Supreme National Economic Council

Cambodian Rice Sector Economic Observatory

Technical Report

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Executive Summary

Rice policy formulation shows the need for monitoring the evolution of Cambodia's rice sector with up-to-date and consistent information for observing and assessing the impact of policy decisions, which take into account changes in input and output market of paddy and rice production at the national, regional, and international level.

The availability of shared and validated information on costs and incomes along the rice value-chains is a basic requirement for building a policy consensus among private and public stakeholders in the rice industry confronted by various policy trade-offs. Hence, the Cambodia Rice Sector Economic Observatory (CRSEO) Bulletin is developed to serve as a tool for policy dialogues among policy decision makers and stakeholders in the Cambodian rice sector.

REPRESENTATIVE SYSTEMS

Thirteen rice-value-chain models or systems have been established by combining different types of agents (farmer, collector, miller, and retailers) fulfilling production, collection, milling and retailing functions. They are representative of wet-season photosensitive fragrant and non-fragrant, early wet season non-fragrant, and dry season non-fragrant. There are three wet-season non-fragrant systems, four wet-season photosensitive fragrant systems, two dry-season non-fragrant systems, 3 dry-season fragrant systems, and 1 early-wet-season non-fragrant system.

FINDINGS

- **Farmer Performance**

Total farming cost per ha varied from KHR 1.41 million to KHR 2.82 million. Chemical input, service, and seed were the three highest components of farming. Farmer's profit varied from KHR 542,000 to KHR 931,000, while the return to family labor varied from KHR 21,200 to KHR 42,000 per day. Early-wet-season and dry-season non-fragrant systems consumed highest chemical inputs, which post concern about impact on wellbeing of farmer, consumer, and environment.

- **Miller Performance**

Total milling cost per one ton of milled rice varied from KHR 185,000 to KHR 370,000. Fixed asset, energy, and financial costs were the three highest components of the milling cost structure for all the milling systems. The return to capital varied from 1.8 % to 13.9%.

- **Value Chain Performance**

On average, the value added was created between USD 107 to USD 408 per ton of milled rice. Rice farming, on average, shared approximately 50% of the total value added created in the rice value chains and the analysis shows that the higher the value added created, the higher proportion goes to farmers. Of the total value added generated, 23% went to millers, 18% to retailers, and 9% to collectors.

Our analysis indicate that the well-performance systems were either wet-season or dry-season fragrant variety with farming owning machine (tractor and hand-tractor, essentially). These systems also operated by large millers (10T/hour), which mill fragrant rice for export market. We also observed that the early-wet-season non-fragrant and dry-season fragrant rice value chains, which mostly exported raw paddy to other countries, had the lowest profitability.

RECOMMENDATIONS

- **Bringing down cost of chemical input**

The key determinants of farmer's profitability, at a given price, are the costs of fertilizer, services (machinery), and seed. To bring down cost of chemical input, this bulletin suggests the government to consider 1) Increasing interventions that bring down the cost of fertilizer and seeds, along with agricultural extension activities to farmers with focus on cost-effective use of chemical inputs and 2) Promoting adoption of Good Agricultural Practice and Sustainable Rice Platform for farmers to find niche markets for high value.

- **Maximizing milling capacity utilization**

Milling shared approximately 23% of total value added on average. Ensuring a level of milling capacity utilization (above 30% of the total capacity) is a key determinant of the miller's profitability and the value chain competitiveness. To encourage miller to maximize milling capacity utilization, this bulletin suggests government consider continuing to increase loans to millers, and improving electricity supply. The downward trend in international price until June 2017 showed the fierce competition that prevailed on the international market even for fragrant price that is highly valued. With the threat of losing a privileged access to the European market, the need for diversifying export destination is a major challenge and a high priority for the Cambodian rice sector.

Content of Report

List of Figures

List of Tables

1. Introduction

1.1 Overview

Rice policy formulation shows the need for monitoring the evolution of Cambodia's rice sector with up-to-date and consistent information for observing and assessing the impact of policies decisions, which take into account changes in input and output market of paddy and rice production at the national, regional and international level.

The availability of shared and validated information on costs and incomes along the rice value-chains is a basic requirement for building a policy consensus among rice private and public stakeholders confronted to various policy trade-off. Hence, Cambodia Rice Sector Economic Observatory (CRSEO) Bulletin is developed to serve tool for policy dialogue of policy decision makers and stakeholders in Cambodian rice sector.

CRSEO Bulletins are the bi-annual analysis and reports on the distribution of added value and highly impactful factors in Cambodian rice sector for Wet Season Rice and Dry Season Rice.

The analysis of rice-value-chain system is based on representative budgets that we developed for the different groups of stakeholders and for the different sub-value chain. The representative budgets present detailed costs structure for each of these groups of stakeholders, the distribution of the added value, and indicators such as ***cost structure***, ***profit, added value, return to cash***, ***added value and return to investment.***

Sensitivity analysis is also incorporated in the bulletin in order to assess the relative impact of possible variation of various key factors on the profitability and distribution of added value. This information is particularly useful for policy decision makers in order to focus on measures with higher impact.

This bulletin consists of six sections as following:

- Section 1: Cambodian rice sector historical trends, describes 5-year evolution (2012-2017) of Cambodian rice sector represented by key indicators, namely, paddy cultivation area, paddy production, milled rice production, milled rice export and paddy-rice .
- Section 2: Key data from the last seasons, illustrates the key figures of Cambodian rice value chain from last seasons, which have been used for analysis in this bulletin. These figures include information of paddy prices, rice prices, paddy production and input prices.
- Section 3: Analysis, analyses performances of farming systems, milling system, and rice-value-chain systems in Cambodia. It presents the results of the computation of key data from 13 representative rice systems.
- Section 4: Conclusion and Recommendation.

1.2 Data Collection

With the given resources available, data collection focused on the major cropping systems and rice milling technologies combining both primary data collected from a sample of farmers, collectors, millers, and retailers, and secondary data from published and unpublished reports.

The selection of the prices inputted in the model mobilizes the different sources of price time series available.

- Farm gate price has been retrieved from price published by the Cambodia Rice Federation (CRF).
- For the collectors' selling prices we use the price published by the Agricultural Market Information System (AMIS) that follows prices per type of paddy at several mills throughout the country. AMIS data is also used for milled rice marketed by millers on the domestic market.
- For milled rice export, the FOB price published by CRF was used, while for paddy export it is assumed that the same price applied as for paddy sold to the miller.
- The Ministry of Commerce follows retail prices for milled rice sold to end users on the domestic market.

Eventually budgets, gathering costs and income, for each type of agents have been discussed and validated by representative from farmers' organization and millers, members of the CRF. Rather than aiming at a comprehensive and detailed coverage of the value chains, the objective was to focus on the most important agents and technology.

- Farmer: A sample of 107 farmers were interviewed to collect up to date data about cropping practices (manual, mechanized, transplanting, direct seeding), the quantity of input use and the yield. A purposeful sample was built to collect data from 20 to 30 plots per major category of rice produced.
- Paddy collector: After paddy production, the second function considered was the collection of the paddy from the farmer field to the miller or to the border for paddy export value chains. Around 15 traders have been surveyed.
- Miller: Around 10 millers were interviewed in different producing areas with complementary information provided by two miller-exporters based in the capital. For the rice value chain models two types of millers have been stylized depending upon their paddy milling capacity.
- Rice retailer: Regarding the marketing of milled rice on the local market, a set of 4 rice retailers have been interviewed in urban centers.

1.3 Representative Systems

The first step for building the rice value chains models is to carry out a functional analysis to characterize the sequence of operations from the production of the raw material (i.e. paddy) down to the delivery of the product to the domestic end consumers or to the point where the product crosses the border for export.

The application of the functional analysis is subject to a trade-off between the diversity of technologies used and practices followed by agents (farmer, collector, miller, and retailers) at different stages of the chain and the availability of data and validated information to integrate these details into the analysis.

Thirteen rice-value-chain models or systems have been established by combining different types of agents (farmer, collector, miller, and retailers) fulfilling production, collection, milling and retailing functions. They are representative of wet-season's photosensitive fragrant and non-fragrant, early wet season non-fragrant, and dry season non-fragrant.

Figure 1: Wet season systems

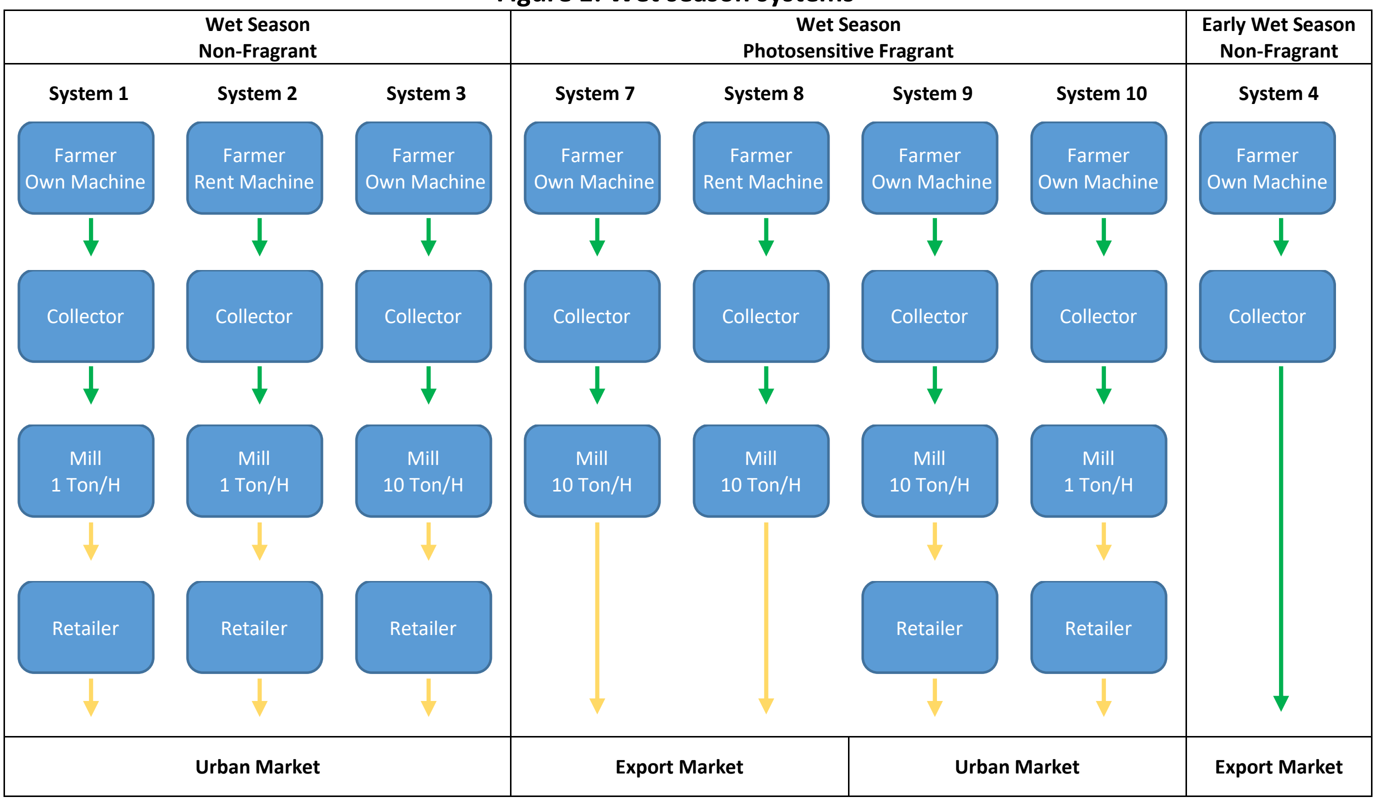
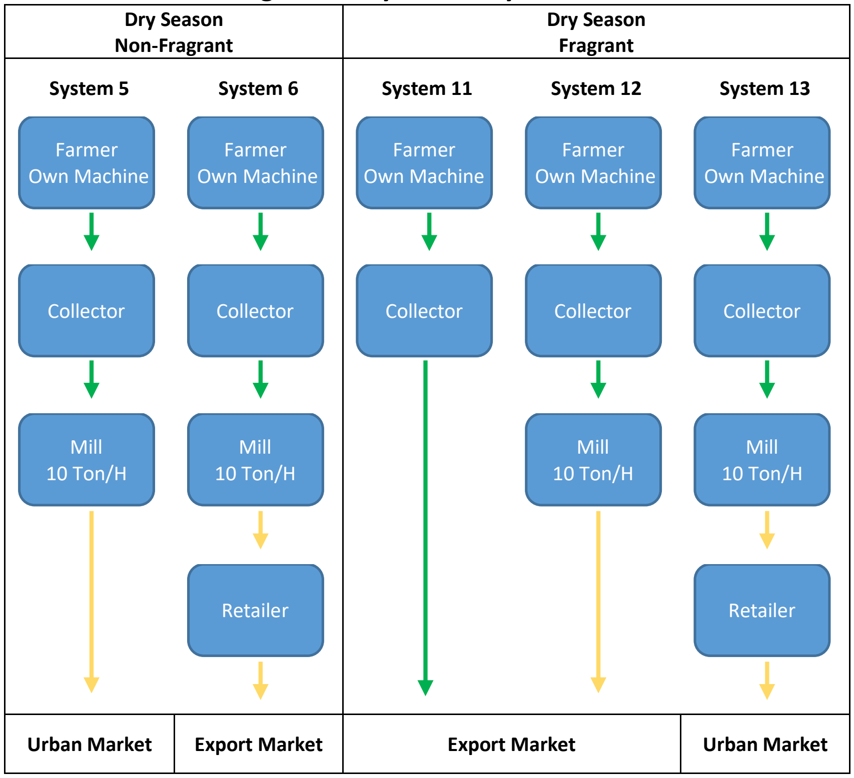


Figure 2: Dry season systems



1. Cambodian Rice Sector Historical Trends

Rice sector has significant economic importance in Cambodia. Economic activities in rice sector, including paddy production, rice processing, and milled rice export are estimated to employ and generate income for millions of people in Cambodia, particularly in rural area.

