MFR PAPER 981

The coming decade will be one of increased competition and search for new sources of supply.

The U.S. Shrimp Industry: Past Trends and Prospects for the 1970's

DONALD R. WHITAKER

ABSTRACT

The U.S. shrimp industry has expanded rapidly during the last two decades and is expected to continue growing during the 1970's. Production has grown in recent years because of rapidly increasing catches of northern shrimp. Total production likely will continue upward, but not as rapidly as in recent years. Most, if not all, of the increase will come from northern shrimp landings. Per capita consumption of shrimp has doubled. Total consumption of shrimp is expected to expand during the 1970's but whether it will expand at a faster rate than the population will depend on discoveries of new resources around the world. Demand for quality and demand for increased services are expected to rise.

INTRODUCTION

The shrimp industry, an important segment of the Nation's fisheries economy, has undergone significant changes during the last two decades. The industry has been characterized by such developments as new areas of production and new processed products, improved technology in producing and processing, shifts in consumer demand, better facilities for storage, and improved packaging. These changes reflect the nature of the type of demand facing the shrimp industry and the changing structure of markets.

This report is a general review of developments in the U.S. shrimp industry over the last two decades and its prospects for the 1970's.

Donald R. Whitaker is a member of the staff of the Fishery Products Research and Inspection Division, NOAA, NMFS, Washington, DC 20235.

TRENDS AND DEVELOPMENTS

Geographic Shifts in Production

Nearly every coastal state is a commercial producer of shrimp, but significant production is concentrated in a relatively few states. The bulk of the production comes from the Gulf States; production of northern shrimp is distributed on both the east and west coasts.

Although fluctuations occur in shrimp production from year to year, the overall trend has been upward (Figure 1). Total production of the domestic fleet increased from an annual average of 135.1 million pounds, heads-off weight, in 1950-52 to 189.7 million pounds in 1967-69. Output of southern shrimp rose from 132.8 million pounds, heads-off, to 147.0 million pounds. Northern shrimp production showed a remarkable increase from 2.2 million pounds, heads-off, to 42.7 million pounds.

While total domestic shrimp production has generally trended upward, especially in recent years, there have been shifts in the relative importance of producing areas. The South Atlantic States' share of the total production has declined since 1950 (Table 1), whereas the Pacific States, including Alaska, gained from 1.2 percent of total production in 1950-52 to 13.5 percent in 1967-69. Production in New England also rose sharply from less than 0.1 percent in the early 1950's to 5.0 percent in 1967-69. The overall upward trend in shrimp production has come about primarily because of increases in landings of northern shrimp. Consequently, southern shrimp dropped from 98.4 percent of the total in the early 1950's to 77.5 percent at the close of the 1960's.

As the 1960's came to a close, some major shifts in production were in the making. Between 1964 and 1969, shrimp production in New England doubled each year and reached a peak of 16.6 million pounds, heads-off, in 1969. The 1969 New England catch was probably near the maximum sustainable yield for the region. Pacific Coast production has also grown rapidly, especially during the last half of the 1960's. Alaska ac-

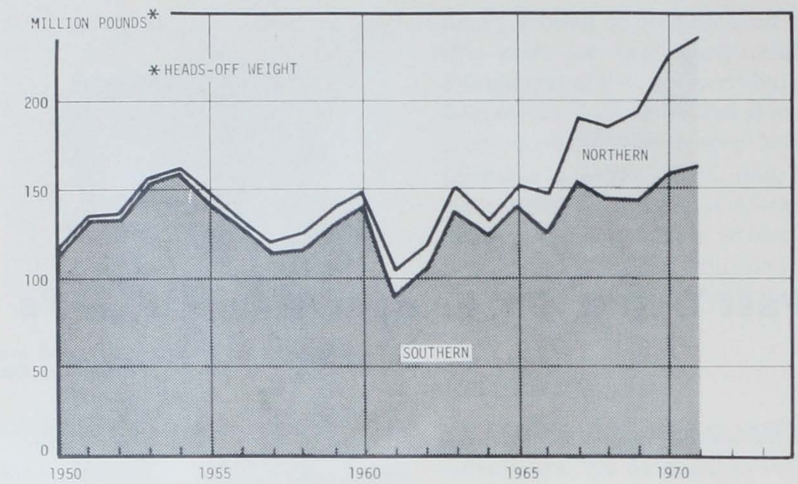

Figure 1.—U.S. shrimp landings, 1950-71.

counts for most of the shrimp landed in the region. Large untapped resources have been exploited, and the potential exists for further increases in production.

