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Extinction of Local Fish Species Due to Over Exploitation Fishing

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Abstract:

Overexploitation through fishing can lead to a decrease in local fish species populations, potentially resulting in the extension of some species. Overfishing removes fish from a water body at a faster rate than they can reproduce, leading to reduced biomass and a shift in the fish community structure, potentially making some species less common or even disappearing. This can also impact the overall ecosystem by reducing the food supply for other animals and disrupting the balance of the food web. Reduced Population Sizes. Fish food is an important nutritive food for human beings. It provides vitamins and minerals, including B vitamins, zinc, and iron. Some oily species of fishes contain omega-3 acids, which are beneficial fats that humans must obtain from their diet. The United States Department of Agriculture recommends that most people eat seafood twice weekly as part of a balanced diet. Several researchers have investigated the nutritional value of fish and its importance in human diet from various perspectives. Some studies revealed that fish consumption helps prevent cardiovascular diseases, high blood pressure, cholesterol, Alzheimer's disease, and various types of cancer. Fish and fisheries products are recognized not only as some of the healthiest foods on the planet, but also as some of the less impactful on the natural environment (FAO). According to (FAOUN, 2019) over 1 billion people are still largely dependent on fish as their primary source of protein, with many of these being in developing countries with urbanized coastal areas. An increased demand for fish, combined with ever-growing world populations, sees our rivers and oceans struggle to keep up with the rate at which we are fishing from these water bodies. The global proportion of overfished fisheries has steadily increased from 10% (1974) to 32% (2008). Overfishing, a fundamental cause of the crisis facing our rivers and oceans, is the result of the failure of our fishing management. This paper focuses on current risk of ecosystem overfishing and increasing trend in the number of unsustainable fisheries.

***Keywords**: Overfishing, Species, Environment, Water Resources.*

Introduction:

The issue overfishing is harvesting a fish stock on a large scale (catching too many fish at once), so the breeding population becomes too depleted to recover. When too many fish are captured from the ocean it creates an imbalance that can erode the food web and lead to a loss of other important marine life. An increased demand for fish, combined with ever-growing global populations our oceans cannot keep up with the rate at which we are fishing our seas (Daniel, 2019, Borenstein, Seth. 2019. UN

report: Humans accelerating extinction of other species. AP News. Retrieved).

Overfishing can lead to a decline in the number of individuals within a species, making them less common and potentially endangering them.

Shift in Species Composition:

Overexploitation can disproportionately affect certain species, particularly large or slow-reproducing ones, leading to changes in the types of fish found in a particular area.

Impact on Ecosystems:

Changes in fish populations can disrupt the food web, affecting other marine life and the overall health of the ecosystem.

Extinction Risk:

In severe cases, overfishing can push species towards extinction, especially if combined with other threats like habitat loss or climate change. Examples of species that have been affected by overfishing include various sharks, tuna, cod, and halibut. The impacts of overfishing extend beyond individual species and can have significant implications for marine biodiversity, ecological processes, and ecosystem services.

Material, methods and Discussions:

The species and populations are the building blocks of any communities and ecosystem which sustain humanity through a wide range of services. Hoffmann et al., Bene C, Barange M, Subasinghe R, Pinstrup-Andersen P, Merino G, Hemre G I and Willians 2015. (2008) noted that there is increasing evidence that human impacts over the past ten millennia have profoundly and permanently altered biodiversity on land. The oceans encompass some of the earth's largest habitats and longest evolutionary history, but there is mounting concern for the increasing human influence on marine biodiversity that has occurred over the past 500 years (Jackson, 2010). Overfishing and habitat degradation have profoundly altered populations of marine animals (Polidoro et al., 2012). Studies have predicted extinction risk, but few have made a priori predictions of risk. Throughout globe with increasing population pressures and changing methods of fishing practices creates severe impact on the natural water bodies and their ecosystems. Blast fishing can result in a crater like reef landscape as substrate is destroyed (Yap, 2013). Overfishing in freshwater systems has caused severe reductions in many fish stocks, especially large species, including top predators and migratory fishes (Allan et al., 2005). Jackson (2001) noted that many of the fundamental alterations seen in ecosystems suffering from overfishing caused by the removal of key top-down regulators. International capture has led to overfishing of many species and the species have suffered greatly from unintentional catch. The commercial and recreational fishing can directly affect marine species by depleting the stock levels difficult or impossible to recover (Lascelles et al., 2014). Overfishing is replicated throughout the world's oceans, where large predatory fish have been in sharp decline since the late 20th century (Myers & Worm, 2003).

