

Use of Sugar by Sugar- based Foodstuffs Industries in Myanmar¹

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Introduction

With growing economy, increasing urbanization and expanded small towns, emergence of groceries and super markets, changing life styles, and boosting up of the travel and tourism, all had led to increase in consumers demand for the soft drink, ready- made packed coffee and tea mix, bakeries, confectionary and cakes, assorted fruit jams, dairy products and improved traditional foods enriched with sugar. Under liberalization of market economy, domestic food industries are expanding and among these, sugar-based food industry has been increasing in number and improved products quality.

Growth in sugar-based food stuffs industry indicates the need for better understanding of the dynamics and structure of sugar consumption in assessing the future of the sugar economy. Sugar consumption includes not only sugar direct consumption but also industrial consumption (sugar based foodstuff industries). However, statistical information of the changing structure of sugar usage by sugar based foodstuff industries is still lacking. The directory or lists of the sugar based food stuffs factories and enterprises are scattering in various sources making difficult to conduct comprehensive consumption survey from the factory side.

Pre-survey data collection is therefore carried out to compile the list of the sugar-based food stuffs enterprises in larger, medium, small and microenterprises producing various types of foods in all regions and states. There are four major official sources or departments in which all relevant enterprises are registered for the business.

Directorate of Industrial Supervision and Inspection (DISI), Ministry of Industry (MoI) received registration of small, medium and large enterprises. Directorate of Investment and Companies Administration (DICA), Ministry of Investment and Foreign Economic Relation has now adopted the on-line digital registration process for the companies including sugar-based food stuffs companies. The Department of Small Scale Industries (SSID), Ministry of Agriculture, Livestock and Irrigation (MoALI) receives registration for the microenterprises. Yangon City Development Committee (YCDC), Mandalay City Development Committee (MCDC), Naypyitaw Council Development Committee (NCDC) and municipalities of all cities and towns and City Development Committee (CDCs) have been receiving registration and issuing license to all types of the business. Myanmar Food Processors and Exporters Association (MFPEA) had been formed at Union of Myanmar Federation of Chamber of Commerce and Industries (UMFCCI) and has compiled the list of food processors and food related exporters, particularly Yangon based companies. The list of the sugar based food stuffs factories is also seen in the respective Industrial Zones of Yangon, Mandalay and other large cities. Myanmar Marketing and Research Department (MMRD) also compiled and published the Food Industry Directory from time to time. Based on these

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sources of information, survey plan was designed to enumerate sugar uses by food industries in 2018-2019.

Objectives of the study

The main objectives of this study were as follow;

- (1) To estimate sugar usage by sugar based food industries in terms of amount, sugar grade and quality by different types of food processors
- (2) To estimate domestic and export sugar requirement based on the consumer market
- (3) To help develop the formulation of sugar strategy towards achieving sustainable domestic sugar industry growth.

Methodology

(a) Coverage

Sample size and sampling procedure has to be designed on the coverage of sugar-based food industry over the whole country. First, the list of enterprises registered at DISI was counted. There are 51,214 total number of industrial enterprises out of which number of food processing enterprises is 29,118, the number of large, medium and small categories are 4030, 5874, and 19,214 respectively as of June, 2019 (DISI). Out of total 29,118, rice mills of different sizes constitute 33.07 percent, major share of food stuff industry. There is only 1,229 number of sugar-based enterprises representing only 5.36 percent of total food stuffs enterprises in the whole country (Annex Table 1). Number of workers in large food industry varies from 500 to 1800 while in small industry; working force varies around 10 and above.

There are 12,549 microenterprises registered at SSID as of June 2019. Food processing microenterprises thinly spread out over the country in the number of 2,312. Out of it, sugar based microenterprises are found to be 611 (Annex Table 2). As defined in Small Scale Industries Promotion Law (2011), microenterprises are categorized using power from 0.25 HP above and 5 HP under and employing number of 3 to 9 workers.

The on-line registration system has been currently in process by DICA. About 69,000 entries are processed for registration. Entries under categories number 10, 11 and 56 may be related to sugar based food industry. Data is not accessible due to the on-going on-line registration process. The scope of survey is therefore limited to the sugar based food industry registered at DISI, SSID and those found in the industrial zones of Yangon and Mandalay.

About 8,136 food enterprises are granted license from Yangon City Development Committee within the municipal area limit of 33 townships, Yangon Region. It is estimated that there are about 4500 food and bakeries stalls, and cold drink and tea shops in YCDC areas. Similar number could be found in Mandalay MCDC area. In Naypyitaw NCDC area, there are recorded number of 955 food stalls, restaurants and tea shops. Sugar based food stalls may be estimated to represent about 25 percent. According to the report of Central Statistical Organization (CSO, 2018), there are total number of 22,903 enterprises of all different commercial and service activities given license by development committees in the 309 townships of the whole country. Food Business somehow using sugar may be estimated to represent 20 percent to the overall food business. In the present survey, all these categories under the respective municipal areas are not taken into account since the previous survey on

the household level sugar consumption has included the sugar source of these categories as “eating outside” item in the survey question.

(b) Sample Design

Visit to the food enterprises and face to face interview in a prepared format were conducted in six Regions and States and there are total number of 266 interviews out of country total 1,229 enterprises. Bakery and confectionary are the largest in number and the survey covered on this food category is 15.48 percent. Ice cream and ice stick food enterprises received 14.57 percent of survey coverage while milk and milk products enterprises receive the survey coverage by 62.3 percent and soft drink enterprises 12.3 percent. Coffee mix enterprises received 9.3 percent of the survey coverage (Table 1). Survey on microenterprises was conducted in Sagaing, Mandalay and Naypyitaw areas by means of face to face interview as well as telephone interview in other States, such as Chin, Kachin, Kayin and Mon. Average sample size is about 4 percent.

