

Trend of the Salt Market in Japan

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ABSTRACT

During 1990, the fiscal year under review, the volume of sales of general-purpose salt was 1.81 million metric tons, the same level as in the previous year. In addition, sales of salt to the chloralkali industry rose to 7.55 Mt bringing the total amount of salt to 9.36 Mt. This paper describes Japan's salt market, both now and in the future, from the viewpoint of volume of sales, quality and uses.

INTRODUCTION

In Japan, about 9.4 Mt of salt were marketed in 1990. In detail, the annual domestic production of salt amounted to about 1.4 Mt while annual imports amounted to about 8 Mt. The following is an outline of the Japanese salt market including the entire supply and demand situation within recent years, fluctuations in consumption, and the qualities of the salt.

HISTORICAL RELATIONSHIP BETWEEN SALT AND THE JAPANESE

A "backbone" of mountain chains form the watershed of the Japanese Islands and most of the principal overland routes were therefore developed along the coast. Since salt was produced exclusively in coastal areas, trade in commodities between the coastal and inland areas was necessary. As a result, roads crossing the mountain chains were developed. Figure 1 shows the "salt roads" (Tomioka, 1983) in the middle of the nineteenth century. Salt, which was a necessity, was mainly transported from the coastal areas and agricultural products, including rice, were transported from inland as a return cargo. Thus the "salt roads" served as the main local routes and contributed to the formation of habitation areas, economic areas and cultural (e.g. linguistic) areas. Many of these roads still function as the main local routes. The "silk road", named after China's typical export, contributed to the cultural and economic in-

terchange in China. It can be said that the salt roads in Japan similarly played an important role in the cultural and economic interchange.

SUPPLY AND DEMAND SITUATION AND PRICE FLUCTUATION

Since 1905 (the 38th year of Meiji), the Japanese salt industry has been managed under the Salt Monopoly Law, the object of which is to stabilize supply and demand and the price of salt which is essential to life in Japan.

This section describes the total situation of supply and demand (Table 1) and the price fluctuations of salt (Table 2).

Salt consumption for general use, i.e. home use, food industry use and general industry use, remains at an almost constant level of about 1.8 Mt per year. Salt consumption for chloralkali industry use varies depending on business trends; recently, it has been increasing year by year. The chloralkali industry's annual salt consumption in 1990 amounted to 7.55 Mt, showing an increasing of about 1.4 Mt compared with 1985. Accordingly, the total annual demand in 1990 in Japan amounted to about 9.36 Mt.

Regarding the supply situation, on the other hand, domestic salt production remains at an almost constant level of about 1.4 Mt per year. Therefore the increase in salt consumption by the chloralkali industry is accommodated by increasing imports. In 1990, about 8 Mt of salt was imported, mainly from Australia and Mexico (Table 3). Thus the degree of

