



**ADB Working Paper Series**

**Enhancing Agricultural Productivity of CLMV Countries:  
Challenges and Agenda for Reforms**

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**Abstract**

Responding positively to economic reforms, the economies of Cambodia, the Lao People's Democratic Republic, Myanmar, and Viet Nam (CLMV) have shown tremendous growth since the mid-1980s, including in their respective agriculture sectors. Recent developments, however, have brought into question the CLMV countries' ability to sustain further increases in agricultural productivity given the slow pace of reforms and emerging challenges. Going forward, the reform agenda must go beyond the traditional view of expanding yields and supply of agricultural products for development gains in the sector to contribute to inclusive growth, poverty alleviation, and food security. This will require changing the market structures and regulatory policies that govern the sector.

**JEL Classification:** Q1, Q21, Q28

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## 1. INTRODUCTION

Cambodia, the Lao People's Democratic Republic (Lao PDR), Myanmar, and Viet Nam (CLMV) are catching up with the rest of Asia, having registered stellar economic performance in the three decades since the mid-1980s. This was underpinned by the growth of their respective agriculture sectors, which responded positively to economic reforms. Through agricultural reforms, the productivity of the sector has improved and created other knock-on effects on the income and well-being of rural populations. Higher productivity also promoted broader economic growth through the expansion of non-farm economic sectors, thus promoting economic development and reducing poverty.

However, recent developments have raised concerns surrounding the ability of the CLMV countries to sustain further increases in agricultural production given the slow pace of reforms and emerging problems in the agriculture sector. The key inputs to production, land and water, have been increasingly constrained with adverse impacts on productivity and, hence, on production. Not only have they become more scarce, but their quality and that of the ecosystem services have deteriorated also. The observed yield growth rate has been on the decline. Moreover, yield has been increasing at differential rates resulting in the widening gaps across the countries. These observed trends are happening not only with rice and wheat, the key food staples, but also among other agricultural commodities.

A looming question now is whether the sector will continue to sustain its growth to further support economic development, improve food security, and enhance the living conditions of the people, particularly those in the rural areas. The current uncertain global environment, with problems of soaring food and fuel prices, volatile markets, and climate change, also presents new challenges to the CLMV countries. Considering that reforms have traditionally played a critical role in the development of the agriculture sector in the CLMV countries, it was argued that the reform process should be stepped up to attain sustained productivity gains and to support the structural transformation of the agriculture sector. However, how these reforms should evolve to enhance the sector's performance not only to sustain further improvement in food security and enhancement of welfare but also to take advantage of the opportunities that come along with the globalization of markets remains a challenge to the CLMV countries.

## 2. OVERVIEW OF AGRICULTURAL REFORMS IN CLMV COUNTRIES

Over the last three decades, the CLMV countries have implemented reforms to improve the efficiency and productivity of agricultural markets. Reforms involved the liberalization of prices for inputs and outputs, elimination of subsidies, and removal of trade restrictions to improve farmer incomes and enhance competition. They also involved removal of regulatory controls and other quantity restrictions on input and product markets, lifting of production quotas, restructuring of state-owned enterprises, and modernization of the financial systems through tax reforms and exchange rate unification. All these reforms had great bearing on the development of the countries' respective agriculture sector and their move toward free trade and greater participation in the global market.

As seen in Figure 1, agricultural production in the CLMV countries increased steadily over the period from 1961 to 2013. Notably, the CLMV countries registered a sharper increase in their production from the mid-1980s onward as compared to their neighbors in Southeast Asia. In fact, CLMV production increased by hundreds from the mid-1980s not only in cereals but also in other commodities including meat and fish products (Table 1). Some of these countries have become major exporters of key commodities.

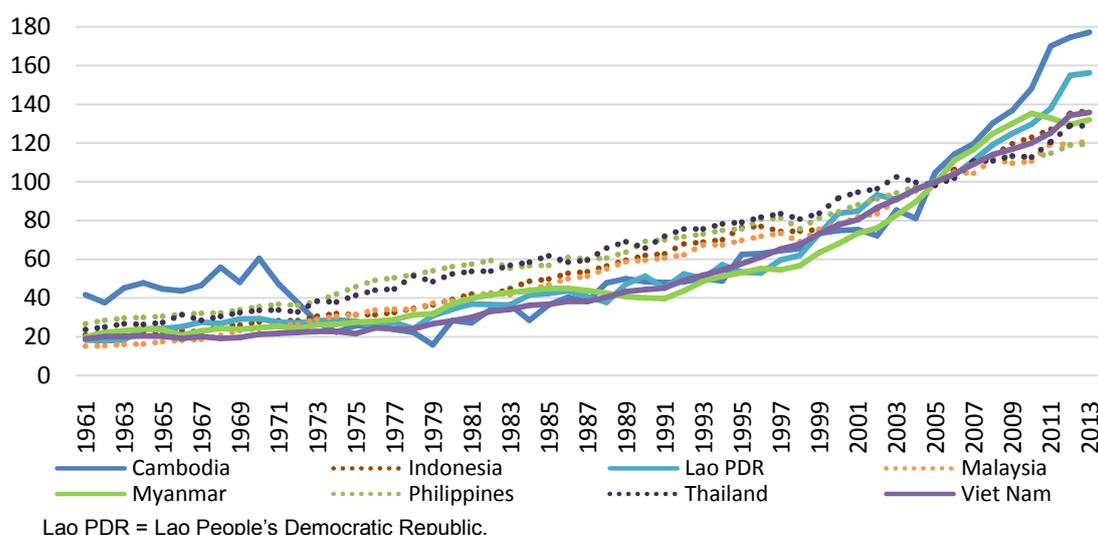
**Table 1: Average Production 1966–1970, 1986–1990, 2006–2010, and 2011–2013**

	Average production ('000 tons)				Change from previous period (%)			Average production ('000 tons)				Change from previous period (%)		
	'66-'70	'86-'90	'06-'10	'11-'13	'86-'90	'06-'10	'11-'13	'66-'70	'86-'90	'06-'10	'11-'13	'86-'90	'06-'10	'11-'13
	<b>CEREALS</b>							<b>FRUITS AND VEGETABLES</b>						
Cambodia	3,019	2,370	7,841	10,018	-21.5	230.8	27.8	715	692	861	1,003	-3.3	24.6	16.4
Indonesia	19,151	48,408	75,982	87,212	152.8	57.0	14.8	4,974	9,564	25,303	27,388	92.3	164.6	8.2
Lao PDR	851	1,359	3,792	4,447	59.8	179.1	17.3	117	177	1,177	1,558	51.4	563.0	32.4
Malaysia	1,441	1,765	2,424	2,678	22.5	37.3	10.5	958	1,396	1,855	2,225	45.7	32.9	19.9
Myanmar	7,885	14,282	33,810	30,775	81.1	136.7	-9.0	1,579	2,982	6,566	7,055	88.8	120.2	7.4
Philippines	6,602	13,655	22,716	24,971	106.8	66.4	9.9	5,623	12,922	20,938	22,428	129.8	62.0	7.1
Thailand	14,416	23,479	36,605	41,939	62.9	55.9	14.6	4,593	8,541	14,522	14,834	85.9	70.0	2.1
Timor-Leste	30	104	201	191	244.3	92.2	-5.0	45	33	39	51	-28.0	18.7	32.5
Viet Nam	9,261	17,956	42,239	48,312	93.9	135.2	14.4	3,693	6,388	14,465	19,328	73.0	126.4	33.6
	<b>COFFEE</b>							<b>PULSES</b>						
Cambodia	0	0	0	0	-69.9	136.9	12.8	28	17	54	76	-37.7	209.0	40.7
Indonesia	162	390	685	676	140.3	75.5	-1.2	294	614	310	278	108.9	-49.5	-10.3
Lao PDR	3	6	38	76	66.0	566.5	100.6	7	11	18	21	58.5	64.7	16.8
Malaysia	4	9	22	14	153.9	141.2	-35.7							
Myanmar	1	1	6	8	14.3	303.9	34.5	266	507	4,383	5,255	90.4	765.3	19.9
Philippines	45	142	98	85	216.3	-30.8	-13.0	21	60	60	68	190.4	-1.1	13.4
Thailand	0	45	52	45	17,589.8	15.9	-13.6	173	378	202	214	118.1	-46.5	5.8
Timor-Leste	4	8	13	9	106.8	59.4	-29.7	5	3	8	10	-31.6	140.3	33.3
Viet Nam	7	45	1,091	1,434	587.0	2,299.0	31.5	90	182	285	308	102.1	56.5	8.2
	<b>MEAT</b>							<b>ROOT CROPS</b>						
Cambodia	61	107	218	203	75.4	103.5	-7.0	49	147	3,255	7,969	199.8	2,111.1	144.8
Indonesia	392	1,265	2,592	3,174	222.6	105.0	22.4	14,456	18,109	24,884	27,846	25.3	37.4	11.9
Lao PDR	31	42	117	135	34.8	177.8	15.8	52	242	422	1,107	365.1	74.3	162.4
Malaysia	144	526	1,372	1,588	264.5	161.0	15.7	406	475	78	114	17.1	-83.6	45.4
Myanmar	168	290	1,592	2,119	72.1	449.4	33.1	56	251	972	1,306	349.8	287.6	34.4
Philippines	548	942	2,774	3,043	71.8	194.6	9.7	1,369	2,707	2,772	3,046	97.7	2.4	9.9
Thailand	597	1,270	2,351	2,542	112.8	85.2	8.1	2,741	20,536	25,781	27,799	649.1	25.5	7.8
Timor-Leste	43	31	31	33	-28.3	-0.1	6.2	66	97	92	64	48.2	-5.6	-30.7
Viet Nam	440	1,005	3,676	4,199	128.4	265.6	14.2	2,139	5,014	10,214	11,524	134.4	103.7	12.8