(c) Survey Instrument

The survey instrument adopted in this survey was a well –structured questionnaire designed to capture all the essential data to be collected for analysis. In the survey questionnaires, respondents (companies) were to indicate the sector they operate, the nature of business and type of products they produced, the source of sugar they use for their operation, where directly imported or locally sourced, etc.

(d) Data analysis

The magnitude of sugar uses has been surveyed with respect to size of the enterprises, large, medium or small. The average of the sugar uses is then multiplied by the number of the food enterprises in given Region or State. Based on the average data, total quantity of industrial sugar usage per year was finally calculated. Besides, sugar usage by sugar type was calculated using survey data.

Results and Discussions

(a) Number of respondents

Industrial sugar consumption survey was conducted during 2019 January to August. According to the registry data on sugar based foodstuffs industries registration obtained DISI and SSID, total number of sugar based foodstuffs industries were 2025 in 2019. In this survey, 289 industries (respondents), 14.3 % of total industries from 28 townships of different regions and divisions were selected for industrial sugar consumption survey (Table 1).

Table 1. Number of industries (respondents) by different sub sectors

No	Type of foods	Registered at SSID			Registered at DISI in 2017-2018						Total Sugar based foodstuffs Industries
		No.of Micro enterprises	No of sample survey	% of Sample	No.of large industries	No.of medium industries	No.of small industries	No.of total industries	No of sample survey	% of Sample	
1	Bakery&Cakes	154	5	3.25	127	195	381	703	127	15.48	974
2	Fruit Juice	159	2	1.26				0			159
3	Soft Drink	6	1	16.67	36	6	8	50	7	12.28	63
4	Wine	17	2	11.76				0			17
5	Toffee/Peanut	15	1	6.67				0			15
6	Fruits jam	137	6	4.38	10	23	9	42	14	30.43	183
7	ice cream/ stick	30	1	3.33	15	65	184	264	50	14.57	373
8	Yogart	31	2	6.45				0			31
9	Jelly/ candy	31	1	3.23	21	0	6	27	12	41.37	60
10	Milk/Product				28	29	11	68	38	62.29	61
11	Htone/Hla Mont	20	2	10.00				0			20
12	Kayaekayar	6		0.00				0			6
13	Coffeemix	5		0.00	16	0	0	16	4	9.30	48
14	Traditional food				6	7	46	59	14	93.33	15
	TOTAL	611	23	3.76	259	325	645	1229	266	18.81	2025

(b) Industrial sugar consumption by different sub sectors

Industrial sugar consumption by different sugar based industries was shown in (Table 2) and Figure (1).

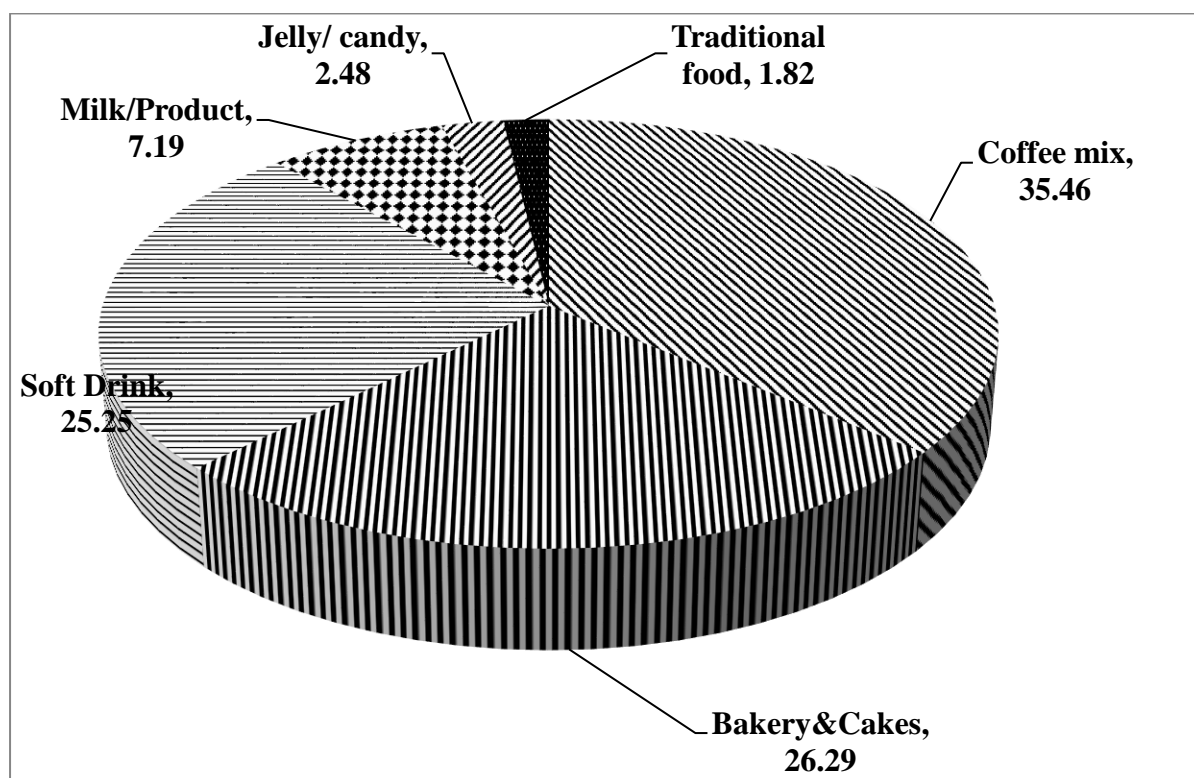
Table 2. Quantity of sugar use by sugar- based foodstuffs industries, 2019 (MT/year).