1.1 Paddy Production

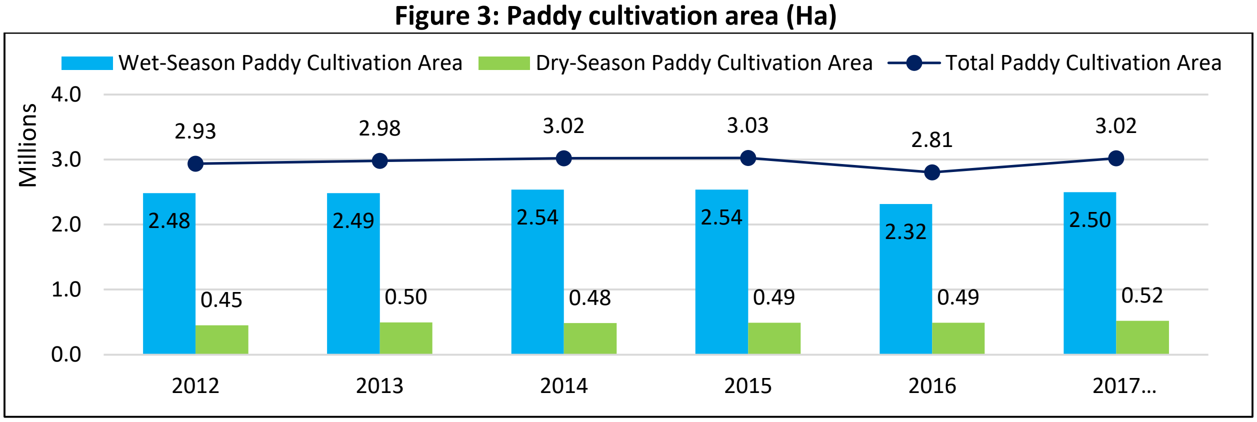
1.1.1 Paddy Cultivation Area

Paddy remains a major crop of agriculture in Cambodia. In the past 5 years, total paddy cultivation area has been approximately 3 million has (ha), the largest, as comparing to other crop.

Wet-season paddy area accounts for 83% or about 2.5 million ha of total paddy area, while the rest, of 17% or 0.5 million ha, is the area of dry-season paddy. This could explain that some possible factors of Cambodia, for examples farmers' preferences, geographical condition, and current agricultural infrastructure, are more favorable for wet-season paddy production than dry-season paddy production (see Figure 3).

Some parts of Cambodia's paddy cultivation area are still vulnerable to natural disaster. In 2016, there was 220,000 ha or 7.3% decrease of total paddy cultivation area, especially wet-season paddy cultivation area, because of heavy rains and flood in 16 provinces in second half of 2016 (MAFF, 2017).

Figure 3: Paddy cultivation area (Ha)



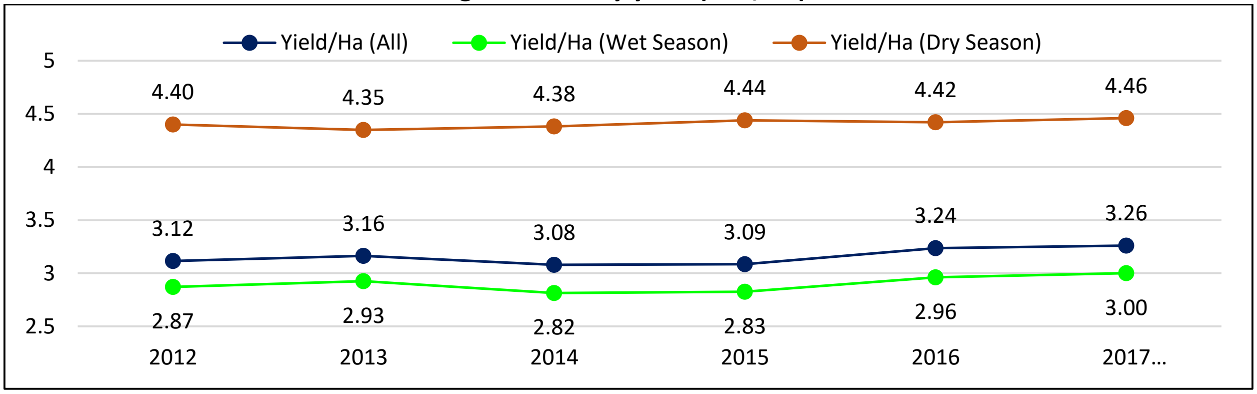
Source: Consolidation from MAFF's Annual and Monthly Reports on Agriculture, Forestry and Fisheries, 2012-2017

1.1.2 Paddy Yield

Yield, volume of paddy produced per ha of land, has increased slightly from 3.12 tons per ha in 2010 to 3.24 tons per ha in 2016. Yield of dry-season paddy per ha has been about 4.4 tons per ha, comparing to 2.8-3.0 tons per ha for wet-season paddy (See Figure 4**).**

Although yield of dry-season paddy has been about 1.5 time higher than yield of wet-season paddy, it does not imply that dry-season paddy production is the ideal option for farmers and economy (See Figure 4. Therefore, it is important to examine the C*ost-Structure*, *Profit*, and *Return-To-Capital* of each paddy systems.

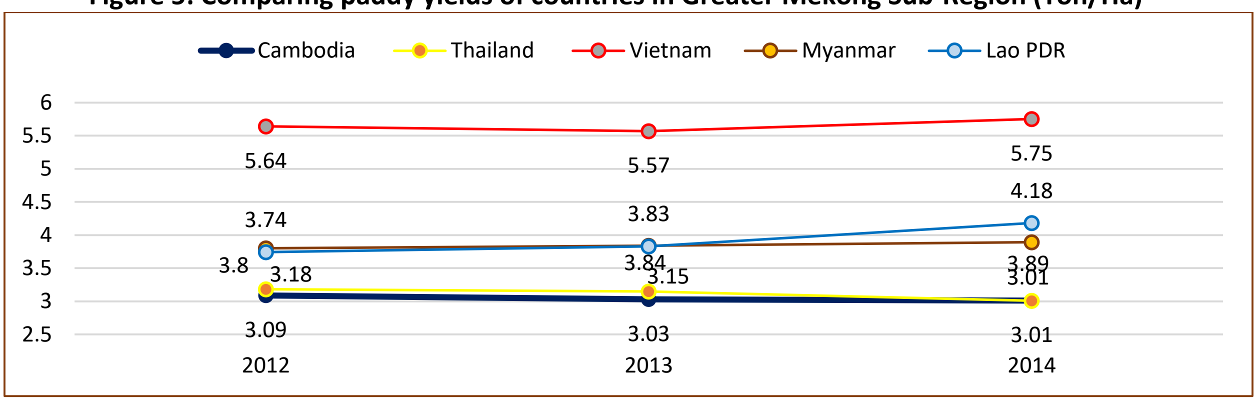
Figure 4: Paddy yield (Ton/Ha)



Source: Consolidation from MAFF's Annual and Monthly Reports on Agriculture, Forestry and Fisheries, 2012-2017

Based on available data from Ricepedia, cross-country comparison of paddy yield in Greater Mekong Sub-Region countries during 2012-2014 shows that the average paddy yields of Cambodia were similar to Thailand, 0.8 ton per ha lower than Myanmar and Lao PDR and 2.5 tons lower than Vietnam (Figure 5). However, we should understand that these countries also produce different varieties of paddy, which result in different yields.

Figure 5: Comparing paddy yields of countries in Greater Mekong Sub-Region (Ton/Ha)



Source: Country profile on www.ricepedia.org, accessed on 13 November 2017

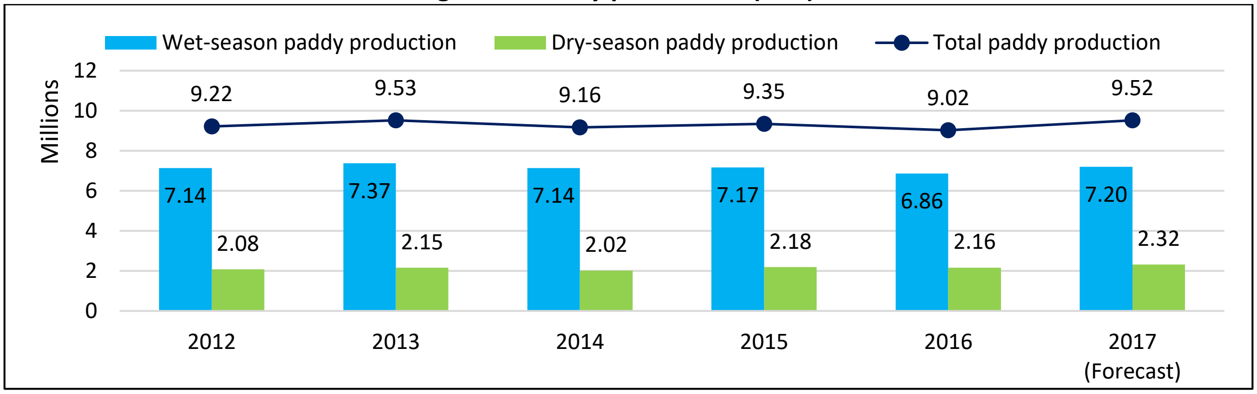
1.1.3 Volume of Paddy Production

More than 9 million tons of paddy have been annually produced in Cambodia in the past 5 years (See Figure 6). Volumes of wet-season paddy production have been slightly above 7 million tons or 80% of total paddy produced, except in 2016 when production fell to 6.86 million tons due to flood in rainy season (See Figure 6).

Volumes of dry-season paddy production have been around 2 million tons or 20% of total paddy produced. Similar to wet-season paddy, there was also little decrease of dry-season paddy production in 2016 because Cambodia experienced serious drought called *"El Nino"* in first half of the year (See Figure 6).

Paddy production of both wet-season and dry-season are expected to recover back in 2017 (See Figure 6).

Figure 6: Paddy production (Ton)

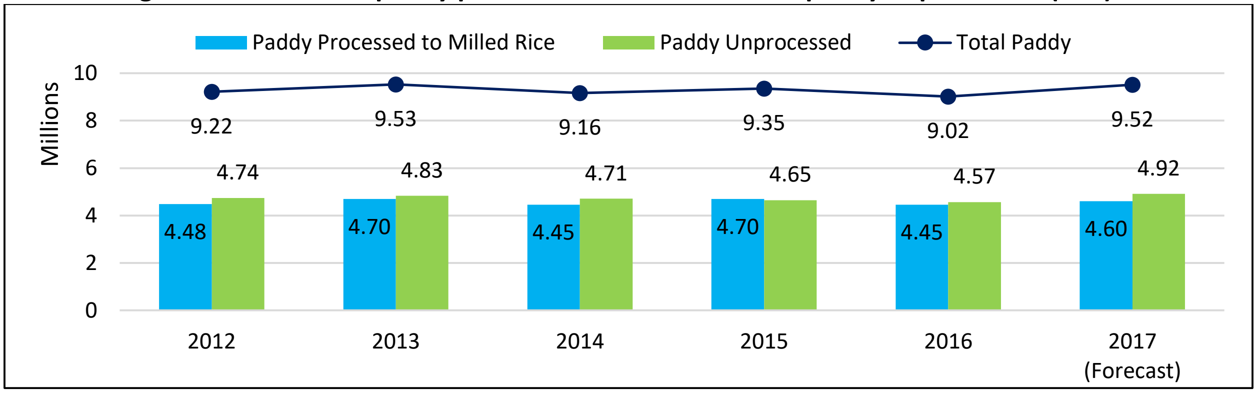


Source: Consolidation from MAFF's Annual and Monthly Reports on Agriculture, Forestry and Fisheries, 2012-2017

Figure 7 shows that about 4.5 million tons of paddy have been annually processed to milled rice in Cambodia. This is only half of total paddy produced in Cambodia. Another 50% of 4.5-4.7 million tons of paddy remain unprocessed and are likely to be exported to Thailand or Vietnam.

