

South Korean Market for Seafood

Perry Smith

Felicity Dennis

Wendy Proctor

ABARE RESEARCH REPORT 96.3



© Commonwealth of Australia 1996

This work is copyright. The *Copyright Act 1968* permits fair dealing for study, research, news reporting, criticism or review. Selected passages, tables or diagrams may be reproduced for such purposes provided acknowledgment of the source is included. Major extracts or the entire document may not be reproduced by any process without the written permission of the Executive Director, ABARE.

ISSN 1037-8286
ISBN 0 642 24820 6

Smith, P., Dennis, F. and Proctor, W. 1996, *South Korean Market for Seafood*, ABARE Research Report 96.3, Canberra.

Australian Bureau of Agricultural and Resource Economics
GPO Box 1563 Canberra ACT 2601

Telephone (06) 272 2000 Facsimile (06) 272 2001

ABARE is a professionally independent government economic research agency.

FRDC project 93/200
ABARE project 1129

Foreword

The Australian seafood industry is strongly export focused and derives over 60 per cent of its revenue from sales to markets in the Asia Pacific region. Its ongoing prosperity depends on being able to respond to changes in demand and supply conditions on a range of markets.

While South Korea is not currently a major market for Australian seafood, it is a major fishing nation with high per person consumption of seafoods. Markets for foods in South Korea are changing as a result of sustained high economic growth, and a range of changes to domestic food industries. These changes, together with reductions in trade barriers applying to seafood and substitute products, such as meat, following completion of the Uruguay Round of GATT multilateral trade negotiations, may open the South Korean market to allow more of the growth in demand to be met by imports.

This study was undertaken to assess the long term trends in demand and supply of seafoods in the South Korean seafood market, to identify the potential for the Australian seafood industry to increase its share of this market, and to identify the barriers to developing this trade.

The research reported here was part funded by the Fishing Industry Research and Development Corporation.

Brian S. Fisher
Executive Director

April 1996

Acknowledgments

The authors wish to acknowledge the helpful comments and suggestions provided by Deborah Peterson, Tony Battaglene, Ros Bell, Ahn Bui-Lan, and Stephen Beare of ABARE, and Peter Dundas Smith of the Fisheries Research and Development Corporation. The assistance of Kerry Connors and Mrs Lee of the Australian Embassy in Seoul, Bob Carmichael of Austrade and Dianne Cameron of ABARE was much appreciated.

Contents

Summary	1
Key findings	2
1. Introduction	6
2. The South Korean economy	7
The fifth five year plan	8
Trade liberalisation	9
3. Supply trends in the South Korean fishing industry	11
The South Korean fishing industry	11
Distant water fishing	13
Adjacent water fisheries	16
Shallow sea fisheries	19
Inland water fisheries	21
Distribution	22
South Korean seafood exports	23
4. Imports and trade restrictions	25
Trade barriers	25
Non-tariff barriers to seafood imports	27
Import trends	30
Restrictions on imports of substitutes	32
5. Demand trends	34
Factors affecting food demand	35
Food consumption trends	38
Demand relationships between seafoods and meats	43

6. Potential for Australian seafood exports	47
Australian seafood exports to South Korea	47
Longer term opportunities	51
Constraints to market development	54
Concluding comments	56
References	73
Appendixes	
A Modelling South Korea's demand for seafood	57
B South Korean trade in fisheries products	64

Figures

A	Total South Korean catch, by fishery	11
B	Catches in South Korea's adjacent water fisheries	16
C	Catches in South Korea's shallow seas fisheries, 1994	20
D	South Korean landings from inland water fisheries	22
E	Value of South Korean exports of fisheries products	23
F	South Korean imports and exports of fisheries products	25
G	Value of South Korean imports of fisheries products	30
H	Population distribution, by age, 1993, Japan and Korea	35
I	Real monthly income for salary and wage earner's households	37
J	Real monthly household consumption expenditure in South Korea	40
K	South Korean household budget shares of seafood and meat	41
L	Movements in consumer prices indexes of major meats and seafoods	41
M	South Korean apparent household consumption index	42

Tables

1	South Korea's major economic indicators	7
2	Major economic assumptions for South Korea	9
3	Total landings from South Korean marine fisheries	12
4	South Korean catches in distant water fisheries, by species	13
5	South Korean catches in adjacent water fisheries, by species	17
6	South Korean catches in shallow seas fisheries, by species	20
7	Import duties on selected seafoods in North Asian markets	27
8	Population and consumption of fisheries products per person in the Asia Pacific region	34
9	Persons employed in South Korea, by industry and age group, 1993	37
10	Real household consumption expenditure, all cities	38
11	Real household expenditure on food and beverages, all cities	39
12	Real household expenditure on eating out, all cities	40

13	Estimated price elasticities for meat and seafoods – household level, 1977–93	43
14	Average estimated income elasticities – household level, 1977–93	44
15	Price and income elasticities for high, middle and low class fish – wholesale level, 1970–88	45
16	Forecast annual real expenditure on meat and seafood in South Korea	46
17	Australian seafood exports to South Korea	48
18	South Korean imports of prawn and rock lobster, by country of origin, 1994	49
19	Value of selected species imported by South Korea, 1994	50
20	Seafood components of household consumption expenditure	59
21	LAAIDS parameter results	61
22	Estimated price elasticities (\hat{E}) for LAAIDS	62
23	Estimated income elasticities (\hat{I}) for LAAIDS	62
 <i>Statistical appendix</i>		
24	Tariff barriers on fisheries products in South Korea	64
25	South Korean imports of fisheries products	67
26	South Korean exports of fisheries products	70

Summary

While South Korea is currently only a small market for Australian seafood, it is a major market for seafood in the Asian region. It is important to the Australian industry, both as an outlet for Australian seafood and through its impact on other markets in the region. The aim in this study is to identify the prospects for increasing this trade.

South Korean food markets are in a period of transition as a result of high economic growth. Consumer demand is changing in response to the rapid pace of economic development, urbanisation and associated lifestyle changes. The number of meals eaten outside the home is rising strongly and there are trends toward more prepared foods, increased convenience of foods and changes in consumer tastes.

Strong income growth has been a major factor influencing household food demand. Household expenditure on food has risen by around 60 per cent since 1985, which has allowed consumers to change their purchasing patterns to better meet their preferences. For example, household spending on seafood, meat and fruit has increased strongly.

The major factors influencing household demand for seafood are the rapid growth in incomes and consumer preferences for improved quality. Prices of other meats were found to be a less important determinant of household demand for seafood. However, consumption of all meats is still increasing and competition between meats could be expected to intensify as the growth in consumption slows.

There are important differences in factors influencing the demand for the seafood products examined. Aggregate demand for fresh fish was found to be relatively unresponsive to changes in price but more responsive to changes in income. By comparison, demand for processed fish was found to be more responsive to price changes. Demand for processed fish and seafood was also more likely to be influenced by prices of other products such as beef and pig meats.

Continued strong economic growth in South Korea is expected to continue to boost demand for seafood. More of this growth in demand is likely to be met

Key findings

South Korean economy

Population

• Estimated population	1995	44.9 million
	2000	46.8 million
• Average annual growth	1995–2000	0.85 per cent
• Residing in urban areas	1965	32 per cent
	1993	62 per cent

Income

• Average annual growth	1977–93	6.5 per cent
	1993–2000	5.5 per cent
• Average household income of wage and salary earners	1993	14.4 million won (A\$18 600)

Expenditure on food and beverages

• Growth, 1985–93	58 per cent
• Strongest growth	'eating out', seafood, fruit
• 'Eating out' is the largest component in food expenditure	26 per cent of total

South Korean fishing industry

Seafood production

• Total production of seafoods, 1994	3.5 million tonnes
fish	49 per cent
molluscs	22 per cent
seaweeds	22 per cent
• Growth, 1990–94 (mainly higher seaweed harvests)	5 per cent
fall in fish production	8 per cent
• Distant water (outside 200 mile zone) fisheries catch	25 per cent
Adjacent water fisheries catch	42 per cent
Shallow water fisheries catch	31 per cent

Key findings

Seafood trade

Seafood exports

- Total value, 1994 sales to Japan US\$1.3 billion
80 per cent
- Share of total South Korean exports, by value 1.2 per cent

Seafood imports

- Total value, 1994 from Australia US\$625 million
under 1 per cent
- Share of total South Korean imports 0.5 per cent
- Average annual growth, 1990-94 20 per cent

Trade barriers

Tariffs

- Standard tariff rate applied to seafood 20 per cent *ad valorem*
(higher rates apply to some items)
- Following the Uruguay Round of multilateral trade negotiations, tariffs are to be phased down over five years, commencing January 1995

Non-tariff requirements

- Main measures used health standards
labelling
fisheries management related bans

by imports because increasing pressure on the fisheries resources of the region may restrict the increases in the domestic industry's fishing harvests. Moreover, recent reductions in trade barriers applying to seafood and substitute products may allow more of this growth in demand to be met by imports.

South Korean strategies for increasing domestic production depend strongly on sustained growth in aquaculture. However, this growth in production is unlikely to meet the growth in demand. It is unlikely that current levels of production in South Korea can be increased significantly or, for some species, maintained. The adjacent water fishery — that is, within the 200 nautical mile fishing zone — which supplies around 40 per cent of catches, is subject to a major management restructuring program to address problems of overfishing and habitat destruction. In addition, the South Korean industry has to address problems of shared access to these fishery resources with the fleets of China and Japan. In the distant water fishery, future catches of Alaska pollack are also likely to be restricted.

Imports are expected to play an increased role in meeting South Korean demand for seafood. However, while the removal of import licencing requirements and reductions in tariffs have improved access to the South Korean market, a range of impediments remain. Even after the Uruguay Round of tariff reductions are fully implemented, tariffs are expected to remain higher than those of many Asian countries, and import requirements may also restrict seafood trade opportunities.

There are prospects for the Australian seafood industry to increase exports to South Korea, particularly of less well established products. However, prospects for growth in the higher valued species are mainly constrained by a limited high value seafood sector comparable to that of Japan. Other constraints include the current high level of competition from substitutes for the major established Australian seafood exports, such as prawns and rock lobster, and the costs of meeting phytosanitary conditions imposed on imports, which have a greater impact on fresh than frozen imports.

Demand from the hotel and restaurant sector is expected to continue to grow strongly, through both stronger domestic demand and increased international visitor numbers. This sector may hold more potential for the Australian industry because it avoids the problems imposed by the absence of a quality focused marketing infrastructure, necessary for establishing premium products on the market. The rapid development of retail chains may also offer some potential for the Australian industry.

Given these constraints, development of the South Korean seafood market is likely to present more medium term rather than the short term opportunities for the Australian seafood industry. However, some market development may be required to establish the reputation of the Australian industry to take advantage of these opportunities.

1

Introduction

South Korea is a major market for seafood in the Asian region. While currently only a small market for Australian seafood (with exports in 1994-95 valued at \$6.8 million, representing 0.6 per cent of the total value of Australian seafood exports of \$1.1 billion), the South Korean seafood market is potentially important to the Australian industry in the longer term.

Strong growth is expected in South Korean demand for seafood as a result of the country's high economic growth and associated increases in discretionary incomes (Smith, Brown and McKelvie 1992). Following the completion of the Uruguay Round of multilateral trade negotiations under the auspices of the General Agreement on Tariffs and Trade (GATT, now the World Trade Organisation), reductions in trade barriers applying to seafood and substitute products may open the South Korean market to allow more of this growth in demand to be met by imports.

Even if the Australian industry does not directly share in the growth of the South Korean seafood market, the expansion of the market is expected to have an impact on the other markets of the region. There is increasing pressure on fisheries resources in the region, which makes it unlikely that the increased demand will be met from South Korean and other Asian catches. As a result, there may be a range of indirect influences on the Australian seafood industry.

The purpose in this project is to examine the longer term trends in South Korean seafood supply and demand and identify the prospects for increasing the trade in seafood from Australia.

The South Korean economy

South Korea has been transformed from one of the poorest countries in Asia in the early 1960s to a major industrial power in the 1990s. Economic growth has been largely sustained, with gross domestic product (GDP) increasing, on average, by 8.3 per cent a year between 1962 and 1994. Over the same period, average annual income per person rose in real terms from US\$87 to US\$8086 and are expected to double by the end of the decade (DFAT 1994a).

Growth has been based on transformation of the economy from one dependent on agriculture to one substantially based on manufactures and exports. This has been achieved in an environment of tight government control, involving assistance to key growth sectors and controls on imports. In 1994 the manufacturing sector contributed almost 30 per cent to GDP, while the rural sector's contribution was around 6.9 per cent, compared with 23 per cent in 1975 (table 1).

I South Korea's major economic indicators

	Unit	1975	1980	1985	1990	1991	1992	1993	1994
GDP (base year 1990)	index	19.7	41.4	62.0	100.0	109.1	114.7	121.0	131.1
Composition of GDP									
Agriculture, forestry and fishing	%	22.5	14.2	13.3	8.7	8.0	8.1	7.5	6.9
Mining	%	1.7	1.4	1.0	0.6	0.5	0.4	0.4	0.4
Manufacturing	%	22.3	26.7	31.4	29.2	29.1	29.1	29.0	29.5
Share of persons employed									
Agriculture, forestry and fishing	%	45.9	34.0	24.9	18.3	16.7	16.0	14.7	13.3
Mining	%	0.5	0.9	1.0	0.4	0.4	0.3	0.3	0.2
Manufacturing	%	18.6	21.7	23.4	26.9	26.6	25.2	24.2	23.1
Unemployment rate	%	4.1	5.2	4.0	2.4	2.3	2.4	2.8	2.4
Trade									
Exports (fob)	US\$b	5.1	17.5	30.3	65.0	71.9	76.6	82.2	108.1
Imports (cif)	US\$b	7.3	22.3	31.1	69.8	81.5	81.8	83.8	111.7
Exchange rates	won/US\$	484	607	870	708	733	781	803	794
Consumer prices (base year 1990)	index	24.6	54.5	76.8	100.0	109.3	116.1	121.7	129.3

Source: Korean Statistical Association (1995); International Monetary Fund (1995).

Economic planning has occurred through five year development plans. The first five year plan, introduced in 1962, focused on import substitution through measures to protect domestic producers from competition and, later, on measures to boost exports. The measures adopted included a devaluation of the currency (by 100 per cent in 1964), tax exemptions for exporters, and access to loans at subsidised rates.

Economic policies in the early 1980s were focused on dealing with a contraction in economic growth (GDP contracted in 1980 by 5.8 per cent from its 1979 level), high inflation and social instability. These policies were successful in achieving high real rates of economic growth of around 10 per cent a year, but at a cost of continued high inflation. As a result, the objectives of reforms introduced in the late 1980s were price stability, sustained and more balanced economic growth and improved income distribution. However, a slowdown in economic growth and deteriorating balance of payments, combined with a period of rapid wage increases, resulted in a change in the focus of economic policies toward the end of the decade.

The fifth five year plan

The fifth five year plan (1993–97) was developed in recognition of the need to remove impediments to economic efficiency, reduce the dependence on labour intensive industries, and address mounting international pressure to deregulate the economy. A range of measures were introduced to address inflation and price stability, including moves to regulate price movements for basic commodities.

Under this plan GDP was forecast to grow at an average annual rate of 6.9 per cent over the period 1993–97. However, growth in GDP is likely to exceed these levels — for example, growth was 8.4 per cent in 1994, and around 9.5 per cent in 1995. By the turn of the century, GDP is expected to be nearly 80 per cent above 1990 levels (table 2). A major factor expected to boost growth is continued strong export performance aided by improved global economic conditions and a strong Japanese yen. Under the plan, inflation was expected by the government to be held at an annual rate of 3.7 per cent. This appears unlikely to be met as annual inflation was 4.8 per cent in 1993, 6 per cent in 1994, and around 7 per cent in 1995.

The won is not expected to change value significantly against the United States dollar in the medium term and to show only a weak depreciation against the Australian dollar. Export growth is expected to continue at a rate

2 Major economic assumptions for South Korea

	Unit	1995	1996	1997	1998	1999
Population	million	44.7	45.0	45.4	45.7	46.0
GDP (base year 1990 = 100)	index	138.2	147.2	156.8	166.9	177.8
Exchange rates	won/US\$	765	773	772	773	781
CPI (base year 1990 = 100)	index	138.4	148	156.9	166.3	176.3

Source: ABARE estimates.

above that of merchandise import growth, particularly as a result of rapidly increasing exports to China, and East and South East Asian countries.

Liberalisation of trade and investment was seen by the South Korean government as essential to sustaining long term growth. Following the completion of the Uruguay Round of multilateral trade negotiations, the South Korean government estimates that increased manufactured exports will generate an additional US\$4–5 billion a year by 1998. Similarly, liberalisation of financial markets was necessary to generate the levels of investment required. This will be introduced in 1996 as South Korea joins the OECD.

In December 1994, liberalisation policies were further entrenched through the introduction of a major government program. The main goals of this program were the downsizing of government, rationalisation of the public service, creation of a more equitable tax base and improvement in income distribution. To achieve these policy goals the government plans to spend around US\$88 billion over the period on social infrastructure and industry restructuring (DFAT 1995).

Trade liberalisation

The South Korean agriculture and fisheries sector has been heavily protected in the past and the government is undertaking a long term program of reform to improve its competitiveness with imports and, in the case of the fisheries sector, to ensure that it is sustainable in the longer term (discussed further in chapter 3).

Measures to reform the rural sector are expected to cost US\$50 billion over the next ten years. In the 1995 draft budget, US\$10 billion was set aside for restructuring the sector. Around US\$2 billion a year will be used to

modernise the agricultural sector, to improve marketing and distribution systems and to provide a social welfare net for people employed in the sector. The funds will be drawn from an agro-fishery special tax, levied on a range of luxury items. This tax took effect in July 1994 (DFAT 1994b).

