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Contribution of Fisheries to Food Security- A Review

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Abstract: The oceans have historically been considered limitless and thought to harbour enough fish to feed an ever-increasing human population. However, the demands of a growing population, particularly in poorer countries, now far outstrip the sustainable yield of the seas. At the same time that fishing has become more industrialised and wild fish stocks have become increasingly depleted, the production of aquaculture, fish and shellfish farming, has grown rapidly to address the deficiencies in catch fishing. Capture fisheries produce more than 90 million metric tonnes of fish annually, providing the world's increasing population with a crucial source of protein. Due to the particular nutritional characteristics of fish, fisheries represent far more than a source of protein. Vitamins and minerals and omega-3 fatty acids are essential micronutrients that are necessary to stop malnutrition and reduce the burden of communicable and non-communicable diseases around the world.

Introduction

In many developing countries, fisheries and aquaculture play important roles in providing food and revenue, either as a stand-alone operation or in combination with crop farming and livestock rearing. The goal of the review paper is to identify how these contributions of fisheries and aquaculture to poverty reduction and food security can be enhanced while also discussing the need for a sustainability change in over-exploited and over-capitalized capture fisheries. Food security and poverty reduction have become central to the world's development agenda, but with the rising population and shifts in the world economy, technology and the state of the climate, the main themes have changed. Latest debate on food security emphasises the need for multiple Customer demand, access, supply and nutrition policy, economic and social actions addressing consumer demand (Grafton et al., 2015).

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Fish is known as a major nutrient-dense animal food source for a large proportion of nutritionally poor people, overshadowing that of most terrestrial animal foods, with a greater emphasis on the nutritional value of food commodities. In 2010, the amount of fish produced was twice as much as in 2010. That of livestock, and that of cattle three times over. In 2010, of the 30 countries in which fish contribute more than one third of the total supply of animal protein, 22 are countries with low incomes and food deficiencies (Kawarazuka & Be´ne´, 2011).

Fish is a crucial food source for individuals. It is man's most important single source of high-quality protein, providing ~16 percent of the animal protein consumed by the world's population. In regions where livestock is relatively scarce, it is a particularly important protein source: fish supplies less than 10 percent of the animal protein consumed in North America and Europe, but 17 percent in Africa, 26 percent in Asia and 22 percent in China (FAO, 2000).

The FAO estimates about one billion people world-wide rely on fish as their primary source of protein. Fish also has substantial social and economic importance. The FAO estimates that the value of internationally traded fish is US$ 51 billion annually, that more than 36 million people are directly employed through fishing and aquaculture, and that as many as 200 million people derive direct and indirect fish revenue (FAO, 2000).

Many fishermen and governments have reacted with investments in equipment and technology to fish longer, faster, and farther away from their home ports as stocks get depleted and fish get harder to catch. Such efforts have led to what is effectively a 'arms race' in the marine fishing industry (MacLennan, 1995).

Capture fisheries play a role distinct from but complementary to aquaculture in terms of nutrition and food protection. Nations with the highest reliance on fish, most of which are developing countries, reap a greater proportion of their fish from fisheries than from aquaculture. Capture fishing in developing regions provides a greater variety of highly nutritious fish than that provided by aquaculture (Hall et al. 2013).

Aquaculture in Bangladesh, which has offset the decreased fish supply from capture fisheries, does not offer the same micronutrient profiles and dietary diversity to the poorest segments of the population that have once been captured by capture fisheries (Belton, van Asseldonk, and Thilsted 2014). The decline in consumption of non-farmed species in Bangladesh was

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followed by a substantial decrease in the contribution of fish to the intake of iron and calcium, implying that commonly farmed fish are not as nutritious as those targeted by catch fishing (Bogard et al. 2017).

Hunger and Malnutrition

The continued prevalence of hunger and malnutrition worldwide and the global pledge to end this issue by 2030 (Sustainable Development Goal 2) is the social problem targeted by this report. It is projected that the incidence of hunger has increased from 10.6 percent of the global population (777 million people) to 11 percent (815 million people) between 2015 and 2016. In essence, 1 in 10 individuals on the planet suffers from hunger. Low weight relative to height occurs in Asia in 9 per cent of children under the age of five and in Southern Asia in 16 per cent of such children. At the same time, in all regions of the world, the incidence of children under the age of five who are overweight is growing.

The Role of Capture Fisheries Food Production

The role of catching fisheries in ending hunger has been promoted by the FAO since 1945, but the number of research publications on the subject has increased significantly over the past seven years. This pattern reflects the fact that fish is exceptional in that it has the ability to address multiple aspects of food and nutrition protection simultaneously, unlike other staple foods such as rice and other grains.

In 2014, catching (or wild-caught) fisheries and aquaculture (production of farmed fish) together produced 167.2 million metric tonnes of fish. The amount corresponds to 20 kilogrammes per capita per year and 17% of the animal protein consumed by the world's population. The production split between catch fisheries and aquaculture in 2014 was approximately half and a half, although a higher proportion of aquaculture production was intended for human consumption (e.g., some of the products from capture fisheries provide feed for aquaculture and livestock).

