

CASSAVA INDUSTRY

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The production and export of cassava products is expected to see only slow growth over the next three years on the back of a weakening Chinese market. This is a consequence of the Chinese government abandoning its policy of price support for corn growers and instead promoting policies to encourage the consumption by Chinese industries of domestically-grown corn. As a result of this, China, which has been a major export market for Thai cassava, will likely cut back on imports, with immediate consequences for Thai producers of cassava chips and native cassava starch. Nevertheless, producers of modified cassava starch will benefit from continuing demand, especially from Japan and the ASEAN region, and this sector will thus see continuing growth.

Overview

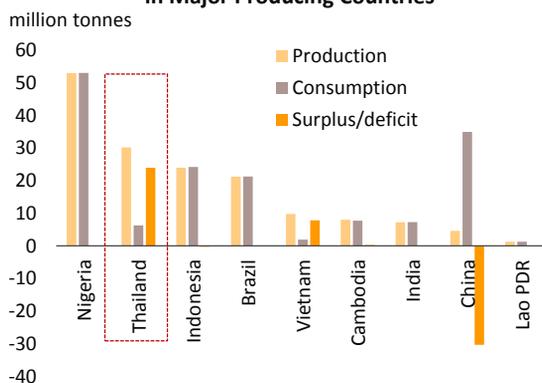
Cassava is a carbohydrate crop yields of which account for 9% of all carbohydrate crops, sitting in 5th place in terms of the amount consumed, after wheat, corn, rice, and potatoes (2016 figures).

Over the past 10 years, cassava has sold at a lower price than other cereal starch crops and this has tended to increase demand for its consumption as an animal feed, in industry (for uses such as the manufacture of alcohol, citric acid, clothing, medicine, paper, and glue), and, in the form of ethanol, as a fuel used in alternative energy.

Globally, in 2016, approximately 270 million tonnes of cassava were produced, with Africa, at 30% of the total, being the single largest producing zone; cultivation is driven by demand for cassava for consumption as a human foodstuff in many African countries. In terms of national producers, the largest is Nigeria, followed by Thailand, Indonesia, and Brazil, which produce 20%, 11%, 9% and 8% of world output, respectively. The largest cassava-consuming nations are Nigeria, China, Indonesia and Brazil, which take 20%, 13%, 9% and 8% of global consumption respectively.

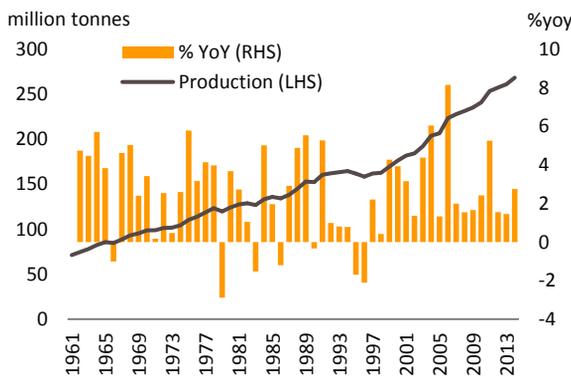
Production in Thailand has expanded continuously over the past two decades and by 2016, a total of 9 million rai (or 1.44 million hectares) of cassava were under cultivation, yielding approximately 31 million tonnes per year^{1/}. Cassava production is concentrated particularly in Nakhon Ratchasima, Kamphaeng Phet, Chaiyaphum, Kanchanaburi and Ubon Ratchathani and these provinces are therefore also home to businesses such as cassava collection centers and cassava starch factory.

