Rice Supply and Demand in Myanmar: Evolution and Future Prospect

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I Introduction

The development of the economy of Myanmar has been largely depending on the agriculture sector. The sector contributes 30 to 40% of GDP and around 30% of the export earning. Moreover, it employs more than 60% of the total labor force. In particular, rice is considered as the most important crop for daily food consumption. Myanmar's rice cultivated area in 1998 was about 5.8 million ha, which covered 51% of the total cropped area and total production was about 17 million MT. In the demand side, according to the household expenditure survey conducted by Central Statistical Organization of Myanmar in 1997, 16% of the total household expenditure of urban family and 22% of the total household expenditure of rural family are spent on rice.

Therefore it is significant for the national economy of Myanmar to have appropriate policy measures for food security and rural development in order to cope with growing rice demand as well as to promote export earning from rice. In this study, we review the evolution of supply and demand of rice in Myanmar, evaluate the effect of procurement price on rice supply and demand and also conduct an econometric study on its future projection with some simulations to provide basic information for policy making.

II Overview of Rice in Myanmar

During 50 years after the independence in 1948, there were two increasing periods of rice production in Myanmar. The first period was from mid-1970s to mid-1980s and the second period was from 1992 to 1999. (see Figure 1) During the period from 1975 to 1985, rice production increased 55% with the average annual growth rate of 4.5%. This growth of rice production was mainly achieved by the yield increase as a result of the promotion of modern technologies and HYVs in rice farming.

Myanmar's economy started to stagnate with less than 3% of annual growth rates of real GDP in 1985-86 and recorded negative growth rate in 1986, 1987, 1988 and 1991. Poor performance of the national economy with continuing foreign currency shortage and high inflation rate forced the Myanmar government to apply unattractive government procurement price of rice. As a result rice production stagnated throughout the period from 1986 to 1991. Rice (unhusked) production decreased nearly 8% from 14 million MT in 1985 to 13 million MT in 1991. During the second increasing period (1992-1999), rice production augmented 36% from 14.8 million MT in 1992 to 20 million MT in 1999 with the annual growth rate of 4.3%. The main reason of growth realized in this period was the expansion of rice-sown area produced by the introduction of the summer paddy program, land reclamation activities and the improvement of irrigation system. Myanmar's overall rice yield has averaged about 2.9 MT per ha and no significant improvement of rice yield was found throughout the period from 1980 to 1999.

The average annual total domestic use of rice in Myanmar during the period from 1980 to 1991 was 13 million MT and during the period from 1992 to 1998, it was 16.5 million MT. Per capita domestic use of rice in Myanmar gradually declined during the period from 1986 to 1991 due mainly to the decreasing production and per capita income (Figure 2). Myanmar’s per capita domestic use of rice increased again from 1992 to 1996 as a result of increase in per capita income and higher rice production. Myanmar’s domestic use of rice decreased in 1997 and 1998 because of severe flooding in 1997 and draught in 1998.
III Characteristics of Regional Rice Production

Myanmar can be divided into five regions according to agro-ecological conditions and topographic conditions. They are Delta region, Lower Myanmar region, Central Myanmar region, Coastal region and Hilly region. Delta region and Lower Myanmar region are the country's largest rice-sown area accounting for 63% of the total rice cultivated area and rice production in these two regions covers 65% of country's rice production. (Table 1) Central Myanmar region locates in the dry zone area and rice cultivation in this region depends upon the availability of water supply. This region is the country’s largest irrigated rice cultivated area and rice-sown area covers 18 % of the total rice-sown area and 17 % of the national production. Remaining two regions are the country’s biggest rice deficit areas covering 19% of the total rice cultivated area and 17% of the total production.

