SNF-REPORT NO. 41/00

The Japanese Seafood Market

by

Akemi Nakamoto

SNF- project no. 5400 "Verdiskaping i norsk sjømatindustri"
and 6345 “Country-of-Origin Strategies in International Marketing of Bioproducts”

These projects are financed by the Research Council of Norway.

Centre for Fisheries Economics
Report No. 65

FOUNDATION FOR RESEARCH IN ECONOMICS AND BUSINESS ADMINISTRATION
BERGEN, AUGUST 2000

ISBN 82-491-0071-9

ISSN 0803-4036

TABLE OF CONTENTS

LIST OF TABLES

1 INTRODUCTION

The aim of this report is to inform Norwegian fish exporters, especially salmon exporters, of the Japanese market situation for fish. Japan is the largest single fish market for Norway. The importance of the Japanese market to Norwegian fish exporters cannot be neglected, especially after Norway's fish exports to Japan showed significant growth. Norwegian seafood[1] export to Japan increased by 58% in value and 45% in quantity in 1999.[2] It is believed that there is a room for Norwegian fish exports to Japan to continue expanding, with the realisation of how enormous the Japanese fish market is and understanding of what the current and expected trends in supply and demand of the fish in Japan.

Japan is the largest single fish market in the world. The country's fish imports account for 16% of all world's imports of fish in quantity, and 30% in value.[3] However, it should be noted that Japan is also a large fishery nation. Indeed, Japan's total fishery production is almost double of that of Norway.[4] Therefore, the massive fish imports to Japan actually represent only about half of Japanese domestic consumption.[5] Thus, although Japan is the largest single market for Norwegian fish,[6] Norwegian fish imported to Japan only accounts for roughly 3% of total fish imports to Japan, and approximately 1.5% of Japanese domestic fish consumption.

The report begins with an overview of Japanese food market, including seafood, and of its consumers (Chapter 2). Chapter 3 is a study of the seafood demand of the Japanese market and aims to assist readers to have better understanding of the special features of the Japanese seafood market. Then the discussion continues with Chapter 4 Fish Supply

[1] "Seafood" and "fish and shellfish" are considered to have the same meaning in this report (*gyokairui* in Japanese).
[2] Norwegian Seafood Export Council (NSEC), 2000.
[3] Fishery Agency, Ministry of Agriculture, Forestry and Fishery (MAFF). "Summery of Fishery White Paper: Annual Report and Fishery Development 1998"
[4] Total fishery production in 1997, except whales and seals: (Japan 6,044,537 tonnes) ÷ (Norway 3,048,873 tonnes) = 1.98. FAO, 1998.
[5] In 1997, the self sufficiency of fish for food in Japan was 60%. Fishery Agency, Ministry of Agriculture, Forestry and Fishery (MAFF). "Summery of Fishery White Paper: Annual Report and Fishery Development 1998"
[6] Norwegian seafood export to Japan accounted for 15% of total Norwegian fish exports in 1999. "Norwegian Seafood Export to Japan Increased by 58%", 3 February 2000, *Minato Shimbun.*

in Japan, where the situations of domestic seafood production and imports are introduced. Chapter 4 also discusses the development of seafood supply in Japan and possible future trend. Salmon supply (i.e., domestic supply and imports) is particularly discussed in Chapter 5, in addition to overall seafood supply. Different salmon species in the market, and different countries, which supply salmon to the Japanese market, are discussed.

2 FOOD MARKET IN JAPAN AND JAPANESE CONSUMERS

In this chapter, the overall food market in Japan is discussed by observing the food consumption pattern seen in the household expenditures. The idea of observing how people spend their living expenditures, including food expenses, is to present some relevant factors which may influence the Japanese food consumption in the future.

2.1 Household Living Expenditures

Japan's household consumption pattern has been changing dramatically since the Second World War. The proportion of food expenses of total household expenses (Engel's coefficient[7]) has decreased dramatically in the past decades, along with the rapid economic development of the country. The food expenses component of the household living expenditures was as large as 38.7% in 1963, but it reduced to less than 30% in 1979.[8] Today, the food expenditures account around 22-23% of total household living expenditures (see Table 1), and it seems to be stable at the current level.

Table 1: Breakdown of Household Living Expenditures 1970-1999 (Workers' Households)

Year	**Food**	Housing	Fuel, light and water charges	Furniture & household utensils	Clothes & footwear	Medical care	Transport'n & communic'n	Education	Reading & recreation	Other living expenses
1970	**32.2 %**	5.3 %	4.1 %	5.1 %	9.3 %	2.6 %	5.5 %	2.7 %	9.2 %	24.0 %
1975	**30.0 %**	5.1 %	4.1 %	5.0 %	9.0 %	2.4 %	6.6 %	2.7 %	8.5 %	26.7 %
1980	**27.8 %**	4.7 %	5.3 %	4.2 %	7.5 %	2.4 %	8.5 %	3.6 %	8.5 %	27.3 %
1985	**25.7 %**	4.7 %	5.9 %	4.2 %	7.0 %	2.4 %	9.7 %	4.2 %	8.7 %	27.5 %
1990	**24.1 %**	5.0 %	5.1 %	4.0 %	7.2 %	2.6 %	10.1 %	5.1 %	9.6 %	27.3 %
1995	**22.6 %**	6.7 %	5.6 %	3.7 %	6.0 %	2.7 %	11.0 %	5.3 %	9.5 %	26.9 %
1996	**22.2 %**	7.0 %	5.7 %	3.6 %	5.8 %	2.8 %	11.5 %	5.3 %	9.6 %	26.4 %
1997	**22.3 %**	6.7 %	5.8 %	3.5 %	5.7 %	2.9 %	11.6 %	5.4 %	9.6 %	26.4 %
1999	**22.5 %**	6.5 %	6.0 %	3.5 %	5.5 %	3.1 %	11.7 %	5.1 %	10.2 %	25.8 %

Source: Statistics Beureau, Management and Coordination Agency, 2000

[7] Engel's Coefficient = Food Expenditure / Household Expenditure. According to the theory, the larger Engel's Coefficient is, the lower the living standard is.

[8] Statistics Bureau, Management and Coordination Agency (1999) "Chapter 4: Kakei ni Miru Kurashi no Tokucho (Characteristics of Everyday Life Seen in the Household Expenditures)", *Kakeibo kara Mita Famiri Raifu (Family Life Seen in the Household Expenditures)*.

However, it should be noted that overall household expenses have been falling for seven consecutive years.[9] In 1999, the monthly average of total household expenses was 323,008 JPY (22,242 NOK),[10] which was 1.6% less than 1998.[11] This has shown that Japanese consumers were still reluctant to spend, despite the government's effort of lowering the maximum tax rate in 1999.[12] One reason was that ongoing recession in Japan caused people to receive less salary, due to lack of additional incentives or bonuses. The other seemed to be that Japanese consumers were discouraged to spend money at the end of the year, when the financial system had shown its weakness. Especially, the workers' households "have been holding down their consumption levels because of concerns about corporate restructuring and possible job losses".[13]

[9] Statistics Bureau, Management and Coordination Agency (2000) "Kakei Chosa Hokoku, Heisei 11 nen Heikin Kekka no Gaiyo (Situational Summary of Average Household Expenditures, 1999)".

[10] "JPY" will be used as "Japanese yen", "USD" as "American dollar" and "NOK" as "Norwegian krone" throughout this report. To calculate 323,008 JPY=22,242 NOK, the average exchange rate in 1999, 6.8858 NOK was used (Norges Bank).

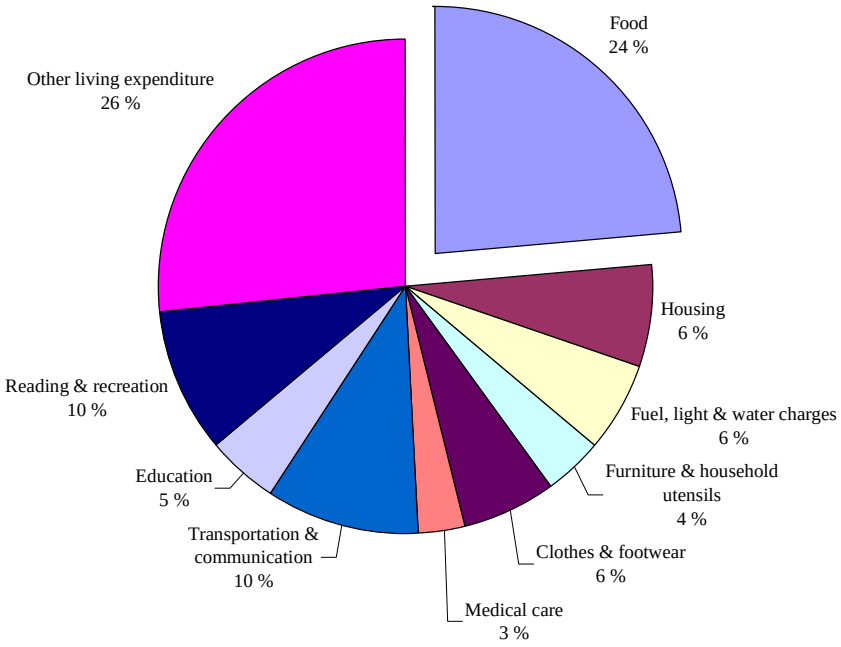
[11] If the 0.4% decline of the consumer price index (CPI) is taken into account, the actual decline would be 1.2%. Ibid.

[12] With some minor exceptions: The lowering of the maximum tax rate has promoted increased consumption among the households of the self-employed, who are categorised as households other than those of wage earners (workers). Japan External Trade Organisation (JETRO) (1999). "2. Consumption, (1) Household expenditures", *The State of the Japanese Economy.*

[13] Ibid.

2.2 Food Consumption Trend in Japan

2.2.1 Household Food Expenditures and Consumption Pattern



Source: "Major Figures on Family Budget All Japan (All Households)", MAFF, 1999.

Figure 1: Household Living Expenditures 1999 (All Households)

Expenses on food cover the largest part of family's living expenditure and seem stable. Nevertheless, the composition of the food expenses is changing year by year.

Traditionally, the Japanese diet is characterised as follows: [14]

1) rice as its staple food
2) large consumption of vegetables, beans, fish and shellfish
3) nutritiously right quantity of meat and dairy products

The second and the third points are especially evident when Japanese dietary habit is compared to the Western one. However, according to the studies on the Japanese food

[14] Kimiko Ishibashi (9 November1999) "Nihon-gata Shokuseikatsu no Doko to Shokuryo Jyuyo no Yukue (Development of Japanese Style Dietary Life and Future Food Consumption)". National Research

consumption trend from the early 1980s to the mid-1990s, home consumption of fish and rice is decreasing, while meat and milk consumption is expanding. Rice consumption is declining in all the age groups, whereas fish consumption is particularly in decline in the age group of 20s and 40s. Moreover, the trend of larger consumption of milk and meat is especially noticeable for teenagers and people in their age of 50s or older. If this tendency continues at the same level and the future demography is taken into account, the predicted consequence in 2010 is the further decline in rice and fish consumption at home; i.e., 40% and 10% less consumption of rice and fish at home respectively compared to in mid-90s. Similar prediction shows 5% increase in meat and 30% growth in milk home consumption. This trend is a sign of further Westernisation of the Japanese diet. It is important to note that the decline in rice and fish seems to be correlated to some extent. Most fish dishes eaten at home in Japan are traditional as such that they are often eaten with rice. It is likely that the less rice is eaten, the less fish are chosen as a dish.

Table 2: Changes in Household Food Expenditures 1970-1999[15]

	1970	1986	1999
Share of Household Food Expenditures			
Fish & shellfish	13%	14%	12%
Meat	10%	11%	9%
Dairy products	8%	5%	5%
Cooked foods	4%	7%	10%
Eating-out	9%	15%	17%

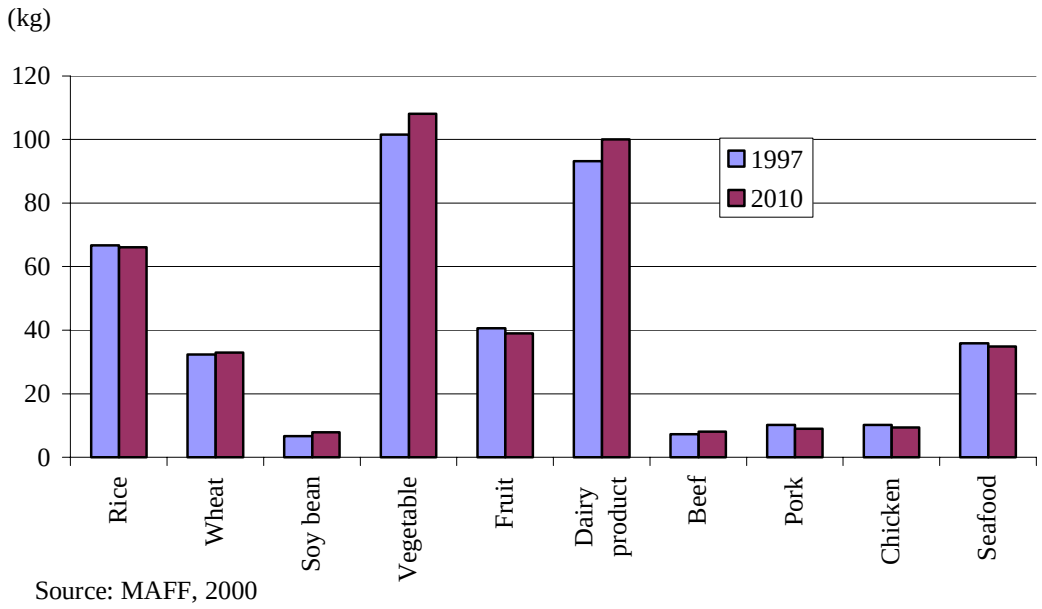
Source: 1999 figures are calculated based on MAFF (1999) "Average of Monthly Receipts and Disbursements per Household (All Households)". 1970 and 1986 figures: Kusakabe and Anderson, *The Japanese Seafood Market: Salmon*, Appendix A, cited in *The Japanese Salmon Market: An Introduction for Alaskans* (1993).

Furthermore, according to the Japanese Government's perspective over expected per capita food consumption, it is likely that the country's total demand of rice and seafood will decrease, but not so much as mentioned above (see Figure 2).[16] The Government's view is based on the expectation that the current trend will not remain the same. The

Institute of Agriculture and Economics (NRIAE). *Summary of 1802nd General Meeting of Research Reports.*

[15] Source: 1998 figures are calculated based on MAFF (1999) "Average of Monthly Receipts and Disbursements per Household (All Households)". 1970 and 1986 figures: Kusakabe and Anderson, *The Japanese Seafood Market: Salmon*, Appendix A, cited in *The Japanese Salmon Market: An Introduction for Alaskans* (1993).

favourable food consumption pattern is expected to be achieved; i.e., food consumption which characterises the favourable nutritious balance and minimisation of



Source: MAFF, 2000

Figure 2: Expected Per Capita Consumption of Food in 2010

food waste. It is true that Japanese people are now more concerned about health, and have more understanding of the environmental anxieties due to dumped excess of food. However, the favourable consumption pattern suggested by the Government is not likely to be entirely accomplished and it seems that today's food consumption trend will continue, at least at a moderate pace for few years.

2.2.2 Growing Nakashoku Sector

Table 2 shows how Japanese people had been spending their budget on food. Eating-out sector has almost doubled in the years from 1970 to 1999. 17% of food expenses were

[16] "Shokuryo, Nogyo, Noson Kihon Keikaku (Basic Plans on Food, Agriculture and Agricultural Villages)", MAFF, March 2000. [http://www.maff.go.jp/soshiki/kanbou/kikaku/chousakai/syokuryobukai/3.../3-2.htm].

spent for eating outside home in 1999. However, more recent and more significant development can be seen in the *nakashoku*, or home meal replacement (HMR), sector. It seems that this HMR sector will continue growing, while HRI sector is stagnant due to both general consumers' and companies' tight budgets for eating out. According to the official research institution in eating-out industry, the market size of the HRI sector in 1999 is said to be 1.2% smaller than in the previous year, which shows a negative growth for two consecutive years.[17] On contrary, *nakashoku* sector, including *sozai* (side-dish) and *bento* (lunch box) sold at convenience stores, supermarkets and department stores, is expected to have grown 1.2% in 1999.[18]

Nakashoku sector consists of the meals categorised in-between *naishoku* (home-prepared meals) and *gaishoku* (eating-out, or HRI[19] sector). Meals eaten as *nakashoku* are usually cooked meals which are consumed at home. HMR includes pre-cooked meal and food, such as *bento*, *sozai*, frozen meal, etc. In short HMR foods are "ready-to-cook, ready-to-heat, or ready-to eat meals.[20] Indeed, average household expenses on cooked food accounted for 10% of the household food expenditures in 1999 (see Table 2), which is more than double of 4% in 1970 and more than triple of 3% in 1965.[21] It seems that recent demographic changes have created this growing *nakashoku* sector: more women are out working, more people living by themselves, less number of children per family, more nuclear families, and so on. The changes in demography will be discussed further in the section 3.1.4.

Moreover, growth of *nakashoku* sector is likely to be benefitted from declining culinary skills of parents. They become "increasingly dependent on canned, frozen, instant, and prepared food, along with an array of time-saving cooking devices and appliances".[22] In this manner, concerning household food expenditures, *nakashoku* sector seems to be

[17] Market size of the HRI sector is expected to have been 28.15 trillion JPY, which is 1.2% down from 1998. "Sakunen no Gaishokusahgyo Shigyokibo, 1.2%gen (The Size of Eating-out Industry 1.2% Decrease)" *Minato Shimbun Digests*, 24 April 2000.
[18] Market size of the HMR sector is expected to have been 5.8 trillion JPY, which is 1.2% increase from 1998, ibid.
[19] HRI sector: hotel, restaurant and institutional sector
[20] U.S. Agricultural Trade Offices, Japan (1999). *Japan Retail Food Sector 1999*, p.4.
[21] Statistics Bureau, Management and Coordination Agency (1999) "Chapter 4: Characteristics of Everyday Life Seen in the Household Expenditures", *Family Life Seen in the Household Expenditures*.
[22] A. Ehara "School Meals and Japan's Changing Diet" *Japan Echo*, Vol. 26, No.4, August 1999.

growing at the expense of raw food materials, such as seafood, cereals, fruits and meat.[23] From 1998 to 1999, the actual decline in family expenses on seafood, cereals, fruits and meat were 4.4%, 3.2%, 2.2% and 1.8%, respectively. On the other hand, household expenditures on cooked food increased 4.7% in 1997, 1.0% in 1998 and 0.7% in 1999, while the overall food expenditures decreased 0.2% in 1997, 2.2% in 1998 and 1.2% in 1999.

Table 3: Annual Growth in Household Expenses (All Households)

Item	1997	1998	1999
Food	–0.2%	–2.2%	–1.2%
Cereals	–2.4%	–0.4%	–3.2%
Fish and shellfish	–1.9%	–3.4%	–4.4%
Meat	–0.3%	–3.6%	–1.8%
Cooked food	4.7%	1.0%	0.7%

Source: Statistical Bureau, Management and Coordination Agency, 2000

As shown in Figure 3, the frequencies of purchases in *nakashoku* sector have been increasing steadily since 1980s. Especially lunch boxes are bought more frequently every year. Now, it should be explained that "lunch box" is probably not the best translation of *bento*, as *bento* differs a great deal from Norwegian equivalent of lunch box, *matpakke*. A *Bento* usually contains steamed rice as a staple food and some side dishes, *sozai*, which are usually fish or meat, some vegetables, and pickles. As explained, *bento* "is a boxed meal that can be taken anywhere, [to] school, work, excursions, train trips, sports [matches] or cherry blossom viewing. [*Bento*es] come in all kinds: they are made at home, ordered out and delivered, bought at the [*bento*] store, eaten at a restaurant. They are usually eaten for lunch, but they can also make a satisfying meal [, for example, when one is] doing overtime [work] at the office".[24] Moreover, due to more people living/eating by themselves and more advanced technology, taking out *hokaben* (hot *bento*) has been popular for many years. Indeed, Hokka-Hakka Tei, the major chain of

[23] Statistics Bureau, Management and Coordination Agency (2000) "Kakei Chosa Hokoku, Heisei 11 nen Heikin Kekka no Gaiyo (Situational Summary of Average Household Expenditures in 1999)".
[24] The Japan Forum [http://www.tjf.or.jp]

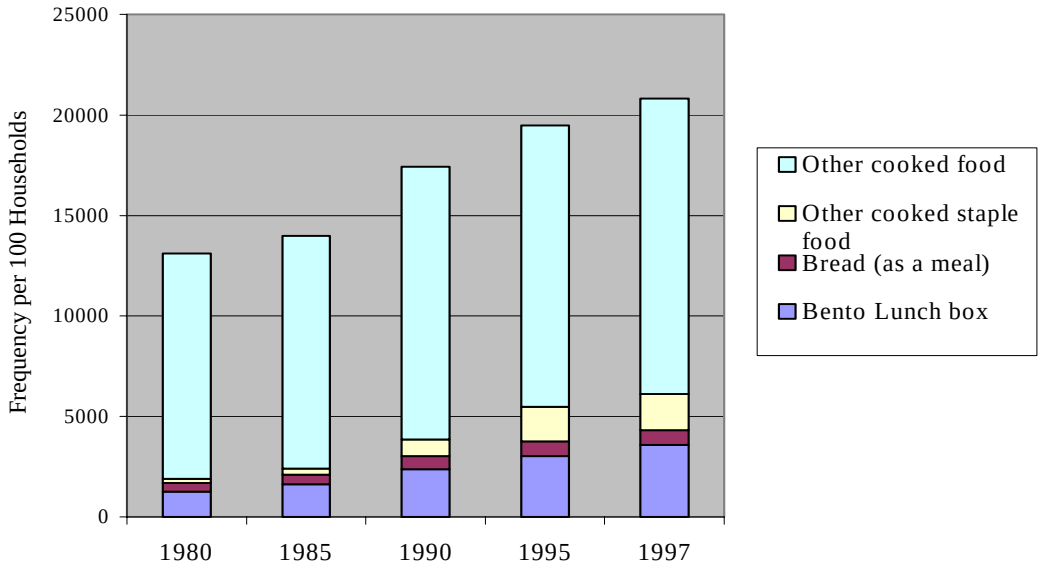
take-out hot *bento* with its 3,248 stores in Japan, has been the second largest company, only after McDonalds, in the catering business for years.[25]

If a *bento* is sold cold, for example at a convenience store, it is warmed up in the microwave oven at the cashier, at work or at home right before it is eaten. Therefore, a *bento* these days is a substantial hot meal and can be eaten even for dinner.

[25] With the 1998 sales of nearly JPY 338 billion. "98 Nendo Inshokugyo Rankingu Dai 25 kai (25th Ranking of Catering Industry 1998)". Although the country's on going recession has been destructive for most of the catering business in Japan, those *hokaben* producers has not been hit as badly as the caterers who are serving more high market segments, such as hotels. Hotel businesses were down 6-12% in 1998. Another *hokaben* chain stores in Kansai area, Honke Kamadoya, ranked in the 8th place. It actually enjoyed its growth of 3.9 % between 1997 and 1998, and Hokka-Hokka Tei had a minus growth of only 0.2 %. *Nihon Keizai Shimbun* (the Japanese financial paper, abbreviated as *Nikkei*), 1999. [http://www.nikkei.co.jp/report/inshoku2.html]

2.2.3 Growing Processed Food Consumption

Among other cooked food (other than cooked staple food), frozen cooked food seems to have the healthiest growth of 28% from the purchasing frequency of 952 times in 1990 to 1,324 in 1997.[26] "The popularity of frozen food among young people and housewives has been increasing continuously in recent years. Frozen food producers, such as Nichirei and Katokichi, have introduced the new line-ups of various frozen foods. According to the Japan Frozen Food Association, 1360,000 tonnes of frozen foods were produced in 1995, which was 3.5% more than they were in 1994."[27]



Source: Statistics Bureau, Management and Coordination Agency, cited in Nippon Sozai Kyokai (Japan Sozai Association)

Figure 3: Purchasing Frequencies of Cooked Food per 100 Household

Some cooking ingredients adjusted for easy home cooking, such as pre-mixed seasoning and sauce, are also growing popular. For example, the flour mix market is expanding

[26] Source: Nippon Sozai Kyokai (Japan Sozai Association) "Sozai no Konyu Hindo (Annual Purchasing Frequencies of Cooked Food Items (Nation-wide, All Households) 1980-1997)", based on "Annual Survey on Family Expenditures", Statistics Bureau, Management and Coordination Agency.

[27] Nihon Keizai Shimbun, Inc. (Ed. 1997). *Gekihen Shoku Bijinesu: Saizensen Rupo, Seisan, Kako kara Hanbai made (Rapidly Changing Food Business: Most Up-dated Report from Producing & Processing to Retailing)*, p.47.

steadily. The mix production in Japan went up about 40% from 1990 to 1997, according to Food Agency statistics.[28] Furthermore, in January 1999, a mix for butter of deep-fried foods was launched by Nippon Flour and it is said that this value-added mix product has a potential to raise the mix market from 5 billion yen to 12 billion yen per annum.[29]

2.2.4 Increasing Demand of Product Information

More detailed information is specified on the labels of many products these days, especially for fresh products, such as vegetables and fish. For fish, the Guideline for Seafood Product Labelling by the Fishery Agency suggests including the following information: what species the fish is, where it is from, whether it was farmed and whether it was frozen.[30] For example, tuna are indicated in seven different species' names. The origin of fish is specified as follows:

1) For domestic catches: either prefectures or the names of the places (city, town, etc.) should be shown on the products.
2) For imports: either countries or regions should be indicated on the products.
3) For the fish runs extensive area: the waters where the fish were caught should be written on the labels.

When the first Guideline was made in 1994, such suggestions were made only for salmon and trout. However, in 1998, horse mackerel, mackerel and shellfishes were added.

