

Cambodia's Agricultural Strategy: Future Development Options for the Rice Sector¹

Introduction

This paper focuses on the role of the rice sector in Cambodia's agricultural strategy. The paper first reviews the performance of the rice sector and rice-related government policies and interventions, and then identifies the potential for and constraints to future development of the rice sector. Against the background of a broad agricultural strategy, the paper further explores the options and possible future development path for rice by comparing the current situation in Cambodia with the early development stage of its two neighbours, Thailand and Vietnam. Although both Thailand and Vietnam are rice growing and exporting countries, they have quite different rice development strategies. The paper concludes by suggesting further research topics that emphasise Cambodia's comparative advantage, and proposing a comparative study of different development paths in rice development and agricultural diversification. Such comparisons may provide more options to inform Cambodia's agricultural development strategy in the future.

Cambodia has undergone dramatic economic transformation, with an impressive average gross domestic product (GDP) growth rate of 9.8 percent over the period 2000-08, exceeding that of most countries in the region (World Bank 2009). This rapid growth was accompanied by remarkable performance in the agricultural sector, which grew at 5.6 percent per year on average in the same period. Nevertheless, Cambodia's economy is still highly dependent on agriculture, which contributes close to one-third of national GDP and employs more than half of the total labour force (World Bank 2009).

Rice Sector Performance and Rice Promotion Policies

Rice is the dominant crop in Cambodian agriculture. It occupies more than 80 percent of cultivated land and is the most important agricultural export commodity. Rice is also the main source of crop value added and the major driver of agricultural growth. As the staple of the traditional diet, rice provides more than three quarters of daily energy intake for the average Cambodian. Therefore, rice has played and will continue to play a strategic role in income growth, poverty reduction, and national and household food security.

Recognising the important role of rice, the Cambodian government has prioritised this sector and rice production appears in government strategy and planning documents wherever agriculture is mentioned. Yield improvement through intensification (such as irrigation and fertiliser use) has been highlighted as the top priority for promoting agricultural growth, rather than further expansion of the farmed land area. According to the Cambodia Agriculture and Agribusiness Support Programme (CAASP), rice production is set to reach 6 million tonnes in 2010, and predicted to rise further to 7.5 million tonnes by 2020 (MAFF & MOWRAM 2008). This growth will be propelled by increasing yield from 2.5 tonnes per ha in 2007 to an anticipated 3.0 tonnes per ha in 2020. At the same time, the harvested rice area is projected to decline slightly but the proportion of irrigated land is expected to increase to 20 percent.

With strong government support, rice production has grown rapidly since 2003. Non-irrigated wet season rice accounts for more than 75 percent of total rice production, and growth in wet season rice output was primarily responsible for more than doubling yield during 1994-2008. Rapid growth in rice production has turned Cambodia from a net rice importer to an exporter. Cambodia's rice export recorded 1.5 million tonnes in 2007, contributing 10 percent of the country's total export value.

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Despite the impressive growth in rice production and exports, however, only a small portion of rice production goes to foreign markets, substantially below the export levels of Vietnam and Thailand.

Future Rice Growth Potential and Constraints

Cambodia has huge potential to increase rice production. The country is known for its abundant agricultural land and water resources. Such natural resource potential has been underutilised: less than 30 percent of potential arable land is under cultivation, and a much smaller portion of area suitable for irrigation is actually irrigated (Pech & Sunada, 2008). Therefore, cultivated area expansion and irrigation development could be straightforward ways of increasing rice production. Productivity is another source of rice development potential as average rice yields in Cambodia remain below the levels in Thailand and Vietnam. Rice yield could be substantially increased through the adoption of crop intensification techniques, including both increased fertiliser use and better farming practices.

Although Cambodian rice production holds great potential, the country needs to overcome a series of constraints to realize it. In the literature, inadequate fertiliser use and under-developed irrigation

facilities are seen as the most binding constraints. Fertiliser is actually widely used by the majority of rice farmers in Cambodia, and the Cambodian Socio-economic Surveys (CSES) 2004 and 2007 report that chemical fertiliser was applied to 77-78 percent of wet season and 87-94 percent of dry season paddy area (Table 1). However, the quantity of fertiliser applied is quite low, below the nationally recommended rate (Blair & Blair 2010). Calculated from CSES data, together with an estimate of the average fertiliser price paid by farmers, fertiliser use was about 72 kg per ha for wet and 105 kg per ha for dry season paddy in 2004. Lack of sufficient irrigation facilities is another major constraint to rice development, making the sector weather dependent. Approximately 11.5 percent of wet season rice and 50 percent of dry season rice areas were irrigated in 2004 (Table 1). The amount of fertiliser used and the irrigated area share of the total rice area fell as input prices surged and farmers enjoyed favourable weather in 2007.