Imports Become An Important Source of Supply

After World War II, shrimp imports increased rapidly—from 8 million pounds in 1945 to 40 million pounds in 1950; however, this was only the beginning of a worldwide search for shrimp supplies which continues even today. In 1950, most imports came from other North American countries, principally Mexico (Table 2). By the late 1960's, only half of the shrimp imports were coming from North America while 29 percent were coming from Asia, 19 percent from South America, and small quantities from the rest of the world. Over the years, Mexico has been the largest supplier to the United States. Imports from Mexico reached a peak of 79.2 million pounds in 1961 and trended downward for the remainder of the 1960's; however, Mexico continued to lead all other countries. India exported only small quantities in the 1950's, but exports from there rose sharply in 1960's so that India became the number two foreign supplier to the United States. Panama consistently shipped large quantities throughout the 1960's and ranked third among all countries.

The general picture over the past two decades is one of rapid expansion in imports—8.8 percent per year (Figure 2). Since 1960, imports from North America have generally stabilized, indicating no discoveries of additional large shrimp producing areas.

When imports from North America began to stabilize, imports from South America increased rapidly from 11.8 million pounds in 1960 to 47.4 million pounds in 1970. Imports from Asia increased from 8.6 million pounds in 1960 to 57.8 million pounds in 1970; India has been the leading source, with Pakistan second and the Persian Gulf area third in importance.

Changes in Production Technology

The U.S. shrimp industry has tended to purchase large, more seaworthy vessels that enable it to range farther from home port. In the past, shrimp were caught primarily in shallow coastal waters. Now shrimp vessels move throughout Gulf of Mexico, Caribbean,

Table 1.—Changes in the absolute and relative importance of individual shrimp producing states, 1950-52, 1967-69, and 1971.

State and Area	PRODUCTION 1950-52 average	PRODUCTION 1967-69 average	PRODUCTION 1971	SHARE OF TOTAL PRODUCTION 1950-52 average	SHARE OF TOTAL PRODUCTION 1967-69 average	SHARE OF TOTAL PRODUCTION 1971
NEW ENGLAND		1,000 lbs., heads-off wt.			— — — Percent — — —	
Maine	30	8,650	9,864	[1]	4.6	4.2
Massachusetts	2	769	3,403	[1]	.4	1.5
New Hampshire	—	46	68	—	[1]	[1]
TOTAL	32	9,532	13,335	[1]	5.0	5.7
SOUTH ATLANTIC						
North Carolina	5,289	3,469	4,740	3.9	1.8	2.0
South Carolina	3,260	3,378	6,904	2.4	1.8	2.9
Georgia	5,191	4,992	5,722	3.9	2.6	2.4
Florida (East coast)	5,115	3,125	2,188	3.8	1.7	1.0
TOTAL	18,855	14,964	19,554	14.0	7.9	8.3
GULF						
Florida (West coast)	16,884	15,372	13,515	12.5	8.1	5.7
Alabama	3,684	9,359	10,459	2.8	4.9	4.4
Mississippi	9,591	5,980	5,909	7.0	3.2	2.5
Louisiana	47,101	47,673	58,630	34.9	25.1	25.0
Texas	36,730	53,654	54,372	27.2	28.3	23.1
TOTAL	113,990	132,038	142,885	84.4	69.6	60.7
PACIFIC						
California	564	1,183	1,226	.4	.6	.5
Oregon	—	5,941	3,707	—	3.1	1.6
Washington	34	656	422	—	.3	.2
Alaska	1,615	25,364	54,111	1.2	13.5	23.0
TOTAL	2,213	33,154	59,466	1.6	17.5	25.3
GRAND TOTAL	135,090	189,688	235,240	100.0	100.0	100.0

[1]Less than 1/10 of 1 percent.

and northern South American waters. The shrimp fishery in New England and the Pacific States is conducted in nearby coastal waters.

