.3	8.6	25.2	23.4
MYS	0.274	58	15.8	79.8	81.8	50.9	77.4	18.1	38.6	n.a.
PHL	0.425	98	29.1	75.6	72.4	45.7	74.1	12.2	37.1	19.4
SGP	0.065	11	23.0	76.3	83.3	60.5	76.3	22.3	33.7	n.a.
THA	0.377	84	5.3	43.1	48.2	59.5	76.2	17.8	36.3	25.5
VNM	0.314	68	26.7	66.2	77.7	72.7	82.5	15.0	30.1	29.5

n.a. = Not available; ASEAN = Association of Southeast Asian Nations; BRN = Brunei Darussalam; IND = Indonesia; KHM = Cambodia; LAO = Lao People's Democratic Republic; MYS = Malaysia; MMR = Myanmar; PHL = Philippines; SGP = Singapore; STEM = science, technology, engineering, and mathematics; THA = Thailand; VNM = Viet Nam.  
Source: UNDP (2020).

### **3. Cooperation Mechanisms**

Over the past 2 decades, the MSR countries have intensified cooperation via diversified mechanisms. According to Le (2018), there are about 15 cooperative mechanisms in the Mekong Region divided into two groups: intra-regional mechanisms (cooperation amongst Mekong countries) and cooperation between the MSR countries and external partners.

#### **3.1 Intra-Regional Mechanisms**

##### **Mekong River Commission**

On 5 April 1995, Cambodia, the Lao PDR, Thailand, and Viet Nam signed the 'Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin' (the 1995 Mekong Agreement), which established the Mekong River Commission (MRC). The MRC is the only organisation in the Mekong region tasked with developing legal frameworks (Le, 2018). Compared to those of other international river basin organisations, the Mekong Agreement has more specific and stricter regulations on water use. Under the Phnom Penh Declaration of the 3rd MRC Summit in April 2018, the MRC leaders reaffirmed the political commitment towards the Mekong Agreement. At the same time, the Declaration also emphasized the unique role of the MRC in the sustainable development of water and related resources in the Mekong basin.

The MRC Strategic Plan, 2016–2020 identified four key results areas, seven outcomes, 43 outputs, and 169 activities to be implemented during a 5-year period. The 2019 Midterm Review of MRC Strategic Plan, 2016–2020 noted some impressive achievements, with 90% of outputs 'on track' and only 10% 'delayed' (relative to 23% 'delayed' in 2017). In 2018, the Preliminary Design Guidance was updated from the 2009 version with the introduction of contemporary performance targets; and design and operating principles for mitigation measures, monitoring, and adaptive management. In late 2017, the four member countries (Cambodia, the Lao PDR, Thailand, and Viet Nam) issued a joint statement on the Pak Beng Hydropower project, concluding the prior consultation process and calling for the Government of the Lao PDR to make every effort to minimise potential adverse transboundary impacts on water flow, sediment, fisheries, water quality, aquatic ecology, navigation, and socio-economic issues. The third State of the Basin report was completed in 2018, covering a consistent set of indicators (15 strategic indicators, 53 assessment indicators, and 182 monitoring parameters) from the MRC Indicator Framework in five core dimensions: (i) environmental aspects; (ii) social aspects; (iii) economic aspects; (iv) climate change; and (v) cooperation. The framework aims at informing member countries on how to progress towards the objectives of the 1995 Mekong Agreement. For the first time, the State of Basin Report also included a review of conditions in the Upper Mekong Basin in China and Myanmar.

The MRC countries continued to increase their funding to the MRC in line with the commitments under the 2030 roadmap to be a self-financing inter-governmental organisation, promoting a greater sense of ownership. Stakeholder engagement continues to be strengthened. The MRC also demonstrated its commitment to continual improvement and being more open and transparent, undertaking independent reviews of its operations and the MRC Strategic Plan.

### **Greater Mekong Subregion Cooperation**

Following the initiative of the Asian Development Bank (ADB), the Greater Mekong Subregion (GMS) was established in 1992 with six members – Cambodia, China (Yunnan Province and Guangxi Zhuang Autonomous Region), the Lao PDR, Myanmar, Thailand, and Viet Nam. The GMS identified 10 priority areas for cooperation. Amongst them, infrastructure connectivity is the top priority. In particular, the GMS countries approved large infrastructure projects, including the three economic corridors (the North–South Economic Corridor, the East–West Economic Corridor, and the Southern Economic Corridor), amongst many others.

The GMS Economic Cooperation Program Strategic Framework, 2012–2022, adopted in 2011, was anchored in the development of economic corridors and expanded the GMS Program from conventional infrastructure to multi-sector investments designed to foster economic corridor development – involving stronger cross-sectoral linkages, better consideration of regional economic development’s spatial aspects, more local stakeholder involvement, and more effective monitoring. In 2014, GMS members ratified the GMS Cross-Border Transport Facilitation Agreement, and agreed on the memorandum of understanding (MOU) for ‘Early Harvest’<sup>3</sup> implementation of the agreement, allowing subregional movement of commercial vehicles and containers to begin. In 2017, a midterm review of the Strategic Framework, 2012–2022 was conducted to ensure the programme’s continued effectiveness and responsiveness. The review called for an expansion of economic corridors to boost connectivity between countries and within rural and urban centres to ensure that the benefits of economic growth are more broadly distributed.

The Sixth GMS Summit in Hanoi in March 2018 adopted the GMS Regional Investment Framework 2022. This framework is project-based, with 222 projects totalling about \$65 billion. It also produced a Joint Declaration of the Summit, the Hanoi Plan of Action, 2018–2022, and a number of related documents to promote cooperation in this period. The joint declaration recognised the GMS’s transformation, which has yielded unprecedented favourable outcomes.

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<sup>3</sup> The MOU allows each GMS country to issue up to 500 GMS road transport permits and temporary admission documents for goods and passenger vehicles registered, owned and/or operated in that country (Greater Mekong Subregion (2018)).

During 1993–2018, the annual economic growth rate of the GMS was 6.3%, while GDP per capita increased by 5% per year and intra-subregional trade grew 90-fold. In line with economic improvement, GMS countries achieved better quality of life for people in the subregion, heading towards high-quality development. Since the establishment of the GMS, the 3Cs (connectivity, competitiveness, and community) formed the core building blocks of the programme, particularly physical connectivity via economic corridors. Developments in power exchange amongst GMS members were highly appreciated, and will contribute to establishing an integrated regional power market.

### **Mekong–Lancang Cooperation**

The Mekong–Lancang Cooperation (MLC) framework includes six countries – Viet Nam, Cambodia, China, the Lao PDR, Myanmar, and Thailand. The MLC was formally established at the First MLC Leaders’ Meeting in China on 23 March 2016, and the Sanya Declaration on Mekong–Lancang Cooperation was adopted at this event, which defined the ‘3+5’ cooperation framework, i.e. three cooperation pillars<sup>4</sup> and five key priority areas.<sup>5</sup> Within 4 years, the MLC cooperation framework has achieved impressive outcomes, including the completion of all 45 Early Harvest projects in the priority areas.

The MLC has been highly institutionalised, with the holding of a Leaders’ Meeting every 2 years, and the annual Foreign Ministers’ Meeting and Senior Officials’ Meeting. Member states also set up national secretariats for the MLC in 2017. The second MLC Summit in January 2018 adopted two important documents, the Phnom Penh Joint Declaration and the Plan of Action on the MLC, 2018–2022, which focused on strengthening sectoral cooperation planning and implementing small and medium-sized cooperation projects. The MLC’s characteristics of ‘pragmatism, high efficiency, [and a] focus on concrete projects’ are considered the key factors for the impressive outcomes of the MLC mechanism (Lancang–Mekong Cooperation, 2017). It had provided financial support for about 214 projects and reports in the Mekong region as of January 2018 (Le, 2018).

With regards to the challenging new regional and international context, MLC leaders have reaffirmed their focus on consolidating coordination between countries in handling regional challenges; bringing about long-term benefits for people; raising the technological capacity of businesses; improving market stability; and pushing the implementation of the MLC Plan of Action, 2018–2020 on regional connectivity, production capacity, water resources, trade, and agriculture. Most recently, the Fifth MLC Foreign Ministers’ Meeting in Vientiane in February 2020 emphasised important areas of cooperation in the coming period, including (i) enhancing trade connectivity, firstly focusing on promoting synergies between the MLC and the Belt and Road Initiative; the Master Plan on ASEAN Connectivity, 2025; and the Ayeyarwady–Chao Phraya–Mekong Economic Cooperation Strategy (ACMECS) Master Plan, 2019–2023; (ii) advancing

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<sup>4</sup> The three cooperation pillars are (i) political and security issues, (ii) economic and social areas, and (iii) sustainable development and humanities.

<sup>5</sup> The five key priority areas are (i) connectivity; (ii) production capacity; (iii) cross-border economic cooperation; (iv) water resources; and (v) agriculture, and poverty reduction.

cooperation in public health; (iii) deepening water resources cooperation; (iv) promoting agricultural cooperation, in particular promptly implementing the MLC Three-Year Action Plan on Agricultural Cooperation, 2020–2022; (v) promoting efforts to improve people’s livelihoods; (vi) actively conducting non-traditional security cooperation, enhancing exchanges over governance, sharing development experiences, and jointly defending peace and tranquillity in border areas; and (vii) facilitating coordinated development of subregional mechanisms such as the GMS, the MRC, and the ACMECS to produce a greater effect.

#### **Cambodia–Lao PDR–Viet Nam Development Triangle**

The Cambodia–Lao PDR–Viet Nam (CLV) Development Triangle was initiated at the First Summit in Vientiane in 1999. It serves to promote socio-economic development, and hunger and poverty reduction, contributing to the stability and security of the three countries. The 10th CLV Summit in Hanoi adopted the Joint Declaration on CLV Cooperation, emphasising the need to strengthen connectivity amongst the three economies to enhance economic competitiveness, effectively take part in regional and global value chains, and respond to common challenges. The summit agreed to gradually expand the CLV Development Triangle Area. Accordingly, the leaders adopted the Master Plan on CLV Economic Connectivity up to 2030, aiming to promote connectivity in infrastructure, institutions, economy, and people-to-people exchange.

#### **CLMV Cooperation**

The first CLMV Summit was held at the 10th ASEAN Summit on November 2004 in Vientiane. The summit adopted the Vientiane Declaration, aiming to strengthen economic cooperation and integration in the frameworks of the Mekong subregion and ASEAN. CLMV cooperation areas include trade, investment, agriculture, industry, transport, tourism, and human resources development. In September 2019, the CLMV Economic Ministers’ Meeting agreed on a framework for economic development, focusing on (i) connectivity to facilitate trade and investment cooperation; (ii) measures to attract skilled workers; and (iii) measures to attract investment in the sectors with comparative advantages (mainly agriculture, food, and tourism). This framework is expected to be approved by CLMV leaders in 2020.

#### **Ayeyarwady–Chao Phraya–Mekong Economic Cooperation Strategy (ACMECS)**

Established in November 2003, the ACMECS presents a framework for economic cooperation between Cambodia, the Lao PDR, Myanmar, Thailand, and Viet Nam. The ACMECS has seven areas of cooperation: (i) trade and investment facilitation, (ii) agriculture and industrial cooperation, (iii) transport linkages, (iv) tourism cooperation, (v) human resources, (vi) public health, and (vii) environment. Implementation is via seven working groups, each of which is responsible for one area of cooperation. Each ACMECS country coordinates at least one area of cooperation (Le, 2018).

### **ASEAN–Mekong Basin Development Cooperation**

The ASEAN Summit in 1995 established the ASEAN–Mekong Basin Development Cooperation (AMBDC). This was an initiative serving to link ASEAN with GMS cooperation. The AMBDC covers a railway corridor from Singapore to Kunming, Yunnan – crossing the Malaysian Peninsula, Thailand, and the Lao PDR, and branching out to Cambodia and Myanmar – as the main axis. The programme is considered instrumental to Mekong river basin development, whilst presenting a forum for policy dialogue between ASEAN and China to strengthen subregional economic development, cooperation, and poverty reduction. The last meeting under the ASEAN–Mekong Basin Development Cooperation mechanism was the 15th Ministerial Meeting in Brunei Darussalam in August 2013. As of 2019, the Singapore–Kunming Rail Link was largely incomplete.

### **3.2 Cooperation Mechanisms with Partner Countries outside the Region**

**Mekong–Japan Cooperation**: The Mekong–Japan Cooperation Framework was started in 2007. This Framework covers various cooperation areas such as socio-economic development, infrastructure construction, implementation of the Millennium Development Goals, environmental protection, and Mekong water resources security. The 10th Mekong–Japan Summit Meeting in October 2018 adopted the Tokyo Strategy, expressing the determination to cooperate in achieving the Sustainable Development Goals (SDGs) in the Mekong region to fully implement the 2030 Agenda for Sustainable Development. The Action Plan for ‘A Decade toward the Green Mekong’, adopted in 2009, is incorporated in The Mekong–Japan Initiative for SDGs toward 2030. Priority areas of The Mekong–Japan Initiative for SDGs toward 2030 include (i) environmental and urban issues (waste management/sound material-cycle society, marine plastic litter/water and river pollution, disaster risk reduction and disaster management, reducing greenhouse gas emissions, and building climate resilience); (ii) sustainable natural resources management and utilisation (agricultural productivity, water resources management, and sustainable forest management); and (iii) inclusive growth (education and human capital investment, health and social welfare, gender equality and empowerment of women, legal and judicial cooperation, promoting inclusive and sustainable industrialisation, and tourism cooperation).

The Mekong countries and Japan shared a common recognition that all the approaches (region-wide approach, open approach, and public–private cooperative approach) are essential to achieve the SDGs in the Mekong region. In addition, the Mekong countries and Japan affirmed that these approaches are in line with ASEAN approaches relating to SDGs, including ASEAN’s ongoing work on narrowing the development gap and promoting complementarities between the ASEAN Community Vision 2025 and the 2030 Agenda for Sustainable Development.

### **Lower Mekong Initiative**

The United States (US) returned to the Mekong region in 2009 with the Lower Mekong Initiative (LMI) between the US and Cambodia, the Lao PDR, Viet Nam, and Myanmar



(officially joined in 2012). LMI members develop shared responses to transboundary challenges across six pillars – agriculture and food security, connectivity, education, energy security, environment and water, and health – and in cross-cutting areas such as gender issues. LMI members are also members of Friends of the Lower Mekong, an important convening platform to improve donor coordination in programming development assistance in the Lower Mekong subregion and to promote policy dialogue.

To date, the LMI has carried out a number of outstanding initiatives and collaborative activities, with significant funds from the US. The MRC and the Mississippi River Commission signed a ‘sister river’ Memorandum of Understanding in 2010 to promote annual exchange of experience. The programs on ‘Forecast Mekong’ and environmental cooperation reflect efforts to monitor climate change in the subregion using an automatic observatory.

### **Mekong–Ganga Cooperation**

In 2000, the Mekong–Ganga Cooperation (MGC) was approved at a meeting of six foreign ministers from Cambodia, India, the Lao PDR, Myanmar, Thailand, and Viet Nam. The MGC serves to strengthen friendship and solidarity amongst the countries in the Mekong and the Ganga basin. The MGC covers four main areas – tourism, culture, education, and transport connectivity. The 11th Mekong–Ganga Cooperation Senior Officials' Meeting in New Delhi in July 2019 discussed the Draft MGC Action Plan for 2019–2022. India’s assistance to Cambodia, the Lao PDR, Myanmar, and Viet Nam under the MGC Quick Impact Project Scheme since its inception in 2014 is progressing steadily. A total of 24 projects with aggregate investment of about \$1.2 million have been completed so far, including 15 in Cambodia and nine in Viet Nam. In addition, one project in Cambodia and three projects in the Lao PDR are under implementation.

In addition to these mechanisms, there are other mechanisms such as the Mekong–Republic of Korea Cooperation and the Swiss–Mekong Region Cooperation Strategy, though the level of cooperation is not significant.

### **3.3 Some Limitations of Current MSR Mechanisms**

Despite the diversity, ongoing cooperation mechanisms involving MSR countries exhibit some limitations. First, such cooperation mechanisms present a complex web, which may be prone to duplication and inefficient use of resources. For instance, GMS cooperation covers transportation, energy, environment, tourism, telecommunications, trade, investment, human resources development, agricultural and rural development, and urban development along economic corridors – many of which may be similar to the three pillars and five priority areas under the MLC, Mekong–Japan cooperation, and the LMI. Dr. An Pich Hatda, head of the MRC Secretariat, acknowledged that ‘overlapping is unavoidable, but what is vital is to create a more coherent and effective coordination mechanism that ensures joint efforts’ (MRC, 2019d). As a consequence, any new initiatives in the MSR will have to address the explicit question of potential duplication and coordination with existing cooperation mechanisms.

Second, the existing mechanisms are yet to sufficiently improve efficiency in water use and management. MRC (2017: 2) notes that:

The absence of joint planning and collaboration between border provinces has resulted in inappropriate infrastructure development in the Mekong Delta. Uncoordinated development of flood control and irrigation systems, such as dikes and embankments, could cause floods and drought in other areas of the floodplain and may result in water pollution and shortages, and less agricultural production.

More recent analysis and data also show that the natural flow of water in the Mekong River has been adversely affected by various infrastructure projects along the river (Viet Nam Department of Water Resources Management, 2020). According to the MRC, the water level in Thailand's Chiang Sen was 2.10 metres, 0.92 metres lower than its long-term average (3.02 metres) during June–July 2019 (MRC, 2019c).

Third, notwithstanding the range of cooperation mechanisms, the diversity of their funding sources has not been improved significantly. For instance, the CLMV and Thailand are yet to fund activities under the MLC. Vannarith (2016) asserted that the main challenge for the MRC during 2016–2020 is the mobilisation of funding. Given the coronavirus disease (COVID-19) outbreak, which may drain the fiscal space of MSR countries and external donors, ensuring sufficient funds for Mekong projects may become no easy task.

#### **4. Policy Recommendations for MSR Countries**

- Facilitate domestic economic reforms to address weaknesses of socio-economic development. Maintain a regular review of the status of the MSR as a whole and individual countries relative to other countries in the region (ASEAN, China, etc.) to recommend appropriate policy recommendations. Promote a better balance between economic and social targets via scoping of inclusive and sustainable development.
- Encourage greater cooperation amongst member countries in undertaking economic promotion activities, accelerating the development of economic corridors, connectivity, cross-border trade, and investment, etc. Promote effective consultations with individual member countries to better understand their reform process and their need for assistance in order to develop more suitable assistance and/or cooperation programmes. New areas of economic development (such as ICT, circular economy, etc.) should be prioritised. Adopt a more proactive approach to planning and the management of trade-offs between sectors and countries.
- Promote synergies and complementarities between the current MSR cooperation programmes and other global and regional initiatives for the development of a sustainable, integrated, and prosperous subregion. From this perspective, rethinking of institutional arrangements for regional cooperation at both the national and subregional/regional levels may be considered in order to facilitate

the participation of a more representative set of stakeholders in the prioritisation of activities and to ensure synergies between the various initiatives.

- Foster the development a long-term, diversified, and sustainable financing system, enhancing financial infrastructure connectivity and encouraging development financial institutions to play active roles in subregional cooperation.
- Facilitate a regional and open approach for addressing new challenges and taking advantage of opportunities for the most sizeable benefits of all participating countries and social groups. Collaboration with external international institutions and donors will help promote the effectiveness of the assistance programmes, especially subregional ones. A cooperation mechanism between MSR countries, with financial/technical support provided by a more advanced country/international institution, needs to be encouraged.

## References

ADB (2018), *Review of Configuration of the Greater Mekong Subregion Economic Corridors*. Manila: Asian Development Bank.

<https://greatermekong.org/sites/default/files/gms-corridors-configuration-review.pdf> (accessed 10 April 2020).

APO (2019), *APO Productivity Databook 2019*. Tokyo: Asian Productivity Organization.

[https://www.apo-tokyo.org/publications/wp-content/uploads/sites/5/APO-Productivity-Databook-2019\\_light.pdf](https://www.apo-tokyo.org/publications/wp-content/uploads/sites/5/APO-Productivity-Databook-2019_light.pdf) (accessed 10 April 2020).

ASEAN (2017a), *ASEAN Community Progress Monitoring System 2017 – Inclusive Development*. Jakarta: ASEAN Secretariat.

<https://www.aseanstats.org/wp-content/uploads/2018/10/Inclusive-Development.pdf> (accessed 2 April 2020).

ASEAN (2017b), *ASEAN Community Progress Monitoring System 2017 – Narrowing the Development Gap*. Jakarta: ASEAN Secretariat.

<https://www.aseanstats.org/wp-content/uploads/2018/10/Narrowing-the-Development-Gap.pdf> (accessed 2 April 2020).

ASEAN (2017c), *ASEAN Statistical Report on Millennium Development Goals 2017*.

Jakarta: ASEAN Secretariat.

[https://asean.org/storage/2012/05/ASEAN\\_MDG\\_2017.pdf](https://asean.org/storage/2012/05/ASEAN_MDG_2017.pdf) (accessed 9 April 2020).

ASEAN (2018), *ASEAN Statistical Highlights 2018*. Jakarta: ASEAN Secretariat.

<https://www.aseanstats.org/infographics/asean-statistical-highlight-2018/> (accessed 2 April 2020).

ASEAN (2019), *ASEAN Statistical Yearbook 2019*. Jakarta: ASEAN Secretariat.

<https://www.aseanstats.org/publication/asyb-2019/> (accessed on April 2, 2020).

ASEAN and UNCTAD (2019), *ASEAN Investment Report 2019 – FDI in Services: Focus on Health Care*. Jakarta: ASEAN Secretariat and United Nations Conference on Trade and Investment.

- [https://unctad.org/en/PublicationsLibrary/unctad\\_asean\\_air2019d1.pdf](https://unctad.org/en/PublicationsLibrary/unctad_asean_air2019d1.pdf) (accessed 9 April 2020).
- Greater Mekong Subregion (2018), 'Joint Summit Declaration', The Sixth GMS Summit, Ha Noi, 31 March. <https://greatermekong.org/joint-summit-declaration-6th-gms-summit-leaders> (accessed 10 April 2020).
- Greater Mekong Subregion (2018), 'Cross-Border Transport Facilitation Agreement: 'Early Harvest' Implementation Guide'. Hanoi. (<https://www.greatermekong.org/sites/default/files/PRF8-VIE.pdf> (accessed 20 May 2020)).
- Government of Japan (2016), 'Fifth Science and Technology Basic Plan'. Tokyo. [https://www8.cao.go.jp/cstp/english/basic/5thbasicplan\\_outline.pdf](https://www8.cao.go.jp/cstp/english/basic/5thbasicplan_outline.pdf) (accessed 12 June 2020).
- Ho, S. and K. Pitakdumrongkit (2019), 'Can ASEAN Play a Greater Role in the Mekong Subregion?', *The Diplomat*, 20 January. <https://thediplomat.com/2019/01/can-asean-play-a-greater-role-in-the-mekong-subregion/> (accessed 1 April 2020).
- International Labour Organization, ILOStat data. <https://www.ilo.org/ilostat> (accessed 9 April 2020).
- Kimura, F. and A. Obashi (2009), 'International Production Networks: Comparison between China and ASEAN', *ERIA Discussion Paper Series*, ERIA-DP-2009-01. Jakarta: Economic Research Institute for ASEAN and East Asia. <https://www.eria.org/ERIA-DP-2009-01.pdf> (accessed 2 April 2020).
- Lancang–Mekong Cooperation (2017), 'A Brief Introduction of Lancang–Mekong Cooperation'. [http://www.lmcchina.org/eng/gylmhz\\_1/jj/t1519110.htm](http://www.lmcchina.org/eng/gylmhz_1/jj/t1519110.htm) (accessed 15 April 2020).
- Le, H.B. (2018), 'Cooperation Mechanisms in the Mekong Region and Vietnam's participation', *Communist Review*, 27 July. <http://english.tapchicongsan.org.vn/Home/Foreign-Relations-and-International-Intergration/2018/1141/Cooperation-Mechanisms-in-the-Mekong-Region-and-VietnAMSs-participation.aspx> (accessed 3 April 2020).
- Mekong–Lancang Cooperation (2020), 'Joint Press Communiqué of the Fifth Mekong–Lancang Cooperation Foreign Ministers' Meeting', Vientiane, 20 February. [http://www.lmcchina.org/eng/zywj\\_5/t1759773.htm](http://www.lmcchina.org/eng/zywj_5/t1759773.htm) (accessed 3 April 2020).
- Ministry of External Affairs, India (2019), '11th Mekong–Ganga Cooperation Senior Officials' Meeting', Press Release, 9 July. <https://mea.gov.in/press-releases.htm?dtl/31560/11th+Mekong+Ganga+Cooperation+Senior+Officials+Meeting> (accessed 3 April 2020).
- MRC (2017), Mekong Delta Water Issues: Collaboration between Cambodia and Viet Nam. IWRM Brief.
- MRC (2019a), *Annual Report 2018 – Part 1: Overview*. Vientiane: Mekong River Commission. <http://www.mrcmekong.org/assets/Publications/Annual-Report-2018-Part-1-final.pdf> (accessed 11 April 2020).
- MRC (2019b), 'Mekong Related Regional Cooperation Frameworks Recommend More Joint Efforts, Coordination to Boost Effectiveness', News Release, 16 August. <http://www.mrcmekong.org/news-and-events/news/mekong-related-regional->

- [cooperation-frameworks-recommend-more-joint-efforts/](#) (accessed 12 May 2020).
- MRC (2019c), 'Mekong Water Levels Reach Low Record', News Release, 18 July. <http://www.mrcmekong.org/news-and-events/news/mekong-water-levels-reach-low-record/> (accessed 30 May 2020).
- MRC (2019d), *State of the Basin Report 2018*. Vientiane: Mekong River Commission. [http://www.mrcmekong.org/assets/Publications/SOBR-v8\\_Final-for-web.pdf](http://www.mrcmekong.org/assets/Publications/SOBR-v8_Final-for-web.pdf) (accessed 12 April 2020).
- Pacific Economic Cooperation Council (2018), 'Regional Economic Outlook and Update on Digital Economy', Presentation at the APEC Economic Committee Plenary Meeting, Port Moresby, 5 March.
- UNDP (2019), Human Development Report 2019 – Beyond income, beyond averages, beyond today: Inequalities in human development in the 21<sup>st</sup> century. <http://hdr.undp.org/sites/default/files/hdr2019.pdf> (accessed 10 April 2020).
- UNDP (2020), Human Development Data (1990–2018). <http://www.hdr.undp.org/en/data> (accessed 9 April 2020).
- USAID (2020), Lower Mekong Initiative. <https://www.usaid.gov/vi/vietnam/lower-mekong-initiative-lmi> (accessed 4 April 2020).
- Vannarith, C. (2016), 'The Mekong Region: From a Divided to a Connected Region', Report for Konrad Adenauer Stiftung.
- Viet Nam Department of Water Resources Management (2020), 'Alleviating Water Shortage in Mekong Downstream Area' [Hạn chế tình trạng thiếu nước nghiêm trọng ở hạ lưu sông Mê Kông], in Vietnamese, 8 May. <http://dwr.gov.vn/index.php?language=vi&nv=news&op=Tai-nguyen-nuoc/Han-che-tinh-trang-thieu-nuoc-nghiem-trong-o-ha-luu-song-Me-Kong-8948> (accessed 10 June 2020).
- Vo, T.T. (2008), 'Narrowing the Development Gap in ASEAN: Approaches and Policy Recommendations', in H. Soesastro (ed.) *Deepening Economic Integration: The ASEAN Economic Community and Beyond*, ERIA Research Project Report 2007-1-2. Chiba: IDE-JETRO, pp.147–55.
- World Bank (2020), World Bank Open Data. <https://data.worldbank.org/> (accessed 10 April 2020).
- World Economic Forum (2019), *The Global Competitiveness Report 2019*. Geneva: World Economic Forum. [http://www3.weforum.org/docs/WEF\\_TheGlobalCompetitivenessReport2019.pdf](http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf) (accessed 9 April 2020).

# Infrastructure Development, Trade Facilitation, and Industrialisation in the Mekong Region

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## 1. Introduction

The Mekong region consists of the five continental Association of Southeast Asian Nations (ASEAN) countries: Cambodia, the Lao People's Democratic Republic (Lao PDR), Myanmar, Thailand, and Viet Nam. It has come under the spotlight for a long time given that it has great growth potential in the ASEAN economy. Meanwhile, Cambodia, the Lao PDR, and Myanmar (CLM) – the latecomer countries – need to catch up with the developed ASEAN Member States (AMS) to reinforce economic integration, to narrow development gaps within ASEAN, and to achieve sustainable economic development. Accordingly, economic development in the Mekong region is a critical factor for driving ASEAN overall.

Two theories – the flying-geese theory (Akamatsu, 1962) and the fragmentation theory (Jones and Kierzkowski, 1990) – can explain the rapid economic development that is ongoing in the Mekong region. Although they focus on different development mechanisms,<sup>6</sup> both theories propose that a development or wage gap generates industrial dynamics across and within countries through international and regional trade. The industrial rearrangements we can observe in the manufacturing industries, e.g. China Plus One, Thailand Plus One, and (future) Viet Nam Plus One, are in line with this development trend.<sup>7</sup> Thus, infrastructure and trade facilitation are essentially important if we want to take maximum advantage of the potentiality of industrialisation in the Mekong region. Infrastructure is expected to provide better logistics for trade, while trade facilitation enables a cost and time reduction in trade.

In this respect, Mekong development has been promoted mainly in the framework of the Greater Mekong Subregion (GMS) organised by the Asian Development Bank (ADB), which includes China's Yunnan Province and Guangxi Zhuang Autonomous Region in addition to the five Mekong countries. ADB initiated the seminal GMS Economic Cooperation Program in 1992, to which tremendous cooperation efforts have been devoted, especially

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<sup>6</sup> The flying-geese theory describes the process whereby a country upgrades its industrial structure by transforming itself from an import substitution to export orientation country in terms of final goods. On the other hand, the fragmentation theory stresses the process whereby a country moves up a step on a value chain through the export of both final and intermediate goods.

<sup>7</sup> The 'plus one strategy' places CLM countries as production bases that complement mother factories in China, Thailand, and Viet Nam. More concretely, in the case of Thailand, labour-intensive manufacturing processes (e.g. wire harnesses) are transferred to factories in CLM, and parts manufactured there are moved back to Thailand to complete final products (e.g. assembling automobiles).

in the trade and transport sectors.<sup>8</sup> Moreover, the construction of the three economic corridors – the East–West Economic Corridor (EWEC), North–South Economic Corridor (NSEC), and Southern Economic Corridor (SEC) – has been advanced to build an effective network of production and logistics. Following the ADB-led initiative, neighbouring countries such as China, Japan, and Australia have extended their development plans and programmes widely in the Mekong Subregion.

The important thing is that the Mekong region needs to enhance its connectivity not only within the region but also with bordering countries, especially China and India. Since intra- and extra-regional tariffs have been drastically removed or reduced (in particular, almost all intra-regional tariffs have been removed in the ASEAN Free Trade Agreement), the next step is to steadily promote infrastructure development and trade facilitation, which help Mekong countries reinforce economic connectivity. As the Economic Research Institute for ASEAN and East Asia (ERIA, 2015) indicated, based on the fragmentation theory, both transportation costs and service link costs should be steadily reduced to benefit from global/regional value chains. There is a high expectation of vigorous industrialisation, in tandem with cross-border trade, by using the three economic corridors effectively.

In this chapter, we highlight the following three important aspects: infrastructure, trade facilitation, and industrialisation. Importantly, these issues are not independent but rather closely connected with each other. We cannot necessarily develop comprehensive discussion of background information about their current progress due to the space limitation, but we aim at presenting straightforward and useful policy recommendations that can be applied to the Mekong region.

## **2. Infrastructure**

The connectivity of the Mekong region with other neighbouring countries has been of increasing importance as a single conglomerate of ‘continental ASEAN’ countries. In particular, connectivity is strongly required with the emerging heavily populated China and India as well as other AMS, since the Mekong region is geopolitically located at the centre of these countries. The Mekong countries need to reap the fruits of the opportunities offered by the large markets of neighbouring countries through international trade, which will be enabled by the enhanced physical connectivity.<sup>9</sup>

The most critical bottleneck has been the Mekong River, which flows along the Myanmar–Lao PDR and Thailand–Lao PDR borders as well as the interior of Cambodia and Viet Nam. However, this bottleneck has been gradually eliminated through the construction of ‘friendship bridges’.<sup>10</sup> Since international highways (e.g. ASEAN highways) are also being built, the amount of cross-border transportation that passes the three economic corridors

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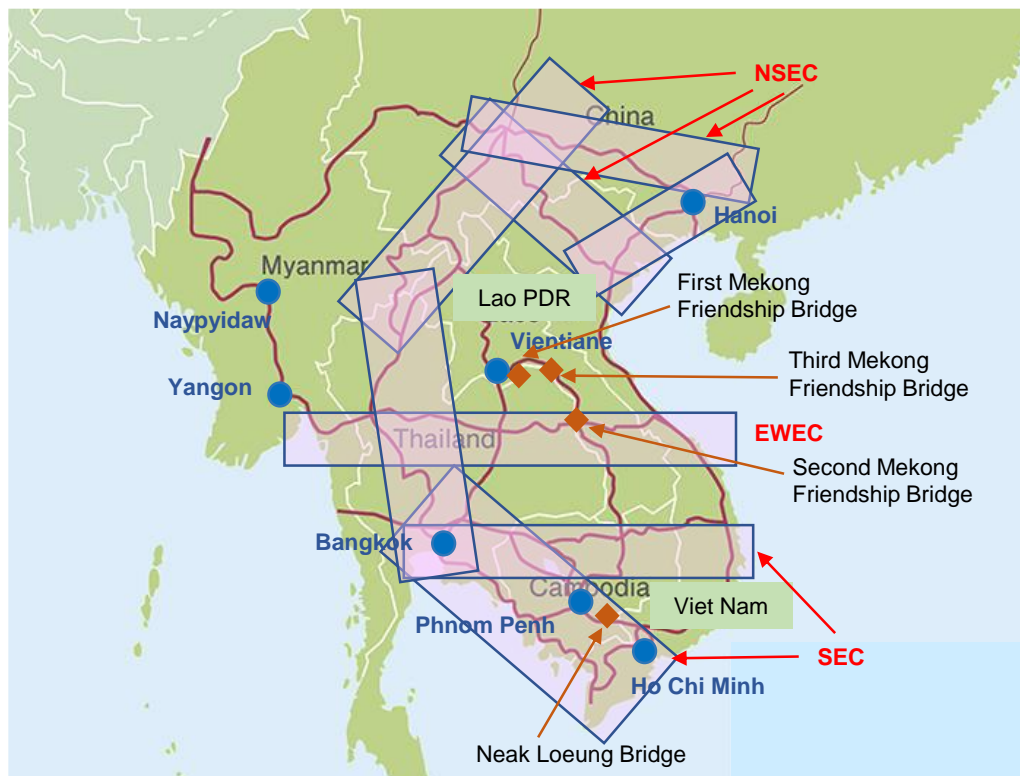
<sup>8</sup> The GMS Economic Cooperation Program covers nine sectors: agriculture, energy, environment, human resources development, investment, telecommunication, tourism, trade, and transport.

<sup>9</sup> ASEAN formulated the master plan on ASEAN connectivity (ASEAN, 2011 and 2016) to support measures undertaken by the ASEAN Community, particularly the ASEAN Economic Community (AEC).

<sup>10</sup> Five ‘friendship bridges’ have been constructed so far with the support of Japanese official development assistance loans to facilitate cross-border transportation in the Mekong region.

(EWEC, NSEC, and SEC) is expected to increase in future.<sup>11</sup> In addition, railway projects which are expected to facilitate the movement of goods and people have been under consideration (e.g. the Singapore–Kunming Railway) and construction (e.g. the China–Lao PDR Railway). Figure 1 depicts the three economic corridors and main physical infrastructure, including roads and bridges.

**Figure 1: Three Economic Corridors in the GMS**



EWEC = East–West Economic Corridor, GMS = Greater Mekong Subregion, Lao PDR = Lao People’s Democratic Republic, NSEC = North–South Economic Corridor, SEC = Southern Economic Corridor.  
 Source: Author compilation based on the map provided by Nippon Express.  
<https://www.nipponexpress.com/press/release/2018/06-Jun-18-1.html> (accessed 12 March 2020).

The Comprehensive Asia Development Plan (CADP) series, published by ERIA, has focused on concrete infrastructure projects that are necessary for industrial development and innovation in ASEAN and East Asia.<sup>12</sup> The previous CADP 2.0 (ERIA, 2015) selected 761 infrastructure projects in total, of which 483 projects are concentrated in the Mekong region. According to Fujisawa, Wada, and LoCastero (2019), which followed up on the progress of these projects, 222 projects (46%) remain at the feasibility study or conceptual stage, while 96 projects (20%) are at the operational stage and 165 projects (34%) are at the construction stage (Table 1). Moreover, in the CADP 3.0 to be published in September 2020 (ERIA, forthcoming), as many as 402 (pending) projects (52% of the total) in the

<sup>11</sup> For example, the planned Hanoi–Vientiane Expressway is likely to link the main cities of the three economic corridors and consolidate the connectivity between Bangkok, Vientiane, and Hanoi (Ambashi, 2019).

<sup>12</sup> The types of infrastructure are classified as road/bridge, railway, port/maritime, airport, industrial estate/special economic zones (SEZs), energy/power, water supply/sanitation, urban development, telecommunication, and others.



Mekong region are considered indispensable for industrialisation and innovation. Thus, since the construction of physical infrastructure has not made much progress yet, it is important to carry out the planned projects promptly.

**Table 1: Stages of Infrastructure Projects in the Mekong Region Assumed in CADP 2.0**

Country	Operational	Construction	Feasibility study or conceptual	Total
Cambodia	26	19	23	68
Lao PDR	11	22	28	61
Myanmar	18	28	41	87
Thailand	13	51	51	115
Viet Nam	28	45	79	152
<b>Total</b>	<b>96</b>	<b>165</b>	<b>222</b>	<b>483</b>

Lao PDR = Lao People's Democratic Republic.

Note: Infrastructure projects are cited from ERIA (2015).

Source: Fujisawa, Wada, and LoCastero (2019).

The quality of infrastructure should be highlighted to ensure long-term benefits for the Mekong region.<sup>13</sup> When it comes to planning infrastructure building, cost considerations are important to construct, operate, and maintain infrastructure efficiently. However, cost should not be the single criterion for adopting a project plan. Rather, infrastructure should be suited to the stage of industrialisation and economic development. The required resilience of infrastructure against various risks, such as natural and human-made disasters (including cybersecurity threats), is an important element in setting the appropriate infrastructure quality. ERIA (2015) discussed the quality of infrastructure in terms of effective project design, implementation, and partnership amongst stakeholders.

Finally, the forthcoming CADP 3.0 sheds light on the role of urban and socio-economic infrastructure such as smart cities, congestion control system, and disaster prevention and management, in addition to traditional economic infrastructure such as roads, bridges, and railways. In the near future, urban and socio-economic infrastructure that increases amenities will be necessary for Mekong countries and to attract professional skilled workers and immigrants who can create advanced product innovation.<sup>14</sup> It should be noted that radical innovation tends to occur in agglomerations such as cities, where close interaction of people and creation of ideas is expected. In relation to this, large cities in the Mekong region – Bangkok, Hanoi, and Ho Chi Minh – would have the potential to transform into 'innovation cities' because they already have good resources for innovation, such as industrial agglomeration with foreign direct investment (FDI), public research centres, and universities. Hence, such cities need to initiate a better arrangement of urban and socio-economic infrastructure immediately and to construct economic infrastructure.

<sup>13</sup> Asia-Pacific Economic Cooperation (2014) provided an overview of the whole cycle of infrastructure projects from the viewpoint of the quality of infrastructure.

<sup>14</sup> According to Glaeser, Kolko, and Saiz (2001), urban amenities include (i) the presence of a rich variety of services and consumer goods, (ii) aesthetics and physical setting, (iii) good public services, and (iv) speed.

### **3. Trade Facilitation**

#### **3.1. Transport and Transit Facilitation**

In addition to physical infrastructure, trade facilitation should be arranged so that production networks can work properly. Since the Mekong region has transboundary economic corridors, it has various cross-border procedures such as customs clearance. Generally, cross-border procedures involve significant costs and time requirements if each country implements its own procedures without coordination and harmonisation with other countries. For example, if cargo trucks are permitted to run only in their home countries, transport service providers arriving at the national border need to move their cargo to other trucks that are permitted to run in the destination countries – entailing risks of breakage, theft, and loss of cargo, as well as loss of time. To promote trade facilitation, ASEAN and Mekong countries have devoted many efforts to simplifying cross-border procedures in multi-country frameworks.

The Cross-Border Transport Agreement (CBTA), which is part of the GMS Economic Cooperation Program, is representative of such efforts. The CBTA consolidates key nonphysical measures for efficient cross-border land transport in areas such as (i) vehicles (on designated open routes), drivers (with mutual recognition of driving licences and visa facilitation), and goods (with regimes for dangerous and perishable goods) crossing national borders through the GMS road transport permit system; (ii) avoidance of costly trans-shipment through a customs transit and temporary importation system and a guarantee system for goods, vehicles, and containers; (iii) the reduction of time spent at borders through single-window inspection, single-stop inspection, information and communication technology (ICT) equipment and systems for information exchange, risk management, and advance information for clearance; and (iv) increases in the number of border checkpoints implementing the CBTA to maximise its network effects and economies of scale (ADB, 2011) (Table 2).

**Table 2: Annexes and Protocols of the CBTA**

<b>Category</b>	<b>Document name</b>
Annex 1	Carriage of Dangerous Goods
Annex 2	Registration of Vehicles in International Traffic
Annex 3	Carriage of Perishable Goods
Annex 4	Facilitation of Frontier Crossing Formalities
Annex 5	Cross-Border Movement of People
Annex 6	Transit and Inland Clearance Customs Regime
Annex 7	Road Traffic Regulation and Signage
Annex 8	Temporary Importation of Motor Vehicles
Annex 9	Criteria for Licensing of Transport Operators for Cross-Border Transport Operations
Annex 10	Conditions of Transport
Annex 11	Road and Bridge Design and Construction Standards and Specifications
Annex 12	Border Crossing and Transit Facilities and Services
Annex 13a	Multimodal Carrier Liability Regime
Annex 13b	Criteria for Licensing of Multimodal Transport Operators for Cross-Border Transport Operations
Annex 14	Container Customs Regime
Annex 15	Commodity Classifications System
Annex 16	Criteria for Driving Licences
Protocol 1	Designation of Corridors, Routes, and Points of Entry and Exit (Border Crossings)
Protocol 2	Charges Concerning Transit Traffic
Protocol 3	Frequency and Capacity of Services and Issuance of Quotas and Permits

CBTA = Cross-Border Transport Agreement.  
Source: ADB (2011).

After it was signed in March 2007, the CBTA eventually entered into force amongst six members in 2015. However, as some of its content has already become obsolete, members are working on revising the CBTA into a new version (CBTA 2.0) with the support of the Australian Government (AusAID).<sup>15</sup> In addition, an ‘early harvest’ measure has been

<sup>15</sup> This description and the rest of this paragraph are indebted to Kasuga (2019), which reviewed cross-border road transport developed in the Mekong region.

introduced to increase the number of licences allocated to vehicles in international trade, but the system of issuing licences is extremely complicated given that licenses are exchanged only amongst bilateral or trilateral transport agreements (in other words, the ‘spaghetti ball phenomenon’). With respect to customs clearance procedures, although all Mekong countries have introduced electronic customs clearance, these systems are different and sometimes incompatible because they have been provided by different donors. The single-stop inspection<sup>16</sup> is expected to be an effective tool to facilitate trans-border customs clearance in a more streamlined manner. However, the implementation of single-stop inspection has been delayed significantly as it requires considerable coordination and harmonisation of rules and regulations. Therefore, based on the above, the CBTA still has room for improvement.

At the regional level, ASEAN has negotiated important agreements on transport and transit facilitation, including the ASEAN Framework Agreement on the Facilitation of Goods in Transit (AFAFGIT), to achieve the ASEAN Economic Community (AEC), which is based on close production networks and the attraction of FDI. Other relevant agreements include Protocol 7 of the AFAFGIT on Customs Transit Systems, the ASEAN Framework Agreement on the Facilitation of Inter-State Transport (AFAFIST), the ASEAN Framework Agreement on Multimodal Transport, and the ASEAN Framework Agreement on the Facilitation of Cross Border Transport of Passengers by Road Vehicles (CBTP).<sup>17</sup> The ASEAN Trade Facilitation Strategic Action Plan documents the full operationalisation of the ASEAN Customs Transit System (ACTS), while the transport facilitation subsection of the section on Enhanced Connectivity and Sectoral Cooperation of the AEC Blueprint 2025 specifies the operationalisation of the AFAFGIT, AFAFIST, the ASEAN Framework Agreement on Multimodal Transport, and the CBTA. However, the four major transport and transit agreements have yet to be fully implemented due to lack of ratification at the national level.

The ACTS provides good practice when fully implemented and could lead to seamless transit in the GMS. It includes a single electronic goods declaration from departure to destination; duties and taxes at risk covered by a single guarantee that is reduced or waived for authorised transit traders; the privilege of simplified procedures given to authorised transit traders; the application of common risk management techniques; waiver of the need to transfer goods to a different truck in each country; and comprehensive computerisation linking all customs offices in transit routes and linking all traders to customs offices of departure.

The GMS countries stand to benefit the most from the full implementation of these agreements and inspire the rest of the region to fully facilitate the regional movement of goods. The transport and transit agreements mentioned above, if fully implemented, will not only minimise choke points at the borders, but will also facilitate trans-shipment and

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<sup>16</sup> Single-stop inspection is a system where custom officials from exporting and importing countries collaborate to inspect cargo in a common control area based on the CBTA.

<sup>17</sup> For more details on the AFAFGIT, see ASEAN Customs Transit System (2019).

transit of goods, especially for landlocked countries such as the Lao PDR which need other country's sea ports to export their goods.

### **3.2. Other Trade Facilitation Initiatives**

Besides the transit and transport facilitation discussed above, other aspects of trade facilitation remain important issues that GMS countries can address to improve their development potential. The remaining aspects of trade facilitation include (i) transparency and information on laws, regulations, and procedures pertaining to trade; (ii) communication and active engagement with stakeholders, and release and clearance formalities at the border; (iii) import and export formalities behind the border; and (iv) cross-border coordination. These aspects of trade facilitation can be improved by GMS economies on a unilateral and concerted basis, building on several ASEAN-wide initiatives in which GMS economies could play a leadership role given their unique geographic situation.

ERIA, in collaboration with the ASEAN Trade Facilitation Joint Consultative Committee, conducted an ASEAN-wide study to understand the trade facilitation environment in the region in 2018, with a follow-up study planned for 2020. The objective of the study was to provide recommendations for reducing intra-ASEAN trade transaction costs by 10% by 2020, a goal set by the ASEAN Economic Ministers in 2017. The study involved taking stock of various trade facilitation initiatives adopted by individual AMS. Thus, the study results shed light on areas where further cooperation on trade facilitation could help reduce trade transaction costs in the region.

When it comes to transparency of information, there is a high level of facilitation across ASEAN, including the GMS countries. All countries supplied information on their trade-related laws and regulations, and procedures on their respective National Trade Repositories (NTRs), which make it easier for traders to obtain information. However, English language versions of such information are not universally available. In addition, one aspect of NTRs which may require further work is to ensure that they are updated regularly with information on non-tariff measures (NTMs) to improve the transparency of NTMs. A more transparent list of NTMs would help facilitate trade and encourage investment in the GMS, as the countries progress towards designing better NTMs and efficiently administrating them. In this regard, one initiative that the GMS could build on is the ERIA–United Nations Conference on Trade and Development NTM Database (Doan and Rosenow, 2019), which was developed in 2019 with the participation of AMS and includes all NTMs in force as of 2018. The raw or more detailed data have been shared with the respective AMS to assist them in building their respective NTRs.

Regarding engagement with stakeholders, each economy has mechanisms in place for private sector participation in the reforms process through formal bodies such as national trade facilitation committees, although they take different forms in each country and the level of actual engagement varies. Strengthening these mechanisms, especially to resolve cross-border issues, will identify and address problems faced by the private sector in moving their goods.

However, countries vary in their facilitation of release and clearance procedures. While more advanced countries such as Thailand have in place facilitative measures such as advanced rulings, pre-arrival processing, and authorised economic operators, in other countries such provisions are lacking or in progress. Furthermore, one way to reduce the time cost of cross-border trade is to conduct regular Time Release Studies (TRS) of border procedures to identify inefficiencies and bottlenecks, and reduce the time cost for traders. While some countries such as the Lao PDR conduct regular TRS, others perform them on an ad-hoc basis. To improve the efficiency of the border process, border countries could conduct joint TRS to identify issues that could be solved through better coordination at the border.

The export/import formalities and coordination component of trade facilitation focuses on the drive towards paperless formalities and the establishment and operationalisation of the National Single Window (NSW) and the ASEAN Single Window (ASW). The NSW and ASW have been the flagship initiatives on trade facilitation in ASEAN since the mid-2000s. The Roadmap for an ASEAN Community, 2009—2015 targeted 2012 as the year when all NSWs of the 10 AMS would be operational. NSWs could play a pioneer role in the modernisation and simplification of procedures in customs and other major trade-related agencies. However, the extent to which countries have implemented paperless trading varies tremendously. Given the importance of the NSW to trade facilitation, greater focus on and investment in improving NSWs deserve top policy priority by GMS countries. Investment in ICT infrastructure and capacity building of officials to use electronic systems is necessary to unleash the full potential of the NSWs. Thailand and Viet Nam's NSWs are more advanced and, along with a few other non-GMS AMS (Indonesia, Malaysia, and Singapore), have been participating in the ASW pilot project for electronic exchange of the document required for the ASEAN preferential tariff treatment (e-ASEAN Trade in Goods Agreement Certificate of Origin Form D). They could lead in encouraging the GMS countries to pursue the exchange of other electronic data or forms, such as the e-sanitary and phytosanitary certificates, which are important documents used in clearance of goods.

The experience of the GMS countries provides some good practices in transit and transport facilitation through cross-border coordination of border agencies. For example, the GMS–CBTA single-stop inspection mechanism allows border control authorities from two countries to conduct one-stop inspections jointly at inbound checkpoints. An example of this mechanism is at the Lao Bao–Dansavanh border crossing between Viet Nam and the Lao PDR, where Vietnamese trucks are checked only at the Dansavanh border crossing and Lao PDR trucks are checked only at the Lao Bao border crossing. This has resulted in a drastic drop in the average clearance time for trucks from 90 minutes to 29 minutes. The GMS CBTA also has a single window inspection wherein the different inspections and controls of goods (e.g. customs, phytosanitary/plant protection, and veterinary) are carried out jointly and simultaneously by the respective competent authorities involved. Indeed, as agreed by the Lao PDR and Viet Nam, the initial one-stop inspection conducted by customs will be expanded to all the customs-inspection-quarantine border agencies, resulting in an even faster clearance time. There is a need to fully implement such mechanisms at all major land crossings in the Mekong Subregion.

The status of trade facilitation varies across GMS countries. For Cambodia, trade facilitation is of high policy priority for the country to maintain its international competitiveness and to prepare for the eventual loss of its preferential access to developed country markets as its per capita income rises. Significant dissatisfaction remains on the part of logistics professionals and executives regarding Cambodia's trade facilitation. This means that early successes at the start of the trade facilitation reform have not been sustained. More importantly, the sharp deterioration in recent years seems to indicate that the country, without an operational NSW, has been increasingly constrained by the much larger volume and wider range of imports and exports of a fast-growing trade- and FDI-driven economy.

The Lao PDR experienced the sharpest improvement in rating and ranking on the World Bank's Customs Logistics Performance Index (LPI) amongst AMS from 2016 (ranked 155) to 2018 (ranked 74) (Arvis et al., 2018). The country was one of the top 10 performing lower middle-income countries in 2018. Nevertheless, much remains to be done to improve the trade facilitation regime in the country. A top priority should be the operationalisation of the NSW and its component foundations, such as the use of digital copies and electronic payments.

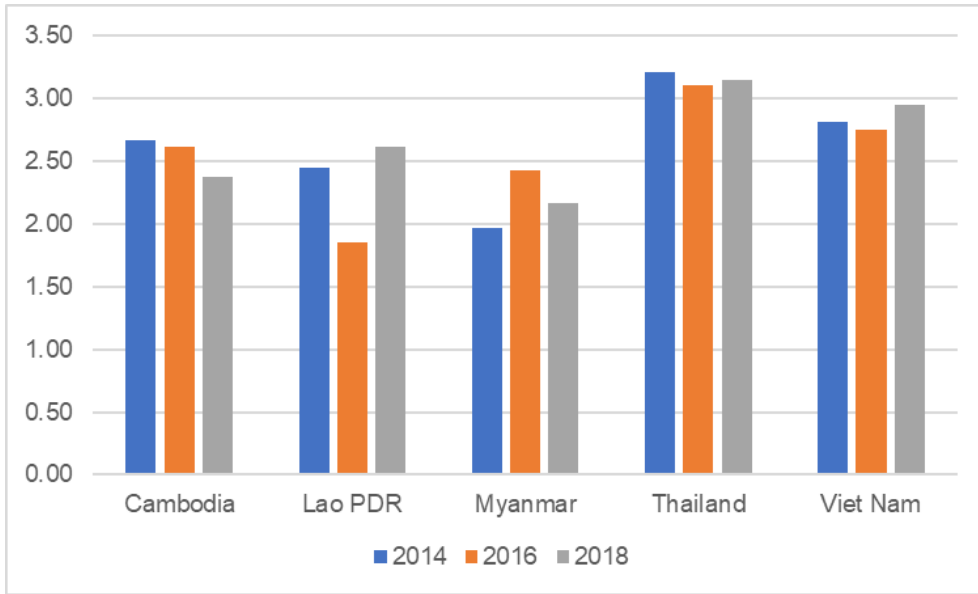
Myanmar's customs agency is significantly under-resourced, primarily in terms of technological capability and the human complement (despite the personnel expansion and training programmes), as the agency is undergoing significant organisational changes. Moreover, the agency only has about half a decade of experience of a large volume of (legal and formal) imports and exports, as the trade to gross domestic product ratio rose from less than 1% in 2011 to about 40% in 2016. One way forward is to complete the reforms while continuing the institutional strengthening of critical agencies, especially customs, in terms of both the necessary infrastructure and personnel.

Thailand was amongst the top five upper middle-income countries in logistics performance in 2018. With its 'Customs 4.0', Thailand has been rising its customs and border management to the next level towards greater trade facilitation while ensuring trade control and security. Such best practice could be emulated by other AMS in the GMS.

The improvement in Viet Nam's ranking on the LPI and the World Bank's Ease of Doing Business (World Bank, 2020) trading across borders indicator reflect the country's success in improving its trade facilitation regime. Viet Nam was the top-performing lower middle-income countries in the 2018 LPI (Arvis et al., 2018: 12). Such marked improvement in trade facilitation occurred alongside very robust FDI inflow and a sharp rise in exports and imports. There is still significant room for improvement for Viet Nam in terms of the efficiency and competence of customs and other border agencies, as well as the issue of informal payments.

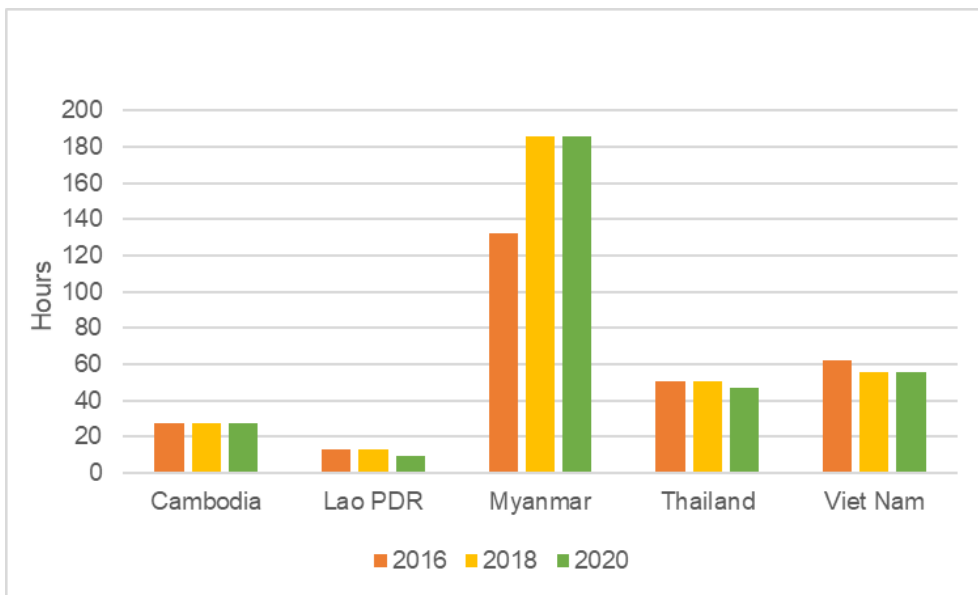
Figures 2 and 3 show the customs LPI and average border compliance time for GMS countries, respectively.