No	Type of foods	Sugar used by DISI sugar based industries MT/year	Sugar used by SSID sugar based industries MT/year	Total	% Sugar Usage
				Quantity of	
				Sugar usage MT/year	
1	Bakery&Cakes	94868	1848	96715.95	17.51
2	Fruit Juice		278.25	278.25	0.05
3	Soft Drink	195408	120	195528.5	35.40
4	Wine		90.1	90.1	0.02
5	Toffee/Peanut snack		135	135	0.02
6	Fruits jam	2767	531.56	3298.4	0.60
7	ice cream/ice stick	4332	48	4380.45	0.79
8	Yogart		96.1	96.1	0.02
9	Jelly/ candy	8554	96.1	8649.7	1.57
10	Milk/Product	32539		32539	5.89
11	Htone/Hla Mont		80	80	0.01
12	Kayaekayar		25	25	0.00

13	Coffee mix	204266		204266	36.98
14	Traditional food	6218		6218.22	1.13
	TOTAL	548952	3348	552300.6	

The total quantity of sugar consumed per year was 552,300 MT. The survey results also revealed that the top sugar-consumed industries were coffee mix, bakery and soft drink sub sectors and their sugar usage percentages were 35.46%, 26.29 % and 25.25 % respectively.

Figure 1. Industrial sugar consumption by top six sub sectors (%), 2019



(c) Sugar usage by sugar types

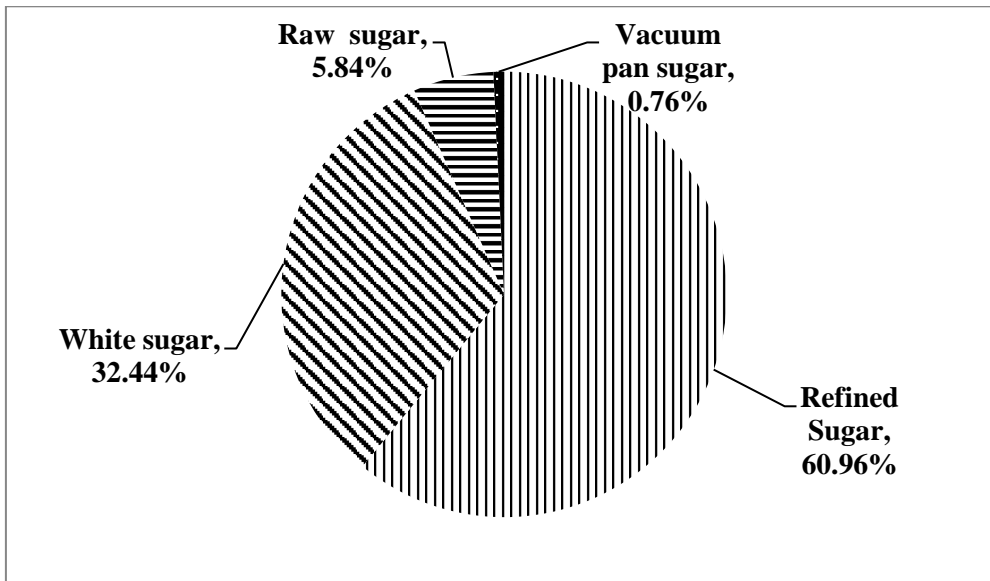
Quantity of sugar usage by sugar types was shown in Table (3) and Figure (2). According to the result, 61 % of total sugar usage by sugar-based industries used refined sugar and 32 % was white sugar in Myanmar. Annual quantity of refined sugar used was (408,815 MT) and that of white sugar was (120,485 MT). The reason why much more refined sugar has been used in the food industry may be due to the dumping of imported refined sugar in the domestic market. It was resulted from the outcome of the sugar re-export policy. Sugar was imported from Thailand, India and other oversea companies by the traders and entrepreneurs for re-export it into the Chinese border trade in the informal way. Thailand refined sugar is competitive in terms of price and quality against the domestic sugar and large amount of the refined was dumped into the domestic market apart from the imported refined sugar allowed license to large food processors. Domestic sugar based food industry easily procured the refined sugar and its usage became high in

quantity in 2018-2019. Vacuum pan SMEs sugar processing plant particularly in Mandalay, Taung Gyi and Pywe Bwe process sugar which is often used for traditional foods making by local food processors. The use of SMEs vacuum pan paung sugar is estimated to be 2653 MT/yr. Traditional food processors and those microenterprises registered at MCDC, NPCDC and township wise municipal committee also used this sugar and the actual used amount may be more than this amount.