The number of shrimp vessels and boats increased from 7,193 in 1950 to nearly 12,000 in 1970. This increase in fishing craft has been fairly steady over time. The number of vessels (5 tons or over) reached a peak of 4,773 in 1970. The gross tonnage of all vessels is a better indicator of trends in the fleet than number of actual vessels. Even though the number of vessels rose only slightly in the 1960's, the total gross tonnage increased from 142,000 tons in 1960 to 238,000 in 1970. So the capacity of the fleet has grown because of increasingly larger vessels. The overall increase in craft and fishermen has caused only a slight increase in southern shrimp landings. The number of shrimp fishermen increased from 15,600 in 1950 to 23,000 in 1970.

Shifts in Utilization

A striking shift in utilization of shrimp has occurred over the last 20 years. With the increased demand for convenience foods, processed shrimp has provided a larger outlet for those producing shrimp, as the convenience aspects appeal to the more affluent buyers. At the same time the fresh market has declined in importance.

Trends in Consumption

Past utilization trends provide the basis for examining the changing pattern of shrimp consumption. Changes in consumption patterns generally reflect the interaction of various factors such as supply, price, income, population, demand, and consumer preference and tastes.

Total consumption of shrimp in all product forms has risen spectacularly. Annual shrimp consumption rose from 140 million pounds, heads-off, in 1950 to 412 million pounds in 1970—increasing at an average of 13.6 million pounds per year (Figure 3). Since 1970, consumption has averaged over 1 million pounds per day.

Table 2.—Changes in the absolute and relative importance of individual countries exporting shrimp to the United States, 1950-52, 1967-69, and 1971.

COUNTRY	IMPORTS			SHARE OF TOTAL IMPORTS		
	1950-52 average	1967-69 average	1971	1950-52 average	1967-69 average	1971
	— —Million Pounds— —			— — — Percent — — —		
Mexico	37.7	62.1	74.6	93.8	32.8	39.0
India	[1]	24.9	22.8	—	13.1	11.9
Venezuela	[1]	5.4	10.1	—	2.8	5.3
Panama	1.8	10.6	9.3	4.5	5.6	4.9
Guyana	—	8.4	9.0	—	4.4	4.7
El Salvador	—	5.4	6.7	—	2.8	3.5
Nicaragua	—	5.9	5.6	—	3.1	2.9
Ecuador	[1]	7.1	5.3	—	3.7	2.8
Colombia	[1]	3.1	4.8	—	1.6	2.5
Brazil	—	1.8	4.4	—	.9	2.3
French Guiana	—	6.8	3.8	—	3.6	2.0
Honduras	—	2.9	3.9	—	1.5	2.0
Trinidad	—	2.5	2.4	—	1.3	1.3
Guatemala	—	1.6	2.3	—	.8	1.2
Costa Rica	[1]	1.8	2.3	—	.9	1.2
Australia	[1]	1.1	2.7	—	.6	1.4
Kuwait	—	6.5	2.2	—	3.4	1.1
Surinam	—	2.7	2.1	—	1.4	1.0
Thailand	—	2.7	2.0	—	1.4	1.0
Barbados	—	2.1	—	—	1.1	—
Other	.7	24.2	15.0	1.7	13.2	8.0
TOTAL	40.2	189.6	191.3	100.0	100.0	100.0

[1]Less than 50,000 pounds.

Shrimp consumption advanced more rapidly than the growth in population; consequently, per capita consumption doubled in the past two decades. Per capita consumption rose from 0.92 pounds, heads-off weight, in 1950 to 2.02 pounds in 1970.

Most of the increase in shrimp consumption has been in frozen shrimp. Growth in fresh and frozen shrimp consumption compared with the growth in consumption of canned shrimp is indicated in the following table:[1]

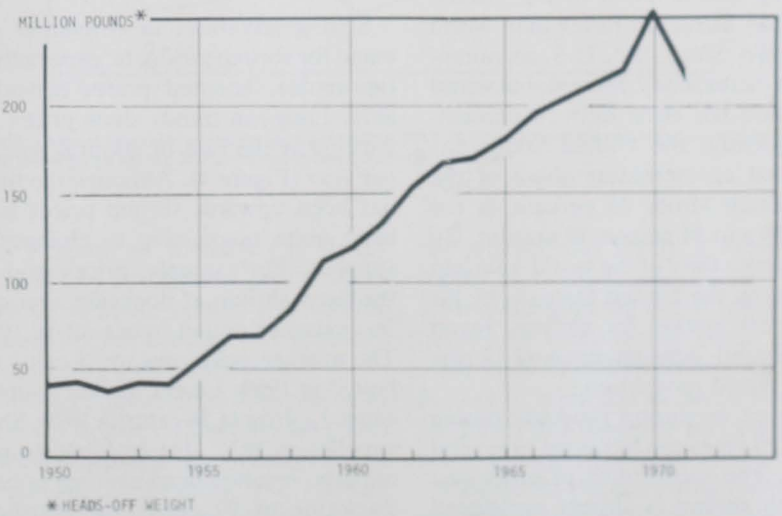

Figure 2.—U.S. shrimp imports, 1950-71.