This information indicates that local milling sector does not have enough capacities (drying, milling and financing) to absorb all paddy produced in Cambodia. The growth of milling sector will help absorb more paddy produced in Cambodia and generate more added value.

Figure 7: Volumes of paddy processed to milled rice and paddy unprocessed (Ton)

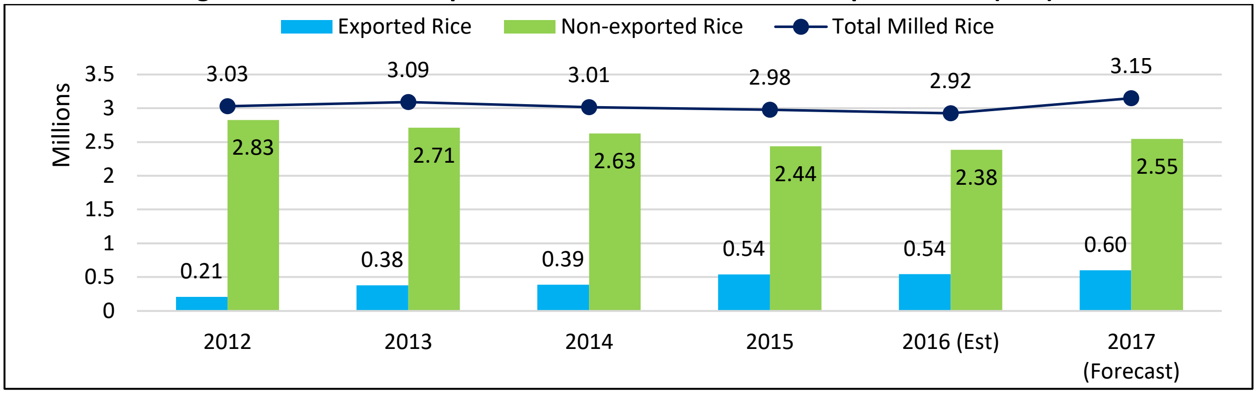


Source: Consolidation from MAFF's Annual and Monthly Reports on Agriculture, Forestry and Fisheries, 2012-2017

1.2 Milled Rice Production

Local millers have annually produced 3 million tons of milled rice from 4.5 million tons of paddy over the past 5 years (See Figure 8). There has been little change of volume of paddy processed to milled rice, which implies that there has been little growth milling activities. From supply side point of view, the room for investment in milling sector remains large.

Figure 8: Volume of exported rice and volume of not-exported rice (Ton)



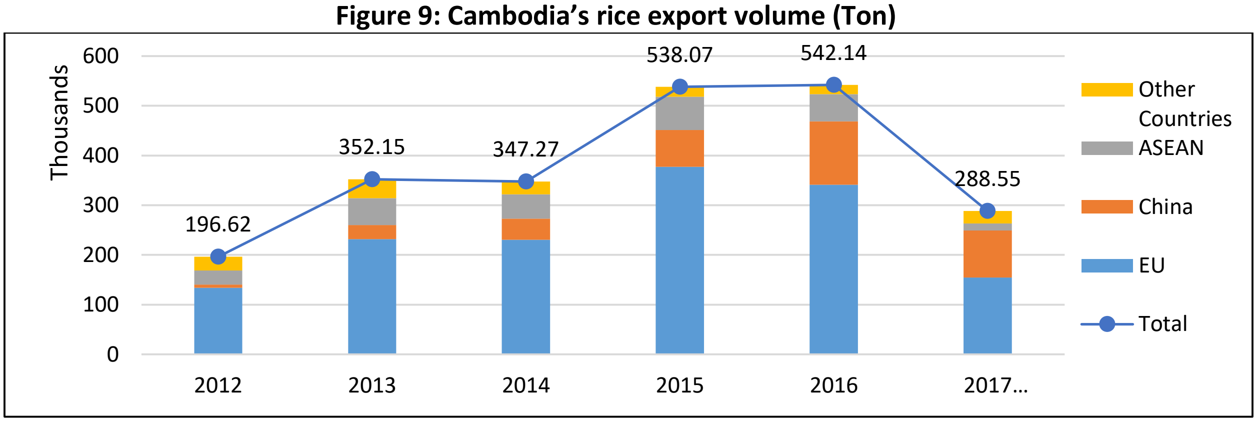
Source: Consolidation from MAFF's Annual and Monthly Reports on Agriculture, Forestry and Fisheries, 2012-2017

Figure 9 also shows positive trend of Cambodia's rice export, as volumes of rice export have gradually increased from 210,000 tons in 2012 to 540,000 tons in 2016. Rice export volume is forecasted about 600,000 tons in 2017. Strong demand from European Unions (EU), increase of China's rice import quota and government's bilateral agreement with other countries are key factors behind rice export growth.

Cambodian milled rice exports remain heavily dependent on markets with preferential treatments, such as EU's *Everything But Arms* (EBA)[1] and China's Rice Import Quota[2]. Cambodian milled rice exports to these two markets account almost 90% of Cambodia's total milled rice export (See Figure 9).

As a result, RGC has made effort to diversifying the market for exporting Cambodian rice. On 2 August 2017, the governments of Cambodia and Bangladesh signed Memorandum of Understanding for 1 million tons export of Cambodian rice to Bangladesh over the next five years, although actual implementation remains to be seen.

Figure 9: Cambodia's rice export volume (Ton)



Sources: Consolidation from SOWS-REF, 2012-2017

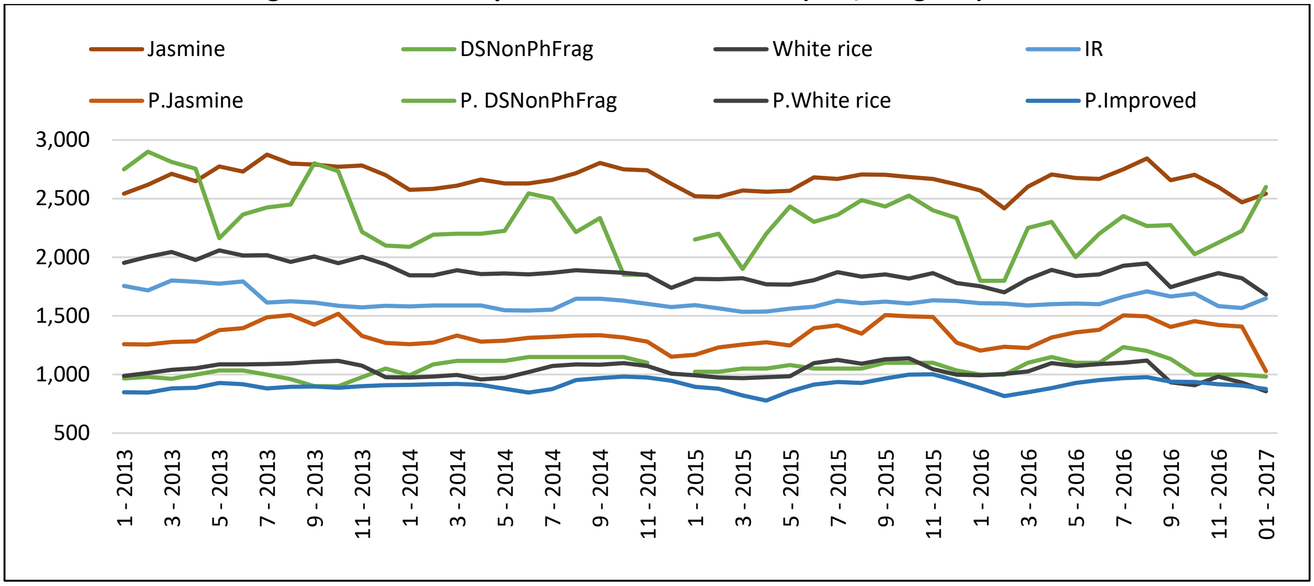
[1] Everything but Arms (EBA) is an initiative of the European Union under which all imports to the EU from the Least Developed Countries are duty-free and quota-free, with the exception of armaments.

[2] On 17 May 2017, Cambodia was able to reach agreement with China to increase rice import quota to 300,000 tons annually starting from 2018.

1.3 Price Trend

The decreasing trend on the domestic market and international market was observed until July 2017 when the prices started to bottom out and increase significantly (See Figure 10).

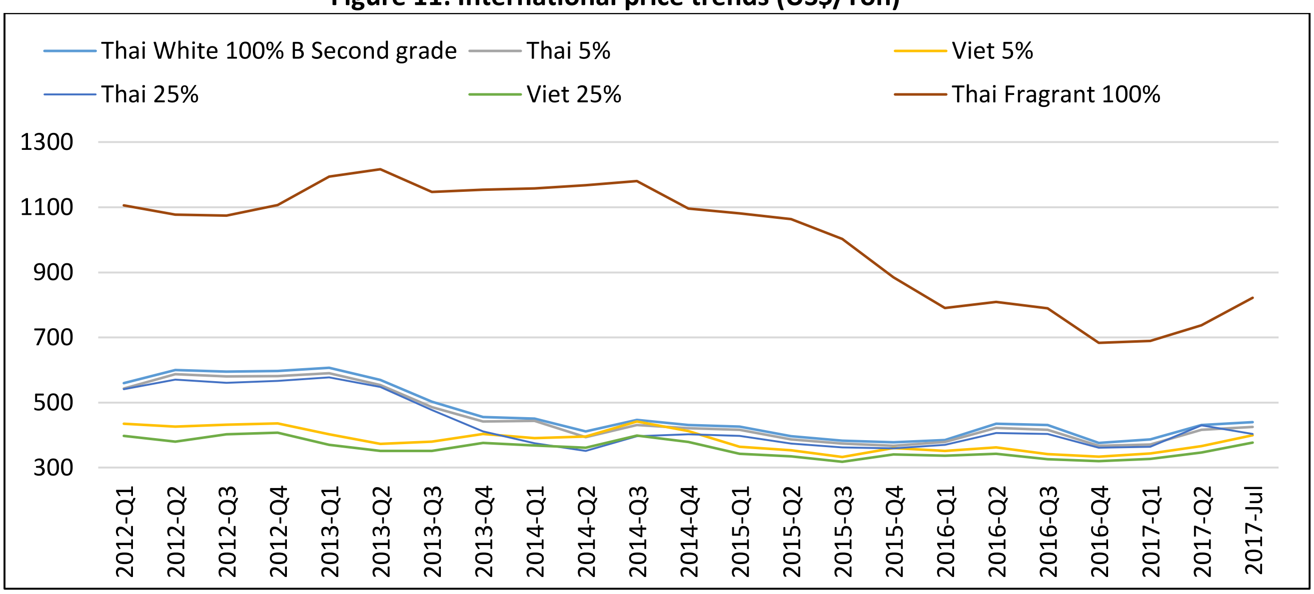
Figure 10: Domestic price trend of milled rice (Riel/Kilogram)



Sources: MAFF's Agricultural Marketing Information Bulletin, 2013-2017

On the international market, the price gap between white and fragrant rice tends to decrease, which will eventually affect the relative profitability of fragrant rice value chains against white rice. Ample worldwide supply for the 2016/17 cropping season did not allow anticipating a reverse upward trend in international rice market prices until July 2017 (See Figure 11).

Figure 11: International price trends (US$/Ton)



Source: Consolidation from FAO's Rice Market Monitor, 2012-2017

2. Key Data

Four Tables in this section provide information of key data for different systems used for the analysis in this bulletin. These four Tables include paddy and rice price, yield per hectare, major cost of all system and marketing and processing cost structure.

Table 1 displays the price applied in the value chain model for computing the consolidated account of each value chain. They are based on the data collected from the AMIS adjusted for seasonal variation between wet and dry season. The technical performance, or yield, of the respective rice cropping system has a strong impact on the overall performance of the whole value chain.

Table 1 : Computed price references inputted in the value chain model (KHR/Ton)

System	Farmer	Collector	Miller/Exporter	Retailer	USD/T
S1 : WS_NF_OW_1T_UM	840 000	900 000	1 850 000	1 900 000	
S2 : WS_NF_RM_1T_UM	840 000	900 000	1 850 000	1 900 000	
S3 : WS_NF_OM_10T_UM	840 000	900 000	2 100 000	2 200 000	
S4 : EWS_NF_OM_EX	750 000	900 000			
S5 : DS_NF_OM_10T_EX	740 000	810 000	1 800 000		450
S6 : DS_NF_OM_10T_UM	740 000	810 000	1 650 000	1 700 000	
S7 : WS_PF_OM_10T_EX	1 100 000	1 200 000	2 800 000		700
S8 : WS_PF_RM_10T_EX	1 100 000	1 200 000	2 800 000		700
S9 : WS_PF_OM_10T_UM	1 100 000	1 200 000	2 450 000	2 600 000	
S10 : WS_PF_OM_1T_UM	1 000 000	1 100 000	2 300 000	2 400 000	
S11 : DS_F_OM_EX	850 000	950 000			
S12 : DS_F_OM_10T_EX	900 000	1 000 000	2 350 000		588
S13 : DS_F_OM_10T_UM	850 000	950 000	2 200 000	2 350 000	

Sources: Computed from CRF, AMIS and Ministry of Commerce

Note: **WS:** Wet Season **NF:** Non Fragrant **OM:** Own Machine **1T:** 1-Ton Mill **UM:** Urban Market
DS: Dry Season **F:** Fragrant **RM:** Rent Machine **10T:** 10-Ton Mill **EX:** Export Market
EWS: Early Wet Season **PF:** Photosensitive Fragrant

Table 2 presents the level of yield used in the models and these values have been discussed and endorsed with representatives of rice farmers organizations.

