The Contribution by the Outboard Motor to the Mechanization and Development of the Fishing Industry

ERNST OTT
Outboard Marine International, S.A., Nassau, Bahamas

THE MECHANIZATION OF FISHERIES through the medium of the outboard motor has improved the economy and raised the standard of living in more than a score of countries throughout the world during the past six years.

Everyone recognizes the importance of raising economic levels, but many are inclined to ignore one result of increased fisheries production which today assumes an importance equal to that of economy—improved nutrition and a better balanced diet. Increased wealth is important only when it provides a corresponding rise in health.

The Food and Agriculture Organization of the United Nations, which has been conducting a world-wide survey of food requirements, reports that today there are millions who do not have *enough* to eat, and additional millions who do not have enough of the right kind of food to be well and strong. This survey, in which the 76 member states cooperated, reveals that by 1980 the world cereal production must be almost doubled and the fish production increased by more than 80 per cent if the population is to be fed at present levels. At the same time, the report stresses the fact that the present levels are not adequate.

The world production of fish is approximately 30 million tons, of which 75 per cent is produced by only eight countries: Japan, United States, China, Russia, India, United Kingdom and Canada. The rest of the world, and this includes nations where animal proteins are in dangerously short supply, contributes less than 25 per cent of the world's fish.

During the past six years this picture has gradually been changing, and if the mechanization programs carried out by government agencies and private organizations of many countries are continued, the improvement will be accelerated.

The outboard motor, for many years viewed as a recreational toy, has been responsible for the improvement of numerous small craft fishery programs and in some instances has been responsible for increases in fish production of more than 1,000 per cent.

In the areas of major production, the large fishing vessel produces the major portion of the marine crop. But in the majority of the fishing grounds throughout the world the use of a large, costly vessel would be economically impossible, as the fishing methods could not be accommodated to local fishing conditions.

This places the responsibility for fish production on small craft, normally one-man or two-man operations. Restricting the propulsion of such craft to sail, oar and paddle limits the range of the boat to waters in the immediate vicinity, and precludes the possibility of the fisherman harvesting more productive waters. At the same time, it seriously restricts him as to markets, which would provide a more lucrative return from his limited catch.

The mechanization of these small fishing craft by means of the outboard motor, which has proved adaptable to every form of local boat, has been possible because of the low initial cost and economical operation of these

propulsion units. The extended operating area resulting from such mechanization has made it possible for the fisherman to reach productive fishing grounds that were formerly too distant for practical use. At the same time, it permitted him to reach better markets in a shorter time and receive a higher return from a larger catch. The improved economy and the resulting standard of living has a beneficial effect on the national economy as well as raising the nutritional level.

Some of the larger, wealthier, and healthier countries are unable to appreciate the importance of fish to nutrition, or to national health. Unfortunately, children are the real sufferers from the illness resulting from diet deficiencies. These ailments, stemming from a common source, have many names. In Central Africa it is "kwashiorkor," in South Africa "infantile pellagra" and in Jamaica "fatty liver disease" or "sugar baby." All stem from lack of protein and in many areas the only protein source, because of the twin factors of availability and cost, is fish.

Surveys have revealed that localities where mechanization has resulted in greatly increased fish production have shown an almost immediate decrease in nutritional ailments, a lower infant mortality rate and a higher health incidence.

The development of outboard motors in higher horsepower units has done much to stimulate the commercial application of this compact power plant, especially among commercial fishermen. Prior to mechanization few small fishermen could afford to install an expensive inboard engine, which normally calls for extensive change in boat design or the purchase of a boat designed for inboard power. Also, only a small portion of the boats used were adaptable for inboard installation.

The outboard, in addition to being available at a lower cost, offering a horsepower range sufficiently wide to insure adaptability, and being adaptable to almost every type of small fishing craft, was simple to operate and insured easy maintenance. These factors were of major importance, even in instances where government-sponsored mechanization programs provided long-term loans for the purchase of motors and fishing gear. Few such programs were sufficiently financed to permit broad mechanization if large diesel or gasoline engines were to be employed. It was learned that a dozen small craft could be mechanized by means of the outboard motor for the cost of one inboard installation.

A number of government fishery agencies as well as the F.A.O. have made surveys to determine the exact degree of economic benefits derived through outboard mechanization. The greatest benefits have been obtained by the smaller nations, which has proved fortunate, as many of these countries stood in greater need of economic improvement as well as improved nutritional conditions.

The experimental outboard mechanization program carried out by Puerto Rico is an outstanding example of the benefits to fishery production.

During the fiscal year 1958-59 the program provided motors for 21 fishermen, and the following year an additional 116 were provided. The government loan amounted to $37,714, with $3,976 invested by fishermen.

In January 1960 a study was made to determine the effect of the mechanization on fish production and on the fisherman's income. A sample cross-section involving 39 fishermen was checked. The average weekly catch jumped from 134 to 201 pounds, or approximately 50 per cent. The 39 fishermen increased their annual fish production by 68.5 tons. The average gross income of these

fishermen was $26.19 before mechanization and $39.47 afterward, representing an increase, after expenses, of $360 a year per fisherman. For the commercial fisherman whose annual income prior to mechanization was around $1,000, this represents a marked increase.

