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Original Article

Sustainable Development and Integrity of Fishery Sector in Pakistan

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Abstract

Fishery development refers to interrelated measures made up of the management of resources, industry, and market that serve as the basic pillars for maintaining the growth of the sector. In the Pakistani fishery industry, we identified the ecological setting, wherein Pakistan's fishery operates and explained how recent technological advancement affects fish catches. Government initiatives, fleet extension, and the creation of export markets are the contributing factors to the growth of the fisheries in Pakistan. For the broader goal of national economic development, development strategies of marine resources have great significance. Current policies and methods for managing fishery industry development have proved less effective in achieving coastal communities' needs. Pakistan should require a balanced resource organization in order to develop its fishery sector. This report focuses on the shortcomings, significance, and guidelines of upholding effective development policy to improve Pakistan's fishery industry.

Keywords: Sustainable Development, Water Resources Managment, Fishery Management, Livelihood of Fisherman

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1. INTRODUCTION

Pakistan fisheries resources can make a prominent asset to economic opportunity of proceedings and societal progressive development [1]. Globally, exceptional for protein-rich fisheries, things remain growing and provide opportunities to the marine upright to countries like Pakistan[2]. With the total populace proceeding to climb, and expanding earnings moving fish utilization propensities, interest for fish will keep on developing. Pakistan's fisheries add to financial development and social turn of events; however, their maximum capacity isn't being figured out[3]. The area at present creates an expected US $650 million of fish every year, comparable to about 0.4% of Gross domestic product, and utilizes a detailed 390,000 individuals straightforwardly [4]. In Pakistan, trade of fish was expanded by 16,991 tons (49.82 million USD) by making 16% of the generation, in 2018, hitting significant extraordinary fish export. The GDP development through this segment recorded in Pakistan was 2.9 and 2.7 in 2017 and 2018, respectively[4].

Fisheries business in Pakistan employ 400,000 individuals directly and 600,000 individuals indirectly. In spite of enormous growth in the fisheries sector, still there's satisfactory and suitable requirement of advancement to be considered, as there will be development weight for a strict application due to over exploitation of marine assets. Pakistan fisheries segment needs legitimate arranging and management, which could be prerequisites to overcome the issue for aquaculture development[5]. Aquaculture division in Pakistan has enormous potential for improvement of the fisheries segment, but in reality, it is expanding slowly. The monolithic structure of dam is use to bar water[6], which is used for multipurpose like fisheries or agriculture and electricity[7]. At display, the government is demonstrating a bit more

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consideration towards this division by contributing a significant amount, while there's sufficient work to be done for the improvement of the aquaculture segment. Pakistan's fisheries sector is completely different and is destitute of financial significance of this sector to the country[8]. In this essential consideration an exertion has been made to bridge the fisheries sector with financial planning by recognizing gaps and making valuable recommendations for progressing and growing the fishery sector in Pakistan and economic issues related to fishermen livelihood[9].

This research report is in line with the views of the government of improving fisheries sector. It provides a structure for the current situation and opportunities, a detailed analysis of the challenges, and recommendations on how to go forward. The whole Pakistani fisheries sector is included by the study, including the marine, domestic catch, aquaculture, and post-harvest growth chain. The report's main topics are the economic development of Pakistan's fisheries industry, its challenges and opportunities to improve livelihood and ecological conservation while also advancing economic development, Pakistan's current fish resource status, the process of processing fish after harvest, and the market and trends in the fishing industry. This study also focuses on the design and method of Pakistan's fisheries governance. Along with all of the previous analysis, it also deals with Pakistan's present fisheries policies, which aims to enhance fish exportation and food and nutrition security, while also protecting the environment and conserving fish supplies. However, it acknowledges that important administrative recommendations and implementations are relevant to fishery challenges. A handful of them result from the supplementary adjustments and the intended devolution of control made as part of the Eighteenth Revision to the Pakistani Constitution in 2010. The fact that fishery segment deviations might be revised to characteristic assets, and so effect employment or modifications, will have to be this manner conquerors and failure, leads to another administrative challenge.

