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Rice Industry in Malaysia: Challenges, Policies and Implications

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Abstract

Rice is the second most important crop in the world after wheat, with Asia being the largest producer and consumer. The National Agrofood Policy of Malaysia, 2011-2012 (Dasar Agromakanan Negara, DAN) had highlighted that local rice production should be increased to ensure the country's demand in future. However, to what extent this ensures food security in Malaysia was not supported empirically so far. The objective of this study is to estimate the future need of rice industry in Malaysia based on past performances. Using polynomial curve on historical production, consumption, export and import values from 1963 to 2013, this study has projected the production and consumption value for the 19-year period between 2012 and 2030. The results had revealed an increasing demand for rice with declining supply can be only off-set by import of rice in future.

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1. Introduction

Rice is the second most important crop in the world after wheat (Matthews , 1995; Banik 1999) with Asia being the largest producer and consumer (Gumma et al., 2011). The increasing population in Asia has led to an estimated 70 percent increase in rice that is needed to meet the demand in the future (Papademetriou, 2000). Nonetheless, food consumption pattern of the adult population in Malaysia shows that Malaysians consumed an average of two and half plates of rice per day (Norimah Jr, 2008). Although one of the studies has indicated that rice is an inferior good for the country's population (Ito, 1989; Tey, 2008), it is the most important staple food in Malaysia (Brown, 1973). The Ministry of Agriculture and Agro-based Industry (MOA) implemented Dasar Agromakanan Negara (DAN) to ensure sufficient supply of food and to transform the agro-based industry to become a more competitive and sustainable industry and increase income of entrepreneurs in this industry. Dasar Agromakanan Negara (DAN) 2011-2012 highlighted that local rice production should be increased to ensure the country's stock of rice as only

7% of world's rice production is traded. Nonetheless, in Malaysia the projection of paddy production was done using system dynamics approach (Alias et al., 2011), whereas rice consumption is based on a few assumptions (Abdullah, Ito and Adhana, 2006) that show an increasing pattern until the year 2050. In this study, however, the forecasted rice production was done using polynomial curve with historical production. The objective of this study is to estimate future scenario of rice industry based on past rice production, consumption, as well as export and import values. This study had analyzed historical data between 1963 to 2013, to draw a projection on rice production value from 2012 to 2030.

2. Rice Production and Consumption Trends

In the third Malaysia plan (1976-1980), the new economic policy had given prime priority on the agriculture sector. Under this policy, opening of more agriculture lands for paddy production resulted in a positive growth in the rice production between 1970 and 1975 (Table 1).

According to the Fifth Malaysian Plan (1986-1990), paddy production decreased by 1.1% compared to the previous five-year plan due to weather conditions, pest and diseases outbreak called "Penyakit Merah Virus" (rice Tungro disease). As a result of this, the average annual growth of rice production decreased by 1% during the same observation period. Nevertheless, in the Eighth Malaysian plan (2001-2005), paddy production had improved due to commercialization, involvement of private sectors and consolidation of small holding through group farming.

The annual growth of average rice consumption after 1985 was generally found to be positive with an ambiguous trend, except in 1980. During the world's food crisis period between 1972 and 1973, the government decided to increase its self-sufficiency level (SSL) to 100%, which resulted in a drastic increase of ending stock from -15% to 23%. However the average growth of rice consumption during that period increased by 3% and appears to be not affected much by the crisis.

Table 1. Rice production, consumption and ending stock growth in Malaysia: 1970-2013

Year	Production	Average Annual growth rate	Consumption	Average Annual growth rate	Ending stock	Average Annual growth rate
	Tones	%	1000/tones	%	1000/tones	%
1970	914550		1345.00		305.00	
1975	1116190	4	1561.00	3	134.00	-15
1980	1318332	3	1500.00	-1	377.00	23
1985	1257970	-1	1520.00	0	320.00	-3
1990	1215065	-1	1490.00	0	235.00	-6
1995	1372584	2	1715.00	3	292.00	4
2000	1381662	0	1946.00	3	485.00	11
2005	1490015	2	2150.00	2	356.00	-6
2010	1588456	1	2690.00	5	733.00	16
2013	1685236	1	2775.00	1	668.00	-2