It is not, nevertheless, compulsory for retailers to make such adjustments according to the Guideline and there is no certain standard of labelling in the market place. Large supermarkets provide even more specified information than the Guideline suggests, because of the great demand by the customers;[31] while the middle and small size retailers are behind the current. Moreover, the further challenge for such detailed labelling is "how far the product origin should be traced for the processed products". Dried horse mackerel, for instance, is labelled according to the last processing location. When it is processed in

[28] "Market for Mixes is Growing", March 1999. *Trends in Food in Japan.* Agriculture, Fisheries and Consumer Products Section, Embassy of Canada, Tokyo.
[29] Ibid.
[30] The explanation of the Guideline in this paragraph is based on "Gaidorain (Guideline)" 23 March 1999, *Nihon Keizai Shimbun.*
[31] Example of the Seiyu supermarket, ibid.

Odawara, it says, "dried mackerel from Odawara", even if the raw material is from Norway or Iceland.[32]

Following such development, it became obligatory to present the origin of fresh products, according to the new JAS (Japan Agriculture Standard) Law, which became effected on 1 July 2000.[33] Among various fresh products (i.e., vegetables, meat, seafood, etc), the changes were most evident with seafood items. However, it is criticised that there are too little foreign names for the product origin of some fish. For example, only famous country names (Spain, Australia, etc.) are used on tuna for *sashimi* at retailers, even though about half of *sashimi* tuna in Japan is from circa 70 countries. At wholesale markets, such as Tsukiji Market, one can tell some tuna is from some infamous places, such as Chile, Fiji, New Caledonia. In addition to origin, it became obliged to tell the consumers whether the product was farmed and whether it was defrosted. The Japanese consumers are facing the new challenge to choose the seafood products wisely, under the new standard.

2.2.5 Demand for Safe and Healthy Food

The consumers' demand for precise product information is also applied to safety of the food products. "In 1996, two Major accidents hit the Japanese food market. One was BSE (Mad Cow Disease) and another was E-Coli O-157 food poisoning. Population [of] Japan is ageing at a high rate. The number of the people suffering from heart disease and diabetes is growing even among the teenage generation.[34] Because of these factors, Japanese people are becoming health conscious more than ever."[35] Additionally, it seems that the Japanese consumers are ever more about food safety, because the foods in Japan are increasingly diversified not only in variety of foods but also in their origins. There are so many unfamiliar foods and products from unknown places that Japanese consumers are not likely to judge the products only by a fleeting look. It seems that the consumers are not convinced only by how the foods look, but they need more information to feel

[32] Ibid.
[33] "Labelling the Product Origins: Questioning the Effect (Gensanchi Hyoji, Towareru Jkko)", 21 July 2000, *Nihon Keizai Shimbun*, p.15.
[34] However, it should be noted that "the incidence of heart disease, which is a major cause of death in Europe, remained extremely low [in Japan] in comparative terms" (Atoh, 1996).

safe to buy them. In such circumstances, the safety of the food products became an important factor for food sales. "Simple promotion of the product safety, for example appealing the usage of organic foods, is not enough to gain consumers' trust", according to Mr. Maekawa, President of Seiyo Foods.[36] It is likely that when the product safety is tactically promoted, the product gains higher acceptance by consumers, despite the weaker buying power in Japan. For example, after the bacterium (VRE), which was immune to antibiotics, was found in certain imported chicken, some retailers introduced labels which show how chicken were raised, such as "no prescription used".[37] It is said that the bacterium outbreak was due to drug usage while raising the chickens. The chickens promoted as safe products were sold as much as the previous year, whereas overall chicken purchases were declining.[38] Moreover, if the safety is promoted, it is possible to have higher price. For example, safe chickens are 30-40% more expensive than normal ones.

The discussion of genetically modified organism (GMO) has been on-going since 1999. The scheduled date of regulatory requirement to label genetically modified food (30 items) would be 1 April 2001, if the standard is accepted by the World Trade Organisation (WTO). However, prior to that, there were already some supermarkets who started to label their GMO food products voluntarily in late 1999.[39] Jusco, the supermarket chain which started to use labels for GMO food on 9 September 1999, says that there has been a great response by their customers. For example, the sales of the fish meat sausages which were labelled "Possible Use of GMO" declined by 10%; while the sales of tofu with the "No GMO Usage" labels increased by 10%. It seems to have been over reaction by consumers regarding GMO foods; however, it is likely that this consumer-driven trend cannot be stopped and the development should be followed. Probably such tendency in mind, the secretary-general of the British Columbia Salmon

[35] © Department of Foreign Affairs and International Trade of Canada, 2000, *Study on Japanese Organic Food Market*.
[36] Quoted in "Seiyo Foods: Shokuzai no Jyoho Koukai (Information Disclosure on Food Products)" 6 April 1999, *Nikkei Ryutsu Shimbun*.
[37] "Gaidorain (Guideline)" 23 March 1999, *Nihon Keizai Shimbun.*
[38] According to Consumers Cooperative Kobe (Co-op Kobe). Ibid.
[39] "Ji-ji Koku-koku: Idenshi Kumikae Shokuhin no Hyouji 'Senko' ni Piri-piri (Column: A Fuss over Labelling of GMO Food in Prior to the Scheduled Time)" *Asahi Shimbun*, 1999.

Aquaculture Association announced, "there is no GMO usage in salmon aquaculture all over the world".[40]

Clear product information is required not only for fresh food products, but also for frozen food products. Japan Frozen Food Association has recently prepared the labelling examples of frozen food products in accordance with standard for processed food products mentioned in the JAS Law revised on 31 March 2000.[41] Frozen food products can be categorised as fresh food products or processed food products. If the frozen food is grouped as fresh food, the product of origin must be stated on the label.

Different age groups have different attitudes concerning health in Japan. In terms of diet the high age group, 65 year old or elder, seems to be more conscious about their health than other age groups. "Since the population is ageing, health and nutrition for later life is an important issue to consumers."[42] There are interesting findings from the recent survey on household food expenditures of this group. First of all, high age households spend approximately 5% more of their living expenditures on food than all households' average.[43] Moreover, the senior households' food expenditures on fish and fruit increased by over 10% in the period of 1980-96. Furthermore, the ratio of the expenses on fish to meat of the elderly households has been changing over those years; from 1:0.51 to 1:0.45. This shows that healthy conscious seniors today eat more fish than they did in 1980. For the all households' average, this ratio remained around 1:1.45 in the same period (1980-96).

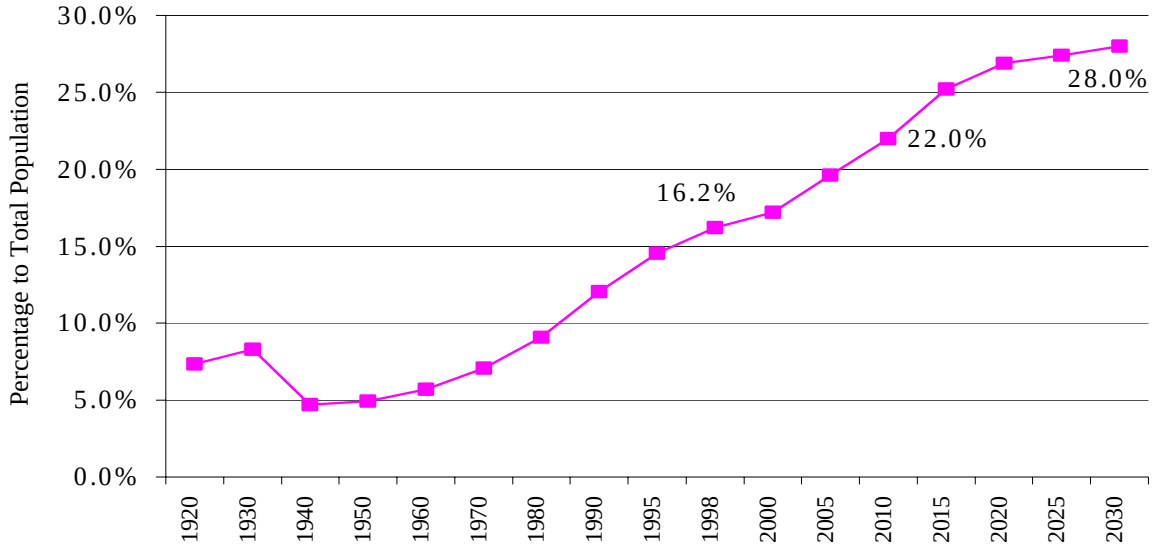
On the contrary, "teenagers and people in their 20s are more interested in health food for the sake of their own attractiveness; that is to say food products that are seen as dietary or beauty aids. For example, vitamin C or collagen enriched foods are considered to be good

[40] "BC shu Sake Yosyoku Kyokai 'Idenshi Kumikae ha Shinai' (Province of BC Salmon Aquaculture Association 'No Intention to Use GMO')", *Minito Shimbun Digest*, 10 March 2000.
[41] "JAS hou Kaisei de Gensanchi Hyouji he (Label the Origin of the Product due to JAS Law Revision)", *Minato Shimbun Digest*, 25 April 2000.
[42] "Market Overview by Sector: Market Opportunities: Food Biotechnology" Ministry of Foreign Affairs and International Trade of Canada, *Action Plan 1999-2000*.
[43] Since 1980's, proportional food expenditures of living expenditure for elderly households have been around 30-35%, whereas approximately 25-30% for all households' average. Aoki & Tanaka (1999) "2. Herushi, Gurume Shiko no Kasoku (Chapter 2 Acceleration of Healthy and Grommet Food Trend)". *Kakei Chosa ni Miru Genkina Koreishazo (Thriving Seniors Seen in Household Income and Consumption Survey)*, Sumitomo Trust Bank.

for the skin. These younger generations are not very interested in nutrition-supplemented products, but are very fashion prone in the kinds of food they are buying".[44]

[44] © Department of Foreign Affairs and International Trade of Canada, 2000, *The Japanese Health Food Market.*

2.2.6 Changing Demography



Source: Statistics Bureau, Management and Coordination Agency, "Population by Age 1920-98" and "Future Population Projections".

Figure 4: Population of High Age Group (65 year old and older)

Japan, a country with a population of more than 125 million, is ageing at an extraordinarily rapid pace. The birth rate in 1999 was less than 1.4,[45] while the post-war baby-boomers born in 1947-49 are going to become 60s in 10 years. Already by 1999, one out of six Japanese was a 65 year old or older person.

The birth rate in Japan dropped dramatically from 1949 to 1957, as "Japan shifted from the traditional high-fertility pattern to the modern low-fertility one".[46] This change was exceptional compared to other industrialised nations, where "this transition took 60-80 years – in France's case, 100 years – but in Japan it came to an end in a mere 8 years".[47] On the other hand, the Japanese life expectancy has been increasing steadily and a drastic decrease is unthinkable, according to Mr. Otoh, director general of the Institute of Population Problems.[48] Under such circumstances, the projections of Japanese population show that 20% of the population will be a high-age group, 65 year old and above, in

[45] The birth rate fell down to 1.38 in 1999. *Nihon Keizai Shimbun*, 19 December 1999
[46] Makoto Atoh, "Population Structure: Fewer Children, More Seniors". *Japan Echo*, Vol.23, Special Issue, 1996.
[47] Ibid.

2006, and 28% in 2030 (see Figure 4). Therefore, to predict the Japanese consumption pattern in the near future, it is imperative to observe the consumption pattern of the growing senior population in Japan.

The recent changes in geographical distribution are:[49]

1. The centralisation of population in the Tokyo area, which consists of Saitama, Chiba, Tokyo and Kanagawa prefectures.[50]
2. The less significant centralisation of population in other large centres than Tokyo, which are Nagoya area (Aichi, Gifu and Mie prefectures) and Osaka area (Osaka, Kyoto, Hyogo and Nara prefectures).
3. The slower increase in regional city centres, such as Sapporo, Sendai, Hiroshima and Fukuoka.

These three large centres of Tokyo, Nagoya and Osaka absorb 49.1% of the population and are growing of 0.54%, 0.40% and 0.22%, respectively. Other regional cities' average growth rate is 0.05%.

Table 4: Populous Prefectures (1998)

Prefecture	Prefectural Capital	Population
JAPAN		126,486
1. Tokyo	Tokyo	11,830
2. Osaka	Osaka	8,804
3. Kanagawa	Yokohama	8,392
4. Aichi	Nagoya	6,974
5. Saitama	Urawa	6,894
6. Chiba	Chiba	5,887
7. Hokkaido	Sapporo	5,700
8. Hyogo	Kobe	5,461
9. Fukuoka	Fukuoka	4,988
10. Shizuoka	Shizuoka	3,770
11. Ibaraki	Mito	2,996
12. Hiroshima	Hiroshima	2,884

Source: Statistics Bureau, Coordination Agency, 1999

[48] Ibid.
[49] Survey on Population Movement in 31 March 1999 by the Ministry of Home Affairs. *Asahi Shimbun*, 27 August 1999.
[50] See Appendix A: Map of Japan by City (p. i) and Appendix B: Map of Japan by Prefecture (p. ii).

Moreover, there are two important developments in relation to demography: the larger number of households and the smaller average size of the households. The number of households was 46,811,712 on 31 March 1999, which was 1.42% more than at same time in the previous year. The average number of people in a household was 2.69 persons in 1999, which was 0.03 less than in 1998. These trends seem to continue and there are numerous consequences in food consumption: e.g. more single households, more people eating by themselves, smaller portion per meal, etc. *Nakashoku* sector is likely to benefit from these developments.

2.2.7 Pressure of Low Price and Quality Oriented Consumers

In the food market, there have been the conflicting demands of consumers. They desire lower prices on foods, while asking for as high quality foods as they had been enjoying before the Japanese bubble economy burst. Japanese consumers have come to take into account value for money, without compromising the taste of the foods. Moreover, it is pointed out that "the 'price destruction' revolution of the 1990s, caused in part by greater price sensitivity and exacerbated in recent years by a weakened yen and a prolonged recession, has resulted in sustained pressure, particularly on retailers, to lower prices".[51] Although one of the factors, "a weakened yen" has improved in 1999, Japanese consumers, who had woken up once, seem to be value conscious continuously.

Safe food, for instance, is accepted to be more expensive than normal food, but the premium of it would have been higher, if it were not for the new value for money conscious consumers. It is said that it is able to put maximum 20-30% of premium on "organic food" labelled foods.[52]

2.2.8 Seasonal Trend

Whether vegetables, fruits and fish are in season or not is an important consideration when Japanese people eat fresh foods. Japan has four distinct seasons. It is said that, in terms of food, the sense of season is weakening in recent years, due to availability of foods all year round. However, it is still easy to feel the seasonal changes in Japan in

[51] "Consumer Trends"*Market Opportunities in Japan for Agrifood and Fish 1999*, © Department of Foreign Affairs and International Trade of Canada, 2000.
[52] Ibid.

general, just by great changes of temperature and climate during the year, together with the seasonal changes of the landscape. The food preference is indeed influenced by the seasonal factors.

Fish can be in season when they have high oil content, before the spawning season. For example, mackerel breed in spring to early summer, and feed on sardines and horse mackerel during summer. Therefore, mackerel are in season from early autumn to early winter. Table 5 shows the right time for consuming several fish in Japan. Some fish are in season, according to the time when fishing around Japan is possible. For example, skipjack's best season is said to be in spring, because skipjack in age of around two years old swim toward Japan in spring: they follow the feed, sardines. In case of tuna, winter is the season, when "fresh" tuna (non-frozen tuna) are available. Fresh tuna from Taiwan, for example, are caught in the months from October and February: half of fresh tuna consumed in Japan are from Taiwan.[53] Moreover, eel is in season in summer, because of its possible nutritious effect. Eel has traditionally been known as a stamina-giving food and people eat it to endure the heat in summer.

Table 5: Japanese Consumption of Fish and Time of the Year

Species	Season
Skipjack	Spring
Salmon: Spring Chum[54]	From May to July
Squid	Summer
Eel	Summer
Mackerel	From early autumn to early winter
Saury	Autumn
Sardine	Autumn
Salmon: Fall Chum[52]	From September to December
Yellowtail	From winter to spring
Tuna	Winter
Cod	Winter
Crab	Winter
Scallop	From winter to spring

Source: Nissui Corporation, [http://www.nissui.co.jp].

[53] "Nama Maguro ni Tsuite (About Fresh Tuna)", *Osakana Jyohokan* [http://ha4.seikyou.ne.jp/home/hodaka/fishroom.htm], Toshio Yabe, 26 Feb. 1998.

[54] Spring chum salmon is called *Tokishirazu* meaning it is fish which is unconscious of the season as it is caught in the ocean and retains its good oil content and silver bright surface colour and lustre. Unlike *aki-sake* (fall chum salmon) which swims up a river from the sea to spawn, this *toki shirazu* wonders about the open sea. These fish have been long preferred in Japan for their high oil content. Although sales volumes of this fish have decreased at supermarkets and other outlets, this *toki shirazu* still has strong market following, particularly among the older population and among people who really know what a good wild salmon is. Fish Info Service, 12 May 2000, *Salmon/Farmed Fish Market Reports*. [http://www.fis-net.com].

In addition to such seasonal trend based on nature and climate, there is the Japanese seasonal consumption pattern based on social events. The calendar in Table 6 shows the time of the year, when food related consumption is higher than usual. The explanations of the occasions will follow, where it seems to be necessary.

Table 6: Seasonal Consumption and Expenses Calendar[a]

Period	Occasion
1) January 1-3	New Year celebration
2) End of February – early March	Graduation ceremonies
3) Beginning of April	Parties for new employees
4) End of March and end of April	Parties for new university students
5) March – May	Cherry blossom viewing season
6) April 29 – May 5	Golden Week
7) March – June	Wedding banquets Tourist season
8) End June – July	Bonus payments for first half of the year
9) Early July – July 15	Midyear present giving
10) August 12-16	Bon festival
11) December	Bonus payments for second half of the year Yearend parties
12) Mid-December	Yearend present giving
13) December 20-25	Christmas season
14) December 26-31	Preparation for New Year

[a] Idea is drawn from "Table 7: Seasonal Pattern of Consumption" (1998) *The Japanese Seafood Market*, p.47. FAO, Globefish. However, some adjustments were made for this report.

5) Cherry blossom viewing is to go out and enjoy beautifully bloomed cherry blossoms at parks, etc. "The custom in Japan, in March and April when the cherry blossoms are in full bloom, is to do [cherry blossom viewing] with family, colleagues from work, or friends. People spread a mat under the cherry blossoms, drink *sake*, sing songs and enjoy the coming of spring. In cities, viewing cherry trees in the evening is especially popular [after work]."[55]

[55] "Hanami (Flower-viewing)", ©Yoichi Sugiura & John K. Gillespie, 2000 "Key Aspects of Japan: Modern Japan" [http://www.japanlink.co.jp/ka/home.html] New Age Publishing Institute.

6) Golden Week is a sequence of public holidays from the end of April to the beginning of May. Many people use the Golden Week combined with weekends and some days off to travel.

8) & 11) "The bonus was originally a special [reward], but now most businesses and government and public agencies provide it at the [fixed] times [in summer and the end of year]. There are two ways of thinking about this, whether to see it as a part of living wage or as a distribution of excess profit; the bonus amount fluctuates depending on economic trends, business earning and the power relationship with labour unions. Most loan repayment plans are made with the bonus in mind, and it is also used at year's end to buy yearend gifts."[56]

9) Midyear gift "today principally refers to gifts that individuals and businesses send from early in July to July 15th to people to whom they are indebted."[57] Because of the recession, consumers are said to become wiser. They demand high quality products, lower prices and products with substance. Consequently, food/drink products did well in midyear gift sales in 1999. According to a survey by Aginomoto General Foods (AGF), the top three items that people wanted to send as mid-year gifts were: 1) beer, 43.3%, 2) coffee, 25.2%, and 3) s*omen* noodle, 12.1%. The average estimated spending per mid-year gift was 4,367 JPY (about 300 NOK).[58]

Some processed meat and fish products can be midyear gifts. For meat, a set of smoked hams is a conventional item. A collection of different fish marinated in *saka gasu* and *miso*, and packages of smoked salmon are also regular items for midyear gifts. Meat and fish products for midyear gifts cost around 5,000-10,000 JPY (approximately 344-689 NOK).

10) Bon is a Buddhism festival to hold a memorial service for the spirits of ancestors.[59] Holidays for Bon are from 12th to 16th of August and some people travel back to their

---

[56] "Bonasu (Bonus)", ibid.
[57] "Chugen (Midyear present)", ibid.
[58] The top 3 of what people would like to receive were even more practical items: 1) gift certificate, 53.7%, 2) beer, 33.7%, and 3) detergent, 28.7%. *Nikkei Ryutsu Shimbun*, p.3, 25 May 1999.
[59] "Bon (Bon Festival)", ibid.

home cities and towns to spend the Bon period with families and relatives. Others may go travelling elsewhere by combining Bon holidays with weekend and some days off.

12) Yearend present is sent in mid-December. In comparison to the midyear gift, "this one signifies gratitude for kindness throughout the year, so it costs somewhat more than [midyear gift]. Early in December, department stores begin to get crowded with people buying gifts, and that hustle and bustle is a part of the yearend scenery that gives a real sense of the approaching New Year."[60]

Similarly to the trend seen in the midyear gift purchases, people would send gifts with practicality: the top four items were 1) beer, 36.6%, 2) fresh foods sent directly from production districts, 22.5%, 3) ham/sausages, 20%, and 4) coffee, 10.9%. The average estimated spending per yearend gift was 4,616 JPY, which was less than in 1998.[61]

A box of salted herring roe is one of the most expensive yearend gifts in Japan, in prior to the large consumption of salted herring roe in New Year season. Moreover, "head on, gill out, gutted salted salmon [are] sold as gifts. One of the most popular items [for yearend gift] is Japan caught salted 'spring' chum salmon. Salted sockeye is also popular."[62] On the other hand, "with the exception of smoked salmon, farmed salmon is usually not used for gift sales".[63]

13) Japan is not a Christian country; therefore, Christmas does not have a traditional meaning in Japan. Generally speaking, Christmas celebration seems to be a commercial event. "Most people in Japan, not only Christians, enjoy Christmas Eve by exchanging presents with family and sweethearts and by eating [dinner] together. The strategy of department stores and businesses, which is to stimulate consumer desire, has created this sort of Christmas culture. By the end of November, large trees decorate shopping districts and the adverting for Christmas sales in department stores and shopping street arcade is in full swing."[64]

---

[60] "Seibo (Yearend present)", ibid.
[61] AGF survey. *Nikkei Ryutsu Shimbun*, p.6. 2 November 1999.
[62] Bill Court (13 December 1999) *Salmon/Farmed Fish Market Reports.* Fish Info Service [http://www.fis-net.com].
[63] Ibid.
[64] "Kurisumasu (Christmas)", ibid.

Moreover, FAO's report on the Japanese seafood market points out the following seasonal consumption pattern of some fish and shellfish:

> "The highest consumption of shrimp, falls during the New Year festival season, the Golden Week and the Bon festival. Tuna consumption in the months of April and May is traditionally high. Eating raw skipjack (*tataki*) used to be associated with traditional poems (*haiku*) praising sashimi-skipjack coming to the Japanese coast in May.
>
> The demand for lobster is usually high during the wedding season, as it is often included in the traditional menu. However, with the economic slowdown, there has been a switch to less expensive products.
>
> Another example of seasonal consumption concerns roe. Reportedly, 50% of the salted herring roe supply is consumed within one week of the New Year festival, while peak consumption for salmon roe is during mid-summer (August) and the year end."[65]

[65] *The Japanese Seafood Market*, p.47. FAO, Globefish, 1998.

3 JAPANESE FISH CONSUMPTION

Fish consumption in Japan is based on the traditional eating habit throughout history; unlike meat and dairy products, which are comparatively foreign to the traditional Japanese diet. Japan is an archipelago. With its five main islands, the series of islands cover more than 4000 km vertically and the country is located where warm and cold currents meet.[66] Thus, the coastal waters of Japan have rich fish resources. In addition to the coastal fishery, the offshore fishery and the distant water fishery provide an extensive variety of fish species. Table 7 shows the wide variety of fish the Japanese consume.

Table 7: Household Fish Expenditures and Consumption 1998

Item	Expendi-tures (yen)	Share of Fish Expenditures	Quantity (g)	Share of Quantities
Fish and shellfish (Total of the items below)	69933	100.00%	33382	100.00%
Tuna fish	8965	12.82%	3538	10.60%
Shrimps and lobsters	5779	8.26%	2478	7.42%
Salmon (non-salted)*	4343	6.21%	3005	9.00%
Pickled fish	4213	6.02%	…	…
Cuttlefish	4193	6.00%	3993	11.96%
Yellowtail	4133	5.91%	1953	5.85%
Salted cod roe	4130	5.91%	1166	3.49%
Kamaboko, steamed fish-paste cakes	4052	5.79%	…	…
Canned fish	3182	4.55%	…	…
Agekamaboko, fried fish-paste patties	3116	4.46%	…	…
Salted salmon*	3017	4.31%	2057	6.16%
Horse mackerel	2568	3.67%	2420	7.25%
Flounder	2376	3.40%	1728	5.18%
Chikuwa, baked fish-paste bars	2369	3.39%	…	…
Bonito	2338	3.34%	1294	3.88%
Dried horse mackerel	1868	2.67%	1618	4.85%
Saury	1733	2.48%	2122	6.36%
Fish prepared in soy sauce	1728	2.47%	…	…
Short-necked clams	1581	2.26%	1926	5.77%
Mackerel	1565	2.24%	1811	5.43%
Oysters	1455	2.08%	811	2.43%
Sardines	1229	1.76%	1462	4.38%

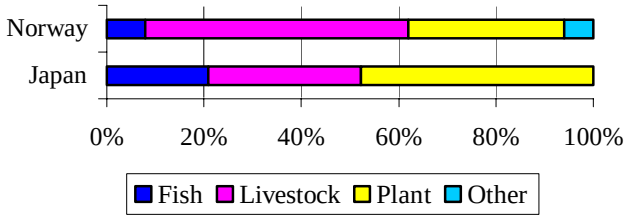
Notes:

- Data are based on the Family Income and Expenditure Survey on Non-agricultural, forestry and fishery households with 2 or more household members.
- Average number of persons per household in 1998 was 3.31 persons.
- *Salmon includes sea trout

[66] On the Pacific Ocean side of Japan, there are the warm current, the Japan Current and the cold current, the Kurile Current.