Lao PDR = Lao People's Democratic Republic.

Source: Food and Agriculture Organization of the United Nations, FAOSTAT online (accessed July 2015).

**Figure 1: Gross Production Indices, 1961–2013**  
(2004–2006 = 100)



Source: Food and Agriculture Organization of the United Nations, FAOSTAT online (accessed July 2015).

This remarkable growth performance of the agriculture sector was motivated by the various policy reforms that started in the second half of the 1980s—and with significant impacts on the sector and the economy.

## 2.1 Cambodia

A combination of economic liberalization and generous external assistance led to Cambodia's rapid economic recovery. Following Viet Nam, Cambodia initiated partial and ad hoc reforms in 1989 to privatize markets. These included the removal of price controls, restoration of private land ownership for family plots, permission for private enterprises to participate in markets, and permission for farmers to sell their surplus in the free market after meeting a small requirement for state procurement. As a result of these reforms, Cambodia's rice production increased more than 200-fold, enabling the country to reverse its position from a net importer to a net exporter of around 200,000 tons of rice in 2012 (Khin and McNaughton 2013). The target is to further expand this volume to 1 million tons in the coming years. The country's root crops production likewise grew as fast, particularly cassava, primarily for animal feed but also to cater to the increasing demand for feedstock in bioethanol production.

Cambodia's more recent social and economic development plan is laid out in the Rectangular Strategy for Growth, Employment, Equity and Efficiency Phase III 2014–2018. Similar to the earlier phases of the plan, enhancement of the agriculture sector is given top priority in Phase III, alongside the rehabilitation and construction of physical infrastructure, private sector development and employment generation, and capacity building and human resources development. The focus of the plan will no longer just be on improving agricultural productivity but also on promoting diversification toward commercialization. Good governance is the core of the rectangle, notably the maintenance of peace, political stability, security, social order, and additionally environmental sustainability.

## 2.2 Lao PDR

The Lao PDR launched a far-reaching reform program, the New Economic Mechanism (NEM), which marked the decisive move away from central planning toward a market-oriented economy (Strategy for Agricultural Development 2011–2020 (draft), 2010). The implementation of the reform was not piecemeal, but bold and rapid. It involved the

liberalization of foreign investment that allowed foreign investors to infuse and hold 100% of their capital and guaranteed against their nationalization. Moreover, it allowed them repatriation of after-tax profits. At the same time, exchange rate adjustment and various tax reforms were instituted. Price and trade liberalization were started, which ended the involvement of major state monopolies.

In the early 1990s, a new constitution was adopted, while the monetary policies continued to be strengthened. By that time, a modest inflow of foreign direct investment was seen. The Asian financial crisis in 1997/98 greatly affected the Lao PDR's economic reform efforts. The country experienced extreme financial destabilization from foreign exchange losses, recurring bouts of inflation and currency depreciation, deficit financing, and other budget problems. In early 2000, the country embarked on a 5-year recovery plan that improved fiscal discipline and structural transformation and increased regional integration. During this period, the National Growth and Poverty Eradication Strategy was also formulated and adopted.

Compared to its neighbors in the subregion, the impact of the reforms was subdued by the geographic characteristics of the country. Being landlocked with a rugged terrain limits access to domestic and international markets, and the relatively slow development of infrastructure has exacerbated this isolation. Despite all these constraints, lucrative cross-border trade has been taking place with the People's Republic of China (PRC), Thailand, and Viet Nam. The Lao PDR's coffee production increased more than 500-fold and was geared toward exports (Pravongviengkham, Douangsavanh, and Sysaneth 2014). The country's vegetables, on the other hand, have been enjoying an enhanced market with its neighbors through cross-border trading.

## 2.3 Myanmar

The agricultural marketing reform in 1987/88 was the very first measure taken to facilitate Myanmar's transition to a market economy. The major feature of the reform was a reduction of the state's intervention in the marketing of major agricultural commodities. It marked the end of the so-called "Burmese Way to Socialism," a regime where economic management is based on self-sufficiency and state ownership. The market liberalization process, however, happened in other commodities like pulses and beans and not rice. Control of domestic rice prices continued, as did the state procurement system but with quota levels at 10%–12% of the production to allow farmers to sell the remaining directly to markets. The other incentive that was afforded producers was the cultivation of summer paddy that was exempted from the state procurement policy.

The market restrictions for rice were finally abolished in 2003–2004. Private traders participated in rice marketing and, for the first time, the private sector was allowed to export rice. Input markets experienced the same liberalized markets. Various plans, programs, and policies have been formulated since, indicating the desire of the country to catch up with its neighbors. The National Strategy on Rural Development and Poverty Alleviation was developed in November 2011 with eight priority areas for support, including the agricultural production sector, the livestock and fishery sector, rural productivity and cottage industries, micro savings and credit enterprises, rural cooperative tasks, the rural socio-economy, rural renewable energy, and environmental conservation (LIFT 2011). In December 2012, the government announced the Framework for Economic and Social Reforms: Policy Priorities for 2012–2015 towards the Long-Term Goals of the National Comprehensive Development Plan, in which agricultural development is a focus sector. In February 2013, through a joint effort of the Food and Agriculture Organization of the United Nations and the Government of the Republic of the Union of Myanmar and in consultation with all stakeholders, they developed the Country Programming Framework (CPF) which reiterated the importance of agricultural development for Myanmar.

With its abundant land and water resources, Myanmar is in a position to accelerate the production of key commodities and become a significant player in the world market (Shwe and Vokes 2013). Rice exports fluctuated in the early 2000s due partly to government policy that imposed production quotas and restrictions on rice trading to follow only the normal channels. In 2012, rice was allowed to be exported across the border to the PRC. This trade facilitation measure resulted in a doubling of rice exports from 0.63 million tons in 2011/12 to 1.25 million tons in 2012/13. The production of Myanmar's pulses, the major export crop and foreign exchange earner, has remained strong and rose almost 800-fold from the 1986–1990 average production level of 506,000 tons to an average level of close to 5 million tons in 2006–2012.

