Fig.1. Change of Areas under CABBAGE Cultivation
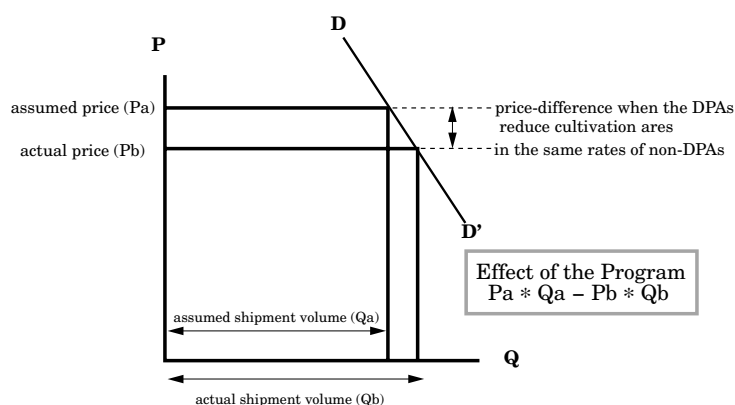Note: Ⅰ :spring, Ⅱ :summer and fall, Ⅲ :winter.

Fig.2. Effect of Price Stabilization Program
Note: DD' : Demand Curve.

(2) Having confirmed the above fact, if the cropping acreage is reduced in the DPAs for the following year as well as in the non-DPAs, the decrease in shipment quantity caused will increase the price (wholesale price). The effect of the price stabilization program can be calculated by applying the formula below. The effect is indicated with (B) in the formula and (Pa*Qa) is the assumed trade value; the assumed price multiplied by the assumed shipment quantity. The actual trade value is indicated with (Pb*Qb), which is subtracted from the assumed trade value.

$$B = Pa*Qa - Pb*Qb \text{ (Fig.2)}$$

(3) Meanwhile, the demand function of cabbage was measured in order to determine the price increase (elasticity) affected by the decrease of shipment quantity. The price elasticity of demand was −0.121.

(4) Based on the result gained in (3), the annual and seasonal effect of the price stabilization program was also calculated. The cost (C) incurred by the operation of the program was defined as the amount of subsidy. The cost benefit brought by the program is therefore calculated (B)/(C) and by using this formula, the cost benefit brought by the program on the price of cabbage between 1991 and 1998 was calculated to be 13.0. Focusing on the annual and seasonal cost benefit, it was 2.7 for the winter of 1993 and 14.4 for the fall of 1997, when the subsidy payments in the same seasons of the preceding years exceeded one billion yen.

Research members
    Toshitaka Katsuki and Shigenori Kobayashi

Effects of Increasing Green Onions Import on the Domestic Production

Toshitaka KATSUKI

Over recent years, a rapid increase in the importation of vegetables has created considerable influence on Japan's domestic production. Especially, the decline in the price of green onions (*negi*) has been significant in line with the rapidly increased importation. Given these circumstances, in April 2001, the Japanese government initiated a provisional general safeguard measure against the importation of green onions.

This research was carried out with the intention of clarifying the influence of the rapidly increased importation of green onions over the domestic production.

(1) Firstly, in order to clarify the impact on the price of green onions created by increased imports, the demand function of green onions was calculated as shown below. The data applied covers 44-quarter terms between April 1990 and March 2001.

$$\ln Q = -0.17533*\ln P + 0.12889*\ln C - 0.32849*D_1$$
$$\quad (10.6922) \quad (0.9941) \quad (26.9262)$$
$$-0.27921*D_2 + 0.45604*D_3 + 0.00155*T_1$$
$$\quad (11.9380) \quad (21.4456) \quad (4.7147)$$
$$-0.01768*T_2 + 0.10968*Z_1 + 0.0720*Z_2$$
$$\quad (5.8048) \quad (3.7439) \quad (6.1204)$$
$$+11.1075$$
$$\quad (7.6222)$$

( ): T-statistic, adjusted R-squared:0.9928

Q : Total volume of supply (domestic+imported)

P : Real price (based on year: 1995)

C : Real private sector final consumption expenditure (based on year: 1995)

D_1 - D_3: Dummy valuables for seasons (subscripts: 1 - Apr. to Jun., 2 - Jul. to Sep., 3 - Oct. to Dec.)

T_1, T_2: Trends (subscripts: 1 - Jul. to Sep., 2 - Oct. to Dec., digits: 1 - yield 1990, 2 - yield 1991 ... 11 - yield 2000)

Z_1: Dummy variables for exceptional months, digits: 1 - Jul. to Sep. 1993, 0 - all other months

Z_2: Dummy variables for institutional changes (digits: 1 - Apr. 1997 onwards after the price stabilization was applied to spring green onions, 0 - all the others)

(2) The theoretical price acquired from the demand function more or less corresponds to the actual price. Having confirmed this fact, another theoretical price was obtained based on the assumption that no imported supplies are available (Fig.1). This supported the large drop in price in parallel to the increase of importation.

