

The Fertilizer Industry in Cambodia

MARKET, CHALLENGES AND THE WAY FORWARD

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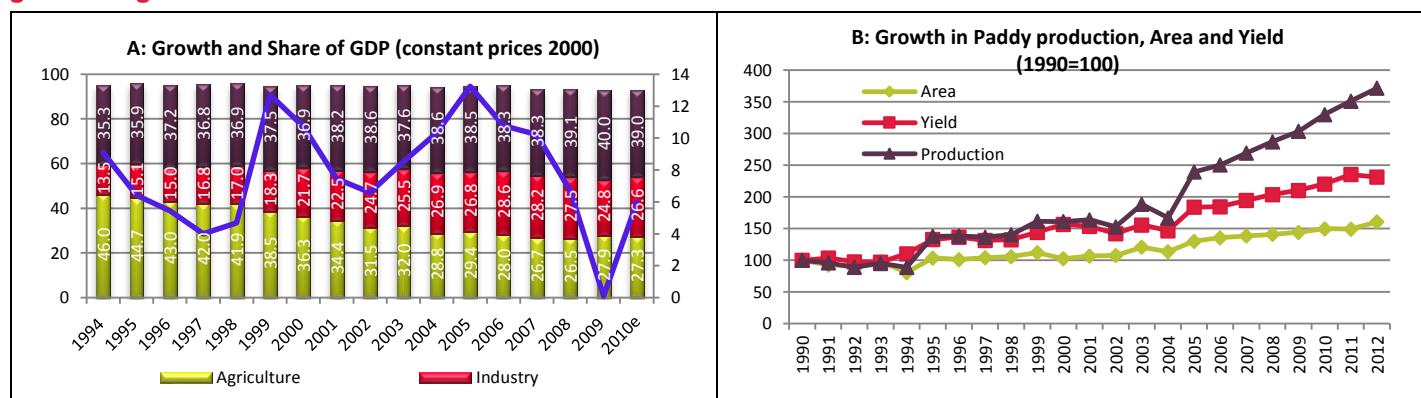
INTRODUCTION

The agricultural sector plays a crucial role in Cambodia's economy, and accounts for approximately 27.3 percent of GDP. Crop cultivation on Cambodia's 4 million ha of agricultural land has become more challenging with each passing year due to low soil fertility (White et al., 1997). Fertilizer application is crucial for nutrient replenishment, increased crop yield and elevated crop biomass which is necessary for moisture retention and nutrient efficiency (Bumb, 1996). Cambodia expects a large proportion of improved crop production to derive from increasing crop yields, and fertilizer is expected to play a major part in meeting future demands for crop intensification and greater food security (RGC 2010).

ROLE OF FERTILIZERS IN TRANSFORMING THE AGRICULTURAL ECONOMY AND FOOD SECURITY IN CAMBODIA

Once occupying a prominent position in the economy of Cambodia, agriculture accounted for 46 percent of GDP as of 1994. By 2010 however, agriculture's share had fallen to about 27 percent. Declining numbers notwithstanding, agriculture remains a crucial part of the economy, and impressive improvements in farm yield from 1990 through 2012 can be primarily linked to increased use of chemical fertilizers (Figure 1; Yu and Fan 2009; USDA 2010).

Figure 1—Agricultural situation in Cambodia



Source: MAFF Annual Report; FAOSTAT; IMF 2004 & 2009; NIS 2011; and CSES 2004 & 2007-2011

FERTILIZER USE PATTERNS

Viewed as an essential production input, fertilizers have been imported and used by Cambodian farmers for many years, and FAO estimates report an estimated overall increase in Nitrogen (N), Phosphorus (P) and Potassium (K) (NPK) consumption from 21,555 tonnes in 2002 to 46,048 tonnes in 2010 (Table 1).

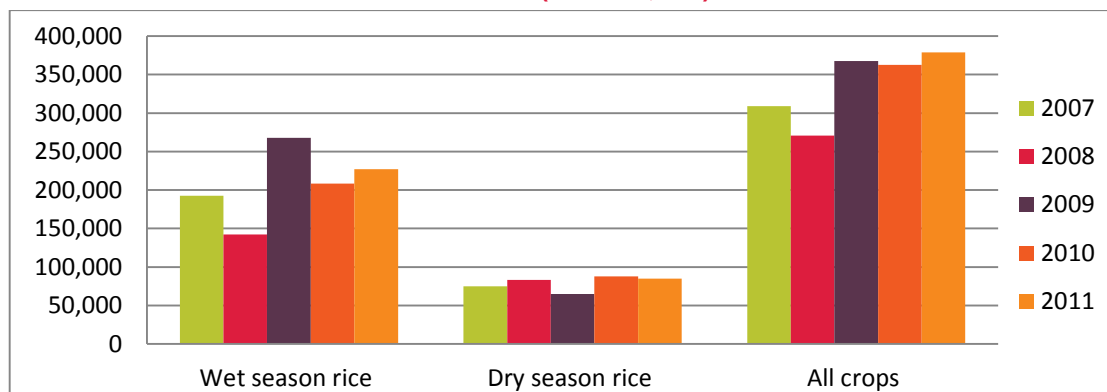
Table 1—Fertilizers consumption by nutrient in Cambodia 2002-2010 (Nutrition, MT)