## **2.4 Viet Nam**

The period between 1986 and 1990 was one of high growth in Viet Nam, due primarily to the new incentive structures afforded by the economic reforms (or Doi Moi). In agriculture, Resolution No. 10, popularly known as Contract 10 (or Khoan Moi) issued by Viet Nam's Communist Party in 1988, initiated the process of de-collectivization, confirmed the household as the basic production unit, and limited the role of cooperatives (Tuan, Nhan, and Kien 2013). Farmers were given land tenure for at least 15 years and, subsequently in 1993 with the passage of the Land Law, the land market started to be developed. Land-use certificates were issued that enabled land exchange, transfer, inheritance, and mortgage. Additionally, farmers were no longer forced to sell contracted amounts of produce to the state, but instead were allowed to sell to the market. In 1987, the internal control posts were abolished, which accelerated trade within the country. In 1989, agricultural prices were liberalized and the official exchange rate devalued to reflect a more free market. Tariffs began to replace quantitative restrictions and the government ceased its exclusive control of foreign trade. More intensified use of inputs, particularly irrigation, took place in the 1990s with the further liberalization of markets that brought large inflows of foreign direct investment (FDI) and the successful implementation of the 1996 Decision No.99/QD-TTg on investment in irrigation in the Mekong River Delta. It is also during this period that a series of efforts on international integration and the lifting of export quotas for most commodities except rice were observed.

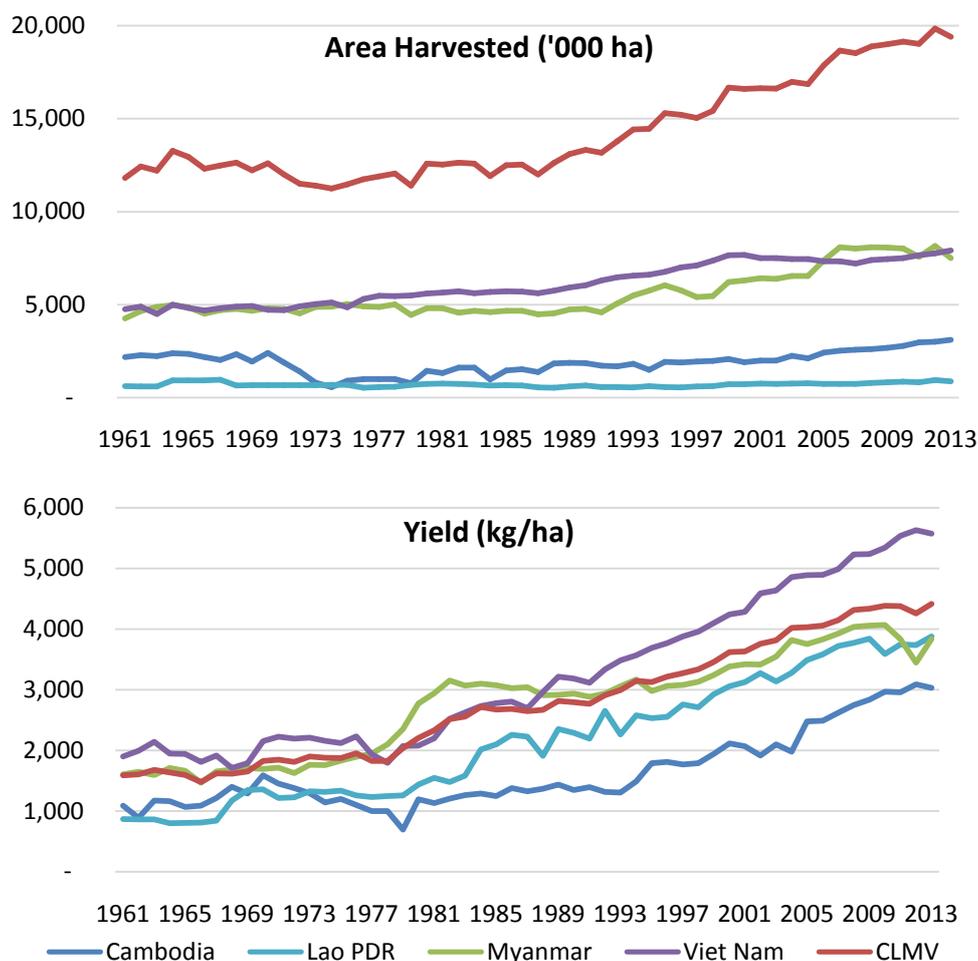
Through all these reforms, Viet Nam regained its number 2 position in the rice export market. The reforms not only had a significant effect on rice but also on other crops, including livestock, fishery, and forestry. The country is also now a leading player in the world market for coffee, rubber, pepper, cashew nuts, aquaculture, wood, and wood products (Nguyen, Tran, and Nguyen 2013).

## **3. IMPACT OF REFORMS ON AGRICULTURAL PRODUCTION**

### **3.1 Higher Rice Production**

The significant increase in agricultural production in the CLMV countries has been accounted for by both area expansion and yield growth. This is evident for rice especially from the mid-1980s when the countries started to embrace a more liberalized market (Figure 2). As second wave adopters of Green Revolution technologies, which started being introduced in the mid-1960s, the CLMV countries had the benefit of learning from the experiences of their neighboring countries and of accessing and adopting improved production technologies. The quick adoption and spread of Green Revolution technologies was enhanced by government reforms that ensued, especially in the 1980s, in support of achieving more rapid agricultural development, not only to improve food security but also to promote greater participation in regional and global markets.

**Figure 2: Growth Trends in Rice Area and Yield in CLMV Countries, 1961–2013**



CLMV = Cambodia, Lao PDR, Myanmar, and Viet Nam; ha = hectare; kg = kilogram; Lao PDR = Lao People's Democratic Republic.

Source: Food and Agriculture Organization of the United Nations, FAOSTAT online (accessed July 2015).

Table 2 shows the performance of rice production from the 1960s to 2013, indicating the relative contribution of area expansion and yield increases. The contribution of yield was bigger compared to area in 1980–1995 with the rapid adoption and spread of Green Revolution technologies, particularly the high-yielding seeds that were suitably cultivated in the river deltas of the Lao PDR, Myanmar, and Viet Nam. Average yields more than doubled their levels in the 1960s when they averaged about 1.8 tons per hectare. Yield growth rates have slowed in more recent years, particularly in the Lao PDR and Myanmar.

In Cambodia, the substantial recovery from the dismal performance of rice production (and the agriculture sector as a whole) during and immediately after the Khmer Rouge period is also evident in Table 2. Production growth rates after 1996 were estimated high as these were coming from negative figures. The remarkable performance continued as government support strengthened because of the desire to participate in the rice export market. The slower yield increases in the initial years of the reform period was overcome by huge rice area expansion in Cambodia. This was made possible by intensified government investment in irrigation development, especially in the wake of the food crisis in 2007–2008 and the policy announcement made by the government in 2010 to export rice in 2015. Cropping intensities doubled in the irrigated rice areas of the country, especially those areas that were once rain-fed and single-cropped. Cambodia exported rice as early as 2013.