2. METHODOLOGY & MATERIALS

To accomplish the goal of the present study, a thorough literature analysis on fisheries reserves and their impacts on the economic situation of Pakistan were used. Even though Pakistan's fisheries sector has a dismal track preserve for the processing of fish, export to other countries, storage, and capture, we sought to shed light on Pakistan's biological resource capacity through fisheries[10]. This research work is qualitative in its nature, to complete this study, data and related material was collected from the Pakistan Bureau of Statistics (PBS), is incharge of creating the national regulations for statistical data, consisting of for the industry of fishing. Additionally, secondary data was used, collected from following secures (sites);

- Fishery and Aquaculture Statistics,
- Development of Marine Fisheries of Pakistan
- World Wildlife Fund
- International Union for Conservation of Nature
- UN Economic and Social Commission for Asia and the Pacific

3. CAPACITY OF FISHERIES SECTOR

An effective management of marine resources may help to avoid drastic output decreases[11]. All significant commercial species groups are projected to experience a significant drop in total stock size (biomass) as a result of overfishing if the present levels of fishing effort are maintained[12]. Estimated yearly yields are determined to be much greater with lowered effort levels compared to status quo effort levels, and Maximum Sustainable Yields (MSY) are attained at around 40-60% of current effort.

Species differences affect the optimal, intermediate point, and any species whose maximum is lower than the present effort point is likely to give higher yields over time from less fishing[13]. Increased value-added processes and decreased economic inefficiencies can result in more economic gain, compared to both present value and future value. On a modest basis, effort management has previously been successful in Pakistan, with the shrimp fishery benefiting from a partially closed season that restricted fishing at specific times of the year. Mesopelagic lantern fish, which do not provide higher-value markets, are ideally suited for fish-meal production. Mesopelagic resources are also of interest as a source of Omega 3 and superior dietary items[14]. The Norwegian Institute of Marine Research is researching the nutritional value of several mesopelagic species.

Aquaculture Development

Aquaculture is one of the world's fastest-growing food production industries, with growth rate of less than six percent for the ten-year period 2005-14. Aquaculture production of Pakistan has grown at far slower rates than Bangladesh and India over the previous five years, with average growth rates of more than six and more than nine percent, respectively[15]. Growth rate of Pakistan lagged these nations' rates throughout comparable stages in the expansion of their aquaculture industries. Pakistan experienced a brief era of rapid expansion some 15 years ago, but it has since slowed. After 30 years, yearly output of more than 2 million tons would result from placing aquaculture on a growth trajectory that equals its neighbors at their equivalent phases of aquaculture development.

Pakistan has previously demonstrated that investments in aquaculture made by the private sector may provide significant returns[15]. Recent studies have focused on semi-intensive freshwater carp and tilapia operations in Punjab and brackish water carp culture in Sindh, with cost-benefit ratios of 1.17:2.0 and 1.37:1.51, respectively. Asian Development Bank (ADB) provided $15 million in funding for a project in the 1990s that built demonstration fish farms and hatcheries as well as enhanced capacity and training. In less than six years, the project immediately aided in the growth of the nation's commercial aquaculture sector by creating more than 1,700 fresh, lucrative small businesses. The possibilities for shrimp farming in their respective regions have been acknowledged by the governments of Sindh and Baluchistan, and five years have passed since the facility first opened. Penaeus monodon, a natural species, has also undergone testing. Baluchistan has created a shrimp farming policy, but extreme caution must be used to prevent environmental harm that shrimp farming has brought about in other nations[16].

Improve Fish Processing

The most practical strategy to increase the economic contribution of the fisheries industry is to increase value-added output. In Pakistan, poor-quality control and antiquated technology impede post-harvest processing, leading to a lack of high-quality and approved processing capabilities[17]. The government spent more than $800,000 renovating fishing boats and fish auction facilities. The EU relaxed its six-year import restriction on fisheries goods from Pakistan in March 2013 and, as a first step, allowed more than two thousands Pakistani fishing vessels received upgrades to meet the EU export restriction. Currently, three further processing facilities are requesting EU permission. Imports from two seafood businesses and exports to markets outside the EU rose.