Source: Statistics Bureau, Management and Coordination Agency, "Yearly Amount of Expenditures and Quantities per Household by Major Household Commodity (All Households) (1998)", *Japan Statistical Yearbook 1999.*

In addition to the kinds of fish consumed, the amount of fish consumed by Japanese people is remarkable. They consume more than 72 kg of seafood per capita annually, which is five times greater than the world average.[67] Also the importance of fish to the Japanese diet can be seen in the composition of the Japanese protein intake. Although it has been declining, fish protein still accounts for more than 20% of the total protein intake per capita,[68] whereas it is only 8% in Norway.[69]



Note: Japan: 1998, Norway: 1997.
Source: Japan: MAFF, 1999; Norway: Statens råd for ernæaring og fysisk aktivitet.

Figure 5: Source of Protein Intake

3.1 Processed Fish Products

To understand the development in Japanese fish consumption pattern, it is helpful to observe how household fish purchases have changed over the past couple of decades (see Table 8).

3.1.1 Decline in Fish-paste (*Surimi*) Products

The most noticeable is the decline in expenditure on fish-paste, or *surimi*, products, which include *kamaboko* steamed fish-paste cakes, *agekamaboko* fried fish-paste patties and *chikuwa* baked fish-paste bars. This decrease in fish-paste products seems to be due to the diversification of the Japanese diet during those years, including the westernisation of Japanese people's taste.

[67] "2. Market Overview by Sector: Market Opportunities: Fishery Products" Department of Foreign Affairs and International Trade of Canada, *Action Plan 1999-2000*
[68] MAFF, 1999.

Table 8: Household Food Expenditure Shares 1970-1999

	1970	1986	1999
Share of Fish & Shellfish Expenditures			
Fresh fish & Shellfish	61%	60%	63%
Salted & dried fish	16%	20%	17%
Fish-paste products	12%	10%	9%
Other processed fish	11%	11%	10%

Source: 1998 figures are calculated based on MAFF (1999) "Average of Monthly Receipts and Disbursements per Household (All Households)". 1970 and 1986 figures: Kusakabe and Anderson, *The Japanese Seafood Market: Salmon*, Appendix A, cited in *The Japanese Salmon Market: An Introduction for Alaskans* (1993).

3.1.2 Decline in Salted Fish Products

The expenses on salted and dried fish also dropped in the last decade (see Figure 6 for development in household consumption of salmon). It is likely that the increasing demand for healthful food today influenced Japanese people's fish purchases. Salty fish are avoided by health conscious consumers. For example, the ratio of non-salted salmon to salted salmon household consumption has been changing favourable to non-salted salmon in recent years.[70]

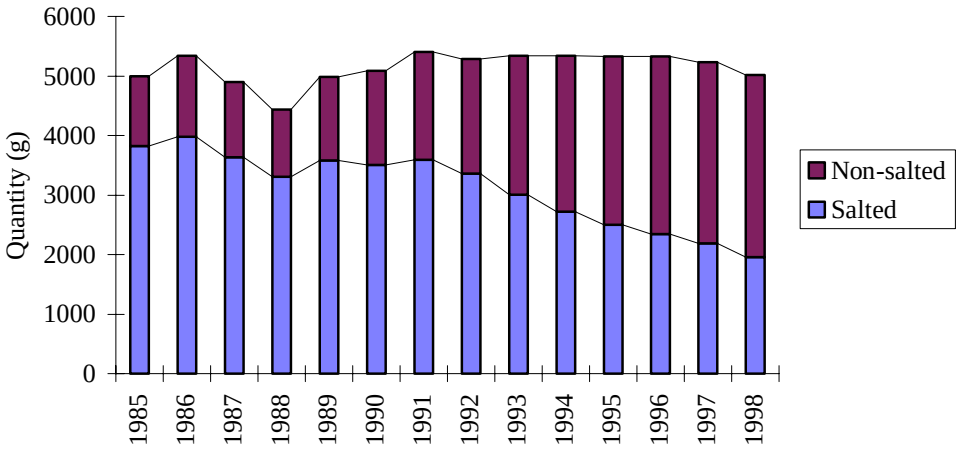
Here is the background of salted salmon consumption in Japan:

> "Originally salmon was very heavily salted because there was no or inadequate refrigeration. The market and consumers grew accustomed to eating heavily salted salmon so well after the diffusion of refrigeration made such heavy salting no longer necessary demand continued. However, over the past twenty odd years as tastes have changed, the diet has become more varied and less traditional and as consumers have become attentive to health considerations, demand for heavily salted salmon has dropped sharply. Not only has demand for the very heavily salted salmon dropped but the demand for medium salted salmon has also fallen as consumer preference has shifted to a lighter salted product."[71]

[69] According to Statens råd for ernæaring og fysisk aktivitet, 8% of Norwegian protein intake was from fish in 1997.

[70] "Tainichi Yushutsu Chili ga 2 nen Renzoku Toppu (Chile Ranked as a Top Salmon/Trout Export Country to Japan in Two Consecutive Years)", 31 March 1999. *Minato Shimbun*.

[71] Bill Court. *Salmon/Farmed Fish Market Reports*, 7 February 2000, Fish Info Servic, [http://www.fis-net.com].



Source: Minato Shimbun, 1999

Figure 6: Household Consumption of Salted & Non-Salted Salmon

Moreover, a reduction in the production of processed squid, especially *surume* (dried squid) and *shiokara* (salted squid fermented in its own liver), is evident, because consumption of these products is decreasing.[72] "Consumption for *shiokara* is declining, partially because customers nowadays tend to shy away from salty items. Supermarkets are planning to decrease the amount of *shiokara* they carry."[73]

3.1.3 Marinated Fish Products

Fish are marinated or pickled in different solution, such as *saka gashu* and *miso*.[74] *Saka gasu* is a by-product of *sake*, Japanese rice wine. It is the leftover substance after filtering

[72] *Squid/Octopus Market Reports*, 19 April 2000, Fish Info Service, [http://www.fis-net.com].
[73] Ibid.
[74] *Miso*: (Soy bean paste) "Like soy sauce, *miso* is made from soy beans. It is a paste-like condiment mostly in a brown colour. Many Japanese have *miso* soup for breakfast. The hot soup is made by adding several ingredients to broth, for example, tofu, seaweeds, or vegetables, then stirring in the soy bean paste. In addition to soup, it is used as seasoning for ramen (a Chinese brand of noodle)… and all kinds of cookpot dishes. Fish or meat pickled in this *miso* keep for a long time and, yet with enhanced taste. Soy bean paste

sake; therefore, the marinated fish in *saka gasu* has a special flavour. Similarly, fish are marinated in *miso* that adds to the flavour. *Miso* is fermented soy bean paste which is used widely in Japanese cuisine. Cod, red fish, salmon and trout are used for these kinds of marinade. Next section will discuses different ways of consuming various kind of seafood, including fresh seafood and processed seafood.

3.2 Different Ways of Consuming Seafood in Japan

"The Japanese archipelago, encircled by the sea, abounds in marine products. Fish in particular is essential to the Japanese diet. Because fresh fish is easily obtainable, dishes that are eaten raw, like *sashimi* and *sushi*, are popular. In addition, grilled or boiled cooking is widespread, but steamed or fried dishes as in Western cooking are not numerous. Fish is deeply related to Japanese culture. When a seabream is grilled whole, it is considered good luck and is invariably served on such occasions as weddings. And lobster or prawn too is considered good luck, because, in a figurative sense, the more its tail is curved and its back bent, the longer one's life."[75]

3.2.1 Sashimi

Sashimi are slices of raw fish. They are usually served with finely shredded vegetables, typically white radish. *Sashimi*'s are dipped in the mixture of soy sauce[76] and *wasabi*,[77]

---

is also an important condiment that is indispensable to the Japanese people. Recently, miso soup in particular has been valued as a health food that contributes to a balanced diet." ©Yoichi Sugiura & John K. Gillespie, 2000, "Key Aspects of Japan: Food" [http://www.japanlink.co.jp/ka/home.html] New Age Publishing Institute.

[75] Yoichi Sugiura & John K. Gillespie (2000) "Key Aspects of Japan: Food" [http://www.japanlink.co.jp/ka/home.html] New Age Publishing Institute.

[76] Soy Sauce: "Soy sauce is a unique Japanese condiment made from soy beans. The English word "soy" derives from the Japanese word *shoyu*. This outstanding condiment, a brown liquid with a peculiar smell, is essential for most Japanese cooking. Accordingly, one can say that it constitutes the basis of the Japanese people's sense of taste. Without soy sauce, the Japanese can't eat *sukiyaki*, *sushi* or *sashimi* or even season any of their cooking. Soy sauce recently has sold well in the U.S. and other Western countries, and has been used as seasoning for steak and other foods. "Teriyaki steak" is grilled with a sauce based on soy sauce." ©Yoichi Sugiura & John K. Gillespie (2000) "Key Aspects of Japan: Food" [http://www.japanlink.co.jp/ka/home.html] New Age Publishing Institute.

[77] *Wasabi* (eng: horseradish, nor: pepperrot): *wasabi* is mainly used by means of taste, now; i.e., to neutralise the fishy taste. However, traditionally, it seems that it was used, also for its antiseptic ability. Kikkoman's Glossary of Japanese foods and related items explains: "This unique Japanese spice once grew naturally alongside clear mountain streams, but today it is mainly cultivated. The wasabi root is peeled, then grated and used as a condiment for sushi, sashimi and chilled soba noodles. These days the fresh root is something of a luxury; most people use ready-to-use grated wasabi paste." *Glossary* [http://www.kikkoman.co.jp./world/cookbokk/glossary/] Kikkoman International Operations Division.

Japanese green mustard, when they are eaten. *Sashimi* is possibly eaten with a bowl of rice or enjoyed with some alcoholic drinks, such as *sake*,[78] beer and white wine. Various fish and shellfish are served as s*ashimi*. Tuna fish is probably the most popular fish eaten raw in Japan.

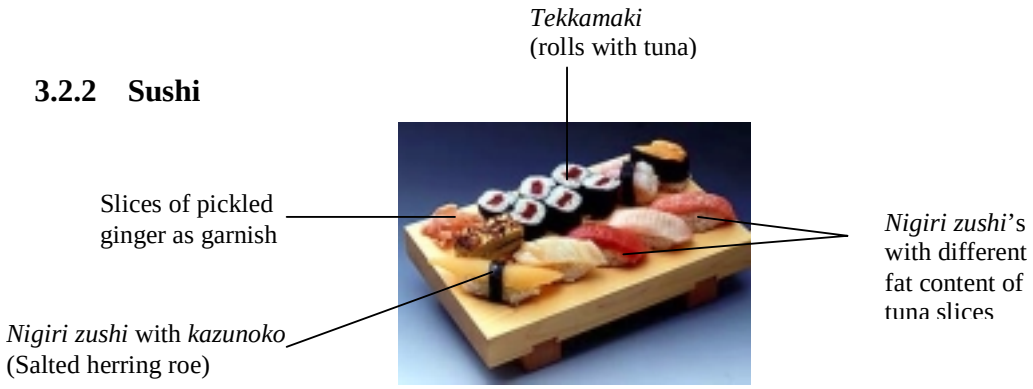
It should be noted that raw salmon is *not* a traditional way of eating salmon in Japan. Actually, it is a recent development after farmed salmon had become familiar to the Japanese market, probably since late 1980s. Even after farmed salmon became familiar as a kind of salmon, it took some years for salmon *sashimi* to be widely accepted by Japanese consumers. Traditionally, it was not possible to eat salmon raw, because naturally caught salmon usually have parasites. On the other hand, aquacultured salmon, such as Atlantic salmon, are recognised to be suitable for *sashimi*. Today, salmon *sashimi* is easily accessible in supermarkets, restaurants, *sushi* bars, and so on; nevertheless, generally speaking, the supermarkets started to handle salmon *sashimi* as much as today, at the end of 1990s.

Tataki is not completely raw, but a kind of *sashimi*. The surface of the raw fillet is roasted to make *tataki*, before it is cut into slices. Skipjack is often prepared as *tataki* and dipped in the mixture of ginger, instead of *wasabi*, and soy sauce when eaten. Now, there are even salmon sold as *tataki* in Japan. When Japan had a problem with O-157 food poisoning in 1996, Maruha introduced "salmon *tataki*".[79]

Some marinated fish is also eaten in a similar way as *sashimi*. For example, a fillet of vinegared mackerel, *shime saba*, is cut into slices and eaten just like *sashimi*.

[78] *Sake*: Japanese rice wine.
[79] "Maruha: «Lakse-tataki» populært som følge av O-157", NSEC, 1997, *Japan Nytt*, p.7.

3.2.2 Sushi



People often talk about *sushi* as raw fish in Norway; however, *Sushi* is not the general term for "raw fish". Rather, *sushi* is connected to the rice used for *sushi*, *sushi meshi*. *Sushi meshi* is made of steamed white rice, seasoned with vinegar and sugar, etc. straight after the rice is cooked. Although *sushi meshi* is always used for making *sushi*, *sushi*'s come in different forms. There are generally five types of *sushi*:

1) *Nigiri zushi* is *sushi* which is made by professional *sushi* chefs, typically at the *sushi* bars. Standard *nigiri zushi* is a small oval shape ball of *sushi* rice with a slice of fish on top. When the chef make *Nigiri zushi*, he quickly puts a little amount of *wasabi* paste between a slice of fish and rice. *Sushi* is lightly dipped in soy sauce when it is eaten. Slices of pickled ginger may be served as garnish. Raw tuna is popular fish for *sushi*. In addition to various raw fish and shellfish, some marinated fish, boiled shrimp, grilled fish, salted fish roe, a small piece of omelette, etc. are used as *sushi* toppings. *Nigiri zushi*'s are originally from Edo, as Tokyo was called in old days.

2) *Maki zushi* is rolled *sushi* wrapped in the dried seaweed sheet, *nori*.[80] Ingredients are *shushi meshi* and some fillings in the centre. *Maki zushi*'s of raw tuna, *tekka maki*, and cucumber, *kappa maki*, are usually on the standard menu.

[80] *Nori*: (Laver) "In Japan, marine products are abundantly taken from the sea. Nori is one kind of seaweed, which adheres to rocks in a mossy form. From the Edo Period(1603-1867) on, nori was popularized after a technique was developed to make it paper thin. It is an indispensable ingredient for *sushi* and rice balls and is used after first drying it over fire. Chopped finely or cut in small pieces, it is used as an ingredient for various dishes. After being dried, it can also be dipped in soy sauce and eaten with rice." ©Yoichi Sugiura & John K. Gillespie (2000) "Key Aspects of Japan: Food" [http://www.japanlink.co.jp/ka/home.html] New Age Publishing Institute.

3) *Oshi zushi* means "pressed *sushi*". Thin layer of fish slices and *sushi* rice are placed in a wooden rectangular container and pressed firmly. Then it is taken out of the box and cut into small pieces to be served. Marinated fish are usually used for this type of sushi. Marinated mackerel, *shime saba*, is typically used. Smoked salmon may be used for this, too. *Oshi zushi* is originated from Kansai region;[81] thus, it seems to be more popular in Kansai than other areas in Japan.

4) *Chirashi zushi* means "sprinkled *sushi*". It is a relatively large bowl of *sushi* rice with toppings. Toppings consist of different kind of ingredients and *chirashi zushi* often looks colourful.

5) *Temaki zushi* is hand roll *sushi*. *Sushi* rice and some ingredients are placed in a small sheet of *nori* and rolled by hands usually in a cone shape.

Sushi's are eaten not only at restaurants or *sushi* bars, where high quality *sushi*s are served, but also at home, at work, etc. *Sushi* can be a handy take-out food. Supermarkets sell take-out *sushi* at the shelves where other take-out foods are sold. There are even *sushi* shops specialised in take-out *sushi*s. Moreover, there are home delivery service of *sushi*s by local *sushi* bars.

Fish consumed raw, such as *sashimi* and *sushi*, needless to say, must be exceptionally high in quality. Extreme freshness, suitable texture (often related to oil content), fresh colour, etc. are required. In order to supply fish for *sashimi* to the Japanese market, the quality of the fish must fulfil certain criteria, which are presented by the buyers.

Here is an example of a Japanese seafood importer, Koyo Suisan. First, Koyo Suisan started to use Norwegian farmed salmon trout for its *sashimi* salmon and other salmon products in 1987. However, in 1990s, they switched their suppliers of salmon from Norwegian ones to Chilean ones. Koyo Suisan gives precise instructions to its Chilean suppliers to implement "Koyo standard". This company standard specifies how the meat texture and colour should be.[82] It seems that farmed salmon are appreciated when it is possible to make suitable adjustments accordingly to the market demand.

[81] See Appendix C (p.iv) for the explanation of Kansai region.
[82] "Suisan Kakougyo no Mosaku (6) Saitekina Genryo, Kaigai kara Chotatu – Kawase ni Hairyo (Groping Seafood Processing Industry (6) Obtain Suitable Raw Material Abroad: Pay Attention to Currency Rate)", 4 March 1999, *Nihon Kreizai Shimbun*, p.1

In addition to such quality standard, size of product sometimes can be a determining factor for raw fish consumed in Japan. Demand for certain sizes of shrimps for *sushi* is an example. Bill Court reports the extreme situation of such demand by Japanese shrimp buyers:

> "Buyer requirements of major convenience stores, conveyor belt sushi shop chains, and take-out sushi chains are extremely strict where shrimp is concerned. The requirements are getting [stricter] and seem excessive. This causes all kinds of headaches for suppliers. The main complaint is uneven sizes.
>
> According to a processor of sushi shrimp in Bangkok, Thailand, it started off by using frozen black tiger 31/40 size. In due course, however, it received instructions to begin sorting shrimp within the 31/40 size category. The standard for 31/40 size is a weight of 11-15 grams per piece, but the processor received instructions to sort product into four categories of 10, 12, 14 and 16 gram sizes. By introducing an automatic sorting machine, it was able to meet this demand. Now it is being asked to limit differences in length to within 2 mm. So product is now lined up in a row and excess length removed with a knife. In this way the processor has somehow been able to comply with these demands. But the Japanese side is now no longer willing to take all sizes, so one size or more always gets left over, according to this processor. When 16 gram shrimp are left over and 12 gram shrimp are in short supply, there are occasions when the processor takes a knife to the 16 gram product and turns it into 12 gram product."[83]

Moreover, the quality of tuna can be affected by the natural environment. According to the Fish Info Service's report, the oil content of tuna is lower and quality of the flesh is poorer, because of "the abundance of whale and consequent lack of feed for the tuna, and oceanic pollution".[84] There has been a similar incident that "the increasing need for tuna to compete for feed with marine mammals" caused lower quality of tuna.[85] Boston and Canadian bluefin tuna turned out to be poor in quality, due to the large population of seals. The quality of tuna is also influenced by the water temperature. Warm water causes tuna to have lower oil content.

[83] *Shrimp Market Reports*, 2000. Fish Info Service. [http://www.fis-net.com]
[84] *Tuna Market Reports*, 18 April 2000. Fish Info Service. [http://www.fis-net.com]
[85] Ibid.

3.2.3 Broiled Fish

Broiled fish is probably the most standard way of consuming cooked fish in Japan. Various fish are grilled as a whole or as fillets. Fish is grilled as whole when the fish is not very large; e.g. saury. Capelin and horse mackerel are also grilled as whole, but they are often dried when they are sold. Unlike Norwegian dried cod, *klippfisk*, "dry" here does *not* mean completely dry. Horse mackerel is opened up in the belly and dried to the extent that it gives good flavour. Capelin, being so small, is dried as whole. They are still half-raw, so must be grilled before they are eaten.

On the other hand, large fish are cut into rather small slices, *kirimi*. Salted salmon, for example, is usually a half size of salmon cutlets with bones and skin on. The backbone of salmon is usually cut into two. Therefore, each fillet only weighs about 70-80g. Besides, yellowtail fillets are not salted when they are sold; thus, they are often broiled with sauce (often *teriyaki* sauce). "*Teriyaki*-style cooking has long been a popular way to prepare large fish with a relatively high fat content, such as yellowtail and [non-salted] salmon, or more delicate fish and shellfish."[86] Indeed, the most popular way to prepare eel, the high fat content fish, is to broil with sauce and it is often served on the bed of rice.

Grilled marinated cod in *saka gasu*
(Photo from the pamphlet of Tsukiji Nakada, 1999)

In addition to salted *kirimi*, marinated *kirimi*, which were explained in the section 3.1.3. Marinated Fish Products, are also for grilling.

Various grilled fish explained above are usually served with steamed plain rice and eaten for dinner, for lunch and, traditionally, even for breakfast.

[86] Kikkoman Corporation, International Operations Division. "The Japanese Kitchen: Teriyaki" (June, 1998) *Food Forum*, Vol.12, No.2

3.2.4 Japanese Breakfast


©Arai City, Niigata Pref.

This is a picture of Japanese traditional breakfast with grilled dried horse mackerel. Grilled fish eaten in the morning is usually either salted salmon fillet or dried horse mackerel. Standard Japanese traditional breakfast would/may include the following items:

- A bowl of rice
- A bowl of *miso* soup
- Pickles or/and seasonal vegetable
- Grilled fish
- A raw egg or Japanese style omelette
- *Natto*: fermented sticky soy beans
- *Nori*
- Soy sauce
- Japanese tea

Recently, some women, young people and children seem to prefer Western style breakfast with bread and cereals. However, many elderly people still choose breakfast with rice and *miso* soup. Also, it is likely that even some young people, especially men, like Japanese breakfast better, because it helps to carry them through longer hours.

3.2.5 Bento

As explained in 2.2.1. Growing *Nakashoku* Sector, *bento* is an item which as been growing significantly in the last few years. *Bento* which contains grilled salted salmon is one of the most standard and probably the most popular *bento*s. Hokka-Hokka Tei, the largest *bento* chain stores in Japan, offers three kinds of salmon *bento*s which vary in price.

3.2.6 Rice ball

Grilled salted salmon is also a popular ingredient for a rice ball. Rice balls are "made by rolling rice in the palms of the hands... Usually, they are made into triangular or round shapes with a pickled plum[87] or fish in the middle and wrapped with [*nori*] on the outside. Like sandwiches for the [Westerners], they are the most popular item for carrying along when on outing or hiking. In urban convenience stores, they have become popular food items for single [people]".[88]

The standard fillings of the rice balls are:

- *umeboshi,* pickled plums
- *tarako,* salted cod roe
- salted salmon
- *okaka,* skipjack flakes seasoned with soy sauce,

©The Japan Forum

These ingredients are easily obtainable at any supermarket in Japan. Thus, it is usually not difficult to make rice balls at home.

3.2.7 Deep Fried Fish

Fish and shellfish are widely used for Japanese deep-fried dish called *tempura*. Especially, shrimp is a popular ingredient for *tempura*. Small white fish, such as sillago are also used for *tempura*. Following is the good a explanation of *tempura*. "Fish, shellfish, vegetables…, are dipped into the batter of wheat flour dissolved in water, fried in hot cooking oil, dipped in a special broth, and eaten. Its special characteristic is a light taste, distinct from food that is directly coated in wheat flour and fried. The ingredients are rich in their variety, and the tastiest way to eat them is on the spot while preparing

[87] *Umeboshi*: (Pickled plums) "These are plums pickled in salt and exposed to the sun for drying. Since the tartness strongly stimulates the sense of taste and causes saliva to flow, this was popular as a convenient preserved food in those times when there were food shortages. Even just one of these pickled plums made a sufficiently tasty meal with rice. Today, it is still a basic food item, essential for rice balls and lunches, for the Japanese." ©Yoichi Sugiura & John K. Gillespie (2000) "Key Aspects of Japan: Food" [http://www.japanlink.co.jp/ka/home.html] New Age Publishing Institute.

[88] Ibid.

them, whether at a restaurant or at home. *Tempura donburi* (or *ten-don*) is a widely popular menu item."

Furai is another way of deep-frying fish, meat and other ingredients. Ingredients are covered by fine bread crams and deep-fried. Again, shrimps are favourably used for this dish and called *ebi furai* (fried shrimps). Also, some shellfish, such as oyster and scallop, and some small white meat fish are cooked as *furai*.

3.2.8 Donburi

Donburi dishes are "simple and easy combinations of rice and complementary foods".[89] As shown below, *donburi*s consists of large bowls of rice with a variety of ingredients as toppings. They are *donburi*s with slices of raw tuna (*tekka-don*),

Various *donburi* dishes ©Kikkoman Corporation

shrimp *tempra* (*ten-don*) and broiled eel. They diverge not only in the kinds of fish which are used, but also in the ways they are prepared. Moreover, in addition to such fish toppings, there are other popular *donburi* dishes with meat; e.g. *donburi*s with cooked beef (*gyu-don*) and deep-fried pork (*katsu-don*).

3.2.9 Cookpots

"Japanese culture, which can be called 'a culture of harmony', places importance on harmony among friends. One cultural form for confirming harmony involves friends getting together to drink *sake* and eat, and [cook pot dish] is appropriate for such gatherings. Soup stock and ingredients are put in a pot and heated; four or five persons sit around it, put soup and ingredients from the pot into their own bowls and eat. This

enhances the bond of friendship and stimulates the discussion. There are all sorts of ingredients and soup stocks, as many flavours and ways of preparing, in fact, as there are households [, so as it is said]. Typical ingredients include fish, shellfish, a variety of vegetables and meats, and soup stocks are seasoned by soybean paste or soy sauce."[90]

One of the fish used for hotpot is cod. Japanese people still seem to associate cod as winter fish, although cod is obtainable all year round nowadays, thanks to the freezing technology. Indeed, in Japanese writing, a word for cod consists of "fish" and "winter". Hotpot itself also features Japanese dinner table in wintertime. Therefore, hotpot with cod is considered a winter dish. It is said that there are less and less seasonal implications in Japanese food culture these days. However, it seems that seasonal aspects are still an important factor to understand Japanese people's food consumption behaviour.