Table 3. Quantity of sugar usage by sugar type in respect of regions and states (MT/yr)

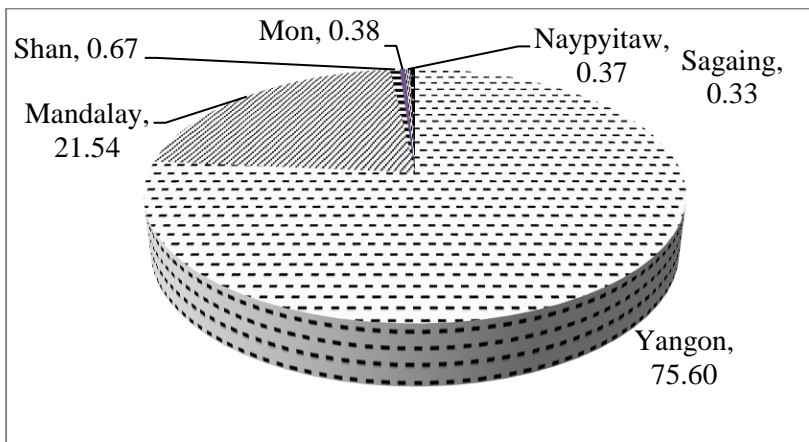
Sr	States/regions	Quantity of sugar usage by sugar type (MT/yr)					% of sugar usage
		Refined Sugar	White Sugar	Raw sugar	Vacuum pan SMEs sugar	Total	
1	Kachin			50	30	80	0.02
2	Kayah			30	12.5	42.5	0.01
3	Kayin			20	50	70	0.02
4	Chin			10		10	0.00
5	Sagaing		581.03		561.94	1142.97	0.33
6	Taninthari		916.32			916.32	0.27
7	Bago	121.5	496.46			617.96	0.18
8	Magwae		818.1			818.1	0.24
9	Mandalay	3267.55	76009.03	541.68	1999.02	74317.28	21.54
10	Mon		1311.15			1311.15	0.38
11	Rakhine		540			540	0.16
12	Yangon	405426	32691.61	19163.3		260820.91	75.60
13	Shan		2314.23			2314.23	0.67
14	Ayeyawady		725.64			725.64	0.21
15	Naypyitaw		1265.5			1265.5	0.37
	Sub Total(DISI)	408815.05	110169.07	19814.98	2653.46	541452.6	
	Sub Total(SSID)		2816.55	531.56		3348.11	
	Total	408815.05	120485.62	20346.54	2653.46	552300.7	
	% of sugar usage	60.96	32.44	5.84	0.76		

Figure 2. Sugar consumption in percentages by sugar types (%)



Sugar consumption by food industries with respect to the regions and states is shown in Annex Table 3. The top regions and states of sugar usage in percentages was shown in Figure (3). Yangon was the largest sugar-consumed region (75.60%) for food industry followed by Mandalay region (21.54%). It implies that food processing companies in Yangon and some in Mandalay distribute their food products nationwide and the volume of production is rather high. Some branded foods such as htou moun /La Mont (glutinous rice pudding enriched with sugar, edible oil and coconut) is Mandalay brand image and distributed nationwide through bus and rail terminals. Other Regions and States produce food products within their region and across townships and the scale of production is therefore limited. The number of bakeries and ice cream making plants are relatively high in Shan and Mon states and Sagaing region, resulting in large sugar uses.

Figure (3) Sugar consumption by food industries in percentages by top six regions and states (%)



(d) Trading and Marketing of Sugar

Some sugar factories directly enter into the advanced sale contract with large Food Stuffs Company with 20 to 30 percent down payment of the total sale price around August or early sugarcane season. Some factories sold sugar through their regular trading agent to the buyers. Some sugar traders directly contacted with the sugar factory and they hoard the sugar after purchase and sell the sugar to the small and microenterprises of food stuffs in retail. Small enterprises could not afford to buy sugar in large amount for five to six months and they buy sugar from sugar traders of market center town in small amount for their need of one week or two –three days. At the time of high price of local sugar, micro-food processors bought artificial sweetener (Sodium cyclamate) which often is cost effective in adding sweet to their foods and thus attempted to survive their food selling business. The final victim of health hazard is local poor consumers or young school children.

Refined sugar of Thailand is readily available in Mon State up to the market centers of Kyaik Hto and Bilin and many jam fruit processors there buy the refined sugar in retail from their nearby market. In the mainland Myanmar towns, primary source of marketing channel is Bayint Naung whole sale market center and medium and large food processors bought either local or imported refined sugar from their regular sugar traders of Yangon Bayint Naung market. Large food stuffs Companies who need quality sugar in large amount applied import license from the Department of Trade, Ministry of Commerce. (MoC). Some factories established under MIC permit also entitled to apply import license for refined sugar import. These factories have good access to imported refined sugar through formal trade channel. Some companies applied import license for more than their need and made pre-sale contract for the surplus amount with some traders of Bayint Nayaung market and upon the arrival of the oversea shipping vessels at Yangon dockyard, additional sugar was downloaded and directly delivered to the pre-contracted traders in Yangon. Some Food Stuffs Companies of Myanmar traditional foods which do not customarily use refined sugar for their products also applied import license for refined sugar since they possessed and operated the factory for which they entitle to apply import license and they sold the license permit to another trader for sugar import. Some factory owner pretended to install refinery process in their sugar factory and they take advantage of applying import license of raw sugar and thereafter sold it to the domestic market. Such stories of misconducts and irresponsible business transactions are often heard particularly during the times of release of import permit from the MoC for re-export sugar to large number of traders. Finally large amount of imported sugar was dumped into the domestic market and the sugar industry (particularly sugar millers and sugarcane growers) was hit hard. They are losers while winners are big sugar –based food companies and sugar traders.