**Figure 2: Customs LPI for GMS countries**



GMS = Greater Mekong Subregion, Lao PDR = Lao People’s Democratic Republic, LPI = Logistics Performance Index.  
 Source: World Bank (various years), Logistic Performance Index. <https://lpi.worldbank.org/> (accessed 29 May 2020).

**Figure 3: Average Border Compliance Time for GMS Countries**



GMS = Greater Mekong Subregion, Lao PDR = Lao People’s Democratic Republic.  
 Source: World Bank (various years), *Doing Business*. <https://www.doingbusiness.org/en/doingbusiness> (accessed 29 May 2020).

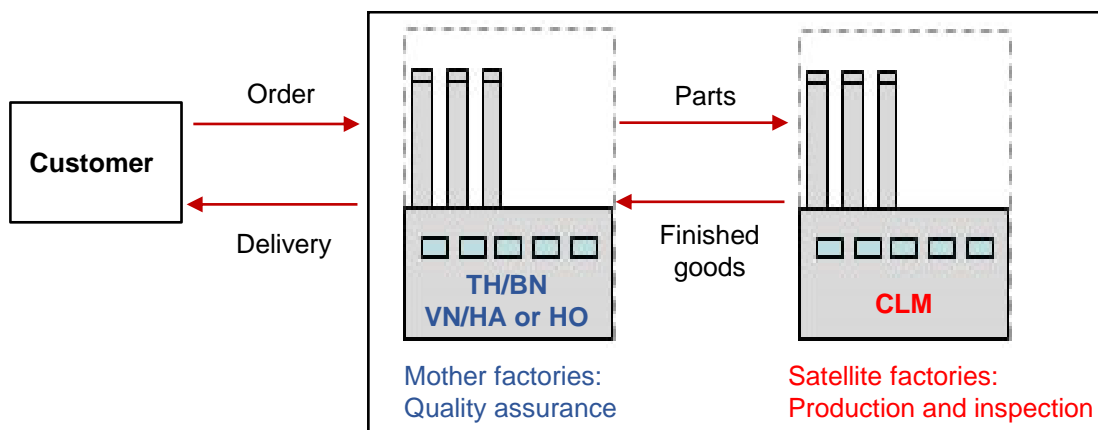


#### 4. Industrialisation

As connectivity within the Mekong region and with neighbouring countries advances beyond physical bottlenecks, a supply chain network and industrial locations have been established alongside infrastructure. In connection with infrastructure development, it is crucial to form industrial agglomerations to enhance opportunities for local firms to link with international production networks. Through this linkage, local firms can access three technology channels: (i) affiliates of foreign firms in the same industrial agglomeration, (ii) universities and research institutes in the country, and (iii) direct learning from abroad through the exchange of experts and exports/imports. Furthermore, appropriate arrangements for industrialisation are highly likely to narrow development gaps in the region through the fragmentation of production and the movement of labour.

Notably, the Plus One strategies undertaken by multinational companies involve CLM countries with international production networks. In the manufacturing base, dispersion is occurring from Thailand to the borders with the CLM countries (i.e. Thailand Plus One strategy). At the same time, the Plus One strategy is being expanded to multinational firms in Viet Nam due to its rapid industrial advancement and wage increases around Hanoi and Ho Chi Minh City (i.e. Viet Nam Plus One strategy) (Figure 4).<sup>18</sup> If these Plus One strategies are carried out in a full-scale operation, neighbouring countries will benefit from opportunities to be involved in deeper and wider global value chains, which will help them upgrade their industrial and export structures. In this respect, it is needless to emphasise that infrastructure and trade facilitation (described above) are essential to realise such Plus One strategies more effectively.

**Figure 4: Thailand/Viet Nam Plus One**



BN = Bangkok; CLM = Cambodia, the Lao PDR, and Myanmar; HA = Hanoi; HO = Ho Chi Minh; Lao PDR = Lao People's Democratic Republic; TH = Thailand; VN = Viet Nam.  
Source: Ambashi (2019).

<sup>18</sup> These Plus One strategies are envisioned by the private sector. For instance, in the ERIA capacity-building symposium addressing the Way Forward to Develop Industrial Parks and Special Economic Zones in the Lao PDR on 8 February 2019, Masao Suematsu, the president of a Japanese automobile-related company in ASEAN, argued that the Lao PDR would have the potential to receive production and inspection orders as satellite factories affiliated with mother factories in both Thailand and Viet Nam.

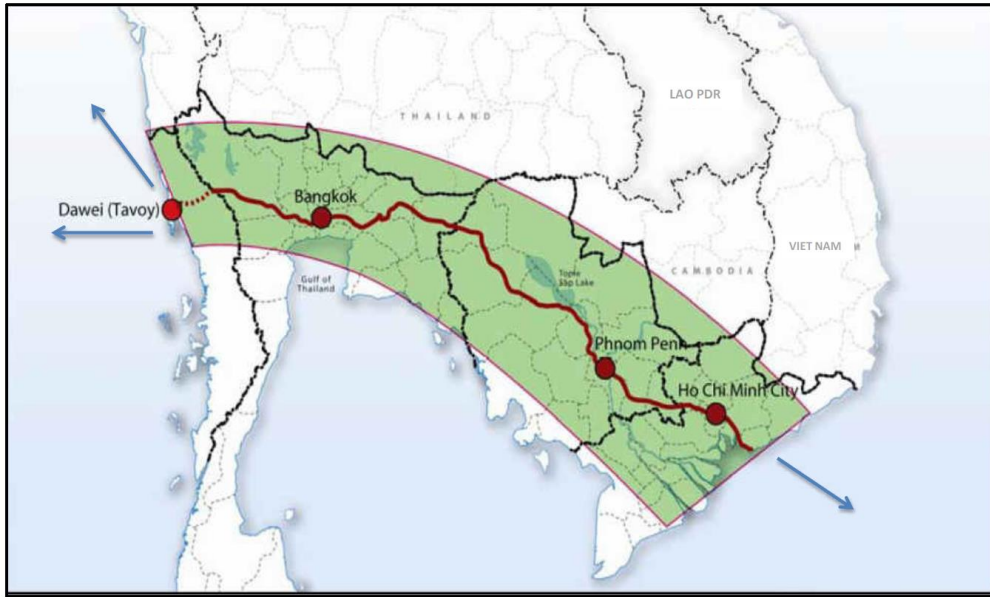
As an example of industrialisation visions in the Mekong region, Ambashi (2019) drew attention to the so-called Bangkok–Vientiane–Hanoi Economic Corridor that could be promoted by the possible construction of the Hanoi–Vientiane Expressway. On the one hand, policymakers and the private sector wish to connect Bangkok and Hanoi, both of which have been growing as pillars of economic development in the Mekong region. On the other hand, Ambashi (2019) stressed the importance of formulating effective industrial development strategies that take maximum advantage of infrastructure and depict the steady path to industrialisation of the region. Specifically, we should locate industrial estates and special economic zones (SEZs) close to essential infrastructure and large cities that are final consumption destinations while considering labour force mobility and wage levels. It is demonstrated that FDI will increase as more essential infrastructure is constructed and the distance to large cities becomes shorter (Ishida, 2020).<sup>19</sup> In addition, logistics hubs and container depots should be established to help industrial estates and SEZs in the internal Mekong region cut cargo transportation costs and time.

Lastly, the Mekong–India Economic Corridor (MIEC) is a noteworthy effort to generate industrialisation that connects Ho Chi Minh City, Bangkok, and Dawei in Myanmar. The MIEC has great potential for becoming a major manufacturing corridor in the near future because the transit time of cargo going to India, the Middle East, and European Union countries will shorten without circumventing the Malay Peninsula, based on the planned deep sea port in Dawei. The Thailand and Viet Nam Plus One strategies are accelerated by the MIEC, so production networks can expand from the Bangkok Metropolitan Region to neighbouring countries including Cambodia, Myanmar, and Viet Nam. Above all, Cambodia and Myanmar are expected to accelerate their industrialisation through the MIEC, whereby the development gap would be narrowed amongst Mekong countries. Therefore, there are high expectations of cooperation and coordination amongst stakeholders engaging in the development of the Dawei deep seaport.

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<sup>19</sup> By conducting an econometric analysis of expressways' effects on FDI using the dataset of Viet Nam provinces, Ishida (2020) found that both the number and amount of FDI approvals tend to increase with the construction of expressways and proximity to Hanoi.

**Figure 5: Mekong–India Economic Corridor**



Lao PDR = Lao People’s Democratic Republic.  
Source: ERIA (2015).

## **5. Policy Recommendations**

Based on the review so far, we summarise policy recommendations with respect to infrastructure development, trade facilitation, and industrialisation in a concise manner.

### **5.1. Infrastructure Development**

- Early construction of economic corridors in the GMS provides the benefits of integration, narrowing gaps, and sustainable development. However, Ishida (2019) showed that a trade deficit occurred or expanded in low-income countries although the international trade of all Mekong countries increased through economic corridors. Therefore, it is a pressing issue to establish a mechanism that facilitates the distribution of benefits stemming from infrastructure development, particularly to CLM, and that allocates the construction costs of infrastructure equally amongst relevant member countries. Mekong countries should establish or reinforce a consultation system in existing organisations such as the Mekong River Commission, the Ayeyawady–Chao Phraya–Mekong Economic Cooperation Strategy, and the Lower Mekong Initiative. Such systems could help member countries conclude intergovernmental and host government agreements, burden sharing of construction and maintenance costs of infrastructure amongst countries, public–private partnership mechanisms, etc.
- It is important to note that the entire inclusion of CLM through the construction of infrastructure would create potential synergies for Thailand and Viet Nam, which could consolidate their regional value chains through economic corridors developed in the Mekong region.

- Infrastructure is generally expected to produce the positive effects described above. However, we need to recognise the negative aspects of infrastructure development, such as traffic accidents, air pollution, environmental destruction, and water management.<sup>20</sup> Thus, the Mekong countries should have an agreed mechanism in which independent bodies assess the impacts of infrastructure development on economies, environment, and society in an appropriate manner, and present concrete recommendations to relevant governments to avoid or mitigate such negative effects and externalities.
- There is an urgent need for workable mechanisms to facilitate public–private partnerships, since many countries will spend their budgets on huge stimulus packages aimed at economic recovery during and after the COVID-19 pandemic. The Mekong countries should increase their reliance on private sector investment, at least in the medium term, after the pandemic.

## **5.2. Trade Facilitation**

- The simplification of cross-border trade procedures is necessary, e.g. single-stop inspection or single window service regarding customs clearance. Although the common control area (CCA) was established in 2015 at the border checkpoint between Dansavanh (Lao PDR) and Lao Bao (Viet Nam) on the EWEC to promote cross-border trade facilitation, the CCA has not yet expanded to other border checkpoints. Moreover, the CCA has not dramatically reduced the time required for customs clearance due to limited opening hours of customs. Nevertheless, the Mekong countries are expected to introduce the CCA as soon as possible in other border checkpoints on economic corridors.
- There is a serious complication regarding the CBTA. Trilateral driving licences cannot be fully used due to transport restrictions, and as a result, only bilateral ones are available. It is necessary for the Mekong countries to make efforts to accommodate both the operations and regulations of the CBTA.
- GMS countries should fully implement existing subregional and ASEAN-wide transit and transport agreements such as the CBTA, AFAFGIT, and AFAFIST. Full implementation includes ratification, the formation of or amendments to relevant existing domestic laws and regulations, and the establishment of implementing mechanisms/institutions.
- GMS countries should develop a mechanism to ensure regular updating of NTRs to make laws and regulations (including NTMs) transparent, and comply with international commitments. GMS countries could exchange best practices to enhance cooperation.
- GMS countries should prioritize investments in ICT infrastructure and build the capacity of government officials so that all government agencies that issue permits and licences can participate in the NSW and ASW to facilitate electronic exchange

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<sup>20</sup> See Chellaney (2019).

of relevant documents related to preferential tariff treatment, sanitary and phytosanitary certificates, etc.

- To reduce trade transaction costs at the border, Mekong countries should conduct regular, coordinated TRS of border procedures to identify inefficiencies and bottlenecks, and reduce the time cost for traders at common checkpoints. Furthermore, better coordination amongst border agencies is required to conduct inspections more efficiently by using integrated risk management.

### **5.3. Industrialisation**

- The Mekong countries should implement industrial policies to eliminate obstacles to business, industrialisation, and technological upgrading. According to the World Bank's Doing Business 2020 (World Bank, 2020), their ease of doing business rankings are still low except for Thailand (Cambodia, 144; the Lao PDR, 154; Myanmar, 165; Thailand, 21; and Viet Nam, 70). Thus, there is much room for improving business conditions to start businesses and attract FDI. Moreover, since industrial agglomeration helps upgrade industrial and export structures, industrial estates and SEZs should be established to encourage local and multinational companies to tap into global and regional markets. In addition, industrial policies should lend support for innovation conducted by private firms by providing tax benefits, funds, access to foreign money, and so on.
- The adoption of the technology of the Fourth Industrial Revolution – such as artificial intelligence, the internet of things, automation, and robotics – gives manufacturing firms a better chance to increase production and strengthen competitiveness, although it is necessary to take care of employment displacement. Communication technology will also give service industries the opportunity to connect with global value chains through service outsourcing. The Mekong countries need to combine leapfrogging and feedback development strategies with the existing step-by-step development strategy. The former two strategies, based on digital technology, are particularly required in the impending new normal which will continue to restrict free movement of goods and services (particularly people).

### **References**

- ADB (2011), *Greater Mekong Subregion Cross-Border Transport Facilitation Agreement: Instruments and Drafting History*. Manila: Asian Development Bank. <https://www.adb.org/publications/gms-cross-border-transport-facilitation-agreement-instruments-and-drafting-history> (accessed 12 March 2020).
- Akamatsu, K. (1962), 'A Historical Pattern of Economic Growth in Developing Countries', *The Developing Economies*, 1(1), pp.3–25.

- [https://www.ide.go.jp/library/English/Publish/Periodicals/De/pdf/62\\_01\\_02.pdf](https://www.ide.go.jp/library/English/Publish/Periodicals/De/pdf/62_01_02.pdf)  
(accessed 12 March 2020).
- Ambashi, M. (2019), 'Vientiane–Hanoi Expressway Project', *ERIA Research Project Report 2018*, No. 3. Jakarta: Economic Research Institute for ASEAN and East Asia. <https://www.eria.org/publications/vientiane-hanoi-expressway-project/>  
(accessed 12 March 2020).
- Arvis, J.-F. et al. (2018), *Connecting to Compete 2018: Trade Logistics in the Global Economy*. Washington, DC: World Bank.
- ASEAN Customs Transit System (2019), 'ASEAN Framework Agreement on the Facilitation of Goods in Transit (AFAFGIT)'. [https://acts.asean.org/Legal\\_Framework/asean-framework-agreement-facilitation-goods-transit-afafgit](https://acts.asean.org/Legal_Framework/asean-framework-agreement-facilitation-goods-transit-afafgit) (accessed 12 March 2020).
- ASEAN (2011), *Master Plan on ASEAN Connectivity*. Jakarta: ASEAN Secretariat. [https://www.asean.org/storage/images/ASEAN\\_RTK\\_2014/4\\_Master\\_Plan\\_on\\_A\\_SEAN\\_Connectivity.pdf](https://www.asean.org/storage/images/ASEAN_RTK_2014/4_Master_Plan_on_A_SEAN_Connectivity.pdf) (accessed 12 March 2020).
- ASEAN (2016), *Master Plan on ASEAN Connectivity 2025*, Jakarta: ASEAN Secretariat. <https://asean.org/storage/2016/09/Master-Plan-on-ASEAN-Connectivity-20251.pdf>  
(accessed 12 March 2020).
- Asia-Pacific Economic Cooperation (2014), *APEC Guidebook on Quality of Infrastructure Development and Investment*. Singapore: APEC Secretariat. <https://www.apec.org/Publications/2014/11/APEC-Guidebook-on-Quality-of-Infrastructure-Development-and-Investment> (accessed 12 March 2020).
- Chellaney, B. (2019), 'Damming the Mekong to Environmental Hell', *The ASEAN Post*, 4 August. <https://theaseanpost.com/article/damming-mekong-environmental-hell>  
(accessed 12 March 2020).
- Doan, T.T.H. and S. Rosenow, eds. (2019), *Non-Tariff Measures in ASEAN – An Update*. Jakarta: Economic Research Institute for ASEAN and East Asia.
- ERIA (2015), *The Comprehensive Asia Development Plan 2.0 (CADP 2.0): Infrastructure for Connectivity and Innovation*. Jakarta: Economic Research Institute for ASEAN and East Asia. <https://www.eria.org/publications/the-comprehensive-asian-development-plan-20-cadp-20-infrastructure-for-connectivity-and-innovation/>  
(accessed 12 March 2020).
- ERIA (forthcoming), *The Comprehensive Asia Development Plan 3.0*. Jakarta: Economic Research Institute for ASEAN and East Asia.
- Fujisawa, T., J. Wada, and M. LoCastero (2019), '2018 Progress Survey Report of Infrastructure Projects in the Comprehensive Asian Development Plan 2.0', *ERIA Research Project Report 2018*, No. 2. Jakarta: Economic Research Institute for ASEAN and East Asia. <https://www.eria.org/publications/2018-progress-survey-report-of-infrastructure-projects-in-the-comprehensive-asian-development-plan-20/>  
(accessed 12 March 2020).
- Glaeser, E.L., J. Kolko, and A. Siaz (2001), 'Consumer City', *Journal of Economic Geography*, 1(1), pp.27–50.

- Ishida, M. (2019), 'Road Infrastructure Development in the Three Economic Corridors of the Mekong Region', in T.V. Tho and S. Karikomi (eds.), *Mekong Region Development and Asian Dynamism*. Tokyo: Bunshindo (in Japanese).
- Ishida, M. (2020), 'Economic Potential of the Vientiane–Ha Noi Expressway based on Experience of the Mekong Region', *ERIA Discussion Paper Series*, DP–2018–11, Economic Research Institute for ASEAN and East Asia.
- Jones, R.W. and H. Kierzkowski (1990), 'The Role of Service in Production and International Trade: A Theoretical Framework', in R.W. Jones and A.O. Kruger (eds.) *The Political Economy of International Trade: Essays in Honor of Robert E. Baldwin*. Oxford: Basil Blackwell, Chapter 14, pp.31–48.
- Kasuga, H. (2019), 'Connectivity Enhancement in the Mekong Region: Improvement of Road Infrastructures and Expansion of Investment Opportunity', in K. Ishikawa, K. Umada, and K. Shimizu (eds.) *Economic Integration and Protectionism in Asia: The Changing Composition of Trade Order*. Tokyo: Bunshindo (in Japanese).
- World Bank (2020), *Doing Business 2020*. Washington, DC: World Bank.

# Data Connectivity in the Greater Mekong Subregion

*Lurong Chen*

## 1. Introduction

Digitalisation will create new opportunities to unleash the potential of rapid development in the Greater Mekong Subregion (GMS) – both economically and socially. To accelerate this process, the digital-friendly ecosystem needs to facilitate digital transformation in the region. The literature has shown that digital connectivity affects a nation's overall economic performance. From the global perspective, Baldwin (2016) explained the economic logic of how digitalisation (the development of information and communication technology (ICT)) could lead to a new pattern of globalisation (the third unbundling) characterised by the new type of international division of labour, which would create new strategies for national development, as Kimura (2018) illustrated. Kimura and Chen (2018) developed the policy framework and applied it to analyse the development strategy of the Indonesian economy. Empirically, the World Bank (2009) estimated that, at the national level, on average a 10% increase of fixed broadband penetration would increase gross domestic product by 1.2%–1.4%, depending on the country's stage of development. Ng, Lye, and Lim (2013) showed that factors such as broadband penetration, the utilisation of broadband infrastructure, and applications are likely to enhance national aggregate outputs.

Although the emerging digital economy and Industry 4.0 will generate great gains to GMS development, challenges and opportunities come hand in hand. While those challenges are mainly on the supply side for most developed and fast-growing countries and regions (Schwab, 2016), regions such as the GMS also face challenges on the demand side, as consumers still need basic conditions, such as logistics, connection, and skills, to obtain access to the digital world.

There is particular concern about exacerbating inequality in the region. In the GMS, a large number of people still have low incomes, low skills, and live in remote areas with limited connection to modernisation. These people lag behind progress in technology – some of them have not yet benefited from Industry 2.0 (i.e. they have no access to electricity) or Industry 3.0 (i.e. they do not know how to use computer). Changes in Industry 4.0 are believed to be even more disruptive than ever before. 5G, the next generation of broadband connection, will power the internet of things and promote further integration of the physical and digital worlds, on which new structured global value chains will be built. The GMS will try its best to catch up with technological progress by accelerating digital transformation that needs not only efforts to improve physical, institutional, and people-to-people connectivity, but also to fill/narrow development gaps. To make digital



adoption a process that effectively narrows the gaps, appropriate policy interventions will be needed and improving inclusiveness will be a main component. However, unevenly developed infrastructure remains one of the main barriers to development of the GMS. Digital connectivity gaps exist across and within countries. This requires closer collaboration amongst all participating parties, including both the public and private sectors.

The GMS has three major economic corridors – the North–South Corridor,<sup>21</sup> the East–West Corridor,<sup>22</sup> and the Southern Corridor<sup>23</sup> – of which the initial priority is to improve logistical linkages and expand the road and rail network. Digital connectivity has been an important component of GMS connectivity and has improved significantly in various aspects, but it is a broad topic. In the context of supporting economic development, it will take into consideration not only data connectivity but also logistics to facilitate the free flow of goods and services, connectivity to facilitate cash flow, and seamless links between cyberspace and physical parts of the e-commerce network (Chen, 2017; 2019; 2020).

This chapter does not intend to cover all these aspects, but focuses on discussing the GMS data connectivity, which is key to any stage of digitalisation. What will make 5G a game changer is the sheer amount of data that can be collected, transferred, processed, analysed, and distributed at high speed with low latency. Improving data connectivity requires infrastructure building and facilitating the free flow of data with trust (Kimura et al., 2019; Chen, 2020).

## **2. Infrastructure for Data Connectivity**

Data are the core of the digital economy, of which the internet is the backbone. Internet connection is the precondition for digital connectivity, and therefore the free flow of data. For instance, fibre network building can directly affect the capacity, speed, and reliability of the internet, and therefore is a crucial part of the required infrastructure.

Development gaps amongst Asia’s emerging economies are widely acknowledged, especially in ICT and logistics. This is also true for the GMS, although the overall level of development in the GMS is lower than that of the Association of Southeast Asian Nations (ASEAN) as a whole, and the gaps between GMS countries/regions seem to be narrower in general.

### **2.1. Network Connection: Coverage and Quality**

By the end of 2018, the GMS had about 150 million internet users, accounting for 45% of the regional population. Thailand (53%) had the highest internet penetration, followed by Viet Nam (50%) and Guangxi Zhuang Autonomous Region in China (46%). In the rest of the GMS, most of the population still does not have access to the internet. Most users in

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<sup>21</sup> The North–South Economic Corridor passes through China, Myanmar, the Lao People’s Democratic Republic (Lao PDR), Thailand, and Viet Nam.

<sup>22</sup> The East–West Economic Corridor passes through Myanmar, Thailand, the Lao PDR, and Viet Nam.

<sup>23</sup> The Southern Economic Corridor passes through Myanmar, Thailand, Cambodia, the Lao PDR, and Viet Nam.

the GMS access the internet via their mobile phones, thanks to technological progress in wireless connections.

While in Thailand, Viet Nam, and China, the 4G network has been the mainstream that covers 90% or even more of the whole mobile network; connection in Cambodia, the Lao People’s Democratic Republic (Lao PDR), and Myanmar (CLM) still relies on 3G technology. Economically, Guanxi and Yunnan are not the most advanced regions in China. Internet development in these two Chinese provinces seems to be more advanced than in CLM, but falls behind that of Thailand and Viet Nam (Table 1).

**Table 1: ASEAN Access to the Internet**

Country	Internet penetration (users as percentage of population)	Mobile subscriber penetration (per 100 inhabitants)	Mobile connection (% of population)	
			3G	4G
Cambodia	34.0	126.3	83.9	57.5
Lao PDR	25.5	54.1	78.0	9.0
Myanmar	30.7	89.8	90.5	75.1
Thailand	52.9	176.0	98.0	98.0
Viet Nam	49.6	125.6	95.0	95.0
Guangxi, China	46.1	89.2	72.6	64.9
Yunnan, China	39.9	96.5	75.8	69.9
China	54.3	104.6	98.0	98.0

ASEAN = Association of Southeast Asian Nations, Lao PDR = Lao People’s Democratic Republic.  
Source: Author. Raw data from World Bank (2019); The Statistics Bureau of Guangxi Zhuang Autonomous Region (2020), *Guangxi Statistical Yearbook 2019*. [tjj.gxzf.gov.cn/tjsj](http://tjj.gxzf.gov.cn/tjsj) (accessed 20 March 2020); and The Statistic Bureau of Yunnan Province (2020), *Yunnan Statistical Yearbook 2019* [stats.yn.gov.cn/tjsj](http://stats.yn.gov.cn/tjsj) (accessed 20 March 2020).

GSMA (2019) compiled the Mobile Connectivity Index to measure and compare the development of mobile connectivity around the world. The second column of Table 2 shows GMS countries’ scores on the network infrastructure index, a subset of the Mobile Connectivity Index. China has the highest score (74) amongst the six countries, but the mobile infrastructure in Guangxi and Yunnan is very likely to be lower than the average level in China and probably closer to that of Thailand or Viet Nam.

The per-user bandwidth in CLM is quite limited compared with that of Thailand or Viet Nam. The gap will be even wider if the speed of the increase in network bandwidth does not catch up with the rise in internet penetration (Table 2). There is a two-sided story here. On the one side, according to Cisco (2019), to use advanced cloud apps, the network speed of download and upload needs to be higher than 2.5 Megabits per second (Mbps) and 1.0 Mbps, respectively, and the network latency must be less than 100 milliseconds. If that is true, the whole GMS has met the minimum requirements and will be able to

benefit from the latest digital technology, such as cloud computing and big data. On the other side, since China is advancing in 5G networks, and Thailand and Viet Nam are also interested in adopting the new technology, CLM needs to catch up quicker, perhaps in a leapfrogging way, to level up the overall digital connectivity in the GMS.

**Table 2: Mobile Network Infrastructure**

Country	Index of network infrastructure*	Mobile connection		Bandwidth capacity	
		Average upload speed (Mbps)	Average download speed (Mbps)	Total bandwidth (Gbps)	Per internet user (Kbps)
Cambodia	53.03	8.6	7.4	102 ~ 174	19 ~ 32
Lao PDR	43.57	n.a.	n.a.	~32.2	~18.4
Myanmar	51.80	14.4	22.7	83 ~ 92	6 ~ 7
Thailand	64.30	9.9	15.4	1,764 ~ 4,364	48 ~ 120
Viet Nam	59.84	7.7	14.3	4,038 ~ 6,100	91 ~ 137
China	73.90	18.1	42.2	10,993 ~ 20,785	15 ~ 28

Gbps = Gigabits per second, Kbps = Kilobits per second, Lao PDR = Lao People's Democratic Republic, Mbps = Megabits per second, n.a. = data not available.

\*The value of the index ranges from 0 to 100. The higher the value, the better infrastructure of the mobile network.

Source: Author. Based on EIU (2019), ITU (2019), World Bank (2019), and GSMA (2019).

Cambodia and Myanmar face an additional challenge from the limits to electricity access in rural areas. The rural population accounts for 80% of Cambodia's total population and 65% of that of Myanmar. In both countries, more than 60% of the rural population still does not have access to electricity. Without the necessary energy supply, it will be difficult for people to adopt ICT technology in daily life (Table 3).

**Table 3: Electricity Access**

Country	Electricity access		
	Urban (% of urban population)	Rural (% of rural population)	Share of rural population (% of total population)
Cambodia	100.0	36.5	79.1
Lao PDR	97.4	80.3	60.3
Myanmar	89.5	39.8	65.4
Thailand	99.9	100.0	48.5
Viet Nam	100.0	100.0	65.8
Guangxi, China	100.0	100.0	49.8
Yunnan, China	100.0	100.0	52.2
China	100.0	100.0	43.2

Lao PDR = Lao People's Democratic Republic.

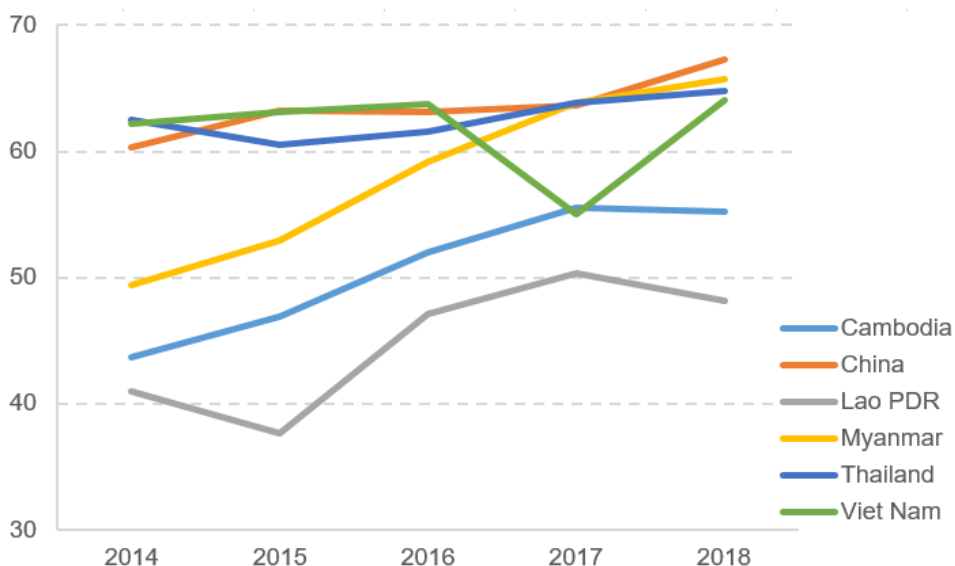
Source: Author. Raw data from ITU (2019).

## 2.2. Affordability of Internet Access

The affordability of using the internet is an important factor worth considering. In the past decade, the cost of internet access, especially with mobile connection, has been driven down dramatically thanks to technological progress and market competition. This has particular implications for digital adoption in regions such as the GMS, where smartphones are the main devices that people use for internet access.

According to GSMA (2019), the affordability of mobile connection in GMS countries has improved substantially since 2014 (Figure 1). Indeed, using mobile connection to access the internet is now more affordable in Myanmar than in most other ASEAN Member States (Chen, 2020). Regionally, the gap across countries has narrowed from 2014 to 2018.

**Figure 1: Affordability of Mobile Connection in the GMS**



GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic.

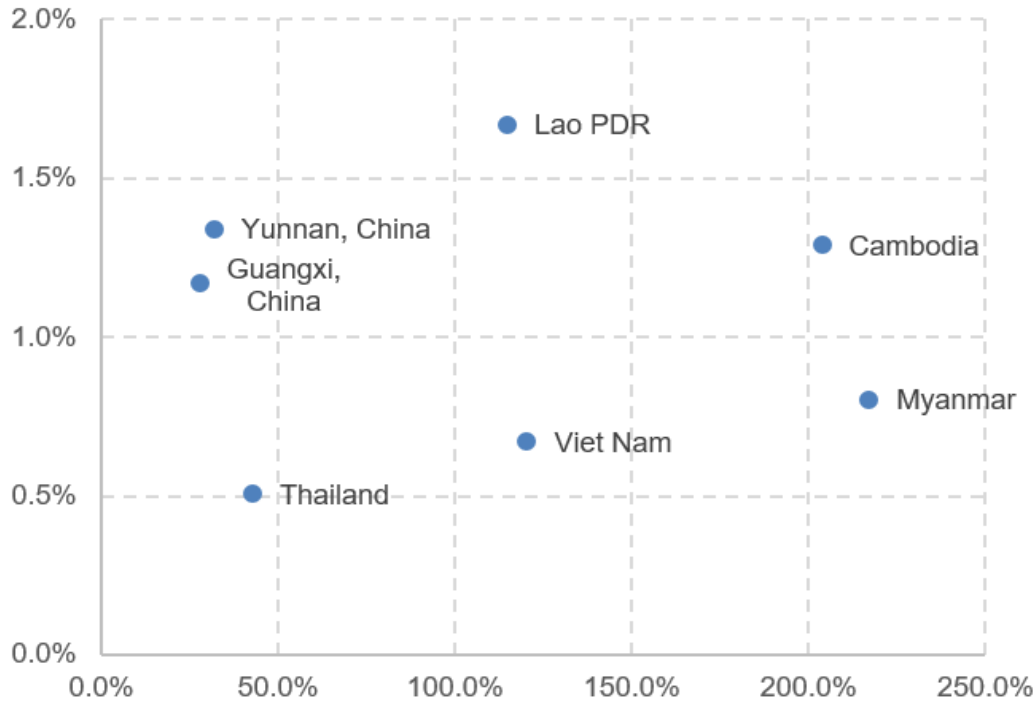
Notes: The vertical axis shows the value of the GSMA index of affordability, which measures the availability of mobile services and devices at price points that reflect the level of income across a national population. The value ranges from 0 to 100. It is more affordable for people in countries with a higher score on the index to use mobile connection to access the internet.

Source: Author. Raw data from GSMA (2019).

The selling price of mobile phones does not vary greatly across countries. In 2017, the global average selling price of a smartphone (an internet enabled device) was about \$235 (IDC, 2018). This is equivalent to about 5% of the average monthly income of consumers in Singapore, but costs people in Cambodia or Myanmar 2 months of average income.

The price of mobile data varies across different service packages and countries. The average 1 Gigabit mobile data package ranges from \$0.87 in Myanmar to \$9.89 in China. Figure 2 reveals more details on the relative cost of mobile data use (indicated by the vertical axis) and the relative price of an Android internet-enabled device (indicated by the horizontal axis).

**Figure 2: Relative Price of Smartphones and Mobile Data**



Notes: The vertical axis shows the price of a 1 Gigabit mobile data package as a share of per capita monthly income. The horizontal axis shows the price of an Android internet-enabled device related to per capita monthly income.

Source: Author. Raw data from Cable.co.uk (2020), Worldwide mobile data pricing. [www.cable.co.uk](http://www.cable.co.uk) (19 November 2019); IDC (2018); and World Bank (2019).

Two issues are worth noting here. First, the IDC (2018) data are based on the country's national average level, but it usually costs more to use mobile connections to access the internet in rural areas, especially remote villages, where the telecom network building normally lags behind urban areas. Second, when taking into account the wide existence of urban–rural income gaps, the affordability of internet access in the GSM could be lower than the level that Figure 2 reveals. For instance, in China's Yunnan Province, the per capita monthly income of residents in rural areas was only one-fourth of that in urban areas (National Statistics Bureau of China, 2019).

### 2.3. Content and Services

The richness and variety of content and services that the internet can provide will also be an important measure of digital infrastructure. Technically speaking, access to the internet is access to the online resource. From the end-user's perspective, it is not the raw data or resource, but the information after filtering and verification, that will be most useful. The more content people can access online, the more they will use the internet and the more information people will post on it.

The first three columns of Table 4 review the development of e-finance, e-health, and e-commerce content based on the Economic Intelligence Unit survey and rating (EIU, 2019). Feedback from interviewees showed little difference between countries in the field of e-finance development. The development of e-health seems to be more advanced in Myanmar, Thailand, and Viet Nam than in China and Cambodia. Most interviewees in

China and Thailand are satisfied with the richness of e-commerce content. In comparison, e-commerce in Cambodia and Myanmar seems to be at the early stage of development.<sup>24</sup>

**Table 4: Content of the Internet, Qualitative Rating, and Score**

Country	E-finance content (0–2, 2 = best)	E-health content (0–3, 3 = best)	E-commerce content (0–100, 100 = best)	E-participation index (0–1, 1 = best)
Cambodia	2	2	29	0.25
Lao PDR	n.a.	n.a.	n.a.	0.17
Myanmar	2	3	23	0.13
Thailand	2	3	68	0.65
Viet Nam	2	3	50	0.69
China	2	2	60	0.90

Lao PDR = Lao People’s Democratic Republic, n.a. = not available.  
Sources: EIU (2019); United Nations (2018).

The last column of Table 4 – the United Nations E-Participation Index – compares the quality, relevance, and usefulness of governments’ use of online services in providing information to their citizens as well as their interaction with stakeholders and involvement in decision-making processes. It shows that CLM lags behind in promoting online public services and citizen engagement, which is an important element of internet development. In general, the status of CLM’s e-government is much lower than either the world average value or that of ASEAN (Chen, 2020).

#### 2.4. Security and Reliability

Cybersecurity measures are necessary to ensure the free flow of data with trust. Possible cyberthreats include theft (of identity, personal data, or secrets); infringement of intellectual property rights; denial of service; leakage of private information; and disruption of critical infrastructure. The level of organisation and sophistication of cyberthreats has increased significantly (OECD, 2012). In terms of digital connectivity, it is important to improve security in ‘cyberspace’ and prevent users from incurring losses due to malicious cyberactivity.

Table 5 contains two indices: CyberGreen’s index of online security and the Global Cybersecurity Index for GMS countries. CyberGreen’s index focuses on the technical aspect, based on the presence of five types of open services (NTP, DNS, SSDP, SNMP, and CHARGEN)<sup>25</sup> in a country and their respective amplification factors. The Global Cybersecurity Index reflects a country’s systematic approach to improve cybersecurity

<sup>24</sup> No data are available for the Lao PDR either because the country was not included in the EUI (2019) survey or due to insufficient feedback.

<sup>25</sup> NTP = Network Time Protocol, DNS = Domain Name System, SSDP = Simple Service Discovery Protocol, SNMP = Simple Network Management Protocol, and CHARGEN = Character Generator Protocol.

through (i) legal measures, (ii) technical measures, (iii) organisational measures, (iv) capacity building, and (v) cooperation.

**Table 5: Cybersecurity – Potential Risks and Preparedness**

Country	CyberGreen’s index of online security			GCI		
	Score (0–1, 1 = best)	Ranking (Out of 244)	Potential risk level	Score (0–1, 1 = best)	Ranking (Out of 175)	Level of commitment
Cambodia	0.30	72	High	0.16	131	Low
Lao PDR	0.56	136	Moderate	0.19	120	Low
Myanmar	0.48	117	Moderate	0.17	128	Low
Thailand	0.08	20	High	0.79	35	High
Viet Nam	0.14	35	High	0.69	50	High
China	0.01	2	High	0.83	27	High

GCI = Global Cybersecurity Index, Lao PDR = Lao People’s Democratic Republic.

Source: Author. Based on Estonian e-Governance Academy (2019) and CyberGreen (2020).

In the GMS, the three most advanced countries in digitalisation (China, Thailand, and Viet Nam) all face a relatively high cybersecurity risk, while the risk in the Lao PDR and Myanmar is classified as moderate. This suggests that the increasing popularisation of internet use and the rising potential of cyberthreats go hand in hand. There is a clear benchmark for the GMS countries’ commitment to implement cybersecurity measures – CLM has a low level of commitment, while the others have a high level of commitment.

Cambodia is of particular concern, as it faces a high level of risk but has a low level of commitment to improve cybersecurity. From a regional perspective, Cambodia’s cybersecurity needs to improve. Otherwise, potential cyberattacks could start at the weakest link and spill over to the regional digital ecosystem. Unbalanced cybersecurity development would hinder regional data flows and increase the cost and risk of doing business online. Improvements in national capacity to adopt and integrate cybersecurity will require efforts in areas such as law enforcement, education, intra-state cooperation, and public–private partnerships.

## 2.5. Policy Discussion

Economies of scale in ICT infrastructure are significant. The fixed cost of building, maintaining, and upgrading telecom networks is high – requiring large capital, technological, and managerial inputs. The cost of expanding existing networks is usually lower than that of constructing a new network from the ground. Once the network is established, the cost of adding new users tends to be marginal. In terms of digitalisation in the GMS, market mechanisms may not be sufficient to promote ICT infrastructure due to geographical remoteness, immature market economies, and the consequent relatively low return on investment. In this regard, subregional cooperation in joint projects and network sharing will be encouraged. For all participants, cross-border collaboration could

help avoid unnecessary overlapping in infrastructure and make it easier to reach the desired scale to ensure that projects are profitable and sustainable.

For instance, to improve the affordability of data connectivity in the GMS, intergovernmental cooperation or/and public–private partnerships in ICT infrastructure building are necessary but not sufficient. To drive down the cost of mobile data, international cooperation and policy coordination are also needed to promote fair competition amongst internet service providers.

Cooperation in e-government tends to have deep implications for GMS development as well. Basically, it is highly recommended that GMS parties place more emphasis on providing information to their citizens, interacting with stakeholders, and engaging in decision-making processes. It is worth noting that low national incomes and limited government resources or capacity need not be obstacles to e-government (Chen, 2020). Changing the mindset, of both the government and the public, is the most important task. On the one hand, better access to online public services will increase public awareness of policies and regulations and facilitate their implementation and enforcement. On the other hand, feedback via the online platform helps policymakers make decisions and take action more quickly in response to public needs.

Two sectors – e-finance and e-healthcare – may require particular attention when considering improving the digital connectivity of the GMS since they are both very relevant to people’s daily lives. Digital tools and apps in these areas provide alternatives for users, especially remote or less developed villages, to obtain access to online resources. All users tend to benefit from cross-border cooperation that increases the richness and variety of information and services. In a recent study, Walsh (2019) showed that many people in Myanmar use their mobile phones to access online healthcare information or receive telemedicine from Thai or Vietnamese doctors.

### **3. Free Flow of Data with Trust in the GMS**

Institutional efforts to improve data connectivity are equally critical, if not more important than, digital infrastructure. One must bear in mind that cyberspace was created to be borderless. Rules and regulations in cyberspace are supposed to deal with issues related to privacy, cybersecurity, or sensitive national interests to protect and facilitate data flows on the internet instead of posing artificial obstacles to their free flow.

The establishment of international rules and regulations will enhance market drivers and strengthen such connectivity. This calls for multilayered cooperation, including public–private partnership, inter-institutional cooperation, subregional cooperation, and coordination amongst different government departments.

#### **3.1. International Rule Setting for Data Flows**

Globally, there are multiple approaches to data connectivity. Multilateralism will be the best option for rule setting given its fundamental role in global trade governance. Some



related rules are in existing World Trade Organization (WTO) agreements,<sup>26</sup> but a multilateral agreement on governing cross-border data flows has not yet been agreed. Asian countries are active in pushing forward WTO talks on digital trade. On the impetus of Australia, Japan, and Singapore, 70 WTO members signed the Joint Statement on Electronic Commerce at the 11th WTO Ministerial Conference in Buenos Aires in December 2017; and some 76 WTO members agreed to commence e-commerce talks on 25 January 2018.

The multilateral trade talks are progressing slowly because of significant differences amongst WTO members. For instance, while the European Union (EU) and Singapore focus on establishing an e-commerce enabling environment, others such as Japan, Brazil, and the United States want to discuss the enabling environment more extensively for various flows related to digital trade. As for the goals of the talks, some want clear rules governing the exchange of data, others think about how to facilitate data-driven growth, and still others are more focused on bolstering e-commerce.

The alternative free trade agreement (FTA) approach seems to progress at a faster pace. In addition to the ASEAN Agreement on Electronic Commerce, which contains non-binding provisions on cross-border data issues, the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), EU–Japan Economic Partnership Agreement, and the recent Singapore–EU FTA all include binding provisions on cross-border data flows. The CPTPP makes the free flow of data a default and requires member states to establish rules to protect the privacy of individuals and firms. It bans data localisation (requirements that data be produced or stored in local servers) and prohibits forced sharing of source codes. In the EU–Japan Economic Partnership Agreement, both parties agreed to recognise each other’s data protection systems as ‘equivalent’, allowing data to flow safely between the EU and Japan. In the 2019 Singapore–EU FTA, cross-border data flow is treated as part of cross-border services. Each party has made commitments on protecting privacy and personal data, including individual records and accounts, with appropriate safeguard measures.

All three FTAs contain exceptions, which may help governments achieve legitimate domestic policy objectives, including rules to protect public morals, public order, public health, public safety, and privacy related to data processing and dissemination. However, governments can only take advantage of the exceptions if they are necessary, performed in the least trade-distorting manner possible, and do not impose restrictions on the transfer of information that are greater than what is needed to achieve that government’s objectives.

### **3.2. Institutional Cooperation**

Table 6 lists some policy plans that have been published or drafted by GMS parties. These plans have common interests and targets of digital development, such as

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<sup>26</sup> Such as the General Agreement on Tariffs and Trade (GATT), the General Agreement on Trade in Services (GATS), the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), the Agreement on Technical Barriers to Trade, and the Information Technology Agreement (ITA and ITA2).

telecommunications infrastructure for high-speed internet, higher internet coverage, a high level of internet access and affordability, and higher human capacity. This will, to a great extent, pave the way for subregional cooperation amongst all parties involved. Moreover, the governments' establishment of special administrative units for digital development tends to increase the efficiency of cooperation in various areas related to the improvement of cross-border digital connectivity, from internet infrastructure to rule setting for regulations.

**Table 6: Digital Development Plans**

<b>Country</b>	<b>Authority</b>	<b>Policy plan</b>
Cambodia	<ul style="list-style-type: none"> <li>• Ministry of Posts and Telecommunications</li> <li>• Telecommunication Regulator of Cambodia</li> </ul>	<ul style="list-style-type: none"> <li>• Policy for the Development of Telecommunication/ICT, 2020</li> </ul>
Lao PDR	<ul style="list-style-type: none"> <li>• Ministry of Post and Telecommunications</li> <li>• Lao Telecommunication Regulatory Authority</li> </ul>	<ul style="list-style-type: none"> <li>• 2nd Five-Year Development Plan of Posts and Telecommunications Sector, 2016–2020</li> <li>• ICT Vision 2030</li> </ul>
Myanmar	<ul style="list-style-type: none"> <li>• Ministry of Transport and Communications</li> <li>• Myanmar Communications Regulatory Commission</li> </ul>	<ul style="list-style-type: none"> <li>• Telecommunications master plan (draft)</li> <li>• Universal Service Strategy for Myanmar, 2018–2022 (draft)</li> <li>• Myanmar e-Governance Master Plan, 2016–2020</li> </ul>
Thailand	<ul style="list-style-type: none"> <li>• Ministry of Digital Economy and Society</li> <li>• National Broadcasting and Telecommunications Commission</li> </ul>	<ul style="list-style-type: none"> <li>• 12<sup>th</sup> National Economic and Social Development Plan, 2017–2021</li> <li>• Thailand Digital Economy and Society Development Plan</li> <li>• National Broadband Policy</li> </ul>
Viet Nam	<ul style="list-style-type: none"> <li>• Ministry of Information and Communications</li> <li>• Authority of Telecommunications</li> </ul>	<ul style="list-style-type: none"> <li>• National Telecommunications Development Plan</li> <li>• Master Plan of Broadband Infrastructure Development to 2020</li> </ul>
Guangxi, China	<ul style="list-style-type: none"> <li>• Government of Guangxi Zhuang Autonomous Region</li> <li>• Leading group of Digital Guangxi</li> </ul>	<ul style="list-style-type: none"> <li>• Guangxi Digital Development Plan, 2018–2025</li> </ul>
Yunnan, China	<ul style="list-style-type: none"> <li>• Government of Yunnan Province</li> <li>• Development and Reform Committee of Yunnan Province</li> </ul>	<ul style="list-style-type: none"> <li>• Digital Yunan, 2019–2021</li> </ul>

ICT = information and communication technology, Lao PDR = Lao People's Democratic Republic.  
Source: Author.

Regionally, ASEAN has made substantial progress and reached several milestones in rule setting for digital connectivity since 2000. In addition to the establishment of the E-ASEAN Framework Agreement in 2000 and the ASEAN Economic Community Blueprint 2025,

which highlighted the role of ICT development in ASEAN's economic and social transformation, recent progress includes the ASEAN Digital Integration Framework and the ASEAN Agreement on E-commerce in 2018 as well as the ratification of the ASEAN Digital Integration Framework Action Plan, 2019–2025.<sup>27</sup>

### 3.3. Policy Discussion

The real effect of all this digital-promoting policy and cooperation, either globally or regionally, depends on how well these agreements and action plans are implemented. When considering the governance of cross-border data flows, especially that of personal data, there is no common position. Even within ASEAN, Member States hold different attitudes and progress at a different pace in domestic rule setting – Indonesia, Malaysia, the Philippines, and Singapore have recently passed new laws; Thailand is considering such rules; and Brunei Darussalam and CLM have no personal data protection laws and regulations.

While countries such as Singapore are strongly against data localisation measures, many others, such as Indonesia, Malaysia, and Viet Nam, have adopted or are considering laws requiring that data generated locally on their citizens and residents be kept within their geographical boundaries and remain subject to domestic law. For instance, the cybersecurity law that entered into effect in Viet Nam in early 2019 allows the government to regulate the data processing methods of technology companies that operate in the country and restrict the internet connections of users who post 'prohibited' content online. Improving regional digital connectivity requires countries to change their mindsets and adopt more open policies on data.

In principle, improving digital connectivity requires substantial efforts regarding (i) rules and regulations to support digital connectivity, (ii) policy action plans to allow new technologies and business models to increase inclusiveness, and (iii) the harmonisation of countries' national strategies and the masterplan of regional cooperation and development.

GMS parties will consider collaborating closely in related areas and if possible, provide prototype experience for regional cooperation in ASEAN and East Asia. For policy supporting data connectivity, Kimura et al. (2019) suggested free flow of data supported by a series of policies to accelerate digital transformation in a policy brief for G20 leaders. The proposed policy framework will be a useful reference for further institutional efforts on promoting digital connectivity in the GMS.

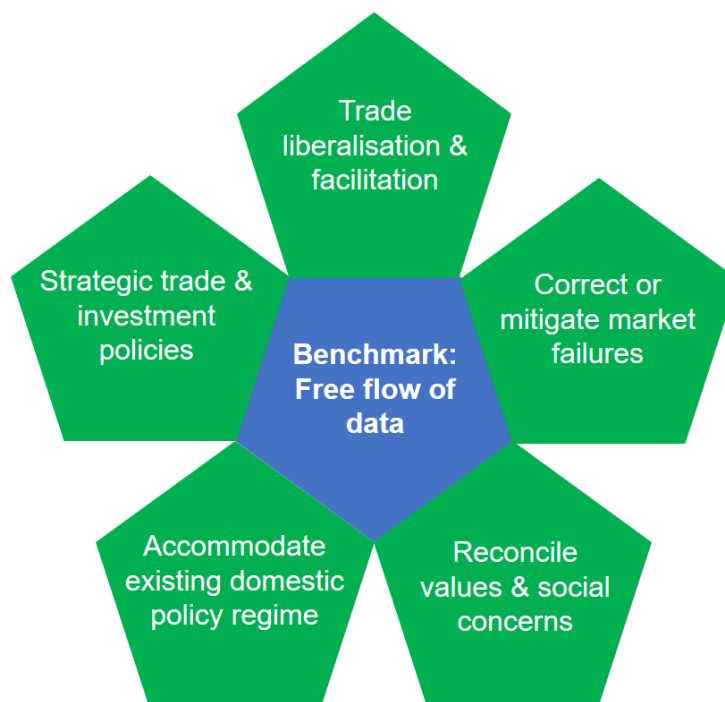
As Figure 3 illustrates, the Kimura et al. (2019) framework places free flow of data as a logical benchmark and classifies supporting policies into five categories. The first category contains policies related to trade liberalisation and facilitation. International trade and production sharing will play an important role in GMS development, which requires continuous effort on tariff elimination, the removal of nontariff measures, service

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<sup>27</sup> The ASEAN Digital Integration Framework Action Plan emphasised (i) trade facilitation, (ii) data protection for digital trade, (iii) digital payments, (iv) the digital workforce, and (v) digital entrepreneurship.

liberalisation, and trade facilitation. For each GMS party, step one of fast growth is to become more deeply involved in the economic corridor(s) and to 'link up' with underlying production value chains by adopting instruments that promote digital trade, such as duty-free electronic transmissions, e-signatures and e-authentication, and de minimis tariff exemptions.

**Figure 3: Policy Framework for Free Flow of Data with Trust**



Source: Author. Based on Kimura et al. (2019).

The second concern is about the potential market failure. In the data-driven economy, potential market failure may come from network externalities, economies of scale, information asymmetry, or any combination of these conditions. Policy efforts on competition policy, consumer protection, and intellectual property rights protection will be needed to cope with the market distortion.

Broadly, digital transformation occurs not only in the economic domain, but also in the socio-cultural dimension. This requires the establishment and implementation of international norms on the free flow of data to reconcile values and social concerns regarding economic efficiency, especially from the aspect of data privacy protection and cybersecurity.

The fourth category consists of international-domestic policy synchronisation in accommodating data flows and data-related affairs to support the incorporation of new technologies, such as artificial intelligence and financial technology (fintech), in the economy and society. In particular, related decisions in the context of GMS cooperation

will accommodate all parties' domestic regimes and seek a balance between market efficiency and fairness from a (sub-)regional perspective.

Finally, the digital economy tends to provide a novel angle for inclusive growth. The GMS, at least part of the region, will be able to create opportunities to leapfrog to a new paradigm of globalisation (the third unbundling) with proper strategic trade and investment policies to nurture their own industries in new data-related business. In this process, some measures may look similar to those of infant industry protection and require consensus or/and mutual understanding amongst all parties involved.

#### **4. Concluding Remarks**

Digitalisation will have important implications for the future development of the GMS. Digitalisation has the potential to create the opportunity for fast growth; and certain conditions will be needed to unlock such potential. Regarding GMS development, improving digital connectivity is a fundamental task, of which data connectivity will be a priority. In particular, policymakers shall pay particular attention to bridging the possible digital divide associated with the existence of development gaps in the region. In addition to digital infrastructure building, another policy focus is to facilitate data flows and unleash the power of data. Subregional cooperation and collaboration need to be enhanced in three dimensions.

*First, subregional cooperation in ICT infrastructure building and related logistic construction.* Digital connectivity is a broad concept. In general, improving digital connectivity requires substantial efforts on improving connectivity infrastructure in both the physical world and cyberspace, rule setting to support a development-friendly ecosystem for digitalisation, and combining countries' national strategies and regional collaboration in eliminating institutional barriers.

*Second, public-private partnerships in capacity building and mitigating market inefficiency.* Due to the GMS's overall stage of development and the existence of development gaps, capacity building to support latecomers' catching-up process is highly recommended. For data connectivity and digital infrastructure, obstacles may come from capacity and resource limits, either capital or technology or both. The public sector may still need to take the lead to initiate and drive the increased supply of public goods in both quantity and quality. Private sector involvement will be equally important to make the development sustainable.

*Third, information sharing in support of production sharing and economic cooperation.* Data and information available on the internet shall be the new resource of development. It will be a new element of GMS cooperation to enhance data connectivity and share online resources, of which a critical step is realising free flow of data with trust. An integrated digital ecosystem will have deep implications for GMS development through its efforts on facilitating trade and investment and accelerating the adoption of new technologies, new digital tools, and new business models in the region.