**Table 2: Paddy Rice in CLMV Countries: Area, Yield, Production Levels, and Growth Rates, by Period (1962–2013)**

	Annual average				Change from previous period (%)			Average growth rates (within period) (%)			
	'62-'79	'80-'95	'96-'05	'06-'13	'80-'95	'96-'05	'06-'13	'62-'79	'80-'95	'96-'05	'06-'13
<b>Area ('000 ha)</b>											
Cambodia	1,635	1,593	2,049	2,778	-2.6	28.6	35.5	-3.67	2.10	2.85	2.90
Lao PDR	701	627	696	820	-10.6	11.0	17.9	0.94	-1.47	3.29	2.31
Myanmar	4,785	4,885	6,239	7,931	2.1	27.7	27.1	-0.25	1.60	2.80	-0.89
Viet Nam	4,974	5,979	7,401	7,521	20.2	23.8	1.6	0.68	1.30	0.46	0.99
TOTAL CLMV	12,095	13,084	16,385	19,051	8.2	25.2	16.3	-0.46	1.35	1.75	0.49
<b>Production ('000 tons)</b>											
Cambodia	1,966	2,158	4,118	7,932	9.8	90.9	92.6	-4.09	6.30	7.59	6.24
Lao PDR	773	1,290	2,128	3,066	67.0	64.9	44.1	3.89	2.16	8.17	3.53
Myanmar	8,459	14,648	21,235	30,758	73.2	45.0	44.8	2.02	2.18	5.66	-0.87
Viet Nam	10,036	17,715	32,010	39,947	76.5	80.7	24.8	0.92	7.15	3.57	2.86
TOTAL CLMV	21,234	35,811	59,490	81,704	68.6	66.1	37.3	0.91	4.52	4.74	1.64
<b>Yield (kg/ha)</b>											
Cambodia	1,174	1,343	1,997	2,842	14.4	48.7	42.3	-1.23	3.14	3.69	2.71
Lao PDR	1,129	2,091	3,033	3,736	85.3	45.0	23.2	2.53	4.75	3.67	1.03
Myanmar	1,767	2,997	3,384	3,878	69.6	12.9	14.6	2.38	0.46	2.23	0.02
Viet Nam	2,019	2,936	4,321	5,305	45.4	47.2	22.8	0.22	4.84	2.97	1.73
TOTAL CLMV	6,089	9,367	12,735	15,761	53.8	36.0	23.8	1.01	2.93	3.04	1.28

CLMV = Cambodia, Lao PDR, Myanmar, and Viet Nam; ha = hectare; kg = kilogram; Lao PDR = Lao People's Democratic Republic.

Source: Food and Agriculture Organization of the United Nations, FAOSTAT online (accessed July 2015).

In the Lao PDR, area growth in 2006–2013 was similarly strong but was not enough to overcome the huge reduction in yield growth. Nonetheless, average rice production in the Lao PDR more than tripled from 1962–1979 to 2006–2013. The slowdown in the yield growth rate is not of much concern to the government at present considering the fact that the Lao PDR has a more than sufficient supply of the staple food. Further area expansion in the central and southern provinces is expected because of large areas with great potential for irrigation development. Their uplands are devoted to organic specialty rice cultivation for export.

Rapid area expansion in Viet Nam and Myanmar was key to their production growth, especially after the initiation of their respective economic reforms. Production increases were sustained with the enhancement of cropping intensity and yield improvement, particularly in the monsoon rice areas that used to be cultivated only during the rainy season. The economic reforms in Viet Nam complemented the effect of investments in irrigation made during the central planning period. Rice areas expanded and farmers were motivated to increase land productivity. This was also the case in Myanmar with the full removal of the compulsory production quota in 2003. Further area expansion and yield increases in the country continued, notably in the areas cultivated for summer paddy where private producers were provided support to install pump irrigation and/or shallow tube wells for rice production. Area growth has gradually slowed down in both countries in the most recent period. This was due to the reduction in cropping intensities of rice farms in the Mekong Delta of Viet Nam and the country's shift in cultivation of its marginal areas in favor of high-value crops such as vegetables and coffee. Rice yield growth remained strong, which enabled the country to maintain its position as a major rice exporter. Unlike Viet Nam, Myanmar's almost nil area growth rate was not complemented by strong rice yield growth. This was deemed to be due not only to the low rate of fertilizer application but also to the poor quality of fertilizer applied (Shwe and Vokes 2013).

There are other reasons for the slower trends in yield growth rate, which are, in fact, not unique to the CLMV countries because they apply to the rest of Asia as well. Foremost, these reasons pertain to the exhaustion of Green Revolution technologies, mainly the

potential of available varieties of rice seeds. Aggravating the situation is the deterioration of land and water quality due to the excessive application of chemical fertilizer and pesticides. Poor farm management practices and illegal activities such as the uncontrolled cutting of trees have resulted in rapid degradation of natural resources, particularly the loss of topsoil cover due to erosion. The rapid conversion of agricultural lands, including prime irrigated areas to non-agricultural use, has contributed to the reduction of farmlands.

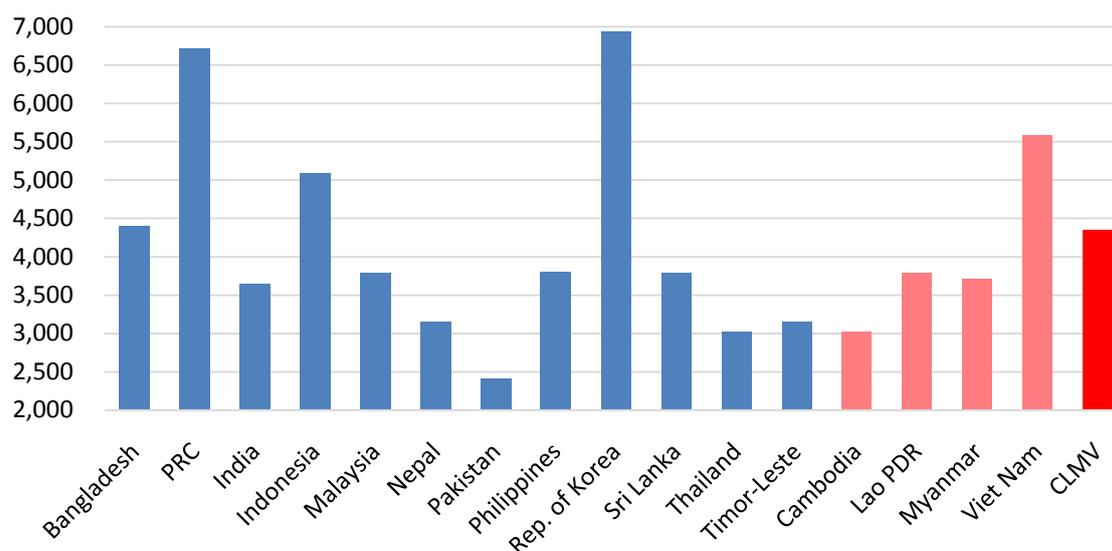
There are also economic factors that account for the slowing trends. A key one relates to the eroding profit margins from rice cultivation due to the decline in its international price while the cost of inputs continues to rise. Enhancing the ability of farmers to compete in the global market by moving toward greater regional integration and liberalization of trade also continues to be a big challenge in the CLMV countries.

### 3.2 Widening Yield Gaps

The other evident trend shown in both Figure 2 and Table 2 is the widening yield gap across the CLMV countries. In the early 1960s, average yield levels in the CLMV countries were within the 0.8–2.0 tons per hectare band, the Lao PDR being the lowest and Viet Nam the highest. Viet Nam's average rice yield (see Table 2) has more than doubled in the last five decades and stood at an average level of 5.3 tons per hectare in 2006–2013. The Lao PDR more than tripled its rice yield, which started from just slightly over 1 ton per hectare in the 1960s, increasing steadily to an average level of 3.7 tons per hectare in 2006–2013. Cambodia's yield level tripled as it underwent a bumpy trend during the 1980s when the country was starting to recover from domestic conflicts and an unstable political environment. Average rice yields in Myanmar were about 348 kilograms less than those of Viet Nam in 1962–1979. The yield differences between these two countries increased by more than 1 ton per hectare in 2006–2013.

Yield gaps are also apparent when comparing the CLMV countries with other countries outside the subregion. In Figure 3, Viet Nam's rice yield, which is the highest in the subregion, is still far lower than that of the PRC. Cambodia is among those with the lowest yield levels in the region, while the Lao PDR and Myanmar are not far ahead.

**Figure 3: Comparing Average Rice Yields across Asia, 2011–2013**  
(3-year average, kilogram per hectare)



CLMV = Cambodia, Lao PDR, Myanmar, and Viet Nam; Lao PDR = Lao People's Democratic Republic; PRC = People's Republic of China.

Source: Data from Food and Agriculture Organization of the United Nations, FAOSTAT online (accessed July 2015).