(e) Types of Sugar Used by Different Food Processors

Large soft drink companies procure imported refined sugar or high quality sugar from the domestic sugar factories. Coffee mix processors often used refined sugar. Bakeries used high quality white sugar or refined sugar. During the interview with 80 foodstuffs companies

in Yangon, 17 percent of the respondents said that they require refined sugar in their food processing. However, about 43 percent of the respondents said that they actually used the refined sugar at present. Six respondents out of 80 used both refined sugar and white sugar. Traditional food processors who process food called “htou moun” (pudding made of glutinous rice, sugar, coconut and oil) applied white sugar or the local paung sugar (fair grade sugar produced by vacuum pan sugar processing SMEs plant). Food processors set up their own SMEs “paung” vacuum pan sugar plant for their htoou moun processing. Some small and micro food processors for fruit jam- making applied raw sugar or sugarcane jaggery. They reported that raw sugar is ideally suited to their assorted fruits jam products. One large condensed milk processor purchased a small sugar factory from the government sale and the company expanded the sugar production with quality for its own condensed milk processing. One large wheat importer had conducted country wide training on bakery and cake making and some small towns have access to such trainings. Most rural young people happen to be oversea migrant workers and upon their return to their villages, they prefer eating bakery products. Small food processors now emerged in most small towns and uses of white sugar have been expanded.

(f) Normal Sugar Sale Business of Foods Stuffs Companies with Sugar Factories

Food Stuffs Companies with monthly requirement of over 30 MT of sugar produced more products of bakery in the cool season and more soft drinks in the summer season and in accordance with their raw material needs, the amount of sugar procurement by the food stuffs companies become a seasonal pattern. For bakery and cakes, the company usually enters into sugar procurement contract with the factory or the sugar trader around September in each year. Advance purchase of sugar could be for the processing months of the whole cool season and summer season. The purchasing price of one food- stuffs company for white sugar in 2018 was recorded in Table 4. Interview with 90 food processors has shown that the average sugar purchasing prices were MMK 1265 in 2016-17, MMK 1182 in 2017-2018 and MMK 1127 per viss in 2017-18. It clearly shows that the sugar re-export has depressive effect on the domestic sugar price.

Table 4. Monthly prevailing price (ex-factory price, MMK per viss) of white sugar in respective sugar factories as the trading partner of one food stuffs company, 2018.

Month	Price offered by local sugar factory 1*	Price offered by local sugar factory 2	Thai refined sugar price	Remark
January	1315	1255		
February	1215	1125		
March	1195	1130	1125	
April	1225	1190	1122	
May	1350	1300	1290	
July	1250	<1200		Slack season
August			1065	Collapse of domestic sugar market due to dumping of Thai

			sugar
September	Large food stuffs companies concluded their sugar procurement and stored the sugar as inventory of six months uses in their warehouse.		

*Sugar factory 1 has more access to the Chinese border market and its sale price is more often higher than that of other factories.

1 viss = 1.637 kg; 1 USD = about MMK 1510 (1250 MMK/viss equivalent to 50 cents per Kg.)

Source: Own interview with one large bakery company, June 2019.

Small and micro enterprises of sugar- based food stuffs normally purchase sugar at the prevailing market price on weekly or monthly basis from the sugar trader throughout the whole year. They are always prone to the fluctuation of local sugar price.

One food stuff company expressed concern about the sugarcane procurement price offered by the sugar factory to sugarcane farmers. When large amount of re-export sugar has been dumped into the domestic market, the local sugar prices collapsed and on account of this low market sugar price, some factory owner tended to depress the sugarcane procurement price to farmers. Some factories have sold out sugar to the food stuffs companies at regular high price while other factories have to sell their sugar at low price due to market collapse. There are varied situations. Sugar market price should be stable under the situation of predictable demand and supply and opening and closing stock in balance. This is important pre-condition for the sustainable adoption of contract farming between sugar factories and sugarcane farmers at the stable sugarcane procurement price or fair product value share between the two parties.

(g) Trade sector vs. production sector

Promotion of sugar re-export without due consideration to domestic production will become anti-production bias trade instrument and this could be clearly illustrated in the case of sugar industry. Over four years from 2015 to 2019, inflow of re-export sugar into Myanmar has amounted to 4.8 million MT² while the outflow of the imported sugar amount was much less than inflow amount and domestic sugar market was flooded with re-export sugar. Due to weak transparency, complaints have been heard that large food stuffs companies for soft drinks, coffee mix, bakeries could import the refined sugar for their need and even surplus amount in most cases. This is hard to deny if one could examine the yearly import data for the domestic sugar based food stuffs companies (Table 5). Drawing a balance sheet of sugar demand and supply and stock in hand could clearly reveal this point.

² Report from Export-Import Division, Dept. of Trade, MOC, January, 2019

Table 5. Estimated sugar demand and supply situation, 2018–2019

1. Amount of sugar (MT) used by food stuffs factories and enterprises –	552300
2. Amount sugar (MT) consumed in different foods & drinks by households -	395000*

Balance (MT) in stock of different foods, bakeries, drinks, etc. -	156497

* (Figures derived from Nyo Nyo Aung et al. 2019 report)

Production of sugar by domestic sugar factories

1. White sugar (MT)	--	470233 (Source DOA, MOALI)
2. Refined sugar (MT)	--	4363
<hr/>		
3. Total domestic production (MT) -		474596

Sugar-based food stuffs enterprises imported with license refined sugar, 2018-19 ; 256840 MT