Figure 1 shows that the fluctuating pattern of rice consumption per capita compared to GDP per capita which had an increasing pattern. In 1960's and 1990's, however the reduction in rice consumption was higher than the increase of GDP per capita, and vice versa in the new millennium. Figure 2 depicts the general long-term trend of Malaysia's rice production and consumption based on the available data from Malaysia Statistic Department and United States Department of Agriculture. The trends in production and consumption show a polynomial relationship. Both trends exhibit very high degree of the goodness of fit, as shown by the respective R-squares for the long-term period of 1963-2013. In the short-term period of 2000 to 2013, on the contrary, the increase in consumption had eventually slowed down until 2005, with slight improvement after 2006 (Figure 3).

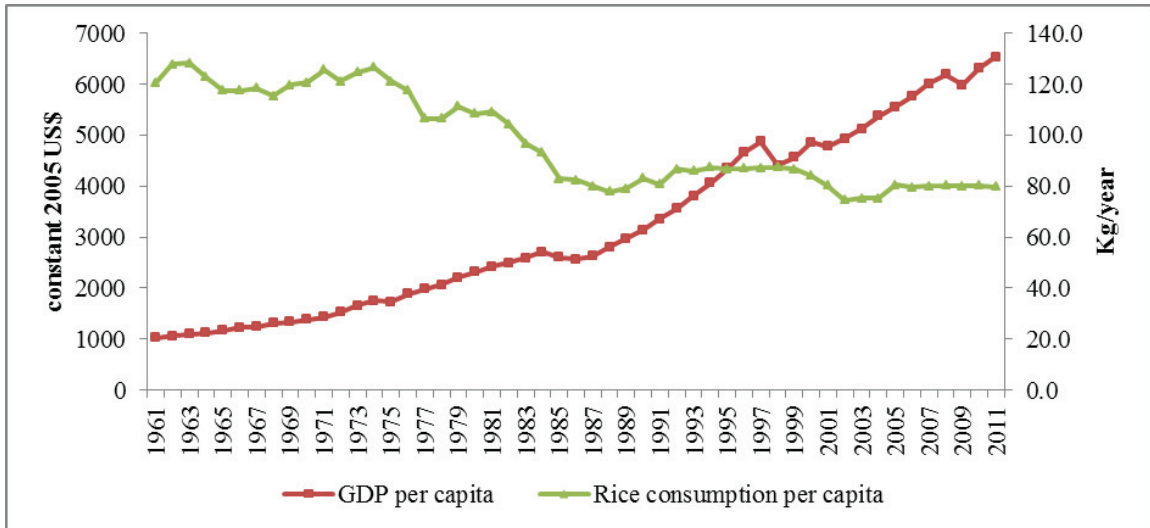


Figure 1. Malaysia GDP per capita and rice consumption per capita

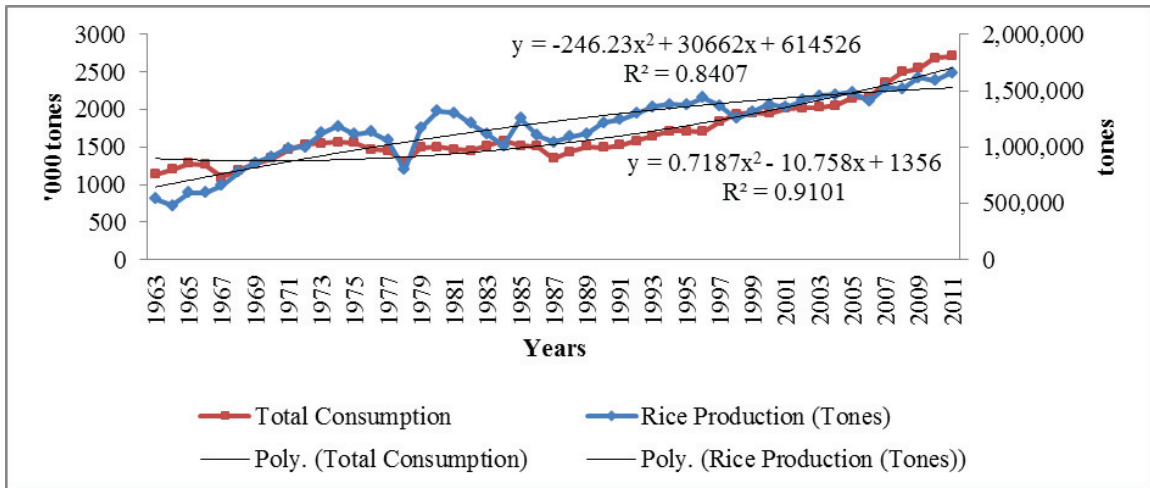


Figure 2. Production and Consumption of Rice, 1963-2013

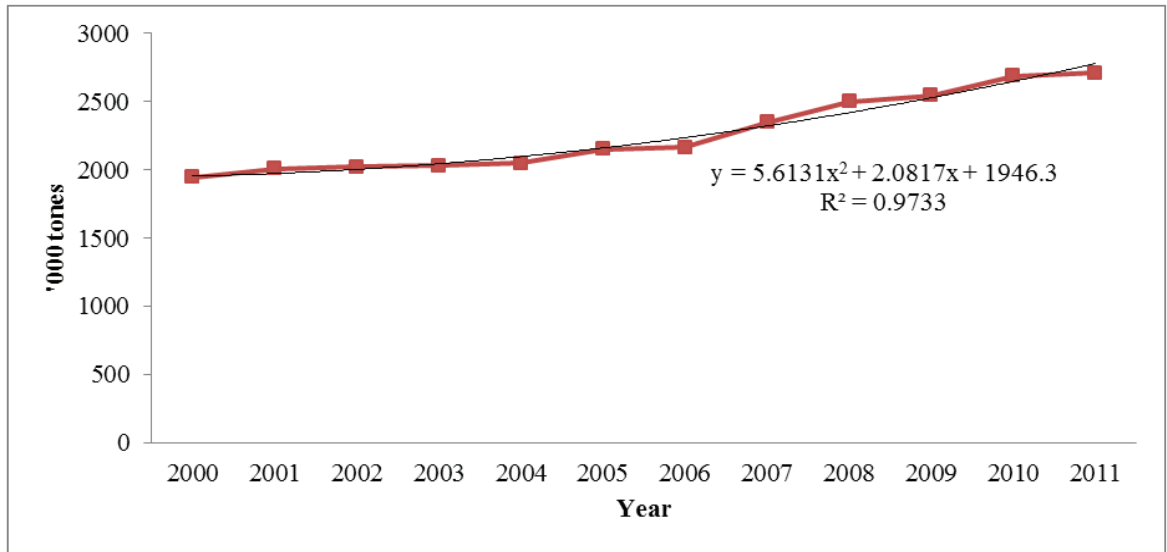


Figure 3: Rice Consumption, 2000-2013

3. Rice Industry Estimation and Projection, 2014-2030

Based on the computed trends, the production of rice in Malaysia will still be lower than the increase in rice consumption in the future (Table 2). Malaysia is an open economy that benefits from import rice to fulfil the shortage in its domestic rice market. Mustapha (1996) highlighted that although import of rice is cost saving, it is risky for security reasons with the changing consumption pattern in the future. The physical accounting form of the net import of rice as presented as follows (Mustapha, 1996):

$$M - X = C - P \tag{1}$$

Where, M is the import value, X is the export value, C is the quantity of rice consumption and P is the quantity of production. Thus, quantity of rice consumption is represented as in equation (2):

$$C = M - X + P \tag{2}$$

Since Malaysia is a net importer of rice, if the quantity of production did not improve with the increasing demand for rice, it will have to depend on imported rice for its supply. Figure 4 shows the comparison among the estimated rice consumption in the long and short run as well as rice production with estimated population from Department of Statistics Malaysia (2012). With increasing demand for rice in the future (short run and long run rice consumption) due to increasing population, lesser supply is estimated for the future (rice production). This situation can lead to shortage in the rice market and as an open economy Malaysia need to import rice from other countries to fulfill future market demand.