The increasing yield gaps are mainly attributed to the countries' varying landscapes, topographical characteristics, and, hence, soil qualities. Also contributing to such gaps are the different levels of commitment and quality of interventions that came with the economic reforms. Foremost of these interventions is the provision of investments for the agriculture sector, the key one being irrigation development. Table 3 shows the state of key agricultural inputs. Despite the vast river deltas in Cambodia, Myanmar, Thailand, and Viet Nam, extensive areas cultivated are still rain-fed lowland or in deep water. Among the CLMV countries, Viet Nam's irrigated area is most extensive at 49% of total cultivated area and Cambodia's is the least extensive at only 9% of total cultivated area. Enhanced investment in irrigation facilities in Cambodia came in the aftermath of the 2007–2008 food crisis. In Myanmar, expansion of sown area in the Ayeyarwady Delta from the late 1990s was due to the installation of pumps for irrigation.

**Table 3: State of Key Inputs to Agriculture**

Country	Irrigated to Cultivated Area	Cropping Intensity	Nutrients Used, 2006–2010	Energy Used, 2006–2009
	(%)	(%)	(kg/ha)	(%)
	1	2	3	4
Cambodia	9 (2006)	121 (2006)	8.4	2.5
Lao PDR	27 (2005)	137 (2005)	–	–
Myanmar	20 (2006)	133 (2006)	7.2	0.0
Viet Nam	49 (2005)	190 (2005)	168.9	1.2
Indonesia	18 (2005)	199 (2005)	74.7	1.8
Philippines	19 (2006)	143 (2006)	58.9	0.6
Thailand	34 (2007)	146 (2007)	85.1	4.7
People's Republic of China	48 (2006)	167 (2006)	375.5	2.5

ha = hectare, kg = kilogram, Lao PDR = Lao People's Democratic Republic.

Notes: Column 1: Total area equipped with full irrigation to cultivated area.  
Column 3: Total of nitrogen, phosphate, and other fertilizers in nutrient equivalent.  
Column 4: Portion of total energy used in agriculture and forestry.

Sources: Food and Agriculture Organization of the United Nations, FAOSTAT and AQUASTAT (accessed March 2014).

The extent and type of irrigation systems influence cropping intensities, which are shown to vary across the countries. Countries with relatively high cropping intensities are those with high percentages of cultivated area under irrigation. These include Viet Nam, Indonesia, and the PRC. Crop intensification seems to have a direct relationship with the rate of fertilizer application. Crop intensification and rates of fertilizer application have accounted for the different productivity growth rates especially among countries with almost homogenous environments such as Viet Nam, Cambodia, the Lao PDR, and Myanmar. It should be noted that the figures on irrigation and fertilizer application refer primarily to rice but also cover a number of other commodities (e.g., fruits and vegetables, pulses, maize, and sugarcane).

The relatively low proportion of energy use in agriculture and forestry as compared to total energy used is clear not only in the CLMV countries but also in the neighboring countries (Table 3). The level of farm mechanization also remains low in a number of countries shown in Table 4, including in Cambodia where the majority of farmers continues to use traditional tools in their production activities. In contrast, mechanization is high in the PRC, India, and the Republic of Korea, where significant development in agricultural mechanization has been taking place (Soni and Ou 2010). Table 4 also shows that not all farm activities are mechanized. Land preparation is highly mechanized, followed by threshing and harvesting. Rice milling is also highly mechanized in most countries in the region.

**Table 4: Level of Mechanization in Selected Asian Countries**

Country	Farm Activities/Level of Mechanization					Overall Level of Mechanization
	Land Preparation	Planting	Threshing	Harvesting	Overall	
Bangladesh	80%	Low	>80%	Low	Low	LOW
Cambodia	Low	Low	Low	Low	<10%	LOW
People's Republic of China	60%	35%	-	30%	42%	HIGH
India	30%	10%	60%	20%	25%–30%	HIGH
Indonesia	Low	Low	Low	Low	-	LOW
Republic of Korea	High	High	High	High	>70%	HIGH
Nepal	-	Low	Low	9 units of combine harvesters	Low	MEDIUM
Philippines	13.20%	0.20%	69%	Low	-	LOW
Sri Lanka	Low	Low	Low	Low	Low	LOW
Thailand	High	Medium	-	-	Medium	MEDIUM
Viet Nam	72%	20%	100%	-	-	MEDIUM

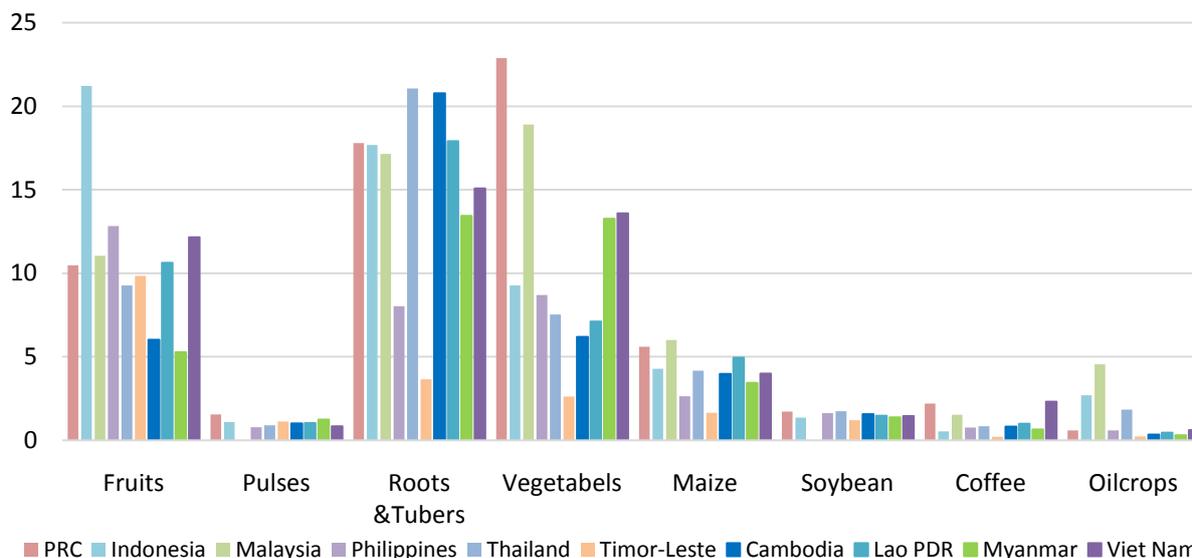
Source: Taken from Soni and Ou (2010).

### 3.3 Production Performance of Other Crops

Contributing to the growth in agriculture and agricultural productivity of the CLMV countries is the relatively strong production performance of other crops. The major ones include cassava, sugarcane, yellow corn/maize, cashew nuts, coffee, pulses, fruits, and vegetables. The livestock and fishery subsectors recorded significant production growth performances as well.

For many of these crops, area expansion has been the key reason for production growth. Yield improvement has nonetheless been happening for some of the crops, but at a relatively slow pace such that the levels are still lower than those of the neighboring countries in the region (Figure 4). This is especially the case for oil crops, fruits, and vegetables. The yield levels of pulses, roots and tubers (primarily cassava), maize, soybean, and coffee are shown to be relatively competitive with other Asian countries. The average yield of coffee in Viet Nam, in fact, is highest among the other countries.

**Figure 4: Average Yields of Various Key Commodities in Selected Asian Countries, 2006–2013**  
(tons per hectare)



Lao PDR = Lao People’s Democratic Republic; PRC = People’s Republic of China.

Source: Data from Food and Agriculture Organization of the United Nations, FAOSTAT online (accessed July 2015).

Cassava production in Cambodia exhibited a huge increase from 147,763 tons in 2000 to about 7.6 million tons in 2012 owing to area expansion (Khin and McNaughton 2013). Exports of the commodity rose exponentially from 2007 until the second half of 2012, raking in huge amounts of export revenues for the country. Key markets for cassava are Thailand and Viet Nam. Yellow corn production increased as a result of both area expansion and yield improvement.

Cambodia’s corn yield is now on par with that of Thailand but still lower than that of the PRC. The rapid production increase is associated with the expansion of the poultry and aquaculture industries. Cashew production from small orchards has made Cambodia the 10th biggest producer in the world. Vegetables and fruits cultivation has been increasingly widespread, primarily on a small household scale. It is done commercially in particular areas with high population density and close proximity to urban markets.