Senior Officers from MoC have defended their sugar import policy for the benefit of sugar-based SMEs and promotion of SMEs growth. But this point may overlook the value of imported goods and output of the domestic industry. In the case of bakery and confectionary, for instance, import content of the domestic product is almost over 95 percent since all contents (wheat, sugar, baking powder, yeast, flavor, food additives), almost all are imported. If the product is exportable commodity like CMP product, export earnings could justify imported expenditure. But the food stuffs are locally consumed. For such commodity, import content should not be too high. It is an overlooked point. Domestic wheat production has been collapsed due to massive import of Australian and others. Sugar industry will come next. There is no denying for the justification of the import policy for the product of competitiveness. But why should not opportunities be given for enhancing the competitiveness and productivity of the domestic industry. Import promotion policy without due respect to allow the structural adjustment of the domestic industry will always lead to the regular trade deficit, weakness of local currency, inflation, inability to improve the national banking system, high domestic investment in production, repeated failure of domestic industry in competitiveness against the imported goods.

Another unseen point is powerful Thailand sugar policy weapon. Thailand adopted the sugar quota “A, B and C” allocation system to their domestic sugar mills and sugar traders. Domestic sugar price in Thailand is ever high and in order to have access to the domestic market (Quota A), sugar millers and traders have to export the prescribed quota (B) to oversea market at competitively reduced selling price. This transaction is administered by Thai sugar act and its national level Office of Cane and Sugar Board. Thai sugar industry adopted it over three decades and the industry reached a giant size. Brazilian sugar industry put up the complaints to WTO for this violation of the WTO rule. Recently Thailand abolished the quota system and adopted another sugar policy but the fundamental trading practices still remain almost the same. The domestic refined sugar price in Thailand in early

2018 was shown to be 22.85 baht per kg refined sugar which is equivalent to 1758 MMK per viss at the prevailing exchange rates. But when it is sold as export sugar, the selling price at Myanmar port becomes only 950 MMK to 1000 MMK per viss of refined sugar which is clearly competitive against Myanmar domestic sugar price. Myanmar sugar industry obviously needs its own government support as did by the other neighbouring country. Without such policy support, the sugar import policy of MOC will be damaging its native industry although it is not done purposely. .

(h) Sugar quality factor

Apart from the sugar policy support, sugar quality improvement should receive the priority agenda for the domestic industry. Myanmar sugar millers have long been used to the informal trade into Chinese's border at high price for regular white sugar quality. They have no incentive for further improvement. Two companies of the northern sugar factories have expanded the crushing capacity of the factories to over 8000 tons cane per day (TCD). The factories are meeting economies of scale with low production cost. The companies gained good profit in sale of fair quality white sugar to the Chinese border market at high sale price. But now the situation of China changed from the informal trade to the formal trade demanding good compliance with the formal trade agreement. Thailand, Vietnam and Cambodia are approaching Chinese formal trade opportunities. Myanmar companies should prepare for the quality market. Table 6,7 and 8 shows comparative sugar quality specification among the domestic sugar factories and that of Chinese quality specification.

Table 6. Compliance standard for sugar to be imported into China

Item	Indicators			
	Refined class	Superior class	First class	Second class
Sucrose content (g/100 g) > =	99.8	99.7	99.6	99.5
Reducing sugar (g/100 g) < =	0.03	0.04	0.10	0.15
Conductivity ash (g/100g) < =	0.2	0.4	0.10	0.13
Loss on drying (g/100 g) < =	0.5	0.6	0.7	0.10
Colour value (g/100 g) < =	25	60	150	210
Turbidity degree (g/100 g) < =	30	80	160	220
Impurity insoluble in water	10	20	40	60

Source: Official communication through diplomatic channel from China, July 2019

Table 7. Myanmar standard criteria of sugar products for domestic sugar factories

No.	Quality specification	Different sugar products			
		Export sugar	Refined sugar	Local sugar	Raw sugar
1	Pol %	99.6 min	99.7 min	99.6 min	98.0 min
2	Reducing sugar %	0.1 max	0.04 max	0.1max	0.5 max
3	Ash %	0.1 max	0.04 max	0.1 max	0.2 max
4	Moisture %	0.07 max	0.04 max	0.07 max	0.2 max
5	Colour (ICU)	120 max	60	250	900 max

Adopted in 1996 at the time of Myanmar Sugar Enterprise, now regulated by Sugar Division, MOALI, 2018-2019; Vietnamese refined sugar product ICUMSA < 30.

The tables indicate that quality performance of most sugar factories appeared to be the same in terms of pol percent value. But it shows various grades in reducing sugar content, SO₂ content, and grain size among 18 sugar factories. Domestic factories should upgrade the quality and set up the brand image for its product. Most complaints coming from the interviewed respondents pointed out physical features such as content of dirt, colour appearances. Thai sugar is said to be sparkling white free from dirt, rodent excreta, and free from any microbial contamination,

Table 8 . Comparative quality indicators of sugar products of domestic sugar factories, Myanmar, 2019

