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Fisheries Management for Food Security

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INTRODUCTION

More than 3 billion people globally rely on fish for about 20% of their average daily animal protein consumption, making it a vital source of nutrition (FAO, 2020). Additionally, fishing supports livelihoods, especially in coastal areas where it is the main source of income (Béné et al., 2016). However, freshwater and marine ecosystems are under unprecedented stress due to the rising demand for fish and fish products. The sustainability of fish populations is thus under jeopardy due to the overexploitation of several fisheries (Pauly et al., 2002).

Food security and vulnerability

The size, frequency, duration, and spatial distribution of human and climatic disruptions define exposure. Sensitivity is the extent to which stress may truly alter a system's reaction. The degree to which humans rely on marine resources for food, money, and revenue is a measure of sensitivity in the context of fisheries. Lastly, people's ability to adjust to changes related to exposure and sensitivity (dependence) will have an impact on vulnerability. This analytical framework is utilised here to analyse and recommend ways to minimise hazards, even though it is more frequently used to analyse climate change vulnerability. It may also be used to evaluate food insecurity (Hughes et al. 2012).

Fisheries and Food Security

Food security benefits from fisheries in a number of ways. First of all, through aquaculture and wild catch, they offer a direct food supply. Second, by giving millions of people who work in fishing, processing, and marketing jobs and money, fisheries contribute to economic stability (Allison & Ellis, 2001). Fisheries frequently act as a safety net for coastal communities, especially during periods of food scarcity (Beveridge et al., 2013).

Fisheries conflict and human security.

Fisheries and political instability have a complicated link; on the one hand, conflicts over fisheries can lead to broader local or regional political instability, while on the other, wars have an impact on fisheries. Because it becomes hazardous for fishermen to go out to sea during a war, fishing pressure tends to decrease in conflict zones. As seen in the North Atlantic during the six years of World War II, this reprieve enables stocks to recover and leads to bonanza catches following hostilities. However, the necessity of feeding troops may result in more fishing being done on grounds that are remote from regions of violence. For instance, sardine supplies in Monterey Bay, California, collapsed in the 1940s due to wartime fishing (Palumbi and Sotka 2010).

Climate change projections and influences

Changes in winds, water temperature, dissolved oxygen, and rising ocean acidity are some of the ways that climate change may impact fisheries productivity. Fisheries output has increased and is expected to continue to rise in some high-latitude locations due to warming and reduced ice cover, according to forecasts of temperature changes, species distributions, and temperature-related growth rates (MacNeil et al. 2010). However, productivity is expected to decrease in low-latitude locations due to decreased nutrient and water column mixing, as well as increased warmth and acid-induced damage to important habitats, particularly coral reefs (Pratchett et al. 2008). Using a warming phase linked to ENSO, Behrenfeld et al. (2006) assessed changes in ocean productivity and discovered that 74% of oceanic net output had decreased, mostly due to stratified conditions in the low latitudes. This reduced plankton production will also lower fish capture rates, since caught species eat a significant portion of the net primary production (Swartz et al. 2010).

Challenges in Fisheries Management

Overfishing, illegal, unreported, and unregulated (IUU) fishing, and environmental degradation are the main issues facing fisheries management. Key fish populations have been depleted as a result of overfishing; around 34% of world fish stocks are considered overfished (FAO, 2020). IUU fishing makes this issue worse and undermines sustainable fishery management initiatives (Agnew et al., 2009). Additionally, the productivity of fisheries is still threatened by pollution, habitat damage, and climate change (Doney et al., 2012).