## References

- Baldwin, R. (2016). *The Great Convergence: Information Technology and the New Globalization*. Cambridge, MA: The Belknap Press of Harvard University Press.
- Chen, L. (2017), 'Developing Asia in the Era of Cross-border E-commerce', *ERIA Discussion Paper Series*, DP-2017-11. Jakarta: Economic Research Institute for ASEAN and East Asia.
- Chen, L. (2019), 'ASEAN in the Digital Era: Enabling Cross-border E-commerce', in L. Chen and F. Kimura (eds.), *Developing the Digital Economy in ASEAN*. Abingdon and New York, NY: Routledge, pp.259–75.
- Chen, L. (2020), 'Improving Digital Connectivity for E-Commerce: A Policy Framework and Empirical Note for ASEAN', *ERIA Discussion Paper Series*, No. 327. Jakarta: Economic Research Institute for ASEAN and East Asia.
- CISCO (2019), 'Cisco Global Cloud Index 2018'.  
[www.cisco.com/c/en/us/solutions/collateral/service-provider/global-cloud-index-gci/white-paper-c11-738085.html](http://www.cisco.com/c/en/us/solutions/collateral/service-provider/global-cloud-index-gci/white-paper-c11-738085.html) (accessed 20 March 2019).
- CyberGreen (2020), 'CyberGreen DDoS Rank'. <https://stats.cybergreen.net/> (accessed 20 January 2020).
- EIU (2014), *The ICT Globalisation Index*. London: The Economist Intelligence Unit.  
[https://eiuperspectives.economist.com/sites/default/files/EIU\\_The ICT Globalisation Index\\_0.pdf](https://eiuperspectives.economist.com/sites/default/files/EIU_The ICT Globalisation Index_0.pdf) (accessed 29 September 2019).
- EIU (2019), *The Inclusive Internet Index*. London: The Economist Intelligence Unit.  
<https://theinclusiveinternet.eiu.com/> (accessed 16 December 2019).
- Estonian e-Governance Academy (2019), *E-Governance Academy YearBook 2018*. Tallinn: e-Governance Academy. [https://ega.ee/wp-content/uploads/2019/03/E-gov\\_yearbook\\_2019\\_ENG.pdf](https://ega.ee/wp-content/uploads/2019/03/E-gov_yearbook_2019_ENG.pdf) (accessed 16 December 2019).
- GSMA (2019), *The State of Mobile Internet Connectivity 2019*.  
<https://www.gsma.com/mobilefordevelopment/resources/the-state-of-mobile-internet-connectivity-report-2019> (accessed 16 December 2019).
- IDC (2018), *Worldwide Mobile Device Trackers*.  
<https://www.idc.com/getdoc.jsp?containerID=prUS44529618> (accessed 16 December 2019).
- ITU (2019), *Measuring the Information Society Report 2018 – Volume 2*. Geneva: International Telecommunication Union.
- Kimura, F. (2018), 'Unbundlings' and Development Strategies in ASEAN: Old Issues and New Challenges', *Journal of Southeast Asian Economies*, 35(1), pp.13–21.
- Kimura, F. and L. Chen (2018), 'Value Chain Connectivity in Indonesia: The Evolution of Unbundlings', *Bulletin of Indonesian Economic Studies*, 54(2), pp.165–92.
- Kimura, F. et al. (2019), 'The Digital Economy for Economic Development: Free Flow of Data and Supporting Policies', *Policy Brief for T20 Summit 2019*. Tokyo: Think20 (T20). [www.g20-insights.org/wp-content/2019/05/t20-japan-tf8-4-digital-economy-economic-development.pdf](http://www.g20-insights.org/wp-content/2019/05/t20-japan-tf8-4-digital-economy-economic-development.pdf) (accessed 15 November 2019).

- National Statistics Bureau of China (2019), *China Statistical Yearbook 2019*.  
[www.stats.gov.cn/English/statisticaldata](http://www.stats.gov.cn/English/statisticaldata) (accessed 16 December 2019).
- Ng, T., C. Lye and Y. Lim (2013), 'Broadband Penetration and Economic Growth in ASEAN Countries: A Generalized Method of Moments Approach', *Applied Econometrics Letters*, 20(9): 857–62.
- OECD (2012), 'Cybersecurity Policy Making at a Turning Point: Analysing a New Generation of National Cybersecurity Strategies for the Internet Economy', *OECD Digital Economy Papers*, No. 211. Paris: Organisation for Economic Co-operation and Development.
- Schwab, K. (2016), *The Fourth Industrial Revolution*. Geneva: World Economic Forum.
- United Nations (2018), *United Nations E-Government Survey 2018: Gearing E-Government to Support Transformation towards Sustainable and Resilient Societies*. New York, NY: United Nations.
- Walsh, J. (2019), 'Internet Services and the Potential for Market Access for Rural Agricultural Households in Myanmar and Viet Nam', in L. Chen and F. Kimura (eds.), *Developing the Digital Economy in ASEAN*. Abingdon and New York, NY: Routledge, pp.232–55.
- World Bank (2009), *Information and Communications for Development 2018: Data-Driven Development*. Washington, DC: World Bank.
- World Bank (2019), *World Development Indicators 2019*. Washington, DC: World Bank.

## Small And Medium-Sized Enterprises In The Mekong Subregion

*Dionisius Narjoko*

Small and medium-sized enterprises (SMEs) play an important role in sustaining growth and helping to distribute it more equally amongst people in a country. They are part of the building blocks of a country's economic structure, contributing significantly to job creation and employing a large portion of the labour force. This is also true for SMEs in the Association of Southeast Asian Nations (ASEAN) Member States (AMS) in the Mekong Subregion, especially those that are moving toward middle-income status and starting to join more sophisticated industrialisation in the context of greater East and Southeast Asian economic integration.

This chapter focuses on SMEs in the Mekong Subregion and tries to come up with ideas on how to help SMEs in the region contribute to the region's sustainable and inclusive growth. The next section briefly describes the relevant implemented SME policies by AMS in the subregion and the SME sector in each of these AMS. It is followed by the section that outlines the major challenges faced by the SMEs and the general ideas (recommended strategies) on how to overcome these challenges in the context of achieving the overall subregion sustainable and inclusive growth.

### **1. SME Policies of AMS in the Mekong Subregion**

The ASEAN SME Policy Index 2018 (OECD/ERIA, 2018) depicted the scope and depth of SME policies implemented in the AMS. The following section summarises it for AMS in the Mekong Subregion, covering the policies which are most relevant to innovative and sustainable growth.

#### **1. 1. Productivity Measures**

Policy to improve productivity is critical for SME development, as it is typically embedded in national SME development plans. Thailand has a stand-alone strategic plan on productivity enhancement that consolidates various programmes and policies in this area. In the Lao People's Democratic Republic (Lao PDR), productivity enhancement is included as the first pillar of the country's new SME Development Plan, 2016–2020.

Public–private dialogue is regularly conducted during the implementation of productivity enhancement programmes in all the subregion's AMS except Cambodia and the Lao PDR. However, in terms of frequency of dialogue, some countries have large gaps between targets and the actual activities conducted. In Myanmar, for example, while public–private dialogue is conducted every 2 months, it only takes place in three to four out of seven regions.



All member states in the Mekong Subregion, as in other AMS, have instruments for enhancing SME productivity. These instruments tend to be mostly financed by the government, although organisations such as the Asia Productivity Commission often provide support. In all member states except Thailand, instruments can also be co-financed by development partners. In Myanmar, for instance, programmes are run by the United Nations Industrial Development Organization and the Japan International Cooperation Agency. Where programmes rely on donor support, stakeholders should ensure that they are sustainable in the long run.

SME business development services (BDS) are crucial to facilitate productivity upgrading for SMEs. Institutional development of BDS has been remarkable in the past 10 years or so. More and more private BDS providers are available in AMS in the Mekong Subregion as well as in the other AMS, reflected in the high growth of BDS such as incubators, accelerators, and co-working spaces. Many of these BDS are run by private sector providers.

Various types of BDS delivery channels are available for AMS. However, for the Lao PDR, Myanmar, and Viet Nam, these have traditionally been developed through government agencies such as SME development centres, where services are delivered through donor-driven programmes, non-governmental organisations, and public employees. This is often necessary due to a lack of private sector providers and insufficient awareness or resources amongst SMEs to obtain external support. Such services are often delivered free of charge or for a nominal fee by SMEs. While these mechanisms create awareness amongst SMEs, they often have to provide standardised services, which have limited impact and often lack sustainability.

With increased development, ASEAN governments are increasingly turning to private suppliers to deliver BDS. While market-oriented channels are generally seen as preferable for the provision of BDS, policymakers should recognise that a certain stage in economic development is necessary for this to be effective. Many AMS use a hybrid model in which the government provides a number of services free of charge, but also collaborates increasingly with private sector providers. Thailand has implemented this hybrid model, through the establishment of a 'One Stop Services Centre' even at the local level. SMEs can access some services free of charge at this centre, but they have to turn to private sector providers for more customised support.

## **1.2. Productive Agglomerations and Cluster Enhancement**

Critical policy instruments to promote the participation of SMEs in industrial clusters are generally well placed amongst AMS in the Mekong Subregion. Fiscal incentives to support business cluster zones (e.g. corporate income tax, value-added tax, and withholding tax) are typically well defined. Examples include financial incentives in economic zones, such as special economic zones (SEZs) or export processing zones (EPZs), such as tax-deductible expenses for investment in the construction, operation, or lease of apartments and social infrastructure facilities servicing employees (Viet Nam), and tax reductions and subsidies for innovation and human resources development by firms (Thailand).

Equally important, AMS in the region have the facilities to encourage networking amongst innovative companies, such as science/industrial parks, competitive clusters, or technology centres. However, disparities exist in terms of the level of development and the sufficiency of facilities relative to the needs of the country.

Despite these factors, linkages in the cluster zones amongst SMEs and between SMEs and large enterprises are still not well established, except for Thailand. In this respect, Thailand has a more highly developed SME infrastructure than the other countries. The major implementation issue is typically lack of linkages amongst institutions within the clusters. This contrasts with the foreign direct investment (FDI) policy in the countries, which is relatively open even compared with the other AMS. Implementation issues in linking the institutions are therefore unlikely to maximise the benefit of FDI.

### **1.3. Integration into Global Value Chains**

Policies to deepen and widen the engagement of SMEs in global value chains (GVCs) through production networks across East and Southeast Asia are related to the policies on cluster development. Policies and programmes on integrating SMEs in GVCs are generally well established across the AMS in the Mekong Subregion, but they vary widely. Thailand is the most advanced country in this respect. Its Bureau of Supporting Industries Development under the Ministry of Industry, and the Board of Investment Unit for Industrial Linkage Development, have played a major role in fostering SME participation in GVCs. Associated initiatives have included a free sourcing service provided by the Board of Investment Unit for Industrial Linkage Development, helping both Thai and foreign buyers source parts in Thailand, and business matching activities by the Bureau of Supporting Industries Development in coordination with SME banks.

Viet Nam has moved closer to Thailand, with a mandate from the Vietnamese government to support linkages between multinational enterprises and SMEs, for SMEs engaged in ancillary industries. These measures include business matching through specialised industrial parks and FDI incentives. They are part of a strong political commitment to deepen Viet Nam's participation in regional production networks, which has become particularly pronounced following the country's accession to the World Trade Organisation in 2007. Programmes under these policies are not yet fully operational.

Policies in the other AMS in the region (Cambodia, the Lao PDR, and Myanmar) are gradually being developed, as the countries slowly integrate further along the path to industrial development.

### **1.4. Technology and Innovation Promotion**

As in the other countries, AMS in the Mekong Subregion have highlighted the importance of innovation in their strategic documents. Innovation policy is well articulated in dedicated national innovation policy (Thailand and Viet Nam) or industrial policy (Cambodia, the Lao PDR, and Myanmar). While the policy is clear, coordination between institutions is challenging, as the nature of innovation policy involves various agencies or ministries.

Another challenge for many AMS, especially newcomers, concerns intellectual property. Amongst the AMS in the Mekong Subregion, only Thailand is fully compliant with international standards to date. The other AMS still face a lack of resources and difficulties in enforcing intellectual property legislation, while Myanmar has not yet established laws and regulations governing intellectual property.

The AMS have implemented considerable efforts in the region, despite quite a large variation in the depth and coverage of such efforts. For instance, while Viet Nam has built many high-tech business incubators throughout the country, other AMS (i.e. Cambodia, the Lao PDR, and Myanmar) face credible issues in providing the infrastructure necessary to set up similar business incubators.

AMS in the Mekong Subregion have developed programmes to support SMEs in innovation and to promote collaboration between academia, the private sector and, in some cases, the public sector, although this is evident in Thailand and to some extent in Viet Nam. These programmes include dedicated business support services as well as training, coaching, or business-matching support. The other countries have yet to enter this phase. Financial assistance is available for all AMS in the region, except Thailand. Types of financial assistance include research and development grants and subsidies, capital risk coverage or guarantee schemes, and innovation vouchers.

In short, Cambodia, the Lao PDR, and especially Myanmar have a long way to go to catch up with Thailand and Viet Nam with respect to the coverage and depth as well as the implementation of technology and innovation promotion policy. Nonetheless, these countries could adapt strategies quite quickly and at a much cheaper cost by learning from the success stories of Thailand and Viet Nam as well as the other more advanced AMS.

### **1.5. Entrepreneurial Skills**

All AMS in the Mekong Subregion implement concrete initiatives to upgrade entrepreneurial skills for micro, small, and medium-sized enterprises (MSMEs) in the region. The following are key observations on initiatives being implemented in some AMS in the region.

In Viet Nam, the agencies responsible for these activities are identified, but no concrete programmes have yet been implemented. In the Lao PDR, the Five-Year National Socio-Economic Development Plan, 2016–2020 outlined measures to enhance the capacity of entrepreneurs, but few concrete programmes appear to be in place. However, some activities are incorporated into donor-backed projects, such as the Regional Economic Integration of the Lao PDR into ASEAN, Trade and Entrepreneurship Development project, which is being implemented with German development cooperation through Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). Meanwhile, in Myanmar, entrepreneurship camps and incubators are run by the country's Young Entrepreneurs Association. In Cambodia, the government is setting up a committee to develop entrepreneurship programmes. The country also has several private sector initiatives to nurture entrepreneurs, e.g. those organised by the Young Entrepreneurs Association of Cambodia.

There is a rather large gap in the policy initiatives between countries which are newcomers to ASEAN and the more advanced older members of ASEAN. A typical challenge in the implementation of such initiatives is to integrate entrepreneurial learning programmes into their national education systems, which tend to face greater resource constraints than those of more developed AMS.

## **2. SME Sector of AMS in the Mekong Subregion**

### **2.1. Thailand**

In the aftermath of the Asian Financial Crisis in the late 1990s, which started in Thailand, the government placed SME policies as a top priority as they considered SME development to be of utmost importance and urgency during the recovery period. The policy shift was to stimulate innovative activities and decrease exposure to large enterprises operating in 'sunset (declining) industries', while SME interventions had only been occasionally featured before the crisis.

In 2000, the SME Promotion Act established the Office of SME Promotion (OSMEP) and the National Board of SMEs Promotion as part of promoting SME development. Since then, SME policies have adopted a sectoral approach, prioritising several sectors to be developed while relegating others to a lower degree of importance and urgency.

According to OSMEP (2013), 99.7% of the more than 3 million enterprises in the country in 2016 were SMEs – with only 0.5% of enterprises medium-sized – and only about 0.3% were large enterprises. This signalled a 'missing middle' in the country's production structure. SMEs in Thailand accounted for a significant share of employment (78.5% of total employment) but only 42.2% of gross domestic product (GDP).

During 2007–2012, SMEs contributed an average of 33% of total exports and 38.8% of total GDP at current prices (OSMEP, 2013). Almost one-third of the SMEs were in the manufacturing sector over 2007–2012. Manufacturing SMEs employed around 27.1% of the private sector workforce on average over the same period, and their contribution to total SME GDP was 28.7%.

Other SMEs operated in the wholesale and retail trade sector, which is estimated to account for 41.7% of all SMEs. Hospitality services also account for a high share of SMEs (39.6%), whereas the manufacturing sector only accounts for a 17.3% share. These 2016 numbers showed a shift in the sectoral distribution of SMEs in Thailand from 2013, when almost one-third of SMEs were in the manufacturing sector (OSMEP, 2013). SMEs in Thailand were highly concentrated around Bangkok metropolitan area (27.6% of SMEs), whereas the second highest concentration of SMEs was found in Chonburi (3.4%) and Chiang Mai (3.2%).

Previous studies pointed out several barriers preventing Thai SMEs from increasing their contribution to GDP. Amongst those limitations are a lack of management capabilities, limited support from the government to access broader market and financial resources, inadequate access to skilled labour, and uncertainties regarding government support programmes (Punyasavatsut, 2010).

The contribution of exports to growth and development continues to remain important to the Thai economy, constituting 57%–64% of total GDP over 2007–2012. In terms of the contribution to total exports, Thai SMEs' contribution was equivalent to 18% of GDP by 2012. Large enterprises play a leading role in the country's international trade, but many manufacturing SMEs contributed to this through becoming suppliers in the production networks of large companies.

## **2.2. Viet Nam**

Following the 6<sup>th</sup> National Congress of the Communist Party of Viet Nam in 1986, a series of radical reforms to liberalise the country's economy began to take place. Private enterprise was permitted from 1990 via the Law on Companies and the Law on Private Enterprises, yet FDI was embraced as a motor to drive industrialisation. After being badly affected by the Asian Financial Crisis of 1997, the country's constitution was amended in 2001 to ease the setting up of businesses, and a series of policies aimed at SME development began to emerge.

A decree on support for SME development was enacted in 2001 (No. 90/2001/ND-CP) to provide a definition of SMEs and a legal basis for the establishment of a dedicated SME agency (the Agency for SME Development) and an SME Development Promotion Council. These institutions are responsible for elaborating, coordinating, and implementing SME policies. In 2006, the country's first five-year SME development plan was implemented. It was followed by a new government decree (No. 39/2018/ND-CP) on SME support in 2009, before the Law on Support for SMEs was passed in 2017 to replace all previous decrees on SME support.

When the new Enterprise Law was enacted in 2000, SMEs accounted for 94.6% of the total 41,964 enterprises (GSO, 2001), and the establishment of new enterprises has been rising rapidly since then. In 2015, around 98% of 442,486 enterprises recorded in the country were MSMEs (GSO, 2015) and 72.8% were microenterprises. Meanwhile, the share of large enterprises remained relatively constant, at around 2% since 2007, while medium-sized enterprises constituted an even smaller portion, with only 1.7% of total enterprises in 2015, indicating a missing middle in the production structure. These statistics show that most of the newly established enterprises in Viet Nam are MSMEs (GSO, 2016).

In terms of job creation, MSMEs demonstrated that they have been increasingly dominant in the country's economic structure, increasing from 35% of total employment in 2000 to 51% in 2012 and 64% in 2015. MSMEs also contributed 45% of GDP and around 14.1% of exports, according to customs data. It is important to note that 97% of the total SMEs in Viet Nam were non-state enterprises in 2011 and the ratio of SMEs in non-state enterprises has continuously increased since 2000. This is particularly significant given Viet Nam's past of banning private enterprise from 1976 to 1985 before beginning to transform the country into a market-oriented economy in 1986 (Tran, Le, and Nguyen, 2008).

### 2.3. Cambodia

After the introduction of a comprehensive privatisation programme in the early 1990s, the number of registered manufacturing SMEs had grown from zero to 24,000 by the late 1990s with the support of a largely stable macroeconomic framework and the development of the basic institutions and infrastructure of a market economy (OECD/ERIA, 2018). The country then started to launch strategic documents and institutions to accelerate private sector development, particularly of SMEs.

In 2004, the government launched its Rectangular Strategy, outlining 13 pillars – one of which is SME development – to promote private enterprise, economic growth, job creation, and productivity enhancement. The strategy also established an SME development framework and an SME subcommittee, chaired by the Minister of Industry and Handicraft. The framework was implemented over two phases: the first ran from 2005 to 2007, while the second ran from 2008 to 2010 and focused on regulatory reform. Meanwhile, the SME subcommittee worked to increase the coherency of SME development measures.

Aside from the Rectangular Strategy, the government formulated the Industrial Development Policy, 2015–2025 to achieve its long-term vision of reaching middle-income status by 2030. One of the policy objectives involved capacity enhancement of SMEs to promote manufacturing and agro-processing sectors in the country, and to integrate the manufacturing sector into GVCs. On that note, one pillar of the Industrial Development Policy is focused on developing and modernising SMEs in the manufacturing sector, specifically in the agro-industrial sector.

According to the last economic census by the National Institute of Statistics of Cambodia, 99.8% of Cambodian enterprises in 2014 were MSMEs, mainly microenterprises which employed less than 10 workers (97.6%). However, in terms of job creation, SMEs only accounted for around 71.7% of employment, with microenterprises accounting for 58.3% of employment (National Institute of Statistics, 2015).

Microenterprises in Cambodia tend to be new (61.7% are 1–5 years old), which might indicate a positive signal about the economic development in the country, providing more opportunity and ease for microbusinesses to emerge. Most of the MSMEs are found in the largest economic centres, such as Phnom Penh (23.1%), Siam Reap Province (18.5%), and Battambang Province (8.5%). Based on the 2014 census, microenterprises were mostly concentrated in wholesale and retail activities (60.7%), followed by manufacturing (14.0%) and accommodation and food service activities (10.9%). Meanwhile, SMEs are mostly found in education (33.7%) and manufacturing (13.5%) activities. MSMEs are also more likely to be owned by Cambodian nationals, while a significant portion of large enterprises (47.4%) are owned by foreigners, particularly Chinese nationals (who own 24.4% of large enterprises) (National Institute of Statistics, 2015).

## 2.4. Lao PDR

Like its neighbouring countries, commercial activity by individuals and private enterprises was banned in the Lao PDR until 1979. Following the introduction of the New Economic Mechanism in 1986, the Lao PDR began to move towards economic liberalisation. Under the Enterprise Law enacted in 1994, a legal definition and foundation for private enterprise, including SMEs, were laid down.

A breakthrough in terms of policy focus on SME development occurred in 2004, with the Decree on the Promotion and Development of Small and Medium Sized Enterprises (No. 42/PM), along with the establishment of the SME Promotion and Development Committee and the SME Promotion and Development Office. From 2007 to 2009, the Lao PDR implemented a project on private sector development, focusing on SMEs, supported by the Asian Development Bank (ADB).

This project ushered in many of the Lao PDR's institutions and policies on SMEs. Its successor project, the Second Private Sector and Small and Medium-Sized Enterprises Development Program, implemented from 2009 to 2011, established a monitoring and evaluation unit within the SME Promotion and Development Office to assess the implementation of the Office's strategy. Under the same project, the Law on the Promotion of Small and Medium Sized Enterprise was also enacted in 2009. Since then, SME policies have increasingly become a priority in policymaking, in collaboration with external development partners such as ADB, the World Bank, and GIZ. Nevertheless, several challenges remain to be addressed. A survey by GIZ (2014) pointed out that the most significant external constraint for enterprises in the Lao PDR is high taxes and duties, whereas the most important internal constraint is lack of capital (GIZ, 2014).

According to the country's 2013 Economic Census, which covered around 75% of registered enterprises, almost all of them (99.8%) were classified as SMEs. Around 86% of these SMEs were microenterprises, employing not more than five workers. This and data from other surveys (GIZ, 2014) indicated a missing middle in the country's production structure, which might have significantly hindered SMEs from expanding. Surveys suggest that very few private Laotian enterprises export, exacerbating the fact that Laotian enterprises have access only to a small domestic market for goods and services (GIZ, 2014).

Although data are not collected on SME contributions to common economic measures such as GDP or value added, the available statistics show that Laotian SMEs have played quite a significant role in terms of job creation, accounting for around 82.2% of total private sector employment, according to the 2013 census conducted by Lao Statistics Bureau (2013). When it comes to geographical distribution, SMEs appear to be concentrated in the country's three most populous regions – Vientiane prefecture, Savannakhet Province, and Champasak Province – which together accounted for almost 50% of MSMEs in the Lao PDR (Lao Statistics Bureau, 2013). Most SMEs tend to be concentrated in wholesale and retail trade (46% of small enterprises and 69.4% of microenterprises), followed by manufacturing activities (19.4% of small enterprises and 11.2% of microenterprises) and accommodation and food services (17.5% of small enterprises and 11.2% of microenterprises).

## 2.5. Myanmar

Myanmar is at a very early stage of developing SME policies, and the institutional framework for SME policy is still rather fragmented. After lifting the private enterprise ban in 1990 through the Private Industrial Enterprise Law, a few targeted SME policies were implemented during 1990–2010, one of which led to the establishment of the Small and Medium Industrial Development Bank in 1996. Under President U Thein Sein, a Central Committee for SME Development was set up in 2012, followed by the enactment of SME Development Law in 2015. From the end of 2015 until 2018, however, SME development policies did not appear to be amongst the top priorities. The SME committee is required by law to meet twice a year, but it has met only once since it was established. On a brighter note, the government is close to finalising an institutional structure for SME policy in Myanmar (OECD/ERIA, 2018).

Although the government does not have a working strategy for SME development in place, several SME policies and programmes have emerged – albeit often embedded in a more general framework. For example, in 2015, the Ministry of Commerce launched a National Export Strategy to foster export-led growth under which export-oriented SMEs could obtain favourable consideration. In the absence of specific government interventions to tackle SME development issues, initiatives have usually emerged through support from external development partners such as the United Nations Industrial Development Organisation, which conducted a project in 2014 to boost SME competitiveness through business linkages establishment, and a European Union-funded project during 2016–2019 called SMART Myanmar (SMEs for Environmental Accountability, Responsibility and Transparency) to help local garment SMEs export their products to European Union countries. Limited government budget and a high degree of informality are amongst the main impediments faced by the government in developing more coherent and strategic measures for supporting SME development.

Data are scarce on MSMEs in Myanmar, but the latest available statistics have indicated that MSMEs are also dominant in Myanmar, with 99.4% of around 127,000 registered enterprises counted as MSMEs in 2016, while some 620,000 unregistered firms are estimated to be operating in the country (Bernhardt, De, and Dickenson-Jones, 2019). Amongst the firms which were registered with the Ministry of Industry as of 2017, 87.1% of them were micro and small enterprises and 18.9% were medium-sized firms, which was a relatively high proportion. Some estimates on the contribution of SMEs to the economy accounted for around 80% of employment (OECD/ERIA, 2018).

In terms of sectoral distribution, it was estimated that around 78% of MSMEs in Myanmar operated in the manufacturing sector (cottage handicrafts) and about 21% in the service sector in 2015. MSMEs outside cottage industries accounted for about 90% of food processing SMEs while an additional 7.6% of the total SMEs operated as construction material producers, followed by 5.1% as mineral and petroleum producers and 4.5% as garment firms (ADB, 2015). Nonetheless, a survey by the German Institute for Development Evaluation (DEval, 2015) on SMEs in Myanmar suggested that only 54% of firms were engaged in the manufacturing sector, while the remaining 46% were in the



services sector – mainly in restaurants and hotels (16%) and retail (14%). Within manufacturing, most SMEs were found in machinery and equipment, vehicles and metal production (12%), food and beverages or tobacco production (12%), and textile and/or shoes production (10%) (DEval, 2015). However, this survey did not cover the agricultural sector, so the picture was incomplete.

### **3. Challenges and Policy Recommendations to Achieve Sustainable and Inclusive SME Development**

The description of the SME sector and SME policy of the Mekong Subregion countries above highlights two major challenges for all countries in the region to achieve sustainable and inclusive growth with the adoption of information and communication technology and digital connectivity.

The first is the distinct variation in the level of SME sector development amongst the countries in the subregion. Micro and cottage industry enterprises still dominate the sector in Cambodia, the Lao PDR, and Myanmar – typically with a lower degree of sophistication than those of microenterprises in Viet Nam and Thailand (as stated above, microenterprises are also dominant in the SME sectors of Viet Nam and Thailand). Many of these micro and cottage industry enterprises typically operate in the low-skill services and low-technology agriculture sector. Arguably, only SMEs in Thailand are relatively well connected with large companies' parts of regional or global production networks in manufacturing. SMEs in Viet Nam are catching up in terms of participation in the production networks, followed by SMEs in Cambodia. Consequently, SMEs in Thailand and Viet Nam, especially those engaged in manufacturing operations, are more sophisticated and technology-intensive than those in Myanmar, the Lao PDR, and Cambodia. Overall, there will also be a different pace in the development of SMEs amongst the four countries. SMEs in Thailand and Viet Nam could move faster than SMEs in the other three countries because they have accumulated more and better knowledge and technology.

Second, the difference in the structure and level of technology adoption of SMEs between the four countries underlines the difference level of the 'unbundling regime' between the countries. Thailand and Viet Nam to some extent are already in the second unbundling regime, while Myanmar, the Lao PDR, and Cambodia are about to engage, or have just began to engage, in the second unbundling regime, typically through the development of transport or machinery industry. This further highlights the high degree of difference in the institutional setting for industrialisation as well as for development. As described briefly, Thailand and Viet Nam to some extent have established robust agencies, laws, and regulations for receiving FDI, complemented by the establishment of institutions in the trade regime to facilitate the production network model assumed by the unbundling regimes. The other countries, meanwhile, are catching up to establish the institutions needed to engage fully in the second unbundling. Catching up may be less difficult than envisaged, as these countries have permitted private sector engagement in their SME development framework, and their participation in the ASEAN integration process helps them significantly in reducing the 'learning time' in establishing appropriate institutions.

These challenges clearly demand policy intervention for SMEs to be able to contribute to the outcome of sustainable and inclusive growth in the Mekong Subregion. This chapter provides the following recommendations for policy directions:

- Further liberalise the investment and trade regime in lagging countries (i.e. Myanmar, the Lao PDR, and Cambodia).  
This is in the context of increasing investment in SMEs to reach the level of SME development of the more advanced countries (i.e. Thailand and Viet Nam).
- Maximise the role of BDS in SME development, especially as a policy instrument to encourage the growth of micro and small enterprises.
- Provide more training for SMEs, especially to improve entrepreneurial skills which are very relevant for promoting the growth of micro and small enterprises.
- Encourage the creation of BDS by the private sector and mainstream further participation of the private sector in upgrading the productivity of SMEs. This could be done by providing incentives for private investment in BDS for SMEs.
- Invent workable programmes that can establish the linkage between SMEs and all actors in industrial clustering within industrial agglomerations.  
This is especially relevant for the linkage between SMEs and large corporations or multinational enterprises which are typically engaged in international production networks.
- Open up digital-related sectors, including telecommunications, retail, and logistics services.  
This is important to adopt a leapfrogging approach of moving up the unbundling path (Kimura, 2018), but applied locally and typically in the SME sector. The leapfrogging approach is defined as a situation whereby countries skip certain stages and directly jump to a higher level of unbundling (Kimura, 2018: 19). This policy direction is important for AMS in the region to consider in the context of applying information and communication technology and digital connectivity. A leapfrogging strategy for SME development implies that SMEs need to adopt digital technology in their business model.

## References

- ADB (2015), *Asia SME Finance Monitor 2014*. Manila: Asian Development Bank.
- Bernhardt, T., K. De and G. Dickenson-Jones (2019), 'Myanmar SMEs' Participation in ASEAN and East Asian Regional Economic Integration: with a Focus on Processed Food and Apparel Manufacturing', C. Lee, D. Narjoko, and S. Oum (eds.), *SMEs and Economic Integration in Southeast Asia*. Singapore: ISEAS., pp.170-286.
- DEval (2015), *Small and Medium Enterprise Survey Myanmar 2015*. Bonn: German Institute for Development Evaluation.
- GIZ (2014), *HRDME Enterprise Survey 2013 for Lao PDR*. Vientiane: Deutsche Gesellschaft für Internationale Zusammenarbeit.
- GSO (2001), *Statistical Yearbook 2000*. Hanoi: General Statistics Office of Viet Nam.
- GSO (2015), *Statistical Yearbook 2014*. Hanoi: General Statistics Office of Viet Nam.
- GSO (2016), *Statistical Yearbook 2015*. Hanoi: General Statistics Office of Viet Nam.
- Kimura, F. (2018), 'Unbundlings' and Development Strategies in ASEAN', *Journal of Southeast Asian Economies*, 35(1), pp.15–23
- Lao Statistics Bureau (2013), *Economic Census of Lao PDR*. Vientiane: Lao Statistics Bureau.
- National Institute of Statistics (2015), *Cambodia Inter-Censal Economic Survey 2014*. Phnom Penh: National Institute of Statistics.
- OECD/ERIA (2018), *SME Policy Index: ASEAN 2018: Boosting Competitiveness and Inclusive Growth*. Paris: OECD Publishing; and Jakarta: Economic Research Institute for ASEAN and East Asia. <https://doi.org/10.1787/9789264305328-en> (accessed 14 May 2020).
- OSMEP (2013), *The White Paper on Small and Medium Enterprises of Thailand in 2012 and Trends 2013*. Bangkok: Office of Small and Medium Enterprises Promotion.
- Punyasavatsut, C. (2010), 'Integrating SMEs into East Asia Production Networks: Thailand', in V.T. Thanh, D. Narjoko, and S. Oum (eds.) *Integrating Small and Medium Enterprises (SMEs) into the More Integrated East Asia*. Jakarta: Economic Research Institute for ASEAN and East Asia, pp.268–304.
- Régnier, P. (2000), *Small and Medium Enterprises in Distress: Thailand, the East Asian Crisis and Beyond*. Burlington: Ashgate Publishing.
- Tran, T., X. Le, and K. Nguyen (2008), 'Vietnam's Small and Medium Sized Enterprises Development: Characteristics, Constraints and Policy Recommendations', in H. Lim (ed.) *SME in Asia and Globalization*, ERIA Research Project Report 2007-5. Jakarta: Economic Research Centre for ASEAN and East Asia, pp.323–64.

# Human Capital Development in the Greater Mekong Subregion

*Dinh Chuc Nguyen and Thanh Quang Trieu*

## 1. Introduction

The Greater Mekong Subregion (GMS) is a geographical area comprising Cambodia, the Lao People's Democratic Republic (Lao PDR), Myanmar, Thailand, Viet Nam, and China (Yunnan Province and Guangxi Zhuang Autonomous Region). These areas are commonly referred to as developing areas in Southeast Asia and China. In such regions, human capital is seen as an important resource. However, it is usually the case that human capital – the main catalyst for development – is low.

The origin of the notion of human capital was introduced by Adam Smith, who emphasised the importance of the valuable capacities of people (Smith, 1776). However, the idea of treating an individual's abilities as an asset or production input was only recognised in the 1960s when Theodore Schultz defined human capital as acquired knowledge and skills (Schultz, 1961). Since then, the concept of human capital has often been used in development studies and within economic and social research. At the macro level, human capital can contribute to poverty reduction, social cohesion, political stability, and national security. At the micro level, individuals with higher human capital tend to have better employment opportunities and higher earnings.

One of the most popular descriptions of human capital was proposed by the Organisation for Economic Co-operation and Development (OECD), which defined it as 'the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being' (OECD, 2001:18). This definition is all-encompassing. It covers various aspects of human capital: skills; competencies; and the physical, emotional, and mental health of individuals. The World Bank recently used this concept to assess the level of human capital based on health and education dimensions in the Human Capital Project (World Bank, 2017).

The objective of this chapter is to provide an overview of the status of human capital in GMS countries and provide recommendations for a way forward in fostering it. The study will (i) assess the current status of human capital, including skills and health, using available data and information; (ii) give a critical overview of the education and health systems in GMS countries through the lens of human capital development; and (iii) propose policy recommendations to promote human capital development in GMS countries.

## **2. Human Capital Concept, Role, and Drivers**

The relationship between human capital and economic growth is mentioned in the Solow economic growth model, even though he did not specifically call it 'human capital' (Solow, 1956). In his theory, education has been determined to be a key determinant of economic growth (Solow, 1956). Later, the role of human capital and economic growth was developed by many other scholars. Nelson and Phelps (1966) described how investment in humans can promote economic growth because education helps workers utilise new technologies, increase their productivity, and spur economic growth. Becker (1962) and Mincer (1974) suggested investing in human capital via education and training. They believed it could improve knowledge and skills, raise productivity, and increase the earnings of individuals. Therefore, human capital is a strong driving force in economic growth (Becker, 1962; Mincer, 1974).

Numerous cross-country studies have found a positive correlation between human capital and economic growth. For example, Azariadis and Drazen found that the literacy rate is a significant factor in gross domestic product (GDP) per capita (Azariadis and Drazen, 1990). Barro discovered that school enrolment rates at the primary and secondary levels are positively associated with economic growth and investment (Barro, 1991). Barro and Lee found that each additional year of schooling can increase GDP per capita by 1.7% to 12.1% (Barro and Lee, 2001). Hanushek and Woessmann provided evidence that every unit increase in a country's average cognitive test scores is associated with increases in a country's GDP per capita in the form of a growth rate of 1.2–2.0 percentage points (Hanushek and Woessmann, 2012). Many researchers agree that human capital is a key determinant in explaining impoverished and wealthy nations (Acemoglu, Gallego, and Robinson, 2014; Gennaioli et al., 2013; Jones and Romer, 2010). Furthermore, Hanushek showed that human capital plays the role of a driver in economic growth for developing countries. To achieve economic growth, developing countries need to promote their school attainment (Hanushek, 2013).

As human capital is proxied by education, skills and health factors influencing these individual characteristics are considered primary determinants. Current studies show that these factors can be divided into two groups: macrostructure forces and microstructure levels (Buchmann and Hannum, 2001). The macrostructure forces – including national conditions such as national economic growth, education systems, health service systems, state policies, and global forces – can promote or prohibit human capital. Theoretically, economic growth and social development provide more resources for education and healthcare. However, initial observations in many developing countries have shown that socioeconomic development does not bring the same benefits to everyone (Brady, Kaya, and Beckfield, 2007). The nation state shapes the provision of educational opportunities and regulates the structure of the educational system through its educational laws and policies (Brown and Park, 2002; Hannum, 2002). For example, passing laws on compulsory schooling may spark demand for education. By privatising and decentralising their educational and healthcare systems, states may prompt schooling and healthcare costs

to increase, thus lowering overall educational participation and health service access, and exacerbating inequality (Brown and Park, 2002; Hannum, 2002).

At the microstructure level, the effects of family background and school characteristics on children's education and health are well documented. Socioeconomic status, family size, structure, and family decision-making processes are often related to educational disparities in both developed and developing countries (Chudgar and Shafiq, 2010; Edmonds, 2008; Haller and Portes, 1973). The positive correlation between household income and educational attainment is found in many studies (Anh et al., 1998; Filmer, 2000; Gumus, 2014; Hannum, 2003; Israel, Beaulieu, and Hartless, 2001). For example, children with low socioeconomic status often have lower rates of school enrolment and attainment than children in better-off families, and single-parent households have negative effects on children's educational outcomes due to lack of human or social capital in the home (Dika and Singh, 2002). Parents' education can contribute to their children's education in several ways: being able to help children with their homework, being knowledgeable about and providing for their health and nutritional needs, and being able to produce safety nets that prevent shocks from disturbing the children's education (Chudgar and Shafiq, 2010).

School-level effects on children's educational outcomes are also evident. Differences in school inputs, infrastructure, and teacher quality result in inequality in educational achievements. Lastly, although research on the role of community-level factors in children's educational outcomes is still limited (Buchmann and Hannum, 2001), studies have found community factors such as the concentration of poverty and the community's adult literacy level to be significantly associated with educational disparities (Binder, 1999; Brown and Park, 2002; Chudgar and Shafiq, 2010).

### **3. Human Capital in the GMS Countries**

#### **3.1. Background**

The current level of human capital in the GMS varies by country. On average, a child born in the GMS today will only achieve 56% of its potential productivity when he or she grows up, according to the World Bank Human Capital Index (HCI) (World Bank, 2020a). Excluding China, the HCI of GMS countries that are Member States of the Association of Southeast Asian Nations (ASEAN) is 53%. Amongst the GMS countries, the Lao PDR's HCI is the lowest, at only 45%, while Viet Nam's HCI is the highest, at 67%.

**Table 11: Human Capital Index of the GMS, 2018**

Country	Human Capital Index	Expected years of school	Learning-adjusted years of school	Harmonised test scores	Probability of survival to age 5	Adult survival rate	Healthy growth
Cambodia	0.49	9.55	6.90	452	0.97	0.83	0.68
China (mainland)	0.67	13.20	9.67	456	0.99	0.92	0.92
Lao PDR	0.45	10.84	6.39	368	0.94	0.81	0.83
Myanmar	0.47	9.85	6.70	425	0.95	0.81	0.71
Thailand	0.60	12.37	8.64	326	0.99	0.85	0.89
Viet Nam	0.67	12.30	10.02	519	0.98	0.88	0.75

GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic.  
Source: World Bank (2020a).

Despite the number of years in school, children are not receiving a high-quality education. While children in the GMS complete 11.35 years of school on average, what they learn is equivalent to just 8.05 years of school. In reality, the GMS has a learning gap of 3.30 years. Amongst the GMS countries, China has the highest expected years of school, at 13.20 years, and its learning gap is 3.50 years. Cambodia has the lowest expected years of school, at 9.55 years, and its gap is 2.70 years. Viet Nam has the lowest learning gap, at only 2.28 years (12.30 expected years of school and 10.02 learning-adjusted years of school), while Thailand has the highest learning gap, at 3.80 years (12.37 expected years of school and 8.64 learning-adjusted years of school). Vietnamese students have the highest harmonised test scores (519), while Thai students have the lowest harmonised test scores (326).

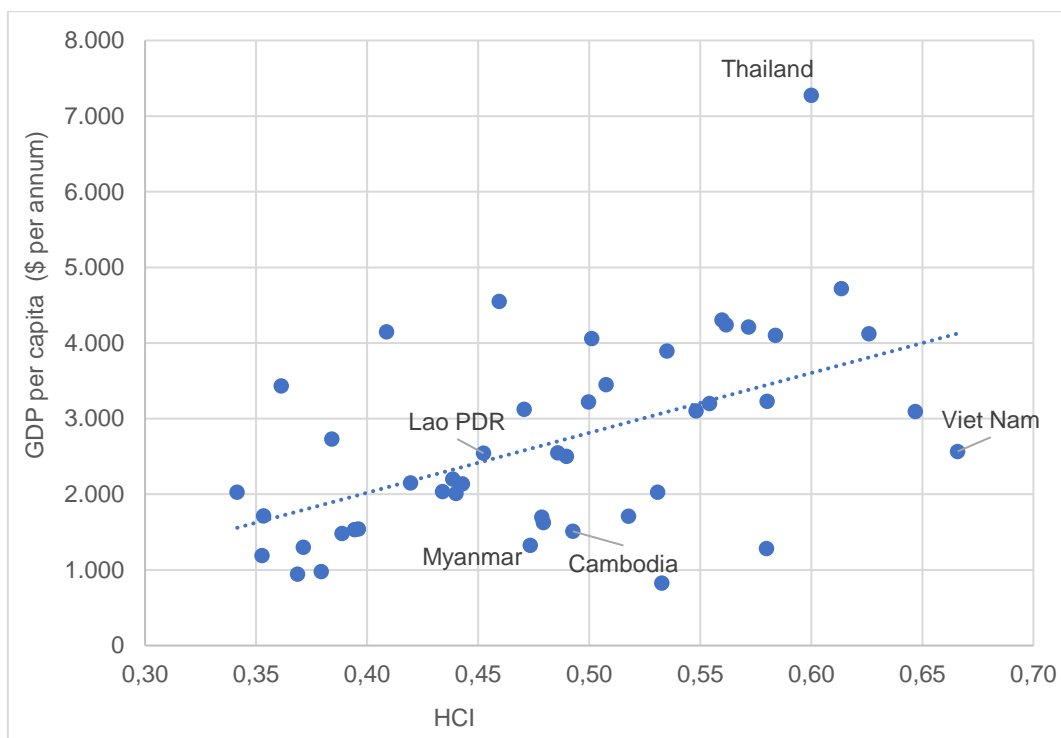
In terms of nutrition, 21% of children in the GMS (except for the Lao PDR for which data were not available) under 5 years of age are stunted due to chronic malnutrition, which puts them at high risk of cognitive and physical development that can last a lifetime. Amongst those countries, China has the highest healthy growth (0.92), while Cambodia has the lowest rate (0.68). Some 15% of 15-year-olds in the GMS will not live until the age of 60, mainly due to non-communicable diseases (diabetes, cancer, and cardiovascular and respiratory illnesses) and injuries. Of those countries, China has the highest adult survival rate (0.92), while Myanmar has the lowest adult survival rate (0.81).

In terms of gender differences, even though the differential is not significant, all indicators favour girls. Most differences occur in standardised test scores and adult survival rates. Being a girl brings a likelihood of having a test score 10 points higher than boys in the Lao PDR, Myanmar, Thailand, and Viet Nam. These data are not available for Cambodia, and China does not have a gender difference. The adult survival rate does not differ significantly between boys and girls (only about 0.02). The average rate for all the GMS countries is 0.85.

### 3.2. Human Capital and Economic Development in GMS Countries

Human capital in the GMS countries has been growing significantly compared with income per capita. The HCI of GMS countries is higher than that of other lower middle-income countries. Viet Nam’s HCI is the highest of the lower middle-income countries (0.67 points). This figure is equivalent to the HCI of China (0.67 points), whose GDP per capita was \$9.771/year in 2018, three times higher than that of Viet Nam (\$2.567/year). Thailand has GDP per capita 2.8 times higher than that of Viet Nam, but its HCI is lower than Viet Nam’s HCI. The Lao PDR approaches the common trend line of lower middle-income countries and is far ahead of Myanmar and Cambodia, but is left behind by the other GMS countries in terms of HCI. This finding suggests that GDP per capita does not always correlate with the HCI in the GMS countries.

**Figure 1: HCI in GDP of Lower Middle-Income Countries**

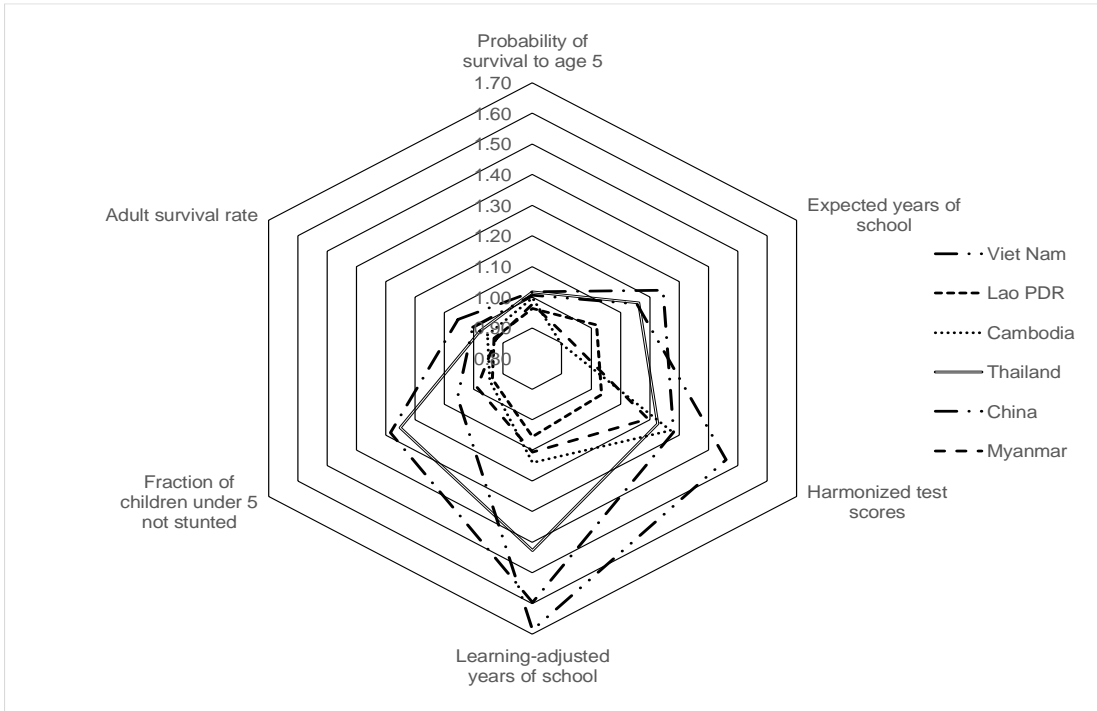


GDP = gross domestic product, HCI = Human Capital Index, Lao PDR = Lao People’s Democratic Republic.  
Source: World Bank (2020a).

Decomposing the HCI into its components shows that the human capital of GMS countries is developed mainly within education, while health indicators are the same as the average level of lower middle-income Asia-Pacific countries. Table 1 illustrates that Viet Nam’s high HCI score mainly comes from success in narrowing the learning gap and improving harmonised test scores and adult survival.



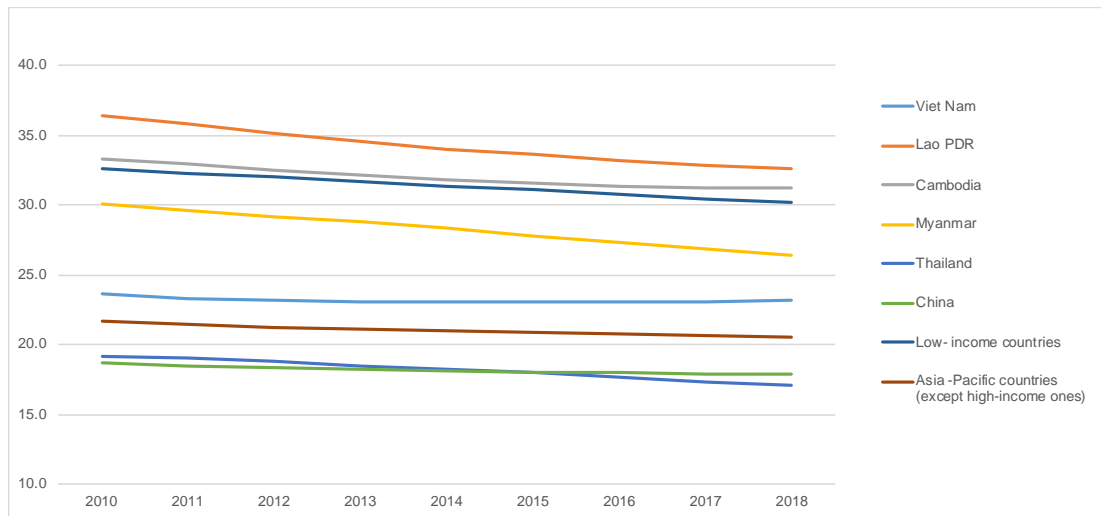
**Figure 2: HCI indicators in GMS Countries Compared with the Asia-Pacific Region**



GDP = gross domestic product, HCI = Human Capital Index, Lao PDR = Lao People's Democratic Republic. Note: For the Asia-Pacific region, the average indicators for lower middle-income countries are estimated. Source: World Bank (2020a).

Figure 1 shows the proportion of the component indicators in GMS countries, compared with the average of lower middle-income countries. It illustrates the most significant disparities in human capital indices in Viet Nam, China, and Thailand, especially in terms of the learning-adjusted school years. It also shows the great learning pressure in these countries, compared with the average of lower middle-income countries in the Asia-Pacific region.

**Figure 3: Proportion of the Population Aged 0–14 in GMS Countries**

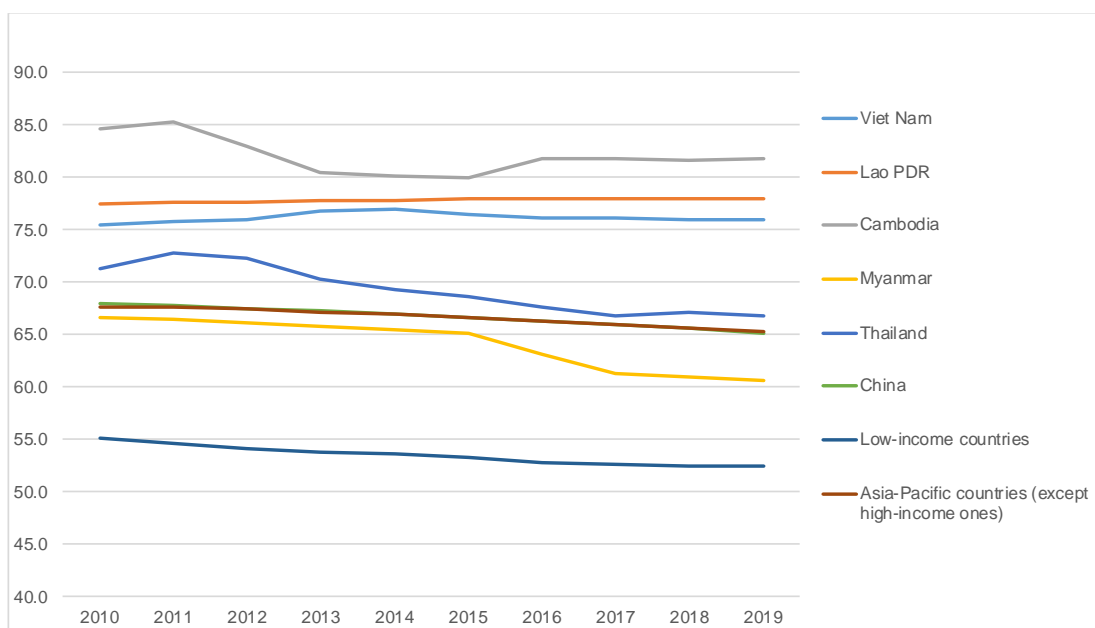


GMS = Greater Mekong Subregion, Lao PDR = Lao People’s Democratic Republic.  
Source: World Bank (2020a).

The pressure to improve the quality of human capital in GMS countries is set in the context of the future labour force tending to decrease. Figure 3 shows that the scale of the potential workforce of the GMS countries tends to decrease gradually. The workforce is also different amongst the GMS countries. The proportion of people aged 0–14 in the Lao PDR and Cambodia is high (more than 30% in 2018 and higher than the average of low-income countries). The proportions in Viet Nam and Myanmar are also higher (23.2% and 26.4%, respectively) than the averages of countries in the Asia-Pacific region. Meanwhile, the rate in Thailand, 17.1% in 2018, is quite a bit lower than the regional average (excluding high-income countries) of 20.5%. This partly reflects the pressure on GMS countries to improve the potential labour productivity of their workforces to guarantee production capacity in the future.

In addition, GMS countries have generally mobilised a significant part of their population into the production of goods and services. The ratio of labour force participation among GMS countries is quite high. It is higher than the general proportion of the Asia-Pacific region (except Myanmar) and much higher than the proportion of low-income countries. It is highest in Cambodia, at 81% of the population aged 15 and above in 2019 (Figure 4).

**Figure 4: Current Workforce in GMS Economies**



GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic.  
Source: World Bank (2020a).

**Table 12: Education Levels of Workers Over 15 Years of Age in GMS Countries**

Education level	Viet Nam (2019)	Lao PDR (2017)	Cambodia (2016)	Thailand (2019)	Myanmar (2018)
Under basic level	10.9	9.9	32.8	20.8	21.2
Basic level	49.9	55.8	43.2	39.4	61.5
Intermediate level	27.6	21.0	7.5	22.4	8.0
High level	11.7	13.2	5.9	16.4	9.3
Unidentified	0	0.1	10.5	1.0	0
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic.

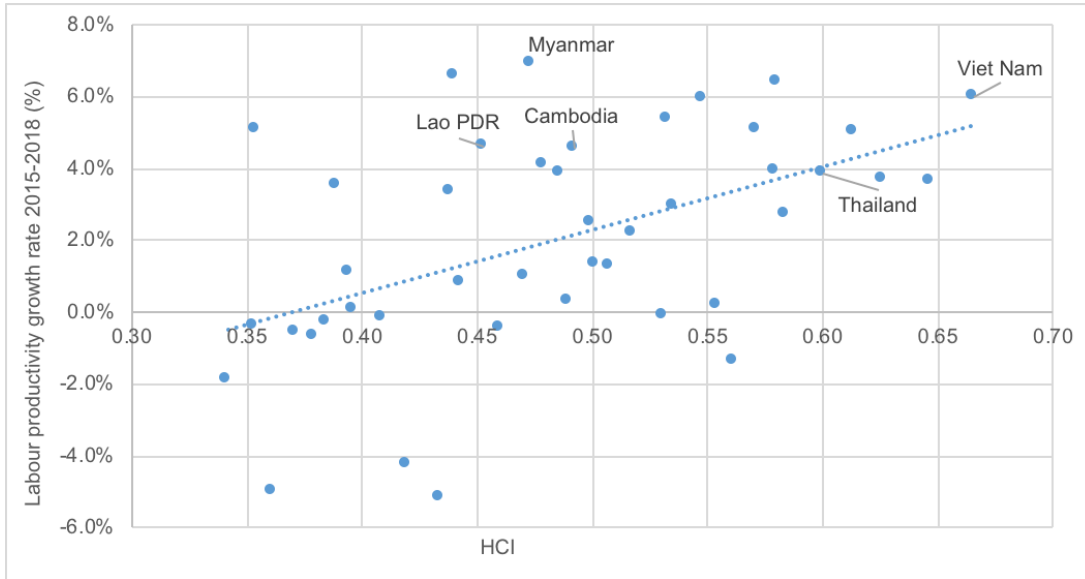
Notes: Under basic level = no training or education at the preschool level; basic level = education at primary school, secondary school, or equivalent; intermediate level = high school and above; high level = university and postgraduate education.