No.	Quality indicators	Nawaday	In Nga Gwa	Duyin Ga Bo	Kan Hla	Grand Precious	Sin Shwe Li (I)	Sin Shwe Li (II)	Pyinmana	Dahat Kone	Taung Zin Aye
1	Pol %	99.5	99.75-99.8	99.56	99.6	99.7/ 99.6	99.78	99.97	99.36	99.75	99.77
2	Moiture %	0.02	0.04-0.042	0.026	0.05	0.03/ 0.04	0.02	0.01	0.073	0.047	0.032
3	Colour (ICU)	219	80-100	105.38	120-150	99/154	117	78	66	80	90
4	Ash %	0.06	0.048-0.055	0.06	0.04	0.03/ 0.04	0.03	0.02	0.055	0.025	0.023
5	SO ₂ (PPM)		6-8	6.82		9-10	11	25	12	14	14
6	Reducing Sugar %	0.11	0.06-0.068	0.09	0.08	0.03/ 0.04	0.04	0.04	0.079	0.068	0.025
7	Grain Size		40-44	49.66	34-38		69	61	89	82	68
8	Turbidity							33			32
9	Impurities, ppm							11			20

Table 8 . Contd.											
No.	Quality indicators	Yedashe	Myo Hla	Oat Twin	Zeyawad y	Madaya	Great Wall	Kanbu Lu		Oak Kan	
								refined	Raw Sugar		
1	Pol %	99.7	99.76-99.8	99.78	99.8	99.85	99.58	99.78-99.80	97.22-97.46	99.82	
2	Moiture %	0.05	0.35-0.037	0.035-0.055	0.04	0.010-0.03	0.023	0.018	0.16-0.20	0.03	
3	Colour (ICU)	100	74.92-95	140-280	90	150-180	150-200	32-45	1064-1731	90-95	
4	Ash %	0.031	0.041-0.049	0.03-0.055			0.03	0.012-0.015	0.11-0.15		
5	SO ₂ (PPM)	6	12-15	7-10	18.56	<=17	15			8-9	
6	Reducing Sugar %	0.061	0.034-0.039	0.4-75	0.07	0.04	0.09-0.1	0.014-0.018	0.13-0.18	0.09	
7	Grain Size	24	55-68	48-56						35-38	
8	Turbidity		38								
9	Impurities (PPM)		30								

source: Collected document by Sugarcane Development Division, Department of Agriculture, MOALI, 2019

Myanmar sugar is said to be inconsistent in quality during the interview. Investment is needed and investment promotion is expected from the government in attempt to restructure and upgrade the sugar factory in Myanmar sugar industry. The revitalization of the domestic industry must be a time bound process and within four to five years, it should be implemented.

(i) Sugar substitute

Sodium cyclamate is synthetic sweetener and in attempt to reduce cost of food and drink preparation, some entrepreneurs applied this chemical sweetener to their product formulation. The sweetening agent is 80 to 100 times sweeter than natural sucrose. Misuse of this artificial sweetener may lead to hazardous effect on the consumers. The US, Korea and some countries banned this sweetener as a probable carcinogenic agent to the consumers. This artificial sweetener does not become a major substitute to sugar products in Myanmar. However, microenterprise who prepares soft drinks, ice sticks or juices applied this agent in large amount as substitute to sugar in time of the high price of the latter product in the domestic market. Inflow of High Fructose Corn Syrup (HFCS) into Vietnam is also a threat to the sugar industry, as reported at fourth meeting of the ASEAN Sugar Alliance in Ho Chi Minh City, 17 June 2019.

(j) Traditional Jaggery

Myanmar had been and is still producing traditional jaggery as toddy jaggery and sugarcane jaggery. Cane jaggery production has been reported in the supply side of this study programme.

The demand side, which is driving from Indonesian based multinational food stuffs company, of the toddy jaggery could be seen in Table 5 .

Table 7. Production of toddy jaggery by small producers and export volume and value of the products

Year	No. of villages	No. of toddy climbers, small producers	Local collectors	Direct small holders sourcing, MT	Sourcing from Market, MT	Total exported MT	Export Earning, USD Million
2012	1	33	1	18	-	18	0.01
2013	6	59	11	314	333	647	0.47
2014	42	1440	54	1313	1572	2886	2.34
2015	53	2430	94	2738	1332	4070	3.20
2016	45	1960	75	1905	1480	3478	3.01
2017	40	2157	77	2035	1239	3274	2.79
2018	40	1924	67	3330	2756	6086	4.65
					Total	20,459	16.67

Source: Zawgyi Agri Trade Ltd. (www.zawgyipremier.com)

Traditional cane jaggery has not been upgraded to the export product. Myanmar still prefers to use it as snack food.

Conclusion

Myanmar food stuffs industry is expanding and improving due to urbanization. In the rural sector, agriculture still remains at the stage of conventional and semi-commercial production stage and if this status is upgraded to the transformation stage of agribusiness development, rural food industry will be growing also. If rural electrification is extending throughout the country within three years, processed foods will be more produced. Myanmar sugar industry should orient to the dynamic status of the food industry and agribusiness development direction. The industry should not pursue the import substitution strategy because it will never realize the objective because the industry history gave us several lessons. The industry should pursue policy of attaining competitiveness and comparative advantage strategy to enable the industry to meet the domestic need with competitiveness against imported goods as well as to enable the industry to export the goods if market is accessible. .

Quality sugar production with competitive price is a MUST for the sugar factories. Factory restructures and revitalization with improved sugar processing is urgently needed. Factory expansion is important to meet the economies of scale in cost effective production. Product diversification such as electricity generation and sale, and bioethanol processing are needed as two legs to support the factory's survival apart from the sugar production as one leg. These three legs will help stabilize the long term survival of Myanmar sugar industry. This is seriously in need of the government support. At least key officials from four union ministries are solicited to sit together for coordinated effort of the sugar industrial restructuring (MOALI for supporting consolidated land uses for sugarcane zone, MOEE for allowing electricity distribution and sale at mutually agreed price and bioethanol processing either for E 10, E20 blending policy or direct export to neighbouring countries, MoI for industrial expansion towards scale economies, MoC for a balanced import policy for refined sugar, and finally taxation and investment promotion by both MOPF and MoIFER). The present day sugar industrial dilemma is not an issue –based problem but policy –based problem and key ministries are crucial in determining the fate of the future sugar industry: collapse or survive.