Food security from marine fisheries:

Sensitivity and adaptability scaling overcapitalization and over subsidization of fisheries worldwide result in losses in both gross food production and potential income (World Bank 2009). This situation varies widely across resource use scales, and a community's or a country's sensitivity to less-than-ideal resource use reflects the local significance of livelihood and nutrition security and vulnerability. The degree of disruption or exposure to the fishing system, as well as the size of the analysis, will affect sensitivity. To ascertain the distribution of these consequences, indicators of fisheries' susceptibility to climate change have been created at both the global and western Indian Ocean (WIO) regional scales. For a national example, Allison et al. (2009) computed a global index of climate change vulnerability that included a sensitivity indicator based on the number of people employed in aquaculture and capture fisheries, fish catch production, fisheries exports, GDP per capita, and reliance on fish as a major source of protein. Depending on the emissions scenarios used, 13 or 14 of the 15 countries with the highest vulnerability of fisheries to climate change were in Africa. This was determined by combining the dependency (sensitivity) index with the expected exposure to global warming and a multivariate measure of adaptive

capacity based on governance and human development indicators. Many countries were in western Africa, but Mozambique was also highly vulnerable under both emissions scenarios used.

Sustainable Fisheries Management

Sustainable fisheries management techniques have been advocated as a solution to these issues. Marine protected areas (MPAs), gear limits, and fishing quota enforcement are some examples of these methods (Hilborn et al., 2004). According to Lester et al. (2009), MPAs have proven very successful in preserving biodiversity and promoting the recovery of fish populations. However, good governance, scientific understanding, and community involvement are necessary for effective management (Gutiérrez et al., 2011).

Aquaculture as a Supplement

One important way to address the rising demand for fish is through aquaculture. Today, it makes up more than half of the world's fish consumption (FAO, 2020). To reduce the environmental effect of fish farming, sustainable aquaculture techniques have been pushed, such as integrated multi-trophic aquaculture (IMTA) (Troell et al., 2009). To prevent problems like water contamination and antibiotic abuse, aquaculture growth must be properly controlled.

Dimensions of Food Security

Availability: This refers to the supply of food through domestic production or imports. Factors influencing availability include agricultural productivity, climate change, and policy decisions affecting food systems (Gernand et al., 2016).

Access: Economic and physical access to food is crucial for food security. Vulnerable populations may lack access due to poverty, inequality, or geographic barriers. For example, rural communities may struggle to obtain food due to inadequate infrastructure (Sen, 1981).

Utilization: This dimension focuses on the nutritional quality of food and individuals' ability to use it effectively. Health, sanitation, and education significantly impact food utilization. Malnutrition can occur even when food is available if individuals cannot absorb the nutrients properly (WHO, 2014).

To combat food insecurity and vulnerability, several strategies can be implemented:

Improving Agricultural Practices: Adopting sustainable agricultural practices can enhance food production while minimizing environmental impacts. Techniques such as crop rotation and integrated pest management can increase resilience (Altieri, 1999).

Strengthening Social Safety Nets: Programs that provide financial assistance or food support to vulnerable populations can help alleviate immediate food insecurity. These safety nets can be particularly effective during crises, such as economic downturns or natural disasters (Devereux, 2016).

Promoting Education and Awareness: Increasing awareness about nutrition and food preparation can empower communities to make healthier choices. Educational programs can improve food utilization, leading to better health outcomes (Micha et al., 2017).

CONCLUSION

In conclusion, effective fisheries management is essential to achieving global food security, particularly for the millions who depend on fish as a primary source of protein and livelihood. Regulations to stop overfishing and sustainable fish stock management are essential for maintaining aquatic biodiversity and bolstering robust ecosystems. Fisheries management helps keep fish populations at sustainable levels and guarantee their availability for future generations by implementing harvest restrictions, safeguarding fragile species, and creating marine protected zones. Achieving sustainable fisheries also requires addressing illicit, unreported, and unregulated (IUU) fishing. Access to and security of food may be directly

enhanced by fisheries management through community empowerment, responsible aquaculture, and the integration of traditional knowledge into governmental frameworks. In order to improve the fair distribution of benefits from marine resources, it is also essential to foster partnerships between governments, local communities, and international organisations.In the end, combining cutting-edge technologies, scientific research, and participatory governance will aid in addressing the issues that fisheries confront, such as climate change and rising global demand. A robust, well-managed fisheries industry is a key component of global food security plans because it promotes sustainable growth, better nutrition, and less poverty. Fisheries management has the power to protect our oceans' health and the lives of millions of people if it is done with initiative and inclusivity.

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