9.0 Value Chain of Cargill Oilseed Malaysia

The Cargill Oilseeds Malaysia business fits into what we call the Palm Oil Value Chain at the refinery step as shown in the following figure6. However only the primary activities will be discussed.

Figure 6: Value Chain of Cargill Oilseed Malaysia

<table>
<thead>
<tr>
<th>Firm Infrastructure</th>
<th>Human Resource Management</th>
<th>Technology Development</th>
<th>Procurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>(General management, accounting, finance, strategic planning)</td>
<td>(Recruiting, training, development of employees)</td>
<td>(R&amp;D, product and process improvement)</td>
<td>(Purchasing of raw materials, machines, supplies)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inbound Logistics (Raw materials handling and warehousing)</th>
<th>Operations (Refining, fractionation, quality assurance)</th>
<th>Outbound Logistics (Warehousing, distribution of finished products)</th>
<th>Marketing &amp; Sales (Advertising, promotion, pricing)</th>
<th>Service (Technical support)</th>
</tr>
</thead>
</table>

9.1 Inbound Logistic

The most important raw materials for the plant are the crude palm oil (CPO) and crude palm kernel oil (CPKO). Others including the packaging materials such as tins; cartons; drum; bottles, PE bags and etc. Plant consumable such as bleaching earth, phosphoric acid, diesel, fuel oil, hydrogen, nitrogen and etc. Heavy machines such as motors, pumps, gearbox and etc.

The CPO and CPKO are purchase by traders of the marketing department. Other than CPO and CPKO, the purchasing department is responsible to ensure the sufficient supply of the plant consumables.

The total storage capacity of the CPO is approximately 8000Mt. Given the total capacity of the plant of 800Mt/day, the total storage capacity in the plant can provide 10 days running stock. CPO is source via the following 4 methods in order to ensure the sustainability of the pipelines:
a) Buying from CPO Millers (Cash Market)
The trader is said to buy the CPO from the cash market when physical product is traded on the spot according to the current market pricing. The advantage of buying from cash market is the origin of the CPO is known, hence minimizing the risk of buying inferior quality CPO. However, the price of the CPO is usually higher than the KLCE price. To minimize the risk of the price fluctuation, traders would apply "back-to-back" method or known as hedging.

b) Purchase from KLCE/COMMEX (Future market)
Future trading is done at KLCE/COMMEX. KLCE serves as a price benchmark for CPO cash market. Another crucial function of KLCE is to serve as a hedging platform for the CPO supply. Hedging is a mechanism deployed to safeguard the traders against fluctuation in the free market. When a trader buys CPO from the cash market, he would be exposed to the risk of having the physical product. For instance if the palm oil market turns sour and the refining margin can’t covered, he would have got caught with the physical CPO. Cash flow would be plugged and at the same time, the quality of the CPO would deteriorate if it is stored over a prolonged period of time. If the merchant is confident that the market would go up and the spot price is low, he could select to take position by stoking up on his CPO. If the trader were utilize the hedging mechanism, he would buy from the cash market and sell it against the future market immediately, hence it's called back-to-back or bull-spread. After the CPO is hedged against KLCE, usually sold in lots (25Mt/lot), and it is decided to consume the CPO, the traders can cover the lots sold to KLCE by buying back new CPO from KLCE itself which is a type of paper trade.

c) Long Term Contract (LTC) with CPO producers
This is an alternative method to source CPO. This is carried out when the traders are writing long term contracts with selected categories of CPO supplier. The advantage of dealing with LTC are summarized as follow:
Since the LTC is written with known CPO source, the quality of the CPO supply is much more predictable and consistent. CSOF can predict up-front the processing cost of the CPO. In addition CSOF has also developed a CPO Supplier Monitoring Program that monitors the quality and delivery of all the CPO suppliers. Constant feedback is given to the CPO suppliers that having long term relationship with CSOF. This in turn helps to improve the quality of the CPO.

Consistent delivery on rescheduled timeline. This would ensure that we have CPO to keep the pipeline going even when the demand is more than the supply. This is particularly important during the month of January, February and March of each year where the CPO production is affected by season.

Having LTC would also frees up the merchant's time enabling them to concentrate on market analysis as well as concentrating on more value added activities that can bring value to the customers.