As part of the Uruguay Round of multilateral trade negotiations, South Korea agreed to minimum access levels and ceiling tariff rates for a number of 'sensitive' commodities, including rice, other grains, dairy products and beef, and agreed to a liberalisation schedule over the period 1995–97 for 147 items (100 agriculture, 46 fishery products and 1 silk yarn product) in which trade was previously restricted. An important exception is beef and live cattle markets, where the current quota system will be replaced with a tariff of 40 per cent in 2001 (Doyle et al. 1995; DFAT 1994b). In addition, a range of products, including pork, some fruit and many seafood items, were liberalised in 1994 in response to previous GATT commitments. The arrangements for fisheries products are discussed further in chapter 4.

Continued high economic growth and expected strong growth in incomes, combined with the improved access to the South Korean market resulting from trade liberalisation are likely to result in major changes in food demand in the medium term. The impact on the demand for seafood imports will depend mainly on developments in the South Korean seafood industry and the impact of a range of factors on food demand. These are examined in detail in subsequent chapters.

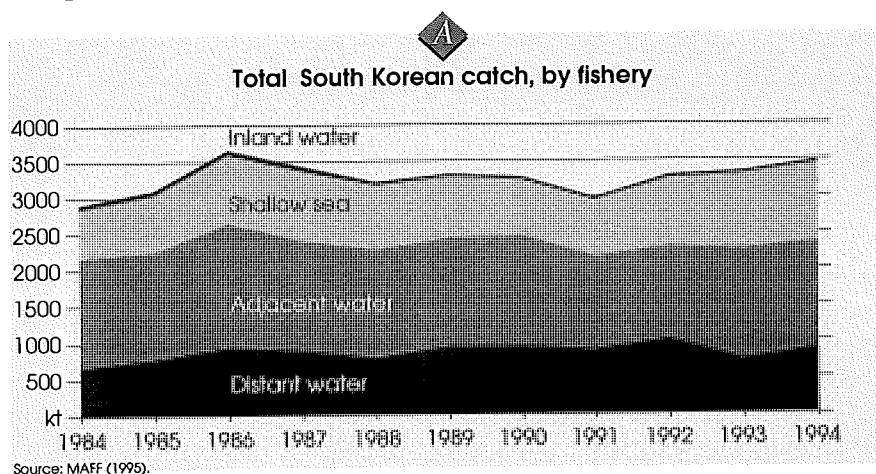
Supply trends in the South Korean fishing industry

With a high population density, paucity of natural land resources, including only a limited arable land area, and pressures for economic growth, fishing has been developed as a major source of food in South Korea. However, overfishing, environmental degradation of fishing grounds, reduced access to distant water fishing areas and an increasing disparity in incomes between the rural sector and other parts of the economy are placing pressure on the South Korean fishing industry to restructure (Presidential Commission on Economic Restructuring 1988).

Market prospects and the potential for seafood trade with South Korea in the longer term will be substantially influenced by developments in the South Korean fishing industry and their impact on domestic supplies. In this chapter some of the main features of the South Korean fishing industry, catches and use of those catches are outlined.

The South Korean fishing industry

The South Korean fishing industry harvested just under 3.5 million tonnes in 1994, making South Korea the eighth largest seafood producer in the world. It is based on three main sectors — distant water fisheries (fishing undertaken outside the 200 mile fishing zone), adjacent waters, and shallow sea aquaculture — and a small inland water industry. The first three sectors



produced 25 per cent, 42 per cent and 31 per cent respectively of the total harvest in 1994. Production trends in each sector over the years 1984 to 1994 are shown in figure A.

Fish landings represented almost half (49 per cent) of total production in 1994, with production of molluscs and seaweed the other main components (22 per cent each) (table 3). Four main species groups (Alaska pollack, tuna, mackerel and anchovies) made up 57 per cent of total fish landings, while squid and oysters were the major molluscs harvested.

3 Total landings from South Korean marine fisheries

	1987	1988	1989	1990	1991	1992	1993	1994
	kt	kt	kt	kt	kt	kt	kt	kt
Fish								
Alaska pollack	444.3	312.9	377.0	321.5	187.5	330.4	226.2	314.7
Anchovies	167.7	126.3	131.9	168.1	170.3	168.3	249.3	193.4
File fish	153.6	221.7	159.1	230.3	70.5	34.9	11.4	4.4
Mackerel	145.0	234.3	205.1	134.0	133.9	155.2	230.7	217.4
Tunas a	145.0	162.1	181.3	243.7	275.6	235.2	178.1	251.2
Total	1 876.6	1 760.5	1 840.2	1 887.9	1 550.2	1 631.2	1 565.4	1 728.3
Molluscs								
Oyster	303.2	298.7	256.3	235.3	231.9	252.9	286.4	193.0
Squid	247.4	260.6	349.7	317.0	397.1	472.3	414.2	380.4
Shell fish b	183.3	158.9	174.9	155.5	133.2	138.2	168.2	177.7
Total	868.2	829.3	838.7	783.7	828.7	920.0	931.8	770.9
Crustaceans								
Shrimp	49.7	49.4	55.3	64.4	54.8	66.7	67.7	46.5
Crab	45.7	51.9	50.3	53.7	53.5	47.3	51.0	78.1
Total	95.9	102.7	105.8	118.8	109.4	115.0	122.2	139.5
Seaweed								
Laver	93.8	137.6	164.8	127.5	174.3	181.5	248.0	277.0
Sea mustard	292.3	288.4	285.7	274.4	271.2	374.9	377.5	417.0
Total	456.7	483.0	487.0	442.2	468.9	604.2	686.5	777.1
Other c	34.3	34.0	45.7	41.9	25.9	18.6	29.7	60.8
Total d	3 331.5	3 209.2	3 317.2	3 274.2	2 982.9	3 288.8	3 335.6	3 476.6

a Includes yellowfin, bigeye, skipjack, albacore and marlin. b Includes abalones, top shells, clams, mussels, cockles and scallops. c Other aquatic animals including sea cucumber, sea urchin, sea squirts and lug worm. d Totals may not add due to rounding.
Source: MAFF (1995).

Distant water fishing

South Korean involvement in distant water fishing (operations beyond South Korea's 200 nautical mile fishing zone, either in the fishing zones of other countries or on the high seas) commenced in the late 1950s with tuna operations in the Indian Ocean. A rapid expansion followed until the mid-1970s when the introduction of 200 nautical mile exclusive economic zones slowed further growth. Landings from distant water fisheries still increased steadily from 1982 to 1986 but since then have fluctuated at around 880 000 tonnes a year. In 1993, catches fell by 28 per cent but recovered in 1994 with higher tuna and fish landings. Landings of squid, however continued to

4 South Korean catches in distant water fisheries, by main species

	1987	1988	1989	1990	1991	1992	1993	1994
	kt	kt	kt	kt	kt	kt	kt	kt
Tuna								
Yellowfin	43.2	41.6	53.5	56.5	69.3	83.8	67.5	64.8
Bigeye	37.8	35.1	30.9	33.9	23.3	25.2	24.8	30.6
Skipjack	41.0	64.1	81.0	138.5	172.0	115.3	74.0	145.5
Albacore	9.4	7.6	5.6	3.7	1.8	0.2	0.1	0.1
Marlin	7.3	6.9	5.6	5.8	4.9	6.0	7.6	7.0
Total	144.5	160.5	180.2	242.5	273.8	233.7	177.7	251.2
Fish								
Alaska pollack	410.6	299.6	361.2	311.7	177.4	320.9	217.1	304.0
Sea bream	17.2	13.0	8.4	13.0	11.8	9.2	8.9	10.9
Hairtail	4.5	9.2	6.8	8.4	10.2	6.5	5.8	9.4
Shark	1.5	2.5	1.5	2.1	2.1	1.0	1.1	1.5
Pacific ocean perch	10.5	7.9	28.8	22.1	17.5	19.7	4.0	1.1
Cod	3.0	1.8	0.6	1.0	0.8	3.7	3.5	3.2
Total	545.7	406.8	469.9	440.1	314.8	468.2	361.5	453.5
Molluscs								
Squid	173.1	197.2	269.1	229.0	270.7	316.1	194.7	176.1
Total	187.3	203.7	276.1	236.4	282.6	319.4	197.5	178.3
Crustaceans								
Shrimp	5.1	3.2	4.1	6.3	2.3	2.6	1.4	0.9
Total	5.7	3.2	4.1	6.3	2.3	2.6	4.5	4.1
Total	882.7	774.2	930.3	925.3	873.5	1023.9	741.0	887.2

Source: MAFF (1995).

decline. The distant water catches between 1987 and 1994 are shown in table 4.

The main Korean distant water operations include those in the Bering sea for Alaska pollack, tuna fishing in the South Pacific, and squid fishing in the southern Atlantic. There is a range of other, smaller ventures, including a distant water venture operating in New Zealand waters, catching squid, hoki and jack mackerel.

Alaska pollack is the most important fish species, accounting for around two-thirds of distant water catches. This is the main source of lower valued fish in South Korea, and provides the basis for a substantial processing industry, largely dried fish and surimi, a fish paste used for the production of a range of processed products.

World production of Alaska pollack peaked at 6 million tonnes in 1988. However, catches since have fallen sharply with the closure of the US fishery to foreign fishing and declining stocks in other areas as a result of increased fishing pressure. The world catch in 1993 was estimated at 3 million tonnes and is expected to fall further because of increased management restrictions aimed at preventing further stock depletion, and as a direct consequence of overfishing the stock.

In 1993, a joint agreement between the United States, Japan, Russia, South Korea, China and Spain resulted in a two year closure of the 'Donut Hole' fishery (a major international fishery in the waters of the Bering Sea outside the United States and Russian Exclusive Economic Zones) to allow for a buildup of stocks. The moratorium will remain in place until stocks, which are reportedly close to collapse, are rebuilt and the fishery can sustain catches of 200 000 tonnes a year. Similarly, Russian authorities announced a decision to close the 'Peanut Hole' (an international zone in the Okhotsk sea) to all foreign fishing from the second half of 1993. In 1992, some 70 vessels from South Korea, Poland and China had harvested around 450 000 tonnes of Alaska pollack from this area.

These restrictions resulted in a 30 per cent fall in South Korean landings of Alaska pollack in 1993, resulting in increasing prices and shortages of dried and processed fish. However, South Korean catches of Alaska pollack recovered in 1994, despite the continued closure of important areas to distant water operations.

Catches of other species of fish have increased in relative importance from 25 per cent to 33 per cent of distant water fish landings, but remain, individually, a relatively small component of total distant water landings in comparison with Alaska pollack. There is no strong upward trend in catches of major species. While Pacific ocean perch landings had shown strong growth in the early 1990s, catches in 1993 fell sharply (from nearly 20 000 tonnes to 4000 tonnes) and fell further in 1994. However, distant water operations remain an important source of sea bream and hairtail, both of which have strong domestic demand.

South Korea is the world's second largest catcher of squid, after Japan. Distant water landings of squid almost doubled between 1987 and 1992, before falling by 44 per cent from 316 000 tonnes in 1992 to 176 000 tonnes in 1994. Over the three years to 1994, distant water fishing activities were restricted by relatively low prices on the Japanese and South Korean markets, and by increasing fishing costs. Future landings of squid by the distant water sector are more likely to be dictated by the economics of fishing than by resource constraints, although restrictions have been placed on fishing in some areas, such as the south west Atlantic.

Fishing for tuna has been growing in importance, with catches of skipjack and yellowfin tuna increasing by over 250 per cent and 50 per cent respectively between 1987 and 1994. While only small in comparison with the key species, catches of bluefin tuna have also increased sharply, rising from 83 tonnes in 1990 to 805 tonnes in 1994.

A factor behind the growth in tuna catches was the relatively lower fishing costs of the South Korean fleet compared with those of the Japanese fleet. This mainly reflected lower wage costs. Some tuna fishing by South Korean boats was undertaken on behalf of Japanese companies for that reason. However, more recently, South Korean wage costs have been increasing rapidly, and a number of tuna operations have been transferred to third countries (such as the Philippines) where wage rates are lower.

Around 40 per cent of South Korea's total catches of tuna was exported in 1994, mainly to Japan. An increasing proportion of catches is used domestically, both in whole and canned forms.

Adjacent water fisheries

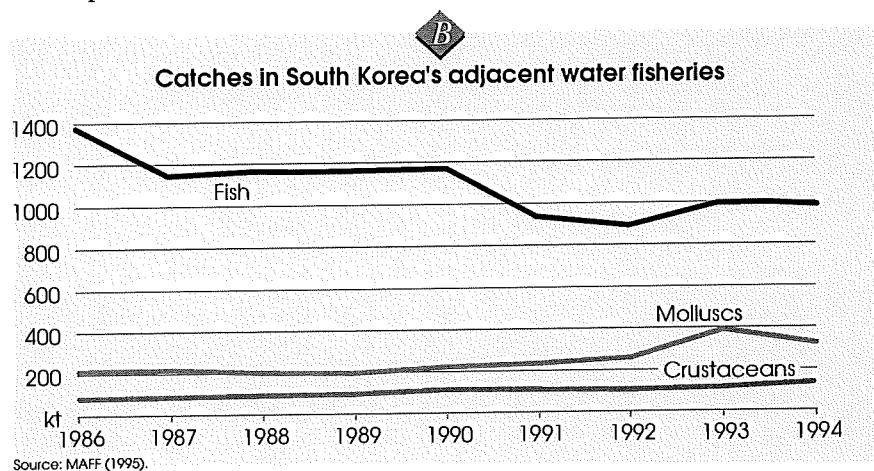
Landings from adjacent marine fisheries (those fisheries within 200 nautical miles from shore) represent the largest domestic source of fisheries products, providing more than 50 per cent of fish for the South Korean market. However, the status of fish stocks would appear to be of concern in relation to future supplies. Fish catches have shown a downward trend since the mid-1980s (figure B).

Although the pattern of landings within the adjacent water area has followed similar trends to catches in the other fishing areas, catches of individual species have been more volatile (table 5). Catches of sardines and file fish, in particular, have fallen markedly, offset in part by higher catches of mackerel over the period. Catches of corvenias (highly demanded on the domestic market) expanded in the early 1990s but fell sharply in 1993 and catches failed to recover in 1994.

Catches of molluscs, mainly squid, and to a lesser extent, crustaceans (mainly shrimp) in domestic waters were increasing prior to 1994. However, in 1994 there was a sharp fall in shrimp catches and a similarly steep increase in crab catches.

Management of adjacent water fisheries

Adjacent water fisheries in South Korea face two major adjustment problems. First, in the coastal areas there are problems of overfishing and marine pollution. Second, an increasing disparity has developed between



incomes in the fishing sector (and the rural sector generally) and urban incomes.

To address these problems, the South Korean government has adopted a major industry restructure program over a ten year period, commencing in 1995 and linked to Uruguay Round adjustment. This adjustment program

5 South Korean catches in adjacent water fisheries, by main species

	1987	1988	1989	1990	1991	1992	1993	1994
	kt	kt	kt	kt	kt	kt	kt	kt
Fish								
Anchovies	167.7	126.1	131.9	168.1	170.3	168.2	249.2	193.4
Sardine	194.4	145.9	182.5	132.9	44.5	46.5	31.3	36.7
File fish	153.6	221.7	159.1	230.3	70.5	34.9	11.4	4.4
Hair tail	113.4	104.3	102.4	104.0	95.7	87.3	58.0	101.1
Corvenia	79.1	67.3	78.1	96.2	129.1	126.3	71.7	70.0
Mackerel	101.3	162.8	163.6	97.2	91.5	116.4	174.7	210.4
Jack mackerel	13.9	39.7	23.0	17.4	16.3	27.7	38.1	38.4
Spanish mackerel	24.0	26.7	16.3	16.9	24.7	8.2	13.9	8.7
Croakers	nas	nas	33.4	45.4	59.9	66.1	52.6	64.4
Total	1 143.5	1 164.6	1 159.6	1 170.9	930.5	892.8	992.4	987.4
Molluscs								
Shell fish	111.2	103.1	101.1	106.7	88.8	86.2	131.7	106.6
Clams	47.4	42.5	32.3	41.6	28.9	27.0	42.2	34.7
Oysters	15.1	14.2	13.3	16.2	16.5	17.5	28.2	20.7
Mussels	6.5	11.7	12.3	21.0	14.4	11.8	5.6	2.7
Abalone	0.3	0.3	0.3	0.4	0.3	0.3	0.3	0.2
Other molluscs	107.4	93.8	107.9	112.4	145.8	173.6	255.2	220.7
Squid	74.3	63.4	80.6	88.0	126.5	156.1	219.5	189.6
Octopus	7.1	7.9	10.2	10.6	9.8	11.2	12.5	12.0
Cuttle fish	25.6	21.9	16.5	13.1	8.6	5.4	5.4	3.0
Total	218.6	196.8	208.9	219.1	234.6	259.8	387.0	327.3
Crustaceans								
Shrimp	44.2	45.9	50.7	57.6	51.9	63.4	65.9	38.1
Crab	45.7	51.9	50.3	53.7	53.5	47.3	51.0	78.0
Lobster	0.3	1.0	0.2	0.7	1.1	1.0	0.4	0.6
Total	90.3	98.8	101.2	112.1	106.5	111.7	117.3	134.6
Other a	73.6	52.4	40.5	39.9	32.2	31.1	29.5	37.0
Total	1 526.0	1 512.5	1 510.3	1 542.0	1 303.9	1 295.4	1 526.1	1 486.4

a Includes other aquatic animals and seaweeds. nas Not available separately.

Source: MAFF (1995).

includes activities to improve production systems, protection of resources through habitat enhancement, including the establishment of artificial reefs and seabed cleanup, and the development of technologies for growing conventional and new species. A fifteen year marine ranching program was implemented from 1987. The total budget for the program is estimated at US\$1200 million, with around US\$300 million invested in the first five years (Soon 1993).