Item	2002	2003	2004	2005	2006	2007	2008	2009	2010
N (total N, tons)	7,763	5,209	7,467	11,053	10,657	8,590	12,447	16,905	21,022
P (total P2O5, tons)	12,829	8,166	11,672	17,380	18,190	23,882	14,874	19,502	23,998
K (total K2O, tons)	963	899	715	1,556	763	792	952	947	1,028
Total	21,555	14,274	19,854	29,989	29,610	33,264	28,273	37,354	46,048

Source: FAOSTAT, (<http://faostat.fao.org/site/575/default.aspx#ancor>, access date: 09 July 2013)

Application estimates for farmers during the wet and dry seasons shows an overall gradual increase with some decline in consumption reported alongside price spikes (Figure 2)¹. Overall, fertilizer use increased for all crops from 2007 through 2011, with a slower increase in the last three years also due to high prices. Discrepancies in fertilizer nutrient consumption (Table 1) and product consumption by farmers (Figure 2), can be attributed to substantial, unrecorded informal trade between Cambodia, Thailand and Vietnam resulting from the high demand for fertilizer and regulations restricting imports.

Figure 2—Trends in fertilizer use in rice from 2007-2011 (Product, MT)



Source: CSES 2007-2011, estimated by authors (sampling weight was applied)

FERTILIZER USE BY CROPS, FARM SIZE AND REGIONS

Crops that with notably high rates of return such as dry season rice and vegetables generally tend to attract higher levels of fertilizer application (Table 2). On average, farmers apply around 200kg – 300 kg of fertilizer product per ha on vegetable crops, 150 kg - 200kg per ha for dry season rice, and around 100kg per ha for wet season rice. Farmers owning less than 3ha of farmland, tend to use more fertilizer than those owning more than 3ha (Table 3). Rates of return notwithstanding a key constraint on fertilizer use for all crops is fertilizer price, and application rates generally decline in tandem with price increases.

Table 2—Quantity of fertilizer product used by crops (kg/ha)

Types of Crop	2007	2008	2009	2010	2011
Dry season rice	232.9	245.9	181.4	229.2	183.7
Wet season rice	108.8	79.1	156.0	115.5	118.1
Corn	138.7	132.2	75.5	107.4	133.8
Cash crops*	163.5	174.4	125.1	146.1	112.1
Cassava	48.2	73.5	77.1	151.5	92.8
Vegetables	330.2	212.0	247.9	277.5	192.8
Other crops	222.4	107.7	192.4	187.6	145.6

Source: CSES 2007-2011, estimated by CDRI (sampling weight was applied)

Note: cash crops are cowpea, mung bean, grain leguminous plants, sugar cane, groundnut (peanut), soybean, sesame, oilseed crops, jute, and kapok

Table 3—Quantity of fertilizer use in rice production by farm size (Product, kg/ha)

Farm Sizes	2007			2009			2011		
	Dry	Wet	Total	Dry	Wet	Total	Dry	Wet	Total
Less than 1ha	220.0	144.4	199.8	169.7	186.3	170.1	174.6	140.4	169.1
1ha-2ha	202.7	82.3	106.9	187.4	139.1	135.5	194.1	96.5	146.0
2ha-3ha	302.6	63.5	124.4	174.9	108.3	130.3	200.3	93.1	146.0
More than 3ha	323.6	60.8	159.3	291.4	93.3	132.3	226.8	96.1	229.4
Total	232.9	108.8	158.4	181.4	156.0	152.0	183.7	118.1	163.2

Source: CSES 2007-2011, estimated by CDRI (sampling weight was applied)

Regional analysis in Table 4, shows the highest levels of use in the Mekong plain where there is greater potential for crop intensification through supplementary irrigation systems. Regional farming practices such as shifting cultivation and *slash and burn* in the

¹ The CSES does not record the amount of fertilizer used; instead, it records total expenditure on fertilizer and other agro-chemicals. Due to data limitations and the high proportion of expenditure on fertilizer (90 %) to total expenditure on agro-chemicals, we made the assumption that total expenditure equaled fertilizer expenditure. We then estimated the amount of fertilizer used by dividing total fertilizer expenditure by average fertilizer prices.

mountain areas also reduce fertilizer application levels. Between 2007 and 2011, the average proportion of smallholder farmers who used fertilizer was between 70 and 80 percent, and dry season rice demands more fertilizer than wet season rice; with approximately 90 percent of dry season farmers applying fertilizers between 2007 and 2011. Yield gap studies on fertilizer applications to rice crops across 30 locations in 2011 showed a yield gap of 24-31 percent between non-fertilized and fertilized plots further demonstrating the significance of fertilizer as an input in improving rice productivity across Cambodia.