Figure 1: Cassava Production and Consumption in Major Producing Countries



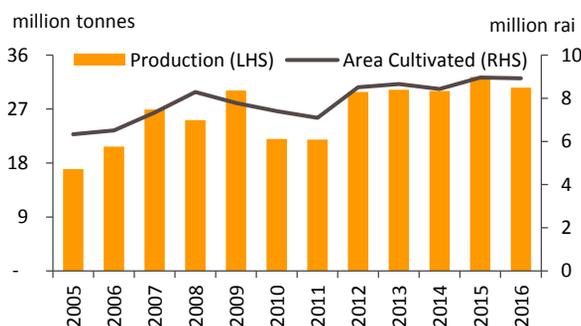
Source: Food and Agriculture Organization of the United Nations (FAO)

Figure 2: World Production of Cassava



Source: Food and Agriculture Organization of the United Nations (FAO)

Figure 3: Thai Cassava Production



Source: Office of Agricultural Economics (OAE)

^{1/} Cassava can be grown in poorer soils and it can also tolerate drought so may be grown year-round in Thailand but it tends to be planted in March to May for harvesting at the year-end or the start of the following year.

The availability of cassava inputs and the state of the domestic cassava-processing industry enable the sector to produce a wide range of products, from primary or upstream materials, such as dried cassava, cassava pellets and cassava chips, to value-added products including native and modified cassava starch. Looking at the value chain for the domestic cassava sector as a whole, 40% of the domestic cassava output is used to produce dried cassava and almost all of this is used to manufacture cassava chips^{2/}, 15% of which is bound for domestic markets, with the remainder exported. 55% of domestic cassava output is converted into cassava power, a quarter of which is consumed domestically, leaving three-quarters for export. The remaining 5% of output is used in the manufacture of ethanol.

Currently, Thailand is the world's largest exporter of cassava products, followed by Vietnam, since other large producers of cassava, in particular those in Africa, tend to emphasize domestic consumption over export. In 2016, Thai native cassava starch accounted for 77% of exports, while Thai cassava chips and Thai modified cassava starch accounted for 60% and 20% of exports, respectively. Exports of cassava pellets are somewhat less certain since the 2005 change in policy by the EU, which saw a reduction in imports of Thai cassava pellets and their replacement with grains grown in the EU zone^{3/}. This has had significant structural implications for Thai exports; previously Thai exporters of cassava pellets were reliant on EU markets but exporters have now shifted their attention such that almost all production goes to Asia, in particular to China, which in 2016 took 75% of all Thai cassava exports, and so is Thailand's number one market.

Figure 4: Thai Exports of Cassava Products (By Volume)

