

Fish as food

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Hunger, malnutrition and poverty rule the lives of hundreds of millions of people, the vast majority of whom is in the developing world. With an estimated 450 million undernourished people in the world today, the search for practical solution to the problem of feeding the hungry has never been more urgent. The part fish could play in this was the major focus of the World Conference on the Fisheries Management and Development held at the FAO Headquarters in 1984.

Of the world's total protein intake, fish contributes about 1 percent, but enough fish is available to raise this figure to 10 percent. Campaigns to eat more fish have taken place in many countries where it is available. Fish farming is being developed but progress is slow.

Fish harvesting has a great advantage over animal husbandry in that it does not require agricultural land whereas animals compete with humans for land for the production of feed and food. In many parts of the

world, land is becoming scarce even for food production. With increasing population and less available agricultural land, less and less acreage will be available for animal husbandry.

The world fish catch was about 75 mt in 1982. Almost 90 percent came from the sea. Of the present world catch, some 52.5 mt or 70 percent goes for direct human consumption either fresh (14.5 mt), frozen (16.8 mt), cured (10.8 mt) or canned (10.4 mt). The remainder of the catch, approximately 22.5 million tonnes is converted into fish meal used for food and animal feed.

The demand of fish, especially for direct human consumption, continues to increase rapidly. Average per caput fish consumption is 11.6 kg per year. To maintain it, annual production will need to exceed 100 million tonnes of food fish by the year 2000.

NUTRITIVE VALUE

From nutritional point of view, fish is comparable to meat

and dairy products. It contains some 18-22 percent easily digested protein and in common with other animal proteins, essential amino acids that the human body cannot manufacture. In particular, the high percentage of the amino acid lysine in fish makes it an extremely efficient supplement to the low protein, high carbohydrate diets commonly found in developing countries. Fish also contains other important nutrients such as Vitamins A, B and D, calcium, phosphorus, iron, iodine and fluorine. White fish is a valuable source of good quality protein but is deficient in Vitamins A, B1, B2, C and D, iron and calcium with energy values ranging from 50-80 kcal/100g. Fat fish contains 8-15 percent of fish and so have a higher energy value (80-160 kcal/100g) than white fish. They supply Vitamin D and nicotinic acid but little calcium, Vitamin A, B1, B2 and C.

Fish proteins have a high biological value similar to the proteins of land animals. Table 1 shows the comparison of the efficiency of utilization of fish protein with other animal proteins.

Yet, although many fish are delicious, on the whole fish diet tends to be monotonous. The percentage of edible protein of fish is appreciably greater than that in mutton, beef or poultry (Table 2).

Fish oils are rich sources of the fat soluble vitamins and are used as nutritional supplements

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Table 1. Efficiency of utilization of various animal proteins

Source	Biological value (%)	Net protein utilization (%)	Digestibility (%)	Protein efficiency ratio
Fish	96.0	80.0	85.0	3.55
Beef	74.0	68.0	99.0	2.30
Chicken	74.0	71.0	85.0	—
Cow's milk	85.0	82.0	97.0	3.09
Egg	94.0	94.0	97.0	3.92

Table 2. Percentage of edible protein from different meat animals

Source	Dressing (%)	Refuse (%)	Lean (%)	Fat (%)	Energy (Kcal/100g)
Fish	60	13.7	80.9	5.4	122
Beef	58	15.0	51.0	34.0	323
Chicken	72	32.0	64.7	3.3	84

for the prevention of vitamin deficiency in man. An excessive use of seafoods, including fish, lowers the blood cholesterol level and reduces the risk of coronary heart diseases. The fish oil keeps the skin and eyes healthy and prevents blindness in children.

HIGH FISH DIET LINKED WITH CANCER

High fish diet may cause cancer. According to a Norwegian study, cancer of the thyroid gland is twice as common in the coastal and fisheries communities in the north of the Norway as in the inland areas of these communities and in eastern Norway. It appears that this form of cancer could be linked to a higher consumption of fish. Cancer of the thyroid accounts point, it is important to note deaths from cancer every year. Similar observations have been

reported from Japan. In the Central Europe, this type of cancer increased when iodine was added to some foodstuff to reduce the incidence of goitre. Cancer of the thyroid occurs three times as often in women as in men. Cancer in this gland occurs most frequently in the 40's age group. Some 500 species of fish may cause allergic reaction and can cause poisoning that is occasionally fatal.