Coffee is the most important export crop of the Lao PDR. Plantation areas devoted to coffee, however, have been on a decline since 2008. Nonetheless, yield levels have more than doubled from 0.54 tons per hectare to 1.54 tons per hectare between 2008 and 2012. The two other agricultural commodities in the Lao PDR whose production has been on the rise because of area expansion are maize and sugarcane. Vegetable area has been on the rise, especially with the cultivation of the uplands with organic vegetables. Likewise, yield levels have also significantly improved.

Positively affected by the liberalization policies of Myanmar are the edible oils and pulses. Production growth of these crops has come from steady increases in both area and yield. Despite the yield growth, however, the levels have remained low, especially for pulses, which are grown mostly under rain-fed conditions where seedling establishments are generally poor and application of fertilizers, including pesticides and insecticides, are at low levels. Among the pulses, green gram, black gram, and pigeon pea are most important in terms of their export potential. Oilseeds for the production of edible oil are largely grown in the dry zone of central Myanmar. Sesame occupies approximately 46% of the area sown to oil crops, groundnut 25%, and sunflower 16%.

The diversification toward higher-value products in Viet Nam resulted from its greater exposure to the international market with the country’s accession to the World Trade

Organization in 2007. Greater market participation of the private sector, including in foreign trade, facilitated private investment in the rural sector, promotion of contract farming, application of modern technologies, and development of rural non-farm activities that helped diversify and improve agricultural products through efficient integration in the value chain. While rice production continued to increase, so did that of the other commodities. Maize production increased 1.8 times in sown area and 2.8 times in output terms from 1986 to 2011. Cash crops for exports such as peanuts, soybean, rubber, coffee, and tea have all expanded in terms of both sown area and output. There has also been a rapid increase of 571,500 hectares of fruit crop area from 261,200 hectares in 1986 to 832,700 hectares in 2011. Viet Nam's yield levels in most commodities are 2–5 times higher than their respective levels prior to the economic reforms. All these developments led Viet Nam to achieve agricultural growth of more than 6% annually in the 1990s.

### **3.4 Livestock, Poultry, and Fishery Production**

The new technologies developed for the livestock and fisheries subsectors that include, among others, the development of high-yielding animal breeds and fish species and the formulation of more effective animal feeds that enhance vigor and resistance to diseases. Many of these new technologies have been tested, validated, and adopted by the CLMV countries.

In Cambodia, the fisheries subsector is the second largest contributor to the country's agricultural gross value added with a share of 25%. With annual fish catch estimated at 400,000 tons per year, the fisheries sector indeed provides direct and indirect employment and income to about 2 million people, especially those who live within the Tonle Sap basin whose means of livelihood and nutritional well-being is fishing. The fisheries subsector recorded an average annual real growth rate of 3.6% during 2007–2012. The removal of restrictions on fishing lot ownership encouraged greater access to fishing grounds. This was complemented by the development of inland aquaculture. Animal husbandry has not been as lucrative, however. While it accounts for 15% of agricultural gross value added, this share has not changed for years due to either stable or declining cattle and swine production. Poultry numbers have increased by 40%, however, during 2007–2012.

Livestock and fish production have both been on the rise in the Lao PDR. Production of livestock increased from 24.2 million heads in 2005 to about 32.8 million heads in 2011. While lowest in number, goats exhibited the highest rate of increase. This was followed by swine and poultry. Fish production increased by 29% from 74,200 tons in 2009 to 95,600 tons in 2011.

Livestock production has been increasing in scale and is becoming more modernized. Farm-based and concentrated industrial forms of animal husbandry are gradually replacing scattered household-level practices. Livestock farms across the country increased from 1,761 in 2001 to as many as 23,558 in 2011, indicating a sharp growth rate of more than 150% annually. In response to increasing consumer demand, livestock production has been growing relatively fast at an average 6% annually. Pork output increased from 0.6 million tons in 2000 to 3.1 million tons in 2011, which has resulted in a rise in livestock output as a share of overall agricultural output from 13% in 1986 to 16% in 2011.

In the fisheries sector, there have been positive improvements in both offshore fishing and aquaculture development. The overall fisheries output increased by 7.5 times, of which aquaculture production increased by 14.5 times during 1986–2011.

## 4. AGRICULTURAL PRODUCTIVITY AND GROWTH IN CLMV COUNTRIES: CONSTRAINTS AND CHALLENGES

As covered in the previous section, productivity increases through policy reforms have enabled the CLMV countries to sustain the growth of agriculture over the years. Table 5 shows the subregion is still flourishing with abundant and diverse resources, which include land, water, and coastal and/or marine resources. The countries also boast ample human resources, with the majority still engaged in agricultural activities. Even though the share of the agriculture sector has declined, from 49% in 1993 to 28% in 2014, the sector has remained strong and has supported overall economic growth in these countries (World Bank 2015). During the last 10 years (2005–2014), the CLMV countries as a subregion grew faster than the more advanced Association of Southeast Asian Nations countries (ASEAN-6, i.e., Brunei Darussalam, Indonesia, Malaysia, the Philippines, Singapore, and Thailand), with average gross domestic product growth rates of 7.5% compared to 5.1% for ASEAN-6 (ASEAN Secretariat 2015).

Despite these gains, the potential of the subregion to achieve higher agricultural productivity and production is not fully realized. In fact, over the last decade, productivity has actually slowed or stagnated because of a number of challenges and constraints that confront the agriculture sector.

For one, the economies of the CLMV countries still face economic and technological constraints that inhibit the exploitation of productivity in agriculture. Farm size and land tenure are the principal constraints. Farm areas are typically small in the CLMV countries, which prevent them from maximizing the productivity and cost-saving benefits from mechanization. Another challenge is access to technology, such as technologies to harness the potentials of marginal areas (e.g., rain-fed and upland) and the use of biotechnologies to develop new food varieties.

For example, while Cambodia's agriculture sector has demonstrated stellar agricultural growth performance in the last 15 years as a result of new policies and programs, it still suffers from serious underinvestment in irrigation, rural roads, extension services, and rural credit. The large, mountainous, and hilly terrain of the Lao PDR has limited its scope for lowland irrigation. The challenge still includes the expansion of rice production using similar high-yielding varieties in the lowlands adapted to the upland ecosystem. In terms of economic efficiency alone, the comparative advantage of the country's agriculture does not seem to lie in the expansion of rice production, but in the increase of high-value cash crops such as coffee and livestock production, especially in conjunction with road network improvement to expand cross-border trade. While Myanmar has opened up and development and transformation processes are taking place even in poorer areas of the country, the present policy framework has still not been able to provide much dynamism for agriculture, including investment in goods transport and other infrastructure facilities.

New developments arising from the globalization of agricultural markets are also putting pressure on efforts to sustain the stability of food markets. As domestic markets are exposed to global markets, food prices become volatile. As a result, the availability, accessibility, and affordability of food production are affected. Because of globalization, the agriculture sector in the CLMV countries has to contend with increased competition from other markets due to removal of trade barriers, higher food standards, and changes in terms of trade that affect the competitiveness of domestic producers. Similarly, due to their small size and increasing reliance on imports of food supplies, local producers become more vulnerable to changes in world market conditions, resulting in lower incentives for farmers to engage in production (FAO 2002). Openness to external markets also exposes domestic markets to greater uncertainty and risks, as the 2008 global food crisis has shown.

Finally, the CLMV countries have to overcome emerging challenges posed by climate change and environmental risks, notably the degradation of natural resources, rising temperatures, and extreme weather events such as floods and droughts. Evidence suggests that global warming (including climate change) can reduce agricultural productivity in developing countries by around 9%–21%, with adverse impacts on agricultural food production and food security (Meyers et al. 2012). Moreover, climate change creates further uncertainty on the production decisions of farmers, thus negatively affecting food production and distribution.