The problem of increasing fishing effort in adjacent waters associated both with an increase in the number and fishing efficiency of boats is to be addressed through removing boats through a buy-back program. The South Korean government is to introduce a substantial buy-back program in offshore fisheries to improve industry profitability, funded 40 per cent by government and 60 per cent by industry (through low interest government loans).

The management of offshore fisheries is complicated by the problems of shared fisheries resources with China in the East China Sea and Japan in the Sea of Japan. The problems in the East China Sea arise from the difficulties in implementing restrictions to fishing effort for each of three main countries involved (Japan, Korea and China). A proposed restriction on the number of vessels from each country fishing the area has not yet been implemented.

There are also problems emerging in the development of effective management in the shared waters of the Sea of Japan and the South China Sea. There are proposals to develop a regional management plan, based on restricting the number of boats in the fishery through the imposition of a boat buyback scheme, mainly funded by Japan. However, it is likely to be very difficult to obtain any substantial improvements in overall management. In particular, there are concerns in the South Korean fishing industry that it will be put under significant market pressure through the expansion of Chinese fishing in the area. Much of the product caught by the Chinese industry is sold on the Korean market.

There have been bilateral agreements since 1980 between South Korea and Japan to manage the number of trawlers fishing in areas adjacent to their territorial waters through self-regulation. However, the latest renewal in 1995 is to remain operational only to the end of 1996, with the Japanese government calling for a new regime of regulation with coastal countries exercising stricter control of fishing in their adjacent waters. The South Korean position was that self-regulation was the most appropriate approach

and that time was required for restructuring its fishing industries (*Korea Times*, 17 May 1995).

Shallow sea fisheries

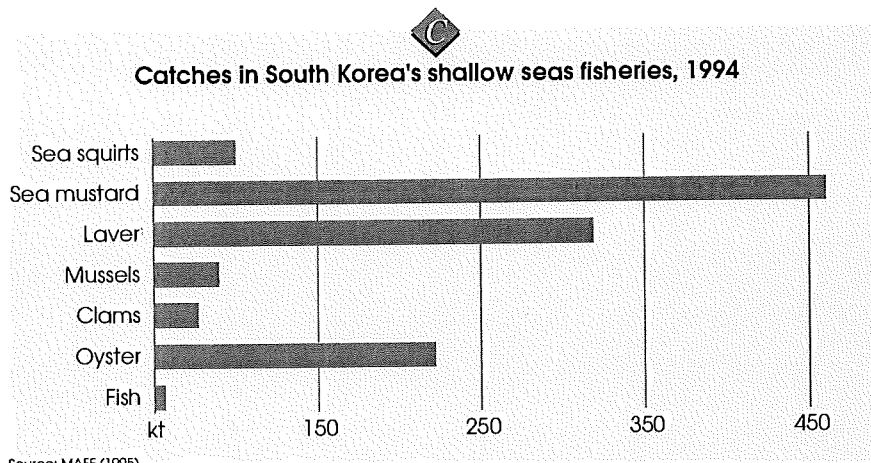
The main products of shallow sea fisheries are seaweed and molluscs. Sea mustard (a seaweed) is the major individual crop (figure C). As a result of low prices, production of sea mustard declined slightly each year until 1991, but then increased strongly in 1992. Production of laver (a more valuable edible aquatic plant) increased strongly over the period (apart from a big drop in production in 1971), a result of the more intensive propagation methods used. Production increased sharply in 1993, in response to higher prices, and continued to expand in 1994 (table 6).

Mollusc culture is well established in South Korea. Oysters had formed the basis of a substantial export industry but, despite increases in 1992 and 1993, production appears to be in decline. While canned oyster exports were worth US\$84 million in 1992 this fell by more than 55 per cent in 1994 (table 26, statistical appendix). By comparison, mussel production increased sharply in 1993, following a period of falling output, with increased interest in new product forms and markets.

To fill the gap in food production, a major expansion of aquaculture is planned, with the goal of producing 1 million tonnes at the end of the next five year plan. However, climatic and environmental conditions are likely to be major constraints to achieving the planned increases in production. A range of products of potential relevance to Australia are being farmed, including abalone, prawns and fish.

Abalone production is set to expand sharply (but from a low base). Farmed abalone contributed over 100 tonnes of the estimated 480 tonnes produced in 1994, and appears likely to continue to rise, given that only 15 tonnes were produced in 1992. There is a strong interaction between aquaculture and wild production, with seed produced in hatcheries subsequently grown out in the wild. A substantial proportion of total hatchery production is for reseeding operations to provide fishing communities with a source of revenue. Over a hundred abalone hatcheries (both government and private) are in operation.

There is considerable interest in farmed prawn production. The major species grown by aquaculture techniques are kuruma prawns (*Penaeus japonicus*) and white Chinese prawns (*P. orientalis*). Kuruma prawns are the



6 South Korean catches in shallow sea fisheries, by main species

	1987	1988	1989	1990	1991	1992	1993	1994
	kt	kt	kt	kt	kt	kt	kt	kt
Fish	1.8	1.3	2.7	2.7	3.9	4.6	5.5	6.6
Molluscs								
Oyster	288.1	284.5	243.0	219.1	215.4	235.3	258.2	172.3
Clams	54.4	51.7	65.1	61.8	45.8	54.6	10.2	19.1
Mussels	26.1	15.7	7.9	9.8	9.9	9.7	55.2	39.7
Total	447.0	420.7	353.2	325.6	308.4	338.6	345.7	284.1
Crustaceans								
Shrimp	0.2	0.2	0.3	0.3	0.5	0.6	0.3	0.6
Total	0.2	0.2	0.3	0.3	0.5	0.6	0.3	0.6
Seaweed								
Laver	90.9	124.4	151.5	110.1	158.3	163.6	235.3	269.6
Sea mustard	285.1	281.7	280.9	269.3	267.0	371.4	372.2	411.6
Total	398.1	441.6	455.3	411.9	445.6	580.0	664.3	750.2
Other aquatic animals								
Sea squirts	19.1	22.9	36.8	32.3	17.0	11.7	22.0	42.8
Total	19.2	22.9	36.8	32.3	17.0	11.7	22.3	50.6
Total	866.1	886.6	848.2	772.7	775.4	935.5	1 038.1	1 072.1

Source: MAFF (1995).

main species farmed because of their greater tolerance to cold than other species. While production has expanded rapidly from relatively low levels to around 500 tonnes a year, output is not expected to increase significantly using the current extensive technologies because of the restricted number of suitable locations and the impact of climatic constraints. Most farmed prawns are exported to Japan, so any increase in production will not have a major impact on domestic supplies.

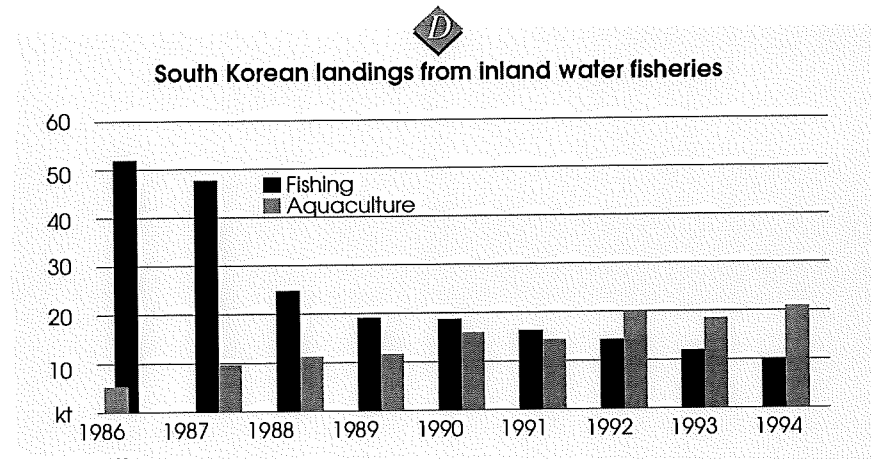
Returns from kuruma prawn production in South Korea are below those achieved in Taiwan but above those in Japan. While production densities are also significantly below those of Japan and Taiwan, production costs are also below those countries (Liao and Chien 1994). As a result, South Korean producers can potentially withstand a fall in prices expected with increased availability of supplies on the Japanese market.

Fish farming operations commenced in the early 1970s and have expanded rapidly with the introduction of improved technology, such as heated tanks, to overcome the production constraints imposed by a severe winter climate. Few species can achieve marketable size within a single growing season. The principal species produced are bastard halibut and rockfish, although Atlantic salmon is also farmed, with smolts produced in fresh water grown to marketable size (around 2 kilograms) within a single season (Soon 1993).

Inland water fisheries

The inland water fisheries sector, consisting of aquaculture and fishing, provides only a small proportion of total seafood production in South Korea. However, all commercial fishing of inland waters is to be banned completely in 1997 because of concerns about the effect of such operations on the water quality.

Catches of fish, molluscs and crustaceans from the inland fisheries have been falling since 1986. Although farming of freshwater fish has increased over this period, this has mostly been insufficient to offset this fall (figure D). Israel carp constituted the main species farmed, by volume, with production of 12 300 tonnes in 1993. The other main species farmed is eels, with 2500 tonnes produced in 1994. Most of the eel catch is marketed live for the domestic market.



Source: MAFF (1995).

Distribution

Distribution of seafood in South Korean producer ports is governed by the National Federation of Fisheries Cooperatives. Currently, all locally caught fish must be sold through the producer markets or government authorised wholesale fish markets to comply with a fish resource monitoring program and for taxation purposes. However, in February 1994, the National Fisheries Commission announced the abolition of the compulsory auction system at producer markets by 1997 to allow a range of other distribution systems and to allow increased competition to develop, improving the efficiency of marketing.

The Noryangjin market is the principal seafood market in Seoul, with average throughput of around 160 000 tonnes a year. This is supplemented in Seoul by five other markets which double as both wholesale and retail markets through their daily operation. Most fish is sold through these markets at a primary wholesale level and then again at a retail level. In Pusan, the second largest city and the major fishing port, the seafood market is run by the Federation of Fisheries Cooperatives.

A range of market stabilisation schemes are operated by the Korean Agricultural and Fishery Marketing Corporation, a government funded statutory authority. These stabilisation schemes operate through the maintenance of buffer stocks, controls on imports, and support of exports. While some fisheries products are included in the schemes, they are less important than other products, such as rice and fruit. Schemes operate for several of the higher volume seafood products, such as dried laver and other

aquatic plants and for dried anchovies, using buffer stocks to smooth supplies and improve producer prices. Products are purchased during peak production periods, stored and resold during the off-season.

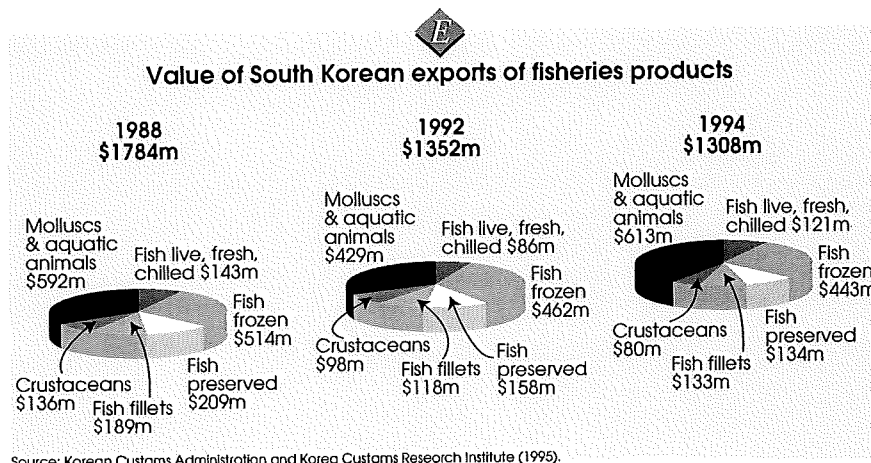
The Corporation has a number of other roles in fisheries, including operation of the Noryangjin Fish Market, development of other wholesale markets and cold storage facilities, the provision of market information, and improvement of the marketing system.

South Korean seafood exports

The South Korean fishing industry was identified as a major potential export industry in the 1970s. The value of exports expanded rapidly, peaking in 1988 at nearly US\$1.8 billion before declining. In 1994 the total value of seafood exports was around US\$1.3 billion, 1.2 per cent of total South Korean exports. Nearly 80 per cent, by value, of seafood exports in 1994 were sales to Japan.

Between 1988 and 1994, seafood exports fell sharply — volume fell by 42 per cent and value by 26 per cent (see figure E and table 26, statistical appendix). Exports of Alaska pollack fillets and fish surimi fell significantly as a result of lower landings and higher domestic sales. Similarly, exports of processed fish, particularly processed mackerel and sardine, fell.

While lower catches have been a factor behind the reduced volumes, a more important factor has been the larger proportion of catches retained for sale



on the domestic market. Total exports of fish fell from around 21 per cent of the catches in 1988 to around 14 per cent in 1994.

The volume of mollusc exports fell by more than half between 1988 and 1994, mainly from lower exports of ark and top shells, clams and other aquatic animals, and lower sales of preserved products, particularly oysters. However, much of the fall in trade was offset by higher values. There was strong growth in the value of live and fresh products, particularly the shell fish products such as ark shells.

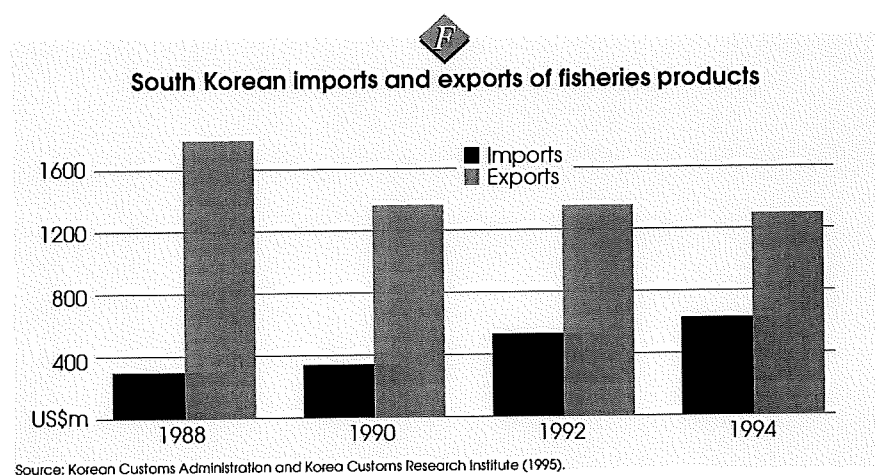
Imports and trade restrictions

While South Korea is a net exporter of fisheries products in value terms (figure F), imports have increased each year since the mid-1980s and the increase may have been greater except for a range of trade barriers in force. The gross value of seafood imports more than doubled between 1988 and 1994, from US\$291 million to US\$624 million.

Trade barriers

Import controls have been a major factor influencing the level and form of seafood imports. South Korea has had a range of import licensing measures in force to protect the domestic fishing industry, and to maintain controls on the balance of payments. Unlike agriculture, in which South Korea was granted developing country status, trade in fisheries products was included in the Tokyo Round of GATT multilateral trade negotiations in the late 1970s and South Korea was required to progressively open its markets.

The South Korean market was effectively closed to seafood imports until the late 1970s. The first licensing restrictions were lifted in late 1986. By 1989, quantitative restrictions had been lifted on 48.5 per cent of seafood products, increasing to 68.7 per cent at the beginning of 1992. At the beginning of 1994 only 13.4 per cent of seafood products were subject to licensing (Kano



1993). The remaining fisheries products subject to licensing are frozen skipjack, mackerel, Alaska pollack, peeled shrimp, frozen and dried cuttlefish and squid, and canned tuna and mackerel.

Import licensing

Import licensing is a quantitative restriction on the volume of imports of the particular categories, rather than an absolute ban. The key impacts are the uncertainty imposed on exporters of seafood products to South Korea and the difficulties in establishing a reliable market in South Korea because there is no assurance of ongoing access.

Under import licensing, there is a requirement for prior approval from the Ministry of Fisheries. The Ministry has, in the past, relied on the advice of the appropriate fishing industry body about granting approval. For example, agreement on imports of Alaska pollack was required from the distant water fishing sector. Approval was generally given on the basis of shortfalls in raw materials required for the South Korean processing industry and on the expected level of supplies on the domestic market. Under this approach, import approval could also be given for products where such approval was required as a condition of South Korean access to the fishing zones of other countries. Consequently, the effects of import licensing have varied between products.

When an item is removed from the South Korean restricted list, imports of that item can enter without prior government approval.

Tariffs

Tariffs applying to South Korean imports of fisheries products are relatively high by the standards of many other markets in the region, with Taiwan being the exception (table 7). The standard tariff rate applying to most fisheries imports is 20 per cent *ad valorem*, although for prepared and preserved seafoods (such as canned crustaceans and molluscs) the rate is 30 per cent, while for some luxury items such as caviar and similar products it is 80 per cent (see table 24, statistical appendix).

While high tariffs may reduce the attractiveness of the South Korean market, they do not totally impede market development, as illustrated by the development of Taiwan as a major market for rock lobster despite high tariffs.

7 Import duties on selected seafoods in North Asian markets

	Korea	Japan	Taiwan	Hong Kong
	%	%	%	%
Rock lobster				
Live, fresh, chilled	20	1-5	42.5	0
Frozen	20	1	42.5	0
Prawns				
Live, fresh, chilled	20	1-5	22.5	0
Frozen	20	1	22.5	0
Abalone				
Live, fresh, chilled	20	0	15-50	0
Frozen	20	10	15-50	0
Scallops				
Live, fresh, chilled	20	10	25	0
Frozen	20	10-15	25	0
Tuna				
Live, fresh, chilled	20	3.5	12.5-20	0
Frozen	10-20	3.5	12.5-37.5	0
Fish				
Live, fresh, chilled	20*	0-10	0-50	0
Frozen	10-20	2-10	12.5-50	0
Fillets	20	2-10	40	0

* Main value but a range of tariffs apply.