FISH STATUS IN THE DEVELOPING COUNTRIES

Fish has often been called the poor man's source of animal protein. Because it has a protein quality equal to that of meat, egg and milk, it has an important role to play in the diet. From an economic and resource viewpoint, it is important to note that there is sufficient raw material in the sea for the pro-

duction of a new product like fish protein concentrate (FPC). In Pakistan, fish is important not only because it provides protein of high biological value to the growing population of the country but also because it brings about two percent of the total export earnings for the country. According to the Micro Nutrient Survey of Pakistan (1978), the average consumption of fish is very low and is 5.9 and 6.9 g/head/day in rural and urban areas, respectively. In 1980-82, fish contributed 0.2 percent of the total calories in the diet. Efforts have been made to increase fish production particularly from marine mostly through raising the number of mechanised boats and the efficiency of existing vessels in the private sector. Consequently, total fish production has risen from 211,000 tonnes in 1972 to 337,000 tonnes in 1982. The average annual growth rate during 1972-82 period for inland fisheries is 9.3 percent and for marine fisheries 4.9 percent. However, the decline in marine fish production in 1980 was mainly due to seasonal factors.

FISH PROTEIN CONCENTRATE (FPC)

The conversion of the fish into protein concentrate is highly efficient with protein loss of less than 4 percent as against 40-60 percent for most other methods of processing (freezing, canning, etc). While FPC is a stable product that can be stored for one to ten years or longer even

in a humid tropical climate. In addition, there is no need for refrigeration during transport and storage and cost is further reduced because of the smaller bulk of FPC. One unit of FPC is the cheapest animal protein available in the market. The FPC is 94 percent digestible and its efficiency of protein for biological utilization is 81 percent. The FPC may be used in small quantities to prevent malnutrition and disease when supplied as a daily supplement to the staple food (wheat, rice), provide extra protein, minerals and vitamins. It also treats people who are sick and malnourished. It is of particular interest that the positive community impact was observed in a population under sub-optimal nutritional conditions, i.e., low caloric intake and high rate of malnutrition.

INCREASING FOOD FISH PRODUCTION

If fish is to play a role in alleviating under-nutrition, more food fish must be produced at a price that people in the developing world, particularly the poor, can afford. Great potential exists for increasing food fish production. First and foremost would be to reduce post-harvest losses. These losses vary greatly from place to place and season to season. Losses of fresh fish result from spoilage, caused particularly due to lack of facilities for immediate chilling, combined with poor storage, distribution and marketing. An estimated 10 percent of all fresh

fish is lost, but the figure is certainly higher in developing countries. On the worldwide basis, some 1.5 mt of fresh fish are lost each year, an amount somewhat higher than the total annual fish consumption of Spain.

With regard to cured fish, the situation is even more serious. Losses of 10-40 percent are common as a result of insect infestation and physical deterioration during and after processing. In some cases, losses of over 50 percent have been observed. Together, losses in fresh and cured fish represent 4.2 mt or 8 percent of the total annual food fish production.

Work carried out by FAO in India, Mexico, Morocco, Senegal, Tanzania and Thailand has shown that the storage life of fresh fish can be increased if the catch is placed immediately in chilled sea water. In India, for example, experiments have shown that fish can be kept over six days if the catch is chilled immediately as compared with one to five days using traditional methods. Unfortunately, the small-scale fisherman who is the backbone of the Third World fisheries can rarely afford that technology needed to realize these possibilities. As part of its efforts to reduce wastage, FAO has demonstrated how losses during fish processing can be significantly reduced both in large and small-scale installations. Another very serious form of wastage involves so-called "by-catch". Fisherman in search of

high market value species, trap in their nets, an huge quantities of unwanted fish, many of them juveniles, which would have commercial value if they were given a chance to mature. This by-catch is through overboard at sea. Global estimates for by-catch waste, most of it occurring in the shrimps industry, are from 5 to 16 million tonnes a year.