Rice in Broad Agricultural Development Strategy

While rice will continue to play an important role in Cambodia's future agricultural growth, it is necessary

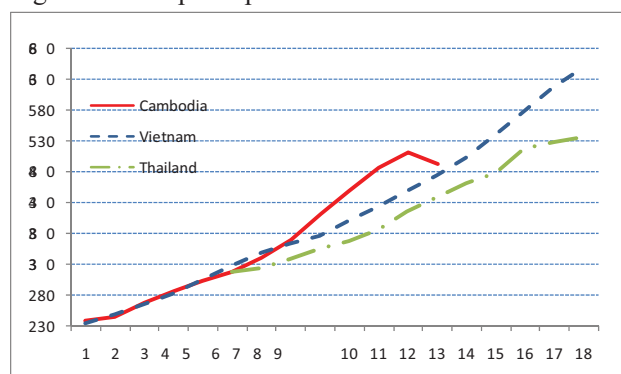
Table 1: Fertiliser use in Cambodia

	Wet season paddy		Dry season paddy	
	2004	2007	2004	2007
Share of plots (%)	86.8	84.1	14.3	15.9
Share of total cultivated land (%)	60.9	79.2	10.8	20.7
In paddy plots				
Share of plots using fertiliser (%)	77.5	76.8	81.5	86.9
Share of area using fertiliser (%)	76.9	78.5	87.2	93.5
Average fertiliser expense (riels per ha)	101,426	84,871	148,265	222,666
Average plot area (ha)	0.9	0.9	1.0	1.3
International urea price (USD per tonne)*	200	415	200	415
Farmer price (USD per tonne)**	350	600	350	600
Average exchange rate (riels to USD)***	4021	4032	4021	4032
Calculated fertiliser use (kg per ha)	72.1	35.1	105.4	92.0
Share of plots using irrigation (%)	14.9	9.4	40.9	38.4
Share of area using irrigation (%)	11.5	8.1	50.1	36.0

Note: fertiliser use in quantity is not reported in the survey. * IFDC (2008); ** CDRI (2008) urea price was USD350-510 per tonne, and diammonium phosphate (DAP) price was USD450-1,080 in provincial markets in 2007; *** IMF (2009).

Sources: Authors' calculation from CSES 2004 and 2007 (National Institute of Statistics).

Figure 1: GDP per capita in constant 2000 US dollars



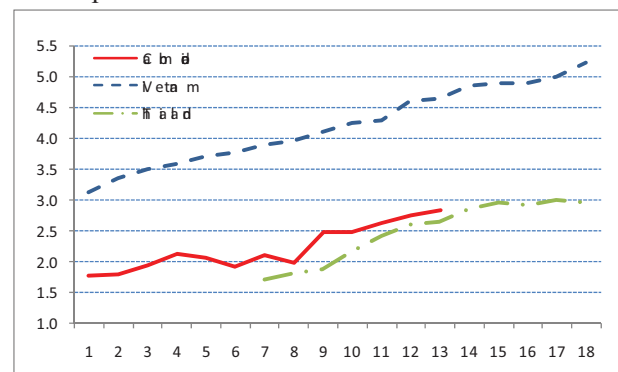
Notes: The value of x-axis is: 1 for 1997 and 13 for 2009 in Cambodia, 1 for 1991 and 18 for 2008 in Vietnam, 6 for 1960 and 18 for 1972 in Thailand.

Source: World Bank (2009).

to put the rice sector in a broad development context to identify better options for its further development. Rice played a similarly important role in Thailand's economic development in the early 1960s and 1970s and in that of Vietnam in the 1990s as it does in Cambodia today. A comparison between Cambodia's present situation and similar development stages in Thailand's and Vietnam's past helps us identify practical options for Cambodia's rice sector.

We chose 1997 as the initial year for Cambodia with a per capita income of USD239 (in constant 2000 US dollars). Vietnam attained a similar level of per capita income in 1991. Thailand's per capita income already reached USD317 in 1960, a level that Cambodia reached in 2002. Figure 1 presents the per capita GDP comparison among these three countries. For comparison purposes, year 1 in the figure represents 1997 for Cambodia and 1991 for Vietnam, while the graph for Thailand starts at the sixth year, which represents 2002 for Cambodia and 1960 for Thailand. Cambodia's recent growth, measured in per capita income, has been more rapid than that of its neighbours when they started at a similar income

Figure 2: Rice Yield Trends in the Three Countries, tonnes per hectare



Notes: The value of x-axis is: 1 for 1997 and 13 for 2009 in Cambodia; 1 for 1991 and 18 for 2008 in Vietnam; and 7 for 1961 and 18 for 1972 in Thailand.