Source: Department of Foreign Affairs and Trade database.

Reductions in tariffs following completion of the Uruguay Round of GATT multilateral trade negotiations in December 1994 are expected to improve trade prospects. While the extent of the reductions in tariffs for a number of products are still to be finalised and the timing of their introduction remains to be determined, the reductions are generally expected to be between a third and half of their 1995 levels. The full extent of the reductions and whether they are bound (agreed) or subject to further negotiation are shown in table 24 of the statistical appendix. For products that are bound, the tariffs are phased down in equal reductions over five years, commencing 1 January 1995.

Non-tariff barriers to seafood imports

Despite the reduction in tariffs under the Uruguay Round agreement, a range of non-tariff measures remain in place which allow the level and composition

of imports to be controlled. These measures fall into three main groups — health standards, labelling and fisheries management related bans.

Health standards for seafood imports

Imports of seafood are required to meet a range of sanitary and phytosanitary conditions in South Korea. These cover a range of product quality aspects and include standards of bacteria count, lead, mercury, radioactivity and, in the case of farmed salmon, levels of oxytetracycline. The Korean Ministry of Health and Social Affairs introduced new standards from February 1995 which seafood imports are required to meet. These standards include:

Bacteria count	less than 100 000/gm
Volatile basic nitrogen	Under 20 mg
Lead	Under 2 ppm
Mercury	Under 0.7 ppm

While similar standards are required of seafood imports in other countries (with the possible exception of bacteria count, which is set at a higher standard), problems can result from the application of the standards. The Korean Fishery Inspection Authority has not, in the past, accepted foreign analysis reports as evidence of product safety. They undertake their own tests of each shipment of imported seafoods, which may result in double inspection and associated delays in customs clearance. In other countries, importers can present documentation certifying that the tests have been undertaken in the country of origin and the product was found to meet the specifications of the importing country.

A resultant problem facing exporters because of reliance on separate testing is the lack of control over the processes within South Korea. For example, product may deteriorate while customs clearance is being undertaken (which may take up to ten days). This process may disadvantage live and fresh exports over other products because of the higher potential for spoilage and often because the product involved is of higher value.

The testing of imports is based on analysis of a sample of the product. If the product fails then all the shipment is recalled. If an exporter of product to South Korea incurs three consecutive violations, all future consignments will be detained until the chemical analysis is completed (ten days), usually resulting in deterioration of quality of fresh chilled product and heavy

mortality of live imports. If a consignment fails it is required to be returned to its country of origin, a practice which may result in a heavy financial penalty because of the freight costs involved.

Domestic products are not specifically tested to the same requirements as imports (although this is understood to be under examination by the Korean Ministry of Health and Social Affairs) but some product inspection is undertaken, mainly as vessels are unloaded. It is difficult to achieve comparability between imported and domestic product because of the different marketing channels used.

Labelling

Legislation requiring country of origin labelling is being introduced to ensure that imported products are not confused with domestic product. This labelling will be required at all levels from customs to final distribution. However, it is unlikely the requirements will be as severe as those which apply to imported beef, which is required to be sold using different market channels from those used for domestic product (Reynolds et al. 1994).

Fisheries management related bans

Recently South Korea instituted seasonal bans on imports of a number of fisheries products to coincide with its closed seasons for comparable species. Domestic fishing industry operators have expressed concern that nearby fishing competitors would continue to catch these species at a time when South Korean fishers were excluded. The bans may cover either size or closed seasons and currently cover the following products and requirements:

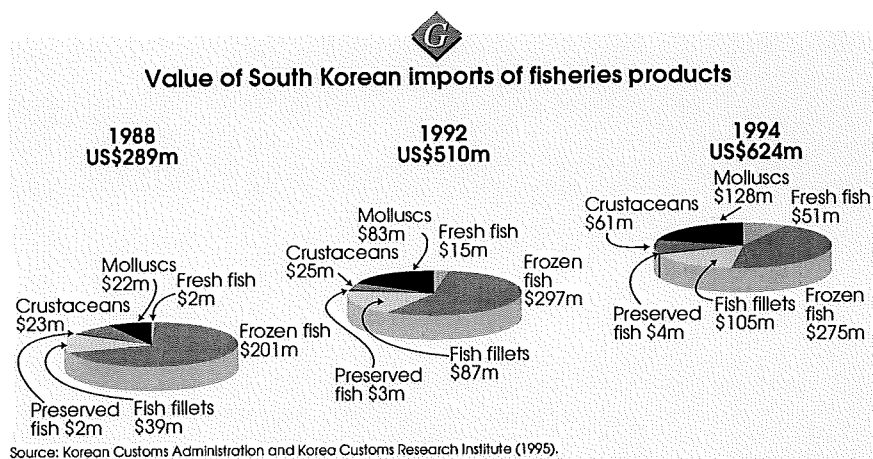
rock fish	less than 10 cm
sea bass	less than 10 cm
sea bream	less than 15 cm
yellowtail	less than 20 cm
conger eel	less than 35 cm
red crab	June to end October
king crab	June to end October
rock lobster	June to end September
other sea crawfish	June to end September

In principle, banning imports is unlikely to contribute toward effective protection of a domestic resource. While one purpose may be to assist in identification of illegally landed product at the retail level, this would be difficult to enforce because product could be carried over from the legal trading periods, or because there are difficulties in identifying products, particularly in filleted or dried forms. For example, much of the imported rock lobster is frozen, so that it can be held in storage over the period concerned. Such bans may also result in the creation of black markets for domestic product and may disadvantage South Korean producers as well as importers. One impact will be to introduce discontinuities in the aggregate supplies of product whereas previously imports and domestic products in combination ensured the ongoing availability of those supplies.

Import trends

Much of the early growth in imports was in two main areas — products that had no close direct South Korean substitutes and those from countries in which the South Korean distant water fleet was operating. Between 1988 and 1992 the main import growth areas in value terms were of frozen fish and fish fillets, and molluscs such as squid (figure G). More recently imports have become more diverse, with a greater range of products being traded (see table 25, statistical appendix).

While the value of frozen fish imports increased by 36 per cent between 1988 and 1994, the relative contribution of these imports to total seafood imports fell. Frozen fish imports fell from 69 per cent of total import value in 1988 to 44 per cent in 1994. By comparison, over the same period, the value of



fresh fish imports rose from US\$2 million to US\$51 million, and of fish fillets from US\$39 million to US\$105 million.

The main factors behind the growth in the value of frozen fish imports between 1988 and 1994 were increased imports of fish roes (which increased over sevenfold in value to \$107 million), the higher value of tuna imports, and the trend toward the import of higher valued species. While the aggregate value of imports of frozen fish rose by 37 per cent, the volume of frozen fish imports fell by 39 per cent. Key products behind this growth in value were higher imports of mackerel, yellow corvinia, bigeye tuna and hairtail. The reduction in the volume of frozen fish imports was principally from lower imports of Alaska pollack and plaice, which fell by 83 000 tonnes and 91 000 tonnes respectively. There was also a large increase in the volume and value of imported fish fillets over the period.

With more liberal seafood trade access and with higher demand, imports of live, fresh or chilled fish grew between 1992 and 1994. Contributing strongly to the more than threefold rise in the value of such imports were increases in the range and volume of species, particularly fresh or chilled salmon, cod, sea bream and tropical fish.

Crustacean and mollusc imports

Import restrictions in force prior to 1994 appear to have had a major influence on trade in prawns and crabs. Following the removal of licensing restrictions on imports of frozen prawns and crabs there was a fourfold increase in volume of both, although the average unit value of prawn imports fell by 18 per cent, and crabs by 17 per cent, between 1992 and 1994. For rock lobster, licensing restrictions had much less impact. Following their removal from import licensing requirements in 1990, frozen rock lobster imports had trebled by 1992. However, fresh rock lobster imports (which were not covered by import restrictions) increased almost fourfold over the same period.

Despite increasing domestic catches and restrictions on imports, South Korean imports of squid and octopus have increased sharply over 1988 levels to meet demand. The volume of frozen squid imports (subject to licensing) increased by nearly 65 per cent in 1992 from 30 800 tonnes in 1988, before falling in 1994. Imports of frozen octopus (which were removed from licensing) increased strongly over the period.

In South Korea, per person consumption of molluscs and other aquatic animals have increased significantly since the early 1980s, with an expanding range of imports required to meet growing domestic demand. In particular, there has been a large increase in the volume and value of imports of ark and top shells, clams, jelly fish and sea cucumbers.

Restrictions on imports of substitutes

A range of factors also influence the supplies of substitute products, such as beef and pig meats. Domestic beef production capacity is limited, in part, by the availability of land for forage production and by a dependence on imported feedgrains. As a result, the main scope for increased domestic beef supplies is from higher imports.

Under South Korean beef import arrangements there are restrictions on the level and composition of imports and controls on the packaging, distribution and pricing of imported beef. The major restraint results from the use of minimum import quotas and other controls on the level of imports. Imports can be suddenly curtailed through these controls, depending on domestic market conditions, by the Livestock Products Marketing Corporation (Reynolds et al. 1994).

Other non-tariff measures disadvantage imported beef in the South Korean market. Under import regulations, imported grassfed beef is required to be processed and distributed in standard retail packs and sold at fixed retail prices, resulting in a deterioration in quality. Imported grainfed beef is not subject to the same level of restriction but is required to be identified separately from domestic product (Reynolds et al. 1994).

Under the Uruguay Round agreement, South Korea has agreed to a phased liberalisation of its beef market. A progressive increase in the minimum access quota levels has been agreed, increasing from 106 000 tonnes (retail weight) in 1994 to 225 000 tonnes in 2000, and tariff quota levels have been set at the bound rate of 20 per cent. However, in 2001 the quota system is to be replaced by a tariff of 40 per cent. This is expected to result in a substantial increase in imports and a 12 per cent fall in real retail prices between 2000 and 2001 (Doyle et al. 1995).

Under the more liberalised beef market, per person consumption of beef in South Korea was projected to increase by 24 per cent between 1995 and 1999 to 7.9 kilograms per person, while average retail prices are forecast to rise

by around 4 per cent in real terms over the same period (Doyle et al. 1995). A similar increase was expected in the consumption of pig meats, while retail prices were expected to rise by around 19 per cent.

5

Demand trends

Seafood represents an important part of consumers' diet in South Korea and provides more than 57 per cent of animal proteins (Presidential Commission on Economic Restructuring 1988). Seafood consumption in South Korea is comparable to that of Japan, and is one of the highest in the Asia Pacific region (table 8). However, with changes in seafood supplies (discussed in chapter 3) and in the overall economic and social situation in South Korea, food demand trends could also undergo rapid change.

In this chapter, factors affecting food and seafood demand trends are examined. These can be considered in two categories: those mainly likely to influence household consumption, and those influencing trends in consumption of foods outside the household. While eating out has been a major area of recent growth (table 12), very little data exist for this sector.

8 Population and consumption of fisheries products per person in the Asia Pacific region

	Population			Seafood consumption per person (liveweight)		
	1984-86	1986-88	1988-90	1984-86	1986-88	1988-90
	'000	'000	'000	kg	kg	kg
Australia	15 757	16 268	16 637	16.2	18.6	18.6
Brunei	224	241	251	42.7	31.0	28.9
Canada	25 299	25 652	27 415	22.4	26.9	22.9
China	1 041 501	1 070 139	1 118 814	6.1	8.0	9.4
Hong Kong	5 462	5 609	5 673	46.1	50.9	53.5
Indonesia	166 421	174 050	179 784	13.6	14.0	14.8
Japan	120 755	122 065	123 145	69.3	71.2	71.9
Malaysia	15 450	16 544	17 439	36.6	30.1	27.5
New Zealand	3 268	3 273	3 333	12.9	13.0	27.5
Philippines	55 093	57 999	59 534	33.7	33.8	35.5
Singapore	2 558	2 615	2 679	40.7	34.0	29.4
South Korea	41 035	41 658	42 471	51.1	49.6	48.1
Taiwan	19 242	19 677	19 990	37.0	42.7	48.3
Thailand	51 593	53 310	54 749	21.6	20.8	20.4
United States	239 298	243 880	247 429	18.4	20.5	21.3

Sources: FAO (1993); Department of Agriculture and Forestry, Taiwan (1991).

Household demand remains the most important component of South Korean seafood demand and is the main focus of this chapter.

Factors affecting food demand

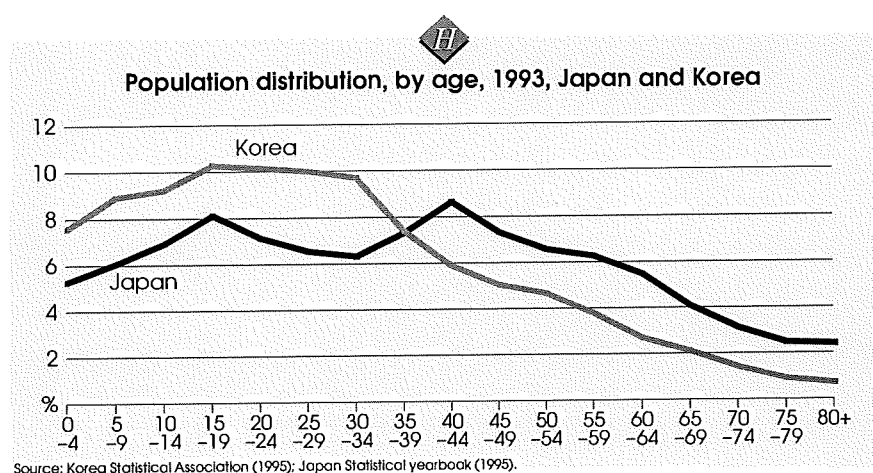
The major factor affecting expenditure on food and the composition of overall food demand in South Korea is economic growth and the consequent growth in family incomes and lifestyle changes. Other factors include population growth and demographic factors, changes in the relative prices of food products and the prospective impact of trade liberalisation.

Population growth

Estimated population in South Korea in 1995 was 44.85 million, and is expected to rise to 46.8 million by 2000, an average growth rate of 0.85 per cent a year. This rate of population growth is similar to that of a number of other countries in Asia experiencing high economic growth, such as Hong Kong (0.8 per cent) and Taiwan (0.9 per cent) but is higher than that of Japan (0.4 per cent). However, increases in the population are likely to be less important than a range of other factors in explaining growth in food demand in South Korea.

Demographic factors

The population of South Korea is younger than that of Japan (figure H). In Japan, there is a strong positive relationship between household expenditure



on a range of seafood items and age, with weaker preferences for seafood (particularly for some higher valued products, such as tuna and crustaceans) among younger than older households (Kingston, Battaglione, Smith and Beare 1991). While data limitations prevented a similar examination of the relationships between seafood consumption and age in South Korea, it could reasonably be expected that similar relationships exist. If this is the case, then household demand for seafoods could fall, all other things being equal, as households in the younger age cohorts seek a more varied diet.

Increasing urbanisation

Industrialisation in South Korea has resulted in a strong trend of urban migration. In 1965, 32 per cent of the population lived in urban areas. By 1993 this had increased to 62 per cent with 12 million people in Seoul, around 27 per cent of the country's population. This trend could be expected to continue, and may accelerate, as a result of trade liberalisation and associated rural adjustment programs being introduced (DFAT 1994b).

An increasing disparity in incomes between the rural and industrial sectors has been a major factor behind this trend. Agriculture and fishing contributed just over 7 per cent of gross domestic product in 1993, and this is expected to continue to fall with further expansion of manufacturing. While average farm incomes in 1993 were nearly 96 per cent of average urban income, approximately 30 per cent of this was derived from off-farm employment (Kim 1994). The number of people employed in the sector, which was around 15 per cent of the total labour force in 1993, is also expected to halve by 2001 (Kim 1994), mainly due to the age of the workforce. In 1993, over 30 per cent of the rural workforce was over 60 years of age compared with 8 per cent of the total workforce (table 9). Increased opportunities for younger age groups in education and the manufacturing and services sectors are also likely to result in increased urbanisation.

This increase in urbanisation is likely to accelerate the growth in demand for foods as more of the population purchase food through marketing channels (as opposed to production of foods for home consumption). There has already been major development of new marketing outlets to cope with the rapid urban growth. For example, in Seoul, several major new market complexes have been established to facilitate the flow of foods from producers to consumers and to service the new urban areas. These are part of the modernisation process to improve industry and marketing efficiency.

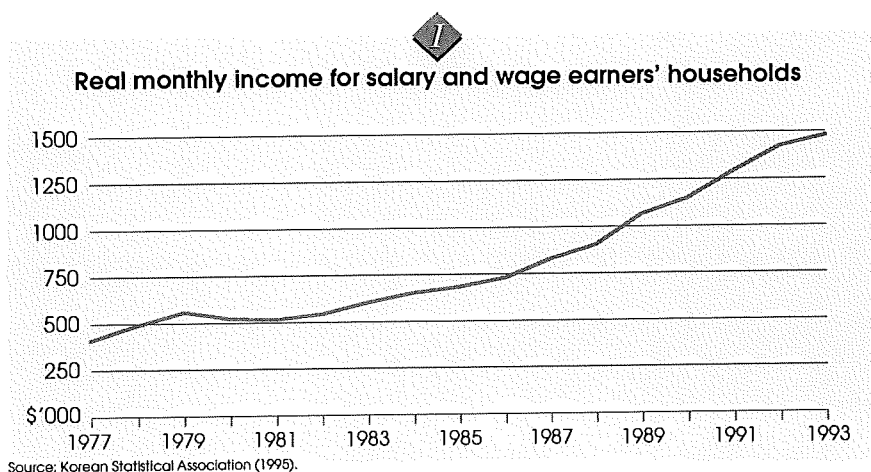
9 Persons employed in South Korea, by industry and age group, 1993

Age	Agriculture, forestry, Total employed	hunting, fishing	Mining	Manu- facturing	Electricity gas, water	Constr- uction	Wholesale, retail trade, restaurants, hotels	Transport, storage, communi- cation	Finance, insurance, real estate, business	Community, social, personal services, other
	15-19	454	11	1	155	2	28	149	11	38
20-24	1 995	45	3	600	5	129	527	61	207	418
25-29	2 578	79	4	822	10	212	643	132	232	444
30-34	3 068	174	7	936	13	286	822	184	223	423
35-39	2 847	241	8	746	13	289	808	195	161	386
40-44	2 118	257	6	497	7	211	590	148	120	282
45-49	1 808	294	9	344	5	195	468	112	110	271
50-54	1 615	393	9	279	7	154	379	92	93	209
55-59	1 291	471	5	154	3	115	248	48	86	161
60+	1 479	863	2	118	-	64	204	22	78	128
Total	19 253	2 828	60	4 651	665	1 685	4 837	1 005	1 360	2 162

Source: Korean Statistical Association (1995).