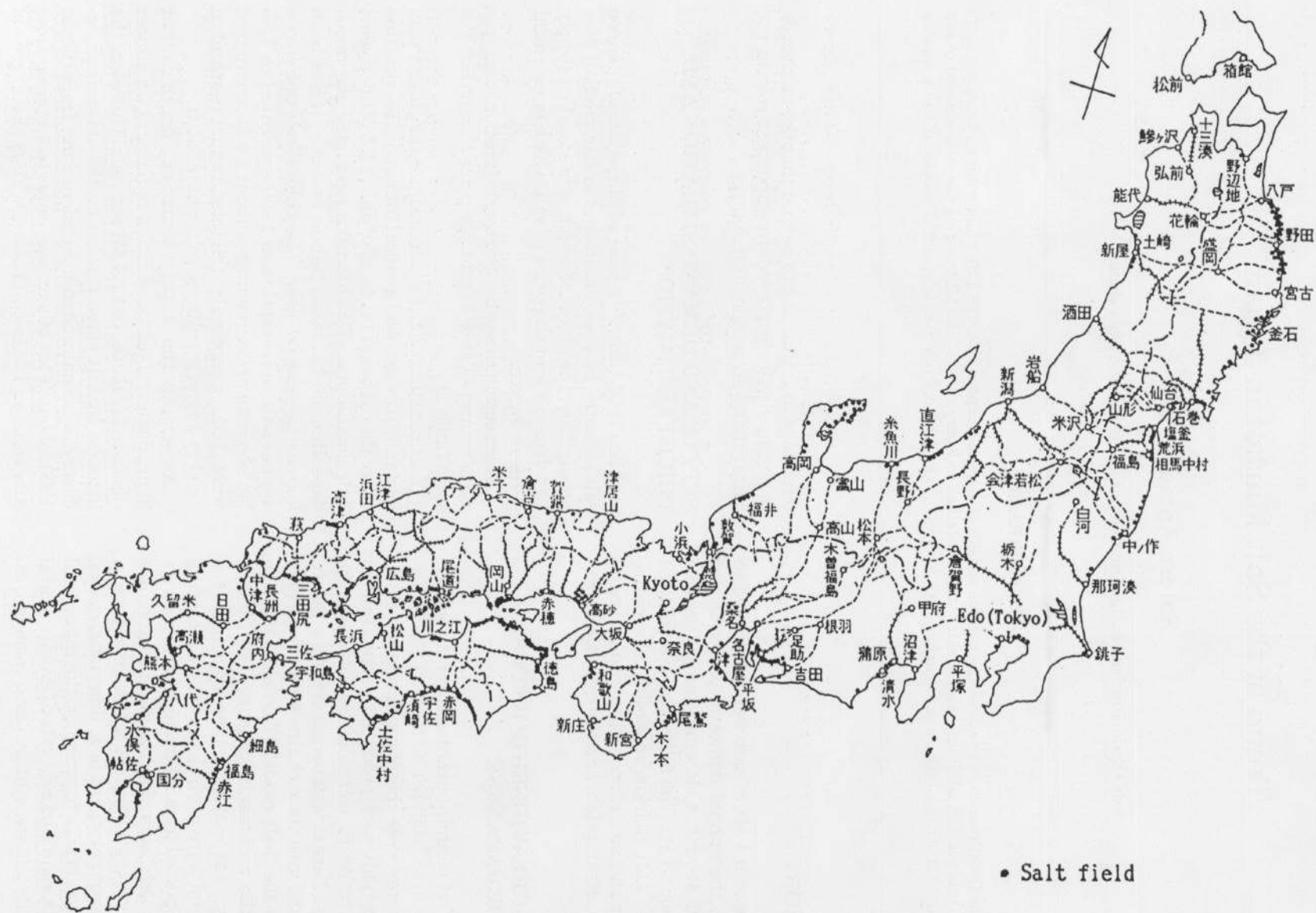


Fig. 1. Salt roads in Japan in the mid-nineteenth century.

TABLE 1
The total supply and demand for salt

		Fiscal year					
		1985	1986	1987	1988	1989	1990
Demand	General use	179	180	178	178	180	181
	Chloralkali industry use	614	621	663	708	708	755
	Total	793	801	841	886	888	936
Supply	Domestic salt production	133	137	140	136	138	138
	Imported salt						
	General use	46	43	40	42	41	43
	Chloralkali industry use	614	621	663	708	708	755
	Total	660	664	703	749	749	798
Total	793	801	843	885	887	936	

Unit: 10⁴ t.

TABLE 2
Comparison of salt price with prices of other commodities

Item	Ratio (1990/1984)
Consumer price index (general)	109
Housing	117
Rice	105
Salt	103

TABLE 3
Salt imports

Fiscal year	China	Mexico	Australia	Other countries	Total
1985	649	2,705	3,245		6,599
1986	726	2,721	3,193		6,640
1987	447	3,115	3,465		7,027
1988		3,279	4,072	140	7,491
1989	30	3,619	3,815	29	7,493
1990	37	3,580	4,234	126	7,977

Unit: 10³ t.

self-sufficiency in Japan is about 15% which is significantly lower than other countries.