After preventing wastage, the second major way to provide more fish for food is to make it available for direct human consumption. About 22.5 mt of fish now being processed into fish meal and can be used for direct human consumption. FAO estimates that over 10 million additional tonnes of marine fish could become available through better management of existing fisheries.

Further development of inland fisheries and aquaculture offer a greater possibility for short-term increases in food fish production. Aquaculture has a good potential for increasing the total production of food fish. At present, aquaculture contributes 8.7 million tonnes to world landings. Thus a number of the prospects for increasing production of fish for direct human consumption are encouraging. At least three basic conditions must be met, firstly, the fish must be available, secondly, it must be affordable and thirdly, it must be perceived as a desirable food. The acceptance of fish as food is governed largely by cultural and traditional rather than nutritional values. The less developed

the society, the more rigid food habits tend to be. Fish is highly unacceptable even in areas where it is readily available. For example, people living in South-eastern Egypt, Eastern Sudan, Ethiopia and Somalia consider sea-fish as "water snakes" and regard eating it as a disgrace. A religious belief holds that the soul of a dead person may appear in the form of a snake. In other areas, some fish are be accepted

while others are avoided.

Fish very quickly loses its freshness and develops off-flavour although this can be delayed by storing it in a refrigerator or deep freezer. Flavour can be preserved to some extent by sprinkling with lemon juice or Vitamin C crystals.

CONCLUSION

While fish alone cannot bridge the world's protein gap, it

could certainly make a greater contribution to easing under-nourishment and malnutrition than at present. To achieve this, nutritional considerations must become an integral part of national and international plans for fisheries management. There is also an urgent need to improve the well-being and nutritional status of 10 million fishermen who are the most vulnerable of all the rural poor.



Fishing communities in Pakistan

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World Food Day was observed on October 16 in Pakistan and 149 other countries of the world. FAO has declared 'Fishermen and Fishing Communities' the major theme for the Day this year to focus attention on their vital contribution to food supplies and urgent need to improve their quality of life.

A TYPICAL FISHING COMMUNITY

Life in the fishing communities is not easy. The fishermen and their families work long and hard for little reward. Throughout the world, small-scale, artisanal fisheries are underprivileged. Because of the severe environmental conditions and isolated locations of many of the fishermen communities, the introduction of modern capital-intensive technology is neither practical nor likely to produce acceptable returns on investment. Labour-intensive methods remain the most appropriate for fisheries. This does not mean, however that there is no possi-

bility of improving the fisheries and living conditions within the communities that they support.

In Pakistan, most of the artisanal fishermen live in small communities all along the coastal belt. Virtually all activities, at sea or on shore are centred on family groups within these communities. There is a close interlinking of family life and fishing. Reinforced by tradition, it has produced its own practices and standards. Over generations, a way of life has been evolved within the communities that although uncodified is remarkably consistent throughout the coastal belt. Fishing, carried out in the traditional manner within the family framework, has generated a simple division of work. The only feature separating individuals and families is ownership of the fishing boats and tackles. Most of the boats (about six metres long) are with either inboard or outboard motors.

Fishermen are hunters, their skills and training are oriented to maximising the catch. Risks to

life that would be unacceptable to most people working on land are a daily reality for them. Fishing is a highly competitive activity. At sea, the fishermen compete for the best fishing zones. They compete with each other to obtain the best catch and price for their products. Nevertheless, in spite of this rivalry, a strong friendship exists among themselves. They cooperate on problems of safety at sea and exchange fishing information. They also join together and pool their experiences to construct and repair fishing crafts and gears.

A fisherman's day is long and varied, tiring and dangerous. Each fishing boat usually has a crew of four to six people. At early dawn, they begin boarding and fitting out their vessels. Many sail for three to six hours to sea to reach their fishing zones. Once there, they drop their nets or long line and very often wait for another 8 to 12 hours to pull in a catch. With the catch on board, they return to the nearest harbour where they sell it to the traders. The earnings contribute to the budget of the extended family, which normally includes more than one active fisherman. In addition, other family members earn money from working at processing plants. Processing is largely undertaken by their womenfolk.

COASTAL BELT

History

The history of Mekran coastal people shows that they start-

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