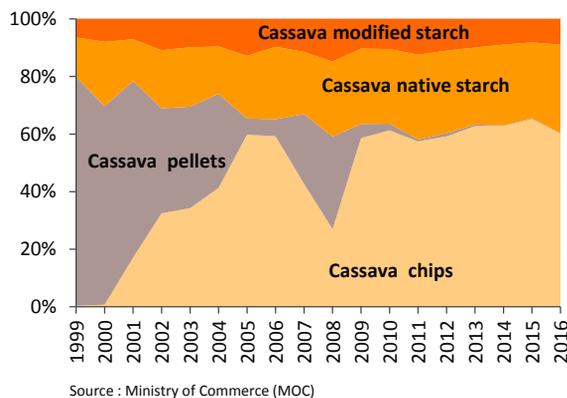


Figure 5: Destination of Cassava Exports

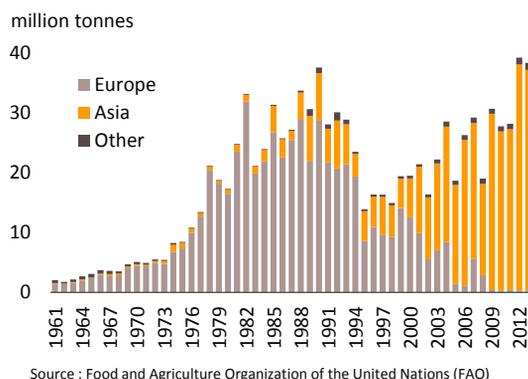
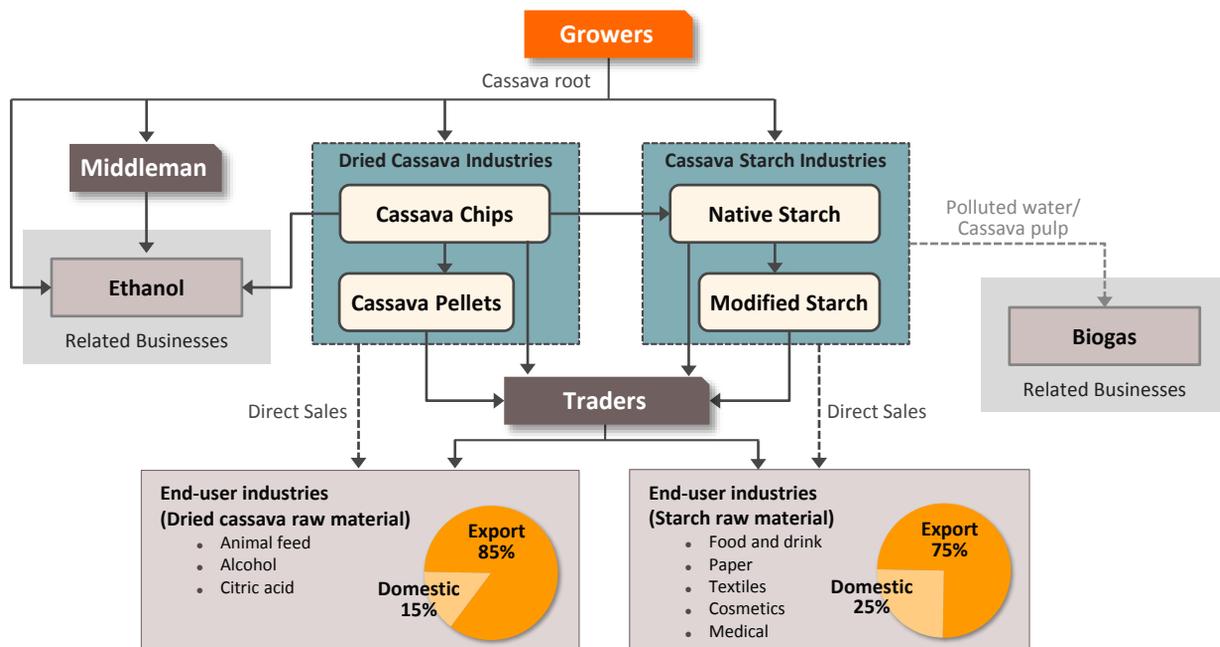