Table 2: Average yield per hectare for different systems

Farming System	Yield (Ton/Ha)
F1: WS_NF_OM & F2: WS_NF_RM	2.6
F3: ESW_NF_OM	5
F4: DS_NF_OM	4.5
F5: WS_PF_OM & F6: WS_PF_RM	2.5
F7: DS_F_OM	3.5

Sources: CRSEO's Farmer Survey

Note: **WS:** Wet Season **DS:** Dry Season **NF:** Non Fragrant **F:** Fragrant **OM:** Own Machine
EWS: Early Wet Season **PF:** Photosensitive Fragrant **RM:** Rent Machine

Table 3 provides the value of critical cost items that have been defined through the survey and interviews with key informants.

Table 3: Major cost of all systems

Item	Unit Price KHR	Unit
Fertilizer price	120 000	KHR/bag
Electricity	680	KHR/KWh
Diesel	3 000	KHR/liter
Transport farmer	13 000	KHR/ton
Delivery Miller	300	KHR/ton/km
Interest rate Farmer	24	%/year
Interest rate Miller	12	%/year

Sources: Computed from CRF, AMIS and Ministry of Commerce

Table 4 summarizes the major parameters applied for the rice value chain marketing, processing and retailing operations.

Table 4 : Marketing and processing cost structure

Cost items	Truck 20 T	Miller 1.5 Ton/H	Miller 10Ton/H	Retailer
Parameters				
Technical parameters	Collection and delivery range Average =100 km	Milling rate 65%	Milling rate 65%	Storage capacity 10T
Maximum capacity	n.a	Maximum capacity 4500T	Maximum capacity 50000 T of paddy	n.a
Effective capacity	Total distance per year 30000 km	Annual input of 1500T of paddy	Annual input of 25000 T of paddy	1300 T Milled rice
Output (Input) of reference	20 T Paddy	975 T of milled rice (1500 T of paddy)	11050T of Rice (25000T Paddy)	1300 T Milled rice
Costs as per output or input above (KHR)				
Fixed asset	44 715	31 029 500	1 333 445 821	29 268 000
Energy	66 000	34 000 000	693 480 317	302 658
Other input	104 710	36 072 000	293 641 000	224 536
Transport			247 232 700	0
Service	104 710			
Labour	218 491	54 024 000	168 291 000	32 512 000
Financial cost		285 867	367 062 667	0
Tax		8 400 000	754 596 650	280 000
Other cost	1 833			
Total cost	540 460	163 811 367	3 857 750 155	62 587 194
Cost/km (USD)	1.22			
Cost/ ton of input (USD)		27	38	
Cost/ton of output (USD)	7	42	87	12

Sources: Computed from CRF, AMIS and Ministry of Commerce

3. Analysis

3. 1 Farmer Perfo rmance

3.1.1 Farming Cost

Figure 12 shows total farming cost varied from KHR 1.41 million to KHR 2.82 million per ha. On average, total farming cost was KHR 1.88 million per ha. *Service*[3], *Chemical input*[4], and *seed* were the three highest components of farming cost structure for all cropping systems (See 12 and Figure 13).

F3 and F4 systems were chemical-input intensive, as indicated by high chemical inputs cost. Because intensive use of chemical input could potential harm farmer, consumer, and export market, discussion on this issue is provided in Section Special Topic.

Figure 12: Farmer's cost structure per ha (KHR/Ha)

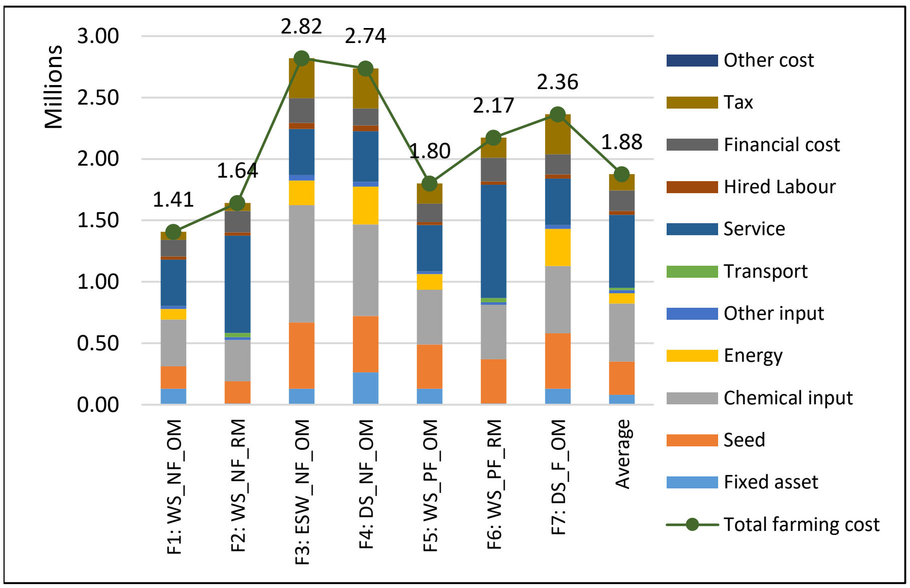
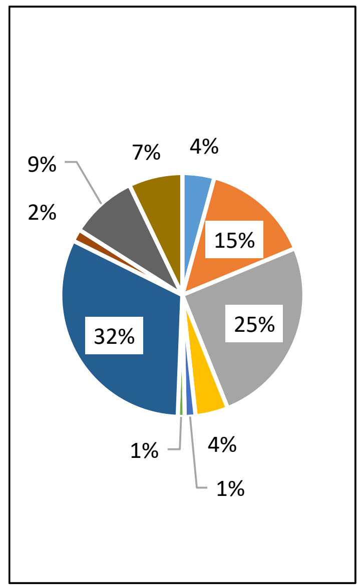


Figure 13: Share of farming cost (%)



Source: Authors' computation for CRSEO Bulletin

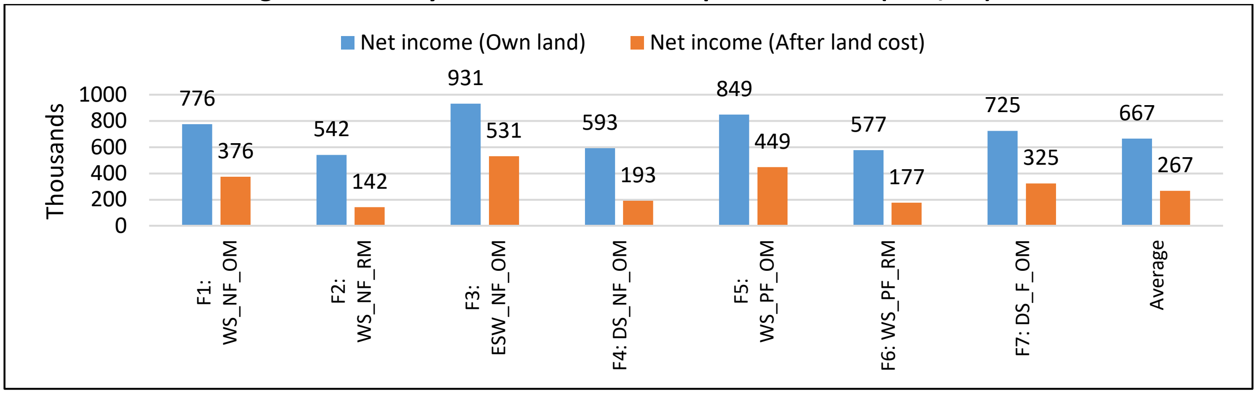
Note: **WS:** Wet Season **DS:** Dry Season **NF:** Non Fragrant **F:** Fragrant **OM:** Own Machine
EWS: Early Wet Season **PF:** Photosensitive Fragrant **RM:** Rent Machine

3.1.2 Net-income (Profit)

Error! Not a valid bookmark self-reference. shows profit varied from KHR 542,000 to KHR 931,000 without taking into account the land cost. On average, the land cost could take around KHR 40,000 per ha per season. Farmer producing early-wet-son non-fragrant variety and own-machine (F3) earned the most from one ha of land, as compared to all cropping systems. However, this system was chemical-input intensive, as discussed earlier.

[3] Service cost includes land preparation, plant management, harvesting, tractor maintenance, pump maintenance, and irrigation.
[4] Chemical input cost includes fertilizer, pesticide, and herbicide.

Figure 14: Paddy farmer's net-income per ha of land (KHR/Ha)



Source: Authors' computation for CRSEO Bulletin

Note: **WS:** Wet Season **DS:** Dry Season **NF:** Non Fragrant **F:** Fragrant **OM:** Own Machine
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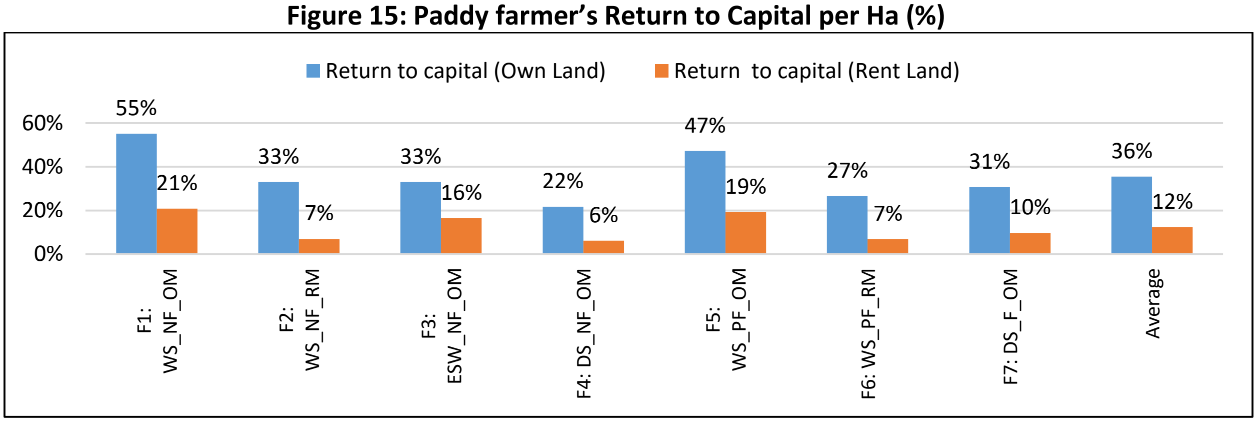
3.1.3 Return to Capital

Figure 15 shows information of return to capital for farmer owning land and renting land of each cropping system. For cropping systems with farmer owning land, the RoC varied from 22% to 55%, and the average return to capital was 35%. If we took into account the land cost (KHR 0.4 million), the return to capital varied from 6% to 21%, and the average return to capital was 12%. F1 was the system with highest RoC.

Figure 15: Paddy farmer's Return to Capital per Ha (%)



Source: Authors' computation for CRSEO Bulletin

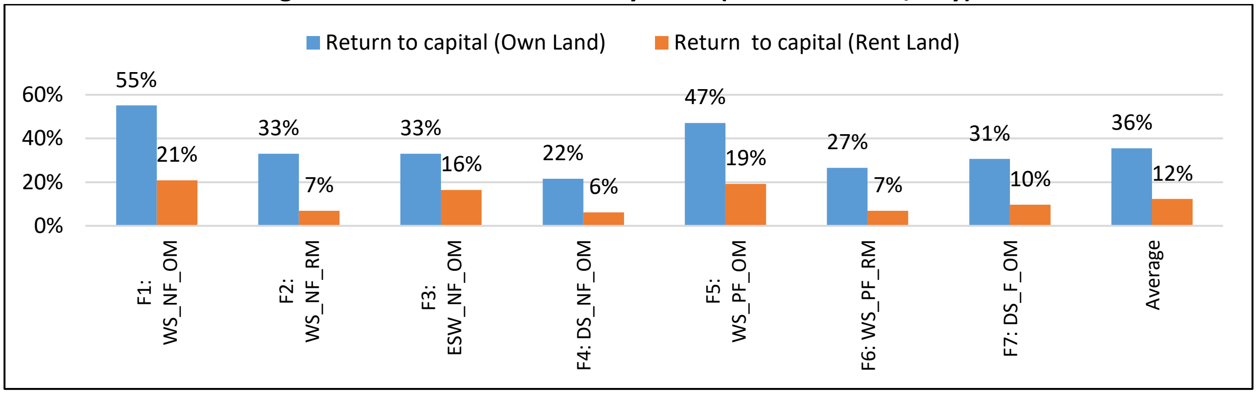
Note: **WS:** Wet Season **DS:** Dry Season **NF:** Non Fragrant **F:** Fragrant **OM:** Own Machine
EWS: Early Wet Season **PF:** Photosensitive Fragrant **RM:** Rent Machine

3.1.4 Return to Family Labor

On average, farmer spent 23 days of family labor for one ha of land. The amounts of family labour used for wet-season systems were 20 days, early-wet-season system was 24 days, and dry-season systems were 27 days.