3.2.10 New Ways of Consuming Fish

Pan-fried fish is categorised as a "western style" dish in Japan. For example, non-salted salmon is seasoned with salt and pepper, sprinkled flour around, and pan-fried with butter.[91]

Unlike in Norway, smoked fish is not traditionally eaten in Japan. Smoked salmon, for example, is relatively new to the Japanese market and it was only for high market consumption; e.g. hotels and banquets. However, although it is still in very small amount, smoked salmon is sold at regular supermarkets nowadays. This seems to be due to diversification of people's taste.

3.2.11 Cooking Appliances

Unlike in Norway, electricity is expensive in Japan. Therefore, in addition to electricity and water, gas is one of the built-in utilities in many of the households in Japan. Gas is often used for cooking; e.g. gas range and gas oven are used. However, some electric cooking appliances are utilised in the Japanese kitchen. Microwave oven, fish roster and

---

[89] Shinpachiro Tamura (June 1998) "The Japanese Table: The Fundamentals of Rice". Kikkoman Corporation, International Operations Division. *Food Forum*, Vol.12, No.2.
[90] ©Yoichi Sugiura & John K. Gillespie (2000) "Key Aspects of Japan: Food" [http://www.japanlink.co.jp/ka/home.html] New Age Publishing Institute.
[91] "Minieru (Munière)" in *Sanseido Japanese Dictionary*.

oven toaster are good examples. Neither of them takes much space nor consumes much energy. Microwave ovens can be found in more than 90% of homes,[92] and probably at office canteens, etc. in Japan. Microwave oven seems to have become part of people's life, where more and more processed foods and take-away foods are consumed.

Most of Japanese households have fish roasters and they are often used for grilling fish. A fish roaster needs only around 900W; thus, it is more economical than an oven. It is not very large approximately 40cm x 27cm x 18cm. The grill inside and the bottom part of the roaster are often detachable so that it is easier to wash them and keep clean.

(Photo by Akemi Nakamoto)

"Trout foil grill pack (mayonnaise taste) for one person" at Daiei

Oven toaster is a tiny oven-like toaster with a door in the front. It can be used for not only toasting bread, but also for making a small dish. As mentioned before, there are more people living/eating alone and supermarkets are offering some packages of ingredients of one person's portion. One such products is a package of some vegetables and a piece of fish for grilling in an aluminium foil. According to the cooking instruction on the package, it requires only 10-15 minutes cooking in the oven toaster. Some frozen foods, such as pizza, are cooked / warmed up in the oven toaster, too. In this way, an oven toaster is somewhat a handy cooking appliance to make one person's portion of food.

Moreover, rice cooker should be mentioned, as using the rice cooker is the most common way to cook rice in Japan. "The easiest way to cook rice is to use a rice cooker. This very convenient appliance automatically controls the cooking temperature, and has water and rice measurement marks on the inside of the cooker. All one needs to do [are to] put in the rice and water, close the lid and turn it on… Most have a warming function that keeps the cooked rice warm for several hours."[93]

[92] "Market Opportunities in Japan for Agrifood and Fish 1999" © Department of Foreign Affairs and International Trade of Canada, 2000.

[93] *Glossary* [http://www.kikkoman.co.jp/world/cookbook/glossary/] Kikkoman Corporation, International Operations Division.

3.3 Different Fish in the Japanese Market

As seen in the development of average household consumption of fish from 1991 to 1998, the consumption of high market fish has been somewhat increasing, while the consumption of the low market fish has been decreasing. For example, consumption of one of the most inexpensive fish, sardine has been declining. Moreover, cuttlefish has been declining, even though Japanese consume half of the world's cuttlefish production.[94] Cuttlefish can be used in many ways and it seems to have been a handy ingredient for home cooking: they are eaten raw as *sashimi* and *sushi*, deep-fried as *tempura* and *furai*, and eaten boiled. However, cuttlefish appears to be less appreciated nowadays, because people tend to eat outside home more often and prefer to use easier cooking materials. On the other hand, the household consumption of some high value fish, such as tuna and salted cod roe, has been slightly increasing.

Table 9: Recent Development of Average Household Consumption of Fish and Meat Products, 1991-1998 (grams)

Item		1991	1992	1993	1994	1995	1996	1998
Fish								
	Tuna fish	3151	3360	3321	3525	3622	3288	3538
	Salmon* (non salted)	**1820**	**1925**	**2336**	**2622**	**2832**	**2984**	**3005**
	Cuttlefish, squid	5410	5733	5282	4746	4568	4801	3993
	Yellowtail	2139	2186	1921	2025	2350	1990	1953
	Salted cod roe	999	979	994	1035	1152	1172	1166
	Salted salmon*	**3587**	**3360**	**3001**	**2722**	**2500**	**2341**	**2057**
	Horse/Jack mackerel	2440	2627	2680	2593	2532	2496	2420
	Flounder	1981	2170	2233	2028	2013	1988	1728
	Bonito/Skipjack	1226	1225	1515	1173	1246	1036	1294
	Dried horse/jack mackerel	1707	1703	1800	1622	1623	1623	1618
	Saury	2599	2770	2434	2337	2020	1655	2122
	Mackerel	797	868	1056	1359	1328	1313	1811
	Sardines	2214	2112	2008	1777	1516	1435	1462
Meat								
	Beef	11347	11437	11767	12245	12335	10938	10543
	Pork	16841	16565	16461	16029	15987	15889	15883
	Chicken	12857	12814	12637	12332	12165	12151	11625
	Ham, Sausage	8337	8544	8423	8276	8323	8219	8210

*Sea trout is counted as salmon.

Source: For 1991-96 figures: FAO, Globefish, *The Japanese Food Market*, p.43.
For 1998 figures: Statistics Bureau, Management and Coordination Agency, "Yearly Amount of Expenditures and Quantities per Household by Major Household Commodity (All Households) (1998)", *Japan Statistical Yearbook 1999.*

[94] Nissui Corporation. "Ika (cuttlefish)" [http://www.nissui.co.jp]

The combined figures of non-salted salmon and salted salmon are 10.54% of the total fish and shellfish expenditures (see Table 9). Quantity wise, it is 15.16% of the total fish and shellfish consumption; i.e., more than tuna fish consumption. This combined amount of non-salted salmon and salted salmon has been relatively stable during 1991 and 1998; nevertheless, as mentioned in 3.1.2 Salted Fish Products, the consumption of salted salmon has been declining, in expenses of non-salted salmon.

Horse Mackerel, *Aji* in Japanese, has been consumed steadily at home. On the other hand, regular mackerel household consumption has increased greatly, more than double during the period of 1991 and 1998. The price of mackerel at supermarkets decreased due to the mackerel imports. First, processors were reluctant to handle Norwegian mackerel as their raw material, because of the higher oil content than domestically caught mackerel, which they believed was not suitable for processing. Moreover, processors were reluctant to use Norwegian mackerel, because the fish are not treated carefully and therefore tend to have scars/marks on the surface and meat is partly damaged. However, as the domestic catch went downwards, they started to use Norwegian mackerel in 1990s (see Table 14). Norwegian mackerel imports continued growing, as import quota for mackerel increased in September 1997. Consequently, overall mackerel supply increased and became more accessible to the consumers. The country's economic recession seems to have had a positive effect on mackerel sales in Japan. Because of the tight family budget, consumers are increasingly in search of bargains. The price cut for mackerel is continuing further, as processing is done outside Japan:

> "Japan's imports of Norway Mackerel[95] fillets processed in China have been increasing. March imports were 1,458 tonnes, a 999 tonne (68.5%) increase compared with the same period in 1999. Prices for Japanese product (400/600 size, 30 pieces/ 5 kg) were 1,800 - 2,000 yen/ case, whereas similar sized product processed in China is sold at the 1,500 yen/ case level. Chinese product is of a little lower quality and is produced to rougher [specifications], according to market sources in Japan, as compared with Japanese product. However, this product is already being delivered directly to supermarkets on account of its attractive price. This phenomenon is being repeated with various other processed seafood products in Japan. Japan's costs for both processing and distribution are too

[95] Norwegian mackerel is presented as "Norway Saba (Norway Mackerel)". Similarly, Norwegian salmon and Norwegian capelin are often called "Norway Salmon" and "Norway Shishamo (Norway Capelin), respectively. Those terms are commonly used almost as brand names.

> high and many are finding the foreign option attractive. China offers the advantages of proximity and quick delivery time."[96]

Having a look at meat products, the consumption has been fairly stable, even though they all have marginally downturn trends. According to a report by US Embassy in Tokyo, the forecast for broiler meat consumption in 2000 is slightly below 1999.[97] Although there are evident signs of an economic recovery in Japan, it seems that consumers stay cautious about their food expenses at home and outside.[98]

3.4 Geographical Consumption Pattern of Fish

3.4.1 Geographical Characteristics by Region

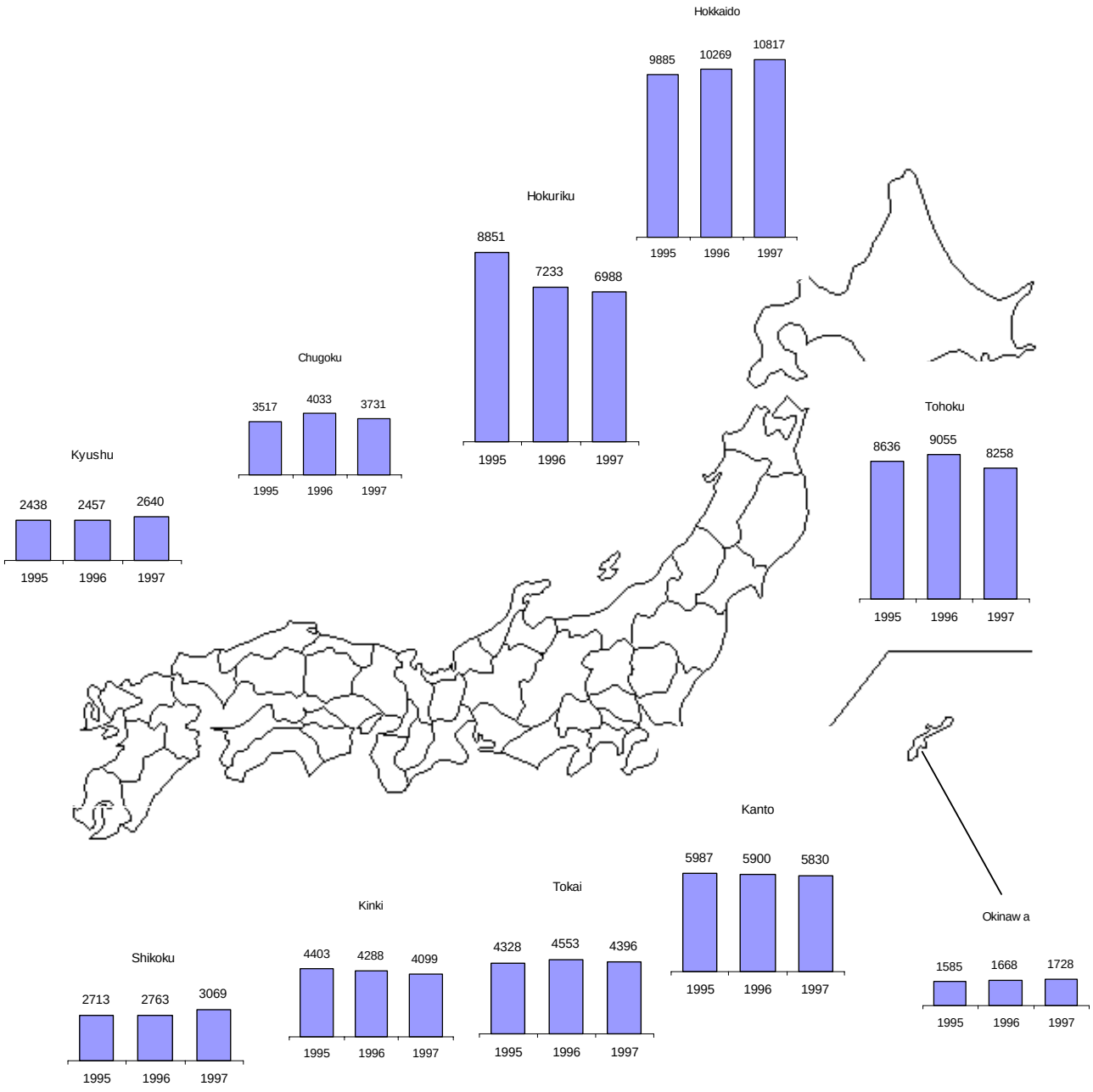
The Japanese food consumption pattern varies according to the regional taste. The report of Canadian Department of Foreign Affairs and International Trade explains:

> "In general, food preferences of consumers in the five major Japanese regions are largely related to the fisheries products available locally. For example, sockeye salmon is preferred in the Kansai, as opposed to chum salmon in the Kanto. The estimated annual per capita consumption of tuna and salmon in the Kanto region (9.2 kg) is 46% more than that in the Kansai (6.3 kg). In contrast, it is estimated that the consumption per person of seabream and flounder in the Kansai region (4.2 kg) is 90% more than what is consumed in the Kanto region (2.2 kg).
>
> There is also a notable difference in preference between two types of salmon roe – one is salmon roe in individual pieces, called *ikura*, and the other is *sujiko*, salmon roe still in the sack. In the Kansai, *ikura* is preferred, while it is *sujiko* in the Kanto. Kansai consumers also prefer thawed fresh crabmeat for their traditional fish meal pot, while Kanto consumers use boiled for the same dish.
>
> In the Kansai region, consumers are known to be more demanding, wanting the tastiest foods at the lowest price. Furthermore, traders of food products in the Kansai tend to be cautious about introducing new or unfamiliar products into the market, but after they are certain of consumer acceptance, become more serious in promoting new products."[99]

---

[96] *Pelagic Market Report*, 19 May 2000, Fish Info Service, [http://www.fis-net.com].
[97] Casey E. Bean, 9 February 2000, "Japan Poultry and Products Semi-Annual 2000". US Embassy, Tokyo. *GAIN (Global Agriculture Information Network) Report #JA0014*, p.1. United States, Department of Agriculture (USDA).
[98] Ibid.
[99] *Market Opportunities in Japan for Agrifood and Fish 1999*, © Department of Foreign Affairs and International Trade of Canada, 2000.

Moreover, regional characteristics can be seen in the quantity of salmon consumed. Figure 7 shows that the salmon purchases per household are significantly greater in northern parts of Japan, where salmon is traditionally caught, than in southern Japan.



Source: NSEC, 1999

Figure 7: Regional Salmon Purchases per Household, 1995-1997[100]

[100] "Kinki" here can be interpreted as "Kansai". See Appendix C: Map of Japan by Region (pp. iii-vi).

3.4.2 Geographical Characteristics by City

Table 10, giving a list of the frequently consumed or purchased foods by city, shows the tight connection betweem the availability of foods and consumption characteristics.

Some fish are more popular in the areas where they are landed. Sapporo City is the capital of Hokkaido. The total catch of salmon in Hokkaido accounts for more than 85% of Japan's total catch of salmon, according to 1997 figures.[101] Bonito is chosen in Shizuoka City and Sendai City. Those cities are capitals of Shizuoka and Miyagi prefectures, which are the largest and the third largest skipjack fishery prefectures in Japan.

In addition to such fisheries, aquacultures influence the consumption pattern of fish in different cities. The first two cities, Sapporo and Aomori, have high consumption of scallops. Sapporo City is in Hokkaido and Aomori City is in Aomori Prefecture. Hokkaido and Aomori prefectures are both known for the aquaculture of scallops. Similarly, Hiroshima, as the largest cultured oyster producer, consumes high amount of oysters. Moreover, red seabream is preferred in Saga and Kumamoto. These cities are both in Kyusyu, where red seabream is cultured.

Consumers in some of the largest cities, including Tokyo, Yokohama and Nagoya, did not choose fish as the most frequently eaten or purchased foods. This shows that the trend in food diversification, including westernisation, is more significant in large cities, especially in the Kanto area. For example, in Yokohama City, cheese and bacon were chosen as some of the most consumed food products.

Table 10: List of Top Ranking Household Expenditure on Seafood & Meat by City

City	Item
Sapporo	salmon, scallop
Aomori	flounder, cuttlefish/squid, scallop
Akita	cuttlefish/squid
Sendai	skipjack, saury, *kamaboko* (steamed fish-paste cakes)
Mito	flatfish, corbicula

[101] (Hokkaido 195,000 tonnes) ÷ (Japan 227,000 tonnes) = 85.90%. "(5) Catches by Major Species and Prefectures" *Production of Fisheries and Aquaculture, 1997 (Preliminary)*. MAFF, 1999.

Niigata	salted salmon
Yokohama	bacon
Toyama	cod, yellowtail, pickled seafood
Kanazawa	flounder, yellowtail
Kofu	skipjack, dried horse mackerel
Gifu	oyster
Shizuoka	skipjack, *shirasu* (tiny fish, usually baby sardines.)
Tsu	shrimp/prawn,
Kyoto	broiled eel
Osaka	octopus, broiled eel
Kobe	octopus
Nara	beef
Wakayama	shrimp/prawn
Tottori	sardine, flounder, mackerel, crab, *chikuwa* (grilled fish-paste bars)
Matsue	yellowtail, corbicula
Hiroshima	oyster
Yamaguchi	horse mackerel
Tokushima	*niboshi* (boiled & dried small sardines, which used for fish stock base)
Matsuyama	octopus, *agekamaboko* (deep fried fish-paste patties)
Kochi	skipjack, dried *shirasu*, dried sardine
Fukuoka	salted cod roe, chicken
Saga	seabream, short-necked clam
Nagasaki	horse mackerel, assorted *sashimi* (raw fish slices)
Kumamoto	seabream, chicken
Oita	chicken
Miyazaki	horse mackerel, *niboshi*
Kagoshima	*agekamaboko* (deep fried fish-paste patties)
Naha	*katsuobushi/kezuribushi* (piece of dried skipjack/dried skipjack flakes), bacon

Note:

- The list is based on the ranking of most frequently eaten (quantity) or purchased (value) foods in different prefectural capital cities. Here, there are only fish and meat products are listed.
- The cities are roughly in sequence from the north to the south of Japan.[102]

Source: Statistics Bureau, Management and Coordination Agency (1999) "Chapter 4: Kakei ni Miru Kurashi no Tokucho (Characteristics of Everyday Life Seen in the Household Expenditures)", *Kakeibo kara Mita Famiri Raifu (Family Life Seen in the Household Expenditures).*

[102] See Appendix A: Map of Japan by City, p.i.

4 FISH SUPPLY IN JAPAN

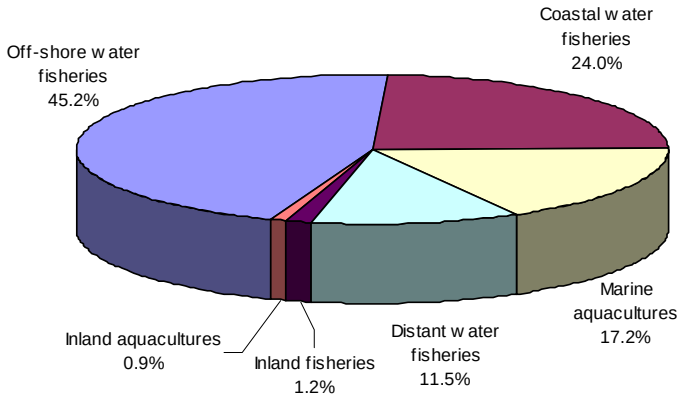
Table 11: Supply and Demand of Fishery Products (1,000 tonnes)

Classification	1975	1980	1985	1990	1995	1996	1997*
Domestic production	9,918	10,425	11,464	10,278	6,768	6,743	6,728
For food	7,552	7,421	7,268	6,311	5,225	5,058	5,012
Fresh, frozen	2,515	2,320	2,100	1,510	1,205	1,037	1,044
Salted, dried, smoked & others	4,353	4,156	4,413	4,351	3,682	3,670	3,612
Canned	684	945	755	450	368	351	356
For fertilizer/feed	2,366	3,004	4,196	3,967	1,513	1,685	1,716
Imports	1,088	1,689	2,257	3,823	6,755	5,921	5,998
For food	752	1,027	1,880	2,714	3,872	3,922	3,881
Fresh, frozen	619	847	1,356	2,034	3,123	3,187	3,085
Salted, dried, smoked & others	123	169	509	662	730	721	781
Canned	10	11	15	18	19	14	15
For fertilizer/feed	336	662	377	1,109	2,883	1,999	2,117
Exports	990	1,023	1,357	1,140	283	342	415
For food	755	817	601	453	263	320	410
Fresh, frozen	193	202	154	280	206	253	320
Salted, dried, smoked & others	18	12	123	97	37	50	71
Canned	544	603	324	76	20	17	19
For fertilizer/feed	235	206	756	687	20	22	5
Changes in stock	…	357	101	67	1,334	600	859
For food	…	35	131	226	57	102	105
For fertilizer/feed	…	392	30	159	1,391	702	754
Supply for domestic consumption	10,016	10,734	12,263	13,028	11,906	11,722	11,452
For food	7,549	7,666	8,416	8,798	8,921	8,762	8,378
Fresh, frozen	2,941	3,009	3,342	3,315	4,167	3,951	3,792
Salted, dried, smoked & others	4,458	4,383	4,717	5,067	4,432	4,464	4,248
Canned	150	274	357	416	332	347	338
For fertilizer/feed	2,467	3,068	3,947	4,230	2,985	2,960	3,074

Note :*Preliminary.

Source : Minister's Secretariat, MAFF

For the fish supply in Japan, this chapter discusses fish imports and marine fisheries and marine aquacultures. Inland water fisheries and aquacultures are excluded, as they only represent about 2 % of total fishery production in Japan. Japanese marine fisheries include distant water fishery, offshore fishery, coastal fishery and marine aquaculture.



Source: *Production of Fisheries and Aquaculture,* MAFF

Domestic Fish Production, 1997

Figure 8 Domestic Fish Production, 1997

The domestic fishery production has been declining: domestic harvest represented 86% of all seafood supplies in 1985, but it has declined to 60% in the late 1990s. This trend is likely to continue, even though the pace of decline moderated in 1997. The decrease of the fishery production in 1996-1997 was small, thanks to the slight recovery in the offshore fishery and distant water fishery.[103] The decline in coastal fishery continued (see Figure 9). Moreover, the seafood imports had been hit hard by the economic recession in Japan, until the appreciated yen in 1999 seems to have restored the situation to some extend.

[103] In terms of fish species, *katakuchi* sardine, and salmon/trout declined, while mackerel, tuna and saury increased. Fishery Agency, MAFF, 1999, *Gyogyo Hakusho no Aramashi – Heisei 10 nendo Gyogyo no Doukou ni Kansuru Nenji Hokoku (Summery of Fishery White Paper –Annual Report on Development in Fishery, Fiscal 1998).*

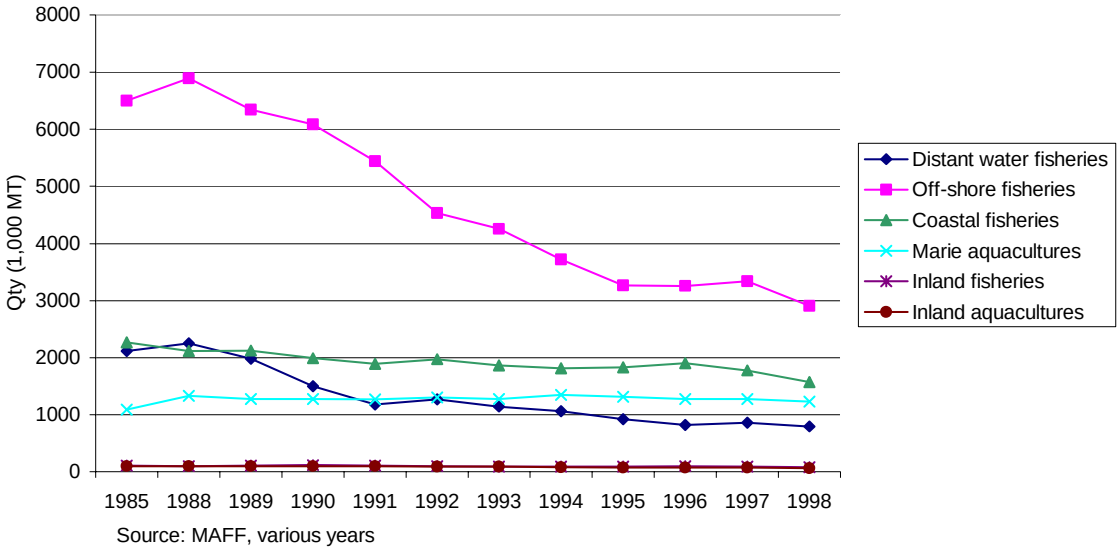


Figure 9: Domestic Supply of Fish

4.1 Domestic Fish Production

According to the recent Fishery White Paper, which was released in 20 April 1999, Japan recognises the following aspects of the country's fisheries:[104]

> "Fishery has an important role in keeping the stability of the country's food supply. The various kinds of seafood not only supply 40% of total animal protein intake in the country, but also have contributed to the rich food culture in Japan. Also, fishery is the essential industry for the coastal area of Japan: together with the related industries, such as seafood processing industry, it plays an important role in the regional economies. Moreover, the existing fishery villages all around the country have contributed to create and protect the original Japanese cultures, such as rich local food cultures, festivals and traditional ceremonies. Those villages also have been preserving the natural environment in the coastal areas.
>
> However, the current situation of the Japanese fishery is that the fish stock in the surrounding seas is overall in low level and has been declining, due to the worsening ocean environment and the exceeding fishery effort. Furthermore, fishermen are ageing, while there are less new comers. Therefore, it is concerned that the continuous usage of the ocean stock in

[104] Fishery Agency, MAFF, 1999, *Gyogyo Hakusho no Aramashi – Heisei 10 nendo Gyogyo no Doukou ni Kansuru Nenji Hokoku (Summery of Fishery White Paper –Annual Report on Development in Fishery, Fiscal 1998).*

> the surrounding seas and the stable supply of the seafood would be difficult in the future.
>
> Japan has signed the UN Convention of Law of Sea in June 1996 and consequently, 200 nautical miles exclusive economic zones (EEZs) were applied. The total allowable catch (TAC) system was introduced in 1997. The challenge for Japan is to re-establish the suitable framework for the fishery policy concerning the fishery management in the EEZs."[105]

4.2 Distant Water Fishery

Japan's fishery production in foreign countries' 200 EEZs and in the international seas has been reduced from more than 2 million tonnes in 1989 to less than 1 million tonnes in recent years (see Figure 9). This change has been due to stricter fishery regulations in the international oceans, and the smaller quotas offered by the coastal countries.