Source: International Labour Organization (2020), ILOSTAT Database. Labour Force Surveys. <https://ilostat.ilo.org/data/> (accessed 2 June 2020).

The education levels of people aged 15 and above working in economies of the GMS countries are generally low. The proportion of labour that is below the basic level<sup>28</sup> is still high, especially in Cambodia, Thailand, and Myanmar. Employees with intermediate or high levels of education in GMS countries number less than 30%. This proportion is only 13.4% in Cambodia and 17.3% in Myanmar.

<sup>28</sup> No education, or education at preschool level.

**Figure 5: HCI and Labour Productivity Growth in GMS Countries Compared with Low- to Middle-Income Countries, 2015–2018**



GMS = Greater Mekong Subregion, HCI = Human Capital Index, Lao PDR = Lao People’s Democratic Republic. Source: World Bank (2020a; 2020b).

Regarding labour productivity, human capital correlated positively with improved labour productivity in GMS countries from 2015 to 2018. In general, GMS countries had positive growth in labour productivity, when comparing the correlation between the HCI and labour productivity growth during this same period. The rate of improving labour productivity is the highest in Myanmar (6.9% per year, while the HCI in this country is 0.47 points). The Lao PDR, Viet Nam, and Cambodia show the same trends, with a large gap between themselves and other lower middle-income countries. The rate of labour productivity growth in Thailand was 3.8% per year from 2015 to 2018 (the HCI in this country is 0.6 points). For reference, the rate of labour productivity growth in China is 6.7% per year and its HCI is 0.67 points (Figure 5).

Despite a relatively high rate of labour productivity growth, labour productivity within GMS countries is still low, and there are large gaps amongst them. For example, Viet Nam’s labour productivity reached \$11,142 in 2018, only higher than Cambodia’s labour productivity at \$6,936, and equivalent to 37% of Thailand’s labour productivity at \$30,115 (General Statistics Office of Viet Nam, 2019).

In summary, despite recent improvements, the human capital of GMS countries still has many limitations, such as the low education level, limited health conditions, low productivity, and plentiful labour force but lack of sustainability. Given the population of more than 300 million in the GMS, these features of labour forces can create obstacles to economic growth in GMS countries. In particular, the impacts of the recent spread of economic nationalism and protectionism have led to an increasing number of companies moving their production out of the GMS countries back to their home countries or regions. Furthermore, the Fourth Industrial Revolution no longer considers human resources as an advantage of economic growth. Even in developed countries, workforces are facing increased competition from automation and robotic technologies.

### 3.3. Human Capital and Health

Human capital, in terms of health, reflects the capacity to participate in the workforce during the present and future. The World Bank specifies human capital in terms of health through three indicators: (i) the survival rate of children under 5 years old, (ii) the survival rate of adults (15–60 years old), and (iii) the proportion of children under 5 without stunting (healthy survival rate for children under 5). While the mortality rate and stunting rate of children under 5 years old reflect the capacity to develop physically and intellectually, meeting the requirements of human resources in the future, the survival rate of adults reflects the capacity to participate in the workforce.

**Table 13: Health Indicators in Human Capital in GMS Countries(%)**

Item	Survival rate of adult (estimated in 2017)	Survival rate of children under 5 years old (2018)	Rate of children under 5 years old without stunting
Lao PDR	81.25	95.3	66.9 (2017)
Viet Nam	87.80	97.9	76.2 (2017)
Cambodia	83.32	97.2	67.6 (2014)
Myanmar	80.81	95.4	70.6 (2016)
Thailand	85.45	99.1	89.5 (2016)
China	92.12	99.1	91.9 (2016)
<b>Asia-Pacific (except for high-income countries)</b>		<b>98.4</b>	
<b>Low-income country average</b>		<b>95.1</b>	<b>69.9 (2019)</b>

GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic.  
Source: World Bank (2020a).

Human capital, in terms of health in the GMS countries, can be divided into three groups when compared with the average level of lower middle-income countries in the Asia-Pacific. In Thailand, where the average income is high, there are many outstanding indicators; in Viet Nam, the indicators are equivalent to the average level of countries in the region (its GDP per capita is equivalent to 95% of the average GDP of lower middle-income countries), while there is a large gap between the rest of the countries and the average level. The Lao PDR's GDP per capita in 2018 was equivalent to the GDP per capita of Viet Nam (\$2,542/year), but the health indicators in these countries were the lowest of all GMS countries. This reflects the physical potential of the Lao PDR's citizens, which has not kept up with economic growth. This may become an obstacle in the future.

**Table 14: Human Capital and Health of GMS Countries**

Year	Cambodia	China	Lao PDR	Myanmar	Thailand	Viet Nam	Asia-Pacific (excluding high-income countries)	Lower middle-income countries
2010	44.3	15.8	68.1	63.3	13.3	23.1	23.1	65
2018	28	8.6	47.3	46.2	9.1	20.7	15.7	49.1
<i>Change</i>	<i>-16.3</i>	<i>-7.2</i>	<i>-20.8</i>	<i>-17.1</i>	<i>-4.2</i>	<i>-2.4</i>	<i>-7.4</i>	<i>-15.9</i>
2010	39.8	9.4	44.2	-	16.4	22.7	-	37.1
2018	32.4	8.1	33.1	29.4	10.5	23.8	-	30.8
<i>Change</i>	<i>-7.4</i>	<i>-1.3</i>	<i>-11.1</i>	<i>-</i>	<i>-5.9</i>	<i>1.1</i>	<i>-</i>	<i>-6.3</i>
2010	72.5	86.3	68.4	69.6	84.2	86.2	83.9	71.1
2018	77.6	89.0	73.8	74.7	87.6	86.8	86.4	74.3
<i>Change</i>	<i>5.1</i>	<i>2.8</i>	<i>5.4</i>	<i>5.0</i>	<i>3.5</i>	<i>0.6</i>	<i>2.4</i>	<i>3.3</i>
2010	63.7	80.2	60.7	55.2	71.0	71.4	76.4	63.7
2018	67.9	83.3	66.2	61.6	74.4	72.0	78.9	66.9
<i>Change</i>	<i>4.2</i>	<i>3.1</i>	<i>5.6</i>	<i>6.3</i>	<i>3.4</i>	<i>0.6</i>	<i>2.5</i>	<i>3.2</i>

GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic.

\* The stunting rates were taken for the following years: Cambodia (2010, 2017); China (2010, 2013); Lao PDR (2011, 2017); Myanmar (2016); Thailand (2010, 2013); Viet Nam (2010, 2017); and lower middle-income countries (2010, 2017).

\*\* The survival rate to age 65 (females) and survival rate to age 65 (males) for the average of lower middle-income countries and countries in the Asia-Pacific region (excluding developed countries) represent the data for 2010 and 2017.

Source: World Bank (2020a).

Overall, the indicators that reflect health in human capital in GMS countries are improving year by year. However, the improvement in Viet Nam is slower than in other GMS countries. It is also slower than the common average speed of the Asia-Pacific region (excluding developed countries) and low-income countries. From 2010 to 2018, the mortality rate of children under 5 years old per 1,000 children decreased 2.4 percentage points, and the stunting rate reduced by only 1.1 percentage points. The rate of survival to 65 years old for females and males increased by only 0.6 percentage points. The speed of improvement in the Lao PDR, Cambodia, and Myanmar is the highest in all four indicators (Table 4).

### 3.4. Human Capital and Education

Human capital, in terms of education, reflects the knowledge and skills that train people to participate in the future workforce. It is specified by the following indicators: (i) expected completed school years, (ii) learning-adjusted school years, and (iii) standardised test scores. These indicators show the duration and quality of education. The expected school years and adjusted school years show the actual learning time and conversion time for students in a country to obtain the amount of knowledge and skills, respectively. Standardised test scores illustrate the quality of education (knowledge and

skills obtained) and are calculated from the test scores from the Trends in International Mathematics and Science Study (TIMSS), an international examination on student achievement that is applied in most countries.

**Table 15: Education Indicators in Human Capital in GMS Countries**

Country	Expected school years (years)	Adjusted school years (years)	Standardised test scores (points)
Cambodia	9.55	6.90	452
China	13.25	9.67	456
Lao PDR	10.84	6.39	368
Myanmar	9.85	6.70	425
Thailand	12.37	8.64	436
Viet Nam	12.30	10.21	519

GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic.  
Source: World Bank (2020a).

As analysed above, human capital in terms of education in GMS countries is relatively high in relation to GDP per capita, especially in Viet Nam. The education indicators for Viet Nam are equivalent to or higher than those of other GMS countries and ASEAN Member States, especially in standardised test scores.

**Table 16: Education Indicators of HDI in GMS Countries, 2010–2018**

Year(s)	Cambodia	China	Lao PDR	Myanmar	Thailand	Viet Nam	Developing countries	Asia-Pacific region
<b>Human Development Index of Education</b>								
2010	0.44	0.60	0.43	0.39	0.61	0.58	0.54	0.59
2015	0.47	0.64	0.48	0.44	0.64	0.62	0.58	0.63
2018	0.48	0.65	0.48	0.45	0.67	0.63	0.58	0.64
<i>Change 2010–2018</i>	<i>0.03</i>	<i>0.05</i>	<i>0.05</i>	<i>0.06</i>	<i>0.05</i>	<i>0.04</i>	<i>0.05</i>	<i>0.04</i>
<b>Expected school years in HDI</b>								
2010	10.7	12.9	10.0	9.2	13.3	12.0	11.3	12.5
2015	11.2	13.8	11.3	9.9	13.9	12.7	12.0	13.3
2018	11.3	13.9	11.1	10.3	14.7	12.7	12.2	13.4
<i>Change 2010–2018</i>	<i>0.6</i>	<i>1.0</i>	<i>1.1</i>	<i>1.1</i>	<i>1.4</i>	<i>0.7</i>	<i>0.9</i>	<i>0.9</i>

GMS = Greater Mekong Subregion, HDI = Human Development Index, Lao PDR = Lao People's Democratic Republic.

Source: United Nations Development Programme (2019), Human Development Reports, Human Development Data (1990–2018). <http://hdr.undp.org/en/data> (accessed 2 June 2020).

The improvement in education indicators in the GMS countries can be reflected through indicators of the Human Development Index (HDI). The GMS countries can be divided into two groups: (i) Viet Nam and Thailand, which are in the upper average or are approaching the common average of developing countries in the Asia-Pacific region; and (ii) Myanmar,

the Lao PDR, and Cambodia, which have a large gap between themselves and the common average of the region and the average of developing countries.

In general, the education indicators of the HDI in GMS countries have improved year by year, but slowly. From 2010 to 2018, the HDI gap in education amongst GMS countries in group 2 and the averages of the region and developing countries remained unchanged (these countries increased about 0.05–0.06 percentage points, while the common average of developing countries increased 0.05 percentage points and the average of the Asia-Pacific region increased 0.04 percentage points). Meanwhile, the disparity in the score of Viet Nam decreased slightly (0.01 percentage points). This shows that reforms in Viet Nam’s education were slower than in other countries in the region and lower than the common average of developing countries.

#### **4. Human Capital and its Drivers in GMS Countries**

##### **4.1. Healthcare System in GMS Countries**

There is a significant difference in the budget allocation for healthcare amongst the GMS countries. Viet Nam and Thailand have high rates of budget spending on healthcare services, while those of the Lao PDR, Cambodia, and Myanmar are quite low (Table 7). Even so, resources for healthcare systems in the Lao PDR and Cambodia are supported significantly by non-governmental organisations and sponsors (Phanphairoj and Loa, 2017). However, this partly reflects the high level of out-of-pocket payments for healthcare services in Cambodia and Myanmar (61.13% and 76.23%, respectively). High private payment rates for healthcare services also reduce the ability to access these systems.



**Table 17: State Spending Budgets on Healthcare Systems in GMS Countries, 2017**

Item	Viet Nam	Lao PDR	Cambodia	Thailand	China	Myanmar	Lower middle-income countries	Asia-Pacific (excluding developed countries)
Percentage of state budget spending on health (% of total budget expenditure)	9.48	4.04	6.08	15.03	9.07	3.49	5.65	
Percentage of state budget spending on health (% of GDP)	2.69	0.89	1.41	2.85	2.92	0.69	1.29	2.74
Share of social spending on health/GDP in 2017 (%)	5.53	2.53	5.92	3.75	5.15	4.66	3.86	4.91
Social spending on health per capita in 2017 (\$)	129.58	62.12	82.08	247.04	440.83	58.04	79.41	313.64
State budget spending on health per capita (\$/person)	63.00	21.84	19.54	188.06	249.83	8.59	25.59	177.95
Private health expenditure (% of total social spending on health)	49.38	48.20	61.13	20.91	43.33	76.23	64.45	42.99

GDP = gross domestic product, GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic.  
Source: World Bank (2020a).

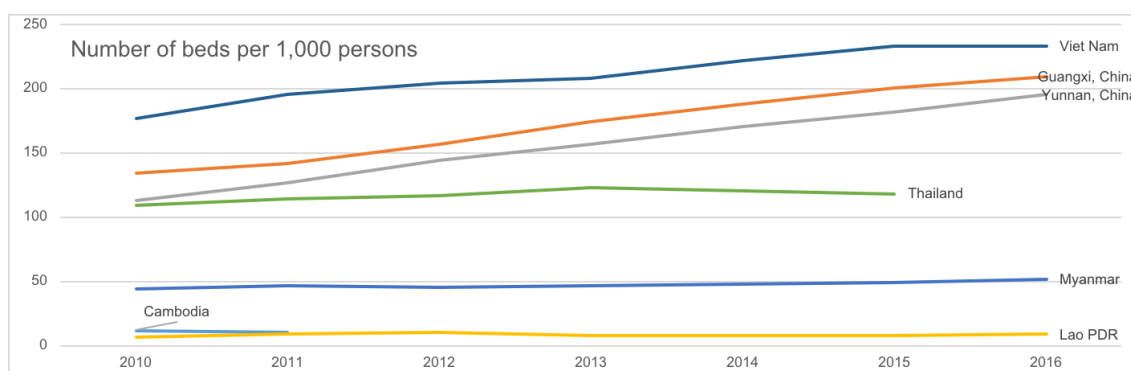
Thailand has a low rate of people paying for healthcare services (20.91%) due to the ability to access a universal healthcare programme (98% of the population), in comparison to Viet Nam (65%), Cambodia (24%), and the Lao PDR (15%).

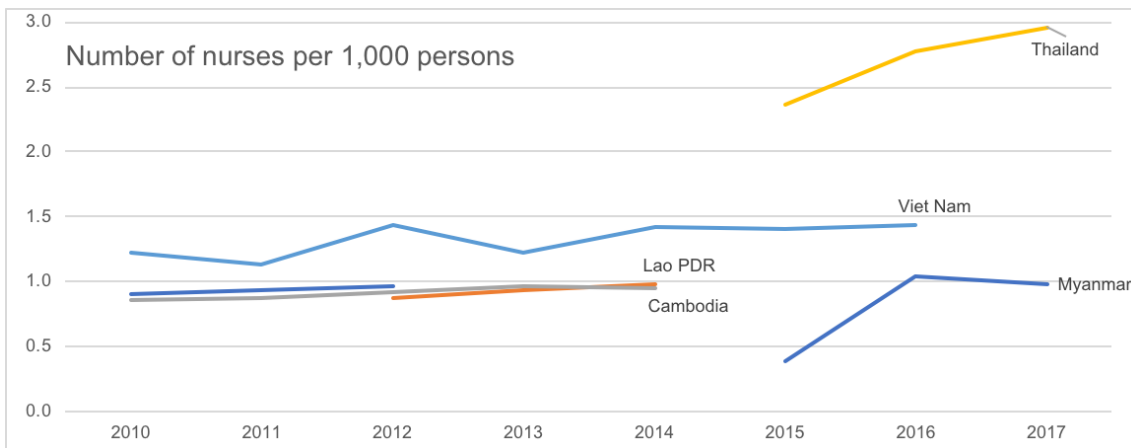
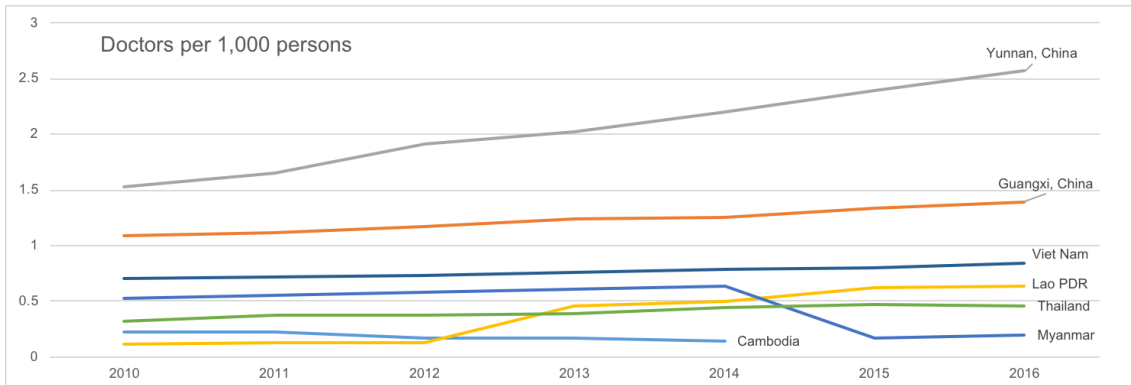
Most hospitals are public in GMS nations. However, the systems have some significant differences. The proportion of public hospitals in Viet Nam (81%) and Thailand (70%) is considerably higher than that of the Lao PDR (32%) and Cambodia (20%). However, comparisons amongst GMS countries show that the level of public services provided in Thai and Laotian hospitals is higher than that in Viet Nam and Cambodia (Phanphairoj and Loa, 2017).

Hospital systems in the Lao PDR, Thailand, and Viet Nam are managed by decentralised management models, while the management system in Cambodia is centralised within the Ministry of Health. In general, decentralised health management systems help provincial health agencies become more responsible in planning, financing, and service delivery – ensuring the ability of local residents to access the appropriate health service.

The health infrastructure of Thailand, Viet Nam, and China’s Yunnan Province and Guangxi Zhuang Autonomous Region is generally better than that of the rest of the GMS countries. The number of beds per 1,000 people in China and Viet Nam is higher than in other GMS countries, while Yunnan Province (China) has a higher number of doctors per 1,000 people than in GMS countries. Guangxi Zhuang Autonomous Region (China) and Thailand have a higher number of nurses and midwives than in other GMS countries. The rate of healthcare workers and the number of beds per 1,000 people have a positive correlation with the accessibility and availability of healthcare services, as well as people’s health status (Kabene et al., 2006).

**Figure 4: Selected Indicators on Health Infrastructure in GMS Countries**





GMS = Greater Mekong Subregion, Lao PDR = Lao People’s Democratic Republic.  
 Source: World Bank (2020a).

The quality of a healthcare system is reflected through the quality of information and communication in GMS countries. This is a key determining factor for the quality of the healthcare system and improving the health of people in Thailand. It is also one of the important factors in Viet Nam and the Lao PDR. Of all four GMS countries, Viet Nam, Thailand, and the Lao PDR use digital health management information systems, while Cambodia still uses a paper system. In Thailand, the Ministry of Public Health restructured the health information system to support the Global Health Insurance Program in 2011. In addition, Thailand has integrated information technology on health management, waste, water supply, and transportation systems in urban development. State budget spending on researching and developing health technology also contributes considerably to improving the quality of health systems and healthcare services. Of all the GMS countries, Thailand (0.39%) has the highest rate of state budget spending on its health system, while Viet Nam only spends 0.19% of the state budget on health. The figures in the Lao PDR and Cambodia are very low (Phanphairoj and Loa, 2017).

#### 4.2. Resource Allocation and Education System in GMS Countries

The share of the budget spent on education development in GMS countries is generally significant. Viet Nam and Thailand have higher rates of state budget spending on developing education compared with the common average of Asia-Pacific countries

(excluding developed countries). In Myanmar, the Lao PDR, and Cambodia, this rate is quite low despite a significant increase from 2010 to 2018.

**Table 18: State Education Budget in GMS Countries (% GDP)**

Country or region	2010	2011	2012	2013	2014	2016	2017	2018
Viet Nam	5.14	4.81	5.53	5.65	n.a.	4.34	n.a.	4.17
Thailand	3.51	4.81	4.54	4.12	n.a.	n.a.	n.a.	n.a.
Myanmar	n.a.	0.79	n.a.	n.a.	n.a.	n.a.	2.16	1.97
Cambodia	1.53	1.51	1.56	2.05	1.91	n.a.		2.16
Lao PDR	1.71	1.71	1.82	3.23	2.94	n.a.	n.a.	n.a.
East Asia and Pacific (excluding high-income countries)	3.16	3.19	3.97	3.74	n.a.	n.a.	n.a.	n.a.

n.a. = data not available in the database, GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic.

Source: World Bank (2020b).

In mobilising budgets within this sector, GMS countries have different priorities for each level of education. The spending is relatively equal for all levels of education in Viet Nam and Thailand, while levels in Cambodia and the Lao PDR are mainly focused on primary and secondary (accounting for 79% and 89% of the budget expenditures for education in 2013, respectively) (World Bank, 2020b).

**Table 19: Quality of Education Systems in GMS Countries**

Item	Viet Nam	Lao PDR	Cambodia	Thailand	China
Quality of primary education system	93	88	112	89	38
Quality of higher education system and training	89	75	109	67	39
- <i>Quality of education system</i>	71	53	79	65	29
- <i>Quality of math and scientific education</i>	85	88	111	83	50
- <i>Quality of school management</i>	120	80	123	78	50
- <i>Accessing internet at school</i>	77	96	101	48	50
Vocational training	94	87	110	65	43
- <i>Specialised training services are available locally</i>	108	95	117	90	55
- <i>Employee training level</i>	71	74	84	47	36
- <i>Quality of vocational training*</i>	102	97	112	74	41
Primary student–teacher ratio*	75	85	124	56	58

GMS = Greater Mekong Subregion, Lao PDR = Lao People’s Democratic Republic.

\* Ranking in 2019.

Sources: World Economic Forum (2017; 2019).

Nevertheless, the quality of education in GMS countries is generally quite low. The rankings of some indicators of GMS countries’ quality in education systems show that Viet Nam, the Lao PDR, Cambodia, and Thailand are all low on the list (World Economic Forum, 2017). Compared with other GMS countries, Thailand has the highest-ranking position for all indicators. The gap between Thailand and other GMS countries is quite large. Although the rate of budget spending on education in Viet Nam is higher than the rest of the GMS countries, except for Cambodia, many educational system quality indicators are low, especially the indicator on the quality of the primary education system, the quality of school management, and the quality of vocational training. This illustrates that the effectiveness of state budget spending on education in Viet Nam is generally low.

## 5. Issues and Policy Recommendations

Improving human capital has an important relationship to the economic growth and labour productivity of a country (Hamilton et al., 2019). It also helps to enhance the adaptability of employees to rapid changes in science and technology and contributes to reducing the negative effects of the Fourth Industrial Revolution, especially in developing countries (World Economic Forum, 2019). Based on these findings, there are some specific issues in improving human capital in GMS countries.

It is necessary to ensure a balance between human capital development factors in GMS countries, including the health, survival, and knowledge and skills required to join the labour force. Through this, human capital can contribute effectively to improve labour productivity and sustainable development in GMS countries.

Another issue is increasing cooperation mechanisms amongst GMS countries in addressing health and education within the subregion, especially the inflow of resources

(including capital and migration), sharing experiences, cooperating on technology development, and human resources training amongst GMS countries. Cross-border labour migration is increasing rapidly within GMS countries. The total number of migrants amongst ASEAN countries increased four times, from 2.1 million in 1996 to 9.9 million in 2016. One of the main routes was between GMS countries – from Myanmar, Cambodia, and the Lao PDR to Thailand. Sharing a language and cultural ties, short distance, and historical relationships, which can reduce the psychological and financial costs of migration, are considered the main drivers of the labour movement (Kikkawa, Gaspar, and Park, 2019). Since then, the cross-border transmission of communicable infections and drug and human trafficking have been increasing challenges.

Therefore, the strength of each GMS country and the overall development of the subregion need to be promoted. Successful health cooperation amongst ASEAN GMS countries during the severe acute respiratory syndrome (SARS) epidemic illustrated the role of regional collaboration in fighting a common threat to the region. However, cooperation still faces challenges in many other fields. For example, the restrictions and regulations on foreign investment may create obstacles to opening education and health markets to other member countries; and health coverage can create a barrier for migrant workers across borders within the GMS countries.

The final issue is mobilising and using effective resources, especially public investment, in health and education in GMS countries. This will achieve great improvement in human capital in terms of health, survival, knowledge, and skills to adapt to the rapid changes of the Fourth Industrial Revolution. Lessons learned in Thailand and Viet Nam suggest that healthcare system decentralisation and compulsory drug licensing policy can be a good way to use resources effectively. In addition, Viet Nam's experience shows that an imbalanced investment structure in education and training (investing too much in compulsory education but less on tertiary education) lowers the quality of higher education. That, in turn, brings down the quality of the labour force. Therefore, the investment structure influences resource-efficient usage.

To summarise, the educational and health disadvantages distort potential human resources, with a population of more than 326 million in the GMS. Furthermore, they may also threaten the advantages of the GMS, while surrounding areas attract investors and promote their competitiveness. Studying more than 1,500 subnational regions of the world, Gennaioli and colleagues suggested that developing regional human capital is critical to promote regional development (Gennaioli et al., 2013). Based on the current human capital development in the GMS, to reach the goals of promoting socio-economic development in the subregion, this study suggests several policies to enhance human capital:

- Policies targeting health improvements should include (i) enriching nutritional interventions to reduce mortality, especially mortality under the age of 5, and ending all forms of malnutrition, and diet and diet-related non-communicable diseases; (ii) promoting public awareness about nutrition and healthcare, especially for disadvantaged and vulnerable populations in each of the GMS countries; and (iii) building capacity for healthcare systems and incorporating technical support and expertise sharing within GMS countries.
- Policies aiming at education achievements should include (i) reducing the learning gap in each country by focusing on learning outcomes, skills, and competencies so that students are able to adapt their skills, critical thinking, and collaborative attitude in their work; and (ii) harmonising technical and vocational education and training standards. One of the strategies that need to be considered is to promote public–private collaboration in education and employment to meet the regional labour market demand. In other words, education and training standards should be market-oriented via public–private collaboration.
- A commitment to strengthening exchanges between countries via the implementation of the GMS Health Cooperation Strategy, 2019–2023, which includes all three pillars: health security as a regional public good, health impacts of connectivity and mobility, and health workforce development (ADB, 2013). The enhancement of the human resources capacities of the health system should be prioritised.
- Based on the Strategic Framework and Action Plan for Human Resource Development in the GMS, 2013–2017 (ADB, 2013), the strategy for GMS cooperation in human resources development should follow the Asian Development Bank recommendations. Moreover, based on the framework, cooperation mechanisms in student and academic exchanges, and technical and vocational education and training, as well as a mechanism for managing migrant labour amongst countries, should be identified. Regulations should be harmonised. Standards and procedures on labour management amongst GMS countries should aim to form a common labour market in the GMS countries (associated with the formation of the ASEAN Economic Community).
- Strengthening linkages, sharing experiences, and promoting learning amongst GMS countries should be a top priority to enhance the quality of health and education systems. Building databases and sharing information amongst GMS countries – especially in education, public health, and migration research – can also increase cooperation between medical and educational infrastructure systems at the border areas between GMS countries.
- GMS countries should identify their priorities for reforming health and education systems to adjust their investment policies, focusing on improving human capital indicators; determine the appropriate level of priorities to invest in higher

education and basic health systems; promote research and development; and enhance the capacity of small and medium-sized enterprises.

- Enhancing the attraction of private resources for the development of health and education systems in GMS countries, and facilitating the flow of investment capital amongst GMS countries, especially in health and education, need to be considered.

## 6. Conclusion

GMS countries differ in terms of human capital. Viet Nam and Thailand have a higher level of human capital development than other countries in the GMS (the Lao PDR, Myanmar, and Cambodia). The two top-ranking countries also have higher expenditure on human capital development (health and education). Measures to improve human capital in the GMS countries must focus on the cooperation and linking mechanisms amongst countries to allocate rational and effective resources (labour and capital) as well as addressing issues related to healthcare and education at the subregion scale.

## References

- Acemoglu, D., F.A. Gallego, and J.A. Robinson (2014), 'Institutions, Human Capital, and Development', *Annual Review of Economics*, 6(1), pp.875–912.
- ADB (2013), *Strategic Framework and Action Plan for Human Resource Development in the Greater Mekong Subregion, 2013–2017*. Manila: Asian Development Bank.
- Anh, T.S., J. Knodel, D. Lam, and J. Friedman (1998), 'Family Size and Children's Education in Vietnam', *Demography*, 35(1), pp.57–70.
- Azariadis, C. and A. Drazen (1990), 'Threshold Externalities in Economic Development', *The Quarterly Journal of Economics*, 105(2), pp.501–26.
- Barro, R.J. (1991), 'Economic Growth in a Cross Section of Countries', *The Quarterly Journal of Economics*, 106(2), pp.407–43.
- Barro, R.J. and J.-W. Lee (2001), 'International Data on Educational Attainment: Updates and Implications', *Oxford Economic Papers*, 53(3), pp.541–63.
- Becker, G.S. (1962), 'Investment in Human Capital: A Theoretical Analysis', *Journal of Political Economy*, 70(5, Part 2), pp.9–49.
- Binder, M. (1999), 'Community Effects and Desired Schooling of Parents and Children in Mexico', *Economics of Education Review*, 18(3), pp.311–25.
- Brady, D., Y. Kaya, and J. Beckfield (2007), 'Reassessing the Effect of Economic Growth on Well-being in Less-developed Countries, 1980–2003'. *Studies in Comparative International Development*, 42(1), pp.1–35. doi:10.1007/s12116-007-9003-7
- Brown, P.H. and A. Park (2002), 'Education and Poverty in Rural China'. *Economics of Education Review*, 21(6), 523–41.



- Buchmann, C. and E. Hannum (2001), 'Education and Stratification in Developing Countries: A Review of Theories and Research', *Annual Review of Sociology*, 27, pp.77–102. doi:10.2307/2678615
- Chudgar, A. and M.N. Shafiq (2010), 'Family, Community, and Educational Outcomes in South Asia'. *Prospects*, 40(4), pp.517–34. doi:10.1007/s11125-010-9169-z
- Dika, S.L. and K. Singh (2002), 'Applications of Social Capital in Educational Literature: A Critical Synthesis,' *Review of Educational Research*, 72(1), pp.31–60. doi:10.3102/00346543072001031
- Edmonds, E. (2008), 'Child Labor', in T.P. Schultz and J. Strauss (eds.) *Handbook of Development Economics*, Vol. 4. Amsterdam: North Holland, pp.3607–3709.
- Filmer, D. (2000), 'The Structure of Social Disparities in Education: Gender and Wealth', *World Bank Policy Research Working Paper*, No. 2268. Washington, DC: World Bank.
- General Statistics Office of Viet Nam (2019). *Statistical Yearbook of Vietnam 2018*. Hanoi
- Gennaioli, N., R. La Porta, F. Lopez-de-Silanes, and A. Shleifer (2013), 'Human Capital and Regional Development', *The Quarterly Journal of Economics*, 128(1), pp.105–64.
- Gumus, S. (2014), 'The Effects of Community Factors on School Participation in Turkey: A Multilevel Analysis', *International Review of Education*, 60(1), pp.79–98.
- Haller, A.O. and A. Portes (1973), 'Status Attainment Processes', *Sociology of Education*, 46(1), pp.51–91.
- Hamilton, K., Q. Wodon, D. Barrot, and A. Yedan (2019), 'Human Capital and the Wealth of Nations: Global Estimates and Trends', in G.-M. Lange, Q. Wodon, and K. Carey (eds.) *The Changing Wealth of Nations 2018: Building a Sustainable Future*. Washington, DC: World Bank, pp.115–32.
- Hannum, E. (2002), 'Educational Stratification by Ethnicity in China: Enrollment and Attainment in the Early Reform Years', *Demography*, 39(1), pp.95–117.
- Hannum, E. (2003), 'Poverty and Basic Education in Rural China: Villages, Households, and Girls' and Boys' Enrollment', *Comparative Education Review*, 47(2), pp.141–59. doi:10.1086/376542
- Hanushek, E.A. (2013), 'Economic Growth in Developing Countries: The Role of Human Capital', *Economics of Education Review*, 37(C), pp.204–12.
- Hanushek, E.A. and L. Woessmann (2012), 'Do Better Schools Lead to More Growth? Cognitive Skills, Economic Outcomes, and Causation', *Journal of Economic Growth*, 17(4), pp.267–321.
- Israel, G., L. Beaulieu, and G. Hartless (2001), 'The Influence of Family and Community Social Capital on Educational Achievement', *Rural Sociology*, 66(1), pp.43–68. doi:10.1111/j.1549-0831.2001.tb00054.x
- Jones, C.I. and P.M. Romer (2010), 'The New Kaldor Facts: Ideas, Institutions, Population, and Human Capital', *American Economic Journal: Macroeconomics*, 2(1), pp.224–45.
- Kabene, S.M., C. Orchard, J.M. Howard, M.A. Soriano, and R. Leduc (2006), 'The Importance of Human Resources Management in Health Care: A Global Context', *Human Resources for Health*, 4(1), 20.

- Kikkawa, A., R.E. Gaspar, and C.-Y. Park (2019), 'International Migration in Asia and the Pacific: Determinants and Role of Economic Integration', *Asian Development Bank Economics Working Paper Series*, No. 592. Manila: Asian Development Bank.
- Mincer, J. (1974), *Schooling, Experience, and Earnings (Human Behavior & Social Institutions)*, No. 2. Cambridge, MA: National Bureau of Economic Research.
- Nelson, R.R. and E.S. Phelps (1966), 'Investment in Humans, Technological Diffusion, and Economic Growth', *The American Economic Review*, 56(1/2), pp.69–75.
- OECD (2001), *The Well-Being of Nations: The Role of Human and Social Capital*. Paris: Organisation for Economic Co-operation and Development.
- Phanphairoj, K. and R. Loa (2017), 'Comparison of the Determinants of the Health Service System and the Health Status of the People in the Greater Mekong Subregion (GMS)', *Current Psychiatry Reviews*, 13(4), pp.246–51.
- Schultz, T.W. (1961), 'Investment in Human Capital', in *The Economic Value of Education*. New York: Columbia University Press, pp.1–17.
- Smith, A. (1776), *The Wealth of Nations*. New York: The Modern Library.
- Solow, R.M. (1956), 'A Contribution to the Theory of Economic Growth', *The Quarterly Journal of Economics*, 70(1), pp.65–94.
- World Bank (2017), Human Capital Project.  
<https://www.worldbank.org/en/publication/human-capital> (accessed 12 June 2020).
- World Bank (2020a), Human Capital Index.  
<https://datacatalog.worldbank.org/dataset/human-capital-index> (accessed 2 June 2020).
- World Bank (2020b), World Development Indicators.  
<https://data.worldbank.org/indicator?tab=all> (accessed 2 June 2020).
- World Economic Forum (2017), *The Global Competitiveness Report 2017–2018*. Geneva: World Economic Forum.
- World Economic Forum (2019), *The Global Competitiveness Report 2019*. Geneva: World Economic Forum.

# Health Services Improvement in the Greater Mekong Subregion

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## **1. Introduction**

The health service system refers to healthcare professionals or organisations that provide healthcare activities to the population. It plays an important role in ensuring the well-being of the people and contributing to the growth and development of an economy. Health service system reforms are needed to accelerate the development of a country (Berman and Bitran, 2011).

The Greater Mekong Subregion (GMS) covers a geographical area consisting of Cambodia, the Lao People's Democratic Republic (Lao PDR), Myanmar, Thailand, Viet Nam, and China (Yunnan Province and Guangxi Zhuang Autonomous Region). It is home to about 300 million people. Regional cooperation and integration have facilitated population movement within the region either legally or illegally, and created a unique set of public health challenges. The collective challenges threaten the GMS countries' Sustainable Development Goals (SDGs), particularly universal health coverage (UHC).

According to the World Health Organization (WHO), 'UHC means that all individuals and communities receive the health services they need without suffering financial hardship. It includes the full spectrum of essential, quality health services, from health promotion to prevention, treatment, rehabilitation, and palliative care' (WHO, 2020). To measure UHC progress, the World Bank and WHO have developed a framework consisting of 16 essential health services in four categories: (i) reproductive, maternal, newborn, and child health; (ii) infectious diseases; (iii) non-communicable diseases; and (iv) service capacity and access.

This chapter aims to provide a comprehensive analysis of the status of health services in the GMS, propose regional targets, and provide recommendations to improve health services in the region. It is organised as follows. The next section presents the status of health services in the GMS. The following sections describe the challenges and opportunities for the improvement of health services in the GMS, and cooperation mechanisms and targets for the future of health services in the GMS. The final section concludes the paper.

## **2. Status of Health Services in the GMS**

### **2.1. Health Service Systems in the GMS**

The health systems in GMS countries differ in terms of structure, operational history, coverage, and quality. The Thai healthcare system is considered the most advanced in the region and consists of government health services, non-profit health organisations, and the private medical sector. In total, Thailand has 17,013 healthcare facilities,<sup>29</sup> of which about 70% are public (Oxford Business Group, 2016). The ratio of doctors, nurses, and midwives per 1,000 population in Thailand was 3.1, lower than the WHO recommendation of 4.45 health professionals/1,000 population – indicating human resources shortages in health services (Pagaiya et al., 2019).

In Viet Nam, a system of mixed public–private health services is evolving. The country’s healthcare delivery system is organised into central, provincial, district, and commune levels. The central health services providers are managed directly by the Ministry of Health (MOH), and village health workers are at the bottom of the system, working in commune healthcare stations (Le et al., 2010). Since 2008, with the adoption of Resolution No. 18/2008/NQ-QH12 by the National Assembly, Viet Nam has stepped up the socialisation of health services, including services provided by public health facilities. In 2018, the number of hospitals in Viet Nam reached 1,063 (of which 12% are private). There is an average of 8.6 doctors and 28 hospital beds per 10,000 people (General Statistics Office of Viet Nam, 2018). Compared with the global average of 15 healthcare workers and 30 beds per 10,000 population, this is much lower (Pham, 2016).

Health services in the Lao PDR are mainly provided by the public system, which is organised into three administrative levels (central, provincial, and district) (USAID, 2019). The MOH manages the system at the central level and oversees the professional operation at other levels of the health service system. The fourth level of the health service system in the Lao PDR consists of health centres, village health volunteers, community health committees, and traditional birth attendants. In 2016, 1,233 health service facilities were operating in the Lao PDR, including 43 central hospitals, 17 provincial hospitals, 137 district hospitals, and 1,026 health centres (Masaki et al., 2017). Meanwhile, the private health sector consists of 1,050 clinics, 29 hospitals, and three specialisation hospitals under construction (ASEAN–Japan Centre, 2019).

In Cambodia, basic health service delivery was restored in the 1990s through health reforms, with a network of public health facilities and a growing private sector. The private sector and informal providers account for 61% and 26%, respectively, of all health service provision in Cambodia (WHO, 2015).

Myanmar’s healthcare system reflects the country’s seven decades of conflict. It includes the system managed by the Ministry of Health and Sports and another system operated by a collective of community-based organisations and the health departments of ethnic armed organisations (Latt et al., 2016). This differentiates Myanmar’s healthcare system

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<sup>29</sup> As of October 2015.

from others in the GMS in terms of service delivery, human resources, and political affiliations (IPSOS, 2013).

## 2.2. Basic Healthcare Services in GMS Countries

Basic healthcare service coverage is generally quite high in GMS countries (Table 1), especially in protecting reproductive, maternal, and infant health. Table 1 also shows that the indicators on universal immunisation and reproductive health are high in many GMS countries (except the Lao PDR).

**Table 1: Basic Healthcare Services in the GMS**

Indicators	Viet Nam	Lao PDR	Cambodia	Thailand	Myanmar	China
Percentage of births delivered by skilled medical workers (%)	93.8% (2014)	40.1% (2012)	89% (2014)	99.1% (2016)	60% (2016)	99.9% (2015)
Percentage of women with antenatal care insurance – at least four visits (%)	73.7% (2014)	62.2% (2017)	75.6% (2014)	90.8% (2016)	58.6% (2016)	
Percentage of family planning demand by modern methods (% of married women in need of family planning)	70% (2014)	61% (2012)	56% (2014)	89% (2016)	75% (2016)	97% (2001)
Percentage of children who received the DPT vaccine in 2018 (% of children aged 12–23 months)	75%	68%	92%	97%	91%	99%
Percentage of children who received hepatitis B vaccine (HepB3) in 2018 (% of children 1 year old)	75%	68%	92%	97%	91%	99%
Percentage of children who received measles vaccine in 2018 (% children aged 12–23 months old)	97%	69%	84%	96%	93%	99%
Rate of HIV drug treatment (% of people infected with HIV) in 2018	65%	54%	81%	75%	70%	
Rate of effective tuberculosis treatment (% of people who received treatment) in 2016	75%	37%	58%	47%	63%	82%

DPT = diphtheria, pertussis, tetanus; GMS = Greater Mekong Subregion; Lao PDR = Lao People's Democratic Republic.

Sources: World Bank (n.d.) DataBank. (<https://data.worldbank.org/indicator?tab=all>; and WHO (n.d.), Data Collections. <https://www.who.int/data/collections> (accessed 15 May 2020).

For example, the percentage of children who have received vaccines for measles is 84%–99% in most GMS countries, but only 69% in the Lao PDR. In Viet Nam, more than 1.70 million children were registered in the national immunisation management information system at 11,183 (or 99%) of medical stations across the country – storing personal vaccination information and facilitating the management of vaccinations at the local level (VNA, 2019). In terms of reproductive health, the percentage of women with antenatal care insurance is highest in Thailand (90.8%), followed by Cambodia (75.60%), Viet Nam (73.70%), the Lao PDR (62.20%), and Myanmar (58.60%). The ratio for Thailand is equivalent to or higher than the average in the Asia-Pacific region (except developed countries).<sup>30</sup> However, access to effective tuberculosis treatment services are quite low in the Lao PDR and Myanmar, at only 37% and 47%. Apart from the Lao PDR and some component indicators in Cambodia and Myanmar (Table 1), the access to basic healthcare services of residents in GMS countries is generally higher than that of other countries in the Association of Southeast Asian Nations (ASEAN). This improved considerably during 2015–2017 in universal immunisation, reproductive health, and infant health. Table 2 shows that the scores regarding access to healthcare services of residents in GMS countries are higher than the ASEAN average, except Singapore. According to the WHO evaluation, in terms of reproductive, maternal, and infant health in 2017, Thailand's scores of 90 were better than those of the other GMS countries and are higher than those of some developed countries such as Japan, the Republic of Korea, and the United States.

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<sup>30</sup> In the Asia-Pacific region (except developed countries), the rate of children being delivered by skilled health workers/midwives in 2015 reached 95%. The vaccination rates for diphtheria, pertussis, tetanus (DPT), hepatitis B, and measles in 2018 were 91%, 91%, and 92%, respectively.

**Table 2: WHO Country Score of Basic Healthcare Services Coverage**

Country or region	Reproductive, maternal, and infant health		Infectious diseases		Non-infectious diseases	
	2017	2015	2017	2015	2017	2015
Viet Nam	82	82	73	66	64	63
Thailand	90	90	74	62	69	68
Cambodia	73	73	66	61	68	67
Myanmar	71	69	62	57	65	64
Lao PDR	59	61	54	43	61	59
China	86	86	69	61	65	64
Philippines	69	65	53	45	64	63
Malaysia	76	76	68	60	62	62
Brunei Darussalam	92	92	77	75	71	71
Indonesia	79	79	36	28	58	59
Timor Leste	65	63	49	44	46	44
<b>ASEAN average score (except Singapore, calculated from average points of countries)</b>	<b>76.5</b>	<b>76.0</b>	<b>61.9</b>	<b>54.7</b>	<b>63.0</b>	<b>62.2</b>
<b>Singapore</b>	<b>90</b>	<b>90</b>	<b>77</b>	<b>76</b>	<b>78</b>	<b>78</b>
<b>Japan</b>	<b>85</b>	<b>84</b>	<b>79</b>	<b>69</b>	<b>71</b>	<b>70</b>
<b>Republic of Korea</b>	<b>89</b>	<b>89</b>	<b>84</b>	<b>82</b>	<b>72</b>	<b>71</b>
<b>United States</b>	<b>90</b>	<b>90</b>	<b>81</b>	<b>79</b>	<b>68</b>	<b>68</b>

ASEAN = Association of Southeast Asian Nations, GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic, WHO = World Health Organization.

Source: WHO (n.d.), Data Collections. <https://www.who.int/data/collections> (accessed 15 May 2020).

### 2.3. Health Service Capacity and Accessibility in GMS Countries

WHO measures health service capacity and accessibility based on hospital access, health worker density, access to essential medicines, health security, and compliance with the International Health Regulations (IHR). Table 3 shows the differences in the medical infrastructure of the GMS countries. For instance, the number of beds per 1,000 people is quite high in Viet Nam (2.51) – far above Cambodia (0.80), Myanmar (0.97), and the Lao PDR (1.23) but less than Yunnan, China (4.08). Indicators on the number of doctors and midwives per 1,000 people show the same trend. The number of nurses per 1,000 people in Viet Nam is lower than that of Thailand and Yunnan and Guangxi Zhuang, China. This figure is equivalent to 1.15 in Viet Nam, above the Lao PDR at 1.07, but about half of Thailand's rate of 2.32. According to the World Bank, the number of nurses and midwives per 1,000 people in Viet Nam in 2016 was only 1.40, which is considerably lower than the Asia-Pacific average (except developed countries) of 2.70, and numbers in other ASEAN Member States such as Malaysia (3.50) and Indonesia (2.40) in 2018 (World Bank, 2020).

**Table 3: Health Services Statistics of the GMS Countries**

Indicators	Cambodia 2014	Guangxi Zhuang, China 2016	Yunnan, China 2016	Lao PDR 2016	Myanmar 2016	Thailand 2016	Viet Nam 2016
Doctors (1,000)	2.19	77.8	122.6	4.33	10.48	31.48	77.5
Number of doctors/1,000 people	0.14	1.39	2.57	0.64	0.2	0.46	0.84
Nurses (1,000)	9.1	122.6	106	7.25	21.6	159.79	106.7
Number of nurses/1,000 people	0.6	2.2	2.22	1.07	0.41	2.32	1.15
Pharmacists (1,000)	0.62	16.7	10.4	1.76	-	12.66	33
Number of pharmacists/ 1,000 people	0.04	0.3	0.22	0.26	-	0.18	0.36
Midwives (1,000)	5.48	-	-	1.52	13.81	-	28.8
Number of midwives/1,000 people	0.36	-	-	0.22	0.26	-	0.31
Number of hospital beds (1,000)	12.41 (2015)	209.02	194.7	8.34	51.46	-	232.3
Number of beds/1,000 people	0.8 (2015)	3.75	4.08	1.23	0.97	1.72 (2015)	2.51

GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic.

Source: <http://www.greatermekong.org/stats/index-static.php> (accessed 15 May 2020).

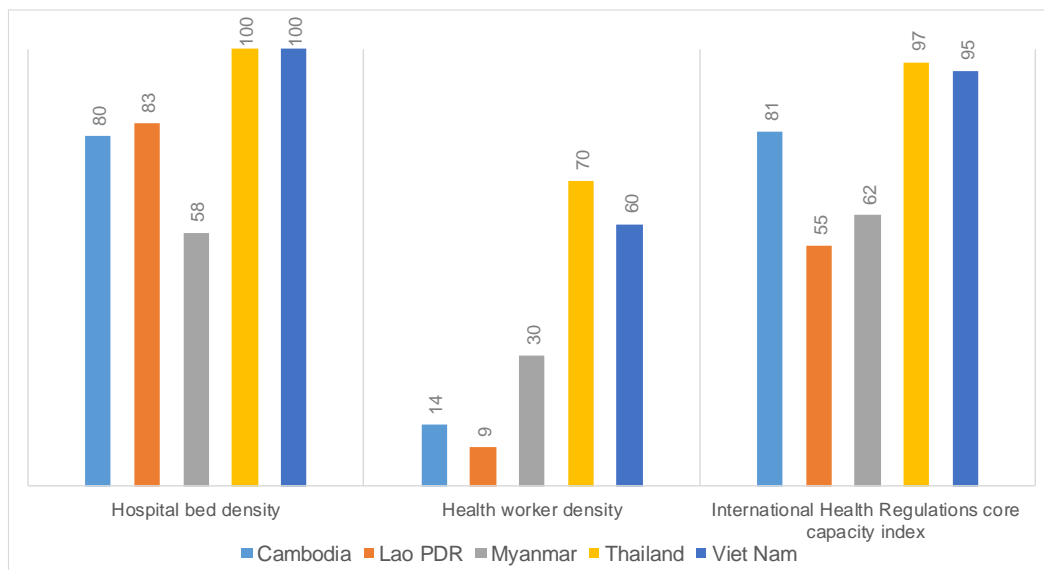
In GMS countries, healthcare services are mainly supplied by public hospitals. The public medical systems supply services at a lower cost than private medical hospitals. The ratio of public hospitals is significantly higher in Viet Nam (81%) and Thailand (70%) than in the Lao PDR (32%) and Cambodia (20%). Therefore, the livelihood of people, especially the poor and informal workers, accessing affordable health services is higher in Viet Nam and Thailand. However, amongst GMS countries, the level of provision of public services in the hospital systems of Thailand and the Lao PDR is higher than in Viet Nam and Cambodia (Phanphairoj and Loa, 2017).

In terms of medical infrastructure in 2017, according to the WHO evaluation, Viet Nam's ability to receive and serve patients was lower (score of 83) than that of Thailand (score of 88). In relation to IHR, core capacity indicators are fully implemented, such as human resources, surveillance, laboratory, and response for limiting the spread of public health emergencies. According to this, Viet Nam and Thailand have significant points, at 95 points and 97 points, respectively.

The effectiveness of using the basic medical system in Viet Nam has many limits. It also generates pressure on hospital systems, especially central and provincial hospitals. About 31% of medical examinations at central hospitals can be resolved at provincial hospitals, while 41% of medical examinations at provincial hospitals can be resolved at district hospitals. In Viet Nam, a large number of district hospitals/medical centres have lacked investment and missing facilities, while about 40% of commune health stations do not meet national standards (Social Affairs Committee of the National Assembly, 2018).



**Figure 1: WHO Evaluation of Infrastructure and Ability to Provide Healthcare Services in GMS Countries**



GMS = Greater Mekong Subregion, Lao PDR = Lao People’s Democratic Republic, WHO = World Health Organization.

Source: WHO (2019).

#### 2.4. Finance for Medical Activities in GMS Countries

The different health care spending levels in Mekong countries in 2017 are shown in Table 4. Overall, the social expenditure on medical activities in GMS countries is high. Except in the Lao PDR and Thailand, the rate of healthcare expenditure/gross domestic product (GDP) in 2017 in GMS countries was higher than the Asia-Pacific average (except developed countries). The rate of Yunnan Province (China) was 8.04% (in 2015), about 1.6 times the Chinese average.

**Table 4: Healthcare Expenditure in GMS Countries, 2017**

Indicators	Viet Nam	Lao PDR	Cambodia	Thailand	Yunnan, China (2015)	Guangxi Zhuang, China	Myanmar	Asia-Pacific (except developed countries)
Social expenditure on health as percentage of GDP in 2017 (%)	5.53	2.53	5.92	3.75	8.04	5.15	4.66	<b>4.91</b>
Social expenditure on health per capita (\$)	129.58	62.12	82.08	247.04	370.88	440.83	58.04	<b>313.64</b>
State budget spending on health (% of total budget expenditure)	9.48	4.04	6.08	15.03	-	9.07	3.49	-
State budget spending on health (% of GDP)	2.69	0.89	1.41	2.85	-	2.92	0.69	<b>2.74</b>
Budget spending on health per capita (\$/person)	63	21.84	19.54	188.06	-	249.83	8.59	<b>177.95</b>
Private expenditure on health (% of total social spending on health)	49.38	48.2	61.13	20.91	-	43.33	76.23	42.99

GDP = gross domestic product, GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic.  
Source: <https://data.worldbank.org/> (accessed 15 May 2020).

Public finance is the main source of healthcare spending in most countries of the GMS. Viet Nam and Thailand spent a large share of their government budgets on health in 2017 (9.48% and 15.03% of total budget expenditure, respectively). As a percentage of GDP, Viet Nam's budget spending on health is higher than the Asia-Pacific average (except developed countries). The Lao PDR and Cambodia have received a large amount of sponsorship for the medical system from non-governmental organisations (NGOs) and foreign sponsors (Phanphairoj and Loa, 2017). The percentage of out-of-pocket payments on health is the highest in Cambodia and Myanmar, at 61.13% and 76.23% respectively.

There is a significant gap in the level of private expenditure on health amongst GMS countries. Thailand has the lowest rate, at about 20% of private spending on health, which is only half the regional average. This partly reflects the effectiveness of public expenditure on health in Thailand as well as the success of the global healthcare programme reaching 98% of residents (against 65% in Viet Nam, 24% in Cambodia, and 15% in the Lao PDR) (Phanphairoj and Loa, 2017). The level of private expenditure on healthcare services in the Lao PDR is lower than in Viet Nam thanks to NGOs and external development partners. In Cambodia, the MOH manages the healthcare system under a centralised model, which increases management costs and raises the burden of payments on the private healthcare system.<sup>31</sup>

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<sup>31</sup> In Viet Nam, the Lao PDR, and Thailand, the health system is managed in a decentralized manner, helping to enhance the role of local governments in planning, financing, and providing health services. This makes it suitable for local conditions, contributing to reducing the management costs of the health system (Phanphairoj and Loa, 2017).

**Table 5: Effectiveness of Medical Cost on Households in GMS Countries**

Indicator	Viet Nam (2016)	Thailand (2017)	Lao PDR (2017)	Cambodia	Myanmar (2015)	China (2013)
<b>Incidence of catastrophic expenditure (%)</b>						
At 10% of household total consumption or income*	9.40%	2.20%	3%	15.3% (2014)	14.40%	19.70%
At 25% of household total consumption or income	1.90%	0.40%	0.30%	5.2% (2014)	2.80%	5.40%
<b>Rate of poverty due to people's own health spending (% poverty line)</b>						
\$1.90/day (price comparison in 2011) (PPP)	0.25%	0%	0.40%	2.99% (2009)	0.63%	1.48%
\$3.20/day (price comparison in 2011) (PPP)	1.16%	0.01%	0.99%	6.15% (2009)	2.92%	
60% daily expenditure/total household expenditure	2.36%	0.62%	0.44%	4.55% (2009)	2.27%	4.19%
<b>Poverty gap increased due to people's self-expenditure on health (% poverty line)</b>						
\$1.90/day (price comparison in 2011) (PPP)	0.05%	0%	0.09%	1.48% (2009)	0.14%	0.38%
\$3.20/day (price comparison in 2011) (PPP)	0.27%	0%	0.39%	2.76% (2009)	0.80%	
60% daily expenditure/total household expenditure	0.70%	0.18%	0.11%	1.96% (2009)	0.63%	1.63%

GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic, PPP = purchasing power parity.

\* Within the Sustainable Development Goal monitoring framework, catastrophic health spending is defined as out-of-pocket health spending exceeding 10% or 25% of the household's total consumption or income (budget). These payments include the part not covered by a third party such as the government, health insurance fund, or private insurance but exclude insurance premiums as well as any reimbursement by a third party. They might be financed by income, including remittances, savings, or borrowings.