Furthermore, using this outcome as a model, the influence on the price fluctuation created by a total supply volume, which was randomly varied after April 2001, was estimated (Fig.2). The volume of 400,000 tons is equivalent to the volume of domestically shipped produce during a poor harvest period and the volume of 460,000 tons is a standard level when excessive supplies are forecasted (the supply volume including the imported supplies for 2001 is 454,000 tons). Another result confirmed by the estimation is that a price around 300 yen is sustained when the annual supply volume is 430,000 tons.

(3) The variation of producer's income was estimated in production areas where the increased importation of green onions created a significant impact. Agricultural cooperative T is Japan's largest grower of autumn/winter harvested green onions in respect of cropping acreage. In T's case, the returns from autumn/winter harvested onions showed a drop by half in 2000, when the importation of green onions rocketed, compared to the ones between 1995 and 1999 except 1998 when there was a price rise caused by a nationwide crop failure (Fig.3). It has also become evident that the same tendency occurred in other production areas.

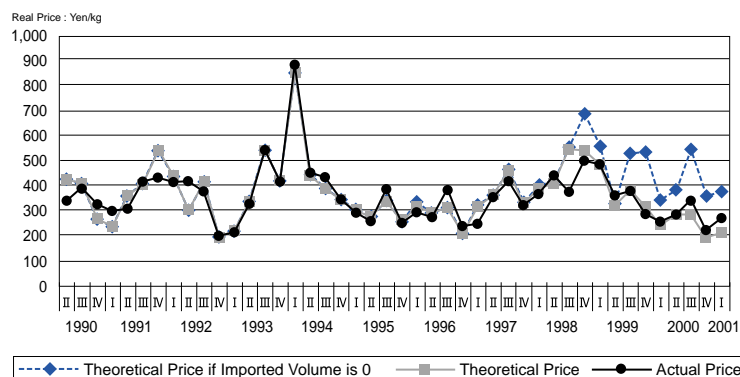### Research members

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Fig.1. Theoretical Price given by the Demand Function of Green Onions

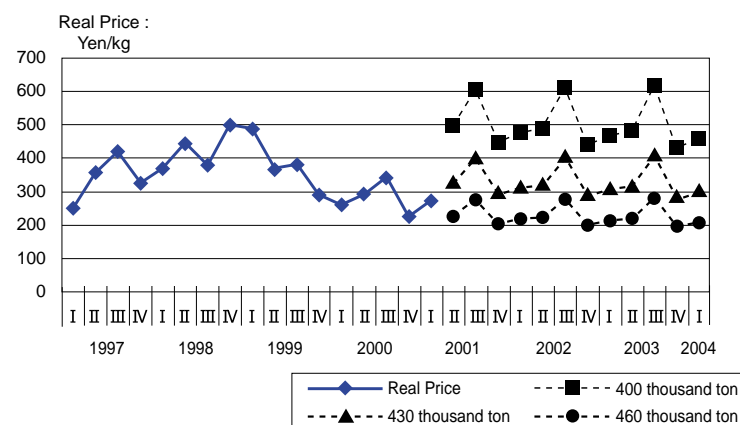**Fig.2.** Price Simulation according to the Change of Supply Volume
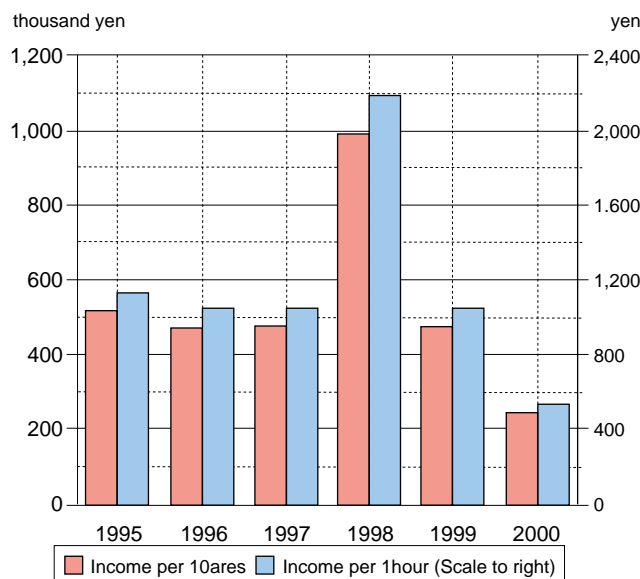

Fig.3. Estimated Income of Green Onions
-A case of "T agricultural co-operatives"-