<table>
<thead>
<tr>
<th>Regions</th>
<th>Rice (Paddy)</th>
<th>Other cereals</th>
<th>Oil seeds</th>
<th>Pulses</th>
<th>Culinary crops</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delta region</td>
<td>1,876</td>
<td>9</td>
<td>69</td>
<td>394</td>
<td>13</td>
<td>2,361</td>
</tr>
<tr>
<td>Lower Myanmar region</td>
<td>1,745</td>
<td>14</td>
<td>224</td>
<td>548</td>
<td>5</td>
<td>2,455</td>
</tr>
<tr>
<td>Central Myanmar region</td>
<td>982</td>
<td>529</td>
<td>1,767</td>
<td>1,355</td>
<td>93</td>
<td>4,726</td>
</tr>
<tr>
<td>Coastal region</td>
<td>444</td>
<td>-</td>
<td>35</td>
<td>21</td>
<td>8</td>
<td>507</td>
</tr>
<tr>
<td>Hilly region</td>
<td>711</td>
<td>132</td>
<td>48</td>
<td>142</td>
<td>34</td>
<td>1,147</td>
</tr>
<tr>
<td>Union Total</td>
<td>5,759</td>
<td>683</td>
<td>2,143</td>
<td>2,459</td>
<td>152</td>
<td>11,196</td>
</tr>
</tbody>
</table>

Data source: Department of Agricultural Planning, Myanmar

IV Estimation of Supply and Demand Elasticities

In this study the price response of rice-sown area of each region is estimated as a function of the government procurement price of rice. On the contrary the price and income response of rice demand is estimated as a function of market price of milled rice and per capita income only for the national level due to the limited availability of information on the rice consumption in each region. Double log form is applied for the above estimation and OLS method is used. In addition market price of milled rice is estimated as a linear function of the government procurement price.

In general the estimated supply elasticities are high as shown in Table 2. Particularly Delta region is more responsive
to price change as compared to the others. It is significant to emphasize that price response has become a more important factor for rice producers since the reduction of government control on rice price in 1987. In contrast Coastal region and Hilly region have very limited ability to change their rice sown area in response to price change. It is also pointed out that the income elasticity is still significant at 0.59.

V Projection of Rice Production and Consumption to 2010

As already mentioned, due to insufficient availability of data regarding regional rice consumption, demand projection is made only for the national level while the supply side projection is performed for respective five regions. The projections are conducted by applying the following six equations.

\[
\text{Sown Area (i region, t year)}: \quad A_{i,t} = S_{i,t-1} \times \left(\frac{FP_{t-1}}{FP_{t-2}}\right)^{\alpha}
\]

\[
\text{Yield (i region, t year)}: \quad Y_{i,t} = Y_{i,t-1} \times \left(1 + GY_i\right)
\]

\[
\text{Total Production (t year)}: \quad S = \sum (A_{i,t} \times Y_{i,t})
\]

\[
\text{Per capita domestic use (t year)}: \quad PC_t = PC_{t-1} \times \left(\frac{MP_t}{MP_{t-1}}\right)^\beta \times \left(1 + GI\right)^\delta
\]

\[
\text{Total Domestic use (t year)}: \quad D = PC_t \times P_t
\]

\[
\text{Market price (t year)}: \quad MP_t = b_1 + b_2 \times FP_t
\]

Where,

- \(A_{i,t}\) = Rice sown area of i region in year t (1000 ha)
- \(Y_{i,t}\) = Yield per sown area of i region in year t (MT/ha)
- \(GY_i\) = Average annual growth rate of yield in i region
- \(GI\) = Growth rate of per capita income
- \(PC_t\) = Per capita domestic use of unhusked rice (Kg/person)
- \(MP_t\) = Market price of milled rice in year t deflated by CPI (Kyats/MT)
- \(FP_t\) = Procurement price of rice in year t deflated by CPI (Kyats/MT)
- \(P_t\) = Population (in thousand)
- \(\alpha\) = Supply price elasticity
- \(\beta\) = Demand Price elasticity
- \(\delta\) = Demand income elasticity