Unfortunately, current environmental conditions in the CLMV countries have further increased their vulnerabilities to climate change. For example, due to economic and political pressures and underinvestment in infrastructure, most of the CLMV countries suffer from inefficient use and management of natural resources. Because the production systems in the subregion are small and have low productivity, and because many farmers lack adaptation skills and practices, adjusting agricultural production to changing climate conditions is also rendered difficult and very challenging.

**Table 5: Strengths, Weaknesses, Opportunities, and Threats of the Agriculture Sector in CLMV Countries**

Cambodia	Lao PDR	Myanmar	Viet Nam
<b>Strengths</b>			
<ul style="list-style-type: none"> <li>• Large agricultural land with special soil types for specialty rice</li> <li>• Abundant water resources</li> <li>• Diverse agro-ecological zones</li> <li>• Large portion of population into farming</li> <li>• Government’s priority sector for development</li> </ul>	<ul style="list-style-type: none"> <li>• Large and productive arable land with low population density</li> <li>• Different ecological conditions that are suitable for growing different specific crops and varieties</li> <li>• Less polluted environment due to continued practice of traditional farming: conducive to promoting organic agriculture</li> <li>• Large portion of population into farming</li> <li>• Low labor cost</li> <li>• Strong development partner support to agricultural development: financial and technical</li> </ul>	<ul style="list-style-type: none"> <li>• Diverse agro-ecological zones allow for wide range of crops</li> <li>• Abundant fertile land and water resources</li> <li>• Farmers responsive to policy reforms and incentives</li> <li>• Strategic location for exports to the PRC, India, and ASEAN</li> </ul>	<ul style="list-style-type: none"> <li>• Appropriate natural resources for agricultural production</li> <li>• Extensive system of irrigation infrastructure</li> <li>• Farmers with good skills in agricultural production</li> <li>• Low cost and high volume of agricultural production</li> <li>• Strategic location in region</li> </ul>
<b>Weaknesses</b>			
<ul style="list-style-type: none"> <li>• Inadequate infrastructure: irrigation, rural road, electricity</li> <li>• Absence of land-use planning and agricultural zoning</li> <li>• Lack of R&amp;D and extension services</li> <li>• Very limited credit and risk-hedging schemes for farmers</li> <li>• Very limited standards on agricultural products</li> <li>• Weak information system in agriculture sector</li> <li>• Ineffective legal framework and enforcement</li> <li>• Limited roles of contract farming and farmers’ cooperatives</li> </ul>	<ul style="list-style-type: none"> <li>• Inadequate infrastructure facilities, particularly road and transportation network that negatively impact development of both input and output markets</li> <li>• High cost of agricultural inputs as well as outputs</li> <li>• Small land sizes that hinder taking advantage of economies of scale</li> <li>• Weak public extension and dissemination system on production-related and market-related technologies and information</li> <li>• Weak farmers’ organizations</li> <li>• Inadequate working capital and access to credit, insurance and other financial services for agricultural production and value addition</li> <li>• Very little entrepreneurship knowledgeable on agricultural value chain</li> <li>• Low trade facilitation and inadequate export promotion of high-quality and value agricultural and agro-processing products (e.g., organic products)</li> </ul>	<ul style="list-style-type: none"> <li>• Poor connectivity (major roads, agricultural roads, internet, telephone network) and power scarcity</li> <li>• High level of landlessness</li> <li>• Rural indebtedness and limited farm credit</li> <li>• Lack of clear strategy and policy: weak capacity in policy formulation and implementation</li> <li>• Weak land policy: problem of land grabbing</li> <li>• Low human resources capacity</li> <li>• Legal framework not conducive to agribusiness investment (e.g., taxes, land laws, banking regulations) and value chain development</li> <li>• Unreliable database</li> </ul>	<ul style="list-style-type: none"> <li>• Limited quantity of resource endowment: small farm sizes</li> <li>• Low uniformity of products, low food safety</li> <li>• Slow structure change, low efficiency</li> <li>• Dependence on import of agricultural inputs</li> <li>• Underdeveloped agricultural products processing</li> </ul>

Cambodia	Lao PDR	Myanmar	Viet Nam
<b>Opportunities</b>			
<ul style="list-style-type: none"> <li>Worldwide potential market access</li> <li>Crowding in support from various stakeholders (government, donors, private sector)</li> <li>Geographical benefits from Thailand and Viet Nam (technological diffusion, market integration)</li> </ul>	<ul style="list-style-type: none"> <li>“Land lock to land link” policy through development of regional linkage and infrastructure development enhance opportunity for agricultural exports</li> <li>Free trade agreements can ease importation of agricultural inputs and lower their cost</li> <li>Growing market of organic products</li> <li>FDI policy attracts more foreign investment</li> <li>Increased public–private partnerships (PPP) in value addition/value chain development of agricultural production, especially for export</li> <li>Regional integration that increases cooperation in exchanging technical knowledge and other information</li> <li>Development of agro- and eco-tourism</li> </ul>	<ul style="list-style-type: none"> <li>Large areas for developing irrigated agriculture</li> <li>Available technologies to increase yields</li> <li>Prospect of substantial aid flows</li> <li>Potential to become major exporter of high-quality rice through integrated rice operations (seedling, milling, logistics)</li> <li>Huge potential to export high-value crops, including fruits, vegetables, pulses, rubber, sugarcane, etc.</li> <li>Potential to increase fertilizer production</li> <li>Potential to embark on green growth to produce organic crops</li> </ul>	<ul style="list-style-type: none"> <li>Growing demand for agricultural products</li> <li>Further international integration</li> <li>Increasing opportunities to attract FDI</li> <li>Support of international donors, especially on climate change response</li> <li>Technology/science base development</li> <li>Government commitment to economic restructuring and support for agriculture and rural development</li> </ul>
<b>Threats</b>			
<ul style="list-style-type: none"> <li>Rural migration</li> <li>Climate change and deforestation</li> <li>Loss of fisheries resources</li> <li>Limited support for agro-industry</li> </ul>	<ul style="list-style-type: none"> <li>Competition in the use of land and water for non-agricultural purposes</li> <li>Low competitiveness of the agriculture sector</li> <li>Unscrupulous farmers and traders taking advantage of the growing agriculture markets</li> <li>Weather conditions and adverse effects of climate change like drought or flood are threats to agricultural production</li> <li>Weak regulatory mechanism and certification of agricultural products for export</li> <li>Limited proper quarantine checks for agricultural production across borders (illegal border trade), which can lead to outbreaks of pests and diseases</li> </ul>	<ul style="list-style-type: none"> <li>Land grabbing might result in extreme social fragmentation</li> <li>Lack of clarity and transparency in land laws may undermine investment</li> <li>Neglect of smallholder farming might result in persistence of poverty and aggravate social tension</li> <li>High-input agriculture might lead to environmental damage and unsustainable use of natural resources</li> <li>Land degradation in dry zone and hill areas and lack of action plans to address slash and burn agriculture</li> <li>Natural disasters/climate change</li> </ul>	<ul style="list-style-type: none"> <li>Increasing competition from neighboring countries</li> <li>Evolving demand for standard compliance</li> <li>Competition of industrialization and urbanization of agricultural resources</li> <li>Increasing risks due to natural disasters and epidemics, including climate change</li> </ul>

ASEAN = Association of Southeast Asian Nations, FDI = foreign direct investment, Lao PDR = Lao People’s Democratic Republic, PRC = People’s Republic of China, R&D = research and development.

Source: Authors.

## **5. FUTURE PROSPECTS AND AGENDA FOR REFORMS**

Considering their rich natural resources, favorable tropical climate, and abundant labor, the agriculture sectors of the CLMV countries can perform beyond their conventional role of providing food (especially for their own needs), tapering inflation, generating foreign exchange, and providing the basis for rural growth. However, this will only be possible if the constraints to the agriculture sector are alleviated by further reforms. Identifying appropriate reforms and implementing good policies are key to unleashing the potential of these countries and seizing the opportunities that are becoming available because of changes in the market environment. Collectively, the CLMV countries can become a veritable subregional food center, specializing in commodities on the basis of comparative and competitive advantage.