Source: Authors' calculation from FAO (2010).

level in the past. For example, Cambodia reached per capita income of USD370 in 2004 (in seven years) and USD511 in 2008 (in 11 years). It took Vietnam seven years to increase its per capita income from USD235 in 1991 to USD364 in 1998, and 13 years to achieve a per capita income level of more than USD500. While the recent global recession slowed Cambodia's economic growth in 2009, growth is

expected to recover in 2010 and 2011 (ADB 2010), and the gap in per capita GDP between Cambodia and Vietnam will likely decrease in the next decade. While the growth recovery in Cambodia may not rely heavily on rice—which has been less affected by the global recession than the Cambodian garment and tourist sectors—agriculture, particularly rice, is still important to the country's future

growth in many respects. An examination of agricultural shares shows that the path of structural transformation in Cambodia more resembles that of Thailand than Vietnam.

A comparison of current rice yields in Cambodia, Thailand, and Vietnam reveals that while Cambodia's rice yield is only half that of Vietnam, there is only a modest 10 percent yield

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Table 2: Simulation Results of Rice Output Increase by Area Expansion and Input Intensification

Season	Current land or input use	Current output (000 ton)	Land expansion or input increase (% of current level)	Simulated increases in land or input use	Output elasticity in terms of land/input	Output increase (tonne)
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Area¹</i>						
Wet	2,110.0	2,828	10	211.0	0.683	193,180
Dry	373.0	827	10	37.0	0.625	51,678
<i>Fertiliser use²</i>						
Wet	72.1	2,828	50	108.2	0.100	141,420
Dry	105.4	827	10	115.9	0.203	16,785
<i>Irrigation³</i>						
Wet	11.5	2,828	100	23.0	0.152	49,441
Dry	50.1	827	10	55.1	0.213	8,823

Notes: 1 Area for columns (1) and (4) is measured in 1,000 ha

2 Fertiliser use for columns (1) and (4) is measured in kg/ha

3 Irrigation for columns (1) and (4) is measured in percentage of total cultivated areas.

Sources: Authors' calculation from CSES 2004, Yu and Fan (2010), and FAO (2010).

gap between Cambodia and Thailand. Although Vietnam is often used as an example to argue the yield potential in Cambodia, the two countries have significant differences in initial conditions, and rice yield in Cambodia follows a similar path to that of Thailand (Figure 2).

Thailand's experience merits more attention from Cambodia in designing its rice development strategy. First, Cambodia and Thailand share similar natural resource conditions, as both countries are relatively land abundant by regional standards. Second, fertiliser application rate and irrigation coverage are low in Thailand compared with Vietnam.

Thailand's competitiveness in the world rice market is less related to yield improvement, as its increased production is the result of both area expansion and yield improvement. Third, one unique feature of Thailand's rice sector is its diversification to meet

different demands from foreign markets. High-quality Thai rice often targets developed country markets or consumers in developing countries with relatively higher income, while low-price rice has helped Thailand penetrate rice markets in many African countries. Cambodian rice

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Results from a simulation exercise based on the estimated supply response to increased use of inputs and expansion of cultivated land area also highlight

Cambodia's comparative advantage. The results indicate that, given Cambodia's current situation, output increase through area expansion could be substantially larger than output increase through the intensification of modern inputs use. The results further confirm that the comparative advantage of Cambodia's rice sector lies in its abundant land resources; therefore, policies focusing on rice yield alone might not be the most effective way to make rice more profitable for farmers.

Future Research for Agricultural Strategy

Since Cambodia had already reached national level food self sufficiency in the late 1990s, a continuous emphasis on increasing rice production might result in an oversupply of rice and missed market opportunities in high value rice varieties and other high value crops. More research needs to focus on how Cambodia could exploit its comparative advantage by exporting high quality rice with higher value added. It is important to examine the trade-offs between different rice development goals, such as yield increase versus diversified and high quality rice development. In addition, Cambodia could draw valuable lessons from Thailand's experience in promoting agricultural research and development to improve the quality and taste of rice varieties. Such research needs to take into consideration the impact of different rice development strategies on poverty, food security and nutrition at household level.

Research on crop diversification is also important for Cambodia's agricultural strategy. Upland crops like cassava and maize have potential for generating more income for farmers, supporting food security in some areas, and expanding the agricultural export earnings base. Related experiences and lessons of other Southeast Asian countries are worth studying. Crop diversification research should focus not only on production, but also on diversification. Experiences from other Southeast Asian countries suggest that diversified food production can lead to consumption diversification which has helped to improve rural households' nutritional status. The relationship between production diversification, consumption diversification, and nutrition improvement deserves more detailed study in the future.

In summary, developing an evidence-based agricultural strategy requires research to better

understand Cambodia's comparative advantage and the available options to explore this advantage. It also requires a better understanding of the interactions between different growth options and growth outcomes in terms of income generation for the poor, food security and nutrition improvement. Finally, it requires prioritisation and sequencing of public investment to promote agricultural growth.

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