Fiscal Year	Sea route						Border		Total	
	refine sugar for factory use		MIC sugar Naypyitaw - Yangon		White sugar					
	MT	USD Mil.	MT	USD Mil.	MT	USD Mil.	MT	USD Mil.	MT	USD Mil.
2013-2014	43734.000	26.387					1358.400	0.950	45092.400	27.337
2014-2015	75834.026	44.551					213.600	0.131	76047.626	44.682
2015-2016	288340.640	164.998	26514.880	14.259			49522.907	25.913	364378.427	205.170
2016-2017	125667.684	69.213	40748.845	21.077	115775.803	63.880			282192.332	154.170
2017-2018	154456.000	83.812	60939.000	31.197	33996.644	18.698	724.000	0.348	250115.644	134.055
2018	137094.500	68.792	36273.441	16.105	620.000	0.282			173987.941	85.179
2018-2019, 1-10-2018 to 11-1-2019	58105.400	27.891	25368.000	11.293	290.800	0.122			83764.200	39.306

source: Export-Import Division, Department of Trade, 25-1-2019, Naypyitaw

Annex Table 1. Number of small scale industries producing various types of sugar -based food stuffs in Regions and States registered at SSID, as of June 2019

Sr	State/ Region	Bakery/Cake	Soft Drink	Juice Fruit	Wine	Toffee/Penut	Assorted Fruit Jam	Ice Cream/ Stick	Yogut	Jelly/Candy	Halawar	La mote/ Htone mote	Coffeen Mix	Total
1	Kachin	1	2	2	4		4		1	1				15
2	Kayah													0
3	Kayin	24	1					9						34
4	Chin	2		5	4					1				12
5	Sagaing	11	1	15	1		2	1		2		1		34
6	Thninthari													0
7	Bago			6			2			1				9
8	Magway	16	1	2	1	5	2		2					29
9	Mandalay	18	1	84	2	6	62	10	17	19		3	2	224
10	Mon	2		2			17							21
11	Rakhine													0
12	Yangon	49		23	3	4	34	7	8	3			2	133
13	Shan	11		12	2		9		2			2	1	39
14	Ayeyawady	8		8			3			2	20			41
15	Naypyitaw	12					2	3	1	2				20
	TOTAL	154	6	159	17	15	137	30	31	31	20	6	5	611

Source: Department of Small Scale Industries, (SSID), Ministry of Agric, Livestock and irrigation, 2019.

**Annex Table 2 . Number of industries producing various types of sugar- based food stuffs
in Regions and States registered at DISI, as of 2017-2018**

Sr	States/regions	Bakery	Soft Drink	Milk Product	Fruit Jam	Ice cream/ Stick	Candy/Jally	Traditional food	Coffee Mix	Total
1	Kachin	24				55				79
2	Kayah	17	1							18
3	Kayin	24	1			9				34
4	Chin	2	1							3
5	Sagaing	44	1	8		17				70
6	Taninthari	35								35
7	Bago	32	1	1		38				72
8	Magwae	30	4	4		16		4		58
9	Mandalay	159	6	43	33	44	9	15	1	310
10	Mon	45	3		1	28	1			78
11	Rakhine	21								21
12	Yangon	150	29	10	1	39	12		15	256
13	Shan	83	3		3	7				96
14	Ayeyawady	24			4		5	40		73
15	Naypyitaw	13		2		11				26
	Total	703	50	64	42	264	27	59	16	1229

Source: Directorate of Industrial Supervision and Inspection (DISI), Ministry of Industry, June 2019.

Annex Table3. Number of industries producing various types of sugar- based food stuffs in Regions and States registered by DISI, as of 2017-2018

Sr	States/ regions	Bakery	Soft Drink	Fruit Juice	Wine	Milk Produ ct	Toffee / Peanu t	Fruit Jam	Ice cream Stick	Candy Jally	Tradit ional food	Coffee Mix	Total MT/ye ar
1	Kachin	70							10				80
2	Kayah	35							7.5				42.5
3	Kayin	70											70
4	Chin	10											10
5	Sagaing	626.94	150			278.88			87.15				1143
6	Taninthari	916.32											916.32
7	Bago	452.61	8.75			7.35			149.25				617.96
8	Magwae	577.92				62.88			81.3		96		818.1
9	Mandalay	47640.66	708			22092		2589.8	344.57	1872	5670.3	900	81817
10	Mon	866.88	301.44					4.68	137.55	0.6			1311.1
11	Rakhine	540											540
12	Yangon	39836.02	193935			9936		120	3409.9	6678		203366	457280
13	Shan	1884.6	305.28					33.6	90.75				2314.2
14	Ayeyawady	252						18.72		3	451.92		725.64
15	Naypyitaw	1089				162			14.5				1265.5
	Sub Total(DISI)	94867.95	195408			32539		2766.8	4332.4	8553.6	6218.2	204266	548952
	Sub Total(SSID)	1848	120	278.25	90.1	96.1	135	531.56	48	96.1	105		3348.1
	Total	96715.95	195528	278.25	90.1	32635	135	3298.3	4380.4	8649.7	6323.2	204266	552300