Impacts of Exploiting Fish on Our Water:

Overfishing can lead to the collapse of certain fish populations, which in turn affects other species and the balance of the ecosystem. For example, if large predatory

fish are overfished, their prey populations can grow out of control, which can disrupt the entire food chain. Fish farms can cause eutrophication (Eutrophication is a general term describing a process in which nutrients accumulate in a body of water, resulting in an increased growth of microorganisms that may deplete the water of oxygen) of waters as fish waste and excess food increase the nutrient content of the water. In addition, fish farms may use pharmaceuticals and chemicals to control diseases, which can lead to water pollution. Certain fishing methods, such as bottom trawling, can damage the seabed and other habitats such as coral reefs and kelp beds. This can lead to species loss and ecosystem degradation. Fish are sometimes used as translocated species to new water bodies, where they can become harmful invasive species. These species can compete with local species for resources and food, which can lead to the decline of local species. Fishing and fish farming can also contribute to the impacts of climate change on water bodies. For example, overfishing can reduce the genetic diversity of fish, which can make them more vulnerable to climate change impacts such as rising temperatures and acidification.

Study Area and Experimental Design:

Overfishing a new problem in the world Throughout the globe seas and oceans are a vital source of animal protein from fishing and a major contributor to global food security. Shijie Zhou et al., (2013) has argued that global wild catch production has reached its limit, and there is concern that many species are overfished. Nearly 80 percent of the world's fisheries are already fully exploited, over-exploited, depleted, or in a state of collapse. Worldwide 90 percent of the stocks of large predatory fish, such as sharks, tuna, marlin, and swordfish, are already gone (The World Counts). World capture fisheries production has been relatively stable for the past decade (FAO 2012). The world's landings of marine species fluctuated between 7.77 and 8.04 9 107 ton from 2006 to 2011, with additional discards estimated at about 7.3 9 106 ton (Kelleher, 2005). Worldwide fishing effort continues to increase. Global data set of fishing effort reveals that fishing power has increased by an average of 10-fold globally and 25-fold for Asia since from 1950 (Watson et al., 2012). However, the effort in some developed countries has declined in recent years. Studies show that many commercially harvested fish stocks have been overfished, and overfishing continues for certain species of fish (Worm, 2009). The selectively catching of a specific ecological group generally reduces the abundance of that group in relation to the unfinished group. According to a World Bank report almost 90 percent of global marine fish stocks are now fully exploited or overfished, and wild capture fisheries struggle without sound regulatory frameworks and strong enforcement. The status of marine biodiversity is closely connected with ocean pollution and acidification. About two thirds of the world's oceans showed signs of increased human impact. Driven by rising populations, higher incomes, and greater awareness of seafood's health benefits, the demand for fish is twice the estimated supply of sustainably caught wild fish (FAO). Worldwide reports show that, in 2017, 34.2 percent of the fish stocks from the world's marine fisheries were

classified as overfished, a continuous increasing trend since 1974, when that figure stood at just 10 percent. Borenstein, Seth. 2019. UN report: Humans accelerating extinction of other species. FAO. 2020. (The State of World Fisheries and Aquaculture: Sustainable Action, FAO, Flagship Pub).