On average, paddy farmer owning land earned KHR 29,300 per day from one ha of land. F5: Wet-season Non-Photosensitive Fragrant is the cropping system with high Return to Family Labor of KHR 42,000 per day, followed by F3: Early-wet-season and F1: Wet-season Non-fragrant. The system with lowest Return to Family Labor was F4: Dry-season Non-fragrant with only KHR 21,200 per day (See Figure 16).

Figure 16: Cash return to family labor (Thousand KHR/Day)



Source: Authors' computation for CRSEO Bulletin

Note: **WS:** Wet Season **DS:** Dry Season **NF:** Non Fragrant **F:** Fragrant **OM:** Own Machine
EWS: Early Wet Season **PF:** Photosensitive Fragrant **RM:** Rent Machine

3.2 Miller Performance

3.2.1 Milling Cost

Figure 17 shows total milling cost for each milling systems and their major cost items per one metric ton of milled rice, excluding cost of paddy purchase. Total milling cost per one ton of milled rice varied from KHR 185K to KHR 370K. On average, total milling cost per one ton of milled rice was KHR 228K.

Figure 17: Milling cost structure for per metric ton of milled rice – excluding paddy cost (KHR/Ton)

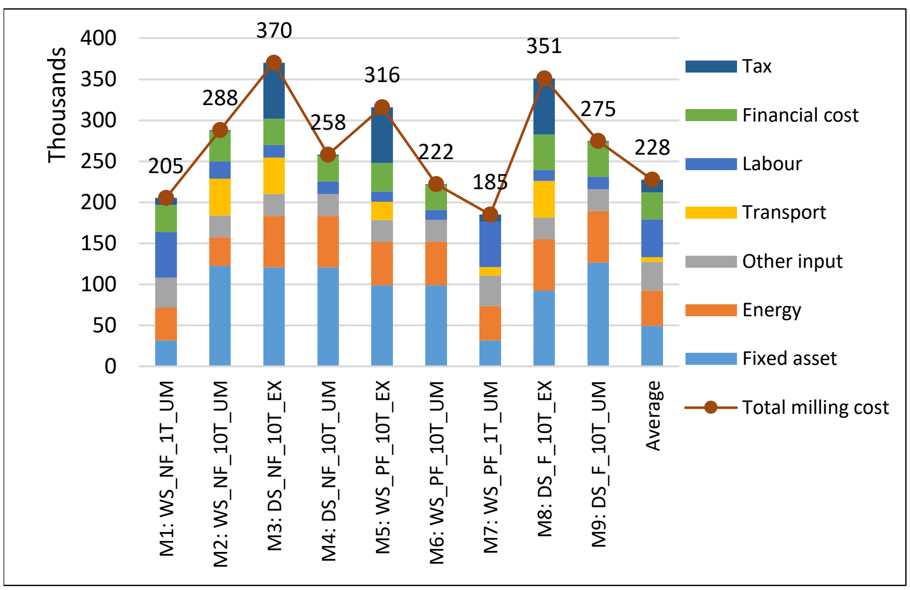
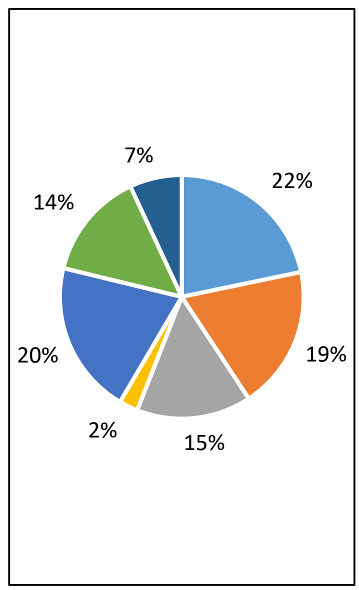


Figure 18: Share of milling cost (%)



Source: Authors' computation for CRSEO Bulletin

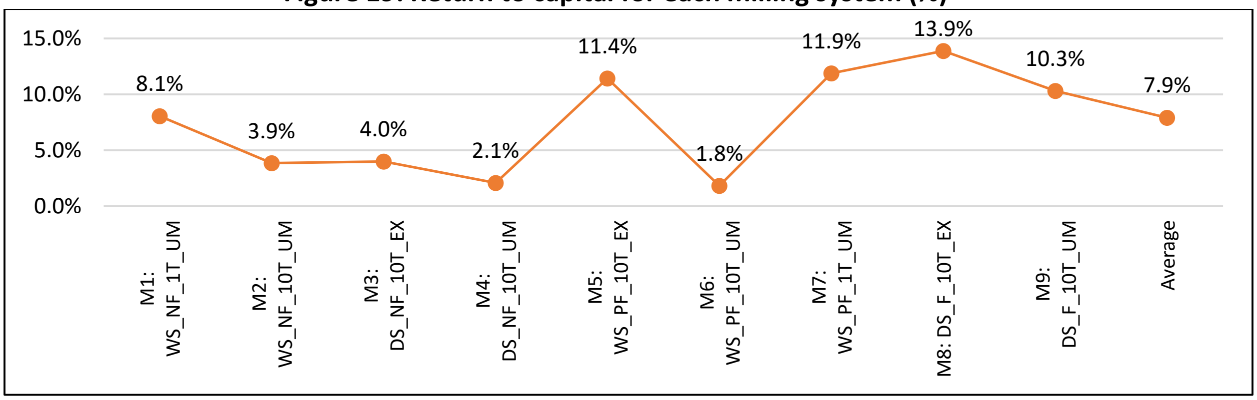
Note: **WS:** Wet Season **DS:** Dry Season **NF:** Non Fragrant **F:** Fragrant **1T:** 1-Ton Mill **UM:** Urban Market
EWS: Early Wet Season **PF:** Photosensitive Fragrant **10T:** 10-Ton Mill **EX:** Export Market

Fixed asset[5], *energy*[6], and *financial costs* were the three highest components of milling cost structure for all milling systems. On average, fixed asset cost KHR 89K (32.6%), *energy* cost KHR 51K (18.8%), and *financial* cost KHR 32K (11.8%) (See Figure 18). Therefore, policy makers and relevant stakeholders should discuss about the intervention to make improvement in fixed asset cost, energy, and financial costs. We suggest policy options for these issues in Section Recommendation.

3.2.2 Return to Capital

Figure 19 shows information of return to capital for miller of each cropping system. On average, the return to capital varied from 1.8 % to 13.9%, and the average return to capital was 8.1%.

Figure 19: Return to capital for each milling system (%)



Source: Authors' computation for CRSEO Bulletin

Note: **WS:** Wet Season **DS:** Dry Season **NF:** Non Fragrant **F:** Fragrant **1T:** 1-Ton Mill **UM:** Urban Market
EWS: Early Wet Season **PF:** Photosensitive Fragrant **10T:** 10-Ton Mill **EX:** Export Market

3.3 Value Chain Performance

3.3.1 Cost Structure

Figure 20 shows total cost for each rice-value-chain system and major cost items per ton of milled rice, excluding costs of paddy purchase or milled rice purchase. *Service*[7], *chemical input*[8], and *seed costs* were the three highest components of all rice-value-chain systems. On average, *service cost* shared 29%, *chemical input* cost shared 18%, and *seed* cost shared 11 %, of total cost.

[5] Fixed asset refers to depreciation of milling facilities including mill, dryer, sorter, packing line, ware house, milling hangar and loader.
[6] Energy include electricity for milling, drying and sorting and diesel for loader.
[7] Service cost includes farmer's service cost (land preparation, plant management, harvesting, tractor maintenance, pump maintenance, and irrigation), collector's service cost (truck maintenance), and retailer's service cost (telephone subscription and rice delivery). Miller's maintenance of milling facilities was done internally by staffs.
[8] Chemical input cost includes fertilizer, pesticide, and herbicide.

Figure 20: Cost structure of each rice value chain system (KHR/Ton)

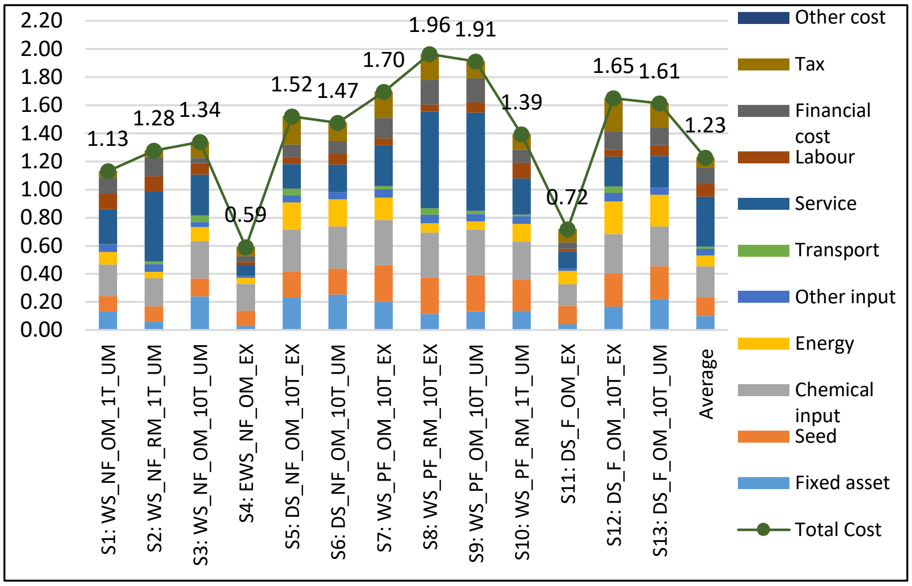
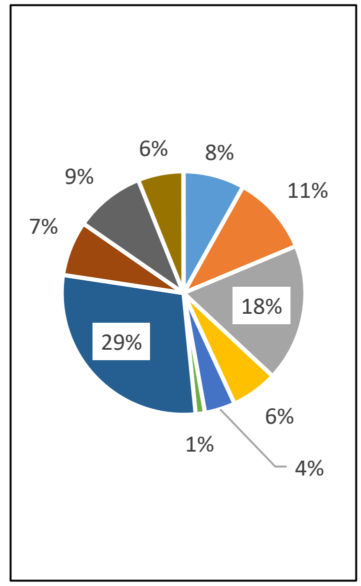


Figure 21: Share of cost (%)



Source: Authors' computation for CRSEO Bulletin

Note: **WS:** Wet Season **DS:** Dry Season **NF:** Non Fragrant **F:** Fragrant **1T:** 1-Ton Mill **UM:** Urban Market **EWS:** Early Wet Season **PF:** Photosensitive Fragrant **10T:** 10-Ton Mill **EX:** Export Market

3.3.2 Added Value

Figure 22 shows total added value for each rice-value-chain system and added value received by by agent per ton of milled rice. Total added value varied from USD 107 to USD 408 per ton of milled rice. On average, total added value per ton of milled rice was USD 266.

The average added value, which farmer received, was 50%. Miller came second with 23% share of added value on average. While there have been a lot of debate regarding the added value taken by paddy collector, we found that paddy collector only had 9% share of added value per ton of milled rice.

