Rice Consumption, Self-Sufficiency and Income Growth in Peninsular Malaysia, 1972-1983

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INTRODUCTION

The purpose of this paper is to study the impact of real income growth on the consumption of rice in Peninsular Malaysia from 1972 until 1983.[1] A forecast of rice self-sufficiency is then made for the years 1985-1990.

Rice is the staple food of Malaysians, and self-sufficiency in this commodity has been a center-piece of national policy since even before independence in 1957.[2] Until the Second Malaysia Plan (1971-1975) was formulated in 1970, the target level of rice self-sufficiency was maintained at 100 percent. This target was reduced to 90 percent for the period of the Second Plan[3] due to the expectation that production from new irrigation schemes coming on line would be more than enough to meet the demand for rice in Peninsular Malaysia. Should there be any excess production of rice, its disposal in the world market would result in a substantial financial cost to the government since Peninsular Malaysia is a high-cost producer

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1). Peninsular Malaysia is the part of Malaysia on the Asian Mainland.

(2). Goldman (1975; p.253-263) provides a detailed account of the rice self-sufficiency policy of Peninsular Malaysia from 1890 to 1972. Our paper discusses the evolution of that policy since 1970.

(3). Bank Negara Malaysia (1971; p.65).

compared to other countries in Southeast Asia. Consequently, the pace of development of new areas for padi cultivation was slowed to avoid the possibility of creating a rice surplus.

In 1973, adverse weather reduced rice production in both the major rice exporting countries and Peninsular Malaysia and other rice importing countries.[4] This created a shortage in world supply, which pushed the price of rice to an all-time high in the world market. The price of rice in Peninsular Malaysia rose correspondingly.

In analyzing the rice situation at the mid-term review of the Second Malaysia Plan, the government reversed its earlier decision and raised the target of rice self-sufficiency again to 100 percent.[5] The reasons for the policy reversal were strategic, economic, and political. Budgetary allocations to the Ministry of Agriculture for the development of new padi areas and the improvement of existing padi schemes were made until 1975.

Full rice self-sufficiency remained a policy objective until February 1984. Although padi was still recognized as a strategic food crop, due to the shortage of rural labor and its high domestic production costs, the national rice self-sufficiency target was changed in 1984 to be only 80-85 percent from then to the year 2000.[6]

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(4). There was a shortage of rice and wheat during the world food crisis of 1973-1974.

(5). Bank Negara Malaysia (1974; p. 100).

(6). Ministry of Agriculture (1984; p. 8).

The level of rice self-sufficiency in Peninsular Malaysia from 1972 to 1983 is reported in Table 1, Column 4. Since 1972, the level of rice self-sufficiency, based on observed per capita consumption of rice as food, averaged 81 percent and was above 80 percent each year except during 1972, 1978, 1982, and 1983. Rice self-sufficiency in 1978 was 71 percent because of severe droughts in the Muda Irrigation Scheme and other padi areas. In 1982, a serious outbreak of the padi viral disease **penjakit merah** or tungro, cut the yield on 36,000 hectares of the padi crop. This disease reduced the level of self-sufficiency to 76 percent. Although rice output recovered in 1983, the increase was not large enough to compensate for the rise in total demand, which stemmed from the fall in the relative price of rice and population growth. Rice self-sufficiency in Peninsular Malaysia remained at 78 percent for that year.

The stability of the level of rice self-sufficiency is partly due to large public sector investments (M$2705 million or $US 1,150 million in 1983 prices)[7] made in drainage and irrigation facilities from 1966 to 1983. Indirect investments, such as those in padi varietal research, agricultural extension services, production subsidies, and marketing and price support have also been made available to the padi growing industry.

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(7). Calculated from the Mid-Term Review of the First Malaysia Plan (1966-1970, P. 60), the Fourth Malaysia Plan (1981-1985, Table 15.3, pp. 290-291), and the Mid-Term Review of the Fourth Malaysia Plan (Table 8.4, p. 246)

In looking towards the future, the key policy question is: what should be the appropriate level of investment required to attain a target level of rice self-sufficiency? To answer this question one must have a forecast of future levels of demand. To make this forecast, we need to know the relationship between changes in demand and changes in real income.

Rice consumption in Peninsular Malaysia is price sensitive. This was apparent during 1973-1975 when rice supply was tight in both the local and the international markets. Between 1973 and 1975, a sharp increase in the price of a kilogram of rice from 63 to 102 cents caused per capita consumption to fall from 121 kg to 107 kg.