Increasing household incomes

There has been high growth in incomes over the past twenty years associated with South Korea's rapid industrialisation. Real average monthly household income for wage and salary earners have risen steadily (figure I), with growth averaging 6.5 per cent a year between 1977 and 1993. Income growth is expected to be around 5.5 per cent a year over the medium term.



10 Real household consumption expenditure, all cities a

	1985	1993	Change
	won/mth	won/mth	%
Income b	561 436	1 214 320	116
Total expenditure	451 296	928 627	106
Consumption expenditure	419 997	838 910	100
Food, beverages and tobacco	154 815	245 186	58
Housing	20 665	37 395	81
Fuel, light and water charges	31 076	36 412	17
Furniture, furnishings and household equipment	19 837	43 463	119
Clothing and footwear	31 717	63 668	101
Medical care and health expenses	29 850	44 222	48
Education, culture and recreation	45 866	118 851	159
Transport and communication	26 576	83 933	216
Other consumption expenditure c	59 595	165 757	178
Other expenditure	31 299	89 718	187

a Deflated by Korean consumer price index, base year 1990. b Salary and wage earners. c Includes non-consumption expenditure.

Source: Korean Statistical Association (1995).

Rising incomes have resulted in major changes in spending patterns. While food expenditure remained the largest item in urban household budgets, its relative importance fell from 28 per cent of total household income in 1985, to 20 per cent in 1993. However, spending on food increased by 58 per cent in real terms between 1985 and 1993, as urban households altered their food purchases in response to increased incomes and changing prices. Spending on recreational pursuits, transport and clothing all increased strongly over the period as a result of the rapid rise in incomes (table 10).

Food consumption trends

Patterns of expenditure on food are changing. There has been a large and rapid shift in spending away from cereals (particularly rice) into 'eating out' (table 11). Between 1985 and 1993, average monthly household expenditure on cereals fell by nearly 23 per cent in real terms; its share of total household expenditure on food and beverages dropped from 28 per cent to under 14 per cent. Eating out's share, on the other hand, jumped from 7.5 per cent to nearly 27 per cent. Other categories whose shares increased were seafood (from 8.6 per cent to 9.5 per cent), fruit (6.3 to 7.5), bread and confectionaries (5.7 to 5.9) and soft drink (2.9 to 3.3).

Eating out

In South Korea there has been strong growth in spending on prepared foods which require less preparation time and processed foods which are more convenient. Total household spending on eating out increased more than fivefold in the eight years between surveys. By 1993, spending on food eaten outside the home was the main expenditure item in the food group (table 11). This trend is similar to that documented for Japan (see, for example Kingston et al. 1991).

Unlike Japan, where expenditure on eating outside the home is spread among a number of foods, the increase in household expenditure has been focused in two areas. Between 1985 and 1992 there was a near sixfold increase in spending on Korean meals and a sevenfold increase in other meals, principally 'fast food' (table 12).

Household expenditure on seafood and meats

Household expenditure relationships between seafood and meat are likely to be important in assessing the demand for seafoods in the long term. If other meats (beef, pork and chicken) are close substitutes for seafood then

11 Real household expenditure on food and beverages, all cities

	1985		1993	
	Expenditure	Share	Expenditure	Share
	won/mth	%	won/mth	%
Cereals	43 477	28.1	33 572	13.7
Rice	38 891	25.1	27 331	11.1
Meat	19 396	12.5	29 599	12.1
Beef	7 938	5.1	10 888	4.4
Milk and eggs	7 837	5.1	10 704	4.4
Fish and shellfish	13 383	8.6	23 245	9.5
Vegetables and seaweeds	19 661	12.7	25 197	10.3
Fruit	9 685	6.3	18 345	7.5
Oil, fats and condiments	13 763	8.9	12 797	5.2
Bread and confectionaries	8 845	5.7	14 470	5.9
Soft drinks	4 499	2.9	7 984	3.3
Alcoholic beverages	2 388	1.5	3 429	1.4
Eating out	11 551	7.5	65 431	26.7
Total food and beverages	154 815	100.0	245 186	100.0

Source: Korean Statistical Association (1995).

12 Real household expenditure on eating out, all cities

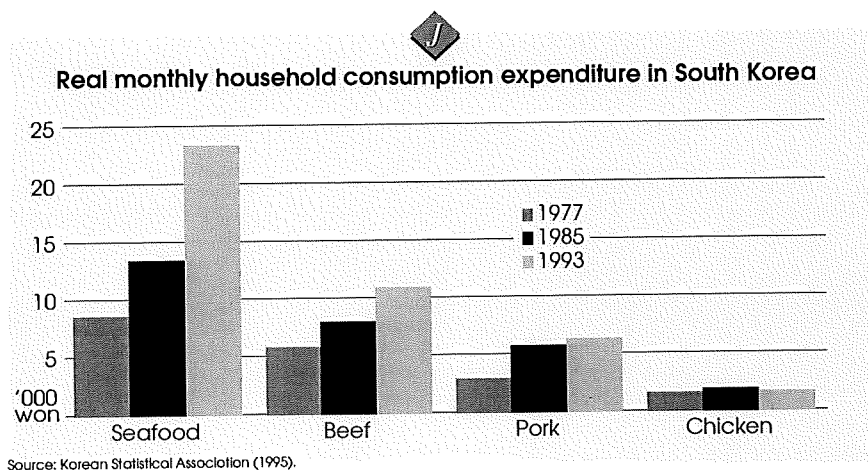
	1980	1985	1992
	won/mth	won/mth	won/mth
Eating out			
Korean meals	na	3 945	23 202
Chinese meals	na	969	1 590
Occidental meals	na	341	831
Other meals outside the home	na	2 076	15 316
School lunch	na	357	473
Drinking	na	3 139	13 084
Others	na	725	3 124
Total	5 681	11 551	57 620
Total food and beverage expenditure	137 136	154 815	243 780
Eating out as a share of total food and beverage expenditure	% 4.1	% 7.5	% 23.6

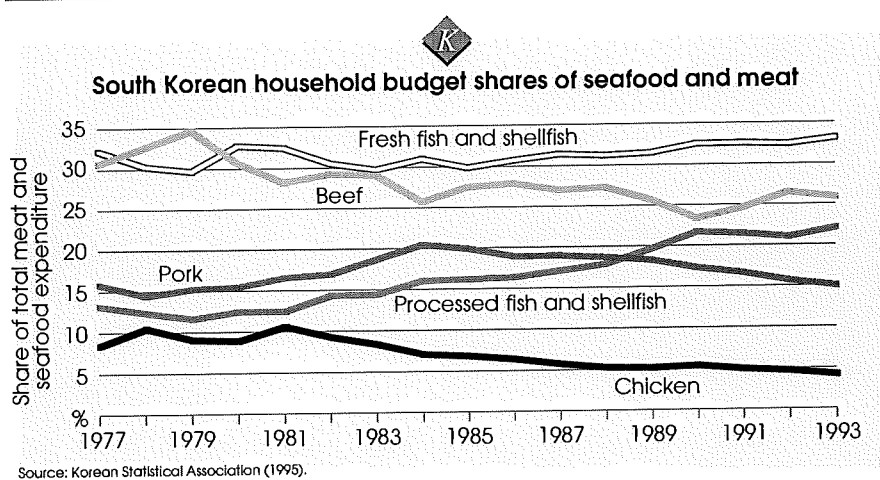
na Not available.

Source: Korean Statistical Association (1995).

changes in prices will have implications for seafood demand. Over the period 1977–93, the increase in spending on seafood was higher than for either beef or pork (figure J). The major factor behind this growth was greater spending on processed fish and shellfish products, which increased by around 280 per cent over the period.

The relative importance of seafood and meat in urban household budgets has fluctuated since 1977. Only processed fish and shellfish experienced a clear

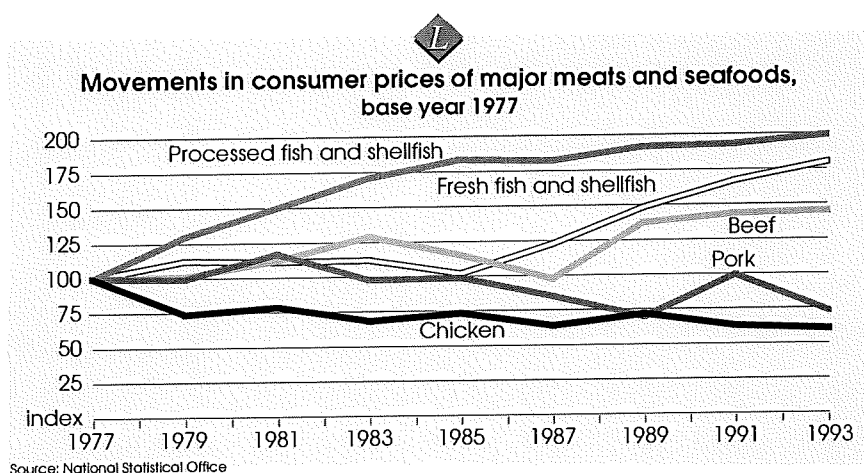




increase in relative spending, while the share devoted to fresh seafood remained relatively constant (figure K). The share allocated to pork rose until the mid-1980s, but has since declined to levels similar to those in the late 1970s. Beef and chicken's shares fell, with chicken remaining the least preferred of the major meats in South Korea.

Consumer prices of seafood and meat

Changes in household spending on fish and shellfish reflect both changes in consumption patterns in response to changing incomes and movements in consumer prices. Prices for seafood have increased at a rate faster than for other meats in South Korea, and are currently the highest of these given meats



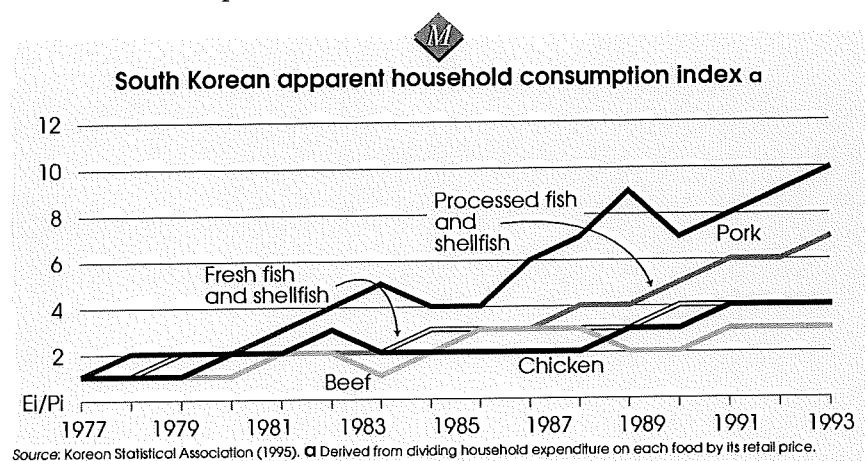
(figure L). The consumer price index for processed fish and shellfish increased consistently over the period 1977–85, but the rate of increase has subsequently slowed. By comparison, prices for fresh fish and shellfish rose roughly in line with the general rate of inflation until 1985, but have since increased by 80 per cent. The consumer price index for beef also increased between 1977 and 1993, despite falling by 24 per cent between 1983 and 1987. The general trend of chicken and pork prices has been one of decline in real terms.

Apparent household consumption of meat and seafoods

Apparent consumption of the individual meats and seafoods (determined by dividing household expenditure on products by their corresponding consumer price index) shows strong growth in consumption of pork and, to a lesser extent, processed fish and shellfish. Consumption of fresh fish and shellfish, chicken and beef grew more slowly (figure M).

Apparent household consumption of both processed and fresh seafood fell between 1991 and 1992, although processed seafood recovered in 1993. The downturn in fresh seafood consumption was associated with higher consumer prices, as expenditure on fresh seafood continued to rise.

While beef is the most important meat in terms of household expenditure, apparent consumption changes are strongly linked with movements in prices. By comparison, lower prices of chicken have resulted in only small increases in consumption per person, as household spending on this product has fallen over the past decade.



Demand relationships between seafoods and meats

The demand relationships between the different meat and seafood products were examined through the use of the Linear Approximate Almost Ideal Demand System (LAAIDS) to identify the relationships between prices and the role of income changes on expenditure patterns over the period 1977–93. The model and detailed results are outlined in appendix A.

The price relationships between meat (pork, chicken, beef) and seafood products (fresh fish, shellfish, and processed fish and shellfish) were estimated at the household level using the LAAIDS model. The estimated own-price (given by the bold type) and cross-price elasticities over the period 1977–93 are shown in table 13.

The results indicate that demand for fresh fish was relatively unresponsive to price changes with a one per cent increase in its own price accompanied by a less than one per cent fall in its consumption. In contrast, the demand for processed fish was found to have been highly responsive to price, with a one per cent price increase associated with a 1.5 per cent fall in consumption. A one per cent price increase for shellfish was associated with a two per cent fall in the quantity consumed.

The difference in the results between processed and unprocessed seafood has important implications for suppliers of seafood. Because the demand for processed seafood is responsive to price, an increase in prices resulting from, say, a fall in supplies would result in a proportionately greater decrease in

13 Estimated price elasticities for meat and seafoods – household level, 1977–93

	Elasticity of demand for:					
	Fresh fish	Processed fish	Beef	Pork	Chicken	Shellfish
With respect to the price of						
Fresh fish	-0.71*	-0.09	-0.16	-0.26*	0.34	-0.02
Processed fish	0.03	-1.50*	-0.01	0.08	0.80*	0.23
Beef	-0.01	-0.002	-1.36*	0.13	-0.15	2.26*
Pork	-0.07	0.09	0.08	-0.92*	0.56*	-1.74*
Chicken	0.03	0.25*	-0.13	0.14	-1.71*	0.30
Shellfish	0.01	0.05	0.32*	-0.43*	0.22	-1.98*

* Significant at the 10 per cent level, two tail test. Price elasticities for shellfish were calculated as the residual term in the model.

consumption. A converse situation would occur in the case of unprocessed seafood. If supplies were to fall, the resultant price increases would have a proportionately lower impact on consumption.

It is not possible to draw strong conclusions about the relationships between the price movements of one commodity on the demand for others as many of the estimated cross-price elasticities were not statistically significant. Chicken and pork, processed fish and chicken, and beef and shellfish were found to be significant substitutes. This means that a rise in the price of beef, for example, would be accompanied by a rise in the demand for shellfish. No significant substitution relationships were found to exist for fresh fish or between the different seafood categories.

Relationships between household demand and income

There were strong relationships identified in the model between demand for most meat and seafood categories and changes in income (table 14). The consumption of processed fish, beef and pork were all found to have been highly responsive to income increases (the quantity demanded of these meats increased by a more than proportional amount than the rise in incomes). This trend could be expected as consumers seek to vary their diet from more traditional foods, and move toward more convenience foods.

14 Average estimated income elasticities – household level, 1977–93

Fish	Processed fish	Beef	Pork	Chicken	Shellfish
0.73 *	1.21 *	1.26 *	1.26 *	-0.07	-0.94

* Significant at the 10 per cent level, two tail test.

The demand for fresh fish was found to be inelastic in relation to income changes, indicating that a rise in income would see the consumption of fresh fish rise by a less than proportional amount. While this would initially appear to be contrary to expectations, the species included in the household consumption survey may have influenced these results (see appendix A). Most of the fish and shellfish species in this survey are lower valued and the income elasticity of these species would be expected to be lower than for higher valued species.

An earlier South Korean analysis of price and income responsiveness of different fish species, grouped according to whether they were high, middle or low priced fish, supports this hypothesis. In the results (shown in table 15), the consumption of both high and medium class fish were found to be highly responsive to changes in income while the consumption of low class fish was found to be unresponsive to income changes. The consumption of all fish was found to be unresponsive to changes in price.

Implications

Continued growth in incomes are expected to have a major impact on household consumption patterns for seafood and other meats. On the basis of past trends, beef, pork and processed fish are most likely to benefit from rising incomes in South Korea because they have been, relatively, the most responsive to income changes. It is possible to infer some changes in future meat and seafood expenditure by households, based on the estimated income elasticities (from table 14) and the assumed annual growth of South Korean gross domestic product (from table 2). The results are shown in table 16.

Although the proportion of household income spent on fresh fish is expected to fall over time, it is expected to retain the largest share of household expenditure. However, the proportion of total meat and seafood expenditure

15 Price and income elasticities for high, middle and low class fish – wholesale level, 1970–88

Classification	Estimate of parameters				DW	R ²	Method
	Coefficient	Price	Income	Time			
High class	-5.4247	-0.5207*** (-3.0429)	1.4587** (1.7487)	-0.0725 * (-1.5380)	2.2595	0.6807	OLS
Middle class	-3.4998	-0.5057*** (-4.9915)	1.2791*** (9.3383)	-	2.0169	0.9053	GLS
Low class	0.1805	-0.1832 (-1.0284)	0.0272 (0.4101)	0.5254 (1.1134)	1.7339	0.9082	GLS

* ** *** indicate significant at 10 per cent, 5 per cent, 1 per cent levels respectively.