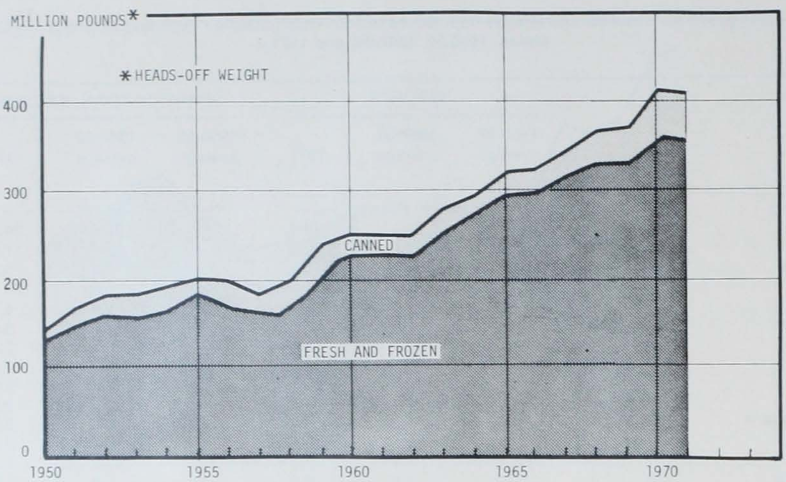

Figure 3.—U.S. shrimp consumption, 1950-71.

Year	Fresh and Frozen	Canned
	Million pounds, heads-off	
1950	118	22
1955	179	22
1960	228	24
1965	290	24
1970	357	56

[1]Consumption of fresh shrimp has been declining, but actual figures are not available.

Consumption of canned shrimp rose only slightly from 1950 to 1967. However, between 1967 and 1970, canned shrimp consumption doubled. Canned northern shrimp accounted for most of the increase in recent years.

Shrimp consumption in the United States has increased faster than world production. Since 1955, U.S. consumption has increased 82 percent, but world production has risen only 58 percent. Consequently, the United States has consumed an increasing share of the world catch—from 26 percent in the mid-1950's to 34 percent at present. By consuming a third of the world's shrimp production, the United States is by far the largest market for shrimp. Japan ranks second, consuming about 15 percent of world production.

Changes in shrimp products during the last 20 years can be traced to several factors. The substitution of processed for fresh shrimp is closely associated with changes in consumer tastes and preferences, living patterns which include more working wives and convenience in shopping. Processed shrimp are essentially convenient and timesaving foods. As family income rose, consumers were willing to pay higher prices if necessary to obtain such "built-in" services.

Development of new or modified product forms, improved quality in processed products, and year-round availability have also contributed greatly to the increase in consumption of processed shrimp.

Prices Increase

Strong advances in consumer demand for shrimp products, especially in the sixties, boosted prices considerably. Long-run trends show prices advancing at the rate of about 6 percent per year (Figure 4). Although the trend has been upward, shrimp prices have been quite responsive to changes in supplies. For example, prices paid for southern shrimp at dockside averaged 36 cents per pound heads-off in 1950. The average price rose to 83 cents per pound in 1969. Larger market supplies caused a drop to 76 cents in 1970. Short supplies in 1971, due to a big drop in imports, resulted in an average price at dockside of 97 cents for southern shrimp.

Besides the overall increase in shrimp prices, other interesting trends are evident in dockside prices for southern shrimp. The larger the shrimp, the greater has been the rate of increase in price. Prices of small southern shrimp, 70 count and more, have increased little in the past decade. Medium shrimp have risen by 4 to 5 percent per year while larger shrimp have increased 7 to 8 percent per year. This means that the spread in price between the smallest and largest shrimp has widened considerably (Figure 5). A decade ago, a fairly constant margin of 4 to 5 cents was quoted between each size of southern shrimp. By the late 1960's, these relatively constant margins no longer existed. Price spreads between the various sizes ranged from 5 cents to 25 cents or even more. Consequently, buyers began to shift purchases to smaller sizes more often than before. For example, if a restaurant found the price of 21-25 count shrimp too costly, it simply bought 26-30 shrimp at a lower price rather than cut down on the size of a serving or reduce the number of shrimp in a cocktail.