Even though the situation is becoming more difficult for Japan, it is inevitable for the country to depend on the distant ocean fisheries, combined with imports. There are numerous fish species that cannot meet the domestic demand only by fishing in the Japanese EEZs.

4.2.1 Tuna and Skipjack Fisheries

Tuna is an example of such fish. The following remark shows the composition of the tuna supply in Japan, which is in range of 700,000 tonnes a year.[106] "Japan is recognised both as a major tuna fishing nation and the leading tuna importer in the world. The country is responsible for about 20% of world tuna landings. Nearly 30% of the world tuna production is also consumed by this market."[107] The Fishery Agency of the Ministry of Agriculture and Forestry and Fishery summarises the situation of the tuna/skipjack fisheries as follow:

> "The tuna and skipjack fisheries can be divided into three categories according to the size of the licensed fish boats: 1) offshore skipjack/tuna fisheries, 2) distant water skipjack/tuna fisheries and 3) fisheries using the mother boats.

[105] Ibid.
[106] FAO, Globefish, *The Japanese Food Market*, p.21.
[107] Ibid.

> Despite the effort to obtain the fishery ground in the world, it is becoming more and more difficult for Japan to fish even in the existing fishery areas. For example, the international attempt to regulate the tuna fishery in Atlantic Ocean and the establishment of quota system for Southern bluefin tuna are limiting Japan's tuna/skipjack fisheries.
>
> Additionally, many tuna/skipjack fisheries related businesses are suffering from large deficits, because of the recession after the burst of the bubble economy and of the lower fish prices due to increasing imports."[108]

Moreover, it was decided by FAO that the boats for tuna long lines fishery in distant water should be reduced in October 1998. The reduction would be 20% of such boats; that is 132 boats.[109] There should be some countermeasure for this international fishery restructuring process to assist the fishermen who have to leave the occupation; i.e., to subsidise the cost for the disposal of the retiring boats, and to discuss the possible work opportunities after leaving the fishery.

As seen in the following Table 12, long line fishery vessels in distance water represents large part of Japanese tuna catch. As tuna migrate extensively in the world's oceans and Japanese appreciate raw tuna, for example as *sashimi*, those vessels are equipped with ultra-freezers.[110] Ziro Suzuki at National Research Institute of Far Seas Fisheries summarises the situation of the tuna and tuna-like fish fishery, particularly for tuna long line fishery as follow:

> "The Japanese *sashimi* market is a key driving force in determining long line fleet dynamics since long line caught tunas with high meat quality are exported to Japan. Retrospectively, it was the invention of deep freezer by Japanese in the 1960s that made the development of distant water long line fleets possible worldwide. After Japan, Taiwan and Korea joined the long-lining. As freezing technology improves, the total number of super freezing long line boats capable of keeping processed tuna as low as minus 60 C° started to increase, with an increase in the sizeable number of boats flying flags of convenience (FOC). With these super-freezer boats, Taiwan, Korea and Indonesia have begun to change target species form yellowfin and albacore to more valuable bigeye, bluefin and southern bluefin tunas, the stocks already being over-fished. As a result, catches by non-member countries of the relevant management bodies and by substantially in the

[108] "Dai 10 setsu Enyo, Hokuyo Gyogyo (Ch.10, Distant Fishery and Northern Sea Fishery)", *Annual Report on Fishery Fiscal Year 1998*, Fishery Agency, MAFF.
[109] Ibid.
[110] National Research Institute of Far Seas Fisheries, "Toward the Sustainable Use of Tuna Resources: Pelagic Fish Resources Division", [http://www.enyo.affrc.og.jp].

long line fisheries.[111] The purse seine fishery also suffers from similar problems. The catches of those valuable tunas for the *sashimi* market have reached an alarming level. In the Early 1980s, Japan unilaterally reduced the number of distant water long-line fleets by 20%. However, due to increase of the long-line fleet of other countries, this attempt failed to control the fishing capacity. Therefore, a reduction of the fishing capacity can not be done effectively without including all fleets involved. The review indicates in very rough estimates from various stocks, mainly bigeye and temperate species, that an overall reduction of some 20-30% of all distant water long-line fleet is necessary as soon as possible. At the same time, the by-catch of juvenile bigeye by tropical purse seiners should at least be capped immediately until more reliable stock assessment becomes available for bigeye stock. It should be reiterated that an increase in FOC boats both for long-line and purse seine fisheries threatens the sustainable utilisation of tuna resources because these boats continue to operate outside of the international conservation schemes. Since the fishing efficiency increases due to technological improvement of fishing gears and associated equipment, quantitative record of such improvement should be collected routinely so that the real increase in fishing capacity by such factors are taken into account to better monitoring of the overall trend in fishing capacity."[112]

Table 12: Tuna Catch in Different Type of Fishery (1,000 tonnes)

Year	Total	Tuna long lines			L & M surround -ing nets*	Skipjack pole and line	Other types
		Distant water	Offshore water	Coastal water			
1980	378	175	74	16	32	65	15
1985	391	194	50	18	64	40	19
1990	293	144	42	24	47	19	5
1993	335	174	38	34	82	20	6
1994	340	167	33	32	63	35	10
1995	332	164	30	32	59	33	14
1996	281	140	25	34	41	32	10
1997	342	150	25	37	76	43	12

Note: "In this table, tuna includes bluefin, bigeye, yellowfin, albacore and *meji*. *Meji* is the young of any tuna species which is not identified by species", according to FAO.

* Large and medium surrounding nets, or according to FAO, "tuna purse seine".

Source: 1980-1993: MAFF, cited in *The Japanese Food Market*, p.21, FAO, Globefish. 1994-97: *Production of Fisheries and Aquaculture, 1997 (Preliminary)*, MAFF, 1999

[111] "No single management body which covers the entire Pacific exists, because the Pacific Ocean is too big in size and too complicating in fisheries as well as socio-economic feature." Ziro Suzuki, "Review of Fishing Capacity Deployed on Tuna and Tuna-like Fish Fisheries, Particularly for Tuna Long-line Fishery", *Bulletin 35, No. 36*, p. 33-45, March 1999.

[112] Ibid.

Table 13: Skipjack Catch in Different Type of Fishery (1,000 tonnes)

Year	Total	*L & M surround -ing nets	Skipjack pole and line			Other anglings	Other Types
			Distant water	Offshore water	Coastal water		
1993	345	162	84	78	10	10	11
1994	300	171	63	52	8	6	7
1995	309	157	72	60	6	13	2
1996	275	158	62	42	6	7	1
1997	314	169	67	61	6	9	1
1998	370	224	77	52	7	8	1

* Large and medium surrounding nets

Source: *Production of Fisheries and Aquaculture, 1997, 1998 (Preliminary)*, MAFF, 1999, 2000

The salmon fishery is also important in distant and offshore waters. It will be discussed in the Chapter 5.

Furthermore, in addition to traditional distant water fishery activities, it has been the mergers and other various forms of businesses which allow Japanese technology and experience to be used for fisheries in foreign waters. This recent development consequently contributes to be part of the stable supply of fish in Japan.[113]

4.3 Offshore Water Fishery and Coastal Water Fishery

The most drastic decline can be seen in the offshore water fishery. It is reported that 27 species have been showing a decrease in the last 20 years. Those species are fish which are caught by trawlers, especially turbot, and fish which need particular habitat to settle, for example abalone. It is believed that the reasons for the decline are 1) overfishing (39%) and 2) the worsened environment (12%).[114]

4.3.1 Overfishing

Overfishing IS caused by mismanagement of the fishing effort.[115] Fishing effort was increasing rapidly: in addition to the new operation by the foreign boats, the Japanese boats became larger, the screw propellers and other machinery (for pulling nets, etc.) became more powerful, fishing equipment became more efficient (larger and better

[113] "Suisan Kihon Seisaku Kentokai Houkoku (Report on Examination of the Basic Fishery Policy)", August 1999, MAFF.
[114] Ibid.
[115] Ibid.

quality nets, etc.), and fish detectors became more technologically advanced (e.g. GPS usage). However, the appropriate fishery management was not put into action earlier.[116] Under such circumstances, the TAC system was applied to saury, Alaska pollock, sardine, mackerel and snow crab in 1997. Pacific flying squid was added in 1998. The implementation of the TAC resulted in the catches which were approximately within the TAC limits in 1998. Among those fish, which are subjected to the TAC regulation, sardine is the species which had the most severe decline in recent years. The catches were 1714 thousand tonnes in 1993 and down to only 283 thousand tonnes in 1997 (see Table 14).

Table 14: Sardine Catch in Defferent Fishery Type (1,000 tonnes)

Year	Total	L & M surround-ing nets*	Purse seine	Set nets	Other lift nets	Boat seine	Other types
1993	1714	1091	471	111	18	16	7
1994	1189	597	463	102	21	4	2
1995	661	381	222	42	10	6	1
1996	319	168	109	31	5	6	2
1997	283	197	57	18	2	3	4

* Large and medium size surrounding nets

Table 15: Mackerel Catch in Different Fishery Type (1,000 tonnes)

	Total	L & M surround-ing net*	Purse seine	Set nets	Other lift nets	Mackerel anglings	Other types
1993	665	479	108	48	16	3	11
1994	633	453	115	42	12	3	9
1995	470	303	94	37	19	3	14
1996	760	548	128	57	16	3	9
1997	849	649	113	52	22	4	9
1998	512	398	62	24	14	3	11
* Large and medium size surrounding nets							
Source: *Production of Fisheries and Aquaculture, 1997,1998 (Preliminary)*, MAFF, 1999, 2000							

On the other hand, catches of other major species, squid, saury and horse mackerel, have been relatively steady.

[116] According to the 42 species, which are subjected to the fishery institute's research, the species that represents 58% of the catches are over-fished. To remain the fish stock in the current level, overall 20-

Table 16: Squid Catch in Different Fishery Type (1,000 tonnes)

Year	Total	Squid anglings		Offshore trawl	Set nets	L & M surround-ing nets*	Other types
		Offshore water	Coastal water				
1993	316	84	177	17	35	-	4
1994	302	60	160	42	34	0	6
1995	290	58	131	43	51	0	7
1996	444	85	180	64	68	42	6
1997	360	78	155	60	58	3	6

* Large and medium size surrounding nets

Source: *Production of Fisheries and Aquaculture, 1997 (Preliminary)* , MAFF, 1999

Table 17: Horse Mackerel Catch in Different Fishery Type (1,000 tonnes)

Year	Total	L & M surround-ing nets*	S & M surround-ing nets**	Set nets	Other types
1993	312	134	122	39	16
1994	326	173	104	35	14
1995	313	116	139	41	17
1996	330	164	114	36	16
1997	329	146	132	36	15

* Large and medium size surrounding nets

** Small and medium size surrounding nets

Source: *Production of Fisheries and Aquaculture, 1997 (Preliminary)* , MAFF, 1999

Table 18: Saury Catch in Different Fishery Type (1,000 tonnes)

Year	Total	Saury stick held dipnet	Set nets		Other types
			Large	Small	
1993	227	275	2	1	0
1994	262	250	11	1	0
1995	274	267	4	2	0
1996	229	214	13	2	1
1997	288	282	5	1	1

Source: *Production of Fisheries and Aquaculture, 1997 (Preliminary)* , MAFF, 1999

4.3.2 Worsening Environment

The changes in environment have been identified as some of the reasons for the declining fisheries in surrounding seas. One is the pollution of the sea and the other is the reclamation of fishery grounds. Holme describes how Japan is fighting pollution of the sea:

30% reduction in catches is required, ibid.

> "Great environment pollution problems are today worrying Japanese governmental and prefectural authorities. Monitoring of seawater has provided statistical material for measuring the degree of pollution in various areas. Coastal fisheries have been badly damaged and bathing beaches closed. A heavily polluted area is the Seto Inland Sea, where, for instance, the COD (Chemical Oxygen Demand) in Osaka Bay exceeds 5 mg/l. After introduction of the monitoring system the number of red tides has decreased, but even now 200 red tide cases are reported every year, and of these about 10 cases do damage to the fisheries. The main plankton that cause these red tides are *Iskeletoneme costatum*, *Noctiluca miliaris*, *Chattonella antiqua*, *Heterosigma akashio*, and *Gymnodinium sanguineum*. Damage to fisheries is sometimes caused by the latter three.
>
> In order to obtain environment quality standards, the government has since 1970 imposed effluent controls on all factories and commercial establishments in Japan.
>
> The Japanese Fisheries Agency has issued detailed instructions for fish farmers in order to reduce pollution from aquaculture plants and the Agency has also introduced a reporting system conformable to duty regarding the occurrence of red tides that might damage aquaculture fish and plants. The operators are even encouraged to make their own examinations of water samples from the water layers in question.
>
> Among the methods used to prevent damage are immersions of net cages to depths free of algae invasion, towing away of plants to safe areas, spraying of cage surface etc."[117]

In this way, pollution is indeed a problem not only for the coastal fishery, but also for fish farming in Japan.

On the other hand, the reclamation which damages the fishery is still continuing; e.g. the reclamation of sandy shoals and algae's natural habitats, and the exploitation of natural gravel.[118] These activities not only cause the loss of fishery grounds, but also spawning and rearing grounds for the fish resources. Thus, further decline in fishery resources is anticipated.

[117] Torolf Holme (1989) *Akvakultur i Soloppgangens land (Aquaculture in the land of the rising sun)*, p.130.
[118] "Suisan Kihon Seisaku Kentokai Houkoku (Report on Examination of the Basic Fishery Policy)", August 1999, MAFF.

4.4 Marine Aquaculture in Japan

Fresh water aquaculture was introduced to Japan by farmers as early as in the Edo era (1603-1867) under Chinese influence.[119] The aquaculture of eels, *ayu* (sweetfish), snapping turtle and rainbow trout started in the Meiji era (1868-1912). As a consequence of the introduction of the pelletised feed, freshwater aquaculture developed rapidly in the second half of the 1950s.

Marine aquaculture began in Japan in the beginning of 17th century, with oyster, laver and shell cultures.[120] Furthermore, pearl aquaculture flourished in the late 19th century. However, Japan started to aquaculture yellowtail, the most important marine aquaculture specie in the country, as late as in 1928. In 1940s, when various technological developments were seen, *nori* culture increased significantly, followed by larger culture production of yellowtail, scallops and other kinds of laver.[121] Today, while the fishery production is in decline, the marine aquaculture industry has an important role in supplying some seafood with high demand, especially yellowtail and red seabream. However, the production has not been increasing, because of the limited cultivable areas, the lower prices on fish due to exceess supply and the significant changes in feeding supply. To maximise profit in the limited aquaculture cites, fish farms tend to be overcrowded (see Table 19).[122]

Table 19: Production in Marine Aquacultures (except seaweeds & pearls) (1,000 tonnes)

Fish Species		1995	1996	1997	1998
Total of fishes		279	256	256	262
	Yellowtails	170	146	138	146
	Red seabream	72	77	81	82
	Silver salmon	14	8	10	9
	Bastard halibut	7	8	9	8
	Globe fishes	4	6	6	5
	Jack mackerels	5	4	3	2
	Striped mackerel	3	2	2	2

[119] Torolf Holme (1989) *Akvakultur i Soloppgangens land (Aquaculture in the land of the rising sun)*, p.120.
[120] Ibid.
[121] National Research Institute of Aquaculture, "Marine Aquaculture", *Wagakuni no Zoyosyokugyo no Genjyo – Heisei 10 nendo Gyogyo Hakusyo yori Bassui (Current Situation of Japan's Aquaculture – from Fishery White Paper in 1998).*
[122] Ibid.

	Other fishes	5	6	6	7
Total of Shellfishes		457	490	474	427
	Common scallop	228	266	254	226
	Oysters (with shells)	227	223	218	200
	Oysters (without shells)	36	35	35	31
	Other shellfishes	2	2	1	1

Source: *Production of Fisheries and Aquaculture, 1997, 1998 (Preliminary)*, MAFF 1999, 2000.

In this section, the Japanese marine aquacultures of yellowtails, red seabreams, scallops, oysters and bluefin tuna are introduced. Salmon aquaculture in Japan is discussed in Chapter 5.

4.4.1 Yellowtail Aquaculture

Yellowtail is the most cultured species in Japan. The original spawning grounds of yellowtail are the ocean off Kyushu and Shikoku islands and south of the East China Sea.[123] Therefore, most of yellowtail aquaculture is undertaken in Kyushu and Shikoku, with the production of 80,000 tonnes and 49,000 tonnes in 1996 and 1997, respectively.[124]

4.4.2 Red Seabream Aquaculture

The production of red seabream has increased steadily from 72,000 tonnes in 1995 to 80,000 tonnes in 1997; while the production of other major marine aquaculture species in Japan, such as silver salmon and yellowtails, had a tendency to decrease in the same period. Ehime prefecture in Shikoku is by far the largest producer of farmed red seabreams with the production of 28,000 tonnes in 1997. Additionally, most of other farming cites of red seabreams are in the warm area of Japan, in Shikoku and Kyushu. Following is the development and the method of the red seabream aquaculture production in Japan:

> "While the culture of red seabream – starting around 1965 – has risen steadily, red seabream catch from the usual fishery has gone down.

[123] Torolf Holme (1989) *Akvakultur i Soloppgangens land (Aquaculture in the land of the rising sun)*, p.123
[124] Fishery Agency, MAFF, 2000. "(2) Yields by Major Species and Prefectures". *Production of Fisheries and Aquaculture, 1997.*

> Natural fingerlings are still partly the basis for the red seabream culture. Fish of 1-2 kg are placed in a cage of 5 m³ with a concentration of 5-7 kg/m³.
>
> Immediately before spawning the fish is transferred to concrete spawning tank. Spawned eggs float on the surface and are removed by pumping into the tank. The eggs float over the brim and are collected. They are placed in a rearing tank with a temperature of 16-20 °C. After hatching, the fry go through a rearing period before they are transferred to sea cages.
>
> The cage nets are changed every 10-45 days."[125]

4.4.3 Scallop Aquaculture

Most of the scallops consumed in Japan are aquacultured. A large scale of scallop aquaculture started in 1963, when a seed collector, which secures large amounts of seed scallop, was developed.[126] Further development of scallop aquaculture and the methods are explained by Holme as follow:

> "Two main method of culture are used, the sowing culture and the hanging culture.
>
> When the sowing culture is used, it takes 1 ½ to 2 years to grow scallops to suitable market size – 1000-2000 g. A rocky bottom is unsuitable for sowing scallop. Favourable conditions are provided by a sandy bottom with a high water exchange rate. The size of the seed should be 2 to 5 cm shell height. Sowing density should be kept below 5-6 shells per square metre. After 18-24 months the oyster shell grows to 10-12 cm – market size as mentioned above.
>
> A number of hanging methods are in use. A favourable method is the cylindrical method, which enables the culture of large quantities of scallops."[127]

Scallops are aquacultured in the northern parts of Japan: in Hokkaido (135,000 tonnes) and Tohoku region (123,000 tonnes).[128]

[125] Torolf Holme (1989) *Akvakultur i Soloppgangens land (Aquaculture in the land of the rising sun)*, p.124.
[126] Torolf Holme (1989) *Akvakultur i Soloppgangens land (Aquaculture in the land of the rising sun)*, p.125.
[127] Ibid.
[128] MAFF, *Production of Fisheries and Aquaculture, 1997 (Preliminary).*

4.4.4 Oyster Aquaculture

Japan has been culturing oysters for hundreds of years.[129] "The development of the hanging culture techniques and the establishment of effective seed production methods have greatly influenced the expansion of oyster cultures."[130] Japan has been producing more than 200,000 tonnes of cultured oysters per annum, for decades. Hiroshima prefecture is the largest producer of cultured oysters with a quantity of 114,000 tonnes in 1997, which was more than half of the country's total production. In 1998, however, the prefecture suffered from the high mortality rate of oysters, due to the red tide,[131] causing a 31% decline in value. Hiroshima is faced to the Seto Inland Sea, where it is apt to the red tide, as mentioned earlier.

4.4.5 Bluefin Tuna Aquaculture

Bluefin tuna aquaculture began about 20 years ago and has recently become commercialised after numerous improvements. In Japan, bluefin tuna is farmed in Okinawa, Kagoshima and Ehime prefectures, where the water is warm.[132] There is an interesting comparison of wild and cultured tuna. According to Table 20, cultured tuna has some disadvantages due to lack of physical exercise. Even though other farmed species have similar kinds of problem, it seems to be more difficult with tuna, which is the species actually travelling over wide ranges of ocean.

Table 20: Comparison of Wild and Cultured Tuna

	Wild Bluefin Tuna	Cultured Bluefin Tuna
Feed	Various kinds of feed	Frozen horse mackerel, mackerel, sardines, squid, etc.
Exercise	Migrate in wide range of ocean(s) and hence a lot of exercise	Live in a closed environment and hence not enough exercise
Flesh Quality	1) Suitable amount of fat 2) Flesh has firm texture 3) Keeps the colour well (it takes time for colour to change)	1) Oil content is high, due to less exercise 2) Texture is dull 3) Colour changes quickly

[129] Torolf Holme (1989) *Akvakultur i Soloppgangens land (Aquaculture in the land of the rising sun)*, p.125.
[130] "Seed collectors are hung from racks in shallow sea. Spats grow to 2-3 mm within days and to 10 mm after about 40 days." Ibid.
[131] "Heisei 10 nen Kaimen Gyogyo, Yousyokugyou Seisangaku, Hiroshima-ken (Hiroshima Prefecture, Production of Marine Fisheries and Aquacultures in 1998)", 29 November 1999, Hiroshima Tokei Jyoho Jimusho (Hiroshima Statistical Information Office).
[132] In addition to those places in Japan, Atlantic bluefin tuna is farmed in Morocco and southern bluefin tuna in Southern Australia. "Kuromaguro no Yoshoku (Aquaculture of Bluefin Tuna)",

Source: Toshio Yabe (26 April 1998). "Kuromaguro no Yoshoku (Aquaculture of Bluefin Tuna)", [http://ha4.seikyou.ne.jp/home/hodaka/home/maguroyousyoku.htm]. In *Osakana Jyohokan* (26 Feb. 1998) [http://ha4.seikyou.ne.jp/home/hodaka/fishroom.htm].

Regarding the quality of the flesh, colour is a crucial factor. For example, in comparison with wild southern bluefin tuna, cultured southern bluefin tuna's colour is pale and the colour changes fast; thus, farmed ones are not suited to be sold at the secondary wholesaler ships together with other tuna.[133] Even though tuna is usually kept in the secondary wholesaler shop's freezers for only two to five days, the farmed tuna cannot keep its colour during those days. It is said that farmed southern bluefin tuna is apt to be sold at conveyor belt *sushi* shops and supermarkets, where they can handle large volumes and thus have shorter time to hold inventory.[134] The position of farmed tuna is hardly settled in the Japanese market and further development should be expected. A report by Fish Info Service explains the Japanese *sashimi* tuna market as follow:

> "Japan's *sashimi* tuna market is in transition. This transition has in many ways been exacerbated by Australian farmed southern bluefin tuna. Almost all the farmed tuna is high in oil content. This makes it a luxury item. It is also expensive. For both reasons, the market can do without it. Consumption of this item is apt to be more price and market sensitive than that of other more basic seafood items, including red meat tuna. Farmed Australian tuna is relatively consistent in size, quality and price. It has become a commodity. When Australia started farming salmon some 15 years ago it was initially a very high value speciality item. Since then production of farmed salmon has increased many times over, the price has fallen almost in half that it has clearly become a commodity.
>
> Perhaps southern bluefin tuna will follow an approximately similar course? Tuna is much different than salmon, because it depends much more heavily on the wild stock. The "farmed" portion of the cycle is only partial. (In the case of tuna, some call it "fattening" rather than "farming" as contrasted with salmon which are reared from eggs.) Furthermore, the market is heavily focused on Japan, though small quantities go to the US and Korea and the Australians are actively working to develop other markets."[135]

4.5 Ocean Ranching

Ocean ranching is the fishery method which is believed to have a potential to grow. This will be discussed as a part of Chapter 5.

[133] *Tuna Market Reports*, 18 April 2000. Fish Info Service, [http://www.fis-net.co.jp].
[134] Ibid.
[135] Ibid.

4.6 Japan's Food Imports

The situation of Japan's overall food imports is discussed, in prior to the discussion of seafood imports, because the overview of Japanese food imports tells how seafood is situated among other imported food items, and where Norway is placed among other food exporters to Japan.