Comparison of the salt price with prices of other commodities (Management and Coordination Agency, 1990) indicates that salt suffers less price fluctuation than rice which is the principal food in Japan.

Thus the stabilization of supply, demand, and the price of salt — the objective of the Salt Monopoly

Law — has been successfully achieved and, therefore, salt is called "an honor good in price".

The Salt Monopoly Law applies to solid materials containing 40% or more sodium chloride. According to this Law, salt is classified into the following four types:

(A) Salt produced from seawater by a salt manufacturer designated by Japan Tobacco Inc. and sold by Japan Tobacco Inc.

(B) Salt produced from seawater by a salt manufacturer designated by Japan Tobacco Inc. and sold without being handled by Japan Tobacco Inc.

(C) Salt produced or processed from the above-mentioned salt A or B and sold by said manufacturer under notification to Japan Tobacco Inc. Salt products containing natural substances, flavors, bitter components, etc. fall within this type.

(D) Salt, which contains 40–60% sodium chloride, sold by an import trader under notification to Japan Tobacco Inc.

These salts will hereinafter be referred to as salts A, B and C; salt D is not mentioned in this paper.

TYPE AND QUALITY SPECIFICATION OF SALT A

The types and quality specification of salt A are shown in Table 4. Salt A involves 16 types, classified as to quality and package form. Regarding quality, purity of salt, particle size and additives — which are used mainly to make the salt flowable and to prevent caking — are specified.

In Japan, ferrocyanides are not authorized as food additives and thus cannot be used, although they are employed in other countries to prevent caking.

TABLE 4
The quality specification of salt A

Type	Production method	Weight per package	Purity of salt	Particle size	Additives
Table salt	Refined crude salt	100 g	99% <	500–300 μm 85% <	Magnesium carbonate (basic) 0.4%
New cooking salt	do.	350 g	do.	do.	do.
Kitchen salt	do.	600 g	do.	do.	do.
Cooking salt	do.	800 g	do.	500–212 μm 85% <	do.
Refined salt	do.	1 kg	99.5% <	500–180 μm 85% <	Magnesium carbonate (basic) 0.3%
Special refined salt	do.	25 kg	do.	do.	None
		25 kg	99.8% <	do.	None
Household salt	Salt produced by the ion-exchange membrane salt production method	700 g	95% <	600–250 μm 80%	None
		1 kg	99% <	600–150 μm 80% <	None
Dried salt	do.	5 kg	do.	do.	None
Sashisuse salt	do.	25 kg	do.	do.	None
		500 g	98.5% <	do.	Sodium phosphate 0.3% Magnesium carbonate (basic) 0.4%
Wetted salt	do.	25 kg	95% <	do.	None
Salt for pickles	Washed and crushed crude salt	2 kg	do.	Mean size 800 μm	Malic acid 0.05% Citric acid 0.05%
Crude salt	Imported solar salt	25 kg	do.		
Crushed crude salt	Crushed crude salt	25 kg	do.	1180 μm over size 15% > 500 μm under size 40% >	

CHANGE IN QUALITY

This section explains the changes in the qualities of the above-mentioned Dried salt during recent years which represented a turning point in the method of salt production.

In Japan, the traditional Ryuka (sloping down) salt production method with the use of Sijoka (gradient concentrators) was converted in 1972 to the ion-exchange membrane salt production method employed at present. This conversion was accompanied by several changes in the composition of the salt (Fig. 2). A remarkable change resided in the fact that SO_4^{2-} decreased while K^+ increased. Furthermore, Ca^{2+} and Mg^{2+} also decreased somewhat. These changes are caused by the properties of ion-exchange membranes used in the ion-exchange membrane salt production method, i.e. they will allow the selective permeation of monovalent ions.