Because of the small size of northern shrimp, fishermen normally receive one price for their entire catch. While southern shrimp fishermen received 97 cents per pound for their catch in 1971, northern shrimp fishermen received 8 cents per pound. Several reasons exist for this apparently large discrepancy in shrimp prices. Because of their size, northern shrimp are not headed on board vessels as southern shrimp are. Also the edible meat yield from a northern shrimp is considerably less than from a southern shrimp. Probably the major reason for the difference in price to date is the taste and preference of consumers. The majority of American consumers are familiar with the larger southern shrimp, which has a different taste and texture.

Exports

Exports of U.S. shrimp products began a strong upsurge in the early 1960's that, except for a few short downturns, continues at present. This provided an outlet for nearly a fifth of domestic catches in recent years.

Overseas sales of frozen shrimp ranged between 1 and 2 million pounds in the 1950's. They increased from 3 million pounds in 1960 to 30 million pounds in 1970. Foreign markets for frozen southern shrimp developed slowly, reaching 8 million pounds in 1967. The jump in exports of frozen shrimp to 12 million pounds in 1968, 25 million pounds in 1969, and 30 million pounds in 1970 was primarily the result of opening new markets for northern shrimp in Western Europe and Scandinavia. Exports of canned shrimp expand gradually from 2.2 million pounds, heads-off weight, in 1950 to 11.2 million pounds in 1970.

In the 1960's exports also increased because of transshipments of foreign shrimp through the United States. Japan relaxed import controls on shrimp in 1961 in order to meet the growing demand for shrimp in that country. One of Japan's principal suppliers has been Mexico. Because of a lack of port facilities on the West Coast of Mexico, much of the production from that area destined for Japan is transshipped through California to Japan. Transshipments reached a peak of 15.9 million pounds in 1967; in 1970 they were 14.7 million pounds.

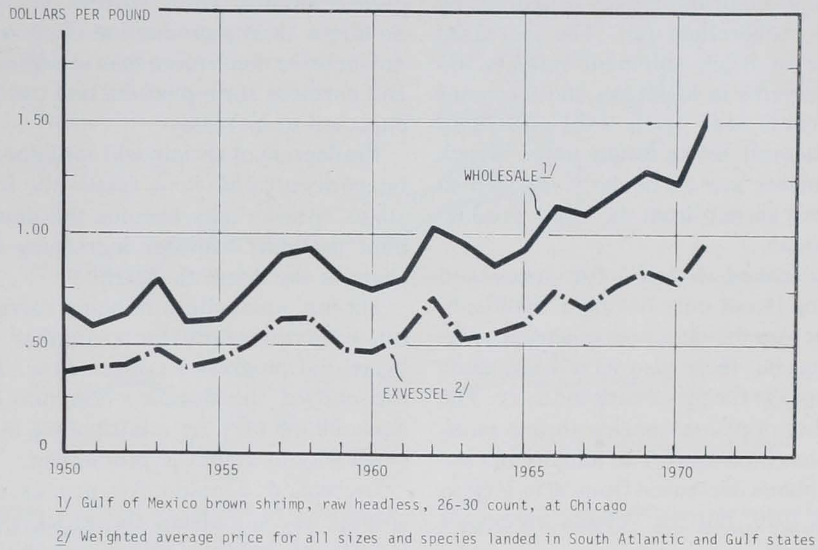

Figure 4.—Annual prices for southern shrimp, 1950-71.