High class species were corvenia, bastard halibuts, puffers, sea bream, octopus. Middle class species were saury, yellowtail, pomfret, sea eel, tongu fish, Alaska pollack, hairtail, flounder, squid. Low class species were sardine, file fish, jack mackerel, anchovies, tuna, mackerel.

Source: Park, Kim and Shin (1990).

16 Forecast annual real expenditure on meat and seafood in South Korea

	Current expenditure	Forecast expenditure					Change
	1993	1995	1996	1997	1998	1999	1993-99
	won	won	won	won	won	won	%
Fresh fish	146 337	175 420	189 942	205 667	221 657	238 891	63
Processed fish	111 392	134 821	146 686	159 596	172 834	187 170	68
Beef	130 659	158 306	172 329	187 593	203 260	220 236	69
Pork	75 264	91 178	99 248	108 033	117 048	126 815	68
Chicken	20 016	23 616	25 369	27 252	29 139	31 156	56
Shellfish	21 239	25 557	27 725	30 077	32 477	35 069	65

devoted to processed fish, beef and pork is expected to rise, as indicated by the greater percentage change in expenditure on these products between 1993 and 1999 shown in table 16.

It is more likely that the main impact of rising incomes on fresh fish will be to increase the demand for higher quality fish species rather than fish in aggregate. In the 1990 South Korean study (results of which are shown in table 15), the consumption of both high and medium priced fish was strongly responsive to income changes, while the consumption of low priced species was not.

It is possible that the strong growth in demand for processed fish compared with fresh fish may have been caused by the absence of adequate refrigeration in many sectors of the market. If this is the case, the introduction of improved refrigeration in supermarkets may have a major impact on demand for middle and higher quality fish species.

Potential for Australian seafood exports

The potential to expand Australian seafood exports to South Korea depends on a range of factors. Some of these factors are specific to the South Korean market, including trends in catches and demand developments. Others are outside the scope of this study, including developments in other markets in the region, trends in the Australian industry, and trends in exchange rates. Other factors include the establishment of appropriate market development contacts, product specifications and similar issues, which are the domain of individual companies engaged in seafood trading.

The purpose in this chapter is to examine the general issues likely to influence the outlook for Australian exports to the South Korean, based on the supply and demand situation previously outlined. This is done through assessing the current constraints and longer term opportunities in the South Korean seafood market against the strengths of the Australian seafood industry.

Australian seafood exports to South Korea

South Korea is currently a small market for Australian seafood, mainly rock lobster and prawns (table 17). Most of Australia's rock lobster and prawn exports supply the hotel and restaurant trade in South Korea. While this trade is expected to continue to expand, particularly following the removal of import licensing requirements for prawns in 1994, this market is limited and there is now strong competition for market share from other exporting countries.

The major growth area has been in frozen prawns with a fivefold increase in volume but a 40 per cent fall in the unit value of those exports over the past two years. Australia held 4.2 per cent of total South Korean imported prawn market in 1994 (up from less than 2 per cent in 1993) but faces increased price competition from China, the Philippines and Thailand (table 18). In 1994 Australia supplied the premium end of the market with import prices 13.4 per cent higher than those received by Thai exporters.

The South Korean markets for lobsters have been dominated by *Homarus* species supplied by Canada and the United States, mainly imported fresh

17 Australian seafood exports to South Korea

	1991-92		1992-93		1993-94		1994-95	
	t	\$'000	t	\$'000	t	\$'000	t	\$'000
Fish								
Tuna (whole)	360	1 010	2	40	—	—	1	11
Filletts	4	44	10	138	12	192	6	103
Dried, salted or smoked	—	—	3	62	10	239	9	243
Other ^a	16	675	20	216	65	862	98	709
Rock lobster	32	895	18	568	43	1 325	8	478
Prawns	15	366	16	413	128	2 506	287	4 430
Abalone	7	42	21	917	—	1	—	15
Scallops	12	209	28	472	24	426	1	36
Other	30	451	5	78	9	147	70	806
Total	476	3 692	123	2 904	291	5 698	480	6 831

^a Excludes live fish.

Source: Australian Bureau of Statistics (1995).

(table 18). New Zealand and Australia share the market for live rock lobster but the New Zealand product received a 35 per cent premium over that of Australia in 1994. The period of peak demand for rock lobster occurs in July and August, which coincides with the Australian closed season, reducing the competition for that market. Supplies of frozen rock lobster, while smaller, have included a significant component of tropical rock lobster, with Indonesia the major supplier. While unit values for Australian supplied frozen rock lobster were higher than those for other exporters (table 1), recorded values are well above prevailing world prices for rock lobster tails.

While there is potential to expand exports of established Australian seafood commodities, such as rock lobster and prawns, to the South Korean market it is unlikely to be a major market in the short term, principally because of the better opportunities on other main markets.

The current strength of the yen against other currencies remains the dominant feature influencing Australia's seafood trade. In the longer term, the South Korean market may be an attractive development proposition to the Australian industry as a hedge. However, this prospect may be restricted in the short term by the strong dependence of the South Korean economy on the strength of the yen for its international competitiveness.

18 South Korean imports of prawn and rock lobster, by country of origin, 1994

	Live fresh or chilled		Frozen		Peeled	
	t	US\$'000	t	US\$'000	t	US\$'000
Prawns						
Australia	0.42	15.2	201.9	2 600.6	3.6	36.4
China	1.55	15.5	1 111.0	2 859.1	14.0	54.2
Indonesia	1.03	20.0	121.8	1 181.8	1.0	10.3
Japan	0.23	60.9	3.1	29.6	0	0
Philippines	14.94	152.4	979.7	11 026.7	0	0
Singapore	0.16	2.4	0	0		
Thailand	0.74	10.3	866.4	9 837.9	3.6	49.0
Vietnam	0	0	151.7	1 023.2	0	0
Estonia	0	0	255.8	844.3	0	0
Other	0.0	0	1 132.5	5 858.0	8.6	57.0
Total	19.06	276.7	4 823.9	35 260.9	30.8	207.3
Lobster (<i>Palinurus, Jasus</i>)						
Australia	3.9	99.8	2.1	117.5		
New Zealand	9.0	308.2	0	0		
Indonesia	0	0	8.4	85.2		
Nicaragua	0	0	0.5	15.3		
Solomon Islands	0	0	0.5	13.3		
United States	0	0	6.0	154.7		
Vietnam	0	0	2.3	5.8		
Other	0.3	7.0	0.1	0		
Total	13.2	414.5	19.9	391.9		
Lobster (<i>Homarus</i> spp)						
Australia	0.2	6.4	1.2	41.1		
Canada	80.4	1 236.4	7.2	125.4		
China	0	0	25.8	56.0		
Indonesia	0	0	1.0	15.3		
United States	69.3	1 076.0	37.0	770.3		
Other	0.1	1.0	1.4	21.0		
Total	150.0	2 316.7	73.6	1 029.5		

Source: Foreign Trade Statistics 1994; Korean Customs Administration and Korean Customs Research Institute (1995).

Australian seafood exports to South Korea have also included relatively small volumes of a range of other products, including slipper lobster, scallops, crabs, salmon, trout, bluefin tuna and several fish species. Although based on very small volumes, prices received by Australian exporters have generally compared favourably with average import prices received by other suppliers to South Korea (table 19).

19 Value of selected species imported by South Korea, 1994

	Total imports t	Import value	
		Total US\$/kg	Australian US\$/kg
Prawns			
Live, fresh	19.0	14.51	36.62
Frozen	4 824.0	7.31	12.88
Peeled	31.0	6.34	10.09
Rock lobster			
Live	13.2	31.34	25.43
Frozen	19.9	19.74	54.79 *
Other lobster			
Live	150.0	15.44	18.43
Frozen	73.6	13.98	33.67
Crabs			
Live	152.0	4.16	NT
King	255.0	12.77	NT
Other	4 469.0	3.57	5
Molluscs			
Scallops (frozen)	137.6	4.37	8.93
Mussels	25.0	2.42	NT
Sea urchins	14.4	32.12	NT
Adductors of shellfish	550.0	7.51	18.72
Abalone (live)	1.0	111.20	NT
Fish			
Sea bream			
Live	949.0	9.90	NT
Fresh chilled	144.0	8.71	5.60
Frozen	1 717.4	2.16	NT
Angler (stargazer)	3 861.0	5.33	NT
Salmon fresh	354.0	7.94	6.70
Frozen	368.0	6.47	NT
Trout frozen	4.8	2.54	7.50
Yellowfin tuna fresh	2.8	10.90	NT
Jack mackerel	1 410.0	0.87	NT
Bigeye fresh	2.5	13.74	NT
Bluefin fresh	1.1	29.40	26.50
Bluefin frozen	433.8	16.05	NT
Hairtail	1 686.6	1.80	NT
Hoki	4 450.0	0.99	NT
Eels (<i>Anguilla</i> spp)	1.4	7.53	NT

NT = not traded by Australian exporters.

Source: Korean Customs Administration and Korean Customs Research Institute (1995).

Longer term opportunities

The South Korean seafood market is in a period of transition in demand and supply. Markets for foods are changing as a result of rapidly increasing incomes and changing tastes associated with industrial development of the economy. The rapid pace of urbanisation and associated infrastructure changes are significantly altering consumer demand for foods, with a strong trend toward more prepared foods, increased convenience shopping, and high growth in the number of meals eaten outside the home. Increasing urbanisation is also likely to increase the retail demand for the additional services needed to improve the availability and convenience of foods.

The higher demand for eating out may potentially boost seafood demand. The demand from the hotel and restaurant sectors is also expected to continue to grow strongly, both through stronger domestic demand and through increased international visitor numbers. South Korea received nearly 3.1 million visitors in 1993, an increase of 2.8 per cent on 1992 levels (Korean Statistical Association 1995). With increased international exposure there may also be increased willingness to adopt other international food trends, in a manner similar to that experienced for fast food.

The major factors currently influencing seafood demand are growth in incomes and consumer taste trends. Price competition between different meats is less important because the consumption of seafoods and other products, such as beef, are all increasing. However, relative prices are likely to become more important as the growth in consumption slows and competition between meats intensifies. Trade liberalisation will have an increasing impact through improved availability of substitute products, such as beef, as that market is open to imports. Within fish and seafood products, income growth is resulting in strongly increased demand for high and medium valued species.

On the supply side, it is unlikely that present production levels can be increased, or for some species maintained. South Korean strategies for increased domestic production depend strongly on sustained growth in aquaculture but this is unlikely to meet the growth in demand. In recent years increased demand for seafood has been met mainly by retaining domestically produced seafoods. However, this strategy is unlikely to be a long term solution because the main species now exported are those which are less in demand or those destined for the Japanese market where they are more highly valued.

Imports are expected to become a progressively more important source of fish and other seafoods. However, while steps have been taken to liberalise trade, a range of impediments to imports still exist. As long as these impediments restrict trade, domestic prices will be sensitive to domestic supply changes. Failure of South Korean authorities to fully implement a liberalised seafood market could result in significantly higher food prices and a loss of seafood markets to other products.

For fish, supply shortfalls are likely to develop in the higher volume species, principally Alaska pollack, but also in other key species, such as hairtail, yellow corvenia and file fish. The shortfall in pollack will also affect a range of dried and processed products (such as surimi) which are also based on this species.

While imports will be sought to meet the shortfall between domestic supplies and demand for traditional species, the major area of growth in imports is expected to be high and middle valued fish species. Already there has been high growth in imports of less established, higher valued products including fresh Atlantic salmon, sea bream, flounder and cod. While the fresh market is limited, a similar trend in imports is apparent for frozen and dried products (table 25, statistical appendix).

The South Korean seafood market is also extremely diverse, and includes a number of species and products not well established in the Australian industry. Dried seafood forms an important component of overall seafood demand. Whether demand for such products will decline with improvements in handling and storage technologies throughout the marketing chain to consumers is difficult to assess. If so, demand for alternative product forms could be expected to increase at the expense of dried seafoods. However, in the short and medium terms, there are potential markets for a wide range of quality dried products.

There does appear to be some potential to expand Australian seafood exports of a range of less well established products. Increasing demand for a wider range of species, and for higher quality products, may present greater opportunities for the Australian industry, considering its limited resource base, than for the higher value established species.

While South Korean prices for most established species which Australia can prospectively supply are generally comparable to domestic prices when adjusted for freight costs, the prospects of increased prices in South Korea

may make that market attractive to seafood exporters. However, before such potential is realised it would be necessary to undertake a range of market testing to ensure product acceptance and establish the most appropriate product specifications.

It is potentially feasible to develop additional trade on the basis of those species which are less well established on Australian and overseas markets. There is a wide range of species, some of which are regarded as bycatch in some Australian fisheries, and other 'new' products, such as eels and yabbies, for which there is the potential to develop trade with South Korea, including:

Farmed species

- eels
- trout
- yabbies and marron

Targeted species

- banana and endeavour prawns
- bream and morwong *Acanthopagrus* spp, *Nemadactylus* spp
- red snapper *Lutjanus* spp
- deep sea dories *Oreosomatidae* spp
- jack mackerel *Trachurus declivis*
- blue grenadier (hoki or whiptail) *Macruronus novaezelandiae*

Less developed species

- squid and other cephalopods
- sea cucumber (beche-de-mer)
- sea urchins

Bycatch species

- skates and rays
- shark (tropical)
- lizard fish *Saurida* spp
- hairtail *Trichiurus lepturus*
- stargazer *Plueroscopus* spp

Constraints to market development

The constraints to developing increased Australian exports to the South Korean seafood markets can be considered in three groups. First, there are the institutional barriers (outlined in chapter 4). Second, there are the specific problems faced by individual exporters in making business contacts and negotiating sales, which are the province of the companies involved and organisations such as Austrade (see Austrade 1993). Third, there are the more general issues associated with developing new export markets for seafood products (see Smith and Reid 1993).

The following sections outline some of the implications of the institutional constraints for Australian seafood exports to the South Korean market.

Tariffs

Even after the reductions following the Uruguay Round agreement are implemented, South Korean tariffs are expected to remain above those of Japan and Hong Kong and generally comparable with those of Taiwan, Australia's other main markets in the region. While such tariffs do not reduce the relative competitiveness of the Australian industry on the South Korean market, because a single rate applies to all imports, they nonetheless reduce the potential returns from that market in comparison with others for the more established products. Such a policy favours the domestic industry over all imports.

Health requirements

Australian seafood exporters to South Korea have experienced a number of problems under the current import regime, principally in relation to bacterial count standards and in having products tested. The costs involved in having the specialised tests required for entry to the South Korean market have also been much higher than for other markets. Australia has no microbiological standard for raw fish except for products which are normally consumed raw (such as oysters).

The current application of health standards to seafood has resulted in high uncertainties about exporting to South Korea. In 1995 almost 16 per cent of the total value of Australian seafood exports to South Korea were rejected on health grounds. This was a sharp increase on 1994 when 1.2 per cent (by value) of Australian seafood product was rejected.

As most Australian seafood exports to South Korea involve small volumes, often of fresh or live product, the inspection risks could be expected to be relatively high as a higher proportion of product will be tested than would be the case with large consignments. Moreover, the costs of addressing any problems encountered through inspection are likely to be high in relation to the value of the consignment.

Labelling

Country of origin labelling is increasingly required at the wholesale and retail levels. While such labelling is aimed at favouring domestic over imported products, such requirements may also be used to the Australian industry advantage, given consumer concerns about pollution problems in relation to seafood.

It may well be feasible to develop a positive image along the lines of that being developed by Australian Prawn Promotion Association in relation to prawns in Japan, and the Australian Clean Food strategy currently used in Taiwan. However, for any strategy to be effective it will be necessary to ensure that all Australian product meets import requirements.

Management related import bans

The introduction of fisheries management related bans may affect Australian exports of rock lobster and slipper lobster. While the ban may be overcome through current representations, its likely impact will be relatively small, given the size of the market and the coincidence of the period of the bans with the Australian closed season for rock lobster.

However, such a ban may penalise Australian exporters compared with suppliers of substitute products, such as the North American homarus lobster, which are not covered by the ban. As both products are supplied to the hotel trade, the ban strongly favours the North American product because importers can ensure continuity of supplies.

Airfreight access

While eastern Australia has good freight access to the South Korean market through daily flights from Sydney, there are no direct flights from Western Australia. Product needs to be transhipped in a third country, increasing the

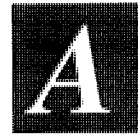
risks involved, or through Sydney, which increases the costs. Freight rates to South Korea are directly comparable to those applying to Japan.

Concluding comments

The South Korean seafood market has long term potential for the Australian fishing industry. However, it is unlikely that this potential will be realised in the short term, principally because of the difficulties experienced in accessing the market as a result of non-tariff measures. These difficulties increase the costs and reduce the returns from that market.

A major source of the problems of market access stems from a reluctance on the part of South Korean authorities to accept the advantages of a more open import policy for seafoods. With limited potential for growth in domestic catches and strong growth in demand, the advantages of a more open import policy are likely to become more apparent with time, both in terms of a greater range of seafoods available to consumers and more stable prices.

Some collaborative market development may be an appropriate means for the Australian industry to increase its long term share of the South Korean market, because of the prospective economies of size involved in overseas market development and promotion and in overcoming the impediments to trade. Individual firms which undertake an investment in market development are often unable to appropriate all the benefits that are generated, particularly in the short term. A collaborative approach on at least some aspects of market access and development in South Korea may yield an improved outcome compared with one where individual firms are required to address basically similar problems.