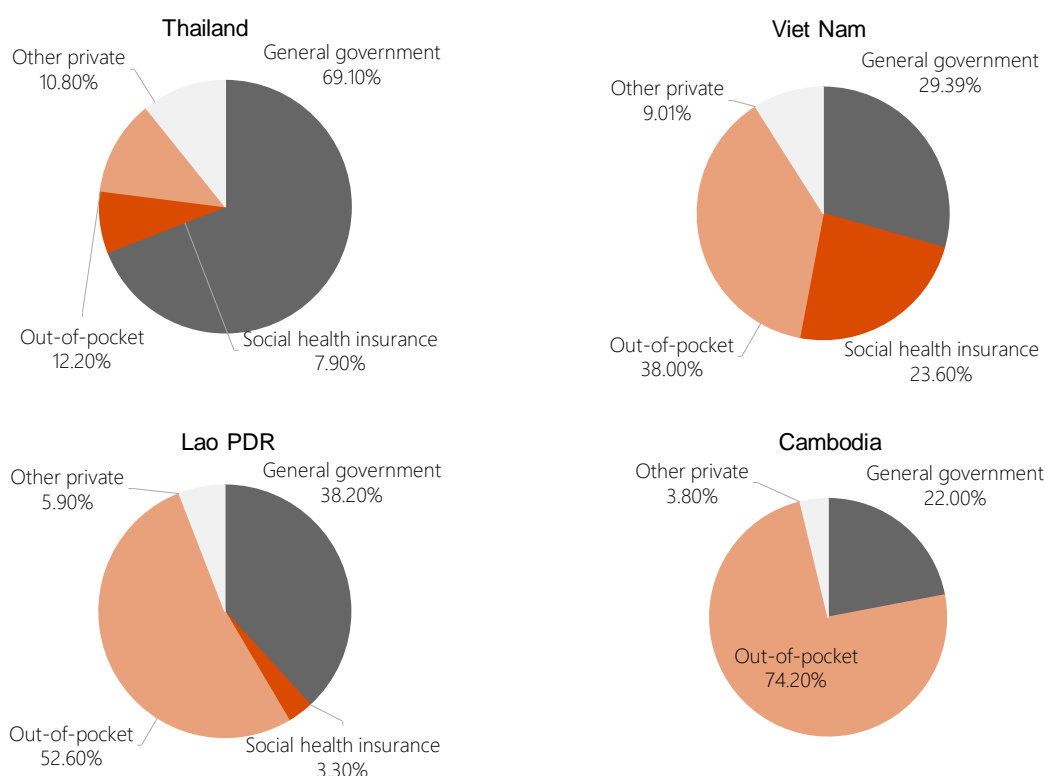
Source: WHO (2019).

Apart from Thailand, households in GMS countries spend a large share of their total household expenditure or income on healthcare. In Viet Nam, 9.4% of households spend at least 10% of their expenditure or income on healthcare services, rising to 15% or more in Cambodia, Myanmar, and China (about 20%).

To go into the details of the structure of medical expenses in GMS countries, there is a remarkable gap between medical insurance coverage and social security. Thailand has the best coverage, with widening of the poverty gap due to basic medical expenses under 0.5%. The rate of widening of the poverty gap due to medical expenses in Viet Nam is maintained at a low level, but the rates of impoverishment due to people's medical expenses (% poverty line) are quite high (the rate of poverty caused by using up to 60% of daily expenditure income on health ranks second amongst GMS countries). This reflects a constrained level of UHC and limited support from the government budget for medical

expenditure. Until May 2019, medical insurance had covered 89% of Vietnamese people (Ha, 2019). In the Lao PDR and Cambodia, medical insurance coverage was 15% and 24%, respectively, in 2014. There was some improvement in using health equity funds (HEFs)<sup>32</sup> to pay for the poor in Cambodia, but employees in the private sector are not totally insured, and vulnerable groups (e.g. the elderly and people with disabilities) are excluded from the free insurance programme (Van Minh et al., 2014).

**Figure 2: Structure of Medical Expenses in GMS Countries**



GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic.  
Sources: WHO (2019).

Insurance is another important resource for healthcare expenditure. Thailand introduced the Universal Coverage Scheme (UCS) in 2002 and since then has improved healthcare access and utilisation. The UCS covers Thai citizens who are not protected by any other public scheme. It replaces all previous health insurance schemes (Glassman and Temin, 2016).<sup>33</sup> In 2017, about 48.80 million people or 72% of the population were registered under the UCS. Other insurance schemes in Thailand include the social security scheme (SSS) and the Civil Servant Medical Benefit Scheme (CSMBS). The SSS provides mandatory

<sup>32</sup> A government-funded subsidy whereby public health facilities provide services free of charge to poor patients, financed through a transfer from the national budget. The schemes are managed directly by operational districts and hospitals.

<sup>33</sup>These include the low-income card scheme for the poor; the medical welfare scheme; a medical welfare scheme for indigent people; and the voluntary health card for the disabled, the elderly, and children aged under 12 years.

coverage for private sector employees but not their dependents who are covered under the UCS. The SSS is mandatory for firms with more than one worker and for the self-employed. The CSMBS covers civil servants and their immediate family members, including spouses, parents, and up to three children under the age of 20 years. It also covers retirees and their dependents. The SSS covers 14 million of the population, while the CSMBS coverage is 5 million. Thai citizens also have access to private health insurance, which covers 6–9 million employees and employers. Private insurance companies provide this insurance (Witookollachit, 2018).

Viet Nam has four main types of social insurance: health insurance, compulsory social insurance, unemployment insurance, and voluntary social insurance. Since 2008, enrolment in health insurance has been mandatory under the Law on Health Insurance, 2008. As of 2019, Viet Nam has the highest proportion of people enrolled in health insurance, at 85.95 million, while the voluntary social insurance is the lowest, at only 570,000 people. The number of participants in compulsory social insurance and unemployment insurance is medium, at 15.77 million and 13.43 million, respectively (VNA, 2020).

Myanmar's social security scheme is run by the Social Security Board (SSB) under the Ministry of Labour, Immigration and Population. The scheme requires a contribution of 2% of workers' salaries and is open to regular workers in the formal sector. Although it has been active since 1956, the scheme only covers about 1,400,000 employees (around 2.5% of the population) out of 54.7 million citizens. Only certain groups of state-owned enterprise employees, civil servants, and employees of public and private firms with five or more employees can enrol in this programme (Van Rooijen et al., 2018). Formal private sector workers are covered by a contributory social security scheme. The SSB does not cover workers in the private and informal sectors.

The Lao PDR had six health protection schemes as of 2017: the National Social Security Fund; the National Social Security Fund; national health insurance (NHI); community-based health insurance (CBHI); HEFs; and the free maternal, newborn, and child healthcare programme. The CBHI covers only 2.2% of the population, while the NHI covers 1.7%. HEFs target the poor and cover only 5% of the population. The MOH aims to achieve UHC by 2025, but the current health insurance programmes only cover 20% of the population (Alkenbrack, Jacobs, and Lindelow, 2013).

In Cambodia, the National Social Security Fund provides basic insurance (employment injury and health) to workers in the formal sector to ensure their welfare and secure their livelihoods in case they encounter hardships. The employment injury insurance scheme had more than 1.6 million registered members in 12,513 registered businesses as of 2018, with 156 contracted hospital facilities. The health insurance scheme had nearly 1.6 million registered members in 9,200 registered businesses, with 1,349 contracted hospitals. The government, through the MOH, has established a HEF to subsidise the healthcare fees of

low-income people who hold an 'IDPoor' card.<sup>34</sup> The programme benefits about 3 million people or 92.70% of the poor population (MOH (Cambodia), 2017). Voluntary health insurance is provided in two forms: CBHI and private health insurance for consumers and informal sector workers. However, CBHI schemes provide only moderate financial protection and access to essential healthcare for those enrolled, through the support of a small number of NGOs. Since 55% of the population is either poor or vulnerable, the level of contributions in the scheme will not be stable (OECD, 2017). At the same time, only a small number of the non-poor informal sector has the capacity to pay into a contributory system. Thus, CBHI tends to fail in encouraging enrolment and it is not able to cover a large section of informal sector labour.

In terms of insurance policies for informal workers or the unemployed, a voluntary social security system for informal sector workers was set up in 2011 under the Social Security Act, 1990 (amended in 1994 and 1999). Thailand is the first country in the GMS to provide access to a universal insurance scheme. In 2012, 69.00% of informal workers who suffered an injury and required hospital treatment used UCS; 6.70% used private health insurance; 2.40% used insurance available to family members of government officers; 19.00% paid for themselves; 1.10% paid with the help of parents, relatives, and/or friends; and 0.80% were covered by employers. Therefore, it is obvious that informal sector workers have benefited from the UCS (Kongtip et al., 2015).

In Viet Nam, only 24.0% of the labour force in 2016 was covered by compulsory and voluntary social insurance schemes. 97.90% of informal workers worked without social insurance, and only 0.2% had compulsory social insurance (ILO, 2020b).

In Cambodia, most people are not fully or partly covered by insurance. The National Social Security Fund covers 1.2 million private sector workers. They are protected by injury insurance, maternity benefits, and, health insurance. However, they are mostly workers of large enterprises (ILO, 2020a).

Similarly, most people in the Lao PDR are not protected by social insurance. Less than 20% of the labour force, mostly in the formal sector, benefits from comprehensive social protection coverage. The government has been supporting NGOs to achieve comprehensive social protection within the next decade and to promote voluntary coverage for self-employed workers (ILO, 2020a).

In Myanmar, it is estimated that 51.50 million people or 97% of the population does not have access to adequate social protection, leaving them to rely on themselves and their communities to cope with life risks (ILO, 2020b).

## **2.5. Effectiveness of Health Services Provision in GMS Countries**

The effectiveness of health services in GMS countries is illustrated through the outcomes of the longevity and health of people in these countries. In general, the health and

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<sup>34</sup> The Identification of Poor Households Programme (IDPoor), established in 2006 within the Ministry of Planning, is part of the Government of Cambodia's ongoing efforts to reduce poverty and support socioeconomic development throughout the country (Ministry of Planning of Cambodia, 2020).

longevity of people in GMS countries (except Viet Nam) improved significantly during 2010–2018, with a greater change than the average of the Asia-Pacific region (except developed countries). The longevity and health of people is lower in the Lao PDR, Cambodia, and Myanmar than in Viet Nam, Thailand, and the Asia-Pacific average (except developed countries). However, the difference narrowed considerably in most of the indicators during 2010–2018, especially in the mortality rate of children under 5 years old/1,000 births (Table 6).

**Table 6: Selected Life Expectancy and Health Indicators of GMS Countries**

Item	Viet Nam	Lao PDR	Cambodia	Thailand	China	Myanmar	Asia-Pacific countries (except developed ones)
<b>Mortality rate of children under 5 years old/1,000 births</b>							
2010	23.10	68.10	44.30	13.30	15.80	63.30	23.10
2018	20.70	47.30	28.00	9.10	8.60	46.20	15.70
Change	-2.40	-20.80	-16.30	-4.20	-7.20	-17.10	-7.40
<b>Stunting rate (% of children under 5 years old)*</b>							
2010	22.70	44.20	39.80	16.40	9.40	-	-
2018	23.80	33.10	32.40	10.50	8.10	29.40	-
Change	1.10	-11.10	-7.40	-5.90	-1.30	-	-
<b>Expected longevity (years)**</b>							
2010	74.80	64.30	66.60	74.20	74.40	63.50	73.10
2018	75.30	67.60	69.60	76.90	76.70	66.90	75.00
Change	0.50	3.30	3.00	2.70	2.30	3.30	1.90
<b>Rate of survival to 65 years for females (%)***</b>							
2010	86.20	68.40	72.50	84.20	86.30	69.60	83.90
2018	86.80	73.80	77.60	87.60	89.00	74.70	86.40
Change	0.60	5.40	5.10	3.50	2.80	5.00	2.40
<b>Rate of survival to 65 years for males (%)***</b>							
2010	71.40	60.70	63.70	71.00	80.20	55.20	76.40
2018	72.00	66.20	67.90	74.40	83.30	61.60	78.90
Change	0.60	5.60	4.20	3.40	3.10	6.30	2.50

GMS = Greater Mekong Subregion, Lao PDR = Lao People's Democratic Republic.

\* The stunting rates were taken as follows: Viet Nam (2010, 2017); Lao PDR (2011, 2017); Thailand (2010, 2013); China (2010, 2013); average of the lower middle-income countries (2010, 2017); and Myanmar (2016).

\*\* The average expected longevity from birth in the Asia-Pacific region (except for developed countries) and lower middle-income countries are according to 2010 and 2017 data.

\*\*\* The rate of survival until age 65 for women and men in lower middle-income countries and Asia-Pacific countries (except developed countries) are from 2010 and 2017 data.

Source: World Bank (n.d.), World Bank Open Data. <https://data.worldbank.org/> (accessed 15 May 2020).



Nevertheless, the quality of the grassroots healthcare system and private medical examination and treatment services in Viet Nam, the Lao PDR, and Cambodia are generally limited. In Viet Nam, the private medical system is fragmented and has many operating difficulties.<sup>35</sup> Grassroots healthcare systems are limited in terms of facilities, the quality of health workers, and healthcare services. Almost all medical stations have a shortage of medicines, including for the treatment of chronic and common diseases, and traditional medicine (Nguyen, 2018). Moreover, the level of antibiotic abuse in Viet Nam is alarming, increasing the risk of antibiotic resistance in the community (APSIC, 2019). Training for medical workers and private health infrastructure in the Lao PDR and Cambodia are limited. In Thailand, the quality of healthcare services is higher, but the best healthcare services in private hospitals are only accessible to the high-income population (Arunanondchai and Fink, 2007).

### **3. Cooperation and Challenges for Providing Healthcare Services in GMS Countries**

#### **3.1. Medical Cooperation in GMS Countries**

Medical cooperation is a priority strategy for GMS countries. It is identified in the GMS Economic Cooperation Program Strategy Framework, 2012–2022 and integrated into other cooperation programmes such as the Strategic Framework and Action Plan for Human Resource Development in the GMS, 2013–2017. Demand for medical cooperation is based on medical issues in the region, such as protecting community health, controlling cross-border diseases, providing healthcare for migrants and vulnerable groups, and upgrading the quality of healthcare services.

Medical cooperation is one of the most effective collaborative actions amongst GMS countries (ADB, 2017). It is implemented through annual conferences between the health authorities of the GMS countries. The Third Meeting of the GMS Working Group on Health Cooperation took place in Thailand in December 2019. The target was strengthening medical cooperation in GMS countries to address regional issues such as health insurance for immigrants, responding to pandemics, developing medical infrastructure, and promoting the application of information technology in the health sector in the context of the Fourth Industrial Revolution. Regarding the health protection of migrants, representatives of the GMS countries signed a memorandum of understanding in 2004 to cooperate in tackling human trafficking. The Mekong Migration Network, established in 2008 to recognise and protect rights of migrants, is a subregional support network for NGOs, migrant grassroots groups, and research institutes (ADB, 2013). In addition, there are bilateral collaborations and memoranda of understanding between Thailand and neighbouring GMS countries on the migration of workers.

Numerous regional and subregional initiatives have been established to ensure cross-border cooperation on migrant health.<sup>36</sup> With the help of the Asian Development Bank

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<sup>35</sup> Resolution No. 20-NQ/TW.

<sup>36</sup> These include the Mekong Basin Disease Surveillance Network; the Joint United Nations Initiative on Mobility and HIV/AIDS; the WHO Mekong Malaria Elimination Programme; and the WHO Regional Action Framework on UHC.

(ADB) and the Ministry of Labour and Vocational Training of Cambodia, the Lao PDR, Myanmar, Thailand, and development partners organised the Roundtable Discussion on Regional Investment Framework for Migrant Health in the GMS on regional migrant healthcare and financing solutions (ADB, 2018). The 'Vientiane Declaration on Transition from Informal Employment to Formal Employment towards Decent Work Promotion in ASEAN' specified the rights of informal workers in ASEAN and requires the members to 'foster research and information sharing amongst ASEAN Member States on best practices in promoting the transition from informal employment to formal employment towards achieving decent work that promotes employment creation, rights at work, social protection, and social dialogue' (ASEAN, 2020).

Although various cooperation programmes protect migrant labour – such as mapping of social protection regimes, establishing social insurance systems to cover the informal sector, and building UHC in all countries – they have not yet been fully implemented. Thus, mutual recognition of migrants' rights, in terms of access to healthcare, has not been achieved.

### **3.2. Challenges to the Healthcare Systems in GMS Countries**

Healthcare systems in the GMS generally produce varying degrees of success in reducing risk pooling, standardising contributions and benefits, and reducing direct payments that help consolidate distinctive features of the health systems as well as ensuring health for all. In Viet Nam, Thailand, the Lao PDR, and China, insurance systems have become more firmly ensconced in the hands of the state, while a combination of government and community-based organisations, religion-based societies, and NGOs provide health services in others.

All the GMS countries have a social insurance scheme to improve the quality of life of their citizens. The programmes cover pensions for employees (both private and public), benefits for survivors, disability, work injuries, and unemployment. One of the most prominent schemes is a UHC provided for all people in Thailand. Other countries are also implementing pro-poor insurance schemes, such as the health fund for the poor in Viet Nam, 'IDPoor' in Cambodia, and HEFs in the Lao PDR.

Improving health systems in the GMS involves several challenges. The first challenge is improving UHC in GMS countries. There is a considerable difference amongst GMS countries in the level of UHC in three groups of indicators: (i) access to health services, (ii) medical infrastructure, and (iii) medical expenses. Support from the state budget and insurance to healthcare in the Lao PDR and Cambodia is low, so the proportion of people paying for healthcare is high. All GMS countries aim to achieve the SDGs on healthcare by 2030, but the level of drug resistance and infectious diseases remains high.

The second challenge is mobilising resources and effective investment to improve the quality of the healthcare system, especially medical infrastructure in GMS countries. This is particularly important in responding to an acute public health threat, protecting health for vulnerable groups from regional integration, and responding to other priority health issues in the GMS. The GMS is a global hotspot for susceptible diseases and recurrent

diseases (ADB, 2019). Therefore, it is necessary to enhance the capacity of supervision, risk assessment, diagnostic capacity in laboratories, communication, and effective response of the public health system.

The third challenge is about enhancing cooperation amongst GMS countries in addressing regional health issues, especially the mechanism of sharing information, harmonisation of legal frameworks and policies on controlling infectious diseases, limiting disease spread, food safety, and protecting immigrant labourers and other vulnerable groups. A common challenge for GMS countries in implementing the SDGs on healthcare is health coverage for immigrants and groups of travelling people. This is most evident in border areas, where people often live and travel across borders, in ethnically diverse areas, with poor health infrastructure compared with other regions (ADB, 2019).

#### **4. Cooperation Goals and Programmes in the GMS, 2020–2030**

The GMS countries have a collective vision for GMS health cooperation – that health and well-being are shared by all in an integrated, prosperous, and equitable subregion. Medical cooperation programmes during 2020–2030 in GMS countries mainly aim to achieve three goals: (i) improving the effectiveness of responding to contagious disease and global health crises, (ii) strengthening the protection of vulnerable groups from the health effects of the integration process, and (iii) enhancing the quality of management and human resources to solve healthcare issues in GMS countries. The implementation of these targets is measured by a set of indicators for UHC in the GMS. On the basis of individual country situations, GMS countries have set their own goals to improve their healthcare systems. National health targets run parallel to the implementation of cooperation goals.

According to the 12th National Health Development Plan, 2017–2021, the Thai targets are as follows: (i) people, communities, local administrations, and networks have better knowledge of health, leading to a reduction in preventable mortality and morbidity; (ii) all age groups enjoy quality of life, with a reduction in premature mortality; (iii) the capacity of services is strengthened at all levels; (iv) an appropriate number of health personnel is in place to take care of people; and (v) the health governance system is efficient and effective (Ministry of Public Health (Thailand), 2017).

Meanwhile, Viet Nam, the Lao PDR, Cambodia, and Myanmar aim at UHC for all. These countries are implementing various policies to ensure that their residents receive health services without suffering financial hardship (WHO, 2020). The implementation of these goals is feasible, based on each government's efforts to commit to increasing levels of investment in health and developing policies to encourage the private sector to provide care services. The governments are also developing national and regional health programmes as well as implementing the major strategic health commitments that have been signed.

To achieve UHC, member countries must use multiple approaches. Thailand's UHC experience has shown that UHC requires long-term planning and continuous efforts to advance step by step when windows of opportunity exist at points along the route of policy development. An early step is improving healthcare infrastructure, then the arrangement of healthcare expenditure, and improving and extending public healthcare and the preventative healthcare system. Thailand's government developed the National Health Sector Plan, 2016–2020 to support UHC (WHO, 2015).

For Viet Nam, the government's Agenda for Moving toward Universal Coverage requires the assistance of central and provincial health facilities to strengthen the capacity of district and community health facilities. The aim is to shift the health service delivering burden to lower-level primary healthcare facilities (Somanathan et al., 2014).

For Myanmar, the government enhanced collaboration amongst the different types of providers at the various administrative levels, through the engagement of ethnic health organisations, NGOs, and private for-profit providers. Currently, the country has four health development strategies: (i) health promotion, disease prevention, and consumer and environmental protection excellence; (ii) fostering fair treatment and reducing inequality; (iii) developing and creating a mechanism to increase efficiency in managing human resources for health; and (iv) developing and strengthening the health governance system (Ministry of Health and Sports (Myanmar), 2016).

For Cambodia, the government aimed to improve equity, efficiency, and sustainability in access healthcare services and financing; improve the quality of healthcare services; and strengthen effective use of information, evidence, and research (WHO, 2016). The government has increased its healthcare expenditure and subsidised specific groups such as the poor, mothers, and children through HEFs.

For the Lao PDR, the government has progressively scaled up the coverage of the Social Security Fund, and streamlined and consolidated the national social protection strategy to attain the country's goal to achieve UHC by 2025 (ILO, 2020a).

To achieve these goals and targets, GMS countries need to implement the following activities. The priority activities to achieve goal 1 are as follows:

- Enhancing the indicator of core ability following the IHR standards. This activity aims to improve the ability of GMS countries to respond to potentially contagious diseases, including a system of medical laboratory facilities.
- Enhancing the capacity for cooperation; sharing information about healthcare amongst GMS countries; and building an integrated, multi-area information system to reflect the potential disease risks. This activity is integrated into other cooperation frameworks amongst GMS countries, to make the most of available resources.
- Cross-border and subregional cooperation on health security. This activity aims to harmonise the health regulations in GMS countries, design policies, and build the collective capacity of GMS countries in responding to public health issues (such as supervising contagious diseases, risk assessment, and information sharing).

Priority activities to achieve goal 2:

- Enhancing the capacity of the healthcare system in border areas, towards the goal of synchronising the quality of healthcare in border areas between countries; through this, enhancing the capacity of management and the access to healthcare services of residents in border areas, especially people who travel frequently across borders.
- Enhancing the access of vulnerable groups to healthcare services, by expanding health insurance and furthering access to UHC in GMS countries for immigrants, people travelling frequently across borders, and other vulnerable groups (with or without documents). Improved linking of health systems in departure and destination countries will improve cross-border patient management and referral. Programming will follow a multi-sector approach, with civil society organisations and other non-state actors engaged in intervention design and delivery.
- Improving the integration of the healthcare system development in association with urban and transportation development in GMS countries. It is necessary to minimise the negative effects on health and increase the positive effects of transportation and urban development to improve the living standards and access of people to the healthcare system. This activity requires cooperation amongst many sectors – urban development, transportation, trade, and healthcare – as well as investment partners, including the private sector.

Priority activities to achieve goal 3:

- Enhancing the capacity for high-level cooperation and exchange on healthcare amongst GMS countries, including organising annual conferences and exchanging information. This helps to unify the priority for medical cooperation amongst GMS countries within an annual unified framework.
- Enhancing the quality of human resources in the healthcare sector, through cooperative training, experience, and skill-sharing programmes, or academy programmes amongst GMS countries.

## **5. Conclusion**

The GMS countries are determined to achieve the SDGs. Thailand has completed most of the Millennium Development Goals and contributed to the global development process by helping to strengthen its neighbours to enhance their capacity and to fulfil their Millennium Development Goal commitments (Ministry of Foreign Affairs (Thailand), 2016). While the rest of the countries do not yet have access to full UHC, they mostly meet the targets on improving healthcare through the goals of the UHC programme. In Viet Nam, Thailand, the Lao PDR, and China, insurance systems have become more state-centred, while Myanmar and Cambodia have a combination of government and community-based organisations, religion-based societies, and NGOs providing health services. Governments are improving national healthcare systems to aim at health service equity for all.

The pursuit of sustainable development in the GMS is still a challenge. Significant differences remain between countries and between different groups within countries. Changing climate patterns have caused the reappearance of old diseases such as malaria, chikungunya, Zika, and Avian flu; and the emergence of new diseases such as coronavirus disease (COVID-19). The rise in the incidence of non-communicable diseases (cancer, cardiovascular disease, chronic respiratory diseases, and diabetes) due to unsustainable lifestyles has also become an increasingly significant source of premature deaths. Additionally, various health insurance schemes offer limited coverage (ADB, 2019). In the 1990s, most GMS countries received finance from civil society, NGOs, the United Nations Development Programme, ADB, and the World Bank, to implement the Millennium Development Goals as low-income countries. As the countries move towards middle-income country status, external development funding has been reduced. That is one of the explanations for high out-of-pocket expenditure, leading to a significant separation between public and private healthcare providers.

First, in terms of cooperation principles, GMS cooperation focuses on the principle of equality and mutual respect. At the same time, enhancing solidarity in the subregion through consensus building in decision-making is a priority of GMS cooperation.

Second, at the national level, GMS members differ in terms of prioritisation: the Lao PDR, Myanmar, and Cambodia may focus more on developing their own health infrastructure, human resources, and social insurance schemes, while Thailand or Viet Nam may work towards supporting sustainable development in regional capacity. The countries should promote mechanisms for phased cooperation and long-term goals, such as a region-wide insurance system, regardless of nationality.

Third, at the regional level, medical cooperation programmes during 2020–2030 in GMS countries mainly aim to achieve three goals: (i) improving the effectiveness of responding to contagious disease and global health crises; (ii) strengthening the protection of vulnerable groups from the health effects of the integration process; and (iii) enhancing the quality of management and human resources to solve healthcare issues in GMS countries. To do this, eight activities are proposed. To maximise the effectiveness of healthcare, GMS governments need to fulfil their commitments regarding health services. In supporting the implementation of the SDGs, the GMS should assist its member countries by providing policy guidance; assisting with building capacity; and serving as a platform for information exchange, follow-up, and review.

In conclusion, externally funded programmes need to be integrated into a well-functioning health system. To tackle health spending issues, support from multilateral development banks, such as the Asian Development Bank and the Asian Infrastructure Investment Bank, are particularly important. These institutions play a significant role in enabling member countries to implement the SDGs. Bilateral aid from countries such as China, Japan, the Republic of Korea, European Union member states, and the United States also plays a significant role in the GMS. Since health issues are a great public challenge – affecting not only health systems but also socio-economic and political security status – cooperation between countries should be not only in the field of health but also in sharing social solidarity values and social welfare actions.

## References

- ADB (2013), *Facilitating Safe Labor Migration in the Greater Mekong Subregion: Issues, Challenges, and Forward-Looking Interventions*. Manila: Asian Development Bank.
- ADB (2017), *Strategic Framework and Action Plan 2013–2017 Implementation Review Report*. Consultant’s Report. Manila: Asian Development Bank (Project No. 46071).
- ADB (2018), *Technical Assistance for Strengthening Regional Health Cooperation in the Greater Mekong Subregion*. Manila: Asian Development Bank.
- ADB (2019), *Greater Mekong Subregion Health Cooperation Strategy, 2019–2023*. Manila: Asian Development Bank.
- Alkenbrack, S., B. Jacobs, and M. Lindelow (2013), ‘Achieving Universal Health Coverage Through Voluntary Insurance: What Can We Learn from the Experience of Lao PDR?’, *BMC Health Services Research*, 13, 521.
- APUSIC (2019), ‘Report at 9th International Congress of the Asia Pacific Society of Infection Control’, Da Nang City, Viet Nam, 19–22 March.
- Arunanondchai, J. and C. Fink (2007), ‘Trade in Health Services in the ASEAN Region’, *Policy Research Working Paper*, No. 4147. Washington, DC: World Bank.
- ASEAN (2018), ‘Vientiane Declaration on Transition from Informal Employment to Formal Employment towards Decent Work Promotion in ASEAN’. Jakarta: ASEAN Secretariat.
- ASEAN–Japan Centre (2019), ‘Health and Social Services: Lao PDR’, Presentation, Services Trade Forum, Tokyo, 27–28 November. [https://www.asean.or.jp/ja/wp-content/uploads/sites/2/03\\_Lao\\_PDR\\_20191127.pdf](https://www.asean.or.jp/ja/wp-content/uploads/sites/2/03_Lao_PDR_20191127.pdf) (accessed 15 May 2020).
- Berman, P. and R. Bitran (2011), *Health Systems Analysis for Better Health System Strengthening*. Health, Nutrition, and Population Discussion Paper. Washington, DC: World Bank.
- General Statistics Office of Viet Nam (2018), Statistics on Health, Culture, and Livelihood. <https://gso.gov.vn/default.aspx?tabid=723> (accessed 15 May 2020).
- Glassman, A. and M. Temin (2016), *Millions Saved: New Cases of Proven Success in Global Health*. Washington, DC: Center for Global Development.
- GMS (2018), *Statistics in the Greater Mekong Subregion: Growth, Tourism, and Health*, 4<sup>th</sup> Edition, 10th Economic Corridors Forum, Nay Pyi Taw, Myanmar, 13 December. <https://www.mekongtourism.org/wp-content/uploads/GMS-STATISTICAL-DATABASE-BOOKLET-4TH-EDITION-WEB-VIEW.pdf> (accessed 15 May 2020).
- Ha, M. (2019), ‘Tỷ lệ bảo hiểm đạt 89% dân số’ (The Insurance Ratio Reaches 89% of the Population). <http://thoibaotaichinhvietnam.vn/pages/tien-te-bao-hiem/2019-06-05/ty-le-bao-phu-bao-hiem-y-te-da-dat-89-dan-so-72302.aspx> (accessed 15 May 2020).
- ILO (2020a), *Building Social Protection Floors with the ILO: Together, to Change Millions of Lives in the Lao People’s Democratic Republic*. Geneva: International Labour Organization.

- ILO (2020b), *Building Social Protection Floors with the ILO: Together, to Change Millions of Lives in Viet Nam*. Geneva: International Labour Organization.
- IPSOS (2013), *Healthcare in Myanmar*. Paris: IPSOS Business Consulting.
- Kananurak, P. (2013), *An Economic Analysis of Voluntary Health Insurance after Retirement*, Doctoral Dissertation, National Institute of Development Administration, Bangkok, Thailand.
- Kongtip, P. et al. (2015), 'Informal Workers in Thailand: Occupational Health and Social Security Disparities', *New Solutions: A Journal of Environmental and Occupational Health Policy*, 25(2), pp.189–211.
- Latt, N.N. et al. (2016), 'Healthcare in Myanmar', *Nagoya Journal of Medical Science*, 78(2), pp.123–34.
- Le, D.-C., T. Kubo, Y. Fujino, T.-M. Pham, and S. Matsuda (2010), 'Health Care System in Vietnam: Current Situation and Challenges', *Asian Pacific of Disease Management*, 4(2), pp.23–30.
- Masaki, E. et al. (2017), *Managing Transition: Reaching the Vulnerable while Pursuing Universal Health Coverage (Vol. 2) – Health Financing System Assessment in Lao PDR*. Washington, DC: World Bank.
- Ministry of Foreign Affairs (Thailand) (2016), A Practical Approach Toward Sustainable Development. [https://data.opendevelopmentmekong.net/dataset/3193ca81-33bc-46be-a4d8-98769a72a8bd/resource/d566301e-1f2a-4344-8837-68d7e6d27112/download/a-practical-approach-toward-9\\*6474sustainable-development.pdf](https://data.opendevelopmentmekong.net/dataset/3193ca81-33bc-46be-a4d8-98769a72a8bd/resource/d566301e-1f2a-4344-8837-68d7e6d27112/download/a-practical-approach-toward-9*6474sustainable-development.pdf) (accessed 20 May 2020).
- Ministry of Health and Sports (Myanmar) (2016), *National Health Plan, 2017–2021*. Naypyidaw: Ministry of Health and Sports.
- Ministry of Planning of Cambodia (2020). IDPOOR Process. <https://mop.idpoor.gov.kh/about/process> (accessed 20 May 2020).
- Ministry of Public Health (Thailand) (2017), *The 12th National Health Development Plan 2017–2021*. Bangkok.
- MOH (Cambodia) (2017a), *Progress Report in 2017 and Plan in 2018*. Phnom Penh: Ministry of Health.
- MOH (Lao PDR) (2017b), *Report on Progress of HSDP Implementation under National Health Insurance Bureau*. Vientiane: Ministry of Health.
- MPIDIC (2016), Round Table Implementation Meeting Vientiane Province, 24–25 November.
- Nguyen, T.K.T. (2018), 'Improving the Quality of Medical Examination and Treatment (Curative Care) Health Insurance (Health Insurance)', Speech at the Grassroots Level Conference, Hanoi, 6 July.
- OECD (2017), *Health at a Glance 2017: OECD Indicators*. Paris: OECD Publishing.
- Oxford Business Group (2016), 'Robust Growth Expected in Thailand's Health Sector'. <https://oxfordbusinessgroup.com/overview/health-check-despite-financial-challenges-sector-set-robust-growth> (accessed 5 April 2020).



- Pagaiya, N., P. Phanthunane, A. Bamrung, T. Noree, and K. Kongweerakul (2019), 'Forecasting Imbalances of Human Resources for Health in the Thailand Health Service System: Application of a Health Demand Method', *Human Resources for Health*, 17(4).
- Pham, P. (2016), 'Vietnam's Healthcare Sector is Poised for Decades of Growth', *Forbes*, 31 May. <https://www.forbes.com/sites/peterpham/2016/05/31/vietnams-healthcare-sector-is-poised-for-decades-of-growth/#1f6653dc3ffe> (accessed 20 May 2020).
- Phanphairoj, K. and R. Loa (2017), 'Comparison of the Determinants of the Health Service System and the Health Status of the People in the Greater Mekong Subregion (GMS)', *Current Psychiatry Reviews*, 13(4), pp.246–51.
- Social Affairs Committee of the National Assembly (2018), 'Notes', The Explanation Session on Healthcare, Hanoi, 7 August.
- Somanathan, A., A. Tandon, H.L. Dao, K.L. Hurt, and H.L. Fuenzalida-Puelma (2014), *Moving toward Universal Coverage of Social Health Insurance in Vietnam: Assessment and Options*. Washington, DC: World Bank.
- UNESCAP (2017), *Southeast Asia Subregion: Challenges and Priorities for SDG Implementation*. Bangkok: United Nations Economic and Social Commission for Asia and the Pacific.
- United Nations (2019), Cambodia Voluntary National Review Key Messages. <https://sustainabledevelopment.un.org/memberstates/cambodia> (accessed 20 May 2020).
- USAID (2019), *Laos Health Strategy, 2019–2023*. Washington, DC: United States Agency for International Development.
- Van Minh, H. et al. (2014), 'Progress Toward Universal Health Coverage in ASEAN', *Global Health Action*, 7(1).
- Van Rooijen, M., C.Y. Myint, M. Pavlova, and W. Groot (2018), 'Health Insurance in Myanmar: The Views and Perception of Healthcare Consumers and Health System Informants on the Establishment of a Nationwide Health Insurance System', *Risks*, 6(3), 81.
- VNA (2019), 'Mekong Countries Bolster Cooperation in Traditional Medicine', <https://en.vietnamplus.vn/mekong-countries-bolster-cooperation-in-traditional-%20medicine/159991.vnp> (accessed 20 May 2020).
- VNA (2020), 'Social Insurance: Main Pillar of Social Security System', <https://en.vietnamplus.vn/social-insurance-main-pillar-of-social-security-system/168740.vnp> (accessed 6 April 2020).
- World Bank (2020), Database. [https://data.worldbank.org/indicator/SH.MED.NUMW.P3?locations=ID&most\\_recent\\_year\\_desc=true](https://data.worldbank.org/indicator/SH.MED.NUMW.P3?locations=ID&most_recent_year_desc=true) (accessed 6 April 2020).
- WHO (2014), *Lao People's Democratic Republic Health System Review*, Health Systems in Transition, 4(1). Manila: WHO Regional Office for the Western Pacific.
- WHO (2015), *The Kingdom of Cambodia Health System Review*. Health Systems in Transition, 5(2). Manila: WHO Regional Office for the Western Pacific.

- WHO (2016), *Cambodia–WHO Country Cooperation Strategy, 2016–2020*. Manila: WHO Regional Office for the Western Pacific.
- WHO (2018), *How Pharmaceutical Systems are Organized in Asia and the Pacific*. Paris: World Health Organization/OECD Publishing.
- WHO (2019), *Primary Health Care on the Road to Universal Health Coverage: 2019 Global Monitoring Report*. Geneva: World Health Organization.
- WHO (2020), Universal Health Coverage. [https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-\(uhc\)](https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc)) (accessed 6 April 2020).
- Witookollachit, P. (2018), *Thailand Healthcare Digital Transforming*. Presentation at the ISPOR Asia Pacific 2018, Tokyo, Japan, 8–11 September. [https://www.ispor.org/docs/default-source/conference-ap-2018/thai-1st-plenary-for-handouts.pdf?sfvrsn=268f61e4\\_0](https://www.ispor.org/docs/default-source/conference-ap-2018/thai-1st-plenary-for-handouts.pdf?sfvrsn=268f61e4_0) (accessed 20 May 2020).

## Environmental and Sustainability Challenges in the Mekong Subregion

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The Mekong Subregion – Cambodia, the Lao People’s Democratic Republic (Lao PDR), Myanmar, Thailand, and Viet Nam – is not only host to the fastest growing economies in the Association of Southeast Asian Nations (ASEAN), but is also rich in natural resources and biodiversity and has a culturally diverse urban population. Returns from the continued economic growth have raised incomes and improved people’s well-being, but have also resulted in many environmental challenges. Although progress has been made, it has proved difficult to effectively integrate economic, environmental, and social objectives in pursuing sustainable development in the region. A combination of factors such as climate change, disasters, and low adaptive capacity are posing challenges to meeting the increased food demand. As countries industrialise in a phased manner and the contribution of the service sector expands, agriculture, forestry, and fisheries remain fundamental to all the countries in the subregion. Embedded with many integration efforts are conflicts over the use and management of natural resources. For instance, conflicts over water – both within and between countries – are intensifying because of escalating industrial and agricultural demand for water, interfering with river flows and creating changes in food security (Reddy, Singh, and Anbumozhi, 2016). Likewise, land for growing food and making a living is increasingly contested. In the Mekong region, rapid urbanisation is another critical process, especially in dynamic peri-urban areas where opportunities and challenges from environmental sustainability are often at a crossroads. Unfortunately, the expansion and intensification of this sectoral growth have been accompanied by the degradation of forest land and the depletion of natural resources. Deforestation and a decline in natural resources are compounded by growing plastic debris in coastal zones and pose an important threat to sustainable economic growth. The rich biodiversity in the region has already been greatly affected by land use changes and remains vulnerable to climate change. A range of economic variables, trade, demand for goods and services, labour migration as well as alterations in natural resources such as changes in river flow transmit environmental pressure from one country to another. Pressure on forests, fisheries, plastic marine debris, and urbanisation has come in part from cross-border demand for increased production and consumption.

## 1. Climate Change and Disaster Impact on Food Security

The climate of the Mekong Subregion is strongly influenced by the monsoon. In many parts of Cambodia, the Lao PDR, Myanmar, Thailand, and Viet Nam – the core tropical zone – several natural disasters such as floods and droughts occur in the same year or with increasing frequency across the years. With a large part of the population still living in rural areas and depending on agriculture and fishing, effective management of climate and disaster risks is important for food security. While temperatures and sea levels are expected to rise, significant uncertainties remain regarding the distributional impacts of climate change and disasters on production and supply. Abundant food is produced in the Mekong region, which includes the major rice exporting countries of Thailand and Viet Nam. Baseline studies indicate that Cambodia, Thailand, and Viet Nam will be more affected than the other countries, depending on the food grain export (Anbumozhi, Breiling, and Reddy, 2019).

While food is plentiful, access to healthy and affordable food is problematic for many low-income households in rural areas. The lack of access creates food ‘deserts’, defined as areas with limited access to affordable and nutritious food. Short-term disruptions to food supplies such as natural disasters exacerbate food insecurity for many households, influencing not only the availability of food supplies but also food quality and, most importantly, prices. The 2017 floods affected nearly 60% of farms in the Lao PDR, primarily the production of rice and maize. Similarly, the 2012 drought affected Viet Nam, Thailand, and Cambodia, with a 27% decrease in yields (Shiomi, Ono, and Fukushima, 2019). Crop losses were highest in the 2011 floods in Viet Nam, where nearly 8 million hectares were flooded and not harvested or planted (Kuwornu, 2019). The 2019 drought brought the Mekong River levels to their lowest point in at least 60 years. Most parts of the basin experienced an exceptionally low flow in the second half of the year. Many rice farmers in the Lao PDR, Viet Nam, and Thailand were unable to plant their main crops, resulting in a 27% decrease in production in 2019. Less water flow could also have a devastating impact on fish reproduction in the Mekong River basin. Experts expect droughts and disruptions to the flow of the Mekong River to become more common, and warn that they could eventually lead to the collapse of the entire ecosystem. Due to climate change – rising temperatures, erratic rainfall, and more frequent floods and droughts – the Mekong Subregion is expected to incur significant losses in rice, corn, sorghum, and soybean crops, reaching about 2%–6% of gross domestic product (GDP) by 2050 (Raghavan et al., 2019). The spatial patterns of food supply and distribution as well as trade are quite variable but concentrated in the Mekong River basin.

The ratio of hazard losses to GDP also varies across the countries, with an average loss ratio of 2%–3% of GDP during 1990–2015 (Liu, 2015). The relative impact of climate change and disasters in the Mekong region is driven by recurring losses from flooding and severe weather. In the cyclone-prone coastal areas of Viet Nam, Thailand, Cambodia, and Myanmar, the losses represent 5%–6% of GDP in some provinces. The relative impact

ratios account for temporal and geographical differences in the economic capacities of the localities, which in turn influence the overall food security conditions.

Enhancing supply chain resilience is one mechanism designed to reduce the impacts of climate change and natural disasters. This is broadly defined as the ability of the food production system to prepare and plan for, absorb, recover from, and successfully adapt to adverse events. There are many approaches to food supply chain resilience. Key policy measures identified by Anbumozhi et al. (2012) included both short- and long-term measures.

#### Short-term measures:

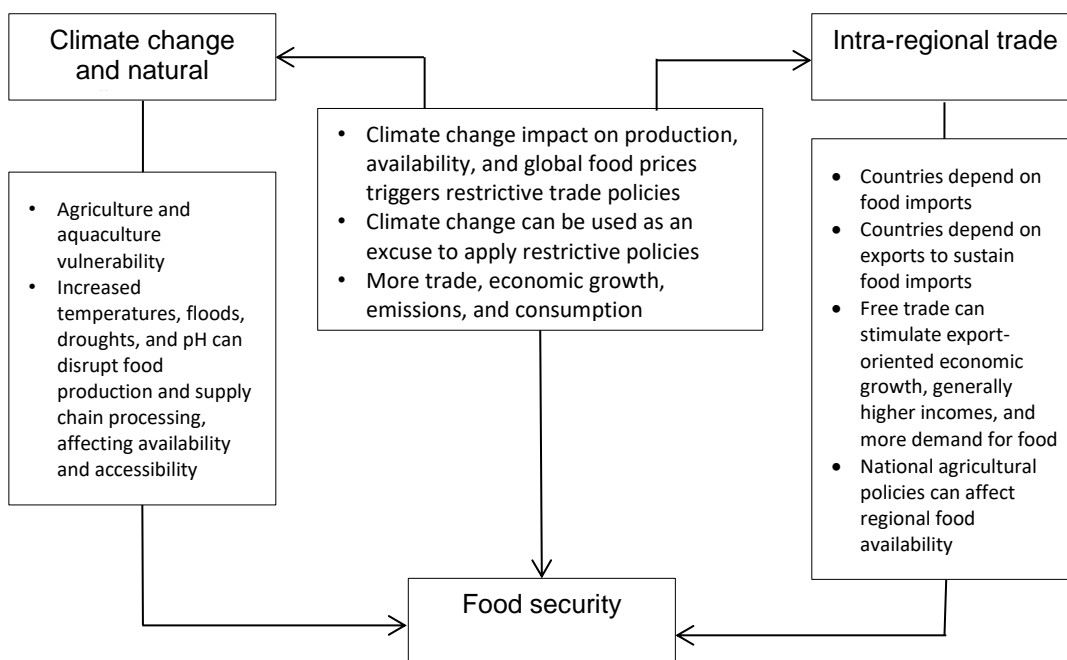
- Support farmers and local communities in developing diversified and resilient community-based agricultural systems that provide adequate food to meet local and consumer needs, while guaranteeing critical ecosystem services.
- Invest in more reliable information and weather forecasts to predict extreme weather events accurately.
- Develop new channels of information exchange and skill transfer between farmers and the research community to promote weather forecasting and mainstreaming of sustainable agricultural production methods.
- Invest in transport and storage systems. Emphasis should be placed on developing locally shared infrastructure and improving value-added activities for farmers.
- Achieve policy coherence and effective coordination of different governmental activities.
- Enhance public investment in research and development programmes on high-yield crop varieties that are tolerant to drought and nutrient stress, and encourage private sector participation in agricultural system infrastructure.

#### Long-term measures:

- Implement a scheme for payments to finance a sustainable agricultural development framework.
- Implement regulations in the financial sector that facilitate the international flow of funds for local communities and reduce barriers to paying farmers for environmental benefits.
- Expand agricultural official development assistance to enhance agricultural innovation and extension systems, ecological farming methods, and supportive infrastructure.
- Reform international trade policies aimed at improving market access for developing country producers and support the agricultural sector.
- Reformulate trade-related policies to strengthen food security. On the export side, increase market access in developed countries for products exported by developing countries to raise farmers' income and reinforce food security. This could be conducted by introducing insurance and financial rebate programmes.

ASEAN is home to major rice and shrimp exporting countries (Thailand and Viet Nam); key rice importers (Singapore, Indonesia, and the Philippines); and agrarian countries (the Lao PDR, Myanmar, and Cambodia). In the event of a sharp increase in world prices due to economic and natural disaster related shocks, large exporting countries such as Thailand and Viet Nam can impose export bans to bring stability and security to the domestic market. Indeed, they invoked the ASEAN agreement on agriculture when the food crisis erupted in 2008. Nevertheless, it remains unclear how free trade restrictions (e.g. sanitary and phytosanitary measures) can be reasonably implemented, if food safety under varying climate conditions is taken into consideration. These linkages are illustrated in Figure 1.

**Figure 1: Climate Change, Trade, and Food Security Linkages**



Source: Authors.

However, the above interlinkages should be seen from the fact that climate change and agricultural productivity are closely related, and those factors will continue to have implications for subregional food security if trade is restricted. Key factors for the resilience of any regional food supply chain include crop impacts; the vulnerability of small producers (incomes, housing, roads, and education); supply chain characteristics (logistics – technology and finance) and behaviours; and institutions (economic operators). To help food producers build their adaptive capacity, and deliver more resilient supply chains, governments should undertake the following tasks:

- Raise awareness and understanding of adaptation within suppliers/producers/retailers, drawing on their market knowledge and technical capacity
- Continuously ask producers/suppliers about current climate trends and impacts
- Work through existing institutions, including governments, to spread the risk by diversifying procurement to more sites

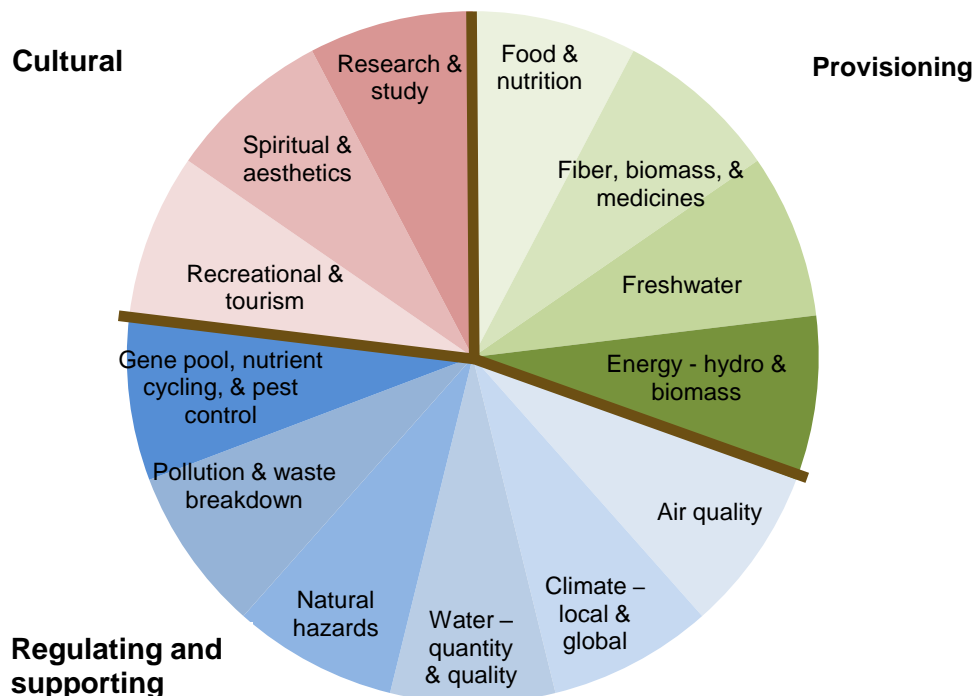
Other environmental issues, such as salinity intrusion and climate change related extremes, are also likely to affect integrated rice production and shrimp farming in the Mekong Delta. According to projections, the Mekong Subregion may lose 40%–60% of its potential fish catch due to fish migrations resulting from changes in temperature, river flow conditions, and ocean conditions. Small subsistence fishers lacking the adequate technology (e.g. satellite imaging) could lose their entire livelihoods and one of their staple foods.

## **2. Deforestation and Natural Resources Management**

The forests of the Mekong Subregion are some of the most biologically diverse places on Earth. However, the region's forest cover decreased to 1,904,593 square kilometres in 2015 from 2,089,742 square kilometres in 2000 at an annual rate of 1.3% from 2000 to 2010 and 1.1% from 2010 to 2015 (ADB, 2008; ASEAN, 1997; 2009; 2015). The driving forces behind the deforestation include rising populations, increasing agricultural production, logging, and mining. Many countries in the Mekong Subregion still rely on timber production for their people's livelihoods. Like the terrestrial ecosystem loss, freshwater and marine ecosystems are at risk. The region has also suffered from the empty forest syndrome (forest land that has lost all its species on record) and wetland loss – adversely affecting the region's rich biodiversity. Hundreds of species in the Mekong region are being threatened by natural habitat loss due to deforestation, climate change, pollution, population growth, and poaching to fuel the illegal wildlife trade. In Cambodia and the Lao PDR, a surge of land concessions for agricultural plantations has added to pressure on both natural ecosystems and the rural communities that depend on them.

Other natural resources (e.g. forests, lakes, and oceans) are the source of various ecosystem services (Figure 2). Planning for forest and natural resources management requires a different approach than for other conventional economic planning. A bottom–up approach involving the local community will bring sustainability, as locals have better information on the status and condition of the natural assets. With practical understanding and experience regarding the potential integration of the management of production and conservation across land, air, and water boundaries, local communities can contribute tremendously in identifying future opportunities and livelihood options.

**Figure 2: Type and Classification of Ecosystem Services Provided by Forests**



Source: Authors.

Absent or inadequate governance (i.e. weak monitoring and implementation deficits, a top-down approach in the management of key resources such as forests, and lack of land rights) is the main challenge in natural resources management of the Mekong Subregion. Natural resources management and governance at the national level have evolved into a set of organisations, policy instruments, financing mechanisms, rules, procedures, and norms that regulate the process of natural resources management and biodiversity loss. Some successful strategies to overcome the implementation deficits are (i) moving the policy discussion to a higher level, e.g. environmental council, chaired by the President; (ii) investing in a good monitoring system and assessment; (iii) strengthening the administrative capability; and (iv) a bottom-up approach that addresses drivers, e.g. providing economic activity/alternatives for people to help communities (Sajise, 2015).

Application of the above strategic management concepts and policy tools can be innovative, if the following principles are adhered to:

- Strengthen cross-cutting policies across themes and sectors. It is important to maximise the benefits by focusing on options that are mutually reinforcing and cross-cutting. That will require introducing policy integration to manage cross-sectoral issues such as water, food, and marine resources management.



- Address the drivers. There is an increasing need to shift attention away from the effects of environmental degradation to a greater focus on underlying drivers such as population increase, poverty, lack of knowledge of the lifetime value of resources, and intergenerational equity.
- Enhance monitoring, evaluation, and accountability. Monitoring and evaluation should be used to improve policy design, increase the accountability of different stakeholders, and identify promising practices that can be subsequently applied in country settings. In this regard, key performance indicators are necessary to evaluate policy progress and clearly identify the success and shortcomings of the implementation of selected policy instruments.
- Improve multi-stakeholder participation at local and national levels. The benefits of involving stakeholders (e.g. communities, the private sector, local governments, community-based organisations, and knowledge institutes) need to be acknowledged at all levels.
- Stronger long-term policy and financial commitment. Governmental commitment is needed for the active involvement of the private sector and better use of market forces.
- More information sharing and capacity building programmes. These are needed across the region to enhance the potential for transferability and the replication of successful policy instruments.

Mekong countries should adopt a standard framework, in harmony with other ASEAN Member States, for managing natural resources. Standard cooperation frameworks, such as the ASEAN Mineral Cooperation Action Plan, 2016–2025, should address the significant interrelated and interconnected political, institutional, economic, and governance areas (ASEAN, 2016; Sunchindah, 2015). Regional monitoring is vital for a planned and adaptive approach towards natural resources management. With shared natural resource assets and differentiated programme implementation and performance, establishing a reporting mechanism at the Mekong and ASEAN levels will help to make quick policy adjustments at the national and local levels, and learn from other’s experiences. Towards that end, ASEAN could establish a regional trust fund for a portfolio of projects in the Mekong Subregion and programmes that enhance current actions on natural resources management. Adopting a green economy approach could also be considered as an option for achieving sustainable growth in the Mekong and, recognising the anticipated changes in the region, is both realistic and feasible. Forest and natural resources management responses need to be strategic, addressing the need for long-term development, and where necessary tactical, using temporary measures to secure species and ecosystems under imminent threat. Multiple actions will be needed, ranging from initiatives at the international, regional, and national policy levels to thousands of projects, negotiations, and decisions at the level of sites and landscapes.

### 3. Marine Plastic Debris

The Mekong River is regarded as a major source of marine plastic debris. Schmidt, Krauth, and Wagner (2017) included the Mekong River in the top 10 rivers that contribute 88%–94% of the global plastic load to the ocean. Flowing 4,909 kilometres through the six countries of the Greater Mekong Subregion – Cambodia, China, the Lao PDR, Myanmar, Thailand, and Viet Nam – the Mekong River loaded 33,431 tons of microplastic and 3,330 tons of macroplastic annually to the South China Sea (Schmidt, Krauth, and Wagner, 2017). Lebreton et al. (2017) revealed that the Mekong River discharges 18,800–37,600 tons of plastic every year and is the 11<sup>th</sup> most polluting river in the world. However, Schmidt, Krauth, and Wagner (2017) and Lebreton et al. (2017) did not use actual data on microplastics measurement in the Mekong River. The measurements were based on population, the amount of mismanaged waste, monitoring data on nearby rivers, and other variables. Although the Promotion of Countermeasures Against Marine Plastic Litter in Southeast Asia and India (CounterMEASURE) Project organized by the United Nations Environment Programme (UNEP) conducted micro and macro plastic monitoring in several places (Limpiteeprakan, 2020; Pirika Inc., 2020), it is short of data to estimate the volume of leakage to the ocean from the Mekong. Hence, future research should be conducted to measure the actual leakage of micro and macro plastics in the Mekong River and the identification of potential sources of the micro and macro plastic leakage.