Table 2. Rice production and consumption forecast.

Year	Production	Consumption (long term trend)	Consumption (short term trend)
	$y = 614526 + 30662x - 246.23x^2$	$y = 1356 + 10.78x + 0.7187x^2$	$y = 1946.3 + 2.0817x + 5.6131x^2$
2014	1543144	2740	17232
2015	1547952	2805	17824
2016	1552267	2871	18427
2017	1556090	2938	19040
2018	1559421	3007	19666
2019	1562259	3078	20302
2020	1564604	3150	20950

2021	1556457	3223	21608
2022	1597818	3298	22278
2023	1568686	3374	22960
2024	1569062	3452	23652
2025	1568945	3531	24356
2026	1568336	3611	25071
2027	1567234	3693	25797
2028	1565640	3777	26534
2029	1563554	3861	27283
2030	1560974	3948	28043

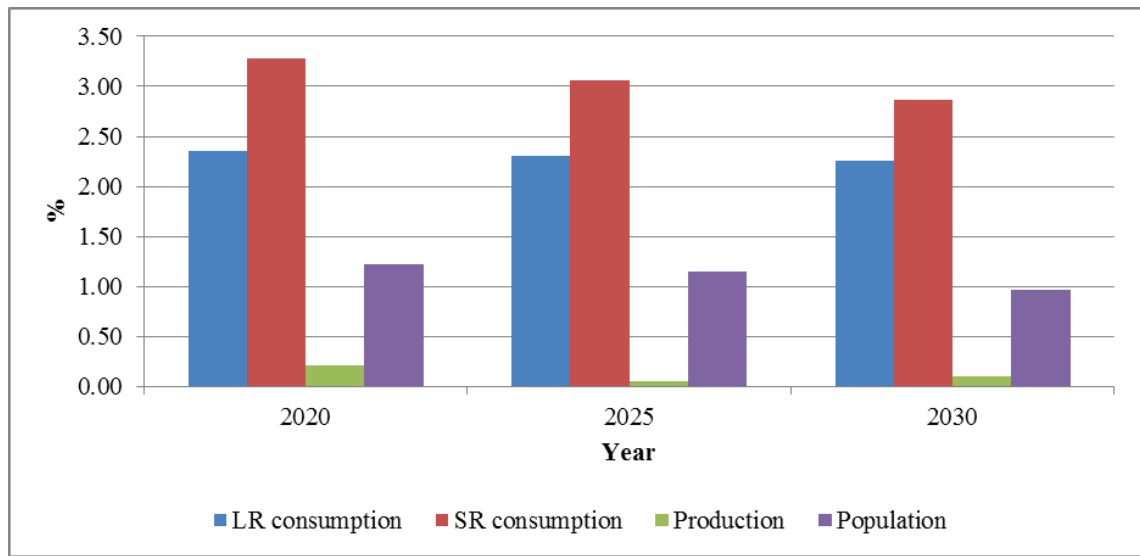


Figure 4. Average annual growth rate of estimated rice consumption in long and short run, consumption, production and population

4. Rice Import and Export Estimation, 2014-2030

Since production of rice is lower than the market demand, Malaysia is considered as a net importer. The trends of the export and import values of rice show that even though Malaysia imports a larger share of market demand, it is still exporting rice to other countries (Figure 5). The forecasted values of its import and export of rice are shown in Table 3. Malaysia will still continue to be a net importer of rice in the future.