Table 4—Fertilizer use by regions, 2011 (Product, kg/ha)

	Mekong plain	Tonle Sap	Coastal	Plateau/Mountain
Dry season rice	194.2	153.2	179.4	177
Wet season rice	142.8	84.4	105.2	126.4
Corn	176.8	55	174.5	50.4
Cash crops	170	67.3	145.5	69.4
Cassava	95.8	85.3	70.9	30.9
Vegetables	203.8	71.9	235.7	225
Others	161.5	158.3	116.7	89.1

Source: CSES 2007-2011, estimated by CDRI

MARKET STRUCTURE AND SUPPLY CHAIN

Cambodia is a net fertilizer importing country. With no in-country fertilizer plant, most of the country's fertilizer came from neighboring Vietnam and Thailand until 2012. Construction of a fertilizer blending plant began in 2009 in Kandal province and operations commenced in early 2013. The annual blending capacity is around 350,000 tonnes of NPK fertilizers in its first phase of operation, and the full capacity is around 500,000 tonnes per annum. However, it is estimated that Cambodia needs about 617,000 tonnes per annum to fertilize about 4.1 million hectares of farmland, so the local production still does not meet local market demand.

Fertilizer import types vary between nitrogen only products like ammonium nitrate and urea, and mixed nutrition imports such as NP (DAP-18:46:0 and 16:20:0), and NPK (15:15:15, 20:2 0:15, and 16:16:8:13s). The potassium only import is Muriate of Potash (0:0:60). Thailand and Vietnam are the major sources of the fertilizer supplies to Cambodia, with a share of 35 and 65 percent respectively, although the share of trade with the latter country is expected to grow in next few years (IFDC, 2010).

A comparison of data from the Customs and Excise Department of the Ministry of Economic and Finance (MEF) with international trade statistics of fertilizer imports into Cambodia from Vietnam and Thailand shows a large discrepancy; with fertilizer consumed by farmers reported as significantly higher than import recorded. This suggests that there is substantial informal trade between Cambodia and its neighboring countries, Thailand and Vietnam (Asian Development Bank 2002, pg. 272; IFDC 2010).

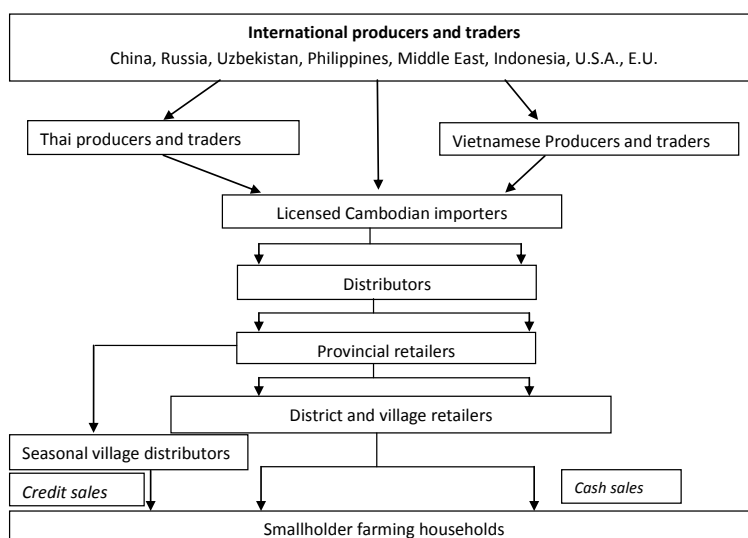
Since the 1993 national election, the private sector has been virtually the sole supplier of fertilizer. The RGC has no protectionism policy to ban imports or protect domestic producers nor does it subsidize fertilizer. Rather, it promotes the free-market by providing zero tariffs for importing agricultural inputs including agricultural machinery and milling equipment. Domestic retail prices for the most common fertilizers follow the fob³ international prices (IFDC 2010: 14-16). Therefore, local producers and importers play an equal role in the free market and compete at all levels of the fertilizer distribution channel, from producers/importers to local villages retailers.