Figure 6: Thai Cassava Sector Structure

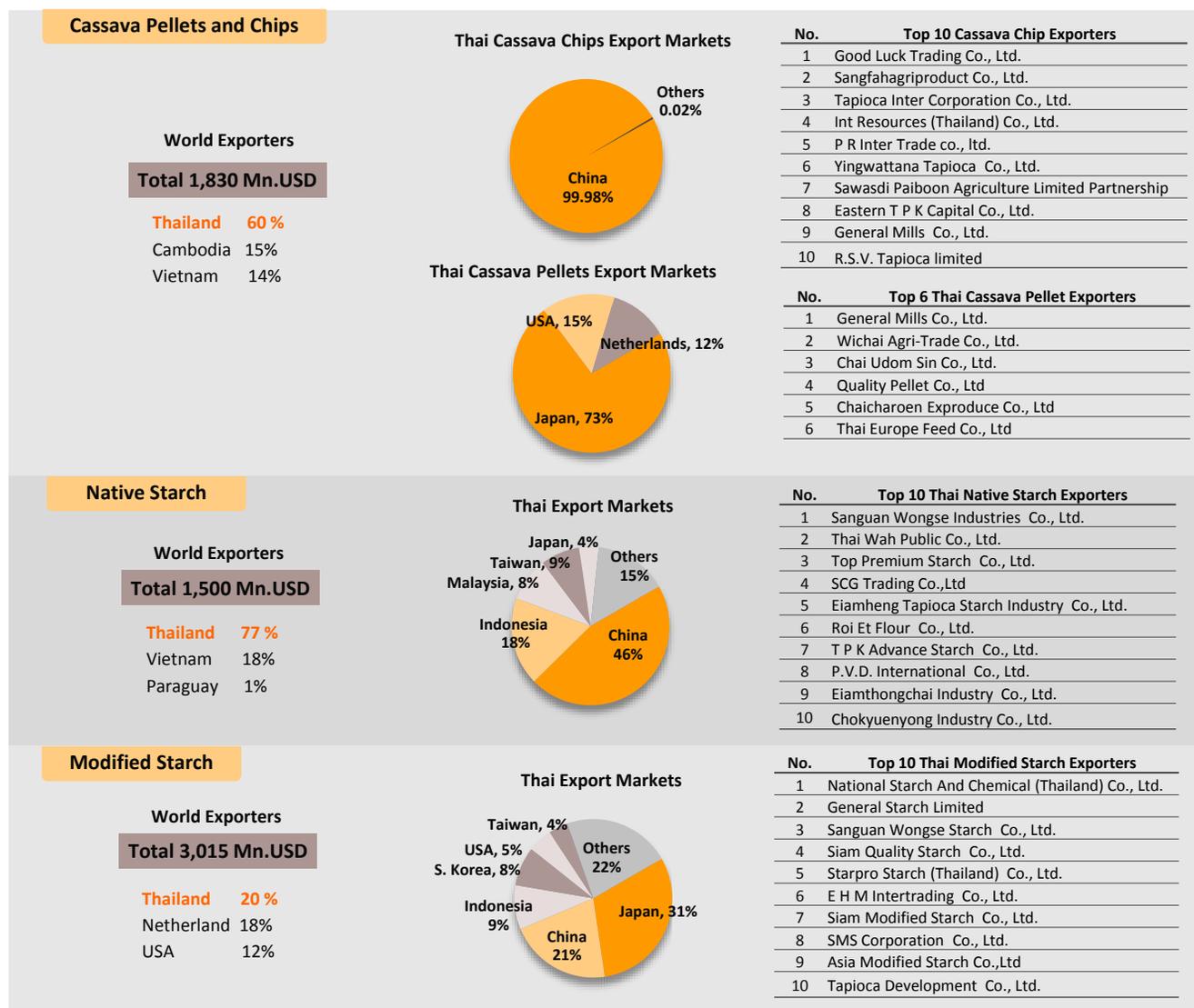


Source : Trademap, Ministry of Commerce (MOC), National Food Institute (NFI), compiled by Krungsri Research

2/ Producing 1 kg of cassava chips or cassava pellets requires 2.4 kg of fresh cassava, while producing 1 kg of cassava starch (or tapioca) takes 4.66 kg of fresh cassava.

3/ Reform of the EU Common Agricultural Policy (CAP) in 2005 forced a cut in imports of Thai cassava pellets as EU member states replaced these imports with EU products. The Thai cassava pellet industry is now classified as a sunset industry with no significant future; manufacturers of pellets have switched or are switching production to cassava chip for export.

Figure 7: World Cassava Exporters & Thai Cassava Export Market by Type (2016)



Domestic demand for cassava is expected to grow as a result of an expansion in investment in a variety of related industries, including food sweeteners (products such as glucose and fructose syrup), flavorings and supplements, L-xylene, and cassava-based ethanol^{4/} which is produced by companies including Ubon Bioethanol, PSC Starch Products and Sima Interproducts (Figure 8).

▲ Situation

In the period 2012-2015, the cassava sector saw continuous growth, with the area of cassava cultivated growing 1.3% pa and the total yield rising by 1.6% pa. This was spurred by high prices for fresh cassava and an expanding demand in export markets, which in turn was caused by the following factors:

- The price of cassava was lower over these years than for other starchy vegetables and cassava also has a relatively high calorific content, giving it an advantage compared to the alternatives and helping to increase demand for cassava as an input into downstream industries. In addition, cassava prices were relatively stable when compared to those of the other world commodities corn, rice and barley and this helped to increase cassava's status as a world commodity and to reduce costs for manufacturers.
- Demand for cassava in China, the single biggest importer of Thai cassava, went up significantly over the period in question, in particular for use as an animal feed. Indeed, a study by Krungsri Research found that in the period 2005-2015, demand for animal feed in China was 90% correlated to growth in the Chinese GDP.
- Chinese agricultural policies also helped to support imports from Thailand between 2008 and 2015. (i) Official promotion of food security policies after 2008 helped to restrict the domestic consumption of corn as an animal feed. Therefore, imports of cassava picked up as a replacement; (ii) As a way of controlling imports of oil and of addressing China's problems with air pollution, policies were introduced to promote the production of ethanol from cassava; and (iii) Government support for corn cultivation helped to push up the prices of Chinese corn products but at the same time, as a way of supporting the agricultural sector, import duties on corn were also set at a high rate. However, as a consequence of a free trade agreement between ASEAN and China, imports of cassava to China from Thailand attracted 0% duty, making them a low cost alternative.

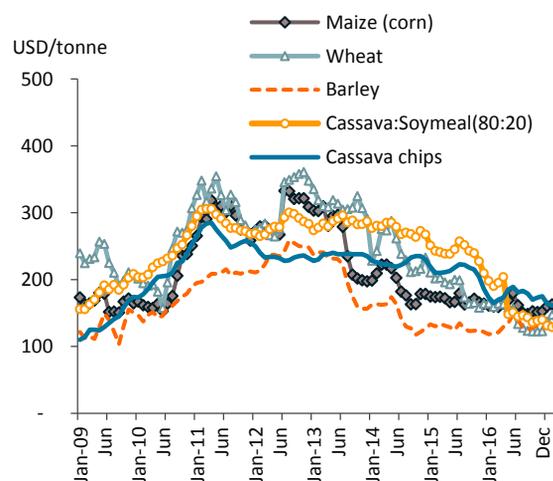
However, from 2016, the Thai cassava sector has experienced a slowdown and this has particularly affected exports, which have seen declines in both volume and value. The slowdown has been caused by a fall in the prices of other starchy or carbohydrate-rich crops, especially corn and wheat prices which move in line with global commodity prices. Such prices are now close to or in some cases cheaper than cassava (not classified as commodity products). This has narrowed the difference in manufacturing costs between cassava-based products and the alternatives, reducing in turn

Figure 8: Thai Ethanol Production & Consumption

Ethanol Factory	Installed Capacity (liters/day)
Cassava Root	
1 Thai Ethanol Power PCL.	130,000
2 Taiping Ethanol Co., Ltd.	150,000
3 E85 Co., Ltd.	250,000
Cassava Chips	
1 Rajburi Ethanol Co., Ltd.	150,000
2 E.S. Power Co., Ltd.	150,000
3 Thai Alcohol PCL.	200,000
4 Thai Agro Energy PCL.	350,000
5 Sapthip Green Energy Co., Ltd.	200,000
6 P.S.C Starch Products PCL.	150,000
Cassava Root and Chips	
1 Ubon Bio Ethanol Co., Ltd.	400,000
2 Sima Interproduct Co.,Ltd	150,000
Total	2,280,000

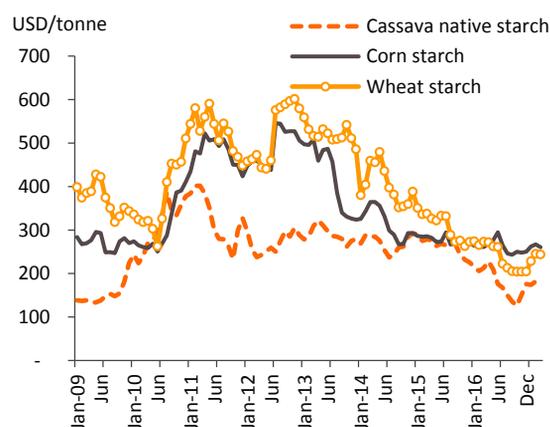
Source: DEDE

Figure 9: Global Animal Feed Price



Source : World Bank, calculated by Krungsri Research

Figure 10: Global Cereal Starch Price



Source : World Bank, Topicaithai, calculated by Krungsri Research

4/ Demand for fresh cassava is estimated to be around 2.2 million tonnes p.a.