As mentioned earlier, reforms have the potential to increase agricultural productivity. To be effective, however, reforms have to be carefully designed and sequenced. Thus, deciding the appropriate policy reforms for such a transformation is crucial. This should involve, among other considerations, an assessment of development pathways that would enable the agriculture sector to overcome threats and challenges, follow a green growth strategy, and ensure more sustainable production growth that benefit everyone, including poor and small farmers. Policy reforms should also remain dynamic and responsive to the changing realities of the markets and economic and political conditions in the region.

### **5.1 Land Management**

The first element of the reform agenda is sustainable land management. Due to the limited resource base in the region, particularly land and water, and the continued degradation of these resources, the CLMV countries have to contend with land scarcity and competition among crops for land allocation. This leads to further land-use pressures and degradation, which, in turn, impact adversely on agricultural production and productivity. Because the majority of farmers in the CLMV countries own small landholdings, with very limited experience in managing land and other resources, many of them have to deal also with low and unpredictable crop yields and incomes.

Scaled-up efforts to improve land and water management practices are therefore needed to increase crop yields and long-term productivity, with positive impacts in terms of increased incomes and employment opportunities to farmers, and increased resilience of the sector. Evidence suggests that effective land management is an integral part of sustained agricultural development (Winterbottom et al. 2013). Thus, it is crucial that policy makers ensure a good balance between promoting land concession and providing incentives for farmers through secured land tenure and property rights. They should also create enabling policies for improved land inventory schemes and more effective land-use planning. A more integrated approach to land and water management is also needed to ensure that best practices are implemented and benefit all agricultural landscapes of the region. Part of this approach is bringing together all relevant stakeholders, smallholders, and farmers to design a plan to restore agricultural productivity and rural livelihoods.

### **5.2 Investment**

Second, investment in agriculture has to be accelerated to generate sustained increases in yields and production given the limited resources. While this can be challenging because of the region's weak investment environment and low level of agricultural productivity stock, renewed emphasis on effective investment measures in agriculture is needed. Key areas in which such investments can be directed are technological innovations, advancement in seed varieties, cost-effective irrigation, communications, transport, and other market

infrastructure. At the same time, investment incentives that improve access to markets by private investors in the agriculture sector should be encouraged.

In addition to rural infrastructure and institutions, there is a need to focus on investments that address the productive safety nets and capacity constraints of the poor farmers (Schmidhuber and Bruinsma 2011). It is widely recognized that agricultural investments have the potential to increase productivity, although the intended impacts are sometimes not being realized because of limited capacity of beneficiaries. For example, many best agricultural practices (e.g., land management and seed development) are not effectively implemented because farmers do not know how to apply them. Thus, investment in knowledge management in agriculture is critical.

### **5.3 Risk Management**

Third, in view of the increased uncertainty in agricultural production systems brought about by changing climate conditions, a comprehensive risk management program must be in place to preserve the capacity of natural resources in sustaining productivity achievements. Policy makers need to give renewed emphasis to understanding the implications of climate change to agriculture, as well as in implementing environmentally effective policies such as regulations that maintain soil carbon content and make efficient use of fertilizers and irrigation (FAO 2008).

More important are those policies related to climate change mitigation and adaptation, and the assessment and monitoring of impacts of climate change in agriculture. While mitigation (e.g., emissions reduction) and adaptation (e.g., land and water management) measures are supposed to complement each other, a key challenge is how to strengthen those linkages. One practical approach is to develop national adaptation strategies in each country to support the implementation of policies (Meyers et al. 2012). For example, the CLMV countries should implement measures to mainstream climate change adaptation with food security, conduct climate change vulnerability assessments, and strengthen capacities and coordination for adaptation and mitigation.

### **5.4 Linking Agricultural Markets**

Fourth, with the increasing importance of regional economic integration, linking the agricultural markets in the CLMV countries is now a necessary condition for sustained agricultural productivity growth. One perspective that is widely discussed is the idea of “agricultural supply chains” where the production process in agriculture is interrelated in many ways through a series of chains of functions (from seed development to marketing of final product) and players (from small farmers to big producers and/or distributors). While the benefits of participating in food supply chains are many, a key challenge is how to identify the weakest links within the supply chain and address them with appropriate policies (Wong 2013).

Thus, it is important that policy measures remain supportive of the markets. This involves linking the farmers to the markets, technologies, knowledge flow, and delivery (Singh 2009). A case in point is the development of the supply chain in rice, a key industry that offers huge potential for the CLMV countries. To develop the rice supply chain, countries need to undertake policies that promote certified seeds and fertilizers; effective agricultural support services such as technology transfer, credit, and marketing; and other innovative developments along the chain (Wong 2013). In a global context, this also means creating linkages with external markets through appropriate policies. These include measures such as improving food standards, quality, and certification; enhancing trade facilitation and logistics; and removing tariff and non-tariff barriers to agricultural trade—key factors that can impact significantly on the competitiveness of the agriculture sector. Such measures, although not new, are still critical if the region is to take advantage of the opportunities being

offered by regional production networks, including the benefits of structural transformation in the economy arising from external competitive forces.

## 5.5 Institutional Changes

Finally, institutional changes matter if these policies are meant to work. The dramatic transformation of the agriculture sector implies that the conditions and institutions that governed the sector over the last three decades are no longer relevant given the new opportunities and risks confronting the sector. For example, the institutions that contributed to the success of the Green Revolution in the 1970s may no longer be appropriate in the current context of globalization and rapidly integrating markets. Similarly, technologies, sources of comparative advantage, and institutional arrangements in agriculture (e.g., increasing role of the private sector in agricultural supply chains) have changed—and, along with those, so too have the policy responses to problems and constraints facing the sector.

In such a new environment, policy makers should be ready to adapt to new institutions and mechanisms when they implement and formulate policies. New institutional changes have to be considered, such as the need to strengthen coordination with relevant agencies in charge of agricultural development, so that policies can address holistically the problems of the sector. Strong partnerships and networking are also needed. In particular, the private sector has to play an increasing role to ensure that policies are consistent with market demands by driving, for example, the organization of value chains that link the markets to small farmers and commercial farms. Furthermore, there is a need for more effective governance mechanisms to ensure that the various initiatives intended for agricultural development are being implemented effectively. For example, a new form of governance that corrects market failures through regulatory interventions can be designed to increase the competitiveness of the agriculture sector and support greater inclusion of farmers in the entire production system.

## 6. CONCLUDING REMARKS

Enhancing agricultural productivity in predominantly agrarian economies as in the CLMV countries is crucial. The transition from an inefficient, state-controlled agriculture sector toward a more open, market-oriented production system has so far produced profound impacts for these economies. Such a transition would not have been possible without the comprehensive reforms that have been implemented over the years. However, while reforms have enabled the CLMV countries to enhance the efficiency and productivity of their agriculture sector, existing constraints (e.g., inadequate investment and market infrastructure) and emerging challenges (e.g., rising competition from integration and effects of climate change) suggest that the reform process is far from complete, and that more efforts are still needed to achieve sustainable agricultural development in the region.

Perhaps one important lesson learned from the experiences of the CLMV countries in promoting agricultural development is the realization that productivity enhancement is not an end in itself. Instead, it should be viewed as one of the many means by which development goals can be achieved. In the CLMV countries, where poverty and food insecurity are still very much prevalent in large parts of the population, the need to ensure sustainable food systems and adequate nutrition should be the ultimate objectives. While productivity has the potential to enhance the incomes of small farmers, economic growth needs to be inclusive in order to sustain long-run improvements in the livelihoods of the poor. Without inclusive growth, the agriculture sector will continue to be marginalized and measures to achieve productivity gains are bound to fail.

This suggests that the reform agenda in the agriculture sector should go beyond the traditional view of expanding yields and supply of agricultural products. Agriculture has to be

transformed as a viable and productive sector of the economy. Such transformation requires changing the market structures and regulatory policies that govern the sector. The growth in agriculture has to be mainstreamed as part of the overall development agenda of the economy, which implies targeting as well improvements in health, nutrition, education, employment, and job creation. More importantly, it requires a change in the mindset, priorities, and political will of the governments implementing the reforms.

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