Comparative analysis of marine and freshwater fishery resources in developing countries.

Sofia Novak*

Department of Marine Biology, University of Split, Croatia.

Introduction

Marine and freshwater fishery resources are critical for food security, livelihoods, and economic development in many developing countries [1]. These resources, however, present distinct characteristics, challenges, and opportunities based on their ecological and socioeconomic contexts. A comparative analysis of these two sectors highlights the unique dynamics of each and underscores the importance of tailored management strategies [2].

Marine fisheries in developing countries often encompass vast coastal zones, coral reefs, and open ocean areas. These fisheries typically support large-scale commercial operations as well as small-scale artisanal fishers [3]. The diversity of marine species targeted in these fisheries includes pelagic fish such as tuna and mackerel, demersal species like snapper and grouper, and shellfish such as shrimp and lobster. Marine fisheries contribute significantly to exports and foreign exchange earnings for many developing nations. However, they face substantial challenges, including overfishing, habitat degradation, and the impacts of climate change, such as ocean warming and acidification. Unsustainable practices, including illegal, unreported, and unregulated (IUU) fishing, exacerbate these issues, particularly in regions where enforcement capacity is limited [4].

In contrast, freshwater fisheries in developing countries are often concentrated in rivers, lakes, reservoirs, and floodplains. These fisheries are typically smaller in scale but play a crucial role in local food security and nutrition [5]. Freshwater fish such as tilapia, catfish, and carp are vital protein sources for many rural communities. Unlike marine fisheries, freshwater systems are more directly influenced by land-based activities, including agriculture, urbanization, and industrial development. This connection makes freshwater fisheries particularly vulnerable to water pollution, habitat loss, and changes in water flow and quality caused by dam construction and irrigation projects. Climate change also poses threats to freshwater systems through altered rainfall patterns, rising temperatures, and increasing frequency of extreme weather events [6].

A key distinction between marine and freshwater fisheries lies in their governance and management. Marine fisheries often involve multiple jurisdictions and international agreements, particularly for migratory and transboundary species [7]. This complexity necessitates regional cooperation and robust monitoring systems, which are frequently lacking in developing countries. Freshwater fisheries, on the other hand, are typically managed at national or subnational levels, with a focus on community-based approaches. While localized management can promote sustainability, it often suffers from inadequate resources, weak institutional frameworks, and limited technical expertise [8].

Economic opportunities also differ between marine and freshwater fisheries. Marine fisheries offer greater potential for high-value exports and tourism-related activities, such as sport fishing and diving. Freshwater fisheries, however, provide critical livelihoods for marginalized and low-income populations, particularly in inland and remote areas. The informal nature of many freshwater fisheries often makes them invisible in national statistics, leading to underrepresentation in policy discussions and investment priorities [9].

Despite their differences, marine and freshwater fisheries share common challenges, including the need for sustainable management and the integration of conservation with development goals. Both sectors require improved data collection and scientific research to inform decision-making. Enhancing the participation of local communities and stakeholders in management processes is crucial for fostering compliance and building resilience against environmental and economic shocks.

Developing countries must also address cross-cutting issues that affect both fisheries. These include climate change adaptation, capacity building, and access to financial resources and markets. Innovations in aquaculture, particularly integrated and low-impact systems, offer promising solutions for supplementing capture fisheries and meeting growing demand for fish products in both marine and freshwater contexts [10].

Conclusion

In conclusion, marine and freshwater fisheries in developing countries are distinct yet interconnected sectors with vital roles in supporting livelihoods, food security, and economic development. Recognizing and addressing their unique challenges while leveraging their respective strengths is essential for promoting sustainable and equitable resource use. Coordinated efforts at local, national, and international levels

***Correspondence to:** Sofia Novak**,** Department of Marine Biology, University of Split, Croatia, E-mail: snovak@unipr.hr

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are required to ensure the long-term health and productivity of these critical fishery resources.

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