Enhanced Food Security and Nutrition:

Increased fish intake in Pakistan may aid to lessen malnutrition and alleviate food insecurity. Fish is a wonderful proteins source, and important minerals such as calcium, iodine, vitamin D, and long-chain Omega-3 fatty acids[18]. It is also very advantageous for a child's cognitive development. Through both direct and indirect means, the fishing industry may enhance nutrition and food security. Families in Pakistan may consume more fish as a result of increased aquaculture and fish output and stabilized pricing. Growth of fishing industry also increase employment and income, enabling more people to eat healthful food overall.

Experience demonstrates that expanding the fishing industry may help increase people's intake of fish. The impoverished and rural sectors of the population in Bangladesh benefited the most from the sector's growth in terms of increased fish consumption. Market-mediated approaches to better nutrition and food security are the most likely to bring about change, but cultural preferences need to be taken into account. In comparison to the global average of 17 kg, Pakistan has one of the lowest per capita fish consumption rates in the world, at roughly 2 kg annually[19]. Increased government support for contemporary poly-cultures may increase earnings and food security, and extension initiatives might promote various types of poly-culture aimed at improving nutrition and women led businesses.

4. IMPERATIVE EXPECTS & DIFFICULTIES IN THE FISHERIES SECTOR

Important obstacles need to be overcome if Pakistan has to manage its fisheries sustainably and achieve the higher socioeconomic value mentioned in the preceding section. In both marine and inland capture fisheries, overfishing and therefore decreased yields in terms of quantity and quality. Fish goods have lower quality, less market access, and fewer added values due to inadequate infrastructure and processing requirements. Although aquaculture is expanding slowly, international experience indicates that it has the potential to make a greater socioeconomic development contribution[20]. The potential of the industry must be realized through the adjustments examined in this section.

Difficulties in Marine Capture Fisheries

Pakistan's major commercial fish stocks face considerable overfishing. Unless fishing effort is reduced, stocks and harvests will continue to decline. Pakistan must take a comprehensive approach to lowering juvenile capture[21]. Technical controls like minimum landing sizes and mesh sizes might be used, along with financial penalties for using fish for purposes other than human consumption. The laws[22] and organizations governing fisheries, both at the federal and provincial levels, are dispersed. The following issues are brought on by this disjointed framework:

- Although Pakistan has laws covering most areas of fisheries management and control, some of these laws are out-of-date and do not accurately reflect the increasingly decentralized character of Pakistan's maritime fisheries.
- Not all international obligations have been resolved.
- The overarching Fisheries Act and its subsidiary regulations have not yet been updated to include some contemporary fisheries policy elements.
- Authorities have less control over fishing capacity that prevents them from enforcing laws against irresponsible fishing methods that deplete populations and harm ecosystems.

Difficulties in Inland Capture Fisheries

The short-term fishing rights auctioning mechanism does not promote investment by rights holders that would boost returns and is not optimal for sustainability and equity. This contractual framework may make it difficult for those without credit, such as indigenous fishermen, to get fishing rights[23]. The lack of adequate infrastructure also hinders the economic contribution of inland fishing[24]. Stakeholder involvement in resource management decision making is not valued, and communities must be given the authority to decide locally and take action to address issues and possibilities unique to their area. A move towards more inclusive co-management systems, wherein local people share responsibility for making and enforcing management choices, may be a crucial facilitator for improved inland capture fisheries.

Threats to Fresh Water Ecosystems

Lakes and waterways in Pakistan are subject to environmental dangers[25]. The environment around the Indus River is likewise in danger. Infrastructure development, the destruction of riverine forests, changes in land use, industrial operations, and the disposal of industrial and urban waste, are all harmful tendencies. The Indus Waters Treaty activities on the river and canals have significantly damaged the ecosystems required to maintain successful fisheries[26]. As a result, there is still little room for the riverine