The technical innovation in the ion-exchange

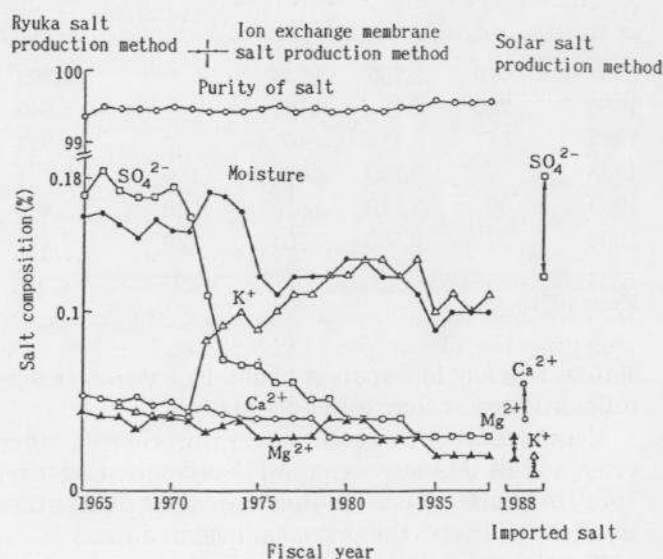


Fig. 2. Change in the qualities of Dried salt.

TABLE 5

Changes in consumption of salt by usage

	Fiscal year						Average quantity change per annum
	1985	1986	1987	1988	1989	1990	
Home use	42	43	41	40	38	38	-0.96
Food industry use	99	100	100	102	102	102	+0.66
General industry use	19	18	18	18	18	18	±0
Others	19	20	20	19	20	23	
Chloralkali industry use	614	621	663	708	708	755	29

Unit: 10⁴ t.

membrane salt production method has incalculable value. The salt production areas in Japan have been almost exclusively distributed in the Seto Inland Sea region which is one of today's prominent industrial areas. Therefore, the employment of the ion-exchange membrane salt production method has made it possible to divert some salt fields to land for industrial use.

When the worsening sea pollution, the salt damage due to spray from Sijoka, and changes in the labor environment are taken into consideration, it can be said that the conversion from the Ryuka salt production method — which is an agricultural process — to the ion-exchange membrane salt production method — which is an industrial one — is highly significant.

CHANGE IN CONSUMPTION BY USAGE

This section describes changes in the consumption of salt by usage in Japan (Table 5). The uses involve home use, food industry use, general industry use and chloralkali industry use.

The changes in total consumption of the above-mentioned salts A and B by use are characterized in that the consumption for home use has decreased year by year, while the chloralkali industry's consumption and salt used for deicing, which is involved in the others, have increased, although the consumption for deicing is limited. On the other hand, the consumption of the food industry and general industry use has either remained at the same level or has somewhat increased.

The following three reasons are suggested for the decrease in the consumption of salt for home use. The first reason resides in an increase in the consumption of salt C. The consumption of salts A and B for home use has decreased at a rate of about 9,600 t per year, while that for food industry use has

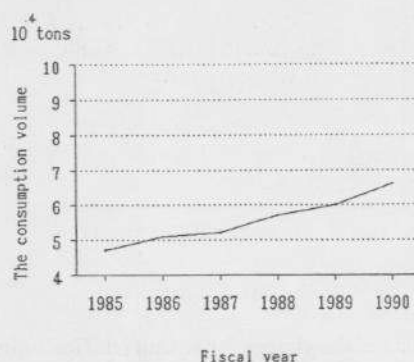


Fig. 3. The consumption volume of salt C (food use).

increased at a range of about 6,600 t per year. Furthermore, the consumption of salt C corresponding to these uses has increased at a rate of about 3,600 t per year (Fig. 3). These facts indicate the diversification in consumers' needs. Accordingly, it may be said that salt A is applied to basic purposes and that salt C satisfies individual needs so as to make up for salt A. Thus, these salts share a role in the market. As to the second reason, changes in our life-style may be cited, i.e. the use of processed foods (Fig. 4) and eating out (Fig. 5) have increased in Japan (Ministry of Health and Welfare, 1990). The ratio of the charge for eating out (involving school lunch) to food expenses has been increasing yearly and amounts to about 15% at present. The third reason is the relative progress of the tendency of salt reduction, as shown by the fact that the salt consumption gain (about 4% in the last 15 years) is lower than the population increase (about 13%). Thus, it can be concluded that these three factors have brought about the above changes.