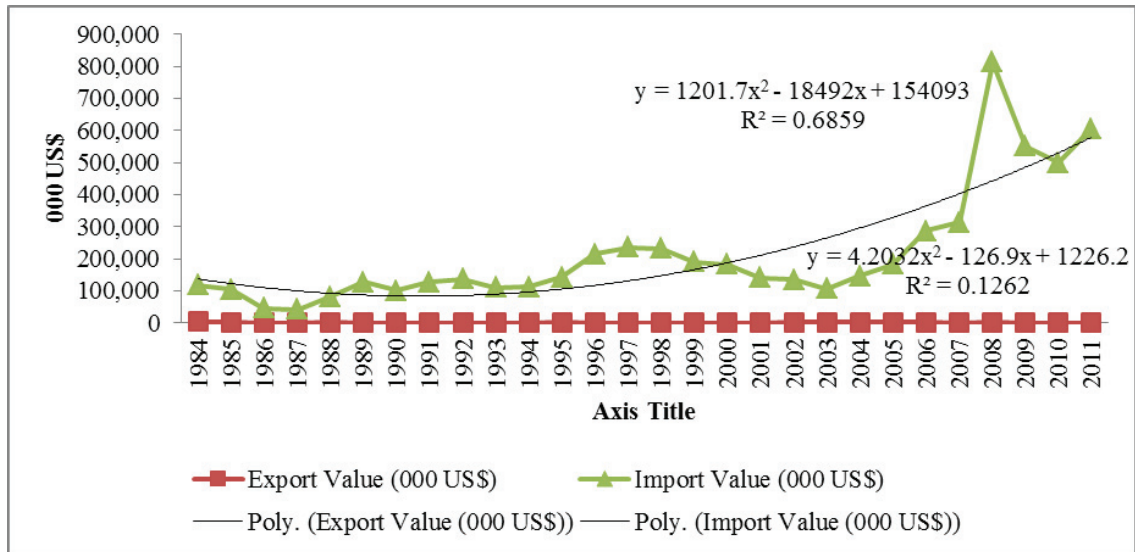


Figure 5. Rice import and export value trends, 1984-2011

Table 3. Rice import and export value forecast.

Year	Import $y = 1201.7x^2 - 18492x + 154093$	Export $y = 4.2032x^2 - 126.9x + 1226.2$
2014	735675	1332
2015	792890	1469
2016	852508	1616
2017	914530	1770
2018	978956	1934
2019	1045784	2105
2020	1115016	2285
2021	1186652	2473
2022	1260691	2670
2023	1337133	2875
2024	1415979	3089
2025	1497228	3311
2026	1580880	3541
2027	1666936	3780
2028	1755396	4027
2029	1846258	4283
2030	1939524	4547

5. Discussion

Given the trends of rice production and consumption in the country, the gap between domestic supply and demand should be fulfilled with import rice. This is proven by the estimated import value, which is more than its export value (Table 3). Since rice is a staple food for Malaysians, too much dependence on imported rice will also give negative impact on the country’s economy.

In response to a study suggesting more Research and Development (R &D) projects to increase rice production (Paul, 2013), their success can only be materialized in the long term. At the same time, any increase in a rice subsidy

only implies an increase in government expenditure that affects the fiscal budget. Therefore, the best solution for the long term and the short term is to stop the export of rice in the short run. As shown in Fig. 5, the export value for the period of 1988 to 2011 was less than its import value. Refer to equation 1, rice production is represented as follows:

$$P = C - M + X \quad (3)$$

Hence, if export equals to zero (i.e., $X=0$), rice production equals the quantity of rice consumption minus imported rice. Thus, increasing the local production of rice, along with the increasing consumption and lowering the amount of rice import in the short run will give positive impacts on the rice industry in the long run. Rahim and Liwan (2012) estimated that if production minus consumption of oil and gas was positive, the country's status would become a net exporter, or otherwise. For the rice industry, the status of Malaysia as a net importer (see Fig. 5) will change to a net exporter if its production of rice is higher than the consumption in the long run. In order to attain this, the involvement of our younger generation in agriculture, particularly in relation to rice production, should be encouraged through awareness programmes and subsidy schemes.

6. Conclusion

As rice is a staple food for Malaysia, the government must ensure that the supply of rice is sufficient for future and current consumptions. The demand for rice comes from the population who consumes rice and gets the supply from either local rice production or imported rice. This study has revealed an increasing demand for rice and a declining supply in the future (Fig.4). In other words, the rice market will face shortage in the future. The shortage will only be overcome by importing rice. If the country is still depending on imported rice for the supply in the future, this will give negative impacts on the local rice industry and value of Ringgit against other currencies. Therefore, the government should encourage local production of rice and reduce its dependency on imported rice by lowering export so as to give positive impact on the rice industry of Malaysia.

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