Figure 22: Added value by each agent for each rice value chain system per ton of milled rice (USD/Ton)

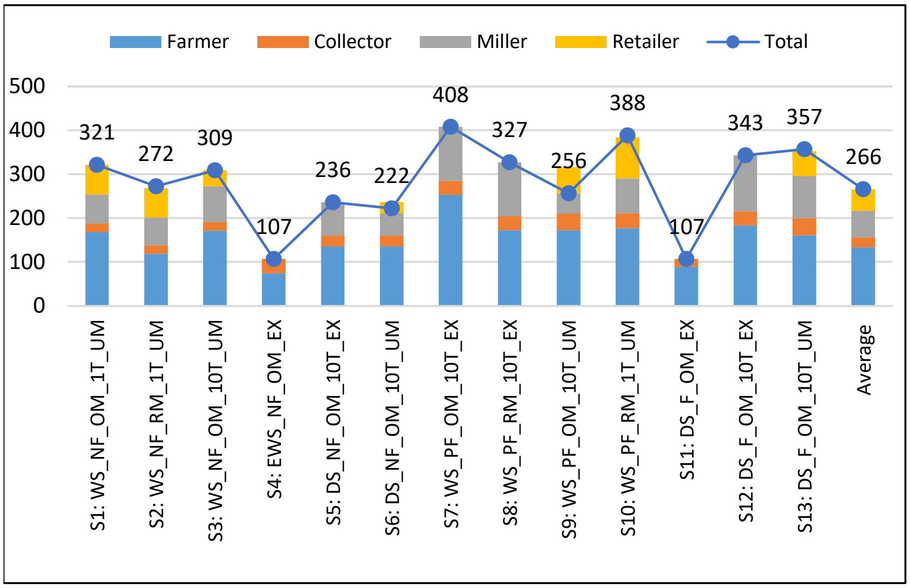
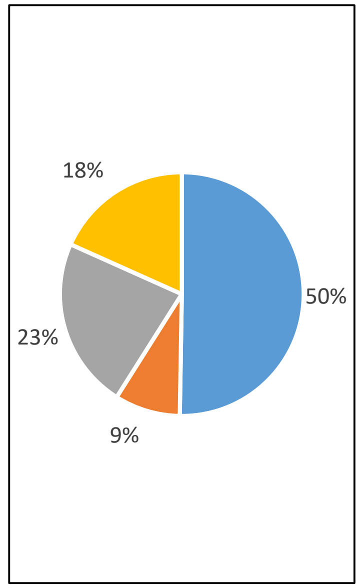


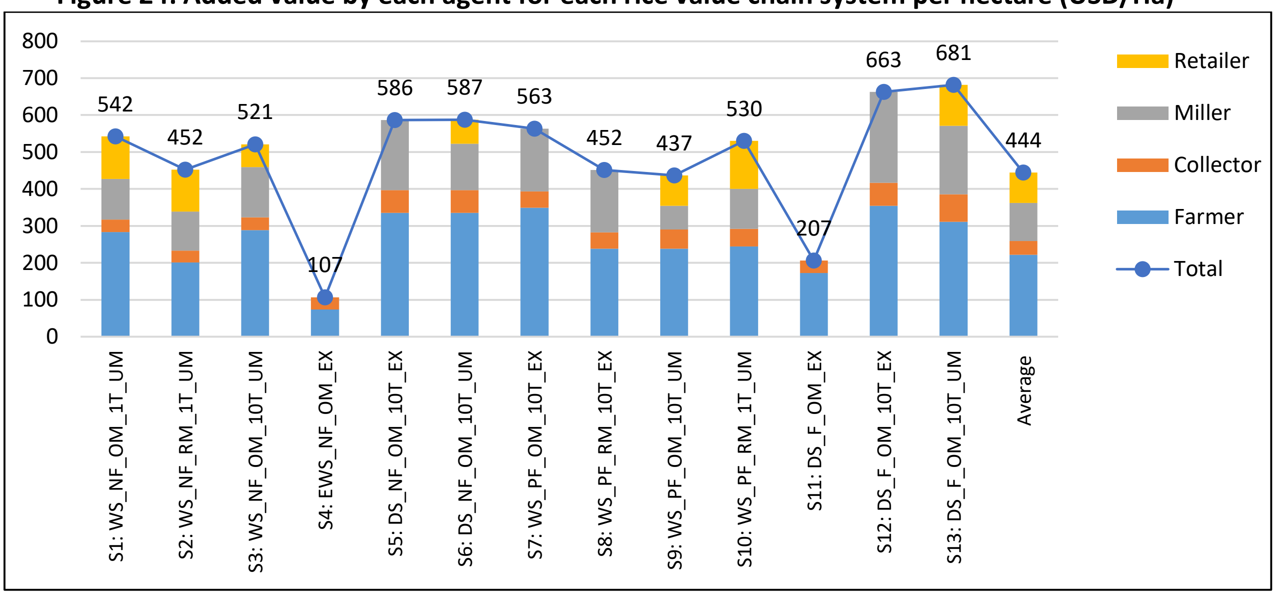
Figure 23: Share of added value (%)



Source: Authors' computation for CRSEO Bulletin

Note:	**WS:** Wet Season	**NF:** Non Fragrant	**OM:** Own Machine	**1T:** 1-Ton Mill	**UM:** Urban Market
	DS: Dry Season	**F:** Fragrant	**RM:** Rent Machine	**10T:** 10-Ton Mill	**EX:** Export Market
	EWS: Early Wet Season	**PF:** Photosensitive Fragrant			

Figure 24: Added value by each agent for each rice value chain system per hectare (USD/Ha)



Source: Authors' computation for CRSEO Bulletin

Note:	**WS:** Wet Season	**NF:** Non Fragrant	**OM:** Own Machine	**1T:** 1-Ton Mill	**UM:** Urban Market
	DS: Dry Season	**F:** Fragrant	**RM:** Rent Machine	**10T:** 10-Ton Mill	**EX:** Export Market
	EWS: Early Wet Season	**PF:** Photosensitive Fragrant			

Figure 25 displays the relative share of each value chain in the total value added generated by the whole set of value chains. The respective weight has been estimated on the basis of data available on production by major systems, domestic consumption, milled rice exports, unrecorded paddy export being the balance. Wet season rice for domestic market represent 70% of the total value added generated by the 13 systems. Value chains targeting export markets (as paddy or milled rice) generates 22% of the total value added.

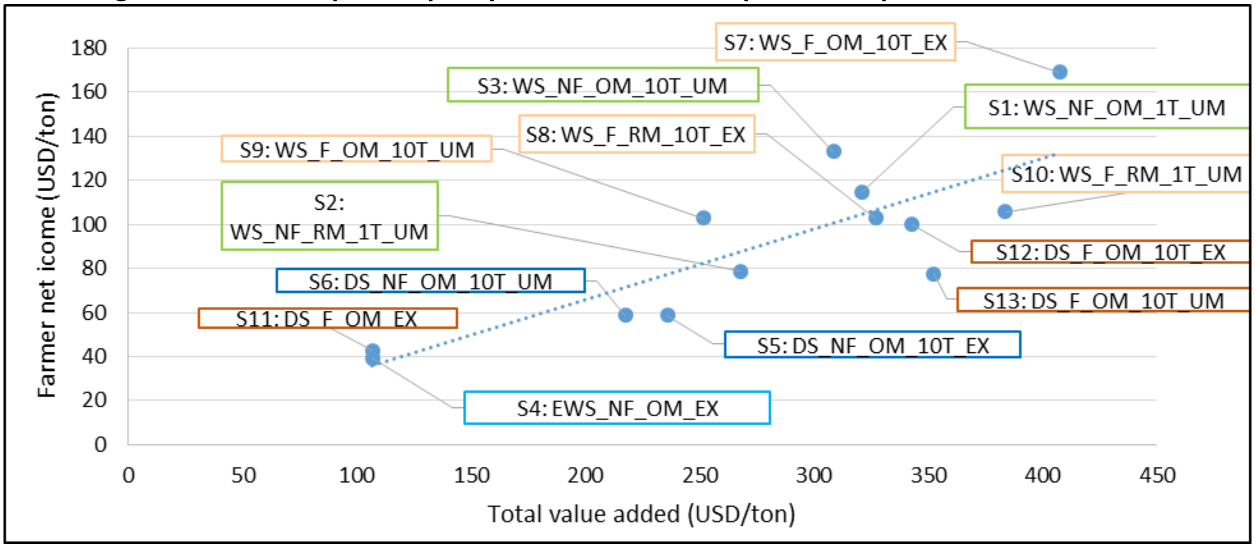
Figure 25: Contribution of rice value chains to rice sector value added generation

Source: Authors' computation for CRSEO Bulletin

Note: Wet-season Non-fragrant; Wet-season Photosensitive Fragrant; Early-wet-season Non-fragrant; Dry-season Non-fragrant; Dry-season Fragrant

Figure 26 illustrates the relationship between the value generated by each ton of rice for each system and corresponding net income per farm. The trend is linear meaning that on average the share of farmer net income is commensurate with the total value generated. This is good for farmers as it suggests that farmers stand the benefit from the higher value added, which can result from higher international prices.

Figure 26: Total VA per ton per systems x net income per farmer per ton of milled rice

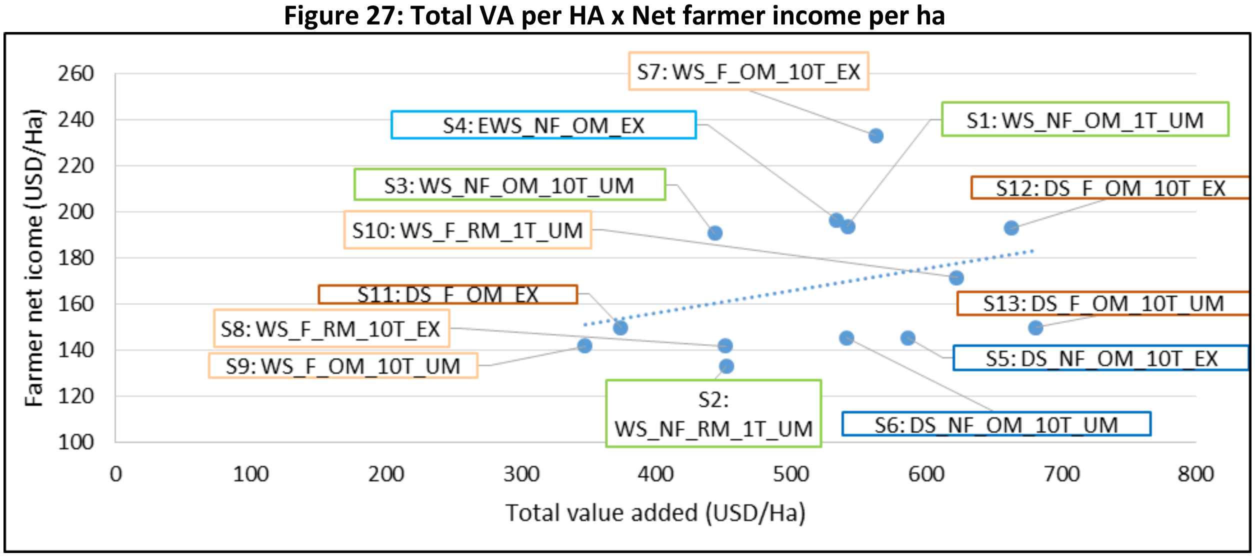


Source: Authors' computation for CRSEO Bulletin

Note: **WS:** Wet Season **NF:** Non Fragrant **OM:** Own Machine **1T:** 1-Ton Mill **UM:** Urban Market
DS: Dry Season **F:** Fragrant **RM:** Rent Machine **10T:** 10-Ton Mill **EX:** Export Market
EWS: Early Wet Season **PF:** Photosensitive Fragrant

Figure 17 illustrates the relationship between the value generated by each hectare of rice for each system and corresponding net income per farm. In terms of value added and net income per hectare the systems with high yielding improved variety are not necessarily the most remunerative for the farmer while photosensitive varieties (SO1, SO2) are less performed at the system level but generate more net income for the farmer per hectare.

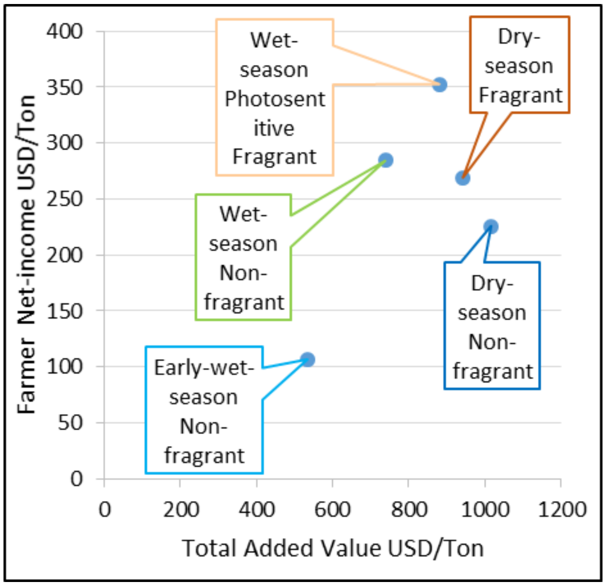
Figure 27: Total VA per HA x Net farmer income per ha



Source: Authors' computation for CRSEO Bulletin

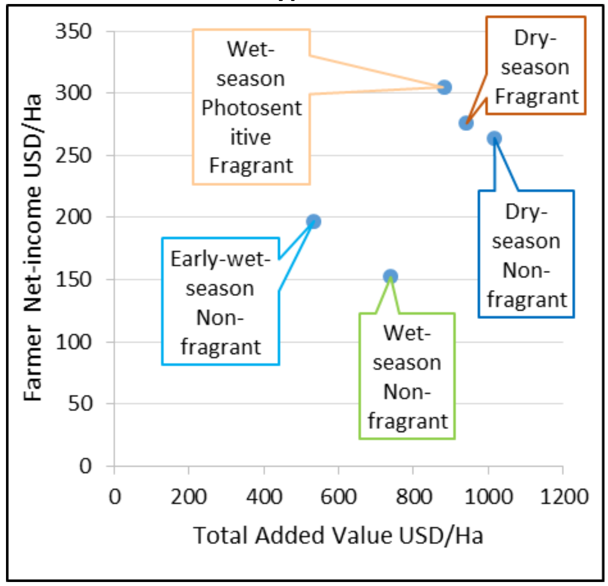
Note: **WS:** Wet Season **NF:** Non Fragrant **OM:** Own Machine **1T:** 1-Ton Mill **UM:** Urban Market
DS: Dry Season **F:** Fragrant **RM:** Rent Machine **10T:** 10-Ton Mill **EX:** Export Market
EWS: Early Wet Season **PF:** Photosensitive Fragrant