The tendency towards salt reduction mentioned above as the third reason is seemingly supported by advances in the technology of processing and pre-

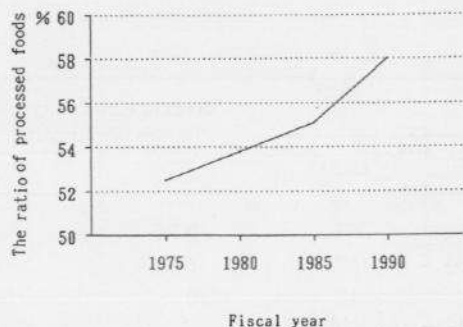


Fig. 4. The ratio of the charge for the application of processed foods to food expenses.

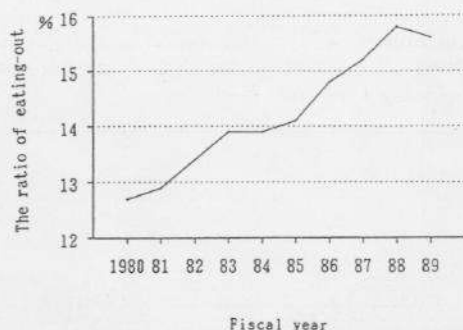


Fig. 5. The ratio of the charge for eating out (including school lunch) to food expenses.

serving foods. The degradation in the keeping qualities of foods containing less salt can be prevented by advanced techniques for refrigerating, pasteurizing and adding food additives such as alcohols. Regarding health care, for example, the Japan Ministry of Health and Welfare set a target upper limit of daily salt intake of 10 g per person. However, the daily salt intake in Japan is currently 12.2 g (Ministry of Health and Welfare, 1990) (Fig. 6). It should be understood here that these data are calculated by multiplying the total sodium intake by 2.54 so as to give the corresponding salt intake.

Compared with the United States and the European countries, only a very small amount (about 100,000 t) of salt was used for deicing roads in Japan in 1990. However, this is a rapid increase when compared with that in 1985 (about 70,000 t).

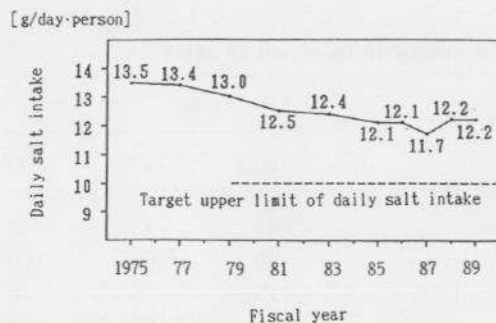


Fig. 6. Daily salt intake of the Japanese.

The difference between Japan and western countries may be the fact that the climate is relatively mild in Japan. However, it is assumed that the consumption of salt for this use will increase in future with the improvement in high-speed road networks.

CONCLUSIONS

Salt is a nutrient and a seasoning essential to our daily life. Furthermore, it serves as a starting material for various industrial products. However, recent changes in our social life and in technology have altered — albeit slowly — the uses and quality requirements of salt.

In particular, the recent tendency towards healthy and tasty foods has diversified requirements for the qualities of salt. In addition, it is necessary to modify the qualities of salt so as to comply with the recent development of fine chemicals and to improve the performance.

It is considered that the establishment of salt-producing technology will become more important in future in order to satisfy the requirements for each purpose appropriately.

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