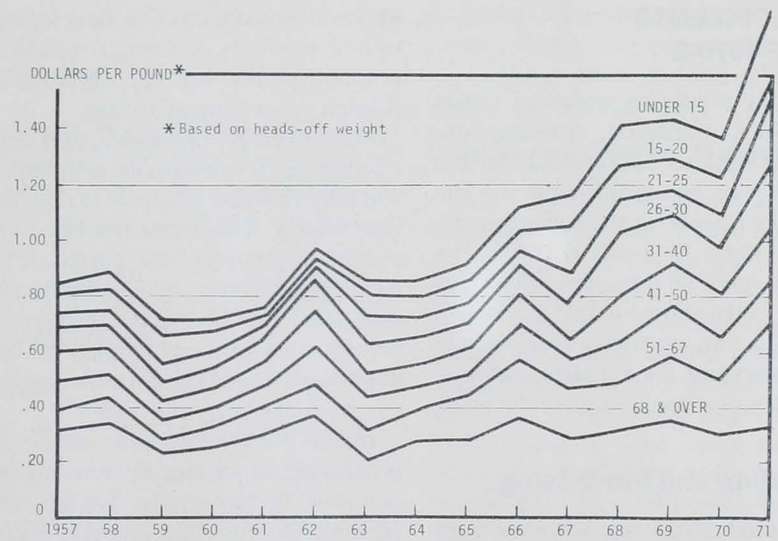

Figure 5.—Annual ex-vessel prices for southern shrimp, 1957-71. Small shrimp (68 count and over) have increased little in price; large shrimp (under 15 count) have increased greatly.

Changes in Marketing and Processing Industry

As a result of the changes in supply and demand many adjustments have taken place in marketing and processing of shrimp.

The growth of supermarkets with their emphasis on merchandising of uniform quality products plus expanded geographic production and improved transportation have resulted in a shift to direct marketing of shrimp. The old marketing system from fisherman through local buyer to wholesale market and retailer is less prevalent. Many fishermen deliver to shipping points which have also become the assemblers and first handlers.

As a result of increases in direct purchases by institutions and retailers at major shipping points, the volume handled by wholesalers has probably been growing only moderately.

Shifts in consumption from fresh to processed frozen shrimp have been also associated with changes in marketing of shrimp for processing use. As an increasing proportion is processed, processors want the fishermen to maintain quality and insure a dependable supply.

Here the growing use of imports has helped in eliminating some of the seasonality in shrimp processing. Also, the use of contracts between overseas producers and domestic processors has become more important.

Changes in the marketing system and equipment have brought changes in the transportation of shrimp. An increasing portion of shrimp moves to market by truck rather than rail. The increased share of truck shipment reflects improvements in highways and increases in truck size with well-equipped mechanical refrigeration units. Truck shipments are particularly adapted to receive shrimp from the many producing areas.

Increased demand for processed shrimp is not only having a significant impact on the structure of shrimp marketing, but there also have been many changes in the processing industry. The number of plants freezing shrimp products has increased. The number of canning plants decreased from 50 in 1950 to 37 in 1970, but the volume processed increased.

PROSPECTIVE DEVELOPMENTS IN THE 1970'S

With the preceding review of trends in supplies, utilization, consumption, and marketing as background, further changes can be anticipated for the 1970's. Prospects for the shrimp industry, like those for other fisheries, depend on many factors—not only those peculiar to the shrimp industry, but also those affecting consumer incomes and preferences and the supplies and relative costs of closely competing products.

Harvesting and Processing

Increased efficiency together with continued increases in use of capital will contribute to more specialization in shrimp harvesting and processing. Many small and marginal vessels and plants may be forced to become more efficient or go out of business. Growth in the total number of shrimp vessels is likely to slow somewhat from the heavy rate of construction in the late 1960's and early 1970's. The number of plants with larger sales will increase. Relatively high costs for labor will lead to continuing substitution of mechanization.

Domestic shrimp landings may increase slightly from current levels. Southern shrimp production likely will not increase much more than at present. But northern shrimp production can be expected to increase.

Production of shrimp will continue to be concentrated in a relatively few states. Alaska may become the dominant producer—further increasing its share of the domestic catch.

Shrimp aquaculture is being carried out experimentally by a number of firms, but progress has been slow. By the end of the decade, commercial aquaculture may be contributing in a small way to domestic production.

Increased demand for processed shrimp has stimulated the processing industry to improve plants and equipment. Some small processors will either discontinue operations or merge with larger, more efficient operating units. More efficient processing, development of new products, and improvements in product quality will contribute to expanded processing of shrimp.

More overseas processing may occur as countries try to earn more dollars by shipping finished products rather than raw shrimp. This trend has been very evident in imports of raw peeled shrimp which more than doubled between 1964 and 1970. At present, imports of breaded shrimp are practically nil, and imports of canned shrimp are small relative to domestic production.

In the decade ahead, it seems that processing of shrimp by freezing will continue to grow more rapidly than canning. Drying will continue to decline in relative importance.