Figure 28: Value added and farmer income generated by type of rice



Source: Authors' computation for CRSEO Bulletin

Figure 29: Total added value generated per ha, and net incomes for farmer per ha for the different types of rice varieties

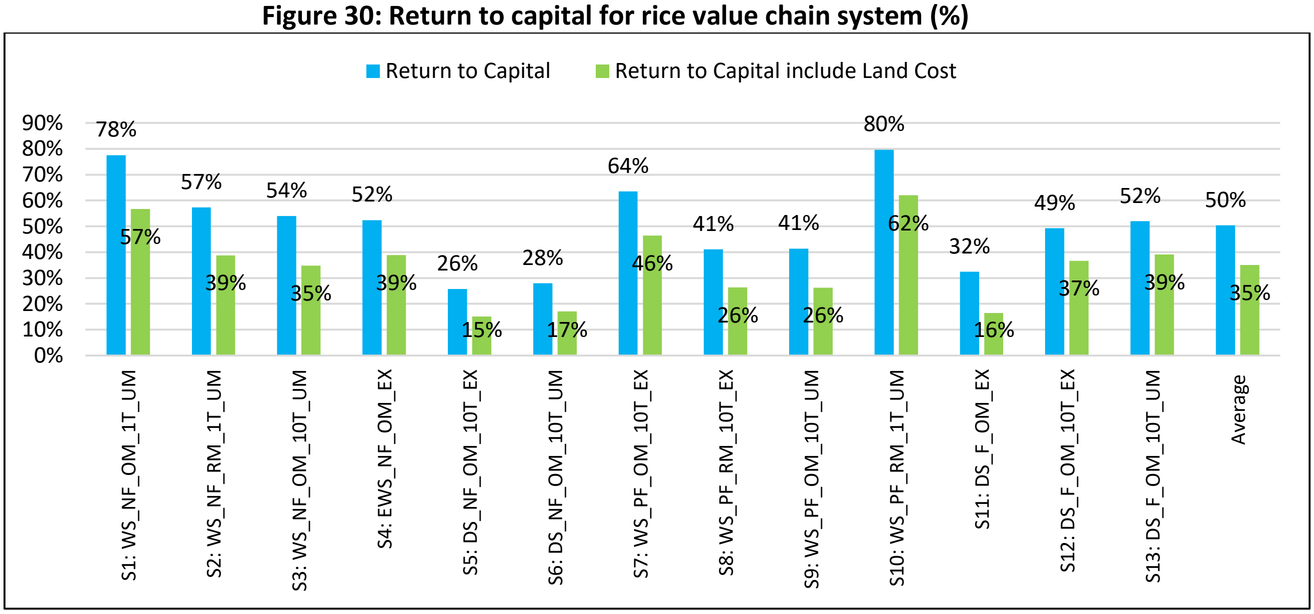


Source: Authors' computation for CRSEO Bulletin

3.3.3 Return to Capital

Figure 30 shows that the return to capital for each rice value chain system varied from 26% to 80% if land cost was excluded. Including the land cost into value chain system would change the return to capital to vary from 15% to 62%.

Figure 30: Return to capital for rice value chain system (%)



Source: Authors' computation for CRSEO Bulletin

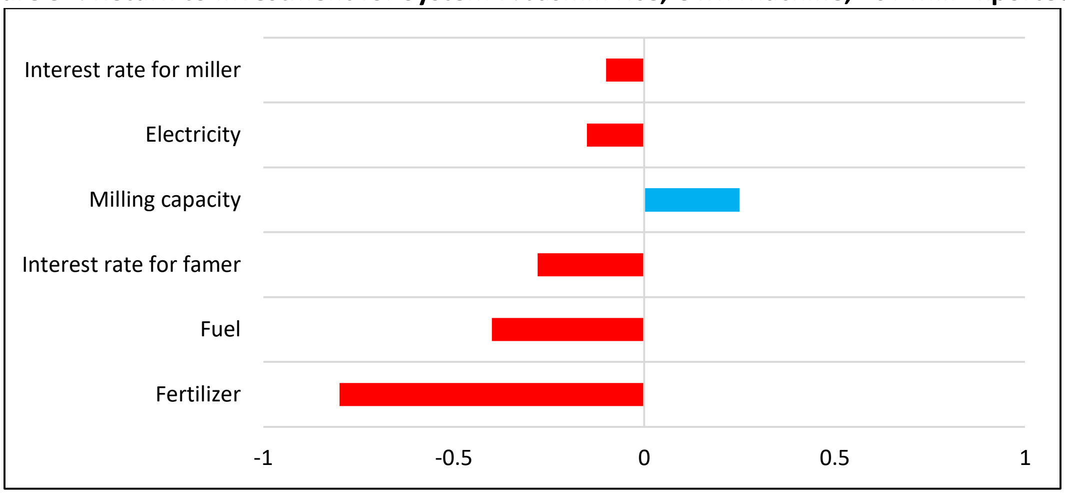
Note: **WS:** Wet Season; **DS:** Dry Season; **EWS:** Early Wet Season; **NF:** Non Fragrant; **F:** Fragrant; **PF:** Photosensitive Fragrant; **OM:** Own Machine; **RM:** Rent Machine; **1T:** 1-Ton Mill; **10T:** 10-Ton Mill; **UM:** Urban Market; **EX:** Export Market

3.4 Impact on Return to Investment based on selected factors.

We present sensitivity analysis of System 7: Wet-season Photosensitive Fragrant Own-machine 10-Ton-Mill Export-market, because this system generated the highest added value.

A sensitivity analysis carried on System 7 indicates that the profitability and competitiveness of the rice sector were highly correlated with the fertilizer price and fuels price. Considering the whole value chain, the return to cost was less sensitive to electricity and the rate of utilization of capacity. While a lot of attention has been given in the current policy debate on the consequence of the rapid development of milling capacity on milling profitability, it should be underlined that the foundations of the value chains' competitiveness are primarily built on the performance of rice farmers.

Figure 31: Return to Investment for System 7: Jasmin rice, Own Machine, 10T Mill Exported



Source: Authors' computation for CRSEO Bulletin

3.5 Milling Profitability

Our analysis found that the 1-ton mill performed better than the 10-ton mill. Although we see small mill performed better than large mill, we did not find any small mill systems, which were able to sell milled rice to export market, while the best-performed systems were both large mill selling to export market.

In general, we assumed that large milling system should have better cost efficiency that the small milling system due to their economies of scale[9]. Why did our finding tell the contrast?

The problem could be relevant the sub-optimal production level. The small mills can reach the optimal production easier. Small mill only need small order of milled rice to operate at optimal level, which enable them minimize the operation cost per ton of milled rice. Therefore, we could see that their fixed asset cost per ton of med rice was very low, as compared to larger mills. In contrast, the 10-ton milling systems require large volume of milled rice order to reach their optimal production. Having high fixed asset cost

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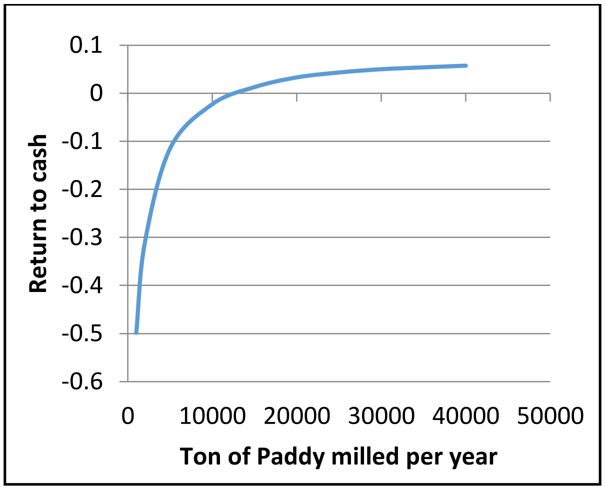
[9] Economies of scale: Some goods can be produced at low cost only if they are produced in large quantities, Mankiw's Principle of Microeconomics,

per metric ton of milled rice, as seen in Figure 17, explains that the 10-Ton milling systems in Cambodia did not reach their optimal production.

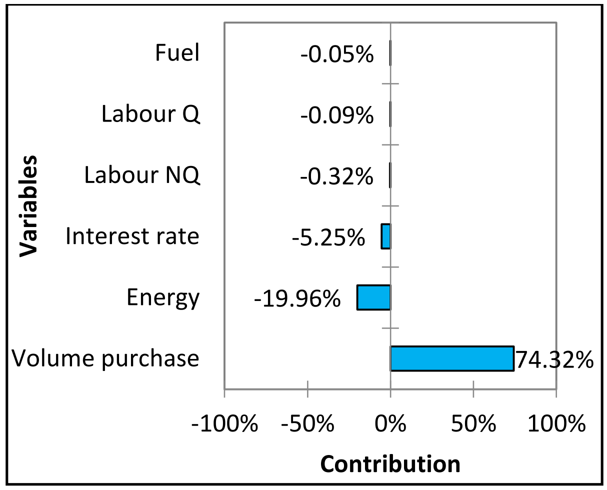
The sensivity analysis presented in Figures 32 and Figure 33 shows that the profitability of the milling operation is highly sensitive to the utilization of milling capacity. Assuming that a 10T mill is able to process 40,000T of paddy per year, milling operations would not be profitable (Return to capital = 0) if the miller process less that 12,000T of paddy per year.

Figure 32: 10-Ton mill return to capital for different level of capacity



Source: Authors' computation for CRSEO Bulletin

Figure 33: Sensitivity of 10Tmill's profitability to various cost parameters.



Source: Authors' computation for CRSEO Bulletin

Several milling companies claimed during the past season that limited revolving fund hampered their capacity to procure enough paddy to ensure the profitability of their industry. A cheap acess to financial support through low interest rates was considered as an option to improve millers capacity to increase their revolving funds and strengthen their profitablity. A sensitivity analysis crossing the combined effect of changes in the level of capacity utilization and interest rate at which millers can access credit shows that the level of capacity utilization is a much heavier constraint than the interest rate (Table 5).

In other words, rather than the interest rate, the major issues remains the level of capacity utilization; a high interest rate (16%) would still be affordable to the millers if it is translated into a higher volume of paddy processed. This assumes that millers have market to profitably sell their their product. However, eventually the ability of the miller to find more market outlets, particularly on the export market, remains the major challenge for the viability of their business, as there is a limit to EU markets.

Table 6 shows the level of return achieved by a rice mill exporting wet-season photosensitive fragrant rice for a combination of paddy purchase price and milled rice export price. If all other factors remain unchanged and price wet-season photosensitive fragrant Rice at 688 US$/T, miller with 10MT capacity can afford to pay paddy at 1,300 KHR/Kg (100 KHR increase) and maintain return to cash invested at 3.9%.

Table 5: Return to capital sensitivity to interest rate level and to capacity utilization.