Felix Inigo, chief of Puerto Rico's Fish and Wildlife Section, reports that the program is being accelerated and with 365 of the 1,091 fishing craft now mechanized, the entire fleet should be mechanized by 1965. The results have been so satisfactory that the program has been extended to cover other phases of the fishing industry. Loans are now being approved for the improvement of boat yards and for transportation facilities to market the catches.

On the basis of increased production, the results of outboard mechanization in the fisheries of Ceylon show the most marked improvement. A survey by the F.A.O. was made in three typical fishing areas, Ambalangoda, Balapitiya and Kalutara. A total of 30 fishing craft were included in the survey, 15 mechanized and 15 non-mechanized. The mechanized fleet docked with a total weight of 3,190 pounds of fish with a value of 2,120 rupees. The non-mechanized fleet, during the same period, brought in a total of 193 pounds, with a value of 230 rupees. In this instance mechanization resulted in a production increase of more than 900 per cent, in terms of increased income.

In Ceylon, as in several other countries, the initial steps in mechanization created problems that were solved by education and example. Many of the fishermen, especially in the more isolated areas, were completely lacking in any knowledge of things mechanical. Individuals knew the advantages and limitations of propulsion by sail and oar, but many of them had never seen a motor. Despite the simplicity of operation of the outboard and the ease of maintenance, it was necessary to carry out a course of instruction that would insure elementary mechanical aptitude.

The F.A.O., convinced that mechanization was the only means of increasing fish production in Ceylon, found the average fisherman apathetic concerning the advantages of mechanical propulsion. The initial program involved three fishermen, who were provided with motors with the understanding that if they did not find them satisfactory after a six-month trial they could return them without cost. One fisherman gave up after a three-month trial. The other two persisted, and the increased catches so influenced other fishermen that more than 100 negotiated for motors. The interest in mechanization eventually reached the point where some fishermen began building boats with motors and chartering them to those in neighboring villages.

With the increase in mechanized craft came improved communications. Fishermen able to transport their catches to more distant and remunerative markets made the return trip to their villages with goods that otherwise would have had no distribution. The resulting increase in income stimulated trade in many products, resulting in better living conditions and a greatly improved standard of living. The fisherman, now able to afford items that formerly were classified as luxuries, stimulated the production of these items, which in turn benefitted other fields.

One government official described the introduction of the outboard as having "created a wake that washed prosperity in many forms to the shore of the waters of its origin."

Another effect of mechanization was to partially eliminate the insular character of the more isolated areas by opening up communications with distant

villages and bringing about the exchange of cultures previously impossible. The benefits in many instances have been cultural as well as economic.

Several countries, such as Mexico, Colombia, the Republic of Senegal and several others, introduced mechanization without the benefit of governmental programs. In some instances the development was initiated by fishing cooperatives, in others by the zeal of distributors who arranged the sale of motors to fishermen on a finance plan.

The development of mechanization itself was not without its problems. In most instances this involved maintenance and repair. This was solved in several ways. In one instance a fisherman's cooperative in Malaya set up a repair shop staffed by a trained mechanic, and carrying supplies of necessary spare parts. In the Republic of Senegal, West Africa, a distributor organized a mobile repair shop in the form of a truck, staffed by a mechanic who not only carried out repairs but instructed in both maintenance and repair. This truck made regular visits to all fishing areas. In several instances the government provided these facilities as part of its mechanization program.

Jan-Olof Traung, chief of the Fishing Boat Section of F.A.O., speaking at the International Economic Conference on Small Craft for Fisheries and Transportation last May, urged that the development of fishery mechanization be initiated by individuals and groups in countries where governmental programs were not available.

"Even in those countries where such programs are scheduled, they are often delayed. Governmental action is normally slow, as the agency charged with effecting the program faces problems that are not encountered by individuals or private organizations. The formulation of rules and regulations for financing often requires months, and the very machinery of investigating individual cases is slow, resulting in costly delays."

The conference on Small Craft for Fisheries & Transportation, sponsored by Outboard Marine Corporation and OMISA, was attended by ambassadors, consular officials and fishery representatives from 37 countries. It served to disseminate information on the application of outboard motors in commercial fishery and transportation activities in a score of countries. A number of papers were presented on the successful methods of mechanization employed throughout the world, with detailed information on the problems encountered and their solution.

Financing has proved to be an obstacle in many areas where mechanization would have been extremely productive. Even in localities where boats are suitable and the fishermen are eager to obtain power for their craft, they lack the means to purchase equipment. Often local merchants, while aware of the potential, do not have sufficient funds to establish time-payment programs. In some cases outboard distributors and dealers in the Republic of Colombia established programs through local banks which made it possible for capable fishermen to finance motors. This practice has also proven to be successful in Tanganyika and Trinidad and is being encouraged by Outboard Marine International S.A., which provides information on the organization of financing programs.