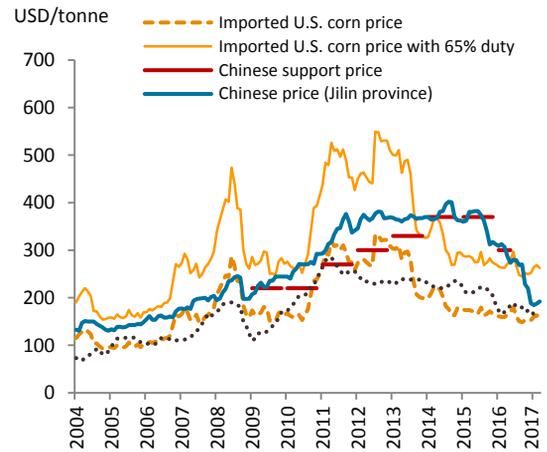
the competitiveness of cassava. Downstream industries have thus switched to using alternative raw materials and orders have fallen considerably, particularly from Chinese purchasers.

In addition to this, changes in agricultural policies by the Chinese government have had adverse consequences for Thai cassava exporters. Specifically, the Chinese government has announced that it will cut back on support for corn producers in order to reduce incentives to increase production and to reduce stocks of corn in the country. This is a temporary policy with effect in the 2016/17 growing season but as yet, no end to the policy has been announced. As a result of the new policies, at the end of 2016, the price of corn on Chinese markets fell from USD 360/tonne to USD 200/tonne, bringing the price of Chinese corn much more into line with the price of Thai cassava chip than it was previously and at the same, making domestically produced corn cheaper than imported corn (after allowing for import duties).

These changing market conditions in Thailand's most important trade partner have had serious consequences for imports of Thai cassava to China, which shrank 3.7% YoY by volume and 14.0% YoY by value. This was due to stiffening competition and increasing haggling over price, particularly by Chinese traders, who have increasingly come to Thailand to buy products directly from processing plants; negotiating by them has forced down the price of fresh cassava and in 2016, this plummeted to THB 1.52/kilo, down 29.6% YoY which had knock-on effects on the price of exports.

- Cassava pellets:** Total exports came to 12,000 tonnes, a fall of 69.8% YoY, with a value of USD 2.3 m., down 73.3% YoY. The majority of exports went to Japan.
- Cassava chips:** Exports of cassava chips fell 11.7% YoY by volume (to 6.4 million tonnes) and 18.4% YoY by value (to USD 1.11 bn.). As discussed above, these falls were the result of the Chinese government removing price support for domestic corn and selling off corn stocks at low prices. This prompted downstream industries to switch to Chinese corn as a cheap replacement for imported cassava. China also has no plans to extend investment in cassava-based ethanol production facilities and so this too helped to reduce demand for Thai products and Thai producers thus faced increasing levels of price competition. However, because large cassava chip manufacturers also control collection center, where cassava is sold by farmers, they were able to force down their purchase prices and thus for 2016, they managed to maintain profits in the face of falling demand.
- Native cassava starch:** There was an increase in the volume of exports of native starch, which rose 11.9% YoY to 6.41 million tonnes but at the same time, the value of exports fell by -7.1% YoY to USD 1.13 bn. This disparity was caused by increasing competition on price with starches from other plants but falling costs of fresh cassava and cassava chip helped native cassava starch producers maintain their profit margins.
- Modified cassava starch:** Exports of modified starch followed a similar pattern with rising volume (up 4.1% YoY) but falling value (down 4.9% YoY). The principal export market for modified starch is Japan and demand there rose, as it did in China, Indonesia and South Korea but increasing haggling by trade partners spurred by falling prices for alternatives to cassava helped to depress prices.