By having LCT, Cargill is able to foster a good working relationship with the CPO suppliers. The suppliers would reconsider before sending us any inferior CPO as it would jeopardize the business relationship.

d) Exchange For Physical (EFP)
This is done by exchanging the physical CPO by one-on-one between buyer and seller. The party who long X amount of CPO would exchange with the party who short X amount of CPO.

Beside CPO, the traders are also buying CPKO. CPKO is the base product for specialty fats produce by Cargill Oilseed Malaysia such as SSSP, SOCOLATE, HYSOC and etc. However the sourcing mechanism is different from CPO.

Specialty Fats merchants and production schedule determine the quantity and delivery of CPKO. The quantity of CPKO purchased is rather small when compared to CPO. The other difference is that CPKO is not traded at KLCE but the price of CPKO would still fluctuate in direct correspondence to the base price of CPO. As the government does not regulate the price of the
CPKO, it's a normal practice for traders to shop around for prices and counter offering with CPKO suppliers such as Lee Oil, Hup Lee, Sang Kee and etc.

9.2.1 Operation 1 – Physical Refining
From the storage tank, the CPO/CPKO is pumped into the plant for refining. The refining process can be divided into 2 stages. As the refining process for the CPO and CPKO is similar, the author discusses only the refining process of CPO will be discussed.

The first stage of the physical refining process is called the bleaching process. In this stage, the bleaching earth and phosphoric acid are added and mix together with the CPO using mechanical force in a vessel called bleacher. The purpose of the bleaching process is to remove impurities that present in the oil such as phosphorus, copper, iron, phosphatides, unsaponifiable fats and etc. The function of the phosphoric acid is to de-gum the oil. The impurities that present in the oil will be adsorbed to the surface of the bleaching clay. Colored compound such as the carotene will also be partially removed via the same mechanism.

The mixture of the oil and bleaching earth plus phosphoric acid is called slurry. The slurry is then undergoes the filtration process via the Niagara filters. At this stage, the impurities, together with the suspended bleaching clay will be screened off. The filtered oil is then passing through a pair of polishing filter to further remove any foreign materials or impurities that escaped or carried over. The pure oil after this stage is called the bleached palm oil (BPO). The oil is red in color due to the presence of carotene. The temperature of the oil is approximately 110°C.

The second stage of the refining process is called the deodorization process. The purpose of deodorization is to remove the odor from the bleached palm oil due to the presence of the free fatty acids (FFA). The BPO is heated up via a series of a heat exchanger network to the deodorization temperature of approximately 270°C, before being fed into the deodorizer. In the deodorizer,
separation occurs in which the free fatty acid is removed from the oil by the force of vacuum and sparging steam.

After deodorization, the oil is cool down via the same heat exchanger network again to the storage temperature of approximately 60°C. During the deodorization stage, some of the colored compound especially the carotene will further be broken down again. The appearance of the oil hence will change from reddish to yellowish in color. The oil after deodorization stage is called as refined bleached and deodorized palm oil (RBDPO). The free fatty acid, which is the by-product of the refining process, is stored in a separate tank before being sold to the oleo chemical industries.

The ultimate quality of the RDBPO is measured base on the amount of the free fatty acid that present in the oil and also the color. The free fatty acid content shall not exceed 0.1% and the color shall be 3 Red max.

**9.2.2 Operation 2 - Fractionation**

After the refining process, 50% of the RBDPO undergoes the fractionation stage. The purpose of this fractionation process is to separate the solid phase of the RBDPO from the liquid phase using mechanical force. The solid phase of the oil is call RBD palm stearine (RBDPST) whereas the liquid phase is call RBD palm olein (RBDPOL).

Before starts, the RBDPO is slowly cool down step by step using the cooling water. When reaching the crystallization temperature, the solid phase of the RBDPST will starts to crystallize and suspends freely in the liquid phase of RBDPOL. The oil at this stage is call slurry. The cooling process is carefully done and carried out under controlled conditions in order to ensure the right crystals are formed.

The slurry is then fed into a horizontal membrane press for filtration. The purpose of the filtration process is to separate the solid phase from the liquid phase. Mechanical force is applied to compress the oil as well as to squeeze the liquid phase out from the slurry in order to achieve proper separation.
The RBDPOL or the cooking oil is the main product whereas the RBDPST is the byproduct for this process. The efficiency of the fractionation process is measured by the RBDPOL yield. The ultimate quality of the RBDPOL is determined base on the color, FFA and moisture content of the oil. The fractionation plant has been designed in such a way to exploit the economy of scope of the industry. There are few grades of RBDPOL available in the market namely RBDPOL 10cpt., RBDPOL 8 cpt., RBDPOL 60IV and etc.