"Japan is dependent on foreign countries for 58% of its food, fish and beverage supplies. Although the government faces political pressure to adjust domestic agricultural policy to address food security concerns highlighted by this fact, including strengthening and protection of their own agricultural industry, domestic self-sufficiency will not increase."[136]

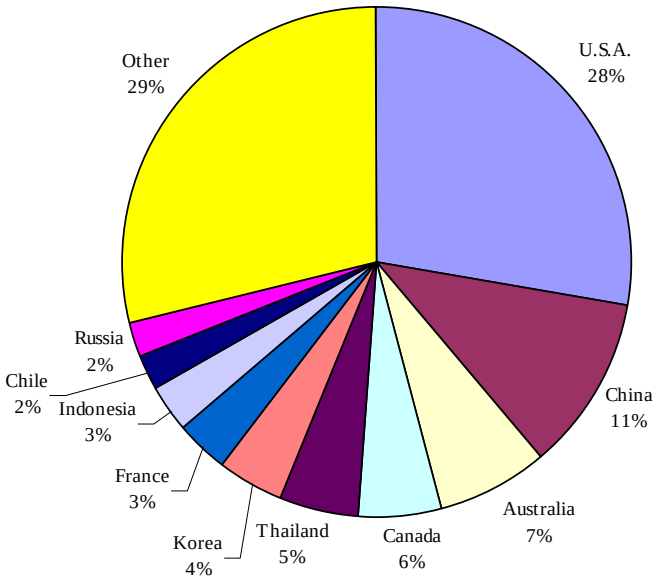
Table 21: Japan's Main 20 Food Imports, 1998

Item	Value (1,000USD)	Growth in Value (%)*
1. Shrimps and prawns	2,767,662	–15.3
2. Beef	2,324,264	–11.4
3. Pork (including offal)	2,203,279	–20.0
4. Corn	2,092,397	–14.6
5. Tuna and skipjack	1,613,379	–8.5
6. Soybeans	1,432,257	–18.5
7. Wine	1,287,640	97.1
8. Wheat	1,093,755	–19.9
9. Coffee beans	1,015,459	–6.0
10. Salmon and trout	**933,435**	**–6.2**
11. Chicken (including offal)	902,821	–7.1
12. Crabs	735,452	–18.8
13. Rapeseed	676,154	–7.0
14. Eels (processed)	644,407	–32.8
15. Pet food	576,906	–4.3
16. Cheese and Curd	557,212	6.2
17. Beef offal	455,693	6.9
18. Fish meat	452,174	–25.9
19. Bananas	406,432	6.5
20. Squid	339,157	–11.0

Source: Trade Statistics, Ministry of Finance, cited in *Statistics of Japan's Food Imports in 1998*, JETRO, Agricultural Department.

[136] *Agrifood and Fish Market Opportunities in Japan 1999*, © Department of Foreign Affairs and International Trade of Canada, 2000.

In value, shrimp is Japan's largest import food item. Other high market fish, such as tuna, salmon and crabs are also important import food items in Japan (see Table 21).



Source: Trade Statistics, Ministry of Finance, cited in *Statistics of Japan's Food Imports in 1998* , JETRO, Agricultural Department.

Figure 10: Share of Top 10 Countries/Areas for Japan's Food Imports, 1997

The top export 10 countries to Japan in 1998 represented about 70% of Japan's total food imports (see Figure 10). USA is by far the largest food exporter to Japan followed by China, Australia and Canada, which are also large agricultural countries. As seafood exporter, Thailand, South Korea, Indonesia, Chile and Russia were ranked within the top 10 food exporters to Japan in 1998. Thailand and Indonesia have their strong position with shrimps and prawns, while Chile's top three export food items to Japan are salmon, fish meal and trout. Russia also exports high value seafood items as her top three, crabs, cod roe and salmon.

Table 22: Japan's Top 10 Food Suppliers, 1998

Country	1998 (1,000 USD)	Growth Rate (%)	Top 3 Items
Total	42,028,883	–11.6	
1. U.S.A.	11,643,919	–14.5	1)Corn 2)Beef 3)Soybeans
2. China	4,760,356	–9.5	1)Eels (processed) 2)Chicken 3)Vegetables

			(provisionally preserved)
3. Australia	2,798,254	–13.1	1)Beef 2)Wheat 3)Pork
4. Canada	2,313,590	–13.1	1)Rapeseed 2)Wheat 3)Pork
5. Thailand	2,086,020	–12.2	1)Shrimps & prawns 2)Chicken 3)Preparation of Shrimps & prawns
6. Republic of Korea	1,732,787	4.6	1)Pork 2)Tuna, bonito 3)Fish fillets
7. France	1,365,953	18.4	1)Wine 2)Brandy 3)Mineral water
8. Indonesia	1,257,088	–9.7	1)Shrimps & prawns 2)Tuna, skipjack 3)Coffee beans
9. Chile	917,694	1.5	1)Salmon 2)Fish meal 3)Trout
10. Russia	909,194	–14.1	1)Crabs 2)Cod roe 3)Salmon
17. Norway	**479,103**	**–14.1**	**1)Mackerel 2)Salmon 3)Trout**

Source: Trade Statistics, Ministry of Finance, cited in *Statistics of Japan's Food Imports in 1998*, Agricultural Department, JETRO.

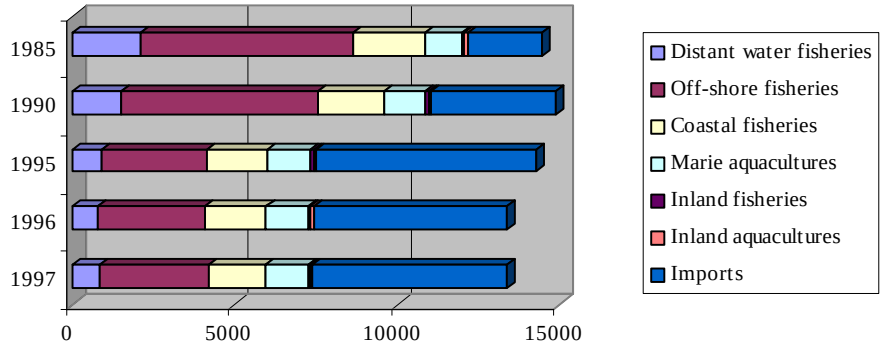
Moreover, Norway ranked as 17th largest food exporter to Japan in 1998 (see Table 22). Norwegian mackerel export had dominant share, nearly 90%, of all mackerel exported to Japan in 1997. On the other hand, salmon/trout, the second largest Norwegian export item to Japan, represented only one fifth of all salmon/trout exported to Japan in 1997. This indicates that salmon/trout is a more competitive export item to Japan than mackerel is. Thus, in order to act efficiently in the Japanese market, studies of competitive advantage(s) of Norwegian salmon/trout are necessary.

Table 23: Japanese Imports of Agricultural, Forestry and Fishery Items Top 10 Items from Norway to Japan, 1997

	1996 (1,000 USD)	1997 (1,000USD)	Growth* (%)	Share** (%)
1. Mackerel	135,001	245,264	181.7	88.9
2. Salmon / trout	182,873	190,324	104.1	19.2
3. Other fish fillets	23,198	29,062	125.3	9.5
4. Cheese	21,828	18,251	83.6	3.6
5. Lumber	16,068	17,849	111.1	0.4
6. Shrimp	25,534	16,189	63.4	0.5
7. Horse mackerel	6,197	11,660	188.2	14.6
8. Herring	13,766	11,168	81.1	13.5
9. Halibut	22,064	9,574	43.4	4.4
10. Fox fur	1,274	1,684	132.2	13.6

Note: *Growth from 1996 to 1997.
**Share of Norwegian export of all exports to Japan.
Source: MAFF, 2000

4.7 Seafood Imports



Source: "Production of Fisheries and Aquaculture", MAFF, 1999

Figure 11: Seafood Supply in Japan, 1985-1997

Figure 11 shows the development of seafood supply in Japan from 1985 to 1997. It illustrates that significant changes took place in the early 1990s. Imports grew dramatically, at the expense of decreased domestic fish supply of distant water fisheries and offshore fisheries. As there is no prospect for dramatic increases in Japanese fisheries, imports are likely to remain important, at least at the current level. According to the prompt trade statistics of Ministry of Finance, the total import of seafood in fiscal 1999 (from April 1999 to March 2000) was 2,961,282 tonnes in quantity and 1,643,587 million JPY (CIF price). In terms of volume, it rose 8.4%, but the value was similar level of previous year (0.1% lower).[137]

Table 24 is the Japanese imports of fishery products in 1997. In quantity, tuna and swordfish were the largest, and in value, frozen shrimps and prawns were the largest of all imports of fishery products.[138] Moreover, Table 24 shows that Japan is a large market for fish which are not traditionally eaten in many countries of origin, in addition to

[137] "99 nendo Gyokairui Yunyu, 298 manton no 1 cho 6436 okuen (Seafood Imports in Fiscal 1999: 2980 thousand tonnes, 1,643.6 billion JPY)". *Minato Shimbun Digest*, 25 April 2999.
[138] In fiscal 1999, Japanese shrimp import was 258,314 tonnes in quantity (8.4% increase) and 303.1 billion JPY in value (0.1% decrease).

globally popular fish. Salmon roe from North America, sea urchin from North America and Chile, and capelin from Norway are good examples.

Table 24: Japanese Imports of Fishery Products, 1997

Item	Unit of Qty	Quantity	Value (million JPY)
Fishery product, fresh, chilled or frozen			
Tuna and swordfish	tonnes	271,209	198,743
Shrimps and prawns, frozen		267,247	357,033
Salmons and trouts		208,785	118,882
Mackerels		152,448	33,858
Crabs, frozen		79,033	81,759
Flat fish		78,898	26,360
Herring		60,935	9,745
Menuke, Sebastes spp.		56,004	14,829
Cuttle fish, excl. Mongs ika		48,634	21,643
Crabs, live, fresh, chilled		44,933	27,133
Cod, excl. Surimi		31,121	6,339
Sable fish		14,609	16,525
Rock lobster, frozen		8,209	18,664
Rock lobster, live, fresh, chilled		2,397	9,093
Lobster, Homarus spp. live, fresh, chilled		1,753	3,258
Lobster, Homarus spp. frozen		1,344	2,919
Shrimps & prawns, live, fresh, chilled		98	152
Fishery products, salted, dried or smoked			
Jelly fish, salted, dried	tonnes	11,812	5,250
Herring roes		11,159	17,171
Salmon roes, salted		6,604	8,623
Cod roes		3,115	4,466
Cuttlefish, salted, dried		2,484	4,033
Herring roe on the tangles		800	2,099
Sea urchins, salted, dried		455	1,234
Salmon & trout, salted		427	293
Fishery products in airtight containers			
Crab	tonnes	306	992
Abalone		526	3,542
Fats and oils of fish and marine mammals			
Fish liver oils	tonnes	1,626	836
Pearls			
Cultural pearls	kg	21,705	36,264

Natural pearls		641	1,275
Other fishery products			
Flours, meals and pellets of fish	tonnes	437,298	36,345
Coral & Shells		12,987	2,991
Agar-agar		1,213	3,096
Natural sponges	kg	22,591	314
Bekko (tortoiseshell)		-	-

Source: MAFF, 1999

Norway exports some important fish items listed in Table 24: salmon/trout and mackerel. Moreover, Japan used to enjoy a high catch of herring in the northern sea near Japan; however, in 1930s the catch of herring became scarce and the country is now mostly dependent on herring imports from Norway, the US and other countries.

4.8 Future of Fish Supply in Japan

4.8.1 Future of Distant Water Fishery

Due to decreased in quotas in foreign 200 mile EEZs, the overall catch is expected to be less. However, operation in new fishery grounds, such as in the southern Pacific Ocean, is expected to improve. Therefore, according to Fishery Agency's hypothetical objectives, distant water fishery production in 2010 is aimed to 5,320,000 tonnes; while it was 4390,000 tonnes in 1998.[139]

4.8.2 Future of Coastal and Offshore Fisheries

According to the Fishery Agency, the combined production of coastal and offshore fisheries is aimed to be 5,230,000 tonnes in 2010; whereas it was 4,300,000 tonnes in 1998.[140] The reduction in fishing effort, which is intended to recover the resource, will cause a temporal decrease in production. It is expected to take long time to see the sign of

[139] "Suisancho, Gyokairui no Jikyuritsu Mokuhyochi wo Settei, 2010 nendo ni Syokuyo 66%, Hisyokuyo Komide 77% (Fishery Agency, Set the Objective Standard of Self Sufficiency of Seafood: 66% for Food and 77% Including Non-Food in 2010)", 9 March 2000, *Hama no Koe*, the National Federation of Fisheries Cooperative Associations, [http:www.zengyoren.or.jp/hamanokoe/kihonhou/kihonnews/kihonjoho_20.html].

[140] "Suisancho, Gyokairui no Jikyuritsu Mokuhyochi wo Settei, 2010 nendo ni Syokuyo 66%, Hisyokuyo Komide 77% (Fishery Agency, Set the Objective Standard of Self Sufficiency of Seafood: 66% for Food and 77% Including Non-Food in 2010)", 9 March 2000, *Hama no Koe*, the National Federation of Fisheries Cooperative Associations, [http:www.zengyoren.or.jp/hamanokoe/kihonhou/kihonnews/kihonjoho_20.html].

recovery of the fish stock. Nevertheless, horse mackerel, mackerel and flat fish are expected to recover, because fish in the suitable sizes for food consumption is expected to increase; therefore, the catch is expected to recover to the current level (late 1990s) by 2010.

4.8.3 Future of Marine Aquaculture

The introduction of new fish species is expected to cause a slight increase in culture production, as indicated in the same report by Fishery Agency. Expected quantity in 2010 is 810,000 tonnes from 1998's 700,000 tonnes.[141]

4.8.4 Future of Fish Supply in Japan

By summing-up the above-mentioned future trends in different fisheries and aquacultures, the Fishery Agency suggested that the overall self-sufficiency rate of seafood would improve up to 66% in 2010, from 57% in 1998. Moreover, when the non-food seafood (e.g. for feed) is included, the aimed self-sufficiency rate would be 77% in 2010, up from 66% in 1998. These aims are set based on two assumptions: one is that a favourable consumption pattern will be achieved and the other is that the domestic production effort will be modified. The suggested favourable consumption pattern includes:

1) suitable nutritional balance to be achieved
2) prevention of waste – especially because fish fat includes functional elements, such as DHA and EPA, and fish is rich in calcium; therefore, it is favourable to minimise the waste.

The modification of domestic production effort includes:

1) Fishery effort should be reduced by applying the TAC system, reducing of fishing efforts and actively managing the stock toward recovery.
2) New fishery grounds should be obtained for the distant water fishery.
3) The aquaculture should be dynamically developed.

[141] "Suisancho, Gyokairui no Jikyuritsu Mokuhyochi wo Settei, 2010 nendo ni Syokuyo 66%, Hisyokuyo Komide 77% (Fishery Agency, Set the Objective Standard of Self Sufficiency of Seafood: 66% for Food and 77% Including Non-Food in 2010)", 9 March 2000, *Hama no Koe*, the National Federation of

4) Supply system should be reorganised by unifying the local fish markets.
5) Efficient utilisation of fish catches should lead to an increase in the commercially valuable portion of the fish.

In this way, the aims set by the Fishery Agency are based on such assumptions and modifications, which are not yet to be a certain trend in the future. Therefore, it can be said that the Fishery Agency's objectives are optimistic ones.[142]

On the other hand, similar objectives suggested by MAFF earlier (14 February 2000) were much lower than the Fishery Agency ones: the aimed self sufficiency rate of fish and shellfish for food in 2010 would be only 50-60% of that in 1997. The following trends are considered when this aim was set: firstly, the fish resource within the domestic 200 miles zone is low, and second, the consumption of seafood will remain the same especially because consumers are increasingly conscious that fish is healthful. This suggestion by MAFF appears to be more realistic than the Fishery Agency's, and it seems that Japan is going to be more dependent on fish imports in the future.

Fisheries Cooperative Associations, [http:www.zengyoren.or.jp/hamanokoe/kihonhou/kihonnews/kihonjoho_20.html].

[142] "MAFF forutsier at selvforsynings graden I Japan vil bli redusert til 50% innen år 2010" *Japan Nytt*, Nr.4, Uke 15 2000, pp.7-8. Translation of the article from *Minato Shimbun*, 16 February 2000.

5 SALMON SUPPLY IN JAPAN

Japan has traditionally been a large salmon fishing nation. However, the domestic salmon catch is declining, while imports are becoming more important. This chapter will look into the two sources of the Japanese salmon supply, the imports and the Japanese domestic supply.

Table 25: Supply of Salmon / Trout (tonnes)

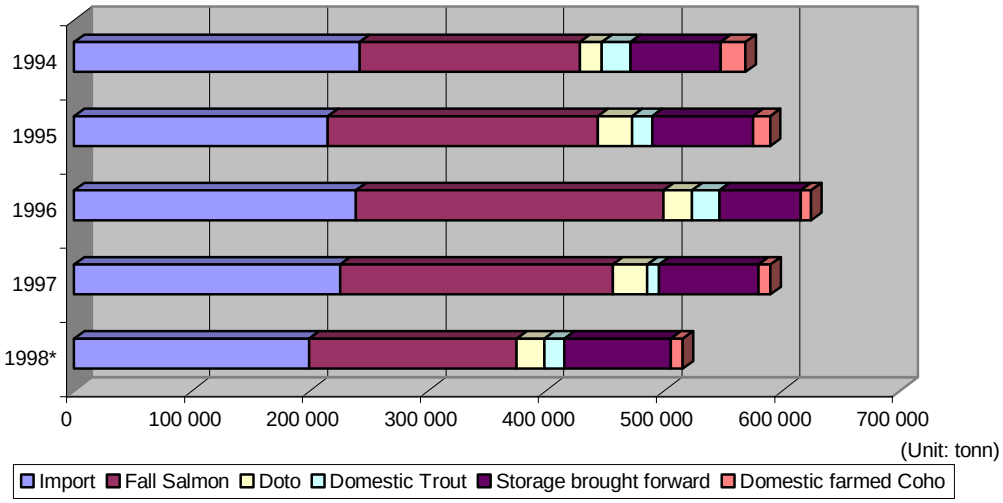
		1994	1995	1996	1997	1998*
Import						
	Fresh	19 050	21 300	21 260	22 100	22 000
	Frozen	220 170	191 400	214 450	200 700	175 000
	Salted & others	2 840	2 500	3 290	2 800	2 000
	Sub total	242 060	215 200	239 000	225 600	199 000
Fall salmon						
	Hokkaido	140 670	171 100	173 300	167 000	131 000
	Honshu	45 830	57 500	87 300	63 800	45 000
	Sub total	186 500	228 600	260 600	230 800	176 000
Domestic trout						
	Sea of Japan	2 200	1 900	1 880	500	1 500
	Sea of Okhotsk	21 700	15 000	21 200	8 500	15 800
	Sub total	23 900	16 900	23 080	10 000	17 300
Doto (East of Hokkaido)						
	Toki	11 170	14 880	12 700	13 800	13 240
	Sockeye	2 810	4 610	5 360	8 800	5 180
	Trout	4 740	9 470	5 580	6 400	4 450
	Coho	30	190	520	400	560
	Sub total	18 750	29 150	24 160	29 400	23 430
Storage brought forward						
	Salmon	68 740	75 060	60 295	72 760	75 343
	Trout	7 670	10 300	8 835	11 300	14 477
	Sub total	76 410	85 360	69 130	84 060	89 820
Domestic farmed Coho		21 570	14 680	8 580	10 300	10 300
Total Supply		569 190	583 890	624 550	590 160	515 850
For Export		10 360	23 410	40 970	28 300	10 000
Total Domestic Consumption		473 470	497 350	499 520	472 040	435 850**

Note:

- Year is according to the salmon/trout year (May to April next year) on the custom clearance basis.
- Export includes trout.
- *Statistics for 1998 are only provisional figures based on the factors in May 1999.
- **Consumption amount for 1998 is an estimate based on the assumption that storage to be brought forward from April 1999 will amount to 70,000 tonnes.

Source: NSEC, 1999.

5.1 Domestic Supply of Salmon



*1998 is provisional
Source: NSEC, 1999.

Figure 12: Japanese Salmon Supply, 1994-1998

5.1.1 The Japanese Salmon/Trout Fishery

The Japanese salmon fishery has hundreds of years of experience. According to the salmon/trout fishery operation in 1998, Japan and Russia agreed to fish up to 5,123 tonnes in the Japanese 200 miles EEZ (restricted by licensing) and 17,732.6 tonnes in Russian 200 miles EEZ (regulated by the quota system).

In the Pacific Ocean, the use of middle size salmon/trout drift gill net in international oceans has been restricted since 1994; thus, currently, it is possible to fish by this method only in Russia's 200 miles EEZ. 70 boats had quotas of 14,402 tonnes and actual catch was 13,340 tonnes (from 24 May to 3 August 1998). On the other hand, fishery with small size salmon/trout drift gill net was operated in both Japan's and Russia's 200 miles EEZ. 130 boats (less than 10 tonnes) caught 4,202 tonnes in Japan's zone out of 4,323 tonnes quota (from 1 May to 30 June 1998). Also, 30 boats with quota of 3,030 tonnes fished 2,980 tonnes in Russia's zone (from 18 May to 20 July 1998).

In the Sea of Japan, 14 boats fished 692 tonnes in Japan's 200 miles EEZ, which was less than their maximum share of 800 tonnes (from 1 April to 25 June 1998). Moreover, 3 boats caught 298 tonnes out of their quota of 300 tonnes in Russia's 200 nautical mile zone in Sea of Japan (from 9 May to 29 June 1998).

5.1.2 Ocean Ranching

There is a type of fishery called *saibai gyogyo*, or cultivation, in Japan. According to the Fishery Agency of MAFF, cultivation is defied as follow: "by which fishers are able to catch marine products that have grown up in the natural sea after being discharged there following an initial period of nurturing"[143]

There are three species of salmon which are reared and released into rivers: they are chum salmon, pink salmon, and sea trout.[144] Chum salmon accounts for more than 90% of the salmon fry released into the rivers. Holme explains the development and the method of the release of chum salmon as follow:

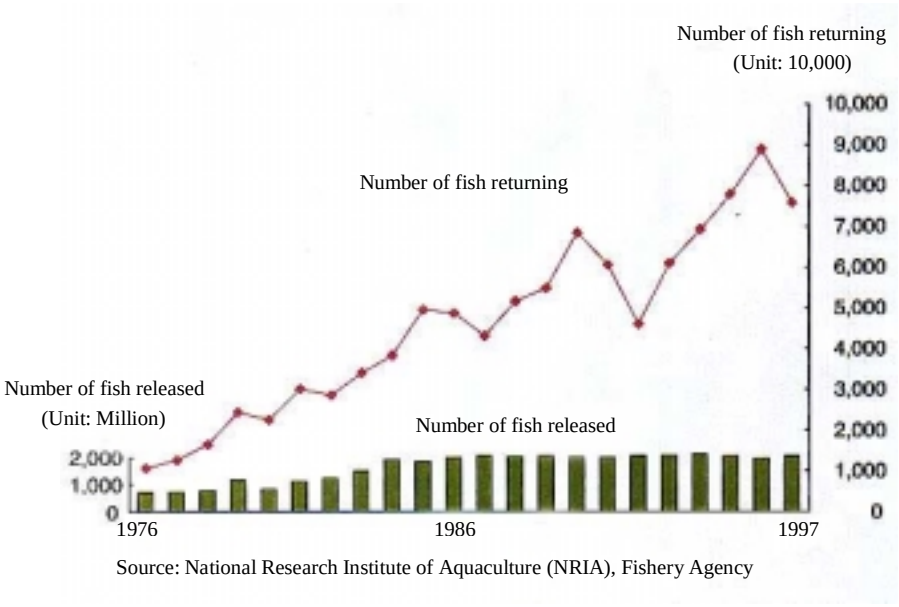
> "The first artificial hatching and release of chum salmon was accomplished in 1880. This activity has developed into an important industry. The year 1975 saw a return rate of 2-4% (30 million fish), compared with 1.0% and about 16 million in earlier years.
>
> At present [1989] 27 governmental hatcheries, 4 local governmental hatcheries and 62 private hatcheries are in operation in Hokkaido.[145] They have the capacity to rear a total of 1300 million salmon eggs. In Honshu 124 private hatcheries can rear 500 million. A total of 1300 million fry can be released from a total of 1800 million salmon eggs. Eight hundred million fry are subject to further rearing by feeding-rearing methods. Salmon fry are released in 157 rivers in Hokkaido and 110 rivers in Honshu.
>
> Only hatcheries are permitted to catch salmon in Japanese rivers. More than 90% of the salmon returning to their 'native' rivers were caught in fixed nets before they ascended the rivers."[146]

---

[143] "Promoting Resource Management Fishing and Aquaculture" *A Guide to MAFF:Fishery*, MAFF, 2000. [http://www.maff.go.jp].
[144] Torolf Holme (1989) *Akvakultur i Soloppgangens land (Aquaculture in the land of the rising sun)*, p.122.
[145] Now, there are 16 national and 53 prefectural cultivation centres in Japan (1998). National Research Institute of Aquaculture (NRIA), Fishery Agency, MAFF "Marine Aquaculture", *Wagakuni no Zoyosyokugyo no Genjyo – Heisei 10 nendo Gyogyo Hakusyo yori Bassui (Current Situation of Japan's Aquaculture – from Fishery White Paper in 1998)*.
[146] Torolf Holme (1989) *Akvakultur i Soloppgangens land (Aquaculture in the land of the rising sun)*, p.122.

Figure 13 shows how the return rate of released fish improved in the last couple of decades. The development is remarkable. According to the Figure 13, in 1997, roughly 4% of the number of fish released returned to the rivers.

In addition to salmon and trout, there are about 80 species which subjected to cultivation.



Source: National Research Institute of Aquaculture (NRIA), Fishery Agency

Figure 13: Development of Release and Return of Chum Salmon

More than 10 million of fry of the major eleven species, such as red seabreams, turbots, prawns and scallops, are released every year.[147] In addition to the return rate of chum salmon and scallops, the return rate of red seabreams and turbots in the Seto Inland Sea and turbots in the Northern Pacific Sea have been increasing steadily.[148]

Table 26: Main Species for Releasing, 1997

Species	Fry Released
Red Seabream	240,000
Turbots	250,000
Kuruma Prawn	2630,000
Kuma Prawn	110,000
Shima Prawn	280,000

[147] National Research Institute of Aquaculture (NRIA), Fishery Agency, MAFF "Marine Aquaculture", *Wagakuni no Zoyosyokugyo no Genjyo – Heisei 10 nendo Gyogyo Hakusyo yori Bassui (Current Situation of Japan's Aquaculture – from Fishery White Paper in 1998).*

[148] Ibid.

Abalone	260,000
Scallop	28,500,000
Clam	200,000
Sea urchin	690,000

Source: NIRA, Fishery Agency, 1999

Cultivation is hoped and expected to grow. For this to happen, it is necessary to make further efforts to release the right number and size of fry at the appropriate location, in the right time. Moreover, cutting cost in the rearing process is crucial.