Figure 11: Chinese and U.S. Corn Price



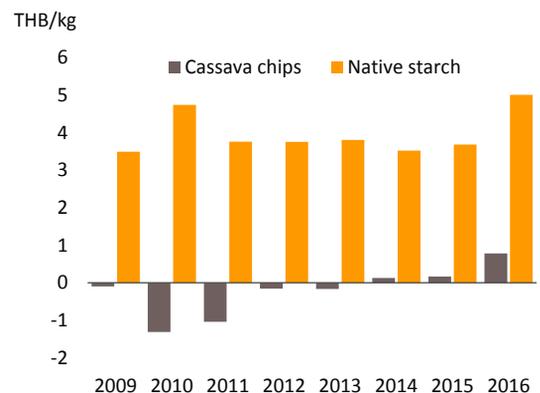
Source : Krungsri Research analysis of data from Bloomberg and China National Grain and Oils Information Center.

Figure 12: Thai Cassava Exports

Year	Value (USD, m)	Cassava Export				Total
		Volume (million tonnes)				
		Cassava Pellet	Cassava Chip	Native Starch	Modified Starch	
2011	2,644	0.04	3.70	1.90	0.80	6.87
2012	2,826	0.08	4.61	2.24	0.86	8.43
2013	3,230	0.05	5.75	2.45	0.91	9.72
2014	3,563	0.02	6.75	3.02	0.96	11.18
2015	3,505	0.03	7.26	2.93	0.91	11.68
2016	2,937	0.01	6.41	3.28	0.95	11.26
% YoY	-16.2	-63.8	-11.7	11.9	4.1	-3.6

Source: Ministry of Commerce (MOC)

Figure 13: Average Profit Margin of Cassava Chips and Cassava Native Starch in Thailand



Source: Office of Agricultural Economics (OAE) and Tapiocathai, calculated by Krungsri
 Note: 1 tonne of cassava chip = 2.40 tonnes of fresh root
 1 tonne of cassava starch = 4.66 tonnes of fresh root excluding other operating expense

▲ Outlook

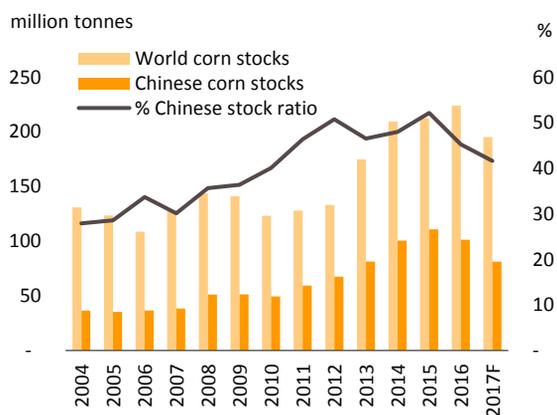
Over the next three years, it is expected that manufacturers of both cassava chips and native cassava starch will experience difficulties and the business will shrink with falling exports. This is a consequence of increasing competition from substitute (i.e. starchy cereals) and the changes to Chinese agricultural policy which have been described above. **However, demand from downstream industries will support continued demand for modified cassava starch, although the rate of growth in the trade will slow.**

- **Tapioca chips Exports are expected to fall by -5-10% YoY over the period 2017-2019 due to the Chinese decision to encourage the domestic industry to consume large stockpiles of corn** (which come to more than 100 million tonnes). In addition, as already described, the removal of price support has reduced the price of Chinese corn, making imports less competitive and depressing the price of Thai imports of tapioca chips. For these reasons, Thai producers are likely to see declining profitability, compared to earlier years.
- **Native cassava starch. Exports in this category are also forecast to fall, though at a slightly lower rate of 5-7% YoY.** This will be caused by falling prices for alternatives to cassava starch, such as that from corn and rice, which will move much closer together, thus increasing demand for starches from non-cassava products. In addition to this, Chinese policies to run down corn stocks will also have an influence, as domestic corn will replace cassava imports for the production of starch.
- **Modified cassava starch: Growing markets in Japan and the ASEAN zone, especially for use in cosmetics and medicine, will help to support an expansion of goods in this product group, which is forecast to grow by 5-7% YoY.** This will help to maintain healthy profit margins throughout the period.