Table 1 shows the estimation of the potential amount of plastic leakage to the ocean from the Mekong Subregion. This estimation is based on the mismanaged or uncollected waste generated by individual countries in the Mekong Subregion. The leakage from mismanaged or uncollected waste is caused by the limited capacity of waste management and the geographic proximity of some provinces in the Mekong Subregion to the Mekong River. Those provinces, either wholly or partially, are defined as the Mekong Basin and/or Mekong Delta. The Mekong Delta particularly refers to southern Viet Nam, which becomes vulnerable downstream of the Mekong River. About 15%–40% of the leakage goes to the ocean (Jambeck et al., 2015). From around 1.8 million tons (MT) of potential plastic leakage, 0.284–0.759 MT of it might leak into the ocean annually. China and Myanmar contribute a relatively small amount of plastic leakage since only a few of their provinces are considered part of the Mekong Basin. Along 12 provinces, the Lao PDR has 50 districts considered part of the Mekong Basin, but the potential plastic leakage is relatively small due to small population and the low percentage of plastics in the waste composition. On the other hand, Cambodia has a high amount of uncollected waste, making this country contribute 0.024–0.066 MT of potential plastic leakage to the Mekong River. Thailand's Mekong Basin is the top contributor, considering potential plastic leakage of 1.3 MT (70% of the total amount), with up to 0.536 MT of it sent to the ocean. Viet Nam is the runner-up, with 0.053–0.142 MT of leakage from both the Mekong Basin and Delta.

**Table 1: Potential Amount of Plastic Leakage to Ocean from the Greater Mekong Subregion**

<b>Greater Mekong Subregion (Provinces in Mekong Basin and/or Delta)</b>	<b>Uncollected waste (ton/year)</b>	<b>Plastic composition (%)</b>	<b>Potential plastic leakage (ton/year)</b>	<b>Potential plastic leakage to ocean (ton/year)</b>
China (3 provinces)	65,308	5	3,265	490–1,306
Myanmar (2 provinces)	22,512	13	2,927	439–1,171
Lao PDR (12 provinces)	464,378	6	28,327	4,249–11,331
Thailand (24 provinces)	4,265,449	31	1,341,057	201,159–536,423
Cambodia (18 provinces)	1,054,338	16	165,953	24,893–66,381
Viet Nam (20 provinces)	2,277,487	16	355,288	53,293–142,115
<b>Total (ton/year)</b>			<b>1,896,817</b>	<b>284,523–758,727</b>

Source: Compiled and calculated by authors, based on Jizhe et al. (2018) for China; Ling and Fodor (2019) for Myanmar; Sang-Arun and Pasomsouk (2012) and GGGI (2018) for the Lao PDR; Vanapruk (2019) for Thailand; Pariatamby, Hamid, and Bhatti (2019) for Cambodia; and Viet Nam Waste Planning (2019) for Viet Nam.

The huge amount of potential plastic leakage from the Mekong Basin region is highly influenced by each country's characteristics. For instance, Viet Nam has a high population but poor municipal solid waste collection and treatment. The conditions eventually lead to rising environmental degradation, especially in the Mekong Delta region (Mendrik et al., 2019; Nguyen and Le, 2011). Moreover, 80% of waste in Viet Nam is disposed of in open landfills, which are not equipped with leachate and gas protection. In addition, the country does not have an official recycling and sorting system, making the waste easily reach its way from the Mekong Delta to the South China Sea (Nguyen and Le, 2011; Bauske, 2018). Besides the waste management problem, the severity of the situation in Viet Nam is exacerbated by the littering problem (Davis, 2016), while data show that each person in the country consumes up to 25–35 kilogrammes of plastic per year (Thang, 2019).

The amount of leakage of plastics from river to ocean is affected by dams and other barriers which detain plastic waste (Loftus, 2018). In accordance with this, the Mekong River has been recognised as a huge source of electricity. To support electricity generation, the development of hydropower dams is a massive issue in the Mekong Basin. Only 10% of potential hydropower dams have been developed in the lower Mekong Basin. In the future, 11 mainstream dams and more than 120 dams are planned to be developed in the Mekong tributaries (Open Development Mekong, 2017). Even the Lao PDR is determined to become the 'Battery of Asia' by building 140 hydropower dams along the Mekong Basin (Beech, 2019). However, the development of hydropower dams, which can

help reduce the amount of plastic pollution in the Mekong River, has created other environmental issues such as soil erosion, changes in the natural river hydrology and sedimentation, and exposure to fish population (Lovgren, 2018; International Rivers, 2014).

The participation of the Mekong Basin countries in international schemes to collect plastic waste from the river and to treat collected waste properly should also be considered. Such schemes could be a platform to facilitate collaboration between co-riparian countries. Collaboration between the Mekong Basin countries is addressed through the Mekong River Commission (MRC), which was legally mandated by the Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin on 5 April 1995. Article 7 of the 1995 Mekong Agreement requires each co-riparian country to make every effort to avoid, minimise, and mitigate harmful effects that might occur to the environment – especially the water quantity and quality, the aquatic ecosystem conditions, and the ecological balance of the river system – from the development and use of the Mekong River Basin water resources or the discharge of waste and return flows. This highlights regional cooperation to cover the cost of upstream effects on ecological systems downstream (Frenken, 2012). In this context, the agreement enforces the collection and proper treatment of plastic waste from the river to eliminate any cumulative downstream effect.

The Mekong River is a busy river that transports people and cargo to support international trade and tourism, so it is vulnerable to leakage. However, most of its ports have no dedicated waste reception facilities (MRC, 2013). The latest report on ports in Viet Nam shows that waste generated from ships might be treated within the port, received by the port then sent to a third party, or sent to a third party by a ship owner with support from the port (Nguyen, 2017). This variety of waste treatment methods is undertaken due to limited facilities. Among 25 ports distributed across six regions in the country, only five ports operate adequate facilities, including facilities for receiving hazardous substances, sewage, and garbage. Towards 2030, Viet Nam will invest in a synchronous and modern port system that includes infrastructure, harbours, and channels.

The International Convention for the Prevention of Pollution from Ships (MARPOL) is a related international scheme that has been adopted. MARPOL has proposed restrictions on waste discharge from ships as well as requirements on waste reception facilities for specified waste. Facilities are supposed to provide adequate waste receptacles, collection facilities, and recycling facilities. They must have sufficient capacity, not create undue delays for vessels, provide sufficient information to encourage their use, and be available for regional cooperation with other ports within a country.

International schemes prevent land-based plastic leakage as well as sea-based plastic leakage. Co-riparian countries lack research on marine plastics. The collection and proper treatment of plastic waste from the river can be conducted effectively if the status of plastic leakage is well documented through assessment and monitoring. To fill this gap, the Government of Japan and UNEP jointly supported the MRC in March 2019 to develop countermeasures against marine plastic litter (MRC, 2020). The initiative is called the

promotion of countermeasures against marine plastic litter in Southeast Asia and India. Funded by the Government of Japan, it aims to measure land-based plastic leakage to determine hotspots along the Mekong River. To do this, the MRC is collaborating technically with the UNEP Regional Office for Asia and the Pacific.

The tourism sector in the Mekong Basin is perceived as one of the main sources of plastic waste. The sector increased economic growth in the Greater Mekong Subregion (GMS) – the Lao PDR, Cambodia, Thailand, Viet Nam, Myanmar, and China’s Yunnan Province and Guangxi Zhuang Autonomous Region – by 15.7% during 2006–2011 (Nonthapot and Lean, 2015). In Viet Nam, the tourism sector contributes 6.6% of GDP. Recognised for its natural beauty, the Mekong Delta is Viet Nam’s main tourism destination (WWF, 2016). Unfortunately, the region is now exposed to toxic plastic waste, which contaminates the environment (Tuyen, 2019). Phu Quoc island, one of the main tourist destinations in the Mekong Delta, has struggled to deal with the excessive use of plastic bags, cups, straws, and food packages used by millions of visiting tourists. In addition, since the tap water in Viet Nam cannot be consumed, tourists mostly rely on drinking water from plastic bottles (Kerber, 2018).

Thailand, which received more than half of all international arrivals in the GMS tourism sector (ADB, 2008; Nonthapot and Lean, 2015), has experienced serious impacts from marine plastic pollution. Coldwell (2018) indicated that the ecosystem in Thailand’s Maya Bay is degraded due to a huge amount of plastic waste disposed of in the sea from the high number of tourists that visit its beach every day. Consequently, the bay is closed to tourists to allow the ecosystem to recover.

Some tourism providers have undertaken preventive actions to reduce marine plastic debris. Viet Nam’s tourism sector recently launched a ‘Go Green’ campaign, whereby businesses and workers raise awareness on environmental protection. The campaign includes a sustainable tourism label called the ‘Green Lotus’, targeting the establishment of accommodation in Viet Nam (VietnamPlus, 2019a). Basically, the label is granted for accommodation that reaches a certain standard for biodiversity protection, use of renewable energy, preservation of natural and cultural heritage, and promotion of environmentally friendly products (VietnamPlus, 2019b). Furthermore, the government of Phu Quoc island has conducted campaigns through clean-up activities, community meetings, and media broadcasts to raise awareness about the impacts of littering. Although the activities still require financial, human resources, and technical support, the local government of Phu Quoc island is trying to establish cooperation with other organisations to expand the scope of the activities (Kerber, 2018).

#### **4. Urbanisation**

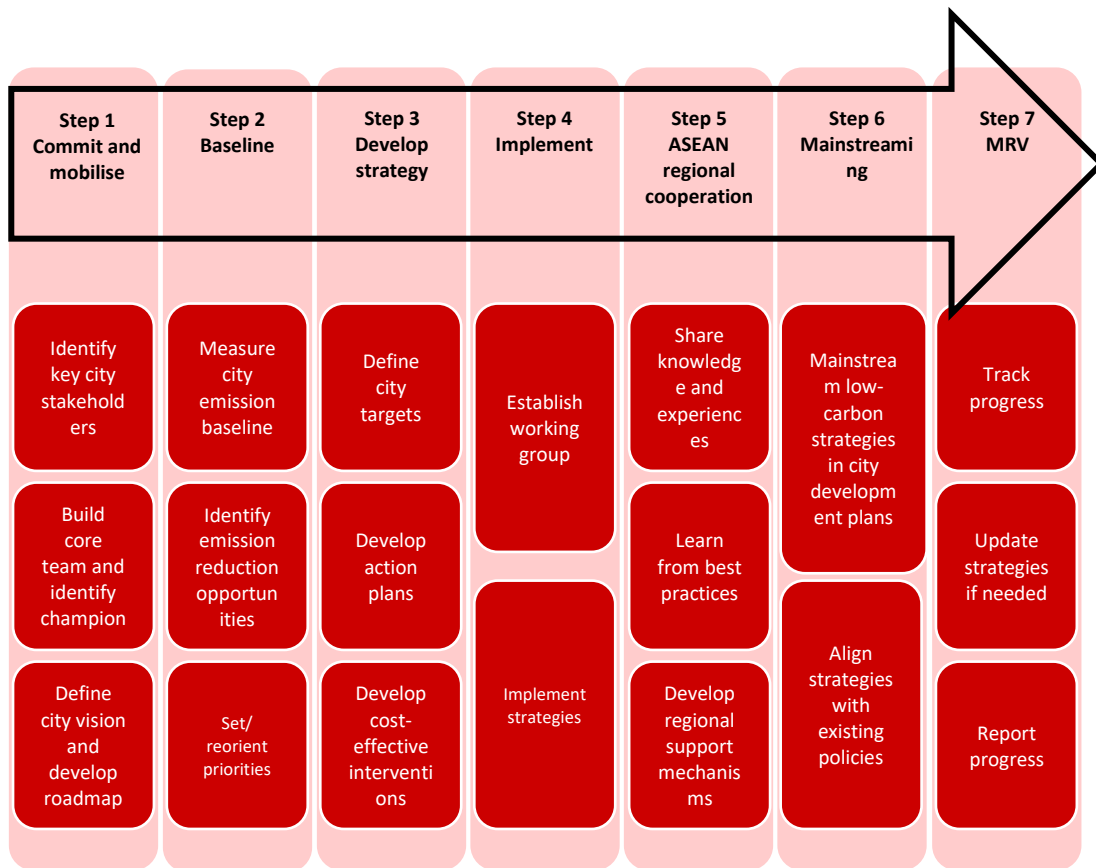
Megacities in the region, such as Bangkok, Hanoi, Phnom Penh, Vientiane, and Yangon, have been the drivers of the economy and have lifted millions out of poverty. However, the environmental consequences of this rapid urban development are apparent. Improvements in GDP and quality of life typically lead to increased resource consumption, and cities become national nodes of consumption as they grow in terms of population

and prosperity. Air pollution commonly exceeds safe levels across the cities. Emissions of noxious gases and particulate matter from motor vehicles, industry, and other causes – plus the rising urban population exposed to them – are increasing the regional burden of respiratory illnesses and cancer (WHO and UN Habitat, 2016). On a regional basis, it is estimated that 55% of urban air pollution mortality occurs in the Mekong (UNEP, 2018).

As the economies of the Mekong become more urbanised, more water will need to be reallocated from the 70%–90% consumed by agriculture to other economic activities such as domestic, industrial, and commercial use (Kumar, 2015). On the other hand, liveable and resilient cities are characterised by less air pollution and virtually no waste or traffic congestion. The planning of future cities requires every part of the design to include principles that shape the city: citizens to live, nature to thrive, business to invest, cultures to celebrate, and visitors to enjoy (Anbumozhi and Intal, 2015). The foregoing conditions are not utopian, though their integration is only achievable through a multi-stakeholder and multifaceted integrated planning approach. The concepts of the circular economy and smart cities have been developed recently to drive diverse agendas of liveable and sustainable cities. The circular economy understands and analyses the stocks and flows of energy and material consumption, understanding their economic value as an external source of resources and as a waste sink for the city's by-products (Anbumozhi and Kimura, 2018). Smart cities understand cities as a complex service delivery system and investigate the effects of the application of information and communication technology (ICT) and big data at different layers of city governance, particularly in the context of low-carbon imperatives (Anbumozhi, Kumar, and Adhityan, 2020). This approach incorporates planners, designers, architects, engineers, and municipal leaders with the common goal of creating liveable and sustainable cities that can sustain the environmental challenges of today and the aspirations of tomorrow.

Figure 3 summarises the above-mentioned framework and takes into consideration the Mekong context in a seven-step approach for building liveable cities in ASEAN.

**Figure 3: ASEAN Framework for Liveable and Sustainable City Development**



ASEAN = Association of Southeast Asian Nations; MRV = monitoring, reporting, and verification.  
Source: Kumar (2015).

The Mekong countries are already implementing various measures pertaining to the Sustainable Development Goals. However, a complete and well-constructed approach to develop smart cities, which fosters the circular economy and low-carbon growth, is an imperative. For that to happen, a city-level decision-making process will need to involve all levels of stakeholders, including national governments, the research community, practitioners, nongovernmental organisations, and the private sector. Engineering sustainable cities in the Mekong region will need to address the following:

- City leaders should advocate for national policy adjustments to support cities as green liveable spaces.
- Cities need to start the process of measuring their emissions and pollution, i.e. the development of an emissions inventory. While national level emissions inventories have been developed for some countries, city-level emissions inventories are generally absent. The focus should be on using a consistent framework of emissions accounting to ensure the cross-border applicability of emissions data.

- Consider the development of a knowledge management centre to share experiences and lessons learned to maximise regional cooperation. This will help cities learn from each other and implement best practices.
- City-level targets should take into consideration any existing national and regional targets and policies to avoid conflicts in the longer term. Such targets and policies should be carefully tied to incorporate the 2030 Sustainable Development Agenda and Paris Climate Agreement targets.
- Liveable, resilient, and green initiatives should be linked with wider food security, energy security, and water security to maximise the benefits of city transformation and ensure alignment with the overall developmental agenda.

## **5. Subregional Cooperation and Harnessing New Technologies for Environmental Sustainability**

Subregional cooperation has the potential to reduce sustainability challenges through its impacts on social and economic areas. However, a reallocation of public and private investments – spurred on through the broader principles of the ASEAN Socio-Cultural Blueprint (ASEAN, 2009) – is needed to build up or enhance natural capital such as forests, water, land, fish stocks, coastal areas, and cities, which are particularly important for countries to reach the Sustainable Development Goals. For that, Mekong countries should recognise that sustainable development is the main priority, and an environmentally efficient and resilient development path provides the opportunity to contribute towards this objective in a more efficient manner. A shared governance policy framework to promote a resource-efficient development path needs to clearly demonstrate strategies for removing current knowledge, capacity, and finance barriers to reap the co-benefits of development and environmental preservation:

- To promote a better understanding of public–private partnership participation, it will be necessary to enable countries to quantify the benefits that come from community involvement in setting targets for climate change actions, natural resources management, and plastic debris; and monitoring progress under ASEAN community blueprints.
- Realization of national sustainable development goals requires regionally coordinated technology transfer and financial mechanisms through innovative policies. More creative financing schemes at the regional level will be needed to implement strategies for access to clean water services, reduce land degradation, and improve air quality – fostering resource efficiency, reducing plastic debris, and promoting climate-resilient actions.


It is in the environmental and economic interests of Mekong countries to implement these strategic actions on a priority basis, through collaboration, cooperation, and coordination. The region has already started to embrace the digital revolution – encompassing clusters of transformative technologies in the domain of ICT, such as artificial intelligence, the internet of things, robotics, 3D printing, neuro-technologies, drones, virtual and augmented reality, and blockchain. This has profound implications for innovative




approaches to managing environmental footprints. Table 2 shows how the application of new ICTs to preserve the environment and tackle vulnerability seem to be around the corner and how data will be the foundation of the revolution, as all digital technologies will be built upon it.

**Table 2: Developmental Level Digital Technologies that Could Address Environmental Challenges**

Digital technologies	Energy use and sharing economy	Resource management and circular economy	Preventing pollution	Protecting biodiversity	Resilience and climate change adaptation
3D printing	Potential being explored extensively in some markets				
Artificial intelligence	Being introduced in some niche markets but not to scale				
Advanced materials	Potential being explored extensively in some markets		Being introduced in some niche markets but not to scale	Potential being explored extensively in some markets	
Advanced sensor platforms	Being introduced in some niche markets but not to scale				
Biotechnologies	Potential being explored extensively in some markets		Being introduced in some niche markets but not to scale	Potential being explored extensively in some markets	
Blockchain	Potential being explored extensively in some markets				
Drones and self-driving vehicles	Being introduced in some niche markets but not to scale		Potential being explored extensively in some markets	Being introduced in some niche markets but not to scale	Potential being explored extensively in some markets
Internet of things	Being introduced in some niche markets but not to scale		Potential being explored extensively in some markets		
Robotics	Being introduced in some niche markets but not to scale				
Augmented reality and new computing technologies	Being introduced in some niche markets but not to scale			Potential being explored extensively in some markets	



Potential being explored extensively in some markets



Being introduced in some niche markets but not to scale

Source: Authors based on ERIA (2019).

In exploring this transformation, however, the debate needs to focus not just on technological applications, but also on reshaping mindsets, incentives, policies, and institutions. Without adequate governance, the practical application of these digital technologies will most likely respond to market needs and not necessarily to the broader sustainability goals of the Mekong Subregion. However, the success of these new

technology-based approaches and their digital interface platforms may cope with several implementation challenges due to associated changes needed in regulations. Current ASEAN agreements, commitments, declarations, and decrees often focus on specific environmental problems and cannot tackle the different issues of sustainability as a whole. Countries tend to free-ride on regional issues, as they are rarely in a position to coordinate action across sectors. Towards that end, capacity development for various stakeholders should be enhanced, including government capacity in various ministries to enforce regulations, incentives, and rewards; and industrial capacity to use resources efficiently to make industry more competitive.

## **6. Key Policy Recommendations**

Understanding and accounting for climate change, deforestation, waste generation, and urbanisation are priority issues, as they have the potential to create a vicious cycle of poverty and vulnerability. However, emerging best practices indicate that a country can alleviate the negative impacts through physical, economic, and institutional development. From that perspective, the following policy recommendations are made.

- The adaptative capacity of sectors sensitive to climate change has to be implemented at two levels. Household and community level strategies must be put in place to reduce risks by strengthening early warning systems. Such strategies may include investing in climate-smart technologies and diversifying the income sources of agriculture households.
- At the public level, a short-term policy for countries to improve climate resilience could include designing a contingency fund within national budgets to provide aid when a climate-induced natural disaster takes place. A tricky balance may be needed at the subregional level to strike a balance between providing crop insurance in case a drought-related disaster hits and not encouraging moral hazard and adverse behaviour (such as settlement, farming, and investment in climate-sensitive areas) through such provisions.
- Mekong countries face the choice of continuing prevailing forest management practices (e.g. standards and certification schemes that provide a sound basis but whose widespread uptake requires more strict implementation and enforcement policies) or introducing market-based mechanisms (e.g. payments for ecosystem services such as carbon and biodiversity). Protecting forests to maintain the livelihoods of the poor, preserve biodiversity, and reduce carbon emissions requires modern technological scrutiny, location-specific protection, and stable financial mechanisms.
- Innovative financial mechanisms such as Reducing Emissions from Deforestation and forest Degradation (REDD+) and payments for ecosystem services are innovative avenues for funding afforestation programmes. Their interface with existing standards, certification schemes, and the network of protected forest areas needs to be monitored objectively.

- The Mekong River is regarded as a major source of plastic waste, based on the estimation of plastic waste leakage, using the amount of mismanaged waste, the composition of plastics in waste, and other measures. Monitoring of plastics flowing in the river should be conducted to measure actual leakage.
- Although exact data on the plastic leakage via the Mekong are not available, governments should reduce single-use plastics, provide waste collection services, dispose of waste properly, and promote recycling of plastic waste. International schemes should facilitate collaboration between co-riparian countries.
- Governments must consider appropriate actions to combat marine plastic in the Mekong Basin without sacrificing other environmental concerns. This refers to the continuous establishment of hydropower dams along the river, which can help retain the flow of marine plastic but brings negative impacts to the Mekong's ecosystem.
- The Mekong River basin is a main tourism destination in Southeast Asia. Governments should undertake preventive actions to reduce the marine plastic debris generated from the tourism sector, such as the 'Go Green' campaign in Viet Nam, which promotes green accommodation through green labelling.
- Cities are where some of the Mekong's sustainability challenges are concentrated – unsustainable resource consumption, air pollution, and waterborne diseases. They are also magnets for rural migrants in search of economic opportunities and thus become sources of income inequality. Transforming cities into smart cities, based on the principles of a low-carbon and circular economy, provide opportunities to promote economic growth, offer equitable social benefits, and minimise environmental risks.
- Numerous instruments for enabling smart and sustainable cities are available and tested at the ASEAN level, but need to be applied in a tailored, context-specific way, with appropriate application of the internet of things technologies for the Mekong Subregion. In this regard, city governments need to coordinate policies and decisions with other levels of governments, but more importantly, they need to be equipped with strategic and integrated planning capacities, including the capacity to choose regulatory tools, technology choices, and economic incentives for locally appropriate sustainable city objectives.

## References

- ADB (2008), *Evaluation Study: Tourism Sector in the Greater Mekong Subregion*. Manila: Asian Development Bank.  
<https://www.oecd.org/countries/mongolia/42221951.pdf> (accessed 16 March 2020).
- Anbumozhi, V., M. Breiling, S. Pathmarajah, and V.R. Reddy, eds. (2012), *Climate Change in Asia and the Pacific: How Can Countries Adapt?* New Delhi: Sage Publications.
- Anbumozhi, V., M. Breiling, and V. Reddy, eds. (2019), *Towards a Resilient ASEAN: Volume 1. Disasters, Climate Change, and Food Security: Supporting ASEAN Resilience*. Jakarta: Economic Research Institute for ASEAN and East Asia.
- Anbumozhi, V. and P. Intal, Jr. (2015), 'Can Thinking Green and Sustainability Be an Economic Opportunity for ASEAN?', *ERIA Discussion Paper Series*, ERIA-DP-2015-66. Jakarta: Economic Research Institute for ASEAN and East Asia.
- Anbumozhi, V. and F. Kimura, eds. (2018), 'Industry 4.0: What Does it Mean for the Circular Economy in ASEAN?', in V. Anbumozhi and F. Kimura (eds.) *Industry 4.0: Empowering ASEAN for the Circular Economy*. Jakarta: Economic Research Institute for ASEAN and East Asia, pp.1–35.
- Anbumozhi, V., S. Kumar, and A. Adhityan (2020), 'Low-Carbon Energy Performance Evaluation of Smart City Models in ASEAN', Paper presented at the 7<sup>th</sup> *IAEE Asia–Oceania Conference*, Auckland, 12–15 February.
- ASEAN (1997), *ASEAN Vision 2020*. Jakarta: ASEAN Secretariat.
- ASEAN (2009), *ASEAN Socio-Cultural Community Blueprint*. Jakarta: ASEAN Secretariat.
- ASEAN (2015), *ASEAN 2025: Forging Ahead Together*. Jakarta: ASEAN Secretariat.
- ASEAN (2016), *ASEAN Minerals Cooperation Action Plan, 2016–2025 (AMCAP-III)*. Jakarta: ASEAN Secretariat.
- Bauske, B. (2018), 'Enough is Enough: How WWF Germany Wants to Stop Plastic Litter Entering the Oceans in Southeast Asia', *Deutschland*, 29 January.  
<https://www.deutschland.de/en/topic/environment/enough-is-enough> (accessed 16 March 2020).
- Beech, H. (2019), 'Our River Was Like a God': How Dams and China's Might Imperil the Mekong', *The New York Times*, 12 October.  
<https://www.nytimes.com/2019/10/12/world/asia/mekong-river-dams-china.html> (accessed 13 April 2020).
- Caballero-Anthony, M., P. Teng, G. Tian, M. Shrestha, and J. Lassa (2015), 'Linking Climate Change Adaptation and Food Security in ASEAN', *ERIA Discussion Paper Series*, ERIA-DP-2015-74. Jakarta: Economic Research Institute for ASEAN and East Asia.
- Coldwell, W. (2018), 'Thailand's Maya Bay, Location for the Beach, too Close to Tourists', *The Guardian*, 14 February.  
<https://www.theguardian.com/travel/2018/feb/14/thailand-maya-bay-the-beach-movie-close-to-tourists-leonardo-dicaprio> (accessed 16 March 2020).

- Davis, B. (2016), 'Vietnam's Littering Epidemic', *Forbes*, 30 April.  
<https://www.forbes.com/sites/davisbrett/2016/04/30/vietnams-littering-epidemic/#740cd5d2725d> (accessed 16 March 2020).
- ERIA (2019), *ASEAN 2040: Towards a Bolder and Stronger ASEAN Community*. Jakarta: Economic Research Institute for ASEAN and East Asia.
- Frenken, K., ed. (2012), *Irrigation in Southern and Eastern Asia in Figures: AQUASTAT Survey – 2011*. Rome: Food and Agriculture Organization of the United Nations.  
<http://www.fao.org/3/i2809e/i2809e.pdf> (accessed 13 March 2020).
- GGGI (2019), *Solid Waste Management in Vientiane, Lao PDR: Situation Assessment and Opportunities for Waste-to-Resource*. Seoul: Global Green Growth Institute.  
<https://www.greengrowthknowledge.org/case-studies/solid-waste-management-vientiane-lao-pdr-situation-assessment-and-opportunities-waste> (accessed 3 April 2020).
- International Maritime Organization (2000), 'International Convention for the Prevention of Pollution from Ships, MARPOL Version 1.0'. London: International Maritime Organization.  
[https://www3.ufpe.br/engnaval/images/pdf/Normas/Marpol/marpol\\_7378\\_part\\_a.pdf](https://www3.ufpe.br/engnaval/images/pdf/Normas/Marpol/marpol_7378_part_a.pdf) (accessed 13 March 2020).
- International Rivers (2014), 'The Environmental and Social Impacts of Lancang Dams'. Oakland, CA: International Rivers.  
<https://www.internationalrivers.org/resources/8390> (accessed 13 April 2020).
- Jambeck, J.R. et al. (2015), 'Plastic Waste Inputs from Land into the Ocean', *Science*, 347(6223), pp.768–71. <http://doi.org/10.1126/science.1260352> (accessed 13 March 2020).
- Jizhe, N. et al. (2018), *China Statistical Yearbook 2018*. Beijing: National Bureau of Statistics of China. <http://www.stats.gov.cn/tjsj/ndsj/2018/indexeh.htm> (accessed 13 April 2020).
- Kerber, H. (2018), 'Vietnam's Island Phu Quoc: What's Left from the Paradise?', *PlastX*, 21 February. <http://www.plastx.org/999-vietnams-island-phu-quoc-whats-left-from-the-paradise> (accessed 14 April 2020).
- Kumar, S. (2015), 'Engendering Liveable Low-Carbon Smart Cities in ASEAN as an Inclusive Green Growth Model and the Opportunities for Regional Cooperation', *ERIA Discussion Paper Series*, ERIA-DP-2015-57. Jakarta: Economic Research Institute for ASEAN and East Asia.
- Kuwornu, J. (2019), 'Effects of Disasters on Intra ASEAN Trade of Agriproducts', in V. Anbumozhi, M. Breiling, and V. Reddy (eds.) *Towards a Resilient ASEAN: Volume 1. Disasters, Climate Change, and Food Security: Supporting ASEAN Resilience*. Jakarta: Economic Research Institute for ASEAN and East Asia, pp.53–106.
- Lebreton, L.C.M., J. van der Zwet, J.-W. Damsteeg, B. Slat, A. Andrady, and J. Reisser (2017), 'River Plastic Emissions to the World's Oceans', *Nature Communications*, 8, 15611. <http://doi.org/10.1038/ncomms15611> (accessed 13 March 2020).
- Limpiteprakan, P. (2020), 'Plastic Leakage Survey and its Finding: Ubon Ratchathani', Powerpoint Presentation, CounterMEASURE 1 Final Stakeholder Conference

- (Virtual), Bangkok, 25-28 May 2020. [https://3d7e7899-1117-43cb-9194-3f1feb5a407b.filesusr.com/ugd/d5ac80\\_be8dc079c6e242cebbd0e23a63883b2d.pdf](https://3d7e7899-1117-43cb-9194-3f1feb5a407b.filesusr.com/ugd/d5ac80_be8dc079c6e242cebbd0e23a63883b2d.pdf) (accessed 28 May 2020).
- Ling, S. and M. Fodor (2019), *Country Environmental Analysis: A Road towards Sustainability, Peace, and Prosperity*. Washington, DC: World Bank. <http://documents.worldbank.org/curated/en/482321571990679515/Myanmar-Country-Environmental-Analysis-A-Road-towards-Sustainability-Peace-and-Prosperity> (accessed 7 April 2020).
- Liu, M. (2015), 'Strengthening Regional Cooperation in Disaster Risk Management and Response: Disaster Risk Financing for Relief, Recovery and Reconstruction in ASEAN', Paper Presented at the ERIA Workshop on Framing the ASEAN Socio-cultural Community Post 2015, Jakarta, 15 August.
- Loftus, A. (2018), 'Should We Prioritise Tackling Plastic Pollution in Rivers? Yes, and....', *Medium*, 29 August. <https://medium.com/wwftogetherpossible/should-we-prioritise-tackling-plastic-pollution-in-rivers-yes-and-5cb68f07ee40> (accessed 13 April 2020).
- Lovgren, S. (2018), 'Southeast Asia May Be Building Too Many Dams Too Fast', *National Geographic*, 23 August. <https://www.nationalgeographic.com/environment/2018/08/news-southeast-asia-building-dams-floods-climate-change/> (accessed 13 April 2020).
- Mendrik, F., D. Parsons, C. Hackney, C. Waller, and G. Vasilopoulos (2019), 'The Ecological Fate of Microplastics in Delta and Marine Environments in South-East Asia', *Geophysical Research Abstracts*, 21, EGU2019-3267. <https://meetingorganizer.copernicus.org/EGU2019/EGU2019-3267.pdf> (accessed 16 March 2020).
- MRC (1995), *Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin*, 5 April 1995. Vientiane: Mekong River Commission. <http://www.mrcmekong.org/assets/Publications/policies/agreement-Apr95.pdf> (accessed 13 March 2020).
- MRC (2013), *Waste Management Guidelines: Prepared for Chiang Saen Commercial Port Area*. Vientiane: Mekong River Commission. <http://www.mrcmekong.org/assets/Publications/basin-reports/Waste-Management-Guidelines-Sept2013.pdf> (accessed 27 March 2020).
- MRC (2020), 'Actions to Address Mekong Plastic Pollution Take Shape', News Release, 13 February. <http://www.mrcmekong.org/news-and-events/news/actions-to-address-mekong-plastic-pollution-take-shape/> (accessed 13 March 2020).
- Nguyen, H.X. and V.L. Hoang (2011), 'Solid Waste Management in Mekong Delta', *Journal of Vietnamese Environment*, 1(1), pp.27–33.
- Nguyen, T.H. (2017), 'Study on the Implementation of the Port Reception Facilities Regulations of MARPOL in Vietnam', *World Maritime University Dissertations*, 586. [https://commons.wmu.se/cgi/viewcontent.cgi?article=1585&context=all\\_dissertations](https://commons.wmu.se/cgi/viewcontent.cgi?article=1585&context=all_dissertations) (accessed 13 March 2020).

- Nonthapot, S. and H.H. Lean (2015), 'International Tourism Market Analysis in the Greater Mekong Sub-Region: A Panel Data Approach', *Pertanika Journal of Social Sciences & Humanities*, 23(4), pp.945–65.
- Open Development Mekong (2017), 'Hydropower Dams', 22 December. <https://opendevdevelopmentmekong.net/topics/hydropower/> (accessed 13 April 2020).
- Pariatamby, A., F.S. Hamid, and M.S. Bhatti (2019), *Sustainable Waste Management Challenges in Development Countries*. Hershey, PA: IGI Global.
- Pirika Inc. (2020) "Survey on Microplastic Leakage in the Mekong River Basin", [https://3d7e7899-1117-43cb-9194-3f1feb5a407b.filesusr.com/ugd/d5ac80\\_a71e87593bb647f3aa2fcd8bd4559cf3.pdf](https://3d7e7899-1117-43cb-9194-3f1feb5a407b.filesusr.com/ugd/d5ac80_a71e87593bb647f3aa2fcd8bd4559cf3.pdf) (accessed 28 May 2020).
- Raghavan, S.V., J. Ze, J. Hur, L. Jiandong, N.N. Son, and L. Shie-Yui (2019), 'ASEAN Food Security under the 2°C–4°C Global Warming Climate Change Scenarios', in V. Anbumozhi, M. Breiling, and V. Reddy (eds.) *Towards a Resilient ASEAN: Volume 1. Disasters, Climate Change, and Food Security: Supporting ASEAN Resilience*. Jakarta: Economic Research Institute for ASEAN and East Asia, pp.37–52.
- Reddy V.R., S.K. Singh, and V. Anbumozhi (2016), 'Food Supply Chain Disruption due to Natural Disasters: Entities, Risks, and Strategies for Resilience', *ERIA Discussion Paper Series*, ERIA-DP-2016-18, Jakarta: Economic Research Institute for ASEAN and East Asia.
- Sajise, P.E. (2015), 'Empowering Communities and Countries to Conserve Biodiversity at the National and ASEAN Levels: Status, Challenges, and Ways Forward', *ERIA Discussion Paper Series*, ERIA-DP-2015-81. Jakarta: Economic Research Institute for ASEAN and East Asia.
- Sang-Arun, J. and K. Pasomsouk (2012), 'A Guide for Improving Municipal Solid Waste Management and Promoting Urban Organic Waste Utilization in Lao PDR', *IGES Working Paper*, No. SCP-2012-01. Kanagawa: Institute for Global Environmental Strategies. <https://www.iges.or.jp/en/pub/guide-improving-municipal-solid-waste/en> (accessed 3 April 2020).
- Schmidt, C., T. Krauth, and S. Wagner (2017), 'Export of Plastic Debris by Rivers into the Sea', *Environmental Science & Technology*, 51, 12246–12253. <https://doi.org/10.1021/acs.est.7b02368> (accessed 13 March 2020).
- Shiomi, Y., T. Ono, and S. Fukushima (2019), 'Innovative Methodology for a Regional Assessment of Economic Losses and Damage Caused by Natural Disasters', in V. Anbumozhi, M. Breiling, and V. Reddy (eds.) *Towards a Resilient ASEAN: Volume 1. Disasters, Climate Change, and Food Security: Supporting ASEAN Resilience*. Jakarta: Economic Research Institute for ASEAN and East Asia, pp.17–36.
- Sunchindah, A. (2015), 'Transboundary Haze Pollution Problem in Southeast Asia: Reframing ASEAN's Response', *ERIA Discussion Paper Series*, ERIA-DP-2015-82. Jakarta: Economic Research Institute for ASEAN and East Asia.
- Thang, L.D. (2019), 'Overview of Marine Plastic Debris in Vietnam in Relation to International Context', FIG Working Week 2019: Geospatial Information for a

- Smarter Life and Environmental Resilience, Hanoi, Vietnam, April 22–26.  
[https://www.fig.net/resources/proceedings/fig\\_proceedings/fig2019/papers/ts01d/TS01D\\_le\\_dai\\_10174.pdf](https://www.fig.net/resources/proceedings/fig_proceedings/fig2019/papers/ts01d/TS01D_le_dai_10174.pdf) (accessed 16 March 2020).
- Tuyen, L.D. (2019), 'Plastic Wastes Pose Threats on Vietnam's Environment', *Heinric Böll Stiftung Southeast Asia*, 6 November. <https://th.boell.org/en/2019/11/06/plastic-wastes-pose-threats-vietnams-environment> (accessed 13 April 2020).
- UNEP (2018), *The Weight of Cities: Resource Requirements of Future Urbanization*. Nairobi: United Nations Environment Programme.
- UNESCAP (2018), *Asia and the Pacific SDG Progress Report 2017*. Bangkok: United Nations Economic and Social Commission for Asia and the Pacific.
- Vanaprak, P. (2019), 'Market Size of Solid Waste Management in Thailand'. Jakarta: Economic Research Institute for ASEAN and East Asia.
- Viet Nam Waste Planning, Final Report of Solid Waste Management in Vietnam. Unpublished.
- VietnamPlus (2019a), 'Tourism Sector Strives to Reduce Plastic Use', 19 August. <https://en.vietnamplus.vn/tourism-sector-strives-to-reduce-plastic-use/158054.vnp> (accessed 16 March 2020).
- VietnamPlus (2019b), 'Forum Promotes Green Tourism in Vietnam'. 27 March. <https://en.vietnamplus.vn/forum-promotes-green-tourism-in-vietnam/149009.vnp> (accessed 2 June 2020).
- WHO and UN Habitat (2016), *Global Report on Urban Health: Equitable Healthier cities for Sustainable Development*. Geneva: World Health Organization. <https://apps.who.int/iris/handle/10665/204715> (accessed 22 June 2020).
- WWF (2016), *Mekong River in the Economy*. Ho Chi Minh: WWF-Greater Mekong. <http://www.mrcmekong.org/assets/Uploads/mekong-river-in-the-economy-final.pdf> (accessed 16 March 2020).



## Fostering Energy Market Synergies in the Mekong Subregion and ASEAN

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The Mekong Subregion, where Cambodia, the Lao People's Democratic Republic (Lao PDR), Myanmar, Thailand, and Viet Nam are located, has great potential for energy cooperation and offers the opportunity to attain energy security, resilience, and low-carbon growth. In recent years, these countries have achieved remarkable progress in economic development. Together with rapid industrial growth and the implementation of rural electrification, electricity demand has increased rapidly. There is often a two-way relationship between the provision of energy services and poverty in Mekong. In many aspects, this relationship is a vicious cycle in which low-income economies which lack access to energy are often trapped in a reinforcing cycle of economic deprivation and the need to improve their living conditions, while using significant amounts of their very limited income on expensive imported energy choices. The link between energy and poverty is also demonstrated by the fact that poor households in rural areas constitute the bulk of an estimated 3 million–5 million people relying on traditional biomass for cooking, most of whom do not have access to grid electricity – particularly in Cambodia, the Lao PDR, and Myanmar. On the other hand, access to modern forms of energy is essential to achieve high levels of human development, generate employment opportunities, and support inclusive growth (Martchamadol and Kumar, 2013). In the next decade, electricity demand in the Mekong Subregion is expected to continue increasing at a high rate due to economic growth. The use of fossil fuels and renewable energy is not only associated with environmental and health impacts, but petroleum consumption and import dependence also greatly impact national budgets, trade balances, and household incomes. The exploitation of clean energy sources and cross-border energy trade are cost-effective options to meet the expected increase in electricity demand, achieve energy security, reduce carbon emissions, and contribute to economic competitiveness. The outlook for the energy system in the Association of Southeast Asian Nations (ASEAN) and the Mekong Subregion will depend on how leaders shape energy policy now to create a better and cleaner energy system. Thus, managing and investing in the energy transition will be key to shifting away from fossil fuel dependence towards more renewables, energy efficiency, a smart grid with the internet of things (IoT), and promising hydrogen fuels.

## 1. Availability and Use of Energy Resources in the Mekong Subregion

The Mekong Subregion has a vast variety of energy resources, including oil, natural gas, coal, and other renewables – mostly hydropower. Table 1 illustrates the distribution of such resources across the five countries. Thailand, Myanmar, and Viet Nam have extensive gas resources. The Lao PDR and Myanmar also have large hydropower potential. The Mekong River basin has a total catchment area of 795,000 square kilometres (km<sup>2</sup>) and estimated potential of 285 terawatt-hours, with exploitable capacity mostly in the Lao PDR and Myanmar. The total exploitable hydropower potential is estimated at about 248,000 megawatts (MW). Less than 25% of the remaining potential is shared among the other three countries. The total installed capacity of hydropower generation in the five Mekong countries is estimated at about 21,035 MW, representing only 8% of the exploitable potential resources (Yu, 2003). Thailand has exploited almost all its hydropower resources.

**Table 1: Availability of Energy Resources in the Mekong Subregion**

Country	Type of Energy Resources Available		
	Fossil fuel	Renewable – Hydropower (MW)	
		Potential	Installed
Cambodia	Oil and gas	15,000	13
Lao PDR	Coal	18,000	663
Myanmar	Coal (230 t), crude oil (2.7 billion oil barrels), gas (450–560 bcm)	100,000	802
Thailand	Coal, gas	10,000	3,422
Viet Nam	Coal (33,000 t), oil, natural gas	15,000	4,155
Subregion	Total	158,000	9,055
	<b>Total:</b>	<b>248,000</b>	<b>21,035</b>
	<b>Coal (81,421 Mtoe)</b>		
	<b>Lignite (11,475 Mtoe)</b>		
	<b>Crude oil (1,200 Mtoe)</b>		
	<b>Natural gas (1,645 bcm)</b>		

bcm = billion cubic metres, Lao PDR = Lao People's Democratic Republic, MW = megawatt, Mtoe = million tons of oil equivalent, t = ton.

Source: Compiled from various sources.

The population, installed capacity, energy consumption, and carbon emissions of the Mekong countries varies widely, as shown in Table 2. Thailand is the key energy market in the region, with high installed capacity, per capita energy use, and carbon dioxide (CO<sub>2</sub>) emissions. It accounted for more than 50% of total regional energy consumption in 2015. Viet Nam accounts for 27% of total energy demand. The remainder was consumed by Cambodia, the Lao PDR, and Myanmar.

**Table 2: Current Status of Energy Use in the Mekong Subregion**

<b>Country</b>	<b>Area</b> (1,000 km <sup>2</sup> )	<b>Population</b> (million)	<b>GDP</b> (\$ billion)	<b>Installed electricity capacity</b> (GW)	<b>Energy use</b> (TWh)	<b>Carbon dioxide emissions</b> (1,000 t CO <sub>2</sub> )
Cambodia	181.04	13.97	36.82	0.26	0.98	4,180
Lao PDR	236.80	6.50	13.75	0.67	2.28	1,874
Myanmar	676.58	48.70	91.13	1.56	6.01	8,995
Thailand	513.12	62.80	596.50	24.76	144.08	295,282
Viet Nam	331.69	87.30	262.80	11.65	60.62	150,230

CO<sub>2</sub> = carbon dioxide, GDP = gross domestic product, GW = gigawatt, km<sup>2</sup> = square kilometre, Lao PDR = Lao People's Democratic Republic, t = ton, TWh = terawatt-hour.

Source: Compiled by the author from various sources.

Combined, the Mekong Subregion has insufficient indigenous fossil fuel resources to meet growing demand, and the share of imported fossil fuel is expected to increase, which has important energy security implications. From 1990 to 2015, electricity production in the Mekong Subregion increased at an average annual rate of 8.2%. During this period, growth was fastest in Viet Nam, followed by Cambodia and the Lao PDR. This is around twice the growth rate of the 10 ASEAN Member States (AMS) and three times the world growth rate. The region will see 4% annual growth in energy demand until 2040, amounting to a rise of 50% over 2015 levels (Kimura and Li, 2019). Electricity demand will double from 2010 to 2040 (Yoshikawa and Anbumozhi, 2019). Energy demand and electricity production will rise at the fastest pace in 2035. According to business-as-usual scenarios based on current policies and expected market developments, most demand will be met by fossil fuels such as coal (IEA, 2017). Rising fossil fuel demand from the Mekong region will also result in increased carbon emissions and local air pollution. Energy-related carbon emissions will increase by 61%, reaching 2.2 Gigatons. External costs related to air pollution from the combustion of fossil fuels will increase by 35% from \$167 billion in 2014 to \$225 billion in 2019 (ACE, 2017). This would equal around 5% of the region's gross domestic product (GDP) in 2040. These energy security and environmental challenges could be addressed by promoting cross-border energy trade, wherein surplus energy from one country is shared with other countries in the Mekong Subregion.

## 2. Best Energy Mix and Regional Grid Connectivity

A country develops energy infrastructure and decides on its energy mix based on the premise of energy security. However, when demand growth outstrips the capacity to supply the necessary domestic resources or when economically efficient power station development is difficult due to constraints such as high fuel transportation costs and power loss during transmission, importing electricity from neighbouring countries is considered. In light of the above, it may be possible to optimise or improve the efficiency of energy infrastructure investments in terms of supply stability, economic efficiency, and carbon emissions reduction if we consider ways to develop the cross-border infrastructure of power stations and grids on a subregional basis.

The region has several frameworks on grid connectivity. The Greater Mekong Subregion (GMS) Strategic Framework, signed in 1992, was the first effort by the five member countries plus China to formulate and adopt a development planning agreement which defined the vision, goals, and strategic thrust for cross-border infrastructure connectivity. This was complemented by the ASEAN Plan of Action for Energy Cooperation, 1999–2004, which focused on activities such as engaging cross-country energy dialogue, promoting energy security, and creating responsive policies to progressively enhance market reforms. The ASEAN Plan of Action for Energy Cooperation, 2016–2025 outlined the ASEAN Power Grid (APG) and the Trans-ASEAN Gas Pipeline as two of seven key cross-border cooperation programs. While these programs lay the foundation for greater regional energy cooperation to investigate cross-border energy supply options to realise larger energy markets and economies of scale, it remains unclear whether their implementation can help the GMS to achieve the objectives of energy security, affordability, and sustainability.

Defining and integrating the imperatives of energy security, affordability, and sustainability within the context of cross-border infrastructure connectivity, subregional cooperation often remains dynamic and contextual with increasing scope. Depending on the issue to be addressed, as few as three (APEREC, 2007) to as many as 372 indicators (Sovacool, 2009) may be examined. In the broader sense, energy security refers to the availability and accessibility of all types of energy resources – both fossil and renewable – within national boundaries that have the potential to replace imported energy (Martchamadol and Kumar, 2013). The estimation of current and future available renewable energy resources, in conjunction with fossil fuels, is necessary to assess the need for cross-border energy connectivity investment in a low-carbon manner. The readiness of interconnected grids to integrate energy procured from renewable sources is an important characteristic that will improve the sustainability of cross-border energy projects. Affordability refers to the economic dimension regarding the price of the energy, which depends on the cost and quality of the interconnected infrastructure. Sustainability is the ability of cross-border infrastructure to efficiently enhance the effective utilisation of low-carbon energy sources such as hydropower. This can also serve as an indicator for technological innovations at the grid level to support renewable energy and policy innovations such as carbon pricing to promote the increased absorption of non-fossil energy resources.

From the perspective of energy sector resilience and quality infrastructure, recognising the limited global reserve of fossil fuel energy and unstable world fuel prices, and meeting the Paris Climate agreement targets, it is essential for the Mekong Subregion to accelerate cross-border connectivity and to promote open trade, facilitation, and cooperation in the energy sector and related industries in the requisite infrastructure.

### 3. Status of Cross-Border Energy Trade

The Mekong Subregion is a net importer of energy. In 2018, nearly 25% of the region’s total primary energy consumption was imported. Thailand remains the largest importer of energy in the region, having to buy nearly 60% of its energy needs. Viet Nam and the Lao PDR import 100% of their transport fuels, such as gasoline (Yoshikawa and Anbumozhi, 2019). Myanmar is the only country in the region to remain a net exporter of energy.

Energy trade within the region started in 1971, when the Lao PDR and Thailand signed a power purchase agreement for importing electricity to the northeastern region of Thailand from Nam Ngum Hydropower Plant in the Lao PDR. Bilateral electricity trade progressively intensified as memoranda of understanding were signed between various governments, including Viet Nam. The existing energy trade flows in the Mekong Subregion are presented in Table 3. The trade is mainly from the Lao PDR to Thailand and Viet Nam, with a smaller amount happening between the Lao PDR and Cambodia.

**Table 3: Status of Cross-Border Energy Trade, 2016 (GWh)**

Mekong country	Imports	Exports	Total trade	Net imports
Cambodia	1,546	-	1,546	1,546
Lao PDR	1,265	6,944	8,210	-5,679
Myanmar		1,720	1,720	-1,720
Thailand	6,938	1,427	8,366	5,511
Viet Nam	5,599	1,318	6,917	4,281
<b>Total</b>	<b>15,348</b>	<b>9,861</b>	<b>26,759</b>	-

GWh = gigawatt-hour, Lao PDR = Lao People’s Democratic Republic.  
Source: Yoshikawa and Anbumozhi (2019).

Infrastructure connectivity is key for power trade. Cross-border power connections in the Mekong region are mainly via transmission lines of 110 kilovolts (kV) and 230 kV capacity, such as those between Nam Ngum and Xeset hydropower plants in the Lao PDR and Thailand. The first 500 kV cross-border transmission line within the GMS was constructed to connect Nam Theun 2 Hydropower Plant in the Lao PDR and Thailand.

In the Mekong Subregion, major load centres are concentrated in capital cities, except in Viet Nam where Ho Chi Minh City accounted for 40% of energy consumption in 2018. Amongst the Mekong countries, Vientiane is the capital with the highest ratio of energy consumption, at 75%, followed by Phnom Penh (56%), Bangkok (30%), and Hanoi (19%). The design and implementation of several 500 kV transmission lines between Cambodia, Myanmar, the Lao PDR, Thailand, and Viet Nam – connecting major cities – are ongoing

(Table 4). China's Yunnan Province is also connected to the Lao PDR, Myanmar, and Thailand by 115 kV lines.

**Table 4: Ongoing Cross-Border Transmission Lines in Mekong Subregion**

No.	Location	Interconnection points	Voltage (kV)	Capacity (MW)	Length (km)
1	Myanmar–China (Yunnan)	Shweli 1 HPP–Dehong	220	600	120
2		Dapein 1 HPP–Dehong	500	240	120
3	Lao PDR–Thailand	Nam Theun 2 HPP–Roi Et 2	500	950	304
4		Houay Ho HPP–Ubon 2	230	126	230
5		Theun Hinboun HPP–Thakhek (Lao PDR)–Nakhon 2 (Thailand)	230	434	176
6		Nam Ngum 2–Na Bong (Lao PDR)–Udon 3	230	600	187
7		Hongsa TPP–Nah (Thailand)–Mae Moh 3	500	1,878	325
8		Xayaburi HPP–Thali Kon Kaen 4	500	1,220	390
9		Pakse–Ubon 3	500	400	90
10		Takhek–Nakhon Phanom	115	160	61
11		Nam Leuk HPP–Pakxan–Bueng Kan	115	80	11
12		Phontong–Nong Khai 1	115	160	51
13		Pakbo–Savannakhet–Mukdahan 2	115	80	5
14		Xeset HPP–Sirindhorn HPP–Ubon 1	115	80	61
15	Viet Nam–Cambodia	Chau Doc–Phnom Penh	220	200	111
16	Lao PDR–Viet Nam	Xekaman 3 HPP–Thanh My	220	250	115
17		Xekaman 1 HPP (Hatxan)–Pleiku	220	300	120
18		Xekaman 4 HPP–Ban Soc–Pleiku	500	80	120
19		Nam Mo HPP–Ban Ve	220	120	200
20	Thailand–Cambodia	Aranyaprathet–Banteay Manthey	115	80	40
21	China (Yunnan)–Viet Nam	Xinqiao–Lao Cai	220	300	56
22		Maguan–Ha Giang	220	200	51
23		Maomatiao–Ha Giang	110	115	n/a
24		Hekou–Lao Cai	110	91	20
25	China (Yunnan)–Lao PDR	Mengla–Na Mo	115	35	60
26	China (Guangxi)–Viet Nam	Fangcheng–Mong Cai	110	25	60

HPP = hydropower plant, km = kilometre, kV = kilovolt, Lao PDR = Lao People's Democratic Republic, MW = megawatt, TPP = thermal power plant.

Source: World Bank (2019).

The main catalyst for the cross-border projects is the Electric Power Forum, established in 1995. This intergovernmental institution adopted a two-pronged approach of establishing (i) physical infrastructure, such as transmission lines, to facilitate power dispatch across borders; and (ii) institutional and policy frameworks that augment cross-border power trade. To advance power trade, an international agreement on power trade was signed and a committee for regional power trade coordination was established. The committee meets annually to set the rules governing trade and establishing new infrastructure. The Vientiane Plan of Action is another agreement, which listed about 73 activities that focus on institutional and financial capacity building for enhanced power trade across the Mekong Subregion. The benefits from cross-border integration of the energy sector across the GMS are calculated to total \$200 billion or 17% savings from total energy costs over the 20-year period from 2010 to 2030 (ADB, 2008). A 6% reduction in import dependence was also anticipated. In light of the above, it may be possible to optimise or improve the efficiency of energy infrastructure investments in terms of supply stability, economic efficiency, and a reduction in emissions and pollution, if we consider ways of developing the cross-border infrastructure of power stations and grids on a subregional basis.

However, numerous barriers confront cross-border energy infrastructure development. These have been classified as regulatory, technical, and political and environment, which need to be systematically evaluated to assess the full benefits of future cross-border projects. Regulatory barriers include distorted energy prices, such as the existence of pervasive subsidies, which have negative consequences on cross-border energy infrastructure investments. Technical barriers include the grid codes, capacity, and engineering characteristics of transmission lines. Unequal starting points in power purchase agreements hinder the development of cross-border projects. While integrating renewable energy into existing grids brings carbon benefits, large-scale construction of hydropower is found to have a negative impact on the living environment. A more structured methodology is needed to estimate the net costs and optimise the full benefits of cross-border connectivity in the Mekong Subregion.

#### **4. Priorities in Cross-Border Grid Connectivity in the Mekong Subregion**

As indicated above, two initiatives are under way for developing power connectivity in the Mekong region. The Asian Development Bank (ADB) initiated the GMS Program in 1992, in which multisectoral partnership was developed in the subregion, including China (Yunnan Province and Guangxi Zhuang Autonomous Region). The program envisions a stepwise process to integrate the current and planned interconnections listed in Table 4. The four steps for integrated cross-border connectivity are as follows:

Step 1: Formulate a power purchase agreement for one-way power sales under which an independent power producer in one GMS country sells power to a utility in a second country, using dedicated transmission lines established.

Step 2: Institute power trade between two GMS countries, initially using spare capacity in dedicated stage 1 transmission lines, and eventually using other third-country transmission facilities.

Step 3: Interconnect all GMS countries with 200–300 kV lines, after introducing centralised operations, with a regional system operator that will facilitate third-party participation in energy trading.

Step 4: Make all the GMS countries accept the legal and regulatory challenges to enable a free and competitive electricity market with independent third-party participation.