Demand

A rising standard of living, increased employment of women, and the desire for more leisure time will contribute to the growing demand for convenience foods. Processed shrimp with their reduced perishability, standardization, and longer shelf life provide the housewife with a year-round choice of shrimp products.

Total demand for shrimp will increase in the years ahead due mainly to the population growth and continued increase in personal disposable income. Per capita shrimp consumption is expected to increase during the 1970's but probably not as fast as in the past two decades. Shifts in consumer preference from fresh to processed shrimp will continue.

Imports

The expected increase in consumption during the 1970's will be possible only if imports of shrimp continue upward.

In the 1960's imports from other North American countries tended to level off after the rapid growth of the 1950's. Imports from North America have been about 90 to 100 million pounds in the last 10 years. This would seem to indicate that all major producing areas in other North American countries have been exploited. The year-to-year changes in imports probably now reflect changing abundance in these countries. Another increase in the 1970's does not appear likely.

Asian shrimp resources are being rapidly developed. Imports from that area likely will comprise a greater part of our total imports in the 1970's. Imports from Africa likely will increase also.

World Competition for Shrimp

The domestic industry will continue to face keen competition from foreign sources for available shrimp supplies. Further increases in imports are likely. However, their rate of growth may not be as fast as experienced during the past two decades. Estimates of the maximum sustainable yields (MSY) for the many species of shrimp around the world total 1,487,000 metric tons (Fullenbaum, 1970). In 1970 the world catch of shrimp was 930,000 tons (FAO, 1971). As of two years ago, the catch was at 63 percent of the estimated MSY; it is probably near 70 percent at present. For the past two decades, world shrimp catches have been increasing at an average annual rate of about 5 percent (Figure 6).

If this rate continued during the decade of the 1970's, shrimp catches would be at the estimated MSY by 1980.

Two forces are expected to be at work which will tend to slow down the rate of increase in our imports and at the same time tend to push world prices upward. First, as production nears MSY, the discovery of new resources becomes more costly. Shrimp resources of a marginal nature will come into production, but only if prices increase enough to make operations profitable. In other words, the cost of catching the last 10 percent will be greater than the first 10 percent of a virgin stock. Second, world competition for available shrimp supplies is likely to increase, driving prices up even further. The competition is expected to come from Japan and Western Europe.

Japan has been a factor in the world shrimp market since the early 1960's when import restrictions on shrimp were lifted. Japan generally paid a premium price, but her purchases were only a small part of total world production. Demand has increased so sharply that Japan, like the United States, now imports more shrimp than she produces domestically. In the mid-1960's Japan began an aggressive program of joint ventures in several shrimp producing nations. There investments are now producing an increasing flow of shrimp to Japan.

In 1973 a new government agency in Japan is expected to be created to help industry continue its expansion in fisheries around the world. As the 1970's began, competition with Japan for shrimp supplies was quite noticeable, and it is expected to continue keen in the years to come.

Although the United States and Japan consume half of the world shrimp catch, shrimp exporting nations have a third large market available—the Common Market countries of Western Europe. The Common Market has a combined population a little larger than that of the United States. The combined economies of these countries are equivalent to about 80 percent of the U.S. economy. Thus, the Common Market will be a strong competitor of the United States.

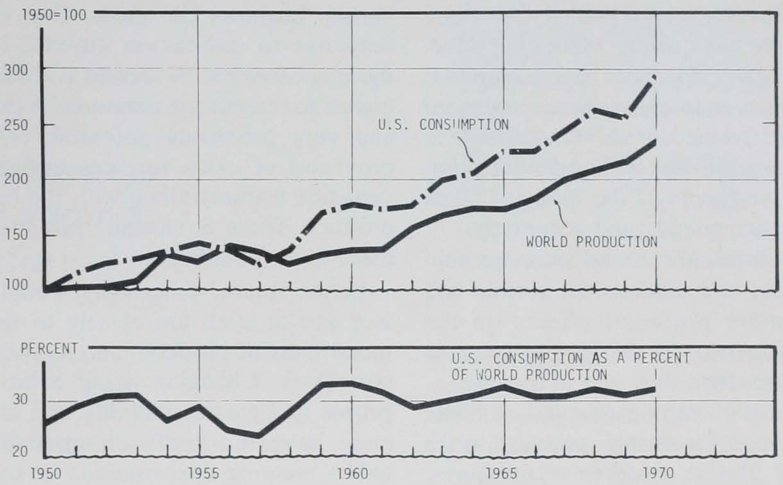

Figure 6.—During the past two decades, world production of shrimp has been increasing at an annual average rate of about 5 percent (upper panel). U.S. consumption has been increasing more rapidly, reaching (lower panel) about one-third of world production in the past few years.