Appendix

Modelling South Korea's demand for seafood

The estimation of individual demand elasticities for seafood in South Korea follows on from a vast array of literature using, or based on, the Almost Ideal Demand System (AIDS) approach. The original model was devised by Deaton and Muellbauer (1980) and is still probably the most widely used systems approach to demand modelling.

This current study on modelling South Korea's demand for seafood is based on a more detailed analysis comparing AIDS with the Modified Almost Ideal Demand System (Proctor and Dennis 1995). The AIDS approach, as presented here, was chosen as the preferred model.

The linear approximate AIDS model (LAAIDS) is used to estimate parameters through a system of budget share equations expressed in the general form:

$$w_i = a_i + \sum b_{ij} \ln p_j + \gamma_i \ln (E / P^*)$$

where P^* (Stone's Price Index) is calculated as $\ln P^* = \sum_k w_k \ln p_k$, w_k is the budget share of commodity k and p_k is the price of commodity k .

The substitution of P^* for the true nonlinear price index into the budget share equations removes the nonlinear characteristic of the model. This simplifies estimation through reducing the number of parameters to be estimated, thereby improving the efficiency of the parameter estimates.

The equations to be estimated are:

$$w_i = a_i + b_{i1} \ln PFF + b_{i2} \ln PCH + b_{i3} \ln PPF + b_{i4} \ln PBF + b_{i5} \ln PP + b_{i6} \ln PSF + \gamma_i \ln (E/P^*) + c_i T$$

where:

w_i = the share of commodity i 's expenditure in total meat and seafood expenditure for i representing fresh fish and other fish and shellfish, chicken, processed fish, beef, pork and shellfish.

PPF = the price of fresh fish
PCH = the price of chicken
PPF = the price of processed fish
PB = the price of beef
PP = the price of pork
PSF = the price of shellfish
*E/P** = real disposable income
T = time variable.

A time trend was included in LAAIDS to try and account for demographic changes and urbanisation trends.

The number of parameters to be estimated can be reduced by imposing restrictions on the model consistent with demand theory, that is:

$$\sum_j b_{ij} = 0 \text{ (homogeneity)}$$

$$b_{ij} = b_{ji} \text{ (symmetry)}$$

$$\sum_i \alpha_i = 1 \text{ and}$$

$$\sum_i \gamma_i = \sum_i b_{ij} = 0 \text{ (the adding up conditions).}$$

It should be noted that in recent years there has been some debate about the extent of the bias introduced by using Stone's Price Index (Pashardes 1993). Despite this, the true nonlinear price index could not be used because of the lack of a sufficient time series of annual data.

Data

Household consumption expenditure data for meat and seafood were obtained from the annual editions of the *Korea Statistical Yearbook* by the Korean Statistical Association (1995). The data are expressed in terms of monthly consumption expenditure per household in All Cities and Seoul, and are available for a range of disaggregated commodities. Consumption expenditure on seafood was disaggregated into the categories of fresh fish (which included a small amount of other fresh fish and other shellfish which

could not be separated out), shellfish and processed fish (table 20). Meat included beef, pork and chicken.

Monthly income for salary and wage earners' households was also collected from editions of the *Korea Statistical Yearbook*.

Although households in 62 cities (until 1987, 50 cities) have been accounted for in the data, it is important to acknowledge that certain households have been excluded. Specifically, these are farm and fishermen's households, single member households, foreign households and households whose income and expenditure are not easily identified.

All Cities consumer price indexes for individual items were used for prices. These are found in the *Annual Report on the Price Survey* (National Statistical Office 1994). This report has been published annually since 1965 and provides detailed price indexes showing the movements in prices over the long term. In order to derive a representative retail price for fresh fish, shellfish and processed fish, the individual commodity consumer price indexes required aggregating and averaging over these categories for any given year.

Expenditure, prices and income were expressed in nominal values for All Cities.

Estimation of the model uses annual data from 1977 to 1993.

20 Seafood components for household consumption expenditure

Fresh fish	Shellfish	Processed fish and shellfish
Hairtail	Crabs	Dried Alaska pollack
Alaska pollack	Oysters	Dried yellow corvina
Yellow corvina	Shellfish	Dried anchovy
Mackerel		Dried cuttlefish
Saury		Pickled shrimp
Cuttlefish		Pickled anchovy
Flatfish		Other pickles
Pomfret		Other salted, dried fish and shellfish
Eymyunsu		Fish paste
Other finfish and shellfish		Other processed fish and shellfish
		Canned marine products

Source: Korean Statistical Association (1995).

Empirical estimation

The AID System was estimated using the Seemingly Unrelated Regressions package in SAS Version 607. Consistent with demand theory and to restrict the number of parameters to be estimated, symmetry, homogeneity and adding up restrictions were imposed and the parameter estimates for the shellfish category were obtained using the aggregation conditions imposed on the system. Stone's Price Index was used as the price aggregator.

Results from the modelling

Results obtained for the individual budget share equations estimated using the LAAID System is given in table 21.

Estimated price elasticities

The parameter estimates from the individual budget share equations were used to obtain income, own-price and cross-price elasticities of demand for the individual meats and seafood categories.

The own-price elasticities (shown in bold type, table 22) for all categories are negative as expected from economic theory. With the exception of fish and pork, all commodities were price elastic with respect to demand, with processed fish, chicken and shellfish being strongly so. This means that the consumption of fresh fish is relatively unresponsive to price changes such that, a 1 per cent increase in its own price would be accompanied by a less than 1 per cent fall in consumption. In contrast, the results showed the consumption of shellfish to have been highly responsive to price, with a 1 per cent price increase associated with around a 2 per cent fall in consumption. For processed fish, a 1 per cent increase in price was associated with a 1.5 per cent fall in the quantity consumed.

This has important implications for suppliers of fish to South Korea. For example, if supplies of processed fish were to fall, resulting in higher prices, the decrease in demand would be proportionally greater than the corresponding price increase. A converse situation would occur in the case of fresh fish.

It is difficult to draw strong conclusions about the relationships between the price movements of one commodity on the quantity demanded for others as many of the cross-price relationships were not found to be significant.

21 LAAIDS parameter results

	Dependent variables					
	<i>ishsh</i>	<i>chicksh</i>	<i>procsh</i>	<i>beefsh</i>	<i>porksh</i>	<i>shellsh*</i>
constant	-1.21 (-0.47)	8.14 (2.89)	-19.67 (-10.16)	13.47 (3.80)	-4.43 (-1.85)	4.70
lnPFF	0.06 (2.24)	•	•	•	•	-0.003
lnPCH	0.003 (0.20)	-0.05 (-2.49)	•	•	•	0.09
lnPPF	-0.01 (-0.37)	0.04 (3.53)	-0.08 (-5.71)	•	•	0.10
lnPB	-0.02 (-1.10)	-0.03 (-1.56)	0.01 (0.60)	-0.08 (-2.21)	•	0.05
lnPP	-0.03 (-2.57)	0.03 (2.10)	0.02 (2.14)	0.03 (2.19)	0.02 (1.60)	-0.12
lnPSH*	-0.003	0.09	0.10	0.05	-0.12	-0.12
ln(E/P*)	-0.08 (-2.36)	-0.07 (-2.35)	0.03 (1.31)	0.07 (1.51)	0.04 (1.38)	0.01
time	0.001 (0.78)	-0.004 (-2.53)	0.01 (9.57)	-0.01 (-3.61)	0.002 (1.64)	
R ²	0.61	0.91	0.98	0.83	0.82	
DW	2.06	1.79	2.17	1.90	1.79	
Objective value	2.93					

• Corresponding values restricted by symmetry. * Value derived by the summation restriction. Numbers in parentheses are t statistics.

However, statistically significant substitution relationships were found to exist between processed fish and chicken, chicken and pork, and beef and shellfish.

Estimated income elasticities

The income elasticity of demand measures the percentage change in the consumption of a good given a one per cent change in income. The income elasticity estimates generated for the meat and seafoods are shown in table 23.

22 Estimated price elasticities (\hat{E}) for LAAIDS ^a

	Elasticity of demand for:					
	Fresh fish	Processed fish	Beef	Pork	Chicken	Shellfish
With respect to the price of:						
Fresh fish	-0.71 (-6.27)	-0.09 (-0.82)	-0.16 (-1.50)	-0.26 (-2.59)	0.34 (1.13)	-0.02 (-0.04)
Processed fish	0.03 (0.43)	-1.50 (-15.13)	-0.01 (-0.13)	0.08 (1.07)	0.80 (3.65)	0.23 (0.50)
Beef	-0.01 (-0.15)	-0.002 (-0.02)	-1.36 (-11.25)	0.13 (1.39)	-0.15 (-0.53)	2.26 (3.44)
Pork	-0.07 (-1.51)	0.09 (1.50)	0.08 (1.21)	-0.92 (-10.60)	0.56 (2.96)	-1.74 (-3.66)
Chicken	0.03 (0.50)	0.25 (3.27)	-0.13 (-1.75)	0.14 (1.77)	-1.71 (-5.24)	0.30 (0.69)
Shellfish	0.01 (0.07)	0.05 (0.58)	0.32 (3.91)	-0.43 (-4.90)	0.22 (0.92)	-1.98 (-2.60)

^a Own-price and cross-price elasticities were calculated using the uncompensated elasticity formula: $\hat{E} = (b_i - \gamma_i w_i) / w_i - \delta_{ij}$, where δ_{ij} is the Kronecker delta which is equal to 1 when $i = j$ and zero otherwise.

There were strong relationships identified between consumption and changes in income. Four of the meat and seafood categories were found to have statistically significant positive expenditure elasticities. The income elasticities for chicken and shellfish were not found to be statistically significant.

The consumption of processed fish, beef and pork was found to be highly responsive to income increases with the quantity demanded of these meats increasing with a rise in incomes by a more than proportional amount.

23 Estimated income elasticities ($\hat{\gamma}$) for LAAIDS ^a

$\hat{\gamma}_i$	Processed					
	Fresh fish	fish	Beef	Pork	Chicken	Shellfish
	0.73 (6.19)	1.21 (7.53)	1.26 (7.21)	1.26 (6.70)	-0.07 (-0.16)	-0.94 (0.66)

^a The uncompensated income elasticity was calculated using the formula: $\hat{\gamma}_i = 1 + \gamma_i / w_i$.

This trend could be expected for processed fish at least as consumers seek to vary their diet from more traditional foods, and move toward more convenience foods. By comparison, the consumption of fresh fish, was found to be inelastic in relation to income changes, indicating that a rise in income would see the quantity demanded rise by a less than proportional amount. The fish species included in the household consumption survey are likely to have influenced these results as most of the fish species in this survey are lower valued.



Appendix

South Korean trade in fisheries products

24 Tariff barriers on fisheries products in South Korea

	Ad valorem tariff	Ad valorem offer a
Fish		
<i>Live fish</i>		
Trout	20	10 (B)
Eels	20	20 (U)
Carp	20	10 (B)
Other	20	10 (B)
Sea bream, conger eel, sharp toothed eel, salad eel and flat fish	20	20 (U)
Other	20	16.7 (B)
<i>Fish fresh or chilled, excluding fish fillets and other fish meat</i>		
Salmonidae, excl livers and roes		
Trout and salmon	20	20 (U)
Other	20	20 (B)
Flatfish, excl. livers and roes	20	20 (U)
Tunas, skipjack or stripe bellied bonito	20	20 (U)
Herrings, excl. livers and roes	20	20 (U)
Cod, excl livers and roes	20	20 (U)
Other fish, excl. livers and roes		
Haddock	20	20 (B)
Other	20	20 (U)
Livers and roes	20	20 (U)
<i>Fish frozen, excluding fish fillets and other fish meat</i>		
Salmonidae, excl. livers and roes	20	10 (B)
Flat fish, excl. livers and roes	20	10 (B)
Tunas, excl. livers and roes		
Skipjack or stripe bellied bonito	20	20 (U)
Other tuna	20	10 (B)
Herrings, excl livers etc	20	10 (B)
Cod, excl. livers etc	20	10 (B)
Other fish, excl. livers and roes		
Sardines, sprats etc, haddock, coalfish, mackerel, seabass and other	20	20 (U)
Sharks, eels and hake	20	10 (B)
Other (alaska pollack, hairtail, saury, puffers etc)	20	10 (B)
Other (sable fish, sea bream, conger eel, yellow corvinia, etc)	20	20 (U)
Livers and roes	20	10 (B)

Continued on next page

	Ad valorem tariff	Ad valorem offer a
<i>Fish fillets and other fish meat, fresh, chilled or frozen</i>		
Fresh or chilled	20	20 (U)
Frozen	20	20 (U)
Other fish meat, frozen (fish surimi and other)	20	10 (B)
<i>Fish dried, salted or in brine; smoked fish; flours, meals and pellets of fish, fit for human consumption</i>		
Fish meal, flours, etc, fit for human consumption	20	20 (U)
Fish livers and roes, dried, smoked, salted	20	20 (U)
Fish fillets, dried	20	20 (U)
Fish fillets, salted or in brine	20	20 (B)
Smoked pacific, atlantic or danube salmon	20	20 (U)
Smoked herrings, anchovies and alaska pollack (incl. fillets)	20	20 (B)
Other smoked fish (incl. fillets)	20	20 (U)
Dried cod, puffers, sharp toothed eel (other than fillets), not smoked	20	20 (B)
Other dried fish (other than fillets), not smoked	20	20 (U)
Salted cod, salmon and trout (not dried or smoked)	20	20 (B)
Other fish, salted (not dried or smoked)	20	20 (U)
Crustaceans		
<i>Frozen</i>		
Rock lobsters, other sea crayfish, shrimps and prawns	20	20 (U)
Crabs		
Crab meat and king crabs	20	20 (U)
Other crabs	20	14 (B)
Other crustaceans, incl. flours etc	20	20 (U)
<i>Fresh, steamed, boiled, not frozen</i>		
Rock lobster, other sea crayfish	20	20 (U)
Other crustaceans, live, boiled etc	20	20 (U)
<i>Molluscs</i>		
Oysters, live, fresh, chilled, dried	20	20 (U)
Oysters, frozen	20	20 (B)
Other molluscs, live, fresh or chilled (abalone, scallops, mussels, cuttle fish, octopus and other)	20	20 (U)
Other molluscs, live, fresh or chilled (snails, other than sea snails, sea urchins and other)	20	20 (B)
Other molluscs, frozen, dried, etc, incl. flours	20	20 (U)
Other molluscs, salted or in brine (jelly fish and other)	20	20 (B)

Continued on next page

24 *Continued*

	Ad valorem tariff	Ad valorem offer a
<i>Aquatic animals other than molluscs and crustaceans</i>		
Natural sponges of animal origin	20	11 (B)
Fish liver oils and their fractions	10	4 (B)
Fats and oils of fish o/t liver oils	10	4 (B)
Fats and oils of marine mammals	10	4 (B)
Extracts etc of meat, fish, crustaceans etc	41.4	31.5-35 (U)
Prepared or preserved fish; caviar and caviar substitutes prepared from fish eggs	80	20 (B)
<i>Crustaceans, molluscs and other aquatic invertebrates, prepared or preserved</i>		
Crab meat, other, in airtight containers	30	30 (U)
Crab meat, smoked, excl airtight containers	30	20 (B)
Shrimps or prawns, other smoked, in airtight containers	30	20 (B)
Shrimps or prawns, other breaded, other	30	30 (U)
Lobster, in airtight containers	30	20 (B)
Lobster, other	30	30 (U)
Other crustaceans	30	30 (U)
Molluscs (oysters, mussels, other abalone etc), in airtight containers	30	30 (U)
Molluscs (cockles), in airtight containers	30	20 (B)
Flours, meals and pellets of fish, crustaceans	10	9 (B)

a Indicates tariff rate offered post Uruguay Round negotiations. **B** = Bound tariff rate indicates a ceiling on tariff rates which can not be breached. **U** = Unbound tariff rate indicates rate offered but with no formal obligation to achieve that particular rate.
Source: Department of Foreign Affairs and Trade.