In Chile the initial mechanization program was started by a merchant, who sold them to fishermen on a hire-purchase basis. The development was slow initially, as the merchant was unable to afford long-term financing. However,

when other fishermen recognized the advantages offered by the outboard they made every effort to avail themselves of mechanization.

In some instances the governments themselves, indirectly, prevented the growth of mechanization by failing to reduce the tax on gasoline for commercial fishermen, which resulted in prohibitive operating costs. Several governments recognized this situation and took steps to eliminate the problem. Jamaica led the way in this development.

Following the inception of a sound mechanization program, which made outboard motors available to fishermen on long-term loans, the Jamaican government provided ready-mixed gasoline to fishermen free of "all" tax. The normal price of gasoline in Jamaica was 56 cents per gallon, but commercial fishermen were able to buy it at one-half this price. As the oil was mixed with the gasoline prior to sale, there was no problem involving the diversion of this fuel to the operation of other vehicles. As a result of these forward steps, fishery production in Jamaica has multiplied, resulting in a marked improvement in the economy.

Among the international organizations which have turned to the outboard as a means of improving living conditions, the program initiated by CARE provides an excellent example. Begun in the Philippines, this program is being extended to other areas.

Restricted catches resulting from a lack of mobility prevented fishermen in many Philippine villages from taking advantage of productive fishing grounds. CARE improved these conditions by providing one of the boats with a motor, making it possible to tow several other craft to distant fishing grounds where greatly increased catches were possible. This resulted in improved living conditions in each village where the program was tried. The success of the CARE plan led to a decision to expand this program to other countries during 1961.

The Outboard Marine Corporation (OMC) has a deep interest in such far reaching programs which are aimed at improving conditions for mankind, particularly in under-developed countries. In the case of CARE for example, that organization maintains 30 missions throughout the world. Conveniently enough, OMC has had distributors in those countries for many years. The objectives of both CARE and OMC, as a joint venture, are to assist local fishermen to mechanize their craft by means of outboard motors.

It is not the intent of such joint programs to saturate any given area with outboards. The principal target is to develop a number of pilot projects designed to assist fishermen to extend their area of operation, to enable them to increase the time they allot for fishing, and to permit them to return to market more rapidly, without suffering spoilage.

In areas where such pilot projects show effective results, they will be continued as a large scale operation. The Outboard Marine Corporation donated 50 outboards to CARE to initiate the program.

The adaptability of the outboard to local craft of varied design, size and displacement has enhanced the value of this power plant to the commercial fisherman. Motors are available with standard or long shaft, insuring acommodations to transoms of various height, and propellers of assorted pitch and diameter are available which permit the motor to be adapted to light or heavy loads. The horsepower range of the outboard now available from 1 to 80 h.p., provides a versatility that cannot be matched by inboard engines.

In addition to its contribution to the increased production of fisheries, the

outboard has made it possible to establish transportation routes in areas where waterways were the only highways. In addition to improving communications with isolated communities, the introduction of the outboard in such areas as Brunei State, Borneo, Thailand, Indonesia, The Philippines, and several others, led to the use of other mechanical equipment. In many instances the transportation of such equipment was made possible only by the use of outboard-powered craft.

The improved transportation facilities that resulted made it possible for the farmer and planter to get his products to market faster and at a lower cost, with a resulting improvement in economy.

In addition to health improvement attained through the increased production of fish and the attendant increase in the protein requirement, the outboard made improved medical care available, even in isolated areas. In the Bahamas, for example, a medical officer is now able to serve a dozen communities through the use of an outboard boat. In times of disaster, medical aid, food and relief equipment can be transported without delay, which has resulted in the preservation of life and property.

A score of examples can be pointed out, highlighting use of the outboard during times of disaster. They serve to transport relief equipment conveniently and without delay. When spring tides, swollen rivers and northwestern gales spilled flood waters over Holland's dikes last year, creating one of the most disastrous inundations in the country's history, the Dutch Red Cross and the Corps of Engineers put outboards into operation in flooded area, with excellent results.

Outboards, in the service of the Royal Danish Life Saving Squad, have played a vital role negotiating treacherous waters. The British Navy's salvage squads frequently depend on outboards. When flood waters of the Kariba Dam in South Rhodesia threatened to wipe out thousands of helpless animals, rescue teams, using outboards, transported and guided them to safety.

Outboards are used, and have been used in many areas, under many different circumstances and conditions throughout the world. No longer can the outboard motor be regarded as a recreational toy. In more than a score of countries where recreational boating is little known, the outboard has proved to be an important industrial workhorse, with a potential that even today has not been fully explored.

Effects of Pesticides on Commercial Fisheries

PHILIP A. BUTLER
Bureau of Commercial Fisheries
Gulf Breeze, Florida

THE NEED FOR AN EXTENSIVE and continuing research program to determine the effects of agricultural chemicals on our fish and wildlife resources has been apparent for many years. The ever-increasing amount and variety of these chemicals in use on farms and forests have made the problem one of national concern. More recently, the need for comprehensive studies in the estuarine environment has been recognized, and various agencies have initiated limited