5.1.3 Japanese Salmon Aquaculture

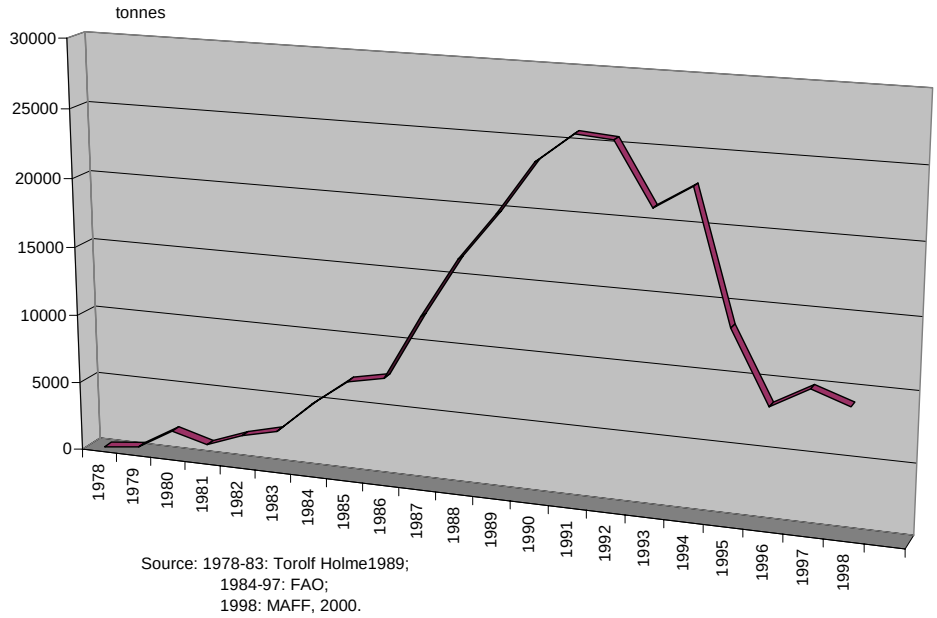


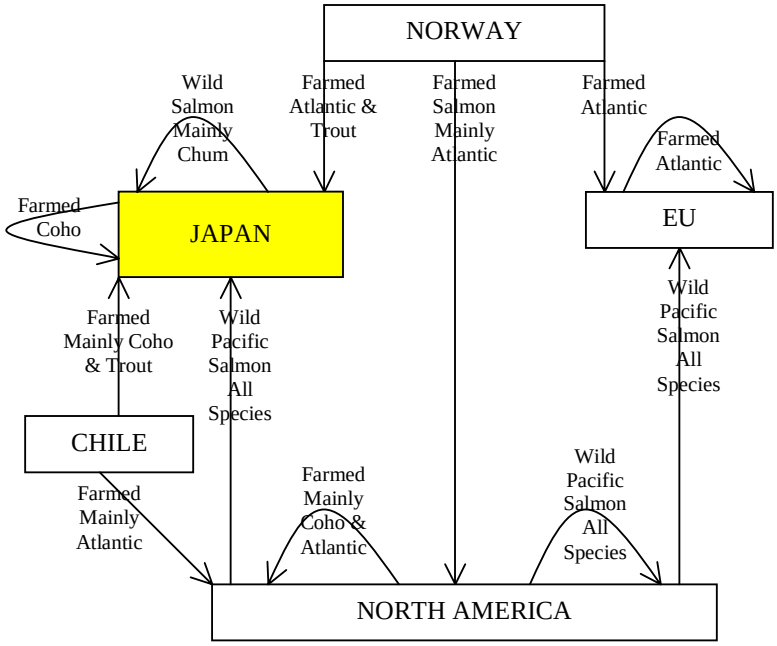
Figure 14: Japanese Coho Salmon Aquaculture Production (tonnes)

Japan started to use the net-cage method of salmon aquaculture in the late 1970s. The main problem of salmon aquaculture in Japan is the warm sea water. However, this obstacle has been removed by commencing the first year's culture in freshwater ponds, and then transferring to net cages in the sea to culture to market size.[149] It reached significant production quantity of more than 20,000 tonnes in early 1990s. However, it is somewhat declining from 14,000 tonnes in 1995, 8,000 tonnes in 1996 and 10,000 tonnes in 1997 (see the Figure 14). Coho salmon is the major species for the salmon aquaculture and mainly cultured in the Miyagi prefecture. As discussed, Japan's coastal ocean is polluted and no longer suitable for salmon aquaculture. Also, with such small production

[149] Torolf Holme (1989) *Akvakultur i Soloppgangens land (Aquaculture in the land of the rising sun)*, p.123.

scale, cost of production is too high and thus Japanese farmed salmon is not competitive against other salmon supply. It seems that farmed salmon from Norway and Chile have taken over the domestic production of salmon.

5.2 Japanese Salmon Imports



Source: Idea is from Hatch, U. & Kinnucan, H. (1993) *Aquaculture: Models and Economics*, p. 192. However, some modifications are made to update the source.

Figure 15: World Salmon Supply

USA, Canada and Russia are the main suppliers of wild salmon to Japan. While traditional wild salmon suppliers, USA and Canada, are struggling with lower production, Russia has been somewhat gaining shares for sockeye and coho salmon. This is because Russia is now catching the salmon that Japan used to catch in Russia's 200 miles EEZ, before the EEZ was introduced. For farmed salmon, Chile and Norway are the large players in the Japanese salmon market. Norway is rather dominant in terms of Japanese import of Atlantic salmon, both for frozen and fresh salmon. However, for trout, Norway and Chile compete in the Japanese market. Moreover, there has been a very small amount of trout from other Scandinavian countries, and even from Finland recently, to Japan (see Table 27).

5.2.1 Farmed Atlantic vs. Farmed Trout

Air freighted chilled Atlantic salmon is used raw for high-market use (i.e., *sashimi* and *sushi* at *sushi* bars and restaurants), and frozen Atlantic salmon is sold as *nama-zake*[150] (e.g. for pan-fry cooking). Atlantic salmon is not suitable for *kirimi*, as the meat tends to become dry in texture. To widen the usage, there has been an attempt to sell Atlantic salmon cutlets for steak/barbecue use. However, many Japanese consumers are not accustomed to salmon cutlets and sales of salmon steak cut have been slow.[151] On the other hand, trout is appreciated for its various usage in Japan:

1) salted as *kirimi*
2) raw as *sashimi*
3) defrosted as *nama-zake*: e.g. for pan-fry
4) processed as smoked trout
5) marinated in *sakagasu*, *miso*, etc.

Such variety of usage that trout can offer is attractive for traders and processors in Japan. Moreover, trout is also preferred for the following factors:

a) reddish meat colour
b) high oil content
c) two main suppliers; Norway and Chile

To summarise the above features, trout has a stronger position than Atlantic salmon in Japan. However, it is also true that it is risky for Norwegian salmon producers/exporters to rely too much on trout, as Japan is almost the only market for trout. How much Atlantic salmon and trout should be handled should depend on each Norwegian company's customer profile: how important the Japanese market is, in comparison with the European market and possibly the US market.

5.2.2 Farmed Trout vs. Wild Sockeye Salmon

Since the wild sockeye catch has been poor since 1997, it seems that farmed trout has established its presence in Japanese market. Although, in the Kansai area, wild sockeye is still highly appreciated; the general trend is that Japan has become used to farmed

[150] See Appendix D: Glossary of Relevant Japanese Terms, p. vii.

salmon. Sockeye salmon has been preferred for its vivid red colour, which trout can also offer. Moreover, sockeye salmon is sold only as salted *kirimi*; while trout can be used in numerous ways. Furthermore, wild sockeye salmon can vary in quality and size, while farmed trout is adjusted accordingly to market demand. Uniformed size and consistency in quality (colour, oil content) are major strengths of farmed trout, compared to wild sockeye.

In such circumstances, the major concern for trout is the price level. Some yeas ago, trout used to be hard to sell, unless the price was lower than sockeye. However, nowadays, farmed salmon's price determines wild salmon's. Prices of farmed species in mind of traders, wild sockeye's price is lowered.

Moreover, according to the estimation of Hokkai Keisai Shimbun, in the period of May 1998 to April 1999 (Japanese fiscal year), the wild salmon accounted only for 32.8% of salmon import for *kirimi*.[152]

In this way, it is safe to say that trout has gained its acceptance in the Japanese market.

5.2.3 Farmed Trout vs. Farmed Coho

Farmed coho is from Chile, while farmed trout is from both Chile and Norway. Both of the species have reddish flesh colour preferred in Japan; thus, are exposed to the competition with sockeye salmon for *kirimi* sales.

Because wild coho has been in the Japanese market for years, the name *ginzake*, or silver salmon, is well established. When trout was first introduced in Japan, some trout was sold as *ginzake*. Now, most trout is sold as trout, or *torauto*; however, the importers still have strong preference for the silver skin of trout. As Japanese consumers are accustomed to the appearance of traditional species, such as sockeye and coho, the skin colour is preferred to be silver. From the consumers' viewpoint, between silver salmon and trout

[151] *Salmon/Farmed Fish Market Report*, 28 April 2000, Fish Info Service, [http://www.fis-net.com].

[152] "It is estimated by the Hokkai Keizai Daily that the total supply of salmon to the Japanese market in the period of May 1998 to April 1999 was 555,450 mt comprising of 93,170 mt of carry over from the previous year, 202,280 mt of Japanese catches (including 151,000 mt of fall chum) and 260,000 mt of imports from other countries. Of this total import, those used for sales in the form of *kirimi* are 196,000 mt. Of this total, 64,2000 met were wild salmon (accounting for 32.8% of the total import) and 131,800 mt, which accounts for 67.2% of the total were farmed salmon. As indicated in these percentage, wild

thus are indifferent when they choose *kirimi*. Availability and price level determine consumers' purchasing behaviour.

The largest difference between coho and trout is that coho salmon is limited in its usage. Coho salmon is sold only as salted *kirimi*; in contrast, trout is consumed as *sashimi* and *sushi*. For this reason, the price of trout has been 40-60 yen/kg higher than Chilean coho or sockeye.[153] Coho salmon tend to be the cheapest of the three species, trout, coho and sockeye. As long as *kirimi* sales are concerned, coho tends to have a stronger position than trout in the retail market, because the price is lower. Higher price of trout on account of its wide variety of usage can be a disadvantage in *kirimi* sales at supermarkets.

Moreover, the imports of Chilean coho are limited from January to April, with a peak in March; while trout supply comes both from Chile and Norway and therefore trout is available for longer period. From the Japanese importers' point of view, this means that trout is more attractive than coho, for being able to plan the purchases across longer time period and thus it is easier to manage the inventory level. In this way, both farmed trout and coho have advantages and disadvantages in the Japanese salmon market.

Table 27: Japanese Salmon Imports

(Units: Metric tonnes; million yen.)		1994	1995	1996	1997	1998	1999*
Frozen Salmon							
Sockeye							
	Russia	7501	9,947	17,901	10,368	11,412	12,186
	Canada	15,467	3,441	4,030	9,958	2,491	481
	U.S.	92,702	77,080	79,251	43,595	33,142	40,954
Total Sockeye		115,879	90,588	101,274	63,970	47,235	53,621
	Value	¥ 115,879	¥ 40,577	¥ 58,085	¥ 40,005	¥ 42,320	¥ 34,462
Coho							
	Russia	149	281	503	285	1,261	1,460
	Canada	3041	1766	2157	504	690	501
	U.S.	12,894	9,386	6,967	2,705	4,623	4,340
	Chile	23,112	29,832	38,010	43,588	49,553	47,397
Total Coho		39,223	41,265	47,642	47,082	56,215	53,765
	Value	¥ 20,183	¥ 20,205	¥ 19,870	¥ 26,852	¥ 25,690	¥ 31,877
Trout							
	Norway	7,543	7,569	11,426	16,244	17,685	30,268
	Sweden	1,070	522	886	360	88	1,185
	Denmark	1,419	464	945	787	837	4,505

salmon prevails in the Japanese market." *Japan Fisheries Market Report* (January 2000) Canadian Embassy, Tokyo.

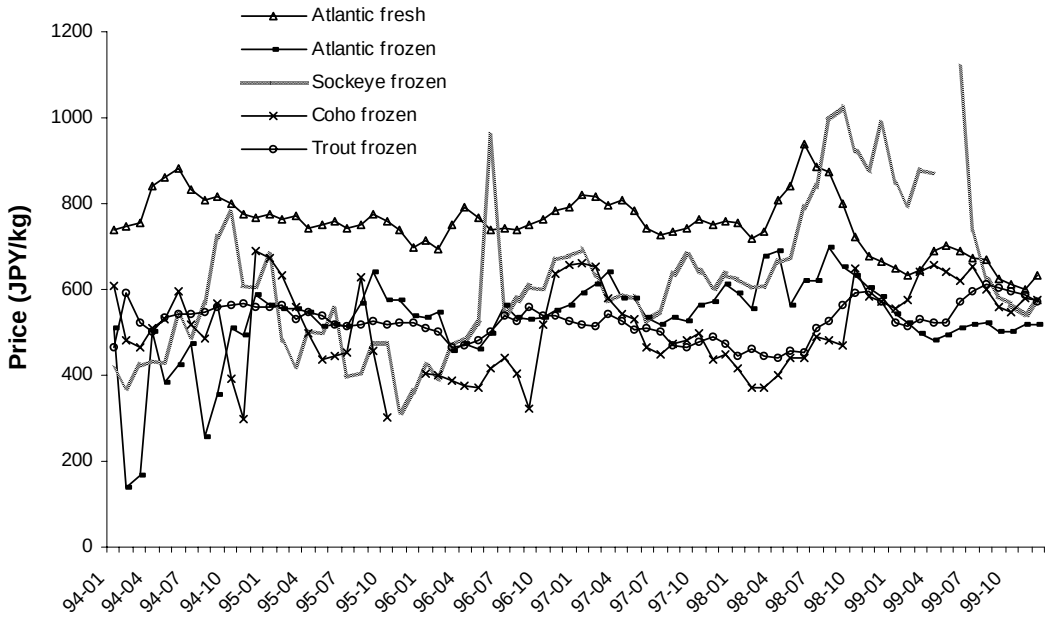
[153] *Salmon/Farmed Fish Market Report*, 25 April 2000, Fish Info Service, [http://www.fis-net.com]

	Finland					168	889
	Chile	17,350	19,485	22,592	31,303	40,508	25,264
Total Trout		28,557	30,476	36,472	50,332	59,691	63,444
	Value	¥ 14,790	¥ 14,199	¥ 16,763	¥ 23,929	¥ 28,958	¥ 35,797
Atlantic							
	Norway	3,163	5,297	7,204	5,078	4,531	14,362
	Denmark	62	249	331	118	8	296
	Chile	1,187	1,373	1,314	1,843	1,349	1,103
	Other	179	466	80	0	24	11
Total Atlantic		4,591	7,385	8,929	7,039	5,912	15,777
	Value	¥ 2,303	¥ 4,031	¥ 4,683	¥ 3,883	¥ 3,533	¥ 8,031
Fresh/Chilled Salmon							
Atlantic							
	Norway	12,354	11,437	13,093	15,434	15,972	21,514
	England	646	823	614	514	491	761
	Canada	222	958	247	1,171	1,327	770
	U.S.	265	236	80	70	25	8
	Chile	1,017	3,385	8,445	2,053	1,071	265
	Australia	1,543	1,740	1,708	1,588	1,016	695
Total Atlantic		16,065	18,605	19,233	20,921	19,991	24,020
	Value	¥ 13,139	¥ 14,058	¥ 14,734	¥ 16,478	¥ 15,875	¥ 15,986

Note: Totals include tonnages not listed.
*Preliminary figures for 1999.
Source: 1994-1998: *Minato Shimbun*, 1 March 1999; 1999: courtesy of Mr. Bill Atkinson (except Frozen Atlantic Salmon); 1999 Frozen Atlantic: Japan Customs Clearance Statistics, December 1999, Fish Info Service [www.fis-net.co.jp].

5.2.4 Import price development

Fresh Atlantic salmon has generally fetched a higher price than its frozen counterparts Atlantic, sockeye, coho and trout. Lately prices have however shown a tendency for convergence (see Figure 16). Thus, the price premium for fresh Atlantic salmon has become substantially smaller than was the case in the mid-nineties. Further, sockeye prices has trended upwards in the 1994-1999 period. From Figure 16 we can see that coho and sockeye have a tendency to fluctuate more than the others do, in particular compared with fresh Atlantic. Sockeye and coho are only harvested once a year, August-September and February-April respectively, thus prices react to the uneven supply of these species throughout the year. For instance, Figure 16 show that sockeye obtained record high prices for the period in June 1999, but plummeted shortly after as the sockeye harvest season started.



Source: Norwegian Seafood Export Council

Figure 16 monthly Japanese salmon and trout import prices from 1994-1999

5.2.5 Changes in Salmon Imports to Japan

Japan imported more farmed salmon and trout than wild salmon for the first time in 1997. The increase in imports of farmed salmon from Chile and Norway was attributed to the smaller catch of sockeye salmon in Alaska in recent years. Furthermore, even though the sockeye catch in 1999 was not as low as the previous year, it was still not a significant level of increase. Thus, imports of farmed salmon and trout continued.

Note: Salmon here include Atlantic, coho, sockeye and sea trout. Thus, other species, like king salmon, are not included. These pie charts are made based on the assumption that salmon/trout from Chile and Norway are all farmed. Thus, they are not entirely accurate, but provide the idea how dramatically farmed imports of main salmon species increased.

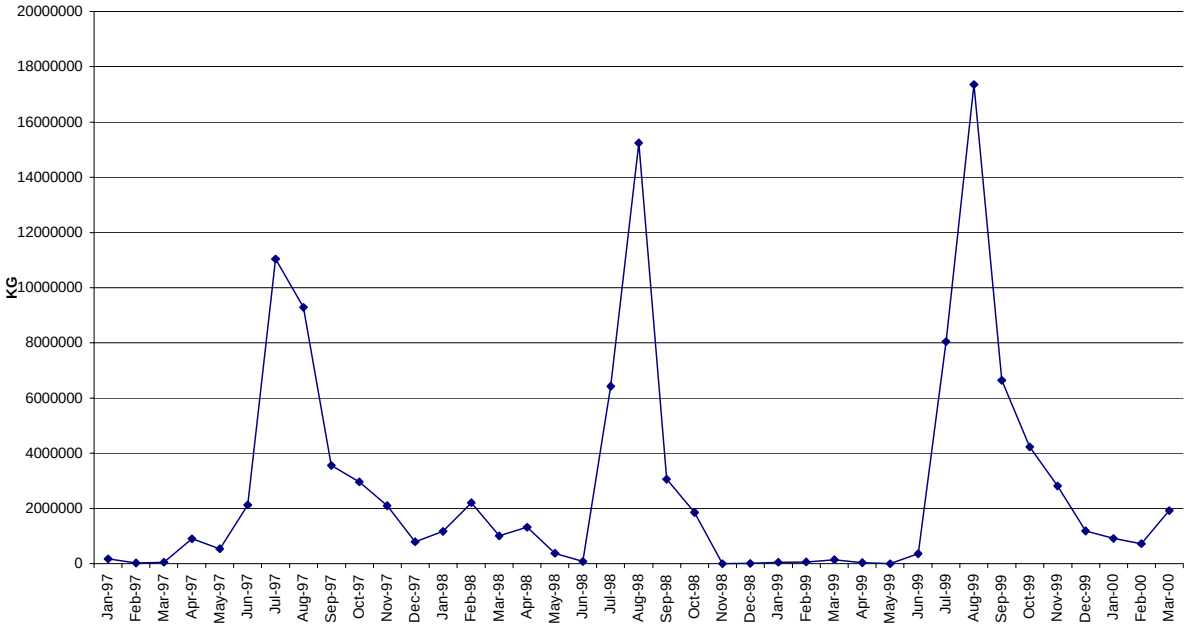
Source: Calculated according to Table 27.

Figure 17: Changes in Japanese Salmon Imports

There are many players in the Japanese salmon market, as Bill Court, a reporter of Fish Info Service in Tokyo, described on 6 August 1999: "The Bristol Bay sockeye season is over, Japan's farmed silver salmon season has passed its peak. The next fishery is Japan's fall chum salmon fishery which begins 1 September. This will be followed by Chilean silvers. In between there will be Russian sockeye, Alaskan sockeye other than Bristol Bay, Canadian sockeye and a variety of chum, pink salmon and silver salmon

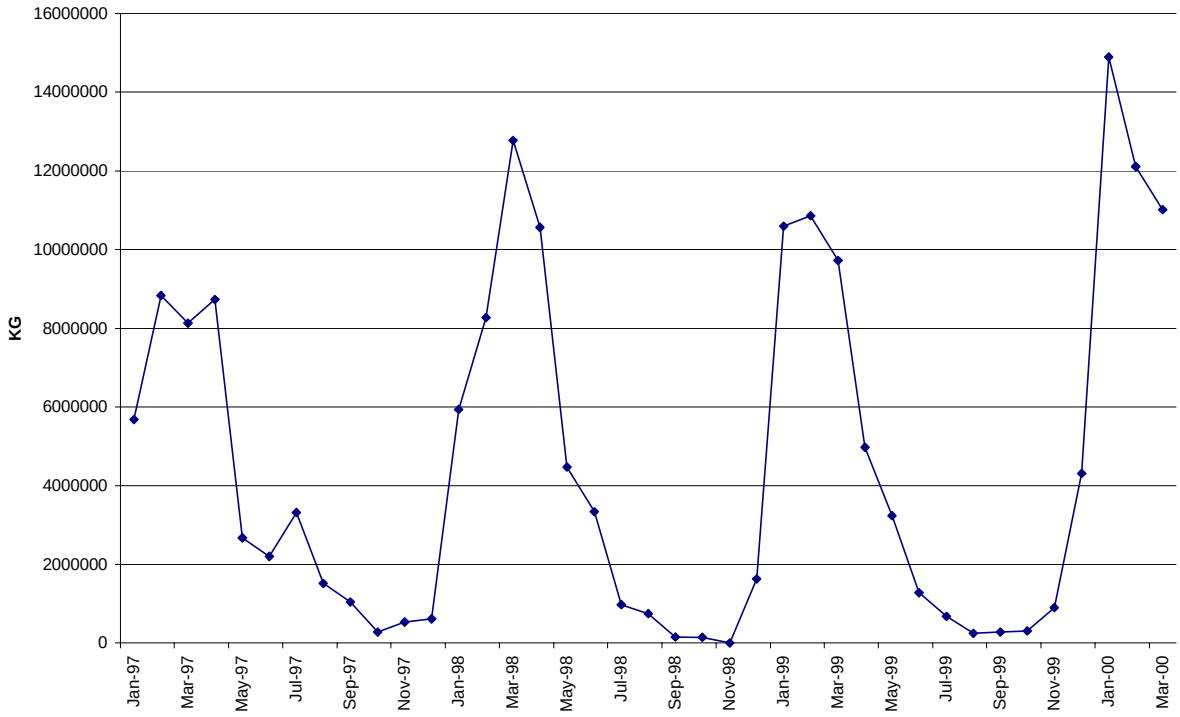
fisheries off the west coast of North America plus continuing farmed salmon from Norway and numerous other locations."[154]

Frozen sockeye salmon from USA is imported to Japan mainly in July, August and September (see Figure 17), while frozen Russian sockeye is also imported in smaller amount in the similar period. Chilean frozen coho is mostly imported between January and April. Except for Chilean coho, farmed salmon do not seem to have followed particular monthly trends in the past couple of years. Especially, Japanese import of Norwegian fresh Atlantic salmon is still in the transition stage and it is not easy to predict the development. Norwegian frozen Atlantic salmon is imported regularly throughout the



year.