Overall, developed countries consumes an average of 18.8 kilogrammes of fish per capita per year, and low-income food-deficit countries eat 7.6 kilogrammes of fish per year, slipping below the global average. And, even though overall consumption levels are lower, these countries appear to depend on fish for a greater proportion of their animal protein than the

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global average. Usually, fish is more economical than other foods of animal origin (ASFs) and plays a particularly important dietary role in countries.

Fish contain vitamin A, D, and B and calcium, phosphorus, zinc, iron, and iodine. Precise nutrient profiles vary across fish species, processing and preparation techniques, and habitat. Micronutrients in fish can lead to a range of health benefits, including reduced risk of cardiovascular disease; positive outcomes of maternal health and pregnancy and increased physical and cognitive development in early childhood; improved function of the immune system; and alleviated health problems associated with deficiencies in micronutrients such as anaemia, rickets, childhood blindness, and stunting. Vitamin D deficiency alone is a prevalent worldwide health problem. It can contribute to childhood rickets, affect adult bone health, and is associated with an increased risk of common cancers, autoimmune disorders, high blood pressure, cardiovascular and communicable disorders. Insufficient vitamin D levels are correlated with an increased risk of preeclampsia, gestational diabetes, preterm birth, and low birth weight for pregnant women. The key cause of preventable childhood blindness is vitamin A deficiency, which can also lead to a compromised immune system and anaemia, as it promotes the use of iron by the body. In combination with iron and folate, vitamin B is also essential for preventing anaemia and a number of neurological and cognitive issues. Likewise, the minerals available in fish can help tackle a number of health problems, such as iron deficiency, which leads to anaemia.

Fish provide Crucial Fatty Acids, including Omega-3 Polyunsaturated Fatty Acids

A variety of benefits to coronary health have been shown to be associated with the ingestion of fish or fish oil, such as a decreased risk of death and accidental death from coronary heart disease , stroke, atrial fibrillation, and congestive heart failure. 1.4 million deaths worldwide are due to diets deficient in omega-3 fatty acids from fish. Consumption of fish is associated with a 36 percent reduction in heart disease and heart attacks and a 12 percent reduction in all-cause mortality.

Special emphasis is placed on high levels of polyunsaturated fatty acids (PUFAs) in fish, in particular the long-chain omega-3 fatty acids DHA and EPA, which are important for the health of the cardiovascular and brain systems. Fish or fish oil ingestion has been shown to be correlated with cardiovascular health benefits, such as decreased risk of death and accidental

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death from coronary artery disease, ischaemic stroke, atrial fibrillation and congestive heart failure (Mozaffarian and Rimm 2006).

Consumption of fish is associated with a 36 percent reduction in heart disease and heart attacks and a 12 percent reduction in all-cause mortality. While marine fish, especially tuna and small pelagic forage fish, usually have higher levels of polyunsaturated fatty acids than freshwater fish, many freshwater fish, such as rainbow trout, lake trout, common carp, wild tilapia, high-water catfish and speckled pavon, can also contain high levels of DHA and EPA (Mozaffarian and Rimm 2006).

Employment and Economic Multipliers

Fisheries, aquaculture and related industries are wholly or partially funded by over half a billion people (workers and dependents), 95 percent of them in developing countries, with a rise in aquaculture likely. Fisheries employment is likely to stabilise or decrease due to the combination of technological transition in labour replacement and management steps to minimise over-capacity in the industry.

There is no direct quantitative evidence of the size of the growth-multiplier effects generated by the production of fisheries and aquaculture, although there is clear qualitative evidence that the fisheries sector increases the amount of cash circulating in rural areas, promoting market-driven production. Aquaculture and related processing industries provide new economic opportunities, especially for female jobs. Trade in fish is worth about US$ 100 billion a year, and there is a positive trade balance between exports of higher-cost species from developing countries to developed countries and imports of lower-cost (but also higher nutritional value) fish from developing countries. In some major fish-producing countries, the fisheries and aquaculture sectors contribute more than 10 per cent of GDP.

Contribution of Fisheries and Aquaculture to Poverty Reduction and Food Security

Capture fisheries and aquaculture delivered approximately 142 million tonnes of fish worldwide in 2008. Of these, 115 million tonnes have been used as human food, offering an average per capita apparent supply of approximately 17 kg (live weight equivalent), an all-time high. Of the fish intended for direct human consumption, the most valuable commodity was fish in live or fresh form, with a 49.1 percent share, followed by frozen fish (25.4

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percent), prepared or preserved fish (15.0 percent). Aquaculture accounted for 46% of the overall availability of fish for food. In 2008, global production of catch fisheries was approximately 90 million tonnes, with an estimated first-sale value of US$ 93.9 billion, comprising approximately 80 million tonnes of marine waters and a record 10 million tonnes of inland waters. As reporting systems appear to be poor, inland water catches may be under-estimated (FAO, 2011).

CONCLUSION

The literature review presented here highlights the multiple aspects of fish's role in nutrition, food security and livelihoods; the various routes by which fish are connected to food security and nutrition; and the processes that form fish's potential role in this context. This study builds on this work, with a special emphasis on catching fisheries, considering the various nutritional contributions of the industry, the serious challenges faced by factors such as overfishing and climate change, and the need for a specific policy outlook.

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