In 2009, there were about 20 registered companies importing fertilizer into Cambodia, although only six were especially active. These include YETAK Group; Heng Pich Chay Import Export Company; Sayimex Co. Ltd.; Heng Ny Heng Co. Ltd.; E Scor Co. Ltd.; and Chhun Heng Company (IFDC 2010). The market structure is well organised with a network of importers, provincial distributors/wholesalers, and province, district and village retailers and is led by the private sector operating in a very competitive market with prices set by market forces keeping the margins and retail prices down (IFDC 2010; Theng 2012) (Figure 3).

² In the case of large movements of fertilizer, as would be carried out by the five major fertilizer companies, the bulk of unofficial imports from neighbouring countries would need to be conducted by traders aligned with those companies in their particular zone of operations in order for those traders to have "permission" to operate (ADB, 2002 pp:27)

³ free on board

Figure 3—Fertilizer distribution channels in Cambodia



Source: IFDC 2010

Licensed Cambodian importers store fertilizer in warehouses near the border (Thailand and Vietnam) and/or in Phnom Penh, and their distributors transport the products to provincial retailers in the main provincial cities (IFDC 2010)⁴. The amounts of fertilizer handled by the provincial lead dealers vary according to the planting season: larger distributors have warehouse facilities that can store up to 2000-3000 tonnes during peak season. Transport costs average US\$0.25 per bag per 100km, and loading fertilizers on and off the trucks costs about US\$0.05 per bag (Theng 2012). Most of the larger distributors have trucks to deliver to district and village retailers. District and village shops have limited storage (less than 100 tonnes), and usually order fertilizers during the planting seasons to save space for other merchandise.

Village retailers are typically a one-stop-shop selling a wide range of farm inputs including animal feed, pesticides, seeds and fuel in addition to fertilizers. Village retailers typically buy fertilizers from the representatives of a main provincial dealer; however, some also use different suppliers depending on prices and services offered and/or to meet specific demands of their customers/farmers. Approximately half of all retail sales are made on credit, with an added mark-up of 15,000 to 20,000 riel (US\$3.5-5) per bag per planting season (3-6 months) (Theng 2012).

All traders who sell agro-chemical products need to be registered annually at the provincial legislation office of the Provincial Department of Agriculture (PDA). However, the seasonal village traders are not required to be registered from the MAFF and can sell fertilizers in many locations in rural areas. They can be farmers in the villages who are a bit better off and are well-connected with main dealers. Mostly the seasonal traders resell fertilizers on credit to farmers, who pay back during the harvest. These kinds of sales may result in a mark-up of as much as US\$5/bag/planting season (three months for dry season, and six months for wet season).

Key constraints to fertilizer supply include an exceedingly complex process for acquiring import licenses which are out of touch with market demand and restrictive to competitive market operation. A lack of transparency also creates opportunities for rent-seeking activity. Furthermore, the restrictions on import tonnages per importer are contrary to all market principles, imposing considerable commercial drawbacks and restricting economies of scale for the importer. The quota system gives less ability to importers to negotiate freely and effectively with the suppliers on price and quantity. Licensing and tonnages quota system also prevent larger importers from cost effective importing activity from international markets forcing importation through either Vietnam or Thailand, adds to transaction costs for customers, prevents small firms from entering markets, and encourages illegal imports.

CONCLUSION AND THE WAY FORWARD

The agricultural sector remains a crucial part of economic growth and poverty reduction in Cambodia and increasing agricultural production in the midst of land constraints a challenge. Fertilizer will likely play a key role in increasing agricultural productivity. The overwhelming majority of farmers currently use fertilizer and the private sector has evolved rapidly in response to farmer demand. Government policy has played a large part in the evolution but there is still more that can be done.

⁴ Cambodia importers mostly import fertilizers from Thai and/or Vietnam traders originally imported in bulk from international markets and re-bagged and re-exported to Cambodia, except for some which is imported directly from Vietnamese producers

Credit access. Approximately 79 percent of farmers report underuse of fertilizer primarily due on financial limitations (Lim 2006). Microfinance institutions are available for most farmers in rural areas, but not for the poorest smallholder farmers (Kem 2012; Ovesen 2012). Interest rates for microcredit are around 2.5 to 3 percent per month, a high burden for smallholders.

Quality issues and reducing informal trade. Product tampering, contamination and mixing are common practices that cause farmers to abstain from or reduce fertilizer purchase and use (Schamel & Hongen, 2003). MAFF should simplify the fertilizer import licensing procedures and regulations to remove rent-seeking opportunities, ease the burden on businesses, and reduce illegal imports. Further, standards which require product labelling including the manufacturer, source and quality of products should be developed. This would enable farmers to identify the sources of sub-standard fertilizers.

Improve on-farm profitability. Removing quantity restrictions would increase economies of scale for importers, reducing retail prices for farmers and improving the profitability for farmers. Investments in the provision of extension also will also ensure that farmers are using fertilizer most appropriate for their farms and at rates that are profitable.

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