25 South Korean imports of fisheries products

	1988		1990		1992		1994	
	t	US\$'000	t	US\$'000	t	US\$'000	t	US\$'000
Fish								
<i>Live, fresh or chilled</i> 111	2 440	1 100	11 828	2 298	15 292	8 565	50 993	
Cod			161	654	450	2 195	716	3 395
Eels			0	162	6	147	3	232
Salmon	0	0	10	141	60	626	354	2 810
Sea bream	92	1 124	746	8 148	875	7 899	1 093	10 650
Tropical fish	1	9	17	1 184	45	1 730	47	1 853
Tuna	4	64	18	288	1	20	8	104
Big eye tuna	2	29	4	82	1	8	3	34
Yellowfin tuna	1	25	1	9	0	0	3	31
Other tuna	0	5	13	198	1	12	2	39
Angler	nas		nas		nas		3 860	20 611
Other	14	1 228	102	1 057	848	2 559	2 484	11 338
<i>Frozen</i>	283 124	201 138	145 093	172 005	179 037	296 878	171 464	275 391
Alaska pollack	104 557	67 614	33 161	16 077	51 402	84 775	21 739	11 619
Cod	28 421	21 672	26 021	29 855	26 989	30 565	33 266	24 136
Sharks	647	300	210	726	333	1 489	999	642
Eel	647	778	182	271	181	310	124	171
Hairtail	160	167	287	151	2 264	4 942	1 687	3 038
Herrings	7 472	15 499	7 536	13 046	6 252	6 998	4 904	3 833
Mackerel	15 758	2 890	7 994	12 198	26 881	32 838	22 396	23 663
Plaice	91 705	34 386	23 914	9 678	14 171	12 222	232	197
Puffers	27	67	10	8	90	226	2 193	6 987
Rock fish (incl. ocean perch)	12 117	9 554	17 453	15 070	15 580	13 450	18 451	15 701
Salmon	4 273	17 834	603	3 334	2 838	7 749	3 806	8 487
Saury	1 041	722	761	666	323	431	560	419
Sea bream	90	85	86	90	36	39	1 717	3 715
Sole	920	951	24	87	0	0	933	2 082
Tuna	1 413	2 192	1 737	6 168	2 116	7 823	2 606	16 539
Big eye tuna	57	115	68	347	246	1 141	922	5 559
Yellowfin tuna	1 316	2 000	408	641	345	1 239	1 091	2 892
Other tuna	41	76	821	4 409	282	4 795	593	8 088
Whiptail or hoki	3 982	3 472	6 300	5 565	4 708	6 153	4 450	4 395
Yellow corvinia	132	318	668	3 723	1 447	5 018	2 270	4 898
Roes	2 143	14 792	5 139	38 690	5 454	58 918	13 838	106 859
Other	6 466	5 350	12 840	16 419	17 539	21 900	4 794	3 464

Continued next page

25 *Continued*

	1988		1990		1992		1994	
	t	US\$'000	t	US\$'000	t	US\$'000	t	US\$'000
<i>Fish fillets</i>	22 707	38 678	34 660	61 960	28 172	86 983	52 087	105 281
Alaska pollack	129	278	0	0	791	931	269	462
Cod	9	27	13	26	112	288	151	554
Conger eel	0	0	224	138	54	129	376	1 729
Alaska pollack surimi			32 981	6 0146	17 566	63 018	22 461	44 472
Other fish surimi	20 718	36 518	590	1 154	9 321	21 458	24 424	44 710
Other	1 851	1 856	852	497	329	1 159	4 406	13 352
<i>Fish processed,</i>								
<i>dried etc</i>	392	1 839	683	1 492	602	2 727	583	4 156
Shark fin	6	430	11	293	5	227	2	288
Salmon	1	43	3	145	20	332	11	270
Alaska pollack	4	31	0	0	0	1	1	5
Anchovies	9	50	594	435	22	86	124	25
Herrings	261	540	1	6	2	17	22	138
Other	83	658	39	555	550	2 062	34	375
Crustaceans	4 490	22 760	4 603	18 567	3 155	24 764	10 061	60 557
<i>Live, fresh or chilled</i>	328	2 525	399	4 749	393	7 413	338	3 652
Crab	0	5	0	49	5	105	152	632
Lobsters								
(<i>Homarus</i> spp.)	10	259	15	375	21	386	150	2 317
Rock lobster and sea								
crawfish			3	83	11	295	13	415
Shrimps and prawns	318	2 261	381	4 239	354	6 613	19	277
Other			0	3	1	14	3	12
<i>Frozen</i>	2 472	18 625	4 187	13 710	2 040	14 741	9 645	55 918
Crab	1 923	14 058	15	367	992	4 838	4 724	19 225
Lobsters								
(<i>Homarus</i> spp.)	38	463	11	431	43	793	74	1 030
Rock lobster and sea								
crawfish	7	90	4	84	13	233	20	392
Shrimps and prawns	503	3 978	2 184	6 187	991	8 867	4 824	35 260
Other	1	35	1 974	6 642	0	10	3	12
<i>Preserved</i>	1 691	1 611	17	108	1 649	6 819	81	931
Crab	41	251	4	45	66	630	15	628
Shrimps and prawns	1 645	1 335	2	27	657	1 976	31	207
Other	5	25	11	35	0	5	35	95

Continued next page

25 *Continued*

	1988		1990		1992		1994	
	t US\$'000		t US\$'000		t US\$'000		t US\$'000	
Molluscs and aquatic invertebrates	33 124	22 307	34 609	66 717	59 742	83 178	71 911	128 224
<i>Live, fresh or chilled</i>	86	407	151	374	668	836	2 415	4 110
Pearl oysters	32	199	19	112	0	0	35	485
Oysters	0	0	0	0	0	0	682	1 768
Abalone	0	0	0	0	1	53	1	99
Clams	5	18	94	66	585	476	1 607	967
Other	49	190	37	196	83	307	91	791
<i>Frozen</i>	31 013	17 355	28 801	50 958	53 376	67 655	60 775	104 206
Squid	30 791	16 514	24 981	30 201	50 846	50 638	46 021	46 708
Octopus							2 681	7 611
Cuttle fish	0	0	468	1 527	497	2 369	432	2 172
Ark shell	11	76	391	6 775	893	10 398	1 849	17 942
Mussels	0	0	91	105	28	44	25	61
Scallops	11	176	6	115	83	754	138	601
Other	200	589	2 865	12 235	1 028	3 452	9 629	29 112
<i>Preserved, dried, etc.</i>	2 026	4 544	5 657	15 385	5 698	14 686	8 721	19 908
Total imports	343 948	289 162	220 748	332 569	273 006	509 822	314 671	624 602

Source: Korean Customs Administration and Korean Customs Research Institute (1995).

26 South Korean exports of fisheries products

	1988		1990		1992		1994	
	t US\$'000		t US\$'000		t US\$'000		t US\$'000	
Fish	385 493	1055 648	322 468	877 197	319 425	824 838	246 999	831 135
<i>Live, fresh or chilled</i>	32 689	143 385	13 640	89 339	10 352	85 745	10791	120851
Angler	474	2 857	27	236	10	159	2	48
Eels	2 741	39 328	3 007	25 008	2 057	21 873	4 068	60 075
Mackerel	2 986	9 988	3 746	19 870	1 962	15 871	1 701	13 862
Plaice	4 313	25 212	2 335	12 235	1 175	7 987	747	5 440
Puffers	1 709	12 215	279	5 767	90	3 427	65	4 030
Saury (incl. horn fish)	454	4 352	304	3 059	256	2 511	340	3 144
Sole	457	2 718	396	2 224	74	455	114	955
Tuna	372	387	69	181	709	5 161	700	3700
Yellowtail	1 354	4 490	95	560	524	5 218	3	17
Other	17 829	41 837	3 381	20 199	3 497	23 085	3 051	29 580
<i>Frozen</i>	224 535	513 825	205 035	414 830	244 373	461 972	165 018	442 962
Alaska pollack	3 145	4 536	628	1 458	4 271	38 840	409	906
Eels	3 065	14 395	986	4 928	281	1 656	380	1 362
Hairtail	376	834	1 788	1 740	2 686	4 321	2 147	2 406
Hake	2 249	691	180	221	850	2 162	553	1 098
Mackerels	26 681	71 856	13 057	23 861	12 190	26 192	24 947	44 845
Plaice	3 433	6 823	6 164	12 301	3 552	8 244	497	2 539
Puffers	1 413	5 346	1 831	4 551	3 552	5 926	541	978
Rock fish	94	273	2 522	3 578	11 008	15 084	1 622	1 419
Roes and livers	5 352	58 546	4 419	26 208	0	0	6 953	72 152
Salmon	406	1 174	32	159	1 086	2 749	959	1 957
Sea bream	8 032	10 039	7 706	12 149	3 654	6 465	1 145	1 853
Tuna	143 699	288 797	150 722	294 794	189 232	322 145	108 332	267 771
Albacore	8 914	20 914	3 694	7 933	1 331	2 702	279	546
Big eye tuna	19 285	61 618	20 774	65 389	19 385	87 228	22 155	137 060
Skipjack	40 995	35 637	58 438	37 091	84 346	49 429	48 317	44 802
Yellowfin tuna	25 817	27 493	20 509	24 429	55 304	57 663	33 183	63 226
Other	26 592	50 516	15 000	28 881	12 010	28 188	16 596	43 676
<i>Fish fillets (fresh, chilled, frozen)</i>	68 209	189 184	47 735	155 398	28 845	118 584	24 531	133 458
Alaska pollack	26 756	41 932	18 530	27 105	8 212	15 411	69	149
Cod	3 798	12 708	1 024	3 998	407	1 568	395	861
Conger eel	8 657	42 990	8 543	49 289	7 204	39 644	11 624	83 268
Fish surimi	7 229	14 423	56	95	0	0	2 273	6 184
Other	21 769	77 130	19 581	74 911	13 022	61 961	10 170	42 996

Continued next page

26 *Continued*

	1988		1990		1992		1994	
	t US\$'000		t US\$'000		t US\$'000		t US\$'000	
<i>Dried, salted or in brine,</i>								
<i>smoked</i>	4 992	33 978	3 959	29 230	2 685	17 096	2 177	13 461
Anchovy	1 227	7 345	927	6 798	464	2 183	459	4 018
Herrings	896	14 607	651	11 561	298	4 260	344	2 075
Mackerel	864	1 113	155	279	73	189	347	676
Shark fin	51	1 074	75	1 037	35	1 052	31	969
Other	1 953	9 838	2 151	9 556	1 816	9 411	996	5 723
<i>Fish prepared or</i>								
<i>preserved</i>	55 068	175 276	52 099	188 400	33 169	141 441	44 482	120 403
Mackerel	2 762	4 082	1 782	2 498	229	519	459	1 743
Salmon	1 360	6 519	864	2 704	127	415	908	2 905
Sardines	9 654	11 438	4 697	6 736	2 138	4 746	1 866	4 207
Other	41 292	153 237	44 756	176 461	30 676	135 761	41 248	111 538
Crustaceans	26 987	135 958	13 187	90 223	11 690	98 466	6 482	80 115
<i>Live, fresh or</i>								
<i>chilled</i>	7 877	40 728	2 904	20 988	1 796	15 61	581	9 332
Crab	7 339	34 667	2 599	18 084	1 640	12 465	412	5 130
Shrimps and prawns	514	5 934	257	2 856	156	3 151	165	4 181
Other	24	127	48	48	1	2	3	20
<i>Frozen</i>	13 293	48 478	6 906	42 994	2 826	26 524	1 209	15 324
Crab	2 936	21 736	1 714	13 985	1 100	10 595	596	8 632
Lobsters								
(<i>Homarus</i> spp.)	824	1 223	49	471	31	267	6	84
Shrimps and prawns, peeled	1 990	7 467	1 025	8 689	411	3 530	49	848
Prawns, other	7 449	17 268	4 018	19 002	1 251	11 841	559	5 759
<i>Dried, in brine,</i>								
<i>preserved</i>	5 818	46 751	3 377	26 242	7 068	56 324	4 692	55 460
Crab	5 301	45 019	3 122	25 758	2 879	25 369	4 604	54 831
Shrimps and prawns	484	1 606	127	484	4 183	30 928	79	457
Molluscs and aquatic animals	116 420	592 366	74 164	392 857	62 987	428 602	52 413	396 251
<i>Live, fresh or</i>								
<i>chilled</i>	3 687	16 895	3 027	13 541	2 169	10 898	3 967	37 526
Cuttle fish	12	56	470	1 138	57	310	93	353
Octopus	1 359	8 874	1 276	6 983	181	1 357	114	1 105
Squid	27	72	67	69	237	265	100	164
Other	2 289	7 893	1 214	5 351	1 694	8 966	3 660	35 904

Continued next page

26 *Continued*

	1988		1990		1992		1994	
	t US\$'000		t US\$'000		t US\$'000		t US\$'000	
<i>Frozen</i>	17 514	42 897	12 064	33 569	10 256	31 677	10 795	42 254
Cuttle fish	7 022	20 197	2 891	9 680	3 009	9 734	862	4 644
Mussels	1 014	1 441	234	646	92	243	32	87
Octopus	2 350	5 333	4 540	8 701	1 540	3 832	288	1 939
Oysters	1 212	3 863	1 897	7 459	2 253	10 379	3 466	20 098
Squid	5 893	11 919	2 501	7 064	3 317	7 181	5 678	13 518
Other							469	1 968
<i>Preserved</i>	30 179	175 889	19 851	117 853	18 675	133 129	11 436	100 044
Mussels	2 568	7 883	1 795	7 277	973	4 366	1 079	4 743
Octopus	57	285	95	247	670	474		
Oysters	12 785	72 218	10 116	56 846	10 827	84 372	4 988	36 990
Squid and cuttle fish	11 089	78 960	6 589	45 984	3 936	29 269	746	5 690
Other (incl. cockles, clam, bai top shell)	3 681	16 542	1 256	7 500	2 268	14 648	4 896	57 174
<i>Other molluscs and aquatic animals, fresh, frozen or preserved</i>	65 039	356 685	39 221	227 894	31 887	252 899	26 115	216 427
Adductors of shell fish	1 209	22 833	1 054	20 131	1 240	22 984	501	11 615
Ark and top shells	27 141	158 009	10 526	87 506	12 768	111 136	12 215	120 974
Clams	29 691	62 236	23 989	44 581	13 916	33 166	12 066	39 386
Cockles	2 707	39 896	688	16 947	2 804	39 871	119	1 897
Sea urchins	1 443	60 654	948	40 803	809	42 635	725	39 256
Total exports	528 900	1783 973	409 819	1360 277	394 101	1351 906	305 894	1307 501

Source: Korean Customs Administration and Korea Customs Research Institute (1995).

References

- Austrade 1993, *Seafood Industry, Korea 1993*, Australian Trade Commission, Seoul, Republic of Korea.
- Australian Bureau of Statistics 1995, Foreign Trade: Magnetic Tape Service, cat. no. 5464.0, Canberra.
- Department of Agriculture and Forestry, Taiwan 1991, *Taiwan Agriculture Yearbook 1991*, Taiwan Provincial Government, Taipei.
- DFAT 1994a, *Korea*, Country Economic Brief, Department of Foreign Affairs and Trade, Canberra, November.
- 1994b, *The Republic of Korea*, Outline Brief prepared by Korea Section, Department of Foreign Affairs and Trade, Canberra, December.
- 1995, *Korea*, Country Economic Brief, Department of Foreign Affairs and Trade, Canberra, March.
- Deaton, A. and Muellbauer, J. 1980, 'An almost ideal demand system', *American Economic Review*, vol. 70, no. 3, pp. 312–26.
- Doyle, S., Bui-Lan, A., Rodriguez, A., Benard, A. and Whish-Wilson, P. 1995, 'Pacific Basin beef trade', *Australian Commodities*, vol. 2, no. 3, pp. 326–39.
- FAO 1993, *Commodities*, vol. 77, *Fishery Statistics*, Food and Agriculture Organisation of the United Nations, Rome.
- International Monetary Fund 1995, *International Financial Statistics Yearbook*, Washington DC.
- Kano, I. 1993, 'Republic of Korea: a burgeoning seafood market', *INFOFISH International*, vol. 12, no. 1, pp. 18–23.
- Kim, Jae Soo 1994, *Korean Agriculture in the 1990's*, Dong Yang Mun Hwa Co. Ltd, Seoul.

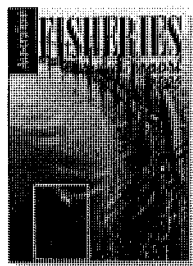
-
- Kingston, A., Battaglene, T., Smith, P. and Beare, S. 1991, *Changes in the Japanese Seafood Market*, ABARE Discussion Paper 91.3, AGPS, Canberra.
- Korean Customs Administration & Korea Customs Research Institute 1995, *Statistical Yearbook of Foreign Trade, December 1994*, Seoul, Republic of Korea (and previous issues).
- Korean Statistical Association 1995, *Korea Statistical Yearbook 1994*, Seoul (and previous issues).
- Liao, C. and Chien, Y.H. 1994, 'Culture of kuruma prawn in Asia', *World Aquaculture*, Louisiana, vol. 25, no. 1, pp. 18–34.
- MAFF (Ministry of Agriculture Forestry and Fisheries) 1995, *The Statistical Yearbook of Agriculture Forestry and Fisheries 1994*, Seoul, Republic of Korea (and previous issues).
- National Statistical Office, Republic of Korea 1994, *Annual Report on the Price Survey 1993*, Kangnam – Gu (and previous issues).
- Park, S., Kim J. and Shin, Y. 1990, *Korea Rural Economic Institute Research Report 224*, Seoul, Republic of Korea.
- Pashardes, P. 1993, 'Bias in estimating the Almost Ideal Demand System with the Stone Price Index approximation', *Journal of Economics*, vol. 103, no. 419, July, pp. 908–15.
- Presidential Commission on Economic Restructuring 1988, *Realigning Korea's National Priorities for Economic Advance*, Seoul, Republic of Korea.
- Proctor, W. and Dennis, F. 1995, Modelling demand for seafood in South Korea using the MAIDS, ABARE conference paper 95.27 presented at the 24th Conference of Economists, Adelaide, 24–27 September.
- Reynolds, R., Shaw, I., Lawson, K., Clark, J., Hamal, K. and Bui-Lan, A. 1994, *North Asian Markets for Beef*, ABARE Research Report 94.10, Canberra.

Smith, P., Brown, D. and McKelvie, L. 1992, *Asia Pacific Markets for Seafood*, ABARE Research Report 92.13, Canberra.

Smith, P. and Reid, C. 1993, *Efficiency of Australian Seafood Marketing*, ABARE Research Report 93.1, Canberra.

Soon Kil Yi 1993, Present status and future directions for aquaculture in Korea, Paper presented at the 1993 Tasmanian Aquaculture Conference, Hobart, 16–18 July.

Fisheries statistics



Australian fisheries statistics 1995

This annual statistical bulletin provides information on production and trade for the three years ended 1994–95.

This issue also includes a profile of Commonwealth and state fisheries in 1995.

Published December 1995

(B5, 48 pp)

Price A\$25 plus P&H

Fisheries surveys report 1995

This report contains detailed estimates of the physical and financial performance of operators in fisheries surveyed by ABARE in 1995.

Information is included on the northern prawn fishery, the south east fishery, the southern shark fishery and the Torres Strait prawn fishery.

Published December 1995

(B5, 41 pp)

Price A\$25 plus P&H

Postage and handling in Australia A\$5, overseas A\$10

For copies of these books, phone (06) 272 2303 or (06) 272 2211.

Visit our home page at <http://www.abare.gov.au>