\begin{table}

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>Government procurement price of rice increase with the average annual growth rate from 1990 to 1997 (4.5%) and per capita income increase with the average annual growth rate from 1990 to 1999 (3.9%)</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>Government procurement price of rice increase 1% annually and per capita income increase with average annual growth rate from 1990 to 1999 (3.9%)</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>Government procurement price of rice decrease 1% annually and per capita income increase with average annual growth rate from 1990 to 1999 (3.9%)</td>
</tr>
<tr>
<td>Scenario 4</td>
<td>Government procurement price of rice increase 11% annually and per capita income increase with the average annual growth rate from 1990 to 1999 (3.9%)</td>
</tr>
</tbody>
</table>

\end{table}

\begin{table}

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>Sown area (1000 Ha)</th>
<th>Production (1000 MT)</th>
<th>Total domestic use (1000 MT)</th>
<th>(+) Surplus/ (−) Deficit (1000 MT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>6,600</td>
<td>24,902</td>
<td>27,191</td>
<td>(+) 2,289</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>6,377</td>
<td>24,034</td>
<td>27,571</td>
<td>(+) 3,537</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>6,250</td>
<td>23,540</td>
<td>27,761</td>
<td>(+) 4,220</td>
</tr>
<tr>
<td>Scenario 4</td>
<td>7,030</td>
<td>26,579</td>
<td>26,321</td>
<td>(+) 257</td>
</tr>
</tbody>
</table>

Note: Domestic use of rice consists of seeds, wastes, stock changes and unpredictable amount of illegal exports to neighbouring countries.
In order to evaluate the effects of the government procurement price on the supply and demand situation, we conduct different projections for four scenarios shown in Table 3. Scenario 1 assumes that the government procurement price of rice will increase with the average annual growth rate from 1990 to 1997, 4.5% per year. In Scenario 2 the government procurement price of rice is supposed to increase at the rate of 1% annually. In Scenario 3 it is supposed to decrease at the rate of 1% annually. Finally in Scenario 4 it is supposed to increase by 11% every year. The same income growth rate of 3.9%, the average annual growth rate from 1990 to 1999, is applied to all the four scenarios. The population projection of UN is used as the future population figures and we assumed that the growth rates of yield, under the same condition of technological progress and growth of input supply, increase with the average annual growth rate from 1995 to 1999 in each region.

Major findings from our projections are as follows. According to Scenario 1, if the government increases the procurement price of rice by 4.5% annually, Myanmar’s rice sown area will reach 6.6 million hectares and the rice production will be about 25 million MT in year 2010 (Table 4). In the same scenario the demand for rice in year 2010 is expected to reach about 27 million MT and the situation of rice shortage will be projected at about 2 million MT. If the government raises its procurement price by 1% annually, rice deficit in year 2010 will be 3.5 million MT and if procurement price decreases by 1% annually, the estimated rice shortages will climb up to about 4.0 million MT. Scenario 4 shows that the annual 11% increase of procurement price in real term will result in more or less balancing the domestic supply and demand of rice in Myanmar in 2010. It should be, however, pointed out that in Scenario 4 the future rice demand level would be much lower as compared to the other scenarios.

VI Conclusion

According to the projection, it is expected that higher demand of rice in Myanmar will appear during the coming decade along with the progress of per capita income and growth of population. Therefore, Myanmar has probability to face rice shortage problem within the coming decade especially from year 2005. This study also investigated the effects of the government procurement price change on the future supply and demand situation. It is considered that proper adjustment policy for supply and demand of rice should be carried out to avoid the rice shortage problem. On the other hand, present growth rate of rice yield is significantly low and it is also considered that only the activities of area expansion can not solve the rice shortage problem in future unless technological progress in rice farming, such as expansion of HYVs rice area and promotion of extension services, will be emphasized.

It is also concluded that the present rice export control policy still has certain importance because of the unstable future situation discussed above and the fact that this policy has been playing an important role in stabilizing domestic rice price and the rice consumption level, particularly of low income class.

References