The filtration technology of CPKO is very similar to the RBDPO. Although using the same mechanism, the efficiency of the fractionation process for CPKO is measured base on the CPKST yield instead of CPKOL. Unlike the palm oil, CPKST is the main product whereas the CPKOL is the byproduct. CPKST and CKPKOL are eventually further being refine and hydrogenate to become cocoa butter substitute and other products that serve various application.

**9.3 Outbound Logistic**

Prior to the delivery of the product to the customers, Cargill stores the products in the warehouse. Upon receiving the customer order, the merchant starts to inform all the related departments such as packaging, forwarding and traffic. Traffic department plays a very important role as it controls the traffic and schedule of the shipment. The timing of the schedule is important to ensure no demurrages as well as no late delivery.

Depends on the customers requirement, the products are shipped in various form or packing. For bulk refined oil such as RBDPO, RBDPOL and etc., the oil is usually shipped in big quantity up to few thousand Mt. For specialty fats such as SSSP, the oil is packed in 20Kg and 25Kg carton. But for cooking oil such as RBDPOL and vegetable ghee, the oil is bottled or packed in tins. All the finished products except the bulk refined oil are then stuff into the container prior being pull out by the haulier to the port for export. The finished products can be exported either from the West-Port or North-Port in Port Klang depends on the nomination of the shipping agent by the forwarding department.
9.4 Marketing and sales

For bulk refined palm products such as RBDPO and RBDPOL, the oil is sell as commodity. The price of the commodity is fluctuating according the supply and demand of the vegetable oil worldwide. Cargill Singapore serves as the trading arm for Cargill Oilseed Malaysia. In another word for bulk refined oil, Cargill Oilseed Malaysia has only one customer. The trading company is called AOTM (Asian Oil Trading and Marketing). AOTM organizes the logistic of freight and vessels for all the marketing activities. This is one of the Cargill’s strengths as it is a very profitable business venture. AOTM also offers trading advises to the local bulk desks forecasting the performance of the market. There are a few type of selling terms employed by AOTM (e.g. FOSFA and NIOP). These are the mutual agreement selling terms, in a normal course predetermined by buyers. The following diagram illustrates the trading structure.

Figure 7: AOTM Trading Structure

Besides bulk refined oil, Cargill also sells packed palm products to country worldwide such as Pakistan for vegetable ghee, Sri Lanka for cooking oil, Latin America for specialty fats and etc. The marketing of the products are done by the Cargill Oilseed Malaysia.

In term of product strategy, most of the palm products manufactured by the company are industrial products except the bottled cooking oil which is sold to the household directly by appointed agent in that particular country. The packing is important to ensure easy handling and not damaging the product
itself after a long journey before reaching the destination. Leaking tins and damaged carton can frustrate the customers.

Personal selling is the only promotion strategy that is used for industrial products. Some examples of the major customers are like big confectionery manufacturer e.g. Nestle, bakery e.g. Arnold Biscuit and etc. To facilitate the promotion strategy, the market has been segmented according to regions such as Europe & Latin America, Middle East, Asia & Australia and etc. Each merchant is responsible to look for their own customers in their region with the help of the local representative or sales agents.

Distribution strategy is via the sales agent e.g. Beng International in China or directly to the customers e.g. Nestle Thailand. The bottled cooking oil for the Pakistan and Taiwan markets on the other hand are sold to a wholesaler using their private name. The wholesaler will do his own promotion and advertising activities in the country to promote their product.

The pricing strategy is differed according to regions and locations. However Cargill’s products are usually sold at a higher price than his competitors associate with the quality assurance and other values provided by Cargill such as quality consistency, on time delivery and etc.

9.5 Services
Periodic customer visits are organized to obtain feedback on the products and services. Feedback are documented in customer satisfaction survey questionnaires. Cargill also provide technical information with respect to product applications, formulations, recipes and process improvement. For larger market, Cargill organize technical seminars to provide forum for discussion of customers’ future needs and to provide information on the latest technological advancements in oils and fats processing.

In addition, Cargill weekly report on CPKO/CPO price trend also serves as a valuable marketing tool to provide the customers with information necessary to decide when to buy and how to trade forward to cover for their needs.