[154] Bill Court. *Salmon/Farmed Fish Market Reports*, 6 August 1999. Fish Info Service. [http://www.fis-net.com]

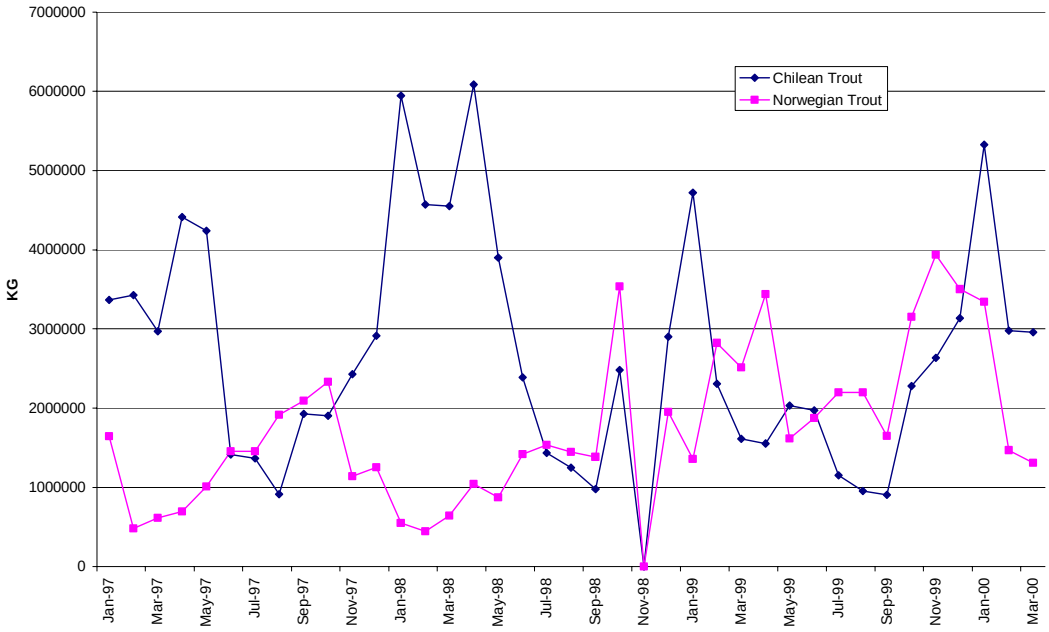


Source: Custom Clearance Statistics, Fish Info Service

Figure 19: The Japanese Chilean Coho Import

It has been said that Norway in the northern hemisphere and Chile in the southern hemisphere balance the trout supply in the Japanese market. As seen in 1997-1998, Chilean frozen trout was mainly imported during the period from January to May; while Norwegian frozen trout was imported mostly in different months, from June to October. However, it was not precisely the case in 1999. Both Chilean trout and coho salmon production turned out to be smaller; thus, the Norwegian trout were imported regardless of the time of the year. In addition to the shortage of Chilean salmon, the stronger yen partly stimulated Norwegian exports to Japan. The Japanese import of Norwegian trout in April 1999, for example, was more than three times that of the same month in 1998. On the other hand, the Japanese import of Chilean trout in April 1999 was 75% less than that in April 1998. This higher acceptance of Norwegian salmon by Japan carried on toward the end of 1999 and it is likely to continue in 2000. It is suggested that it would be

difficult for Chilean species, especially trout, to recover market share against Norwegian salmon/trout.[155]



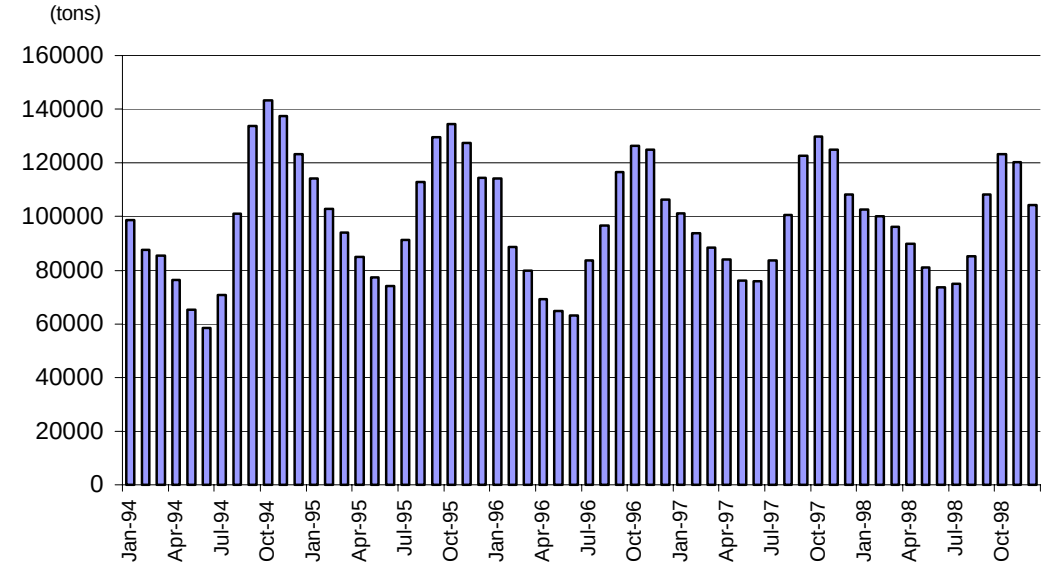
Source: Custom Clearance Statistics, Fish Info Service

Figure 20: The Japanese Trout Import

In this way, the Japanese salmon market is still in transition and the development should be observed carefully.

[155] Bill Court. *Salmon/Farmed Fish Market Reports*, 8 June 1999. Fish Info Service. [http://www.fis-net.com]

5.3 Salmon Inventories



Source: *Minato Shimbun* , 31 March 1999

Figure 21: Salmon/Trout Inventories in Japan

The salmon/trout inventory in Japan is lowest in June. Prior to the sockeye season, Japanese importers tend not to buy salmon, unless it is necessary for immediate use. Once the result of the sockeye fishery is known, the traders act accordingly. When the catch is bad, they seek other sources, such as farmed trout and salmon. On the other hand, the salmon/trout inventory is the highest in October, after the fall chum salmon fishery has started and before the larger consumption of salmon in winter begins. In this fashion, the salmon inventories in Japan fluctuate according to the gap between harvest season and consumption season. The import of farmed salmon is usually influenced by the inventory level and the market situation. For example, the import of Norwegian trout was much less in February and March in 2000, as compared to the same months in 1999, when the sockeye inventory was high and they were to be sold on sales in the supermarkets. This was because of the slow sales of sockeye in 1999, even though the sockeye catch was better than the two previous years.

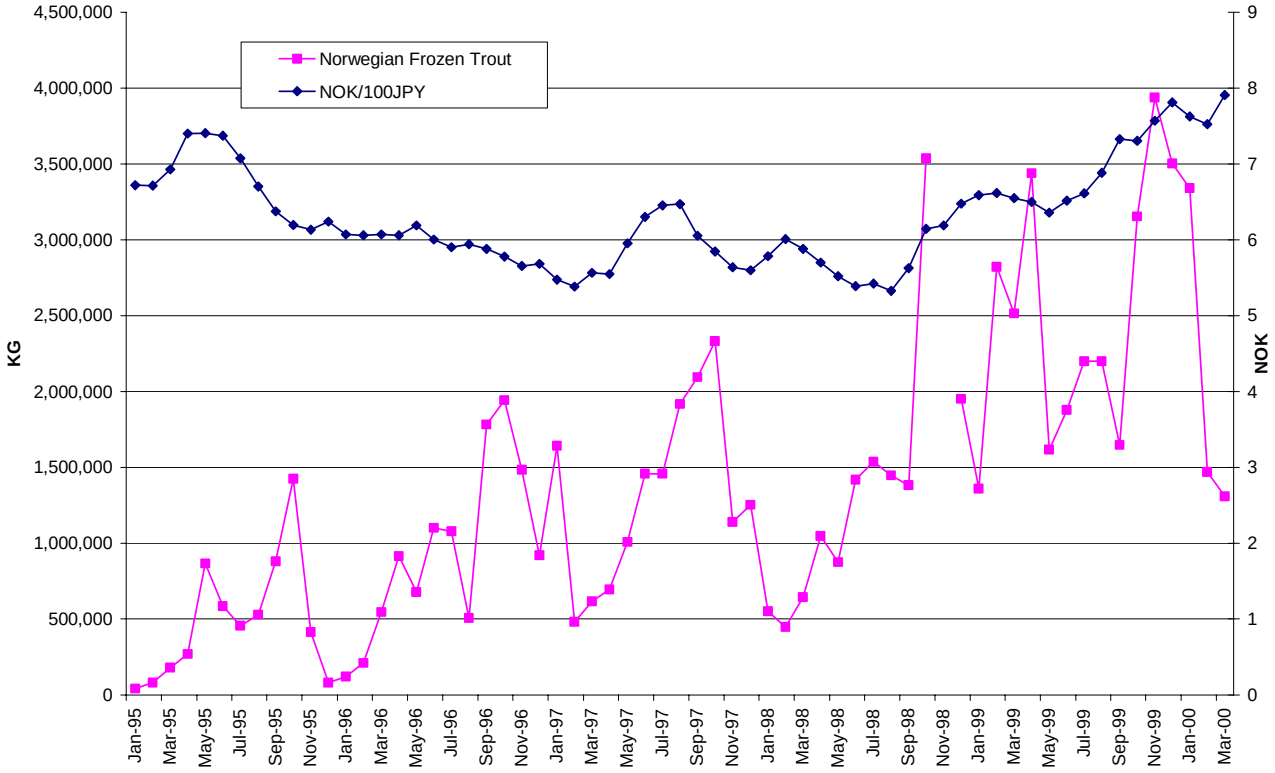
As seen in the Figure 20, the fluctuation in the inventory level has become smaller in recent years. This trend is due to the greater presence of farmed species from Norway and Chile. In other words, Alaskan sockeye is no longer the dominant factor when the inventory level is managed.

5.4 Prices & Quantity of Japanese Salmon Imports

As has been discussed, there are many aspects to be considered to predict the salmon market in Japan: substitutability between different species, the exchange rate, consumers' taste, importers' preference, etc.

5.4.1 Influence of Exchange Rate

In late 1999 and the beginning of 2000, many Norwegian salmon exporters said that the Norwegian salmon sold well to Japan because of the strong yen. However, such simple analysis is not compelling explanation of the recent growth of Norwegian salmon export to Japan (see Figure 21).



Note: No frozen trout import registerd on November 1998.
Source: 1995-96: *Månedsstatistikk*, NSEC.
1997-2000: Custom Clearance Statistics, Fish Info Service.
Exchange rate: Norges Bank (NB).

Figure 22: Exchange Rate and Japanese Import of Norwegian Frozen Trout

Exchange rate may influence the decision-making process at the point of salmon is bought; i.e., if the Japanese yen is stronger, the negotiation is smoother, etc. However, good exchange rate alone does not stimulate Japanese importers to purchase more salmon than necessary.

5.4.2 Influence of Expected Demand of Salmon

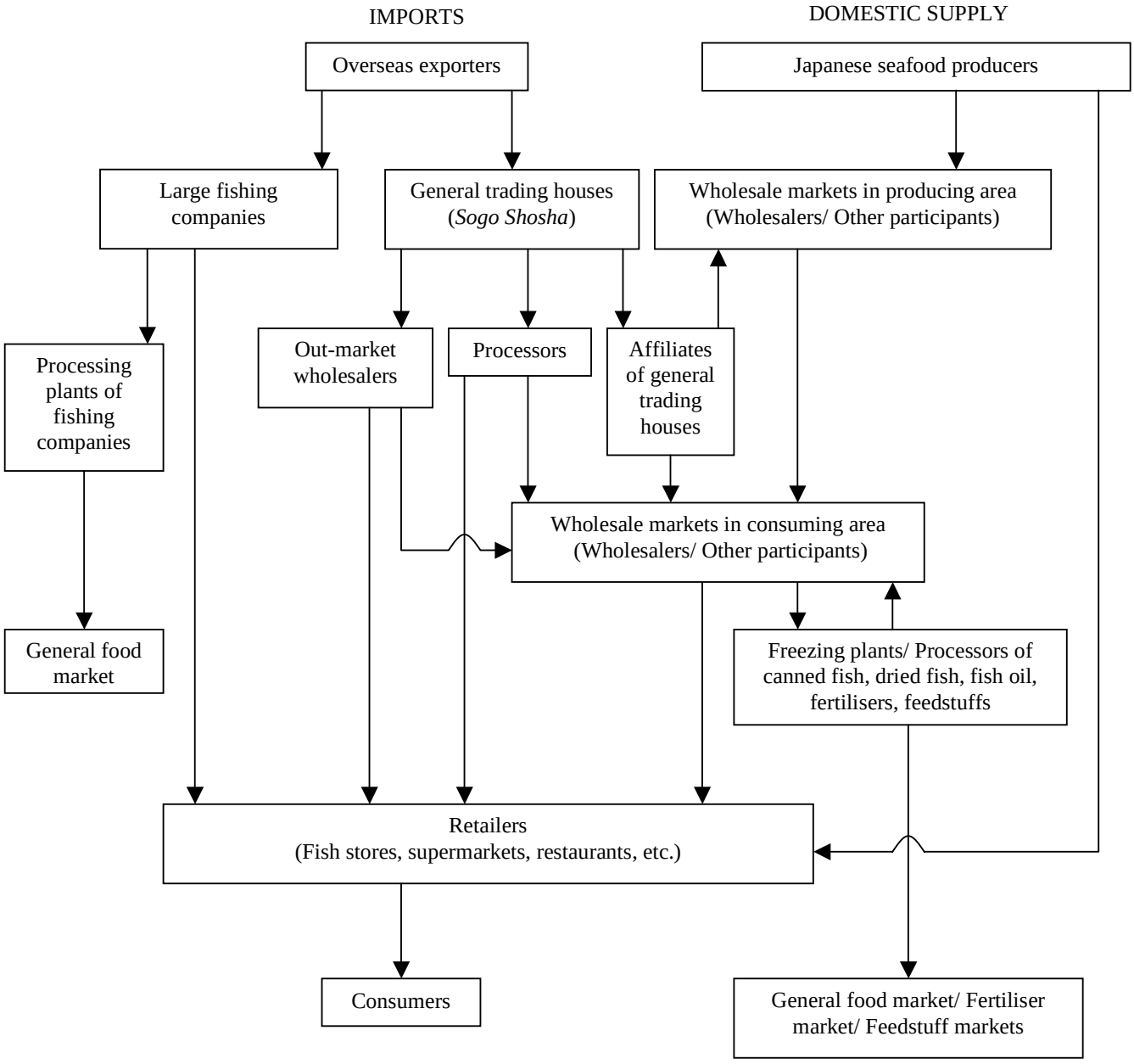
The total amount of money which can be earned by all the stakeholders in the Japanese salmon market (from Norwegian producers to Japanese retailers) is limited by what Japanese consumers are willing to pay. Together with the continuing demand for high quality products, the pressure to lower the price is strong, and thus it is exceptionally difficult for suppliers to fulfil consumers' demands. Moreover, the concern is not the wholesale price at the time of the season, but what Japanese salmon importers think it will be when they sell the salmon at the wholesale market. For example, the sockeye salmon are imported to Japan during the fishery season, but they can be sold until the next year. If the sockeye inventory is high at the beginning of the following year, the sockeye should be sold quickly prior to the coming fishery season in May-June.

It is similar with the import quantity. The current demand for salmon does not determine import quantity; this is determined by how much the salmon importers expect the demand will be when the salmon is sold. Therefore, for salmon importers, inventory management is crucial and salmon imports are often influenced by the inventory level.

5.5 Future Outlook of the Japanese Salmon Imports

Farmed species, especially trout, will continue to be strong in the Japanese salmon market. Atlantic salmon is now mainly for *sashimi* and *sushi* and consumers are increasingly used to the raw salmon. Thus, fresh Atlantic will likely to have steady and favourable position in the market. On the other hand, frozen Atlantic has rather difficult to market in Japan. The characteristics of Atlantic salmon (meat colour, texture, etc.) are not suited to Japanese consumers' preferences. There has been attempts to widen the product usage of the Atlantic salmon (e.g. barbecue salmon), but just proved to be tough to sell. Coho is the strongest of all species for *kirimi* (i.e., sockeye, coho and trout). If it can offer stable supply, coho will remain its market share in the Japanese salmon market.

6 SEAFOOD DISTRIBUTION IN JAPAN



Source: "Exhibit 3: Distribution Channels for Fish Products", *The Role of Trading Companies in International Commerce*, MAFF, 1993.
However, slight modifications are made for this report.

Figure 23: Seafood Distribution Channels in Japan

6.1 Distribution of Domestic Seafood Products

In Figure 22, the distribution channels for both imports and domestic supply are illustrated. The domestic seafood products are first distributed through the primary wholesale market near the landing/producing area and then through the secondary wholesale market in large cities, where numerous retail outlets are. This distribution system is competent in handling seafood quickly, while it is fresh, and thus it is the main channel for domestic seafood distribution.

The primary wholesale markets efficiently gather the catches of the off-shore and distant water fisheries and hand-over the products to the participants in the secondary wholesales markets in the consuming areas. The secondary wholesale markets have some marketing functions, such as choosing products and pricing, to meet the local demands. A report by JETRO points out, "…recent years have seen a new trend in distribution emerge which bypasses wholesale markets altogether. An example of this can be seen in the increase of tuna boats with advanced freezers. This type of boat sorts and deep freezes the catch by species making direct delivery to buyers possible. Another example is found with volume buyers which buy directly from producers or wholesalers under special agreement".[156] Nevertheless, such development is still at a small scale and the wholesale markets seem to remain as main channels of Japanese seafood distribution.

6.2 Distribution of Imported Seafood Products

In most cases, importers of overseas seafood products are general trading companies, *sogo shosha*, and large fishing companies.

6.2.1 General Trading Companies, *Shosha* (*Sogo Shosha*)

"Essentially, trading companies perform two tasks: they act as trade intermediaries, linking product suppliers with users, and they develop trade flows by engaging in activities that increase the supply of products and stimulate additional demand. Other activities – such as financing, risk absorption, resource development, project

[156] "Chapter II. Distribution". JETRO, December 1997. *Japanese Market Report: Relation & Practices: Seafood Products*, p.10.

coordination, investment, and provision of information – are generally carried out to facilitate these two principal tasks."[157] Therefore, a trading company may own a seafood processing company, out-market wholesaler business, etc. Seafood products are imported and distributed to answer for the affiliated companies.

6.2.2 Large Fishing Companies

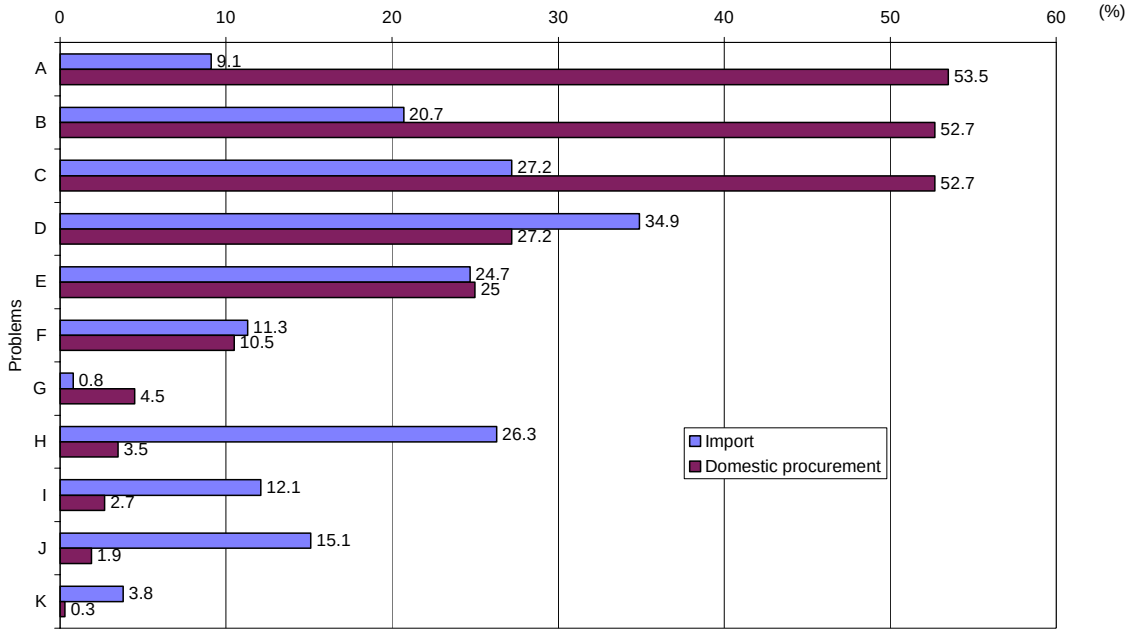
Large fishing companies used to operate high sea fisheries, typically salmon/trout fisheries. However, they have gradually transformed themselves to be marine food companies in recent decades. The fishery companies are no longer in "fishing", but their main businesses consist of trading/procurement of seafood, product development (research and development) and sales/marketing. It is safe to say that the Japanese fishery companies nowadays are trading companies, *shosha*, specialised in marine products. For example, there was an acquisition of a Chilean farming business by a large food company, Nippon Suisan Kaisha, Ltd. (Nissui), in 1988. As discussed in 6.2.1 General Trading Companies, such involvement in international investment and in a production facility is a typical feature of *shosha*.[158]

6.2.3 Seafood Procurement and Problems

According to Figure 23, domestic seafood supply is considered unstable by many traders, in terms of both price and volume. On the other hand, seafood imports have some concerns due to the remote location of production facility; that is, "product is not fresh enough" and "hard to obtain accurate price/product information" in Figure 23. Overall, the issues regarding the seafood imports are not large concerns. In contrast, procurement of domestic seafood produce has some negative feedback by traders (see points A, B and C of Figure 23). These results seem to suggest an optimistic future for Japanese seafood imports.

[157] JETRO (1993) *The Role of Trading Companies in International Commerce*.

[158] Specialised trading companies "are active in importing and distributing goods in quite clearly defined markets. Some representative examples of the trade service activities of smaller trading companies are as follows: … Company B specialises in agricultural and marine produce. Not only does this company import processed products, it has also been instrumental in establishing integrated broiler plants in Thailand and prawn and crab operations in India and China to serve the Japanese market. For these projects, it has transferred technologies to local concerns and provides them with a constant flow of information on Japanese consumer trends", ibid.



Source: Source: Association of Agriculture and Forestry Statistics, "Annual Report on Japan's Fisheries Fiscal 1997"

Recognised Problems:
A. Price is too high
B. Price fluctuates too much
C. Cannot expect stable supply
D. Hard to obtain accurate price/product information
E. Product range is limited
F. Not able to appoint standardised products
G. Credit period is too short
H. Product is not fresh enough
I. Do not have ability to make adjustment in processing
J. Hygienic standard is not good enough

Figure 24: Problems of Seafood Supply, Domestic Procurement vs. Import

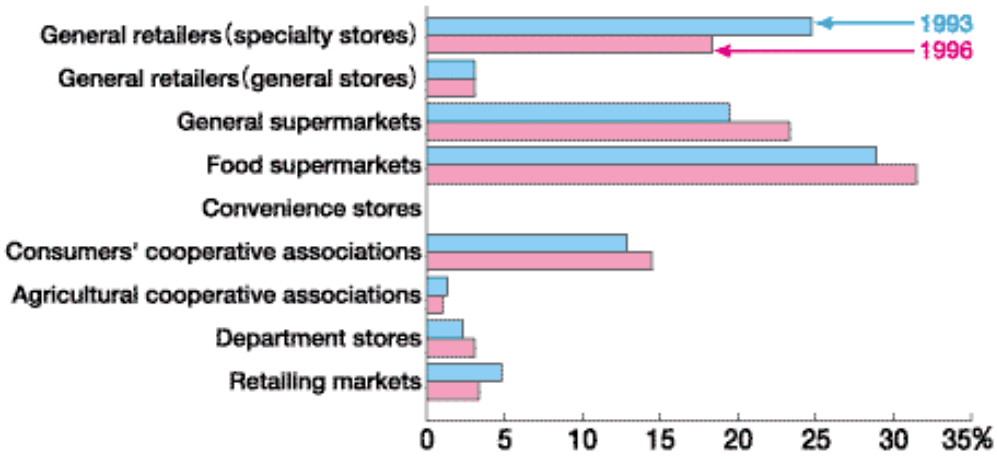
6.3 Retailers

Japanese consumers are purchasing seafood more often at supermarkets (see Figure 24). This is due to the following consumer trends:[159]

[159] First Regular Survey of Food Consumption Monitors MAFF, 1996. Cited in "Changes in Where Fresh Fish is Purchased by Consumers", *Data on Marine Products in Japan*, web-site of the 2nd Japan International Seafood and Technology Expo 2000, [http://www.k-ide.com/seafood/index.htlm].

1) the diversification of consumer needs
2) increasing number of consumers tend to carry a smaller household inventory and buy exactly as much as they need only when it is necessary
3) increasing trend of buying in bulk

In such cases, supermarkets are more convenient and, consequently, small fish shops are disappearing (see "speciality stores" in Figure 24).



Source: First Regular Survey of Food Consumption Monitors MAFF, 1996. Cited in "Changes in Where Fresh Fish is Purchased by Consumers", *Data on Marine Products in Japan*, web-site of the 2nd Japan International Seafood and Technology Expo 2000, [http://www.k-ide.com/seafood/index.htlm].

Figure 25 Where Seafood is Purchased?

6.4 Recent Development in Distribution

Recent developments for fishery companies are that they are expanding the low temperature warehouse business. The new type of warehouse business deals not only with storage of the products, but also delivery of the products; in other word, it operates as an agent of logistics of fresh goods.[160] When Japan's economy was in boom in the late

[160] It is called "third party logistics" in the US. "Reizo Soko, Butsuryu Daiko Sabisu Kakudai: Nichirei, Nihon Suisan, Toyo Suisan (Expanding Agent Services of Refrigerated Warehouse and Logistics: Nichirei, Nihon Suisan, Toyo Suisan)". 23 July 1999, *Nihon Sangyo Shimbun* (Japanese Industrial Newspaper), p.22.

1980s, the large fishery/food companies invested in number of low temperature warehouses. Now, demand for warehousing goods has limited growth potential. Thus, by combining the warehouse and delivery services as one package, they aim to offer lower cost services for fresh food producers.

7 CONCLUSION

Japan has been the most important seafood market in the world in the last few decades, and there is no indication that this would change in the near future. However, the key feature of the Japanese seafood supply and demand today is the continuous changes, e.g. introduction of different species and countries of origin, competition with other food items and the emergence of new consumer preferences. Because of globalisation, together with the deregulation of food imports, food in Japan is diversified and therefore the Japanese food market is highly competitive. Along these lines, the Japanese seafood market is in transition, but it is not likely that the market will grow in terms of volume. Seafood consumption is stagnating against other food, typically meat items. Also, the recent recession educated the Japanese to become more cautious about “value for money” and people are not purchasing unreasonably priced food or excess amount of food. For seafood exporters to Japan, such a competitive market may appear unappealing, especially when the product standard requirement is so high that product modification can be costly.

Nevertheless, Japan is one of the richest countries in the world with a large population, which appreciates seafood in everyday life. Succeeding in the Japanese seafood market will result in high volume and good price. Additionally, because the Japanese domestic seafood production is declining, seafood imports are likely to continue to grow. Simultaneously, consumers are becoming accustomed to imported seafood. Therefore, uncertainty in the Japanese seafood market today is actually auspicious for seafood exporters to Japan and provides room for new opportunities. Seafood products are more easily accepted by the Japanese market when product information is well presented and its quality (freshness, safety, appearance and taste) meats the market's demands. Moreover, as seen in the case of the recent growth in Norwegian mackerel export to Japan, a marine product which has a traditional consumption pattern has better potential of success than a seafood item which is entirely new to the Japanese consumers. When a new species is introduced, it is important that the Japanese market already has very

similar seafood, especially in taste, and that the Japanese generally[161] can appreciate the taste and have knowledge about possible usage(s).

In conclusion, up-dated knowledge about trends and changes in the Japanese seafood market will have increasing importance for Norwegian seafood exporters.

Bergen, 31 May 2000

[161] Seafood which is "generally" appreciated means that the seafood is not only consumed in specific geographic locations or in particular occasions.