Ton of milled paddy	Interest rate					
	4	8	10	12	14	16
40000	0.10	0.09	0.09	0.08	0.08	0.08
35000	0.10	0.09	0.09	0.08	0.08	0.08
30000	0.09	0.08	0.08	0.08	0.07	0.07
25000	0.08	0.08	0.07	0.07	0.07	0.06
20000	0.07	0.07	0.06	0.06	0.06	0.05
15000	0.05	0.05	0.04	0.04	0.04	0.04
10000	0.02	0.01	0.01	0.01	0.00	0.00
5000	-0.07	-0.08	-0.08	-0.08	-0.08	-0.09
2000	-0.27	-0.27	-0.27	-0.27	-0.27	-0.28
1000	-0.46	-0.46	-0.46	-0.46	-0.46	-0.46

Source: Authors' computation for CRSEO Bulletin

Table 6: Rice milling profitability sensitivity to paddy purchase and milled rice selling price: return to capital invested for System 08: Wet-season Photosensitive Fragrant Rent-machine 10T Export-market

Paddy purchase price KHR/Kg	Price of milled rice exported USD and KHR/Ton								
	442	492	541	590	639	688	737	787	836
	1 800 000	2 000 000	2 200 000	2 400 000	2 600 000	2 800 000	3 000 000	3 200 000	3 400 000
400	75.4%	93.7%	111.9%	130.2%	148.4%	166.6%	184.8%	202.9%	221.0%
500	49.3%	64.9%	80.5%	96.0%	111.5%	127.1%	142.6%	158.0%	173.5%
600	30.0%	43.6%	57.1%	70.7%	84.2%	97.7%	111.3%	124.8%	138.3%
700	15.1%	27.1%	39.1%	51.2%	63.1%	75.1%	87.1%	99.1%	111.0%
800	3.3%	14.1%	24.9%	35.6%	46.4%	57.2%	67.9%	78.7%	89.4%
900	-6.4%	3.4%	13.2%	23.0%	32.8%	42.5%	52.3%	62.1%	71.8%
1 000	-14.3%	-5.4%	3.6%	12.5%	21.5%	30.4%	39.3%	48.3%	57.2%
1 100	-21.1%	-12.8%	-4.6%	3.7%	11.9%	20.2%	28.4%	36.6%	44.9%
1 200	-26.8%	-19.2%	-11.5%	-3.9%	3.8%	11.4%	19.1%	26.7%	34.3%
1 300	-31.8%	-24.6%	-17.5%	-10.4%	-3.3%	3.9%	11.0%	18.1%	25.2%
1 400	-36.1%	-29.4%	-22.8%	-16.1%	-9.4%	-2.7%	3.9%	10.6%	17.3%
1 500	-39.9%	-33.7%	-27.4%	-21.1%	-14.8%	-8.5%	-2.3%	4.0%	10.3%
1 600	-43.3%	-37.4%	-31.5%	-25.5%	-19.6%	-13.7%	-7.8%	-1.8%	4.1%
1 700	-46.4%	-40.7%	-35.1%	-29.5%	-23.9%	-18.3%	-12.7%	-7.1%	-1.5%
1 800	-49.1%	-43.7%	-38.4%	-33.1%	-27.8%	-22.4%	-17.1%	-11.8%	-6.5%
1 900	-51.5%	-46.5%	-41.4%	-36.3%	-31.2%	-26.2%	-21.1%	-16.0%	-11.0%
2 000	-53.8%	-48.9%	-44.1%	-39.2%	-34.4%	-29.6%	-24.7%	-19.9%	-15.1%

Source: Authors' computation for CRSEO Bulletin

Note: Volume of Paddy Processed: 25,000 T

Paddy Price: 1200 KHR/Kg   Milled Rice Price: 688 US$/T

Table 7: Rice milling profitability sensitivity to paddy purchase and milled rice selling price: return to cash invested for System 05: Dry-season Non-fragrant Own-machine 10T Export-market

Paddy purchase price KHR/Kg	Price of milled rice exported USD and KHR/Ton							
	300	350	400	450	500	550	600	650
	1 220 400	1 423 800	1 627 200	1 830 600	2 034 000	2 237 400	2 440 800	2 644 200
400	22%	40%	59%	77%	96%	114%	133%	151%
500	4%	20%	36%	52%	68%	84%	100%	116%
600	-9%	5%	19%	33%	47%	61%	75%	89%
700	-19%	-6%	6%	19%	31%	43%	56%	68%
800	-27%	-16%	-4%	7%	18%	29%	40%	51%
900	-33%	-23%	-13%	-3%	7%	17%	27%	38%
1 000	-39%	-30%	-20%	-11%	-2%	8%	17%	26%
1 100	-44%	-35%	-26%	-18%	-9%	-1%	8%	17%
1 200	-48%	-40%	-32%	-24%	-16%	-8%	0%	8%
1 300	-51%	-44%	-36%	-29%	-21%	-14%	-6%	1%
1 400	-54%	-47%	-40%	-33%	-26%	-19%	-12%	-5%
1 500	-57%	-50%	-44%	-37%	-31%	-24%	-17%	-11%
1 600	-59%	-53%	-47%	-41%	-34%	-28%	-22%	-16%
1 700	-61%	-55%	-50%	-44%	-38%	-32%	-26%	-20%

Source: Authors' computation for CRSEO Bulletin

Note: Volume of Paddy Processed: 25,000 T Paddy Price: 800 KHR/Kg Milled Rice Price: 450 US$/T

Table 8: Rice milling profitability sensitivity to paddy purchase and milled rice selling price: return to cash invested for System 12: Dry-season Fragrant Own-machine 10T Export-market

Paddy purchase price KHR/Kg	Price of milled rice exported USD and KHR/Ton								
	344	393	442	492	541	578	590	639	688
	1 400 000	1 600 000	1 800 000	2 000 000	2 200 000	2 350 000	2 400 000	2 600 000	2 800 000
400	35%	53%	71%	89%	106%	120%	124%	142%	159%
500	16%	31%	46%	61%	76%	88%	92%	107%	122%
600	1%	14%	28%	41%	54%	64%	67%	81%	94%
700	-10%	2%	13%	25%	37%	46%	49%	60%	72%
800	-19%	-9%	2%	12%	23%	31%	34%	44%	55%
900	-27%	-17%	-7%	2%	12%	19%	21%	31%	41%
1 000	-33%	-24%	-15%	-6%	2%	9%	11%	20%	29%
1 100	-38%	-30%	-22%	-14%	-6%	1%	3%	11%	19%
1 200	-43%	-35%	-27%	-20%	-12%	-7%	-5%	3%	10%
1 300	-46%	-39%	-32%	-25%	-18%	-13%	-11%	-4%	3%
1 400	-50%	-43%	-37%	-30%	-23%	-18%	-17%	-10%	-4%
1 500	-53%	-47%	-40%	-34%	-28%	-23%	-22%	-15%	-9%

Source: Authors' computation for CRSEO Bulletin

Note: Volume of Paddy Processed: 25,000 T Paddy Price: 1000 KHR/Kg Milled Rice Price: 578 US$/T

3. Conclusion and Recommendations

Under the current output and input price condition, while there could be losses incurred by certain actors, on average the thirteen value chains analyzed are profitable and viable for all stakeholders. It is observed that the non-photoperiodic non-fragrant rice value chain, which is mostly for raw paddy export to Vietnam, has a lower profitability than the fragrant rice systems and wet season rice. Farmer received the highest added value among all agents, followed by miller, while retailer and collector came 3rd and 4th in most rice value chain systems.

Our analysis indicate that the well-performance systems were either wet-season or dry-season fragrant variety with farming owning machine. These systems also operated by large mill (10T), which milled fragrant rice for export market. We also observed that the Early-wet-season non-fragrant and dry-season fragrant rice value chain, which mostly exported raw paddy to other countries, had the lowest profitability.

Two rice-value-chain systems with high health and environmental concern were Early-wet-season Non-fragrant and Dry-season non-fragrant, which had very high chemical input cost. Intensive use of chemical inputs (fertilizer, pesticide, and herbicide) could potential affect wellbeing of farmer, consumer, and environment.

On average, the value added was created was $266 out of one ton of milled rice or $444 out of one hectare of rice land. Rice farming, on average, shared approximately 50% of the total value added created in the rice value chains and the analysis shows that the high the value added created, the higher proportion goes to farmers. Of the total value added generated, 23% went to millers, 18% to retailers and 9% to collectors. Yet, while reading these figures, one has to keep in mind that the analysis does not take into account: i) opportunity cost of labor for farmers); ii) opportunity cost of farm land; iii) externalities (such as environmental impact and possible depreciation of soil fertility).

From the policy perspective, it is viable for government to continue to support the rice industry for its high value added generation and especially for farmers. Ensuring a level of milling capacity utilization (above 30% of the total capacity) is a key determinant of the miller profitability and the value chain competitiveness. Energy cost is the second important parameter for ensuring the viability of the modern mill.

- Increasing interventions that bring down the cost of fertilizer and seeds, along with agricultural extension activities to farmers with focus on cost-effective use of chemical inputs
- Continuing to increase loans to millers, and improving electricity supply and preferably with lower cost.
- The downward trend in international price until June 2017 showed the fierce competition that prevailed on the international market even for fragrant price that is highly valued. With the threat of losing a privileged access to the European market, the need for diversifying export destination is a major challenge and a high priority for the Cambodian rice sector.

Future Topic of Bulletin

For the future topic of CRSEO Bulletin, we suggest the following three options for policymakers to consider:

- Adding new rice value chain systems such as GAP rice system, organic rice system, and SRP rice system to compare their performances with existing systems in this bulletin.
- Adding variation of farm size variable in existing systems to assess its impact of farm size on performance of rice farming systems.
- Adding contract farming and cooperative variables in existing systems to assess their impact on farming systems.

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Appendix: Detailed cost structure for paddy production

Cropping system parameters	Wet Season				Dry Season				Early Wet Season	
	Non-fragrant		Photosensitive Fragrant		Fragrant		Non-Fragrant		Non-Fragrant	
	Own Machine	Rent Machine	Own Machine	Rent Machine	Own Machine	Rent Machine	Own Machine	Rent Machine	Own Machine	Rent Machine
Cycle duration (month)	6	6	5	5	4	4	3	3	4	4
Cubic meter water/ha	1000	1000	3000	3000	15000	15000	15000	15000	7000	7000
Seed (Kg/ha)	130	130	120	120	150	150	230	230	270	270
Bag fertilizer	3	3	4	4	4.3	4.3	6	6	8	8
Yield (Ton/ha)	2.6	2.6	2.5	2.5	3.5	3.5	4.5	4.5	5	5
Paddy price (KHR/ton)	900 000	900 000	1 100 000	1 100 000	1 200 000	1 200 000	850 000	850 000	750 000	750 000
Paddy price (USD/ton)	221	221	270	270	295	295	209	209	184	184
Fixed asset	130 990	9 146	130 990	9 146	130 990	9 146	261 981	9 146	130 990	9 146
Seed	182 000	182 000	360 000	360 000	450 000	450 000	460 000	460 000	540 000	540 000
Chemical input	336 230	336 230	443 480	443 480	548 330	548 330	745 403	745 403	953 570	953 570
Energy	100 380	0	127 750	0	302 050	0	308 350	0	199 500	0
Other input	22 750	22 750	21 875	21 875	30 625	30 625	39 375	39 375	43 750	43 750
Transport	0	33 800	0	32 500	0	45 500	0	58 500	0	65 000
Service	377 000	792 000	377 000	892 000	377 000	1 492 000	412 000	1 492 000	377 000	1 092 000
Labor	26 000	26 000	25 000	25 000	35 000	35 000	45 000	45 000	50 000	50 000
Financial cost	133 128	174 938	151 771	193 746	165 456	234 132	140 120	189 929	199 122	245 562
Tax	65 040	65 040	162 600	162 600	325 200	325 200	325 200	325 200	325 200	325 200
Total non-paddy cost	1 373 518	1 641 905	1 800 466	2 140 347	2 364 652	3 169 934	2 737 428	3 364 553	2 819 132	3 324 228
Total cost	1 373 518	1 641 905	1 800 466	2 140 347	2 364 652	3 169 934	2 737 428	3 364 553	2 819 132	3 324 228
Revenue Paddy/Rice	2 340 000	2 340 000	2 750 000	2 750 000	4 200 000	4 200 000	3 825 000	3 825 000	3 750 000	3 750 000
Profit	966 482	698 095	949 534	609 653	1 835 348	1 030 066	1 087 572	460 447	930 868	425 772
Return to cash invested	70%	43%	53%	28%	78%	32%	40%	14%	33%	13%
Land rent	400 000	400 000	400 000	400 000	400 000	400 000	400 000	400 000	400 000	400 000
Net revenue (after imputed land rent)	566 482	298 095	549 534	209 653	1 435 348	630 066	687 572	60 447	530 868	25 772
Family total labor	20	20	20	20	27	27	28	28	24	24
Return to family man-day	27 972	14 720	27 218	10 384	53 724	23 583	24 586	2 161	22 389	1 087
Return to invt with land imp. Cost	32%	15%	25%	8%	52%	18%	22%	2%	16%	1%

Cambodia Rice Sector Economic Observatory

The Cambodia Rice Sector Economic Observatory (CRSEO) is a monitoring mechanism serving as a dashboard for policy makers and stakeholders to analyze the Cambodian rice sector health and competitiveness and to monitor the distribution of added value and socio-economic impacts of the rice sector situation.

CRSEO Bulletin

The outputs of CRSEO are the two bi-annual bulletins, which analyses and report on the distribution of added value in the Cambodian rice sector for Wet Season Rice and Dry Season Rice.

Each bulletin is based on representative budgets for the different groups of stakeholders and for the different sub-value chain and details the cost structure for each of these groups of stakeholders, the distribution of the added value, and key indicators. Sensitivity analysis of key factors on profitability and distribution of added value is also incorporated in each bulletin for policy decision makers to focus on measures with higher impact.

CRSEO Governance

The CRSEO is owned by the Royal Government of Cambodia and is placed under the responsibility of a **Committee**, acting as the ordering institution to a **Technical Unit** in charge of the implementation of data compilation and analysis.

The Committee composes of representatives of the Supreme National Economic Council (SNEC) as the chairperson, of the Ministry of Agriculture, Forestry and Fisheries (MAFF) and of the Ministry of Commerce (MoC) and of the Cambodian Rice Federation (CRF). All these institutions also facilitate necessary access to data and information and participate in data validation process. After SCCRP project, it is foreseen that the CRSEO will be moved under MAFF.

The Technical Unit, for first stage of implementation, composes of one international consultant from The French International Research Centre for Agricultural Development (CIRAD) and two local consultants from the Centre for Policy Studies (CPS). SNEC’s Support to the Commercialization of Cambodian Rice Project (SCCRP), funded by the *Agence Française de Développement* (AFD), has supported technically and financially the development of this bulletin.