

SECTION 6

The Effects on the Japanese Rice Market

6.1. Introduction

The delicate balance between supply and demand in Japan's rice market is affected both by government policy and by climate. The purpose of this section is, firstly, to simulate the effects of temperature variations on national rice supply and rice stocks using an integrated econometric model; and, secondly, to consider what fiscal and policy responses are most appropriate. The temperature variations considered here are similar to those adopted as scenarios in the preceding sections.

The rice production system in Japan is an interrelated structure comprising climatic, technological and political factors, economic and fiscal variables, and rice policy measures. The impact of climate on rice yield and production has been shown in the preceding sections of this study to differ considerably between regions. The dominant effect of climate is through cold summer damage to rice in the northern part of Japan, the magnitude of which is well represented by July–August temperature (Uchijima, 1981; *see also* Sections 4 and 5). In this study a model of the Japanese rice system, incorporating those variables (including climate) mentioned above, has been constructed for three regions of Japan (Hokkaido, Tohoku, and the rest of Japan), and its parameters estimated using econometric methods for the period 1966–82. The model thus represents the integration of a crop–weather relation into an economic model, the need for which has been emphasized elsewhere (Parry and Carter, 1984).

The model is based on a prototype developed for Japan and its rice trading partners for the 1950s and 1960s period (Tsuji, 1982). The prototype is a nationally aggregated rice market model with an emphasis on rice production technology and on international rice trade relations. The new model is a rice

market (supply and demand) model for Japan alone, with the supply side disaggregated into the three subregions of Japan for the purpose of capturing more accurately the regional impacts of temperature changes on rice supply.

In this section the development and performance of the model is first described. Secondly, impacts of climatic variations on rice production are evaluated by model simulations for a number of specific climatic scenarios. Finally, implications regarding policies for rice prices, surplus disposal, land diversion, reserve stocks and production technology, and food and agricultural policy in general will be explored, based on the simulation results.

6.2. The Rice Production System

Rice is the staple food for the Japanese, and is grown all over the Japanese archipelago on four million farms (*Table 6.1*). Both in economic and political terms it is therefore the most important agricultural product in Japan. Because all paddy fields in Japan are irrigated (a situation that was achieved over 100 years ago), drought is not a problem. However, the recent northward extension of rice production (*see* Section 1) has exposed rice crops in the north (especially in Hokkaido and Tohoku districts) to cooler temperatures that can be damaging to production. This assessment focuses on such effects by considering the two northern districts separately from those in the rest of Japan. The contributions of each region to national rice production are shown in *Table 6.1*.

Japan's rice balance is shown in *Table 6.2* for two years, 1980 and 1983. In both years, domestic rice production (supplemented by some minor imports and previous years' stocks) was utilized for direct consumption and for other uses such as animal feed, while a small proportion was also exported.

We can illustrate the role of government in influencing rice production in Japan by using a straightforward supply-demand diagram (*Figure 6.1*). Simply expressed, supply, in this case rice production, increases as the farmers' price increases (represented by the supply curve S), while demand, the quantity of rice that is required and can be afforded by the consumers, decreases as the consumers' price increases (the demand curve D). By superimposing government pricing policies onto these basic relations, the problems of this sector of Japanese agriculture quickly become apparent.

The domestic rice market is separated from the world rice market by the government monopoly of international rice trade, and is effectively under the control of the government, which determines both the prices paid to farmers (P_F) and the price (P_C) paid by consumers [which is itself determined by the government's resale price (P_R) - *Figure 6.1*]. Thus in Japan discrepancies between the demand for and supply of rice are not adjusted by changes in the rice prices, and thus not through market mechanisms. Since the end of World War II a dominant but declining part ($S_2 - R$) of the total marketed rice ($S_2 - T$) has been purchased from farmers by the Food Agency at P_F , stored, and resold at a lower price, P_R , to wholesalers. Mainly because of the strong political power of nationally organized agricultural cooperatives, and due to the effects