Data Collection and Calculation:

Status of overfishing globally the problem of overfishing is major and causes significant decrease in catches, negatively impacting ecosystem health and the sustainability of stocks. Accurate assessment of Fisheries Status is crucial to avoiding unacceptable harm to fish stocks, habitats, and ecosystems caused by overfishing. According to a report by FAO (2020) stated that in 2017, 34 percent of the fish stocks of the world's marine fisheries were classified as overfished. Problem of overfishing has stripped many fisheries around the world of their stocks.

Data statistical analysis:

Problems of overfishing: It is estimated that at least 80 percent of the world's monitored fisheries are overexploited. This has some serious implications for both ocean ecosystems as well as human beings. Overfishing causes problems due to use of advanced fishing techniques which are physically destructive and destroy the physical environment. Figures published by the UNFAO shows why overfishing is such a problem. - 52 % of fish stocks are fully exploited (misused) - 20% are moderately exploited - 17% are over exploited - 7% are over depleted - 1% is recovering from depletion The above figures clearly show how much fish is misused. Increased demand for fish, combined with ever growing global populations our oceans cannot keep up with the rate at which we are fishing our seas. (Daniel Jonathan Bradey. 2019. Overfishing: Pressure on our oceans, Res. Agri. Lives. Fish. Vol. 6(3):

Selection Process:

Pressure on oceans: When too much fishing is carried out in the oceans it creates an imbalance that can erode the food web and lead to a loss of other important marine life. Overfishing not only threatens a valuable source of food, but the entire marine ecosystem. Overfishing and climate change is disrupting the physics, chemistry and ecology of the ocean, with significant consequences on the life it holds (Rashid & Travis, 2020). Human society has had considerable and far-reaching impacts on the global ocean (Halpern et al., 2015), and overfishing has lasting effects on marine ecosystems and continues to be one of the greatest threats to ocean health (Gattuso et al., 2018). The indirect pressures of overfishing include habitat degradation and pollution. Habitat loss has implications for marine life but will also affect other aspects of ocean health. Threats to marine biodiversity According to a FAO estimate, over 70% of the world's fish species are fully exploited. The dramatic increase of destructive fishing techniques worldwide destroys the entire marine ecosystem. Marine biodiversity is important for the survival and development of the human population, it affects various aspects of our living beings and is suffering from the world's rapid expansion of modern society and economy. At present, marine

biodiversity faces various anthropogenic threats including pollution, eutrophication, overfishing, habitat alteration and global climate change (Bei Huang, 2015). Marine diversity is a provider of economic services which comes as a blessing to coastal people (MoE Report, 2011). Degradation and loss of habitat for marine flora and fauna may reduce the overall ecosystem services being provided by the coastlines. Fishing down the food web has been argued to cause a reduction in the number and length of the pathways in the food web, making the ecosystems less resilient to environmental fluctuations (Pauly & Maclean, 2003). IUCN assessments suggest that documented fish extinctions in the wild are relatively rare. (Freyhof J, Brooks E. 2011. European Red List of Freshwater Fishes. Publication office of the European). Combatting the exploitation of fish is crucial for maintaining the health of our oceans and ensuring sustainable fisheries for future generations. Here are several solutions that can help address this issue.

1. Implementing and Enforcing Sustainable Fishing Practices: Governments and fisheries management organizations can establish regulations and quotas to prevent overfishing and ensure that fishing practices are sustainable. This may include setting limits on catch sizes, enforcing seasonal closures, and implementing gear restrictions to minimize bycatch.

2. Promoting Responsible Consumption: Consumers can play a role in combatting fish exploitation by choosing sustainably sourced seafood. Certification programs such as the Marine Stewardship Council (MSC) or Aquaculture Stewardship Council (ASC) label seafood products that meet certain sustainability criteria. Encouraging restaurants and retailers to source seafood responsibly can also make a significant impact.