Another initiative on cross-border interconnection is the APG, which covers five countries in the lower Mekong River basin. The plan for the APG is to make power grid interconnections on bilateral terms, then gradually expand to a subregional basis, leading to an integrated APG system. As one of the physical energy infrastructure projects in the Master Plan on ASEAN Connectivity, the APG is designed to enhance electricity trade across borders – aiming to meet rising electricity demand and improving access to energy services in the region. As of 2015, six bilateral interconnections had been put in operation, linking Singapore and Peninsular Malaysia; Thailand and Peninsular Malaysia; and connecting to Cambodia, the Lao PDR, and Viet Nam via Thailand. Following 2015, a new initiative was announced by four AMS – the Lao PDR, Thailand, Malaysia, and Singapore – to undertake a detailed project to explore multilateral cross-border power trade from the Lao PDR to Singapore, which could serve as a pathfinder to enhance multilateral electricity trading.

The progress of the APG projects in the Mekong region is presented in Table 5, including seven hydropower projects with 4,152 kilometres (km) of transmission lines, integrating the existing connections, and four new projects having a combined transmission length of 2,469 km.

**Table 5: Cross-Border Energy Transmission Connectivity under APG Program**

<b>Cross-border connectivity</b>	<b>Existing</b>	<b>Ongoing</b>	<b>Future</b>	<b>Total</b>
Thailand–Lao PDR	3,584	2,469	1,865	7,328
Lao PDR–Viet Nam	248	1,879	NA	538
Thailand–Myanmar	-	290	11,709–14,859	11,709–14,859
Viet Nam–Cambodia	200	-	-	200
Lao PDR–Cambodia	NA	-	-	300
Thailand–Cambodia	120	300	2,200	2,320
<b>Total</b>	<b>4,152</b>	<b>2,469</b>	<b>15,774–18,924</b>	<b>22,395–25,545</b>

APG = ASEAN Power Grid, Lao PDR = Lao People's Democratic Republic, NA = not applicable.

Source: ADB (2014); Kutani and Li (2015).



Evaluation studies by these organisations reflect multiple economic benefits of cross-border interconnectivity. In the case of Lao PDR–Thailand connectivity, the benefits are more evident in the Lao PDR. Exports of electricity as a percentage of GDP increased five times from 1.63% in 1994 to 34.2% in 2010. The hydropower plants built to export electricity to Thailand have benefited rural communities in the Lao PDR with electrification. In 1995, only 45% of households nationwide had access to electricity, but this increased to 75% of households in 2005 (ADB, 2008).

## **5. Low-Carbon Energy Development in the Mekong Subregion**

Compared with other countries in the region, Thailand has made impressive progress with low-carbon energy development. Alternative energy sources (solar, wind, biofuel, biogas, and mini-hydropower) account for 12% of Thailand’s overall energy use, and the government is targeting an increase to 25% by 2021 (Anbumozhi and Tuan, 2015). The main policy and regulatory framework for reaching this target is the Alternative Energy Development Plan, announced in 2012. The projected quadrupling of installed alternative energy capacity over the period from 2000 up to 2021 is expected to derive from dramatic advances in solar and wind power, a doubling of biomass energy, and a multiple increase in mini-hydropower. The main support for renewable energies in Thailand is the feed-in tariff premium, differentiated according to technology, capacity, and location. Other mechanisms in support of investment in renewable energy in Thailand are financial incentives in the form of grants and low-interest loans, fiscal incentives in the form of exemption from import duties, and personal income tax and corporate income tax provisions.

Viet Nam has renewable energy resources such as hydropower, biomass, wind energy, geothermal energy, and solar energy. So far, these clean energy sources have not been widely used due to a lack of policy initiatives and the absence of a supportive institutional framework. However, Viet Nam has ambitious targets for the development of renewable energy technologies, described in the National Master Plan for Power Development, 2011–2020 with Outlook to 2030 or the Power Development Plan VII. The share of renewable energy in electricity generation is expected to grow from 3.5% in 2010 to 6.5% in 2020, 6.9% in 2025, and 10.7% in 2030. Targets are set for four renewable energy sources: wind, solar, biomass, and small hydropower. Originally, a feed-in tariff for wind power was approved by the Prime Minister’s Decision No. 37/2011/QD-TTG in 2011. A fixed price of \$0.078 per kilowatt-hour (kWh) is offered for a grid-connected onshore wind project. However, compared with other countries in the region and the world, the support price of wind power in Viet Nam is too low and is not attractive to national and international investors (Anbumozhi and Tuan, 2015). In 2018, the Prime Minister amended Prime Minister’s Decision No. 39/2018/QD-TTg (Decision 39), stating that the wind feed-in tariff (excluding value-added tax) would be D1,928 per kWh (equivalent to \$0.085 per kWh) for onshore wind power projects and D2,223 per kWh (equivalent to \$0.098 per kWh) for offshore wind power projects (Hoang and Mitchell, 2018).

Other supporting mechanisms for grid-connected biomass co-generation and solid waste power projects were also approved by 2014, which regulated a fixed price of \$0.058/kWh for biomass co-generation, \$0.1005/kWh for incineration technology, and \$0.0728/kWh for the burial of solid waste (Anbumozhi and Tuan, 2015). The government has provided many additional incentives to encourage investment in renewable energy, including import duty exemptions, an incentive rate for corporate income, and the exemption or reduction of land use fees/rental.

The Lao PDR's low-carbon energy development strategy, approved in 2011, defined the capacity required to achieve a 30% share of renewable energy in the total energy use in 2025. This is the most ambitious target in the Mekong region. However, large hydro is not included as part of this target – only installed capacity and generation for small hydropower are specified. In 2011, the total installed and operational capacity of the Lao PDR was 2,566 MW for both domestic consumption and export, of which 1,987 MW was used for the export market in Thailand and Viet Nam (ADB, 2013). The installed capacity of renewable energy sources was around 28 MW in 2015. In 2016, the Lao PDR added 599 MW of installed hydropower capacity, bringing its total installed capacity to 4,168 MW (International Hydropower Association, 2016).

Myanmar has significant renewable energy potential, but little of the country's solar, wind, and biomass energy potential had been exploited by 2015. The focus had been on hydropower investments. The total installed renewable capacity was about 150 MW in 2015. The Ministry of Energy is targeting an additional 600 MW of renewable energy, which represents 17% of the current installed capacity in 2017. At present, there are no specific renewable energy incentives. However, the government announced a new foreign investment law in 2017 which offers general foreign investment incentives, including, for example, tax exemptions, income tax relief, and targeted customs duties for the importation of machinery and equipment, which could be applied to renewable energy promotion (US Commercial Service, 2019).

Compared with other countries, in 2015, the development of renewable energy in Cambodia is still limited to a demonstration project. Financial incentives for renewable energy are not yet in place. Some investment incentives under the Investment Law, 1994, are available, such as tax exemptions and import duty exemptions. Cambodia does not have a renewable energy development target, but this is linked to the electrification program to achieve full electrification of villages by 2020 and 70% household electrification by 2030. Some of the main components of this program are solar, wind, mini and micro hydro, biogas, and biomass. Financial resources for the development of renewable energy are mainly from foreign countries, in the form of donations or grants. Access to finance is considered one of the main barriers to the implementation of low-carbon energy development in Cambodia (ACE, 2017).

In summary, Thailand has achieved early success in low-carbon energy system development, mainly by relying on important support measures that include subsidies and feed-in tariffs. However, this measure of success is based on renewable energy capacity expansion and does not necessarily capture other indicators such as energy

security, innovation, job creation, and environmental impact mitigation. Moreover, an integrated strategy that sets clean energy targets, priorities for renewable energy technologies, and skills development is still lacking. In the case of Thailand, these additional considerations could be used as lessons learned, to be shared and to help advance the development and use of low-carbon energy development throughout the region.

## **6. Factors Constraining Full Integration of Renewables in Cross-Border Grid Connectivity**

Achieving energy security and affordability, and meeting intended nationally determined contribution targets, remain the objective of future energy development in Mekong countries. More investment in cross-border interconnectivity means reduced emissions from the energy sector and addressing growing concerns in the heterogeneity of global commitments. However, there are several barriers to the operationalisation of this connectivity. The operation of interconnecting transmission lines may be roughly divided into passive and active operations. In passive operations, interconnecting transmission lines are used only when an excess or shortage in the power supply ability emerges for some reason on the premise that each country maintains the supply and demand balance based on the concept of energy security. In active operations, interconnecting transmission lines are used for maximising the economic benefits of facility operations by balancing the power supply capacity of each country and the demand in the subregion. Active operation may be what the GMS is aiming for, as demand for power is increasing rapidly in every country and an integrated energy market is desired.

As cross-border transmission progresses and the use of interconnections expands, the benefits for the entire system in the region will increase. Therefore, it is necessary to carry out structural formulation and system design for the management and operation of interconnections while the Mekong countries are still making considerations and deliberations. Additionally, to accelerate the interconnection projects in progress in the GMS and materialise the benefits of electric power interchange, some conditions need to be satisfied. In this regard, the following region-wide actions are required: (i) overall optimisation and adjustment of power infrastructure development plans that fully integrate renewables, (ii) the harmonisation of technical standards and energy pricing mechanisms, and (iii) the establishment and authorisation of regulatory and consultative bodies to support Mekong-wide energy market integration.

The Mekong region has generally abundant potential for renewable energy development and, once harnessed, this potential could be integrated into grid networks. However, cooperation and harmonisation are very limited. There is room to increase cooperation and harmonisation for individual countries and the region as a whole. The expansion of renewables such as wind, solar, biomass, and geothermal would increase diversity, assuming that they do not completely displace fossil fuel sources. However, an increased share of renewable energy in power generation at the country level may have alternative impacts. For example, it could result in a higher cost of electricity or less jobs. The impacts

of expanded renewable energy uptake in place of coal are not very clear from a net cost–benefit perspective.

There are few initiatives on regional cooperation, apart from joint studies on the renewable energy support mechanism for bankable projects, off-grid rural electrification approaches, and renewable energy technical standards. To help shape influential renewable energy policies and increase the deployment of cross-border transmission lines, several feasibility studies have been undertaken by international organizations on topics such as (i) CO<sub>2</sub> reduction – a greater role for renewable energy in the ASEAN power generation sector; and (ii) the impacts of renewable energy integration through grid connection. Since countries in the region are at different levels of development, interregional cooperation on regulatory standards – and exchange of information and lessons learned on pilot and demonstration projects, best practices, and benchmarking – would facilitate rapid progress. Cambodia, the Lao PDR, and Myanmar have the opportunity to benefit from other experiences such as those of Thailand, Malaysia, and Viet Nam in implementing successful policy reforms through interregional cooperation. Energy policy and planning in the region has been developed individually, as countries are at different stages of development. That said, the governments require capacity building to define the necessary policies and redefine the planning process under the agreed framework of the ASEAN Plan of Action for Energy Cooperation, 2016–2025.

## **7. Managing the Energy Transition in Mekong in the Context of ASEAN Energy Cooperation**

The world is undergoing an energy transformation from a system based on fossil fuels to a system based on cleaner energy use, including renewable and cleaner use of fossil fuels, to reduce global greenhouse gas (GHG) emissions and avoid the most serious impacts of climate change. Addressing the energy transition towards a cleaner energy system has been a common goal, as reflected in the Paris Climate Agreement, where global leaders agreed to set a goal of limiting global warming to well below 2°C compared with pre-industrial levels.

Although the common goal has been reached, policy measures and actions undertaken have varied from country to country – reflecting different socioeconomic, political, and geographical contexts. The energy transition is an economic problem, since the present financial system tends to prioritise immediate profit, discounting medium- and long-term advantages. Therefore, new and clean technology seems more expensive than the conventional fossil fuel-based energy system. So, we have a policy problem in the sense that we need to allocate economic resources for the transition to ensure equitable and affordable access to energy for everyone.

According to the *Energy Outlook* of the Economic Research Institute for ASEAN and East Asia (ERIA), demand for fossil fuels (oil, coal, and natural gas) in the ASEAN region will almost triple from 507 million tons of oil equivalent (Mtoe) in 2015 to 1,393 Mtoe in 2040 under the business-as-usual scenario (Kimura and Phoumin, 2019). This demand growth will be driven mainly by the objectives of ensuring energy security, fuel supply stability,

and affordability. Even under the advanced policy scenario, assuming more aggressive energy efficiency and higher penetration of non-fossil fuels, the fossil fuel demand in 2040 is projected to be 1,027 Mtoe, double the 2015 level. Notwithstanding ongoing efforts in the East Asia Summit<sup>37</sup> region to promote energy efficiency and renewable energy sources, fossil fuels will play a crucial role in the energy mix of the ASEAN region. Managing the energy transition in ASEAN will need to include the presence of fossil fuels (coal, oil, and natural gas) in the short and medium term of transition. What matters is how to explore the way to use fossil fuel in an environmentally sustainable manner to act as a bridge to a carbon-free energy future, rather than simply ruling out them completely. For the successful implementation of the energy transition and climate change policy objectives, policymakers will need to balance other equally important policy objectives – energy security, energy access, and affordability. For instance, policies that ban public financing on clean coal technology (CCT) could be counterproductive in terms of climate mitigation since lack of finance for highly efficient but more expensive CCT would simply result in the deployment of cheaper and less efficient technologies such as critical or subcritical technology and more CO<sub>2</sub> emissions.

The energy transition and its shift towards a cleaner energy system will have fundamental impacts for ASEAN and the global economy. The pace at which countries have adopted low-carbon policies has resulted in drastic changes in the cost of the energy system. One of the greatest challenges that the energy transition presents is the cost and associated know-how technologies and infrastructure of adopting and integrating a higher share of renewables into the energy system. Another equally important issue is the changing geopolitical landscape, where fossil fuel producing countries will need to move at a similar pace to adopt a new, diversified, economic model to cope with change. It is important to note that the shift in and pace of the energy transition will involve costs and investment in all energy-related infrastructure, and it will hugely affect the affordability of energy. Bridging the gap from the current energy system to a cleaner energy system will need to consider the role of cleaner use of fossil fuels, and innovative technologies that can reduce CO<sub>2</sub> and GHG emissions. Therefore, urgent steps need to be taken to decarbonise the energy sector through pathways to a low-carbon economy – requiring rapid deployment of the clean use of fossil fuel technologies, renewable energy development, and a doubling of energy efficiency – given that the energy sector accounts for two-thirds of global GHG emissions.

### **7.1. Investment Outlook and Energy Transition**

The rapid projected increase in energy demand in ASEAN will require coordinated and appropriate energy supply infrastructure and investments to ensure the region's energy sustainability, development, and environment. Investments in some new and renewable energy, and clean technologies, still face unstable and costly energy supply. Thus, ASEAN leaders will need to promote energy policy targets and clean technology penetration in the

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<sup>37</sup> The East Asia Summit has 18 members – the 10 ASEAN countries (Brunei Darussalam, Cambodia, Indonesia, the Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Viet Nam) along with Australia, China, India, Japan, New Zealand, the Republic of Korea, the United States, and Russia.

energy system, perhaps learning from well-established European Union (EU) infrastructure for the low-carbon economy. Investments in low-carbon technologies and renewables are important to manage the energy transition towards cleaner energy use and addressing critical environmental challenges. While the Organisation for Economic Co-operation and Development (OECD) will likely oppose financing for coal-fired power plants, ASEAN is installing more coal-fired power plants to meet the increasing energy demand to fulfil energy affordability and accessibility. Therefore, coal use in ASEAN's energy transition should be more environmentally friendly – using the best available technology to reduce pollutants and emissions – while gradually increasing the penetration of renewables. The EU could assist ASEAN in huge areas of cooperation towards a cleaner and lower carbon economy through the transfer of technologies and investments.

The world's cumulative demand for energy infrastructure investment is projected to be \$60 trillion from 2014 to 2040 (IEA, 2017) or \$2.7 trillion per year. For Southeast Asia, about \$1.7 trillion of cumulative investment in energy supply infrastructure to 2035 is required, with 60% in the power sector (IEA, 2013). While IEA (2013) predicted the investment needed for energy infrastructure, the current investment deficit in the energy sector – encompassing the extraction, generation, and distribution of traditional fossil fuels as well as renewable sources – is yet to be solved. Hence, funding the gap for the required energy investment is a key issue for ASEAN countries. Energy infrastructure and clean technologies are costly, requiring large investments, and various stakeholders are involved. Such stakeholders discuss whether investments in clean energy-related infrastructure projects are 'bankable', 'financeable', and 'investable', as each stakeholder looks at projects from a different perspective in terms of the return on their investment. For example, investors such as banks, governments, and developers differ on the risk/return profile of a given project. Generally, a 'bankable' project is a project that a bank is willing to finance. However, bank financing is only one component of the capital investment structure, and most private investors seek much higher returns on their investment. Therefore, the terms 'financeable' and 'investable' are used if a green project appears to be a strong project, with stable revenue, a suite of credit guarantees, political risk insurance, and expected single-digit or mid-teen returns. This is far below the hurdle rate for risk-adjusted equity investments for frontier market projects. In addition, green projects usually face many risks unless they have government guarantees.

Finance for energy infrastructure projects requires a mix of investors (developer and/or private equity firms or corporate investors) and debt providers (commercial banks or public sector funding). Within a particular capital structure, for example, a project may receive equity investment from a private equity firm or group of investors, with wrap-up insurance from development finance institutions such as the Multilateral Investment Guarantee Agency, Overseas Private Investment Corporation, International Finance Corporation, World Bank, and ADB; or pledged debt from a bank. Institutional investors may participate either directly or through a private equity allocation or the purchase of other financing options such as government infrastructure bonds. Most infrastructure investment is financed by the public sector, public-private partnerships (PPPs), or external official

development assistance for emerging AMS. For PPPs, the AMS have different levels of infrastructure policies, financing methods, and financial capacity. PPPs have been significantly developed and utilised in Malaysia, Indonesia, Thailand, the Philippines, and Singapore. Whilst Cambodia and Viet Nam are yet to formalise the PPP modality, private sector participation has become increasingly important in infrastructure development. The Lao PDR and Myanmar have potential for renewable energy development, although they face multiple challenges – from lack of fiscal sources to fiscal sustainability. PPPs still play a less significant role in Brunei Darussalam, which has abundant public financial resources to build infrastructure.

## **7.2. Making Better Use of Coal in the Energy Transition**

Coal, as the most abundant and reliable energy resource, will continue to be the dominant energy source in power generation to meet fast-growing electricity demand in the ASEAN region and emerging economies around the world. However, coal use has been drastically reduced in the OECD countries and developed economies because of the increased use of natural gas, renewables, and advanced technologies. ASEAN's share of coal use in power generation was 32% in 2015 and it is projected to increase to 42% by 2040, while the share of gas was 42% in 2015 and it is expected to drop to 37% in 2040 (Kimura and Phoumin, 2019). The increased use of coal for power generation in ASEAN countries will lead to widespread construction of coal-fired power plants, which will result in increased GHG and CO<sub>2</sub> emissions if the best available CCTs are not used. Meanwhile, the climate narrative at the United Nations Climate Change Conference (COP 25) in 2019 and the 2020 COP will likely enforce the ban on public coal financing, not limited to the OECD but throughout the world, utilising financial instruments to influence multilateral development banks and all OECD members not to invest in the use of coal. The efforts of developed economies to ban coal financing have merit, but the unintended impacts of such policies need to be understood. The technological development of CCTs has been achieved quickly in developed nations, while the transfer and diffusion of technological know-how of the CCTs to the developing world has been slow. Actions taken to abate CO<sub>2</sub> and GHG emissions have gained momentum in developed economies, especially OECD countries, while developing nations cannot afford the available technologies to reduce CO<sub>2</sub> and GHG emissions. Further, China is leading the financing of coal-fired power plants in developing economies, as it is not bound to OECD rules and obligations to ban coal financing.

If not paired with more sustainable energy development, increasing coal use in emerging Asia will have negative effects on the region's environmental security. With the projected increase in coal-fired generation capacity, both local pollutants – CO<sub>2</sub> and GHG emissions – will become major issues in the future. Based on the global GHG emissions data (US Environmental Protection Agency, 2020), emissions from fossil fuel combustion and industrial processes contributed about 78% of the GHG emissions increase from 1970 to 2011. The largest emitters of global GHG emissions are China, the United States, India, and Russia (Frohlich and Blossom, 2019). With substantial new generation capacity required to generate power, unabated coal-fired power generation plants are increasingly

being constructed in developing Asia. These trends bring forward the urgent need to address the environmental sustainability of powering emerging Asia's economic development and the need for the deployment of CCT.

### **7.3. How to Scale Up the Penetration of Renewables**

While economic growth has increased the affordability of renewable energies around the world, many emerging economies are still at the early stage of development. In AMS that can afford more investment in renewable technologies, an important concern is the need for electricity storage and smart grids to support higher renewable energy penetration levels in the electricity sector. Smart grid technologies already make significant contributions to electricity grids in some developed countries of the OECD. However, these technologies are undergoing continual refinements and improvements, so they are vulnerable to potential technical and nontechnical risks. Renewable energy growth will thus be constrained by infrastructure development as well as by the evolution of technology. This includes capacities for assessing and predicting the availability of renewable energy sources. These capacities offer additional benefits, notably the promise of higher reliability and overall electricity system efficiency.

As a climate narrative, renewable energy provides a bright prospect for the world's energy sector. AMS will have to follow the worldwide trends and expand their renewable energy industries. Due to technological advances, the greatest growth potential of renewable energies will come from wind, solar, and biofuel power, which will be competitive with traditional fossil fuels. Amongst the AMS, there is ample scope for growth in hydroelectricity, particularly in less developed economies such as Cambodia, Myanmar, and the Lao PDR. In several AMS, there is potential for growth in geothermal energy. Therefore, the largest reduction in CO<sub>2</sub> emissions is expected in the power sector, by introducing renewable energy as much as possible. To achieve high penetration of renewables in the power system, huge investment is needed in power system integration that enables coordination of the interplay between distributed generation (wind power plants, mega-solar photovoltaic plants, and rooftop solar photovoltaic systems on buildings); market systems; demand response technologies; and information technology (data acquisition and communication). Such coordinated power system integration, using IoT, is known as a smart grid system. ASEAN can learn lessons from the EU, which has achieved high penetration of renewables using IoT or smart grid systems – involving a complex arrangement of infrastructure whose functions depend on many interconnected elements. Thus, investment in smart grid system components will have huge potential to fulfil future electrical system demand.



## **8. Potential of New Type of Clean Energy Source – Hydrogen**

Hydrogen is the most abundant element in the universe, and it has the potential to fuel the economy while emitting few or no emissions. Hydrogen can be used as clean energy for vehicles, heating, electricity generation, industrial processes, and energy storage.

The EU's ambition to make Europe the first climate-neutral continent in the world by 2050 will involve a significant role for hydrogen fuel, as an enabler, to achieve carbon neutrality. Hydrogen is high on the EU's agenda, as there is overwhelming agreement amongst countries regarding the importance of hydrogen in a carbon-neutral Europe (McKenna, 2020). In early 2019, the EU launched the Innovation Fund, which is a promising tool to support hydrogen applications in hard-to-abate sectors such as steel manufacturing. For many years, the focus has been on power generation and how to decarbonise it, but EU policy is now examining sectors that are more difficult to decarbonise. There is a big focus on steel, but the EU is also looking at refineries, the chemical sector, and transport, including heavy-duty and maritime transport. Europe's focus is on accelerating the production of green hydrogen from renewable sources, but there is still a long way to go and most likely this will not happen at scale until 2030. In the meantime, it will have to rely on large-scale conventional production methods combined with carbon capture technology – otherwise known as 'blue' hydrogen.

ERIA research on hydrogen energy has identified significant potential hydrogen energy supply and demand in the East Asia Summit region. An ERIA study (Kimura and Li, 2019) projected growth in hydrogen adaptation and usage in all sectors by 2040, with the cost of hydrogen reducing from \$0.90/Nm<sup>3</sup> in Japan in 2018 to \$0.30–\$0.40/Nm<sup>3</sup> in 2040, which is a competitive target price for gasoline. China is one of the biggest potential producers and consumers of hydrogen energy. It aims to get 1 million fuel-cell vehicles on its roads by 2029, and will have invested more than \$17 billion in hydrogen by 2023. Japan is promoting the global adoption of hydrogen for vehicles, power plants, and other potential uses. The use of hydrogen is expanding in the transport sector and its adoption is gaining momentum. For example, in 2020, Tokyo Metropolitan Government will increase the number of hydrogen buses in its fleet to 100 and Sarawak Local Government will start to operate hydrogen buses.

While countries around the globe, especially the OECD countries and China, try to promote the introduction of hydrogen fuels, there are various cost and institutional barriers. There are two major barriers to developing green or clean hydrogen energy. First, there is a lack of comprehensive and valid feasibility studies on potential renewable or clean energy to hydrogen projects, as well as the energy infrastructure network for transportation and distribution. Second, there are institutional and regulatory barriers to enabling hydrogen projects. For example, the current regulations of power grid companies have no capacity to transmit the curtailed renewables or integrate energy from nuclear and hydrogen production facilities to meet market demand. They do not have incentives to build dedicated new lines for such purposes. Further, current power sector regulations do not allow on-site production of hydrogen at renewable power stations, using curtailed electricity.

## 9. Conclusions

The benefits of subregional cooperation amongst the Mekong countries on energy security, affordability, and sustainability are high. However, countries will need to address many of the technical and regulatory barriers to achieve the multiple benefits of interconnections. What will determine the realisation of future cross-border energy connectivity are not only technical limitations, but also political and regulator limitations. Mekong countries are developing their national power development plans, low-carbon implementation frameworks, and priority actions for the Sustainable Development Goals. However, these plans are usually initiated at bilateral or national level and need more subregional focus to better capture new opportunities with cross-border energy infrastructure development. Therefore, while countries develop their own energy strategies, they should work together to formulate subregional targets within their own energy and power development strategies for operationalising cross-border connectivity. This would allow for enhancing energy security and reduced emissions, as determined by several completed studies. The social benefits of such an approach are clear in terms of employment and local development. Nevertheless, the following key policy options are recommended to realise the planned cross-border interconnections:

- Conduct an overall assessment, optimisation, and adjustment of planned cross-border power connectivity plans to provide detailed information for public and private decision makers about the quantity, quality, and location of APG and GMS master plan projects, technical standards, and institutional capacities.
- Develop a comprehensive renewable energy investment roadmap as a strategy to show bold leadership in removing the barriers to integration and to make new investments more cost-effective at the grid level through regulations, incentives, and capacity building for taking credit risks.
- Earmark financial resources for power market integration, by expanding the ASEAN Infrastructure Fund to drive private investments with clear policy signals.

The emerging digital and industry 4.0 revolution is also set to transform energy demand and supply in the Mekong Subregion. The adoption of smart transport, housing, and manufacturing on a large scale will have a profound impact on both energy demand and the optimisation of energy supply at the national level. A sound policy and market design will be critical in steering a digitally enhanced energy system along more efficient, secure, and stable grid connectivity across the borders.

Mekong subregional cooperation should also be viewed in the context of ASEAN's overall economic, social, and political dynamics, which have made the region one of the fastest growing regions. However, ASEAN also faces the challenges of growing energy demand, energy security, and energy affordability to steer such growth. While the OECD has achieved a rapid reduction in GHGs in response to the climate commitment of COP 21, ASEAN seems to be struggling to achieve a balance between economic growth, energy affordability, and availability. Much of the future energy mix of emerging AMS will rely on coal use for power generation. Many AMS are locked into coal use for many years, as the contracts of coal-fired power plants are for 20–35 years. Thus, ignoring coal use in ASEAN

means ignoring the reality of and emissions from coal use. Treating coal use as part of the energy transition in ASEAN is essential to address energy affordability and climate change impacts. The deployment of CCT is urgent in the ASEAN region. Although ASEAN energy targets include more renewables, they remain expensive in terms of system costs. The inability of traditional grids to achieve higher penetration of renewables is another constraint. Smart grids using IoT will be a new green investment infrastructure to allow more penetration of renewables, but they need significant investment such as hard grids, applications, data management, and human resources. Hydrogen fuel will be the next clean energy source due to its versatility for use in many sectors. The promotion and adoption of hydrogen fuel will be key in moving towards clean energy. The EU and developed economies are leading hydrogen research and development. ASEAN will need to catch up, learn, and adopt the application and uses of hydrogen in the economy.

Moreover, in moving towards a clean energy future, ASEAN needs to deal with the current and future new generation capacity of coal to generate power. Coal-fired power generation plants are increasingly being constructed in developing Asia. This trend underlines the urgent need to address the environmental sustainability of powering emerging Asia's economic development and the need for the deployment of CCT.

- The current climate narrative and policy approach of banning coal use should be reviewed to assist emerging Asia to afford CCTs, provided that less costly alternative energy options are available for emerging Asia in the medium term to meet energy demand. Treating CCT as a technology solution in the energy transition will be a win-win solution for a climate-friendly world that is reflective of Asia's need for energy accessibility and affordability.
- Emerging Asia will rely on the CCTs available in the market at an affordable price. The up-front costs of such ultra-supercritical (USC) technology or advanced ultra-supercritical (A-USC) technologies are higher than those of supercritical and subcritical technologies. Thus, it is necessary to lower the up-front cost of A-USC or USC through policies such as attractive financial/loan schemes for USC technologies, or a strong political institution to deliver public financing for CCTs to emerging Asia.
- A policy framework should clearly state the corporate social responsibilities of developed and developing economies, by highlighting the near- and long-term policy measures for the coal industry and coal-fired power generation, with the acceleration of research and development on the commercialisation of carbon capture sequestration, utilisation, and storage. Business models will need to be developed around carbon capture sequestration, utilisation, and storage.
- Public consultations or local participation are needed regarding the potential impacts of the selected coal technologies/CCTs. However, for emerging Asia, the governments may not emphasise such local participation. Thus, an active local organisation is needed to disseminate information on the potential harm resulting from less-efficient coal-fired power plants.

- China, the leading public financier of coal-fired power plants in Asia, will need to embed environmental standards in its funding mechanism to ensure that the deployment of coal-fired power plants uses at least USC technologies in emerging Asia.

International assistance and cooperation will be crucial to move ASEAN to a high level of renewable energies through smart grid investment and cooperation. Such investment areas include the following:

- Investment in 'hard' infrastructure – in-country physical grid components; APG connectivity; the power generation, transmission, and distribution network; and energy storage facilities – to balance load fluctuations caused by higher renewable energy penetration.
- Investment in telecommunications services that monitor, protect, and control the grid – wide area networks, field area networks, home area networks, and local area networks.
- Investment in data management, which ensures proper data mining and utilisation, to facilitate smart grid applications.
- Investment in tools and software technologies that use and process information collected from the grid to monitor, protect, and control the hard infrastructure layer and reinforce the grid to allow the integration of renewable energy.

Hydrogen energy-related industries will be a huge investment in the future. It is essential to consider the clear policy road map of hydrogen adaptation and usage in all sectors. Below are key policy directions for investments in hydrogen:

- There is huge potential for investments in hydrogen production from renewables and nuclear energy. Curtailed electricity from renewable energies is suitable for hydrogen production, but clear policies and regulations are needed to promote such hydrogen production.
- For hydrogen vehicles to be widely adopted, hydrogen refuelling stations and hydrogen transportation and storage facilities need to be developed.
- Public awareness and willingness to pay, together with public financing for the hydrogen production and supply chain, are key to promote investment.
- Governments need to establish targets for hydrogen penetration/uses in all sectors. Energy policy and targets to promote hydrogen uses will encourage investment in supply chains.

## References

- ACE (2017), *The 5<sup>th</sup> ASEAN Energy Outlook, 2015–2040*. Jakarta: ASEAN Centre for Energy.
- ADB (2008), *Energy Sector in the Greater Mekong Subregion*. Manila: Asian Development Bank
- ADB (2013). *Asian Development Outlook 2013: Asia's Energy Challenge*. Manila: Asian Development Bank.
- ADB (2014), *Lao People's Democratic Republic: Energy Sector Assessment, Strategy, and Road Map – 2013 Update*. Manila: Asian Development Bank.
- ADB and ADBI (2012), *Connecting South Asia and Southeast Asia*. Tokyo: Asian Development Bank Institute.
- Anbumozhi, V. and N.A. Tuan, eds. (2015), *Integrative Strategy and Policies for Promoting Appropriate Renewable Energy Technologies in Lower Mekong Basin Region*, ERIA Research Project Report 2015, No. 21. Jakarta: Economic Research Institute for ASEAN and East Asia.
- APERC (2007), *A Quest for Energy Security in the 21<sup>st</sup> Century*. Tokyo: Asia Pacific Energy Research Centre.
- EU (2020), EU Action: 2050 Long-Term Strategy. <https://ec.europa.eu/clima/policies/strategies/2050> (accessed 27 April 2020).
- Frohlich, T.C. and L. Blossom (2019), 'These Countries Produce the Most CO<sub>2</sub> Emissions', *USA Today*, 14 July. <https://www.usatoday.com/story/money/2019/07/14/china-us-countries-that-produce-the-most-co-2-emissions/39548763/> (accessed 3 June 2020).
- Hoang, P.A. and A. Mitchell (2018), 'Vietnam Legal Update: Changes To Wind and Solar Power Feed-in-Tariff Deadlines', DFDL, 12 September. <https://www.dfdl.com/resources/legal-and-tax-updates/vietnam-legal-update-changes-to-wind-and-solar-power-feed-in-tariff-deadlines/> (accessed 22 June 2020).
- IEA (2013), *Southeast Asia Energy Outlook 2013*. Paris: International Energy Agency. <https://webstore.iea.org/download/summary/463?fileName=English-Southeast-Asia-Energy-Outlook-2013-ES.pdf> (accessed 2 June 2020).
- IEA (2017), *Southeast Asia Energy Outlook 2017*. Paris: International Energy Agency.
- IEA (2020), 'Global Energy Prospects and their Implications for Energy Security and Sustainable Development'. <http://www.oecd.org/parliamentarians/meetings/gpn-meeting-february-2020/Faith-Birol-Global-energy-prospects.pdf> (accessed 28 April 2020).
- International Hydropower Association (2016), *Hydropower Facts, Country Profiles, Laos*. <https://www.hydropower.org/country-profiles/laos#:~:text=Laos%20added%20599%20MW%20of,installed%20capacity%20to%204%2C168%20MW.> (accessed 2 June 2020).
- Kimura, S. and Y. Li, eds. (2019), *Demand and Supply Potential of Hydrogen Energy in East Asia*, ERIA Research Project Report 2018, No. 01. Jakarta: Economic Research Institute for ASEAN and East Asia.
- Kimura, S. and H. Phoumin, eds. (2019), *Energy Outlook and Energy Saving Potential in East Asia 2019*. Jakarta: Economic Research Institute for ASEAN and East Asia.

- Kutani, I., ed. (2014), *Study on Effective Investment of Power Sector Infrastructure in East Asia through Power Grid Interconnection*, ERIA Research Project Report 2012, No. 23. Jakarta: Economic Research Institute for ASEAN and East Asia.
- Kutani, I. and Y. Li, eds. (2015), *Investing in Power Grid Interconnection in East Asia*, ERIA Research Project Report 2013, No. 26. Jakarta: Economic Research Institute for ASEAN and East Asia.
- McKenna, J. (2020), 'Europe's New Love Affair with Hydrogen', *Spectra*, 30 March. <https://spectra.mhi.com/europes-new-love-affair-with-hydrogen?gclid=EAAlaQobChMI-NS1xoal6QIVlg4rCh1qMAPqEAAYASAAEgJf6vD BwE> (accessed 27 April 2020).
- Martchamadol, J. and S. Kumar (2013), 'An Aggregated Energy Security Performance Indicator', *Applied Energy*, 103, pp.653–70.
- Phoumin, H. (2015), 'Enabling Clean-Coal Technologies in Emerging Asia', *2015 Pacific Energy Summit Working Paper*. Seattle and Washington, DC: The National Bureau of Asian Research.
- Sovacool, B.K. (2009), 'Energy Policy and Cooperation in Southeast Asia: The History, Challenges, and Implications of the Trans-ASEAN Gas Pipeline (TAGP) Network', *Energy Policy*, 37(6), pp.2356–67.
- Tran T.D.L., N. Mithulandhan, A. Lomi, A. Arputharajah, and A. Sode-Yome (2016), 'Electrical Power Exchange in GMS and its Influence on Power Systems in Vietnam and Thailand', Proceedings of IEEE ICSET, 6–9 Dec, Kandy, Sri Lanka.
- US Commercial Service (2019), Burma Country Commercial Guide, Burma – Energy. <https://www.export.gov/apex/article2?id=Burma-Energy#:~:text=Currently%2C%20Myanmar%20has%20a%20total,Megawatts%20by%20renewable%20energy%20sources> (accessed 2 June 2020).
- US Environmental Protection Agency (n.d.), Global Greenhouse Gas Emissions Data. <https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data> (accessed 16 June 2020).
- World Bank, (2019), *Greater Mekong Subregion Power Market Development: All Business Cases Including the Integrated GMS Case*, Issue No. 3. Ricardo Energy and Environment Final Report for the World Bank. <http://documents.worldbank.org/curated/en/541551554971088114/pdf/Greater-Mekong-Subregion-Power-Market-Development-All-Business-Cases-including-the-Integrated-GMS-Case.pdf> (accessed 29 May 2020).
- Yoshikawa, H. and V. Anbumozhi, eds. (2019), *Shaping Energy Policies to Achieve the Sustainable Development Goals in Myanmar and the Greater Mekong Subregion*, ERIA Research Project Report 2019, No. 10. Jakarta: Economic Research Institute for ASEAN and East Asia.
- Yu, X. (2003), 'Regional Cooperation and Energy Development in the Greater Mekong Sub-region', *Energy Policy*, 31(12), pp.1221–34.

# Water Resources Management in the Mekong Basin<sup>38</sup>

*Han Phoumin and To Minh Thu*

## 1. Introduction

The Mekong River basin has long been a beautiful, fertile region that is rich in resources. It is the source of many productive activities such as fishing, agriculture, hydroelectric power, transportation, and so on. Nowadays, however, the construction of dams and other projects, development and high population pressure, lack of proper management of water resources, and lack of cooperation amongst riparian countries have resulted in rising complications in water quantity and quality, biodiversity loss, and disasters such as drought and flooding. Water management in the Mekong region has, in practice, been dominated by energy and food objectives in an uncoordinated manner amongst riparian countries, leading to rapid degradation of water resources.

In July 2019, the lowest water levels in history were recorded at all monitoring stations in the mainstream, and the amount of water flow dropped by 70%–75% from the average of the same period in 2018. Moreover, the flood cycle has become irregular, severely affecting fishing, agricultural production, and people's lives. Amid these many challenges, there are opportunities in water resources management through the application of new technology in energy and agricultural production and better cooperation in water management amongst riparian countries. In fact, regional cooperation in the Mekong Basin has become increasingly dynamic in recent years with the emergence of a new mechanism and the reshuffle of existing ones. Cooperation mechanisms amongst riparian countries and with external partners have provided platforms for the discussion of regional issues, including water resources management and sustainable development.

This paper identifies major challenges in water resources development, using scenarios for foreseeable water resources development and planning, and evaluates the current Integrated Water Resources Management (IWRM) tools used in the Mekong and the water resources procedures of the Mekong River Commission (MRC). The paper then reviews existing cooperation mechanisms in water resources management and explores ways to

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<sup>38</sup> The authors express their gratitude to the Mekong River Commission Secretariat (MRCS) for providing access to the results of its Council Study, basin-wide scenario assessment, and the most up-to-date information on Mekong water resources development and cooperation, as the basis of data/information to write the chapter on water resources development in the Mekong as part of the contribution of the Economic Research Institute for ASEAN and East Asia (ERIA) to Viet Nam's 2020 ASEAN Chairmanship deliverable. Special thanks go to An Pich Hatda, the Chief Executive Officer of the MRCS, who granted us permission, made these documents available, and provided guidance on sensitivity and water politics in the Mekong countries. The authors are also thankful to our collaborator, Thim Ly, Chief River Basin Planner of the MRCS, who provided guidance. Most of the information presented in this paper is extracted from the MRCS studies

improve coordination amongst riparian countries and amongst water use activities in the region.

## **2. Challenges to Water Security in the Mekong River Basin**

The Mekong River is the world's 12th longest river, at almost 4,763 kilometres, flowing from the Tibetan Plateau in China at an elevation of about 5,000 metres. In China, the river runs through Yunnan Province and is known as the Lancang River. After leaving China, it flows through Myanmar, the Lao People's Democratic Republic (Lao PDR), Thailand, Cambodia, and Viet Nam into the sea. In this paper, we use the name Mekong for both the upper and lower parts of the river. Throughout history, the river basin has been home to millions of people in its riparian countries. The river has been the source of food (rice, other crops, fish, etc.) and waterways for its people. Rice dominates agricultural production, at both the commercial and household levels. The Lower Mekong countries produced more than 109 million tons of paddy rice in 2017, with Viet Nam, Thailand, and Myanmar being the 5th, 6th, and 7th largest rice producers in the world, respectively. While a large percentage of this rice goes to local markets and remains within the countries, the region is also an important rice exporter. Thailand and Viet Nam are the 2nd and 3rd largest exporters in volume, and Cambodia is the 8th largest exporter (Statista, 2018). Most rice production in the region is traditional lowland cultivation, in which water is the single most important component for production and the Mekong water is truly a valuable resource.

Total catches and production from Mekong fisheries (including aquaculture) totalled about 3.9 million metric tons in 2008, of which about 2 million metric tons were from capture fisheries. Fisheries account for nearly 12% of Cambodia's gross domestic product (GDP) and contribute more to the country's economy than rice production. In the Lao PDR, the fisheries value is equivalent to 7% of the country's GDP. Although proportionally less significant to the national economy, the Mekong fishery sectors in Thailand and Viet Nam add well over \$750 million to their GDP each year. Millions of people rely on subsistence fisheries for food security, and fisheries support tens of thousands of businesses – from shops and food stalls that supply fishing families to boat builders and fishing gear suppliers. Capture fisheries make the largest contribution to the Mekong's fishery sector. In 2008, production was estimated at about 1.9 million metric tons five times more than in 2000. About 1.6 million metric tons originate in the Mekong Delta in Viet Nam. The production of inland aquaculture in Cambodia, the Lao PDR, and Thailand is also increasing, but remains less important than capture fisheries (MRC, 2018a).

The Mekong Basin has considerable potential for hydropower development, serving both domestic and export markets. The Upper Mekong Basin in China has estimated hydropower potential of nearly 30,000 megawatts (MW), equivalent to that of all five Lower Mekong Basin (LMB) countries (MRC, 2010a). Unfortunately, this distinguishing feature is also the source of complications that have arisen in the past few decades. In 1986, China started damming the Lancang, its section of the Mekong, with Manwan Dam. Since then, it has completed another 10 mega-dams on the Lancang. The northernmost



of the dams is Yunnan's 990 MW Wunonglong Dam, high in the Himalayas of the Diqing Tibetan Autonomous Prefecture, which was completed in 2019. The southernmost one in Jinghong is near the lush forests of Xishuangbanna. Apart from China, the Lao PDR possesses two hydropower dams – the Xayaburi Dam and Don Sahong Dam – in the mainstream of the Mekong. Thanks to its favourable geographic position, the Lao PDR has strong hydropower potential and it considers earnings from exports of hydroelectricity as a means to leapfrog development and reduce poverty. Indeed, hydropower is a lucrative sector, and the governments and media of countries with the potential for dams promote hydropower as a source of green and clean energy, superior to dangerous or polluting coal-based energy (Yoshida, 2020). However, dams bring various challenges such as deforestation, relocating local residents, designing dams that can facilitate the flow of fish and sediment, and coordinating operations.

In fact, the Mekong River basin faces a multitude of problems, such as changes to its natural flow, severe and more frequent droughts and floods, loss of sediment, biodiversity degradation, and saltwater intrusion, which could be aggravated in the future unless appropriate solutions are applied. Alterations to the natural flow regimes of the river and streams, with increased dry season flows and decreased wet season flows, have been recorded in riparian countries, as evidenced at Chiang Saen where the Mekong enters the Lower Basin.<sup>39</sup> In addition, riparian countries have suffered the adverse impacts of more acute droughts. To illustrate, the 2019 drought has brought the Mekong water level across the basin to a record low since June, with a serious inflow deficit to the Mekong compared with the yearly average – lower than ever recorded since measurements began 60 years ago. Besides, floods have worsened the state of the basin, putting the livelihoods of tens of millions of people living and working along the river in jeopardy. Another critical problem is sediment reduction, which is projected to drop by as much as 67% in 2020 and 97% in 2040 in the Mekong Delta (MRC, 2018b). The sedimental poverty is likely to have detrimental effects on the agricultural productivity, geomorphology, and persistence of the delta landform (MRC, 2018b). Under the impact of natural disasters and human exploitation, the basin is undergoing substantial loss of biodiversity. According to the WWF, the Greater Mekong Subregion (GMS) risks losing more than a third of its remaining forest cover within the next two decades (WWF, 2020). Salinity intrusion in the Lower Basin in general and the Mekong Delta in particular has occurred earlier and deeper than in the 2015–2016 dry season, the period of historic salinity which caused \$646 million of damage to the delta. In fact, saltwater intrusion has been very high since December 2019 and is projected to rise with high tides (Vietnam Disaster Management Authority, 2020). It can be said that the severity is caused and exacerbated by both natural phenomena such as climate change and human activities such as the construction of dams.

The operation of upstream hydropower dams is seen as a catalyst for dramatic fluctuations in river levels and changes in the natural cycle of the river (Bainbridge and Vimonsuk, 2020). The ecosystem deterioration is also imputed to hydropower projects, as these dams prevent the migratory pathways of fish and capture sediment behind their

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<sup>39</sup> For further details, see Basist and Williams (2020).

walls. An empirical study showed that more than half of the Mekong's 165 million metric tons sediment load has been trapped by 11 mega-dams on the mainstream in China (East-West Center and The Stimson Center Southeast Asia Program, 2020). This aggravation of the Mekong spurs the active engagement of relevant stakeholders to ensure sustainable water use management, for the security and prosperity of the whole basin.

To face the above challenges, institutions governing transboundary water resources are crucial for achieving cooperation benefits and preventing conflicts. With the increasing challenges in the Mekong region, riparian countries have initiated or participated in various multilateral and bilateral cooperation mechanisms. The existence of these mechanisms has helped to build trust amongst countries, mitigate the risk of water conflict escalation, and contribute to progress in water resources management.

### **3. Water Resources Development Scenarios in the Lower Mekong Basin**

The current well-being of the Mekong people is relatively poor, and these millions of poor people exploit the natural resources of the Mekong Basin for their food security and livelihoods. At the same time, in response to the power demand to meet the energy consumption of Southeast Asia's emerging economy and to address the ambitious poverty reduction of the LMB, the LMB countries are looking at all possibilities – including the use of the Mekong water resources for generating income as well as poverty reduction to meet the Sustainable Development Goal (SDG) targets. The Mekong countries are seriously considering the possibility of developing hydropower because of the predicted increase in energy demand in Southeast Asia (predicted to almost double from 2015 to 2040) to meet the growing economy of Southeast Asia, geopolitical dependency on oil in the Middle East, and global renewable energy trends (Phoumin, Kimura, and Malik, 2019). In addition, the level of water resources development is clearly driven by markets and the private sector while most governments consider it fit for purpose for common goals.

Now, China has completed major hydropower dams on the upper Mekong (Lancang), with a combined capacity of about 17,000 MW. A further 11 projects are under construction, with a capacity of 11,800 MW. Another 10 projects are planned in the upper basin, with a capacity of 3,800 MW. As for the LMB, the pace of hydropower development has accelerated in recent years, with growing demand for low-cost electricity to support economic development. In 2001, there were about 17 hydropower projects in operation in the LMB, with a capacity of less than 1,400 MW. From 2002 to 2015, an additional 40 hydropower projects with a capacity of 6,442 MW were commissioned. A further 14 dams with a total capacity of 3,000 MW are scheduled to be commissioned by 2020 and another 30 dams with a total capacity of around 6,653 MW are in the development process, with most having completed feasibility studies. Five mainstream dams in the LMB have been submitted to the MRC under the prior consultation process of the Procedures for Notification, Prior Consultation and Agreement (PNPCA). The 1,285 MW Xayaburi and the 260 MW Don Sahong projects have been in operation since 2019. The 912 MW Pak Beng, 770 MW Pak Lay, and 1,460 MW Luang Prabang projects completed the PNPCA prior consultation review, in 2017, 2019, and 2020 respectively, but construction has not yet

started. Following from these last three PNPCA prior consultation processes, a joint action plan (JAP) has been agreed by MRC members which will be implemented to carry out measures to avoid, minimise, and mitigate negative impacts. In addition to tributary dams and the possibility of irrigation expansion, the Lower Mekong countries have about 11 proposed mainstream dams on the Mekong River and many tributaries. These developments of the upper and lower parts of the Mekong River bring both opportunities and risks, which imply social, environmental, and economic implications for the Mekong countries.

Through a series of national and regional stakeholder consultations, three main scenarios were considered and assessed for potential future planning in the LMB for the MRC Council Study. Those scenarios were (i) an early development scenario (2007) or M1 scenario, (ii) a definite future scenario (2020) or M2 scenario, and (iii) a planned development scenario (2040) or M3 scenario. Each formulated scenario has a basin-wide scope and is composed of project developments. These developments were introduced as composite changes to an assumed *reference period*, which is defined by a 24-year time series from 1985 to 2008 of hydro-meteorological data (rainfall, evaporation, boundary water levels, etc.) broadly representative of the historic natural flow conditions of the Mekong River. The historical period was calibrated using a range of *exogenous drivers* that are not directly linked to the water infrastructure investments in the scenarios but have substantial influence on livelihoods; sustainability; and social, economic, and ecological conditions. Trends were statistically estimated for these exogenous drivers, which include population growth for each of the member countries at the level of the LMB. The combination of past hydro-meteorological data (or patterns) and trends of exogenous drivers define the M1 scenario.

#### ***Early Development Scenario (2007) – M1 Scenario***

The M1 scenario aims to assess the distribution of the benefits, costs, impacts, and risks of water resources development in the Mekong Basin as of 2007. The scenario defines the state of water infrastructure development as it was in 2007 when the flow regime of the Mekong mainstream was considered to be still in a natural state, except for the influence of Chinese dam impoundments in the Upper Mekong or Lancang River. The scenario includes the infrastructure and land use/cover changes as of 2007. In addition to modelling with the decision support framework, the impact assessment of the early development scenario was based on existing observations, studies, and assessments of historical changes in land use, development of (irrigated) agriculture, flood control structures, wetland areas and biodiversity, capture fisheries, and livelihood and well-being indicators. The assessment results allowed the member countries to consider whether the benefits, impacts, and risks of new water resources development are reasonable and equitable.

#### ***Definite Future Scenario (2020) – M2 Scenario***

The M2 scenario aims to assess the distribution of the benefits, costs, impacts, and risks of water resources development in the Mekong Basin in 2020. The scenario includes all existing infrastructure development of hydropower to be in place by 2020. The impacts (positive and negative) of this scenario are inevitable (but negative impacts can be mitigated).

### ***Planned Development Scenario (2040) – M3 Scenario***

The M3 scenario aims to assess the distribution of the benefits, costs, impacts, and risks of water resources development in the Mekong Basin in 2040. In addition to the development in the definite future scenario, the planned development scenario includes all water resources development that is planned in the Mekong Basin. On a timescale, the scenario covers the water resources development that would be in place by 2040 if these plans were fully implemented. The formulation of the three main sub-scenarios was considered, building from the M3 scenario, in response to key policy questions arising from the stated objectives and interest of the riparian states as a result of climate change, the high level of irrigation development, and flood protection, in addition to what is assumed under the M3 scenario.

Given the situation described above, there has been increasing pressure from the basin countries and project developers for the provision of an integrated basin perspective against which national plans and proposed projects can be assessed to ensure an optimal balance between economic, environmental, and social outcomes in the LMB, and mutual benefits to the LMB countries. The development of such a basin perspective is beyond the responsibility of any individual country or project developer. Legally and intuitively, the role of the MRC – as agreed by the 1995 Agreement of the LMB countries – includes advising in such a challenging water resources development in the LMB. Experience elsewhere in recent years has suggested that scenarios for water resources development could be a tool for planning and strategy testing. A summary of the main scenario assessment results of the Council Study is presented below.

### **Key Results of Basin-wide Development Scenarios Assessment**

Using the Delphi method, the sustainability scores were assessed for the three main scenarios (M1, M2, and M3CC) and their sub-scenarios by experts from LMB riparian countries. Not all sustainability indicator data are available, so only selected prioritised indicators were used amongst the economic, social, and environmental indicators. The SDG-based index<sup>40</sup> provides a simple approach to approximate how development investments, as defined under the various main and sub-scenarios, impact sustainability.

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<sup>40</sup>The sustainability index was based on the subset of SDG indicators and calculated by normalising each indicator. As a first step, the selection of SDG indicators was completed with member countries. As a second step, the range of possible outcomes was specified for each indicator, in conjunction with member countries. The starting values for the worst and the best situation – lower and upper bound – of each indicator were derived from global data. Once complete, disciplinary assessment results were used to calculate the state of each indicator for each scenario and then normalised within the agreed value range of possible outcomes. Each assessment indicator was assigned a sustainability value between zero (unsustainable) and one (highly sustainable).

### ***SDG-based Sustainability Index***

Table 1 shows the sustainability level for scenario M1, the differences between the main scenario and M1, and the differences between sub-scenarios<sup>41</sup> and the main scenario M3 with climate change (M3CC). The results of the SDG-based sustainability index indicate a rather low level of sustainability for Viet Nam's Mekong Delta. Another key insight is that the Lao PDR would incur the greatest loss for main scenario M2. Main scenario M3, on the other hand, would result in the same absolute loss of sustainability points for Cambodia and Viet Nam. Thailand would most likely experience the lowest reduction in sustainability across all scenarios. The sub-scenario perspective reveals that lower investment levels in hydropower would lead to more sustainable development pathways in all countries, in which the sustainability index would increase by between 1.12 points in Thailand up to 1.73 points in Cambodia. The comparison of the planned development scenario without hydropower (H1a) and the planned development scenario without mainstream hydropower (H1b) shows that this index suggests a similar impact from tributary and mainstream dams. The planned development scenario with hydropower mitigation investment (H3) indicates that substantial improvements in dam management and the implementation of mitigation measures can provide substantial gains in Cambodia. The planned development scenario with high agriculture and land use (sub-scenario ALU2) highlights that excessive agricultural expansion can lead to overall sustainability losses, as shown for Cambodia.

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<sup>41</sup> Three sub-scenarios for 2040 were developed to explore the interactions between water resources development and changes in climate. Comparisons between scenarios M3 and CC2, for instance, measure the effect of water resources development at the level of 2040 under a climate that is even wetter than mean projections.

**Table 1: Scenario Impacts on SDG-based Sustainability Indicators**

Country/ Region	Scenario															
	M1	M2- M1	M3- M1	M3CC- M1	ALU1- M3CC	ALU2- M3CC	CC2- M3CC	CC3- M3CC	IRR1- M3CC	IRR2- M3CC	FP1- M3CC	FP2- M3CC	FP3- M3CC	H1a- M3CC	H1b- M3CC	H3- M3CC
CAM	7.62	-1.38	-2.24	-2.27	0.31	-0.05	-0.01	-0.23	0.10	-0.07	0.18	0.07	0.33	1.73	0.79	0.20
LAO	8.27	-2.08	-2.24	-2.28	-0.07	-0.02	-0.05	-0.09	-0.06	0.03	0.01	0.01	-0.08	1.41	0.37	-0.09
THA	8.70	-1.18	-1.47	-1.51	0.02	-0.03	-0.02	-0.27	-0.05	-0.01	0.04	0.00	-0.04	1.12	0.58	-0.08
VIE	5.41	-1.22	-1.70	-1.24	0.04	-0.38	0.04	-0.17	-0.24	-0.32	-0.14	-0.29	-0.29	1.18	0.52	-0.11
LMB	29.9	-5.85	-7.63	-7.68	0.30	-0.49	-0.04	-0.76	-0.24	-0.37	0.08	-0.21	-0.08	5.44	2.27	-0.08

ALU = agriculture and land use; ALU1 = planned development scenario without ALU; ALU2 = planned development scenario with high ALU; CAM = Cambodia; CC2 = planned development scenario with climate change (wetter climate); CC3 = planned development scenario with climate change (drier climate); FP1 = planned development scenario without flood protection; FP2 = planned development scenario with medium flood protection; FP3 = planned development scenario with high flood protection; H1a = planned development scenario without hydropower; H1b = planned development scenario without mainstream hydropower; H3 = planned development scenario with hydropower mitigation investment; IRR1 = planned development scenario without irrigation; IRR2 = planned development scenario with high irrigation; Lao PDR = Lao People's Democratic Republic; LMB = Lower Mekong Basin; M1 = early development scenario (2007); M2 = definite future scenario (2020); M3 = planned development scenario (2040); M3CC = planned development scenario with climate change (mean of warmer and wetter climate); SDG = Sustainable Development Goal; THA = Thailand; VIE = Viet Nam.  
Source: MRC (2017).