Since 1974, the wholesale and retail prices of rice in Peninsular Malaysia have been regulated by the National Padi and Rice Authority. The maximum price set in 1974 for each grade of rice in a specific region has remained unchanged since then. However, since the ceiling price is high, considerable price fluctuations have still been observed. During most of the period under study, the forces of supply (including regulated imports) and demand in the marketplace have been the major determinants of price.

RICE CONSUMPTION AND INCOME GROWTH

In a recent study, Lai et al (1984) examined the demand and supply of rice in Peninsular Malaysia from 1972 to 1982 using data which took into consideration stock changes, post-harvest whole grain losses, weight losses due to moisture reduction, and other uses of rice for non-human consumption

(e.g. seed and animal feed).[8] Following Lai's methodology, we calculated the supply and demand for rice in 1983 and observed per capita consumption of rice during 1972-1983. Table 1, Column 1 shows that over this 12 year period the observed per capita consumption of rice in Peninsular Malaysia declined by 1.2 percent per year, from 123 kg to 110 kg. We see from Table 2, Column 6 that during the same period real per capita income, as measured by the per capita Gross National Product in 1971 prices, rose by 5 percent per year, from $1,185R to $2,021R. These observations fit the hypothesis that in a developing country, per capita consumption of the staple food declines beyond a certain level of income. A more detailed examination of the relationship between income and rice consumption in Peninsular Malaysia is presented below.

DATA SOURCES

The estimates of observed per capita consumption of rice in Peninsular Malaysia come from Lai (1972-1982) and our own calculations (1983). Data on rice prices and the Consumer Price Index for Peninsular Malaysia are published by the Department of Statistics in the **Monthly Statistical Bulletin, Peninsular Malaysia.** The per capita GNP data on Malaysia were obtained from Bank Negara Malaysia.[9] The estimate of the price

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(8). Whole-grained rice is preferred for consumption as food in Malaysia. The food processing industry uses less expensive low-grade broken rice.

(9). The GNP data refer to Malaysia, and are used as a proxy for those of Peninsular Malaysia as the latter series is not available.

elasticity of demand for rice in Peninsular Malaysia was obtained from an unpublished study by the Division of Agricultural Economics, Ministry of Agriculture. This parameter was estimated using data from the Household Expenditure Survey 1973, which covered 7,000 households for a period of 12 months.

METHODOLOGY

The relatively short time series of observed per capita consumption of rice in Peninsular Malaysia places a constraint on the analysis. We, therefore, do not estimate the own price and income elasticities of demand from the same equation. Instead, we obtain the estimate of the price elasticity of demand of -0.41 from the Household Expenditure Survey 1973, using it to adjust the per capita quantity of rice consumed for the effects of changes in the real price of rice since 1971.[10] This new series of data for the per capita consumption of rice, from which the effect of real price changes has been removed, is then used to estimate the income elasticity of demand for rice during 1972-1983. In adjusting the observed data series for the change in quantity demanded due to the change in the real price of rice, we first estimate the change in quantity

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(10). A price elasticity of demand for rice of -0.41 is close to that obtained by other researchers. Goldman (1975; p.275) reported: "There is a stability in the price elasticity of demand for rice in (Peninsular) Malaysia" ranging from -0.35 to -0.46. Goldman himself obtained an estimate of -0.40 using wholesale rice prices.

demanded Q_t as follows:

$$\Delta Q_t = N_p \times Q_a \times \Delta P_t/P_t \qquad (1)$$

where,

N_p is the own price elasticity of demand for rice;

Q_a is the quantity of rice that would have been demanded if there had been no real price changes, (i.e. the adjusted per capita consumption of rice)

and $\Delta P_t/P_t$ is the cumulative change in the real price of rice since 1971. The real price series for rice is obtained by dividing the nominal price per kg of rice by the Consumer Price Index for the period.

The level of rice consumption per capita in a year if the real price of rice had remained constant, Q_a, is derived as follows:

$$\Delta Q_a = Q_t - \Delta Q_t \qquad (2)$$

Where Q_t is the observed per capita quantity of rice consumed. Substituting Equation (2) into Equation (1) for ΔQ_t and simplifying, we have:

$$\Delta Q_t = (N_p \times Q_t \times \Delta P_t/P_t)/(1 + N_p \times \Delta P_t/P_t) \qquad (3)$$

In Table 2, Column 5 we report the percentage change in the average annual real retail price of rice since 1971, and in Table 2, Column 7 the estimated per capita rice consumption is figured under the assumption that no change had taken place in the real price of rice throughout this period.

The relationship between changes in real income (Table 2, Column 6) and per capita consumption of rice is estimated using the semi-log and the double-log functional form of the Engel