Marketing

With retail chains getting larger, more shrimp likely will be purchased directly. Large institutional buyers will also tend to buy directly. However, wholesalers with a decreasing share of the market will continue to exist as outlets for specialty items, and likely will offer a wider range of services.

Prices

Even though supplies of shrimp may moderately outrun gains in population over the decade, rapid advances in consumer demand point to continued favorable dockside prices, especially in the southern fishery. Prices for processed shrimp products have been increasing at a rate of 6 percent per year for the past decade. Assuming a continued strong demand, this trend likely will continue and possibly at an even higher rate.

Exports

The volume of U.S. shrimp exports likely will continue to expand in the 1970's. This increase assumes a growing world demand and a continuation of present trends in world shrimp output. Biggest gains in volume are likely for frozen northern shrimp. Only slight increases appear likely for frozen southern shrimp, while exports of canned shrimp may change little.

Distributing Shrimp Output

Fishermen, processors, and distributors in recent years have tended to work more closely together to reduce some of the uncertainties in supplies which characterize the shrimp industry. Trends have been toward contracting catches both here and abroad. Processors have merged with large national food concerns. The more efficient production-marketing system that is slowly evolving will contribute to steadier earning flows for fishermen and marketers in the shrimp business system.

CONCLUDING COMMENTS

Substantial improvement in economic performance of the shrimp industry during the past two decades is clearly evident. Total output of product and services by the industry has risen almost steadily. Recognition has been given to shifting and varying preferences of consumers. Progress has been made in the development and adoption of advanced technology.

Improvements in pricing efficiency also have been made. Marketing information programs have been expanded, all levels of industry are better and more equally informed, grade standards are in more general use, and communication among segments of the industry takes place more quickly and accurately.

Developments abroad in foreign supply areas and markets for shrimp will have more profound effects on the shrimp industry in the United States in the future than they had in the past.

Even with strong demand at home and abroad for shrimp produced in the United States, competitive pressures, developed through cost-reducing innovations, likely will increase and intensify. Prices will tend to reflect costs of more efficient operators. The more progressive processors probably will be taking advantage of all available opportunities for reducing procurement, plant, and distribution costs, and, as a result vertical integration and merger may become more prominent features.

There are three ways in which the shrimp business can grow. One is in response to population growth, i.e., more consumers. A second is through higher per capita consumption. A third, and very promising potential, is the provision of extra services and convenience features along with the basic product. There is virtually no limit to these latter possibilities.

In the future, processors would do well not to stick too closely to traditional lines of products and marketing structures. Changing living habits of people and greater mobility and affluence have markedly changed food habits creating opportunities in snack foods, barbecue, catering, franchised outlets, and drive-ins, plus new foods for the kitchen which require a minimum of preparation. The successful shrimp processor of the future will be highly market-oriented and constantly innovating.

A continuing future challenge for the shrimp industry is in the development of foreign markets, particularly for northern shrimp. Price and consistency of supply are main limiting factors in shrimp trade expansion. U.S. shrimp prices are probably high relative to most shrimp-surplus-exporting countries. A dependable export business cannot be built on uncertain, fluctuating supplies.

For continued survival, more effective progress through early adjustment to change and achievement and maintenance of relatively high levels of efficiency will be required. In general, however, the future offers challenging opportunities for the industry and for the individual or firm with foresight to see the possibilities, with the ability to plan carefully and continuously, and with the capability and willingness to make adjustments.

LITERATURE CITED

Food and Agriculture Organization of the United Nations. 1971. Yearbook of Fishery statistics. Vol. 30, 476 p.

Fullenbaum, Richard F. 1970 MS. A survey of maximum sustainable yield estimates on a world basis for selected fisheries. Econ. Res. Lab., NMFS, NOAA, U.S. Dept. of Commerce, 78 p.

MFR Paper 981. The paper above is from Marine Fisheries Review, *Vol. 35, Nos. 5-6. Copies of this reprint, in limited numbers, are available from D83, Technical Information Division, Environmental Science Information Center, NOAA, Washington, DC 20235.*