### **Benefits and Impacts in the Lao PDR**

The main scenario M2 is likely to provide very mixed outcomes for the Lao PDR. The development gains and increasing investments in infrastructure (e.g. irrigation) imply that more assets are exposed to extreme events, such as floods. The increasing risk can convert into increasing vulnerabilities if no additional protective or adaptive mechanisms are put in place. Floods are an important driver for community vulnerability. Table 2 shows the net present value (NPV) of investments in flood protection included in the relevant scenarios. The overall investment cost by the Lao PDR (M2: \$23 million; M3: \$99 million, M3CC: \$119 million) would result in reduced exposure and thereby reduce vulnerability, and a positive NPV of \$162 million for scenario M3CC. Extreme floods (1:100 years) would not be averted and would cause damages of around \$144 million.

**Table 2: Net Present Value (Net Gains from) for Flood Protection Investments**  
(\$ million)

Scenario	Lao PDR	Thailand	Cambodia	Viet Nam	Total
Scenario M1	3	6	541	3,061	3,611
Scenario M2	38	139	335	2,014	2,527
Scenario M3	26	411	46	1,384	1,867
Scenario M3 CC	162	1,264	337	3,791	5,554
Scenario F1	12	21	0	0	32
Scenario F2	355	2,420	189	3,858	6,821

FP1 = planned development scenario without flood protection, FP2 = planned development scenario with medium flood protection, Lao PDR = Lao People’s Democratic Republic, M1 = early development scenario (2007); M2 = definite future scenario (2020); M3 = planned development scenario (2040); M3CC = planned development scenario with climate change (mean of warmer and wetter climate).  
Source: MRC (2017).

### **Benefits and Impacts in Thailand**

Thailand is likely to become a main beneficiary of the hydropower expansion planned for scenario M2. Vulnerabilities related to agricultural activities are likely to decline if irrigation expansion plans are being implemented. The NPV of investments in flood protection is nearly \$1.3 billion for M3CC. The planned investments (M2: \$83 million; M3: \$149 million; M3CC: \$178 million) would reduce flood-related vulnerabilities. Only 1:100-year events would continue to cause substantial damage, estimated at around \$639 million per event.

### ***Benefits and Impacts in Cambodia***

For scenario M2, most impacts on Cambodia's community are likely to be negative. The vulnerability of communities is likely to increase substantially due to reduced food security, particularly increasing food prices. This might be partially mitigated if agricultural productivity improvements outpace population growth. However, the fisheries losses are likely to put pressure on the livelihoods of many communities in the Tonle Sap area. Adaptation strategies are likely to make outmigration necessary, which can lead to deep social problems, depending on how successful public investments will be in creating new employment opportunities. The NPV of investments in flood protection is about \$337 million for M3CC. The planned investments (M2: \$4 million; M3: \$482 million; M3CC: \$579 million) would mitigate flood-related vulnerabilities. Only 1:100-year events would continue to cause substantial damage, possibly up to \$325 million per event.

### ***Benefits and Impacts in Viet Nam***

Viet Nam is likely to experience a diversity of vulnerability-related effects. Fish-related losses are likely to be substantial for M2 and M3, translating into economic losses and livelihood adaptation pressure. Some might be balanced by agricultural expansion, which would also compensate food security losses, particularly if land use change will continue diversification trends (including aquaculture and upland crops). Sediment losses are likely to demand serious investments to mitigate erosion and to maintain agricultural nutrients inputs. Importantly, these changes need to be seen in combination with the increasing vulnerability of salinity intrusion due to the sea-level rise. Floods are part of life in Viet Nam's Mekong Delta and are typically connected with a range of positive effects (e.g. sediment, nutrients) and negative impacts. While positive effects are projected to decline sharply with upstream hydropower, negative effects are likely to be mitigated by substantial investments in flood protection (M2: \$36 million; M3: \$1 billion; M3CC: \$1.25 billion). The NPV of investments in flood protection for M3CC is about \$3.8 billion, which indicates that these investments are worth considering. However, investment plans would not cover 1:100-year events, which would cause substantial damages of about \$3.2 billion.

### ***Impacts and Benefits of the Scenario with all 11 Proposed Mainstream Dams in the LMB***

In addition to the scenarios developed under the Council Study, the MRC also analysed various scenarios for the proposed mainstream dams. It is very important to highlight that the benefits and impacts under the scenario considered all 11 proposed mainstream dams in the LMB (MRC, 2009). The net economic benefits of the hydropower sector are large (\$32,823 million out of the scenario's total NPV of \$33,386 million). Under the 'all mainstream dams' scenario, the new irrigation expansion contributes \$1,659 million of net benefits. By country, the benefits are unevenly distributed. The Lao PDR invests and benefits most, with an NPV of \$22,588 million, compared with Thailand's \$4,410 million NPV, Viet Nam's \$4,151 million NPV, and Cambodia's \$2,237 million. The 11 mainstream dams will have little effect on the flow regime created by the M1 scenario. However, the conversion of large reaches of the mainstream to a series of slow-moving waters between



run-of-the-river hydropower schemes will create localised impacts for people dependent on the river system for their livelihoods. Sixty percent of the ecologically valuable river channel between Kratie and Houei Xai would change to a series of connected impoundments. Important habitats such as deep pools, rapids, and sandbars would be largely lost, resulting in severe loss of biodiversity. Some of the flagship species would be very severely impacted, even to the point of extinction. Fourteen out of the 32 environmental hotspots<sup>42</sup> in the LMB would be highly impacted. The 'all proposed mainstream dam' scenario could also result in significant changes in the ecology and primary productivity of the Tonle Sap system. Capture fisheries production would be severely affected in both Cambodia (37% decline) and Viet Nam (28% decline). This decline is much less in the Lao PDR (6%) and Thailand (2%). The reduction in fisheries and the creation of impoundments on vast reaches of the Mekong mainstream will have substantial negative social consequences in the affected areas, especially in Cambodia where, conservatively, the livelihoods of up to 1.2 million people would be put at risk under this scenario. Similar numbers would be affected in Viet Nam, although arguably less severely. The number of people at risk of loss of livelihood is potentially 600,000 in the Lao PDR and 470,000 in Thailand. The large reduction in capture fisheries production may be partly offset by increases in aquaculture (including paddy field and reservoir fisheries). However, increases in aquaculture are unlikely to benefit poor people, many of whom would lose their wild fishing and who have no access to land, water, or capital to fall back on.

#### ***Impacts and Benefits of the Scenario Without Two Mainstream Dams in Cambodia***

This scenario contains nine mainstream dams but excludes the two dams in Cambodia (Stung Treng and Sambor) from the previous scenario. Fish migration up the Mekong into the Sesan, Srepok and Sekong river basin (known as the 3S river basin) would still be possible, and the ecologically very valuable stretch between Kratie and the Cambodia–Lao PDR border would maintain its natural character. Only one of the four flagship species would be severely impacted, and the highly impacted environmental hotspots would reduce from 14 to 11. When compared with the baseline condition in 2010, fisheries losses in Cambodia would decrease from a reduction of about 37% with all mainstream dams constructed to about 18% for this scenario. There would also be a significant reduction in fish losses in Viet Nam (14%) and a small 3% reduction in fish losses above the Lao PDR–Cambodian border compared with the 'all mainstream dams' scenario. For Cambodia, if this smaller reduction in fish production is simply proportioned amongst vulnerable resource users, then the number of users affected would drop from about 1,200,000 for the 'all mainstream dams' case to about 350,000. In addition, the number of vulnerable resource users in Viet Nam would reduce by 637,000 or 50%. This scenario results in an NPV of \$31,739 million, which is a drop of \$1,652 million compared with the 'all mainstream dams' scenario.

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<sup>42</sup> Environmental hotspots include Ramsar sites, biosphere reserves, protected areas, important bird areas, and GMS hotspots.

### ***Impacts and Benefits of the Scenario Without Two Thai Mainstream Dams***

This scenario includes nine mainstream dams, excluding the two in Thailand. In most respects, the impacts are similar to those with all 11 mainstream dams, as the two Cambodian dams and the Don Sahong dam in the Lao PDR will already be affecting fisheries and other environmental values. The scenario has an NPV of \$29,277 million compared with \$33,386 million for the 'all mainstream dams' case.

#### **4. MRC Water Resources Procedures and Implementation**

The MRC was founded in 1995 by Cambodia, the Lao PDR, Thailand, and Viet Nam (MRC, 1995). The four countries have common goals of using the Mekong water resources to accelerate equitable growth for poverty reduction and to protect resources through the principles of IWRM. In 1996, China and Myanmar became MRC dialogue partners. The MRCS is the secretariat of the MRC, providing technical and administrative service to the MRC Council and Joint Committee. The Council, the highest body of the decision-making level of the MRC, where members consist of one representative from each country at the ministerial or cabinet level, meets once a year to provide policy decisions and guidance concerning the promotion, support, cooperation, and coordination of joint activities and programmes to implement the 1995 agreement. The Joint Committee consists of one representative from each country of no less than head of department level; it is responsible for the implementation of policies and decisions of the Council, and supervises the activities of the MRCS (MRC, 1995).

The 1995 Mekong Agreement outlined the commitment of the four parties (Cambodia, the Lao PDR, Thailand, and Viet Nam) to cooperate with respect to the sustainable management and development of the LMB to the countries' mutual benefit and people's well-being. To achieve this, the parties committed to the following:

- the reasonable and equitable use of water through the Rules for Water Utilization and Inter-basin Diversion (Article 5);
- notification and prior consultation processes (Article 5);
- the maintenance of flows on the mainstream (Article 6); and
- preventing, ceasing, and taking responsibility for harmful effects (Article 7).

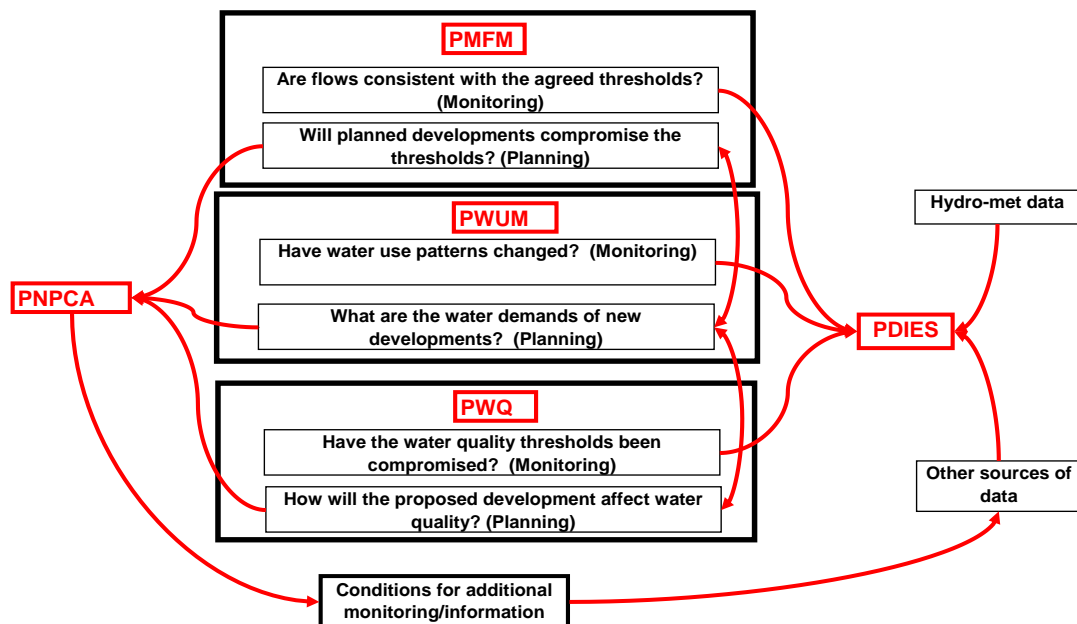
These commitments have subsequently been developed into five procedures supported by technical guidelines. Together, the agreement, procedures, and technical guidelines form a single treaty (Article 38) that gives effect to cooperation towards a basin vision of 'An economically prosperous, socially just and environmentally sound Mekong River Basin' (MRC, 1995). The procedures and technical guidelines are therefore the tools that enable the countries to achieve this goal. It is consequently generally recognised that the implementation of these procedures and technical guidelines forms the cornerstone of the implementation of the Mekong Agreement. However, several challenges to the routine uptake of these procedures and guidelines by the member countries remain. The procedures and their technical guidelines provide thresholds defining an acceptable level of water resources development in the basin, support the reasonable and equitable use

of water, and provide mechanisms to address the potential of significant harm through pollution. The five procedures are as follows:

- The PNPCA provide mechanisms to assess, accommodate, and agree on the possible impacts of water resources developments.
- The Procedures for the Maintenance of Flows on the Mainstream (PMFM) provide for flow thresholds at critical points along the Mekong mainstream, ensuring sufficient water for downstream use and environmental needs.
- The Procedures for Water Use Monitoring monitor actual water use.
- The Procedures for Water Quality (PWQ) provide water quality thresholds at given points in the river system.
- The Procedures for Data Information Exchange and Sharing (PDIES) ensure that the data from these procedures are quality assured and all the member countries have easy access to these data.

Together, these procedures should provide a water use/allocation mechanism – ensuring that the water resources are used in a reasonable and equitable manner, sufficient water flows downstream to meet critical environmental needs and downstream demands, and preventing significant harm (Figure 1). For planning purposes, basin development scenarios can also be checked against the agreed flow thresholds, while the impacts of individual projects on flows can be similarly checked to support the PNPCA process. Likewise, the PWQ can be used to support the PNPCA and basin planning processes. The PNPCA process may also identify conditions associated with the project under notification or consultation. This may include special monitoring required to ensure that agreed operational regimes are put in place, or to monitor potential impacts or benefits that may be associated with the project. In these cases, monitoring may be carried out as part of the implementation of the project, and reported through the PDIES to ensure that all the member countries can access data and information.

**Figure 1: Schematic of How the Procedures Collectively Contribute to Cooperation**



hydro-met = hydrological and meteorological; PDIES = Procedures for Data Information Exchange and Sharing; PMFM = Procedures for the Maintenance of Flows on the Mainstream; PNPCHA = Procedures for Notification, Prior Consultation and Agreement; PWQ = Procedures for Water Quality; PWUM = Procedures for Water Use Monitoring.

Source: Kevin and Han (2013).

The implementation of the five procedures will collectively ensure the reasonable and equitable use of water, an effective PNPCHA process, and the sustainable development of the LMB. A better understanding of this will not only help improve the implementation of the procedures, but will also help prevent negative impacts and conflicts. The effective and successful implementation of these five procedures and their technical guidelines will support the national and regional development objectives of the LMB countries through the basin development planning to support the economic development of the riparian countries. The implementation of procedures will also optimise and share the benefits of the regional development optimum that provides the most benefit for the most people with the minimum environmental and social harm. Importantly, the Procedures for Water Use Monitoring, PMFM, and PWQ help define the boundaries of the water development opportunities, while information on compliance with the opportunities to develop the basin is shared through the PDIES. Here, the PNPCHA play an important role in examining the full spectrum of potential impacts of any proposed development project, with a view to agreement on whether it could go ahead if the impacts are minimised and benefits are large for the host country and for benefit sharing in the basin.

How does the implementation of these procedures link to sustainable development, which forms the core of the 1995 Mekong Agreement? There is no clearly defined expression of how much development would be considered sustainable by all four member countries. The flow thresholds in the technical guidelines for the PMFM to some

extent reflect what is considered an acceptable level of change from 'natural', while the PWQ define 'acceptable' water quality. Any elaboration of social and environmental targets would reflect what development of the basin would be considered sustainable or acceptable. However, in the absence of a complete understanding of the impacts of water resources development on the economy, social structures, and environment, 'sustainable development' is largely a socio-political construct based on the level of risk of environmental impact considered to be acceptable. This perception of risk will differ depending on who benefits and who may be impacted by any development project. Those gaining the most may be willing to accept a higher risk, while those potentially impacted by the project are likely to demand a much lower level of risk.

Nevertheless, an overarching agreement on the general level of risk the member countries may wish to accept for the basin as a whole may be possible. These risks could be expressed as procedures for establishing and monitoring environmental targets which outline an acceptable change in ecosystem functioning.<sup>43</sup> The role the procedures collectively play in defining and monitoring 'sustainable development' in this context is therefore important.

It is very important to note the gradual improvement of the procedures' implementation towards sustainable development through impact minimisation and consensus. For example, from the lessons learned from the PNPCA to date (MRC, 2019), the MRC is putting in place improvements to the requirements for project development before and after the construction of hydropower projects to avoid, minimise, and mitigate impacts. For the Pak Beng and Pak Lay projects, member countries had agreed a JAP which is to be implemented by the notifying country and the developer before construction. This will inform the notified member countries of actions implemented in the design or operation of the projects to address their concerns raised during the PNPCA process. In addition, the member countries have agreed to implement joint environmental monitoring of certain Mekong mainstream hydropower developments after construction, with the intention to expand this programme basin-wide. This will allow the assessment of changes to the environment after project implementation and support adaptive management of the project's mitigation measures to address residual impacts measured upstream and downstream of the projects.

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<sup>43</sup>International best practice suggests that targets for water management should include assessments of how much change in ecological functioning is considered acceptable, i.e. the 'good' ecological status of the European Union Water Framework Directive, the 'sustainable diversion limits' in the Murray–Darling basin, and South Africa's river classification system.

## **5. Cooperation Mechanisms in Water Management**

In the Mekong River basin, there has been a proliferation of cooperative mechanisms, of which water-related issues have been of various levels of concern. Amongst them, the MRC is the niche institution whose sole focus is on sustainable management and development of the Mekong Basin's water resources. Due to the sensitivity of water governance, its level of importance in the agenda of other mechanisms varies. Water issues are also prioritised in mechanisms such as the Mekong–Lancang Cooperation (MLC), the Lower Mekong Initiative (LMI), the GMS, Cambodia–Lao PDR–Myanmar–Viet Nam (CMLV), and the Ayeyawady–Chao Phraya–Mekong Economic Cooperation Strategy. These mechanisms serve as platforms for conducting water diplomacy, as they fulfil the roles of norm builder, policy dialogue facilitator and coordinator, and information hub for transboundary water resources management.

### ***High-level Policy Coordination and Consultation***

Subregional cooperation mechanisms serve as forums for riparian countries to consolidate their trust and enhance dialogue to jointly tackle common challenges on the basis of harmonising the benefits of all parties. High-level meetings (including foreign minister meetings and senior official meetings) offer opportunities for countries to share national interests and international obligations. In general, high-level diplomacy at the head of state, diplomatic special envoy, and minister levels represents the highest degree of institutionalisation of cooperation. Such high-level panels are fruitful for promoting friendly relations and negotiations, speeding up and sustaining diplomatic momentum by reaching joint documents which serve as a foundation for future cooperation, setting deadlines for the completion of an existing issues, and breaking deadlocks in negotiation. In addition, high-level platforms are opportunities for countries to gather information about other countries and their leaders, clarify intentions, create awareness, generate understanding, and foster cooperation.

In the Mekong River basin, meetings institutionalised at a high level are conducted on a regular basis, serving as an official configuration for policy consultation. As water diplomacy is mainly a top–down approach, collaboration through high-level policy consultation is considered an effective channel to enhance transboundary water resources management.

Cooperative mechanisms are successful in establishing formal frameworks for policy coordination where riparian countries share their assessments of the current situation with respect to water security, and discuss methods to synergise their attempts to counter challenges and improve water governance. The first MRC summit was convened in 2010, at which the Hua Hin Declaration reaffirmed the member countries' commitment to implement the 1995 Mekong Agreement, recognised the socio-economic importance of the development of water and related resources, and launched the reforms of the MRC, with the goal of making the organisation financially sustainable by 2030 (MRC, 2010b). The 3rd MRC summit in 2018 issued the Siem Reap Declaration, which reiterated the primary and unique role of the MRC in cooperating on sustainable development of water

and related resources in the Mekong River basin (MRC, 2018c). Ministerial meetings with the participation of senior representatives of the ministries of foreign affairs, natural resources and environment, etc., which focus on reviewing and evaluating the annual operation of the MRC and proposing working plans in the coming years, are necessary to handle existing problems immediately, paving the way for higher-level coordination and commitment.

The GMS holds a summit every 3 years to examine how global trends are affecting the subregion, the progress that has been made in cooperation and integration, and the best strategy for moving forward in the years ahead. In light of rising demand in the food–water–energy nexus, the 6th GMS summit released a joint statement in which member states committed to strengthening their cooperation regarding the sustainable use and integrated management of natural resources (including land, water resources, and forests) through transboundary cooperation and collective efforts – to achieve food, water, and energy security in the subregion (GMS Secretariat, 2018).

The MLC, which prioritises water resources within its agenda, has created a multi-level meeting mechanism from biennial summits, annual ministerial meetings, and senior officials meetings, to specialised working groups to boost institutional capacity (Thu and Tinh, 2019). The 2nd MLC summit in Phnom Penh in 2018 adopted two important documents – the Phnom Penh Joint Declaration and the Plan of Action on the Lancang–Mekong Cooperation (2018–2022). Notably, in 2019, China hosted the first ministerial meeting of the Lancang–Mekong Water Resources Cooperation, which saw the approval of a joint statement and the signing of a memorandum of cooperation between the Lancang–Mekong Water Resources Cooperation Center and the MRC Secretariat. This has been seen as a great effort to uplift the cooperation between China and the lower Mekong countries and create synergy in regional water resources cooperation.

With regard to subregional cooperative mechanisms with external partners, the LMI, Mekong–Japan Cooperation, and Mekong–Republic of Korea Cooperation consider water security as a major focus. Their joint statements, issued at high-level conferences, often highlight the significance of water cooperation. In 2018, at the 11th LMI Ministerial Meeting, member countries approved the restructuring of the mechanism into two pillars of cooperation, of which cooperation on water, energy, food, and environment is a priority. The United States (US) also supports the Mekong Water Data Initiative to strengthen water data management and information sharing in the lower Mekong. The results of the 2018 LMI Ministerial Meeting can be seen as a sign of a more concrete US commitment in the region. Moreover, the 1st LMI Policy Dialogue (a newly established platform for LMI countries) and the Friends of the Lower Mekong (for officials up to director general level) have served as a consultative platform concerning transboundary water management, in which participants focus on the exchange of water data and ways of employing big data technology to predict droughts and floods in the subregion (Ministry of Foreign Affairs, Thailand, 2019).

At the 11th Mekong–Japan summit, with regard to sustainable natural resources management and utilisation, Prime Minister Abe emphasised the importance of managing water resources under an open framework and stated that Japan would enhance its coordination with the MRC. The leaders also reaffirmed their efforts to strengthen the capacity and application of advanced technology in water resources management in the Mekong countries (Ministry of Foreign Affairs, Japan, 2009). In recent years, the Mekong–Republic of Korea Cooperation has been accelerated and upgraded from ministerial meeting to summit. At the 1st summit in 2019, heads of state were unanimous in boosting cooperation in environmental areas and setting up the Mekong–Korea Biodiversity Center and the Mekong–Korea Water Resources Joint Research Center to accelerate the preservation of natural resources and sustainable development in the Mekong River (Ministry of Foreign Affairs, Republic of Korea, 2019).

Although some assume that conference diplomacy cannot generate substantial efficiency, as it acts as a talk shop without any teeth and joint statements are purely formal, the aforementioned high-level meetings play a crucial role in a trust-building measure, promoting dialogue, sharing national interests and international obligations, reaching a consensus for further cooperation, and carrying out strategic planning for future water governance in the Mekong River basin. More importantly, consensus reached at high-level meetings, especially summits, reflects the highest political will of a state. It should be noted that the building of consensus is complex and subtle. In addition, some detailed cooperative plans have resulted from these senior diplomatic activities, illustrating the effectiveness of the policy consultation process.

### ***Data Sharing***

The sharing and exchange of scientific information is a prerequisite for regional water governance. From the technical perspective, data are a crucial input for water resources management and help enhance adaptive capabilities to new and changing situations. The accessibility of water resources information is of great importance for water resources management, enabling early warning in response to natural disasters such as floods and droughts (Vannarith, 2019). From the political perspective, as theorised by liberalism, information exchange, especially through multilateral institutions, is a constructive measure in the confidence-building process amongst riparian countries, giving impetus for more effective and comprehensive international cooperation, while the reluctance to share information may hamper the long-term relationship.

In light of transboundary water resources management, the 1997 Convention on the Law of the Non-Navigational Uses of International Watercourses requires data and information on hydrological and hydrogeological areas to be exchanged regularly as well as upon request (United Nations, 1997). In the Mekong River basin, where hydrological data are considered sensitive (as upstream states are inclined to limit the downstream states' access to statistics about water withdrawals) (Affeltranger, 2009), the MRC has made an important contribution by gathering and processing substantial amounts of data on the river and its basin. This action of collaboration is legalised in the 1995 Agreement on the Cooperation for the Sustainable Development of the Mekong River basin, which



states that ‘During the wet season, intra-basin use shall be subject to notification to the Joint Committee’ and ‘During the dry season, intra-basin use shall be subject to prior consultation which aims at arriving at an agreement by the Joint Committee’ (MRC, 1995: Chapter 3, Article 5, Point B). In addition, the agreement regulates that one function of the Joint Committee is ‘to regularly obtain, update and exchange information and data necessary to implement this Agreement’ (MRC, 1995: Chapter 4, Article 24, Point C). This issue was elevated in the MRC agenda by the institutionalisation and ratification of the PDIES in 2001, which required all signatories to provide information on water resources and 11 other fields. The PDIES have three key objectives: (i) operationalise the data and information exchange amongst the four MRC member countries; (ii) make available, upon request, basic data and information for public access as determined by the National Mekong Committees concerned; and (iii) promote understanding and cooperation amongst the MRC member countries in a constructive and mutually beneficial manner to ensure the sustainable development of the Mekong River basin (MRC, 2001). Moreover, the Guidelines on Custodianship and Management of the MRC Information System under the PDIES are a repository of information on the river such as water availability, water use, water quality, and water extremes and flood monitoring. It ‘collects and manages a range of data and information with its member countries and other regional stakeholders’ and disseminates through its website and the MRC Data and Information Services Portal.

Amongst all datasets, water resources data sharing has recorded the largest number, solidifying the credibility of the MRC. It also serves as a platform for member states to promote the transparency of information related to pressing issues such as hydropower development. Recently, the MRC has worked on data exchange with China. As an MRC observer, China has agreed to provide hydrological data to the MRC twice a day during the rainy season.<sup>44</sup> Despite the improved frequency of the information exchange, the level of data sharing from China still falls short of the requirement for effective water resources management. Since early 2020, in response to a call by stakeholders and to ensure that the Mekong’s major dams (e.g. the Xayaburi and the Don Sahong) are monitored and disclosed, the MRC has been collaborating with the Lao PDR government and developers to keep track of the transboundary environmental impacts of these two dams through the MRC Joint Environmental Monitoring Programme. The purpose is to collect, create, and share reliable scientific data and information on the hydrology and hydraulics, sediment, water quality, aquatic ecology, and fisheries of each location throughout the basin.

Data sharing has drawn attention to other mechanisms. In the MLC framework, in response to requests from other partners for strengthening subregional cooperation in data sharing, China has proposed projects including the Lancang–Mekong River Space Information Cooperation Center and the Building of a Comprehensive Information Platform for the Lancang–Mekong Water Resources Cooperation.

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<sup>44</sup> Before 2013, China shared its hydrological data once a day from 15 June to 15 October.

Cooperation on data sharing has also drawn attention from external partners. The US, within the framework of the LMI, established the Mekong Water Data Initiative, a programme of the Sustainable Infrastructure Partnership, and put into operation 'Mekong Water' with the aim of supporting the MRC and promoting data sharing for disaster forecasting and policy making (Mekong Water Data Initiative, n.d.). On this basis, downstream countries are able to publish a new data sharing platform and a new impact assessment programme in the Lower Mekong. Moreover, the US intends to cooperate with the Republic of Korea (henceforth, Korea) to implement a project on using satellite images to assess floods and drought in the Mekong River; and collaborate with experts from the World Bank, Australia, France, and Japan to conduct dam safety assessments on 55 dams in the Lao PDR (To Minh Thu and Vu Thi Thanh Tu, 2019).

### ***Consultation Related to Hydropower Development***

The construction of hydropower dams has sparked controversy and increased strain amongst countries sharing the Mekong River, requiring a diplomatic approach to ease tension and mitigate the detrimental effects of these dams. Cooperative mechanisms facilitate water diplomacy through mutual notification, prior consultation, and dispute resolution.

In this case, the MRC is an official platform for member countries to carry out their dialogue activities. Nonetheless, it should be noted that the MRC has no mechanism for basin-wide regulation of hydropower or other forms of sector development on the Mekong mainstream (Hung and Kenny, 2017); rather, it provides a platform for diplomacy instead of arbitration and enforcement. In accordance with the 1995 Mekong Agreement and the PNPCA, member countries need to hold prior consultations to discuss the potential transboundary impacts that mainstream hydropower development may have on the Mekong River flow regimes, water quality, and other environmental and socio-economic conditions before any commitment is made to proceed. The PNPCA have three separate parts: (i) notification – for tributary use and mainstream use, within the basin, in the wet season; (ii) prior consultation – for the use of water, within the basin, on the mainstream in the dry season, and for taking water out of the basin (inter-basin transfer) during the wet season; and (iii) specific agreement – for taking water out of the basin (inter-basin transfer) during the dry season (MRC, 2003b). The consultation process aims to prevent adverse impacts to riparian communities and the downstream. The first mainstream hydropower dam in the LMB, Xayaburi, is of great concern to riparian countries, donors, civil society, and non-governmental and international organisations due to its latent ramifications downstream. Before the Xayaburi proposal of the Lao PDR, hydropower projects in the lower river had only been constructed on the Mekong's tributaries, not on the mainstream. While proposed projects on the tributaries only need to notify other MRC member countries, mainstream development, considered to have more transboundary impacts, requires prior consultation so that member countries can rigorously review the project with the aim of reaching agreement on whether to proceed with the proposal, and if so, under what conditions. All mainstream development proposals are required to undergo the prior consultation process and aim to come to a

unified agreement on how to proceed. Diversion projects, for example, diverting water from the mainstream Mekong will also require prior consultation and agreement amongst MRC member countries if the diversion involves using Mekong water in another basin. Up to now, 74 PNPCA projects have been submitted to the MRC, of which five projects have been under the prior consultation process while the rest have been initially informed and notified (MRC, n.d.). Although consultation is not about approving or disapproving the proposed water use, it is a rare tool for the notified countries and relevant stakeholders and communities to give suggestions and for the initiating country to accept certain measures to avoid, minimise, and mitigate any potential adverse transboundary impact and to find a better way to share the benefits.

In other examples, without the prior consultation process, the Pak Beng or Pak Lay mainstream hydropower development would not have been subjected to a second opinion. In the Pak Beng case, the MRC specialists and international experts reviewed the project documents to determine the projects' alignment with the MRC's Design Guidance on Mainstream Dams and to recommend measures for minimising and mitigating potential negative transboundary impacts. In its technical review, the MRC noted issues regarding the design and potential adverse impacts on downstream countries, fish passage, sediment transport, navigation lock design, and aquatic habitats. Although the 6-month consultation ended, the process did not end there. The Pak Beng and Pak Lay consultations both ended with the member countries agreeing on a JAP that provides mechanisms beyond the 6-month process for ongoing feedback, data exchange, and knowledge sharing between the developer and the Lao PDR, and the MRC and stakeholders concerning the ongoing design, construction, and operation (Sotheary, 2019).

With the notice and prior consultation process, the agreement only requires the parties to notify and consult 6 months in advance of a mainstream dam project; the consultee still proceeds with construction whether or not agreement is reached. This mechanism does not bind members to reach agreement, and the consulted country does not have the veto to request a project to stop. In fact, so far, the MRC Joint Committee has repeatedly had to extend the consultation period so that the MRC and its member countries fully evaluate the impacts and study measures to minimise the environmental impacts of projects. These regular extensions may cause stresses and rifts in the MRC if the country proposing the project states that member countries do not support or prevent the economic development of their country. Other mechanisms, albeit without niche consultation processes, also encourage discussions related to water utilisation in the subregion. Therefore, riparian countries have the space to raise such issues and affect policymaking.

### ***Dispute Settlement***

The MRC offers member states a pivotal mechanism for overcoming divergence related especially to hydropower plants, although other issues (particularly if they are placed beyond the mainstream and topics of concern apart from hydropower dams) are governed less effectively (Schmeier, 2013). The Mekong Agreement specified the MRC as

the primary institutional mechanism for dispute resolution and asks for the MRC to ‘make every effort to resolve the issue’ (MRC, 1995: Article 34). If the MRC is unable to remedy a dispute, the next step is for ‘the Governments to take cognizance of the matter for resolution by negotiation through diplomatic channels within a timely manner’ (MRC, 1995: Article 35). Furthermore, Article 35 of the 1995 Mekong Agreement provides space for external parties to act as external arbitrators and mediators (MRC, 1995). Although the MRC cannot perform the function of an arbitrator, to some extent, it spurs relevant stakeholders to pursue a diplomatic approach to solving disagreements.

### ***Disaster Management***

Natural disaster prevention and reduction is one pillar of water diplomacy activities. Existing mechanisms play the vital role of supplying fast and accurate flood and drought forecasting and early warning to the lower Mekong countries. The Flood Management and Mitigation Programme of the MRC provides technical and coordination services to the four countries in the LMB to prevent, minimise, or mitigate the civil and socio-economic losses due to floods and flooding, while preserving the environmental benefits of floods. Forecasts, flood data, technical standards, capacity-building, and training packages are key outputs of the programme.

In the Five-Year Plan of Action on Mekong–Lancang Cooperation (2018–2022), MLC member states reached a consensus on enhancing cooperation in the fields of disaster prevention and mitigation as well as humanitarian assistance – ensuring food, water, and energy security – while exploring various solutions for supporting people affected by disasters and the impacts of climate change (Lancang–Mekong Cooperation China Secretariat, 2018). These targets are concretised through a series of actions, including deepening Lancang–Mekong River flood and drought disaster emergency management, carrying out joint assessments of flood control and drought relief in the Mekong Basin, and conducting joint studies on the early setting up of communication lines/channels for information sharing during emergencies such as floods and droughts on the Lancang–Mekong River.

On the LMI’s agenda, disaster prevention and management are of high priority. The LMI Disaster Response Exercise and Exchange is an annual multinational exercise sponsored by the US Pacific Command under the Pacific Resilience series of exercises which it holds throughout the Asia-Pacific region. The objective of the LMI Disaster Response Exercise and Exchange is to boost regional readiness to tackle hazard situations in the Lower Mekong by advancing integrated subregional cooperation. According to the US Army, the exercise comprised a variety of activities, including working groups with panel sessions to discuss topics and promote communication and information sharing; a site survey where participants travelled to a dam near the mouth of the Perfume River in Hue; and a tabletop exercise where member states worked together to develop solutions to a disaster scenario (Parameswaran, 2017). The GMS member states also coordinate to implement risk financing projects to help at-risk communities cope better with the economic costs of natural disasters and extreme weather (GMS Secretariat, 2017).

### ***Regional Cooperation in Waterway Transport***

The Mekong has been used for the transport of goods and people, especially in the stretches of the delta. However, upstream navigability remains challenging. The upper Mekong (starting from upstream of Vientiane) is full of rocks, reefs, and shoals that make navigation difficult and often dangerous. So far, riparian countries have attempted to facilitate waterborne transport for economic and ecological development. Three important regional agreements have been reached to regulate Mekong River navigation: (i) Article 9 of the Mekong Agreement (MRC, 1995) on Freedom of Navigation (Cambodia, the Lao PDR, Thailand, and Viet Nam); (ii) the Agreement on Commercial Navigation on the Lancang–Mekong River amongst the Governments of China, the Lao PDR, Myanmar, and Thailand, signed in 2000, followed by a Joint Committee on Coordination for Commercial Navigation; and (iii) the Agreement between the Government of Viet Nam and Cambodia on Waterway Transportation, signed in 2009. Development plans have been established under each mechanism of cooperation, including the Development Plan of International Navigation on the Lancang–Mekong River under the Joint Committee on Coordination for Commercial Navigation and the MRC Master Plan on Regional Waterborne Transport development in the Mekong Lower Basin. Notably, the MRC Navigation Strategy’s focus ‘to increase the international trade opportunities for the MRC member countries’ mutual benefit, and assisting in coordination and cooperation in developing effective and safe waterborne transport in a sustainable and protective manner for the waterway environment’ (MRC, 2003a: 38) can be seen as a foundation for water diplomacy amongst member countries in terms of waterway transport. In addition, waterway transport has been highlighted in the working agenda of subregional cooperative mechanisms such as CMLV and the Ayeyawady–Chao Phraya–Mekong Economic Cooperation Strategy. China has begun implementing projects on navigational safety and infrastructure transportation under the MLC framework.

### ***Facilitation of Multi-Stakeholder Water Diplomacy***

Although state actors are major players in water diplomacy, the engagement of non-state actors in water resources management has been increasingly noticeable and evidenced in several mechanisms. In nature, the MRC is a purely intergovernmental organisation. However, it has been criticised for negligence of public voices in the basin community and concentrating exclusively on states’ interests in water governance (Schmeier, 2013). In 2003, the MRC’s Public Participation Strategy was issued, stating that ‘stakeholder involvement in decision-making about sustainable development is fundamental to achieving feasible, equitable and lasting solutions’ (MRC, 2003c: 3). This was buttressed by the issuance of the 2009 Communication Strategy, which emboldens people to access strategic documents, the minutes of Council meetings, programme documents, work plans, and functional data and research products (MRC, 2009a). This extends to ‘para-diplomacy’, which refers to the involvement of constituent units (regions) of (multi)national states in water diplomacy and helps enhance the effectiveness of water governance by engaging various actors’ interests.

Furthermore, the benefits of establishing and strengthening partnerships with epistemic community groups for capacity development and knowledge enhancement should be appraised. Noticeably, IWRM, considered the MRC's water diplomacy framework, is an exemplification of how a new approach to river basin governance proposed by the epistemic community was acquired and put into operation by an interstate institution. In addition, in February 2020, the MRC organised the 9th MRC Regional Stakeholder Forum to facilitate the participation of civil society organisations in the Luang Prabang hydropower project through holding informal dialogue to listen to their concerns and seek an appropriate avenue for effective coordination. Since consultation and policy-planning processes are embraced by non-state and sub-state actors, decisions can be responsive to local needs and contexts. Thus, informal water diplomacy in the Mekong Basin is flexible and adaptative to the changing dynamics of the environment by stressing the role of local ecological knowledge. Such polycentric governance would not only vigorously boost robust river management through the diversification of problem solving, but also help achieve a greater sense of accountability and legitimacy (Sovacool, 2011).

Other mechanisms such as the LMI, MLC, and GMS also create space for the participation of relevant stakeholders. For instance, one development that is worth noting in the GMS is the adoption of a revised version of the Water Policy of the Asian Development Bank (ADB) in 2005 (ADB, 2003). The policy requires that 'all large water resources projects especially those involving dams and storage – given the record of environmental and social hazards associated with such projects – that all such projects will need to be justified in the public interest, and all government and nongovernment stakeholders in the country must agree on the justification' (ADB, 2003: 19).. By increasing openness and inclusiveness, mechanisms attempted to bring in-depth multi-track water diplomacy to the fore in governing transboundary water resources.

## **6. Conclusions and Policy Recommendations**

Although some positive outcomes have been achieved, subregional cooperation platforms show some limitations. First, despite the existence of more than 10 cooperative mechanisms, cooperation on water management in the Mekong falls far below expectations. Dams have been built on the river mainstream, causing irreversible and long-term environmental and economic impacts for the countries in the Lower Mekong Delta, such as lack of water, loss of sediment, and unexpected changes in the ecosystem. While the MRC is the most capable institution and has the mandate for water resources management, China has refused to be a member of the MRC and thus its actions in the upstream are not bound by the MRC's rules and requirements. Second, the countries in the lower Mekong region have limited economic capacity to invest in regional programmes and thus rely on external support. Mekong countries lack ownership over the funding and sometimes control of the development projects. This form of cooperation makes them voiceless and powerless in asserting their own regional and national interests vis-à-vis the geopolitical agenda of their development partners. The involvement of regional powers and their competing interests have complicated the Mekong cooperation dynamics beyond the control of Mekong countries (Bosba, 2018). Third, except for the

MRC, which is an organisation, all other mechanisms are just forum-type policy consultation platforms for country leaders or specialists. There are no common rules for the use of water in the region, no mechanism with binding rules, and no dispute settlement mechanism. Fourth, the presence of so many cooperative mechanisms in a subregion of six countries inevitably leads to the overlapping and duplication of cooperative efforts. Thus, there remains significant space for the Mekong countries to play a more proactive role in setting the cooperation agenda and synchronising the areas of focus, which can help to harness these mechanisms more effectively for national and regional development. Fifth, there exist differences in the interests of Mekong countries as well as amongst the external partners, especially in the field of water resources management. Due to the pressure to speed up economic growth, the sustainable development aspect in many Mekong countries has not been paid enough attention; the 'power-shed' mindset is still dominant amongst regional policymakers. It is urgent that regional mechanisms play a greater role in coordinating the different interests of individual countries in water usage on the basis of mutual respect and in accordance with international laws. Finally, power politics and the trust deficit amongst riparian countries and partners makes it difficult to coordinate amongst different mechanisms for common goals.

Despite the limitations, there are opportunities to strengthen water resources management mechanisms in the Mekong region. On the one hand, there have been positive moves in understanding the river, the way the water–energy–food nexus works, and thus the urgent need for more efficient water management. On the other hand, several external factors have emerged at the global and regional level which could facilitate better and more coordinated water resources cooperation in the Mekong. Looking ahead, to take advantage of existing mechanisms and overcome the above-mentioned limitations, it may be advisable for riparian countries and partners to consider the following recommendations:

- Riparian and partner countries should promote more rules-based governance of water management in regional cooperation for water management by (i) encouraging riparian countries to adhere to international law on water management; and (ii) establishing common standards and rules for IWRM, such as a code of conduct for the Mekong River basin. This code of conduct would help alleviate and prevent tensions in transboundary water management. It should consist of three main components: confidence building measures, preventive diplomacy, and dispute resolution mechanisms. Communication via the hotline, early warning, and the use of effective diplomatic staff are very important to prevent resource conflicts between riparian countries.
- The member countries should embrace the implementation of the 1995 Mekong Agreement through the five procedures and their technical guidelines, as they will be the IWRM-based rules for water resources development to provide the most benefit and minimum environmental and social harm. The implementation of the

five procedures will support the national and regional development objectives for sustainable development.

- Members and partners should help strengthen the role and capacity of the MRC as a hub for water management and coordination amongst other mechanisms in the field of water management; and strengthen the implementation of the MRC procedures and technical guidelines. Information exchange and data sharing at all levels should be strengthened through bilateral and multilateral channels for regular updates, especially regarding new developments in the basin. Data sharing is crucial in both the rainy and dry seasons for equitable water resources management and disaster prevention and management.
- Riparian countries should coordinate to promote synergy amongst Mekong regional cooperative mechanisms so that they can be complementary and help address the interests of riparian countries. In the field of water resources management, major partners such as ADB, the US, Japan, Korea, and the European Union are important as they can provide the resources, technology, and knowledge to serve regional economic development; and assist in seeking long-term and fundamental technology and policy solutions for sustainable development and environmental protection in the Mekong River region. In addition, the Association of Southeast Asian Nations (ASEAN) should play a more central role in the development of the Mekong Subregion. ASEAN can facilitate the policy coordination process, paving the way for elevating water governance and diplomacy in the Mekong River basin to a regional agenda. Simultaneously, this could increase opportunities for creating synergy amongst mechanisms that share topics of concern.
- Looking at the bigger picture, riparian countries should find alternative development opportunities that are less dependent on hydropower and extensive water use production. Cooperation should be promoted amongst Mekong riparian countries regarding the equitable and sustainable use of the Mekong River's resources, including water resources, on the basis of harmony of interests and with the aim of achieving sustainable development for the entire Mekong River basin.
- Any transboundary issues/conflicts should not be looked on as exclusively negative. Healthy conflict management can lead to growth and innovation, new ways of thinking, and additional management options. However, it is important to understand transboundary conflicts clearly, i.e. the fish losses and environmental damage which impinge on social and food security. Then, the negative impacts or conflicts could be effectively managed by reaching a consensus that meets the needs of all stakeholders. The goal is for all to 'win' by having at least some of their needs met. Recognition of this fact undoubtedly led to the Mekong Vision with the sharing of benefits.



- Transparency and public consultation are amongst the keys to the success of transboundary issues. Transparency would help to create an enabling environment for community participation and especially enhance the role of women. This service could be extended to the coordination of identifying and monitoring impacts so that mediation services may be offered early in the process to prevent tensions from leading to conflict.
- The member countries should envisage the future changes that will have significant impacts on water resources management in the Mekong Basin, especially what the changes will be and the spatial distribution patterns of such changes. To what extent will these changes benefit people through the effective roles of state, community, and private sector action to respond to the food security of the poor who are affected by water resources management and development? Thus, state-of-the-art, evolving, and effective institutions such as the MRC will be crucial to facilitate development in the basin, with a sustainable basin perspective of the riparian states.
- Finally, water diplomacy – bilateral and multilateral – should be promoted on the basis of transparency and goodwill. A focus on transparency, as one of the most important principles and measures, could help build trust and confidence amongst the countries sharing the Mekong River. In this process, relevant governments should take a multi-stakeholder approach, encouraging the participation of government agencies and other groups such as academia, the private sector, and non-governmental organisations in subregional cooperation activities in a bid to strengthen mutual trust and understanding and to seek new thoughts and ideas for future manoeuvres. The participation of the private sector in the process of designing and implementing cooperation programmes should also be part of the process.

## References

- ADB (2003), *Water for All: The Water Policy of the Asian Development Bank*. Manila: Asian Development Bank.
- Affeltranger, B. (2009), 'Sustainability of Environmental Regimes: The Mekong River Commission', in H.G. Brauch et al. (eds.) *Facing Global Environmental Change*. Berlin and Heidelberg: Springer, pp.593–601.
- Bainbridge, A. and S. Vimonsuk (2020), 'China's Mekong River Dams Are Generating Renewable Energy, but Are Costing Locals Their Livelihoods', *ABC News*, 19 January. <https://www.abc.net.au/news/2020-01-20/china-mekong-river-plan-creates-renewable-energy-but-costs-jobs/11872640> (accessed 2 June 2020).

- Basist, A. and C. Williams (2020), *Monitoring the Quantity of Water Flowing Through the Upper Mekong Basin Under Natural (Unimpeded) Conditions*. Bangkok: Sustainable Infrastructure Partnership.
- Bosba, D. (2018), 'Dynamics of Cooperation Mechanisms in the Mekong', *Khmer Times*, 23 October, <https://www.khmertimeskh.com/50543025/dynamics-of-cooperation-mechanisms-in-the-mekong/> (accessed 2 June 2020).
- East–West Center and The Stimson Center Southeast Asia Program (2020), 'The Mekong Matters for America/America Matters for the Mekong'. Washington, DC: East–West Center.
- Government of Cambodia, Office of the Council of Ministers (2018), *Phnom Penh Declaration of the Second Mekong–Lancang Cooperation (MLC) Leaders' Meeting*, Phnom Penh, 11 January. <https://pressocm.gov.kh/en/archives/21699> (accessed 2 June 2020).
- GMS Secretariat (2017), 'How Risk Financing Can Help Mekong Farmers Cope with Disasters', 2 October. <https://greatermekong.org/how-risk-financing-can-help-mekong-farmers-cope-disasters> (accessed 2 June 2020).
- GMS Secretariat (2018), 'Joint Summit Declaration: Leveraging 25 Years of Cooperation for a Sustainable, Integrated and Prosperous GMS', Sixth GMS Summit, Ha Noi, 31 March.
- Hoang, N. (2020), 'Các nước sông Mekong kêu gọi đập Xayaburi chia sẻ dữ liệu', 24 February. <http://khoa hocphattrien.vn/thoi-su-quoc-te/cac-nuoc-song-mekong-keu-goi-dap-xayaburi-chia-se-du-lieu/20200221045830774p882c919.htm> (accessed 2 June 2020).
- Hung, P.T. and A. Kenny (2017), 'Application of Principles of Sustainable Development in the Mekong Dispute Settlement', in M.-C. Cordonier Segger with C.G. Weeramantry (eds.) *Sustainable Development Principles in the Decisions of International Courts and Tribunals: 1992–2012*, Oxon: Routledge, pp.702–20.
- Kevin, Q. and H. Phoumin (2013), 'Improving the Implementation of MRC Procedures under 1995 Mekong Agreement'.
- Lancang–Mekong Cooperation China Secretariat (2018), *Five-Year Plan of Action on Lancang–Mekong Cooperation (2018–2022)*. Beijing: Lancang–Mekong Cooperation China Secretariat.
- Macan-Markar, M. (2020), 'Vietnam Puts the Mekong's Fate on ASEAN's Agenda', *Nikkei Asian Review*, 26 February. <https://asia.nikkei.com/Politics/International-relations/Vietnam-puts-the-Mekong-s-fate-on-ASEAN-s-agenda> (accessed 2 June 2020).
- Mekong Water Data Initiative (n.d.), <https://www.mekongwater.org/about-us> (accessed 9 April 2020).
- Ministry of Foreign Affairs, Japan (2009), 'Joint Statement of the 11th Mekong–Japan Summit', Bangkok, 4 November.
- Ministry of Foreign Affairs, Republic of Korea (2019), 'Mekong–Han River Declaration for Establishing Partnership for People, Prosperity and Peace', 1st Mekong–Republic of Korea Summit, Busan, 27 November.

- Ministry of Foreign Affairs, Thailand (2019), '1st Lower Mekong Initiative (LMI) Policy Dialogue', Press Release, 30 April.  
[http://www.mfa.go.th/main/en/news3/6886/102377-1st-Lower-Mekong-Initiative-\(LMI\)-Policy-Dialogue.html](http://www.mfa.go.th/main/en/news3/6886/102377-1st-Lower-Mekong-Initiative-(LMI)-Policy-Dialogue.html) (accessed 2 June 2020).
- MRC (n.d.), MRC Data and Information Services. <https://portal.mrcmekong.org/home> (accessed 13 April 2020).
- MRC (1995), *Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin. 5 April 1995*. Vientiane: Mekong River Commission Secretariat.
- MRC (2001), *Procedures for Data and Information Exchange and Sharing*. Phnom Penh: Mekong River Commission.
- MRC (2003a), *MRC Navigation Strategy*. Phnom Penh: Mekong River Commission.
- MRC (2003b), *Procedures for Notification, Prior Consultation and Agreement*. Phnom Penh: Mekong River Commission.
- MRC (2003c), *Public Participation Strategy*. Phnom Penh: Mekong River Commission.
- MRC (2009a), *Communication Strategy and Disclosure Policy*. Vientiane: Mekong River Commission Secretariat.
- MRC (2009b), *Technical Report No. 1: Scoping and Planning of Basin-Wide Development Scenarios (BDP, 2009)*. Vientiane: Mekong River Commission Secretariat.
- MRC (2010a), *Strategic Environmental Assessment of Hydropower on the Mekong Mainstream: Summary of the Final Report*. Vientiane: Mekong River Commission.
- MRC (2010b), 'Hua Hin Declaration: Meeting the Needs, Keeping the Balance: Towards Sustainable Development of the Mekong River Basin'. Vientiane: Mekong River Commission Secretariat.
- MRC (2017), *The Council Study: The Study on the Sustainable Management and Development of the Mekong River Basin including the Impacts of Mainstream Hydropower Projects*. Vientiane: Mekong River Commission Secretariat.
- MRC (2018a), Fisheries. <http://www.mrcmekong.org/topics/fisheries/> (accessed 2 June 2020).
- MRC (2018b), *Short Technical Note: Mekong Sediment from the Mekong River Commission Study*. Vientiane: Mekong River Commission Secretariat.
- MRC (2018c), 'Siem Reap Declaration: Enhancing Joint Efforts and Partnerships towards Achievement of the Sustainable Development Goals in the Mekong River Basin'. Vientiane: Mekong River Commission Secretariat.
- MRC (2019), 'Working Document PNPCA Commentary'. Vientiane: Mekong River Commission Secretariat. <https://www.mrcmekong.org/assets/RSF8/Final-Working-Document-of-PNPCA-Commentary-Note.pdf> (accessed 11 June 2020).
- Parameswaran, P. (2017), 'Mekong Disaster Drills Highlight US-ASEAN Subregional Cooperation', *The Diplomat*, 14 December.  
<https://thediplomat.com/2017/12/mekong-disaster-drills-highlight-us-asean-subregional-cooperation/> (accessed 2 June 2020).
- Phoumin, H., S. Kimura, and C. Malik (2019) 'Energy Outlook and Saving Potential in the East Asia Region: Main Report' in S. Kimura and H. Phoumin (eds.) *Energy Outlook*

- and Saving Potential in East Asia 2019*. Jakarta: Economic Research Institute for ASEAN and East Asia, pp.1–52.
- Schmeier, S. (2013), *Governing International Watercourses: River Basin Organizations and the Sustainable Governance of Internationally Shared Rivers and Lakes*. Oxon: Routledge.
- Sotheary, P. (2019), 'Taking a Closer Look at the MRC's Prior Consultation Process', *Khmer Times*, Blog, 6 November.  
<https://www.khmertimeskh.com/50657344/taking-a-closer-look-at-the-mrcs-prior-consultation-process/> (accessed 2 June 2020).
- Sovacool, B.K. (2011), 'An International Comparison of Four Polycentric Approaches to Climate and Energy Governance', *Energy Policy*, 39(6), pp.3832–44.  
<https://doi.org/10.1016/j.enpol.2011.04.014> (accessed 2 June 2020).
- Statista (2018), 'Principal Rice Exporting Countries Worldwide in 2017/2018 (in 1,000 metric tons)', <https://www.statista.com/statistics/255947/top-rice-exporting-countries-worldwide-2011/> (accessed 2 June 2020).
- Thu, H.N. and U. Wehn (2016), 'Data Sharing in International Transboundary Contexts: The Vietnamese Perspective on Data Sharing in the Lower Mekong Basin', *Journal of Hydrology*, 536, pp.351–64. <https://doi.org/10.1016/j.jhydrol.2016.02.035> (accessed 2 June 2020).
- Thu, T. and L. Tinh (2019), 'Vietnam and Mekong Cooperative Mechanisms', in D. Singh and M. Cook (eds.) *Southeast Asian Affairs 2019*. Singapore: ISEAS–Yusof Ishak Institute, pp.395–411.
- Thu, T.M. and V.T.T. Tu (2019), 'The Lower Mekong Initiative: 10-year Retrospect and Future Prospects', *International Studies*, 41.
- United Nations (1997), *Convention on the Law of the Non-Navigational Uses of International Watercourses*. New York: United Nations.
- Vannarith, C. (2019), 'Water Security in the Mekong Region and Policy Interventions', *CSCAP Regional Security Outlook 2020*. Hanoi: Council for Security Cooperation in the Asia Pacific.
- Vietnam Disaster Management Authority (2020), 'MARD Report on the Drought and Saltwater Intrusion in Mekong River Delta', 19 February.  
<http://phongchongthientai.mard.gov.vn/en/Pages/mard-report-on-the-drought-and-saltwater-intrusion-in-mekong-river-delta.aspx?item=/en/Pages/mard-report-on-the-drought-and-saltwater-intrusion-in-mekong-river-delta.aspx> (accessed 2 June 2020).
- WWF (2020), 'Mekong Deforestation'.  
[https://wwf.panda.org/our\\_work/forests/deforestation\\_fronts2/deforestation\\_in\\_greater\\_mekong/](https://wwf.panda.org/our_work/forests/deforestation_fronts2/deforestation_in_greater_mekong/) (accessed 8 May 2020).
- Yoshida, Y. et al. (2020), 'Impacts of Mainstream Hydropower Dams on Fisheries and Agriculture in Lower Mekong Basin', *Sustainability*, 12, 2408.  
<https://www.mdpi.com/2071-1050/12/6/2408/pdf> (accessed 2 June 2020).