

SECTION 7

The Implications for Agricultural Policies and Planning

In the preceding sections we have shown that Japanese agriculture is finely adjusted to the climatic conditions prevailing in different regions of the country. In northern Japan in particular, where thermal conditions are critical determinants of rice production, seemingly small temperature anomalies can result in wide variations in productivity and regional rice supply that have implications for the national rice market, itself a precarious balance of domestic heavily subsidized supply and demand.

Through the use of simple models we have evaluated some of these impacts for a set of specified climatic conditions (scenarios). In this section we will first summarize the experiments and their results and, secondly, discuss their implications in terms of the requirements for further research, technological developments, economic restructuring and policy responses.

7.1. Summary of Results

7.1.1. Climatic scenarios

Experiments were conducted to simulate a range of feasible future climatic conditions defined largely on the basis of temperature. As described in Section 2, listed in *Table 2.1* and summarized here in *Table 7.1*, scenarios were selected to reflect:

- (1) The weather in extreme individual years (viz: 1978 warm, and 1980 cool) identified from the existing records of agroclimatic conditions over about one century up to the present.
- (2) The weather in anomalously warm or cool decades recorded historically (viz: 1921–30 warm, and 1902–11 cool).

Table 7.1. Summary of results of impact experiments in Hokkaido district and in the whole of Japan, as absolute values for the baseline period and as deviations from the baseline for each climatic scenario.

Hokkaido district										Whole of Japan	
Climatic scenario	Repre- sentative period ^a	Mean July- August temp- erature (°C) ^b	Altitudinal shift of potential cultivation limit (m) ^c	Rice yield index ^c	Simulated rice yield ^d						Rice stock (1982 equi- valent) ⁱ
					Present technology ^e		Adjusted technology ^f		Relative total net production ^h (vegetation)	Rice yield index ^h	
					Mean	C V%	Mean	C V%			
Baseline	1951-80	20.6	250 ^j	1.03	4.48 t/ha ^k	11.6%	4.48 t/ha ^k	11.6%	1.00	100%	8.34 M tonnes ^p
Cool year	1980	-1.6	-254	-40%	-15%	-	+17% ^m	-	-7%	-13%	-100% ^q
Cool decade	1902-11	-1.1	-175	-25%	-	-	-	-	-	-	-
Unstable decade	1926-35	-0.3	-48	-6%	+0% ^l	-	-	-	-2%	+0%	+11%
Stable decade	1957-66	-0.1	-16	-2%	+0%	-33%	-	-	-1%	+3%	+20%
Warm decade	1921-30	+0.4	+63	+6%	-	-	-	-	-	-	-
Warm year	1978	+2.5	+397	+15%	+6%	-	+31% ^m	-	+3% ⁿ	+3% ⁿ	-
2 × CO ₂	Future	+3.5	+556	+5%	+4%	-27%	+26%	-33%	+9%	-	+191% ^r

^a Unless otherwise stated.

^b Mean of two stations: Sapporo and Asahigawa (from Section 2).

^c From Section 4.

^d From Section 5.

^e Present cultivar: Ishikari; present planting date.

^f Late-maturing cultivar: Nipponbare; planting date 25 days earlier than present.

^g Coefficient of variation (standard deviation/mean).

^h From Section 3.

ⁱ From Section 6.

^j Present-day upper limit of main cultivation area.

^k Baseline climate is 1974-1983.

^l Unstable decade is 1974-1983.

^m Extreme years are adjusted to 2 × CO₂ climate.

ⁿ 1979 chosen as warm year.

^p Baseline climate is 1966-1982.

^q 10 consecutive occurrences of 1980 climate from 1973 to 1982.

^r 2 × CO₂ equilibrium climate.