Despite the negative outlook, cassava producers will benefit from expansion into downstream industries such as ethanol production and biomass energy generation. This will help to maintain income and reduce exposure to risks arising from fluctuations in exports. In addition, the ability to produce their own energy will help manufacturers reduce their costs.

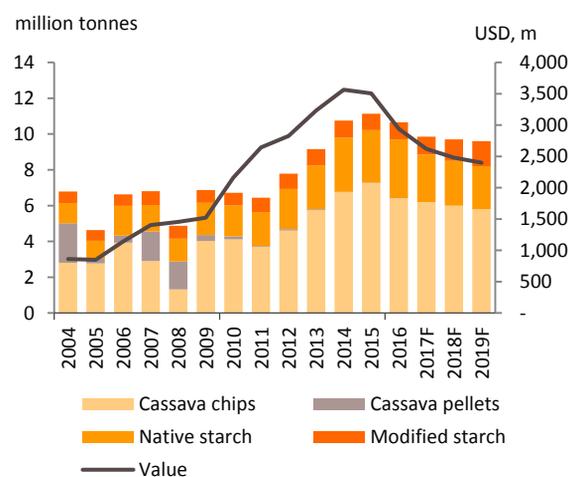
Over the long term, the cassava industry faces risks which need to be addressed. In particular, producers of low value-added primary products, for example, cassava chips face tough competition in seeking raw materials among ethanol and bio-plastic producers. Low value-added producers; therefore, need to consider adjusting their range of products to move themselves further up the value-chain if they wish to be assured of continued growth. Moreover, an over-reliance on Chinese export markets may expose operators to uncertainties in their income and a developing cassava sector in competitor nations, in particular in Vietnam and Cambodia, may lead to increasing price competition with an attendant downward pressure on prices, which would eat into profitability.

Figure 14: Global and Chinese Corn Stocks



Source : U.S. Department of Agriculture (USDA)

Figure 15: Thai Cassava Exports Forecast



Source : Ministry of Commerce (MOC), forecast by Krungsri Research

▲ **Krungsri Research view:** It is expected that, in contrast to earlier periods, turnover in the cassava industry taken as whole will not see high levels of growth.

- **Cassava growers: Farmers growing cassava will face the risk of downward pressure on prices for fresh cassava from processors, while production costs remain high.** On the other hand, government support for growers would come from the Committee on Cassava Policy and Management, which would institute measures to support the price of fresh cassava, including a pledging scheme, price support and specifying the quantity of stock which would have to be maintained as a proportion of exports. In the 2016/2017 season, this was set at a ratio of stock to export of 1.5:1. In addition, competition for the supply of fresh cassava from industry will help to reduce falls in prices.
- **Producers of cassava pellets: This group will continue to face sluggish demand and will be subject to unpredictability in their export markets,** which will lead to uncertain levels of income.
- **Producers of cassava chips: Manufacturers of cassava chips face the considerable risk of a contraction in the Chinese export market,** although this may be offset to a certain degree by the increasing value of sales to industries in the domestic market such as ethanol production and will this help to stabilize incomes.
- **Producers of native cassava starch: Incomes for this group will fall in step with declines in the Chinese market but profit margins will remain high** as the cost of fresh cassava remains low, while the price of finished products has not fallen when compared to products which have lower added-value, such as cassava chips.
- **Producers of modified cassava starch: This group will fare best of all, and incomes are expected to grow significantly,** supported by growth in the cosmetics industry and the possibility of expansion into new markets. Operators in this area have increasingly invested in business which are connected to the cultivation and primary processing of cassava and this will help to secure supplies of raw materials and to reduce the risk of having to compete with other industries for supplies of cassava.
- **Traders in cassava-based products: Incomes are expected to fall** for traders and merchants in cassava products as exports fall, especially to the Chinese market, and this will mean that incomes are not expected to grow significantly.

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