3. Supporting Marine Protected Areas (MPAs): Establishing MPAs can help protect critical habitats and allow fish populations to recover. These protected areas can serve as breeding grounds and refuges for marine species, contributing to overall ecosystem health.

4. Investing in Aquaculture: Sustainable aquaculture practices can help reduce pressure on wild fish populations by providing an alternative source of seafood. However, it's important that aquaculture operations are managed carefully to minimize environmental impacts such as habitat destruction, pollution, and disease transmission.

5. Educating Communities: Raising awareness about the importance of sustainable fisheries and the impacts of overfishing can help garner support for conservation efforts. Education initiatives targeted at fishermen, policymakers, and the general public can promote responsible stewardship of marine resources.

6. International Cooperation: Many fish species migrate across national borders, making it essential for countries to collaborate on fisheries management. International agreements and organizations such as the United Nations Food and Agriculture Organization (FAO) can facilitate cooperation and coordination on issues related to sustainable fisheries management.

7. Research and Innovation: Investing in research and technology can lead to new

approaches for monitoring fish populations, reducing bycatch, and improving the efficiency of fishing practices. Innovation in fishing gear, such as the development of more selective and environmentally friendly gear types, can help minimize the negative impacts of fishing activities.

8. Reducing Illegal, Unreported, and Unregulated (IUU) Fishing: Strengthening enforcement mechanisms and increasing transparency in the seafood supply chain can help combat IUU fishing, which undermines efforts to manage fisheries sustainably. This may involve improving monitoring and surveillance capabilities, enhancing traceability systems, and imposing stricter penalties for violators.

9. Ban Fishing Subsidies: Target subsidies for fuel, gear, and vessel construction, which incentivize overfishing by reducing the operational costs for fishing companies. These subsidies often benefit large-scale fishing operations, indirectly encouraging the use of fuel-intensive fishing methods and destructive practices such as deep-sea trawling.

Conclusion:

Marine and freshwater overfishing unbalancing the natural ecosystems. Loss of habitat threatens the habitat with extinction risk of fish fauna. Stress on major ecosystems results in erosion of biodiversity. Conservation of the marine and freshwater fishes will require management and restoration strategies focused on species at the greatest risk of extinction. Lack of fishing regulations leads to overfishing when rural citizens have few other economic opportunities. So, community-based management development is essential. The levels of extinction present the most depressing part of global and national threats to marine and freshwater aquafauna. Uncontrolled activities in the marine and freshwater creates two serious problems: we are losing species as well as entire ecosystems. It's in risk stage of losing a valuable food source which we depend on for social, economic and dietary reasons. Now, it is the time to follow strategies which need to incorporate ecosystems, together with population and community-level assessment. The continuous assessment aquatic ecosystems require to evaluate the sustainable exploitation of aquatic ecosystems.

References:

1. Bene C, Barange M, Subasinghe R, Pinstrup-Andersen P, Merino G, Hemre G I and Willians, Polidoro et al., 2012, Jackson, 2010, Allan et al., 2005). Jackson (2001), Zhou et al., (2013) 2015. Feeding 9 billion by 2050 – Putting fish back on the menu, Food Security, 7(2): 261-274.
2. Borenstein, Seth. 2019. UN report: Humans accelerating extinction of other species. AP News. Retrieved. Kelleher, 2005, Watson et al., 2012, Worm, 2009, Rashid & Travis, 2020, MoE Report, 2011,
3. Daniel Jonathan Bardey. 2019. Overfishing: Pressure on our oceans, Res. Agri. Lives. Fish. Vol. 6(3):
4. FAO. 2020. The State of World Fisheries and Aquaculture: Sustainable Action, FAO, Flagship Pub.
5. fao.org. "SOFIA 2018 - State of Fisheries and Aquaculture in the world 2018". www.fao.org. Retrieved 9
6. Freyhof J, Brooks E. 2011. European Red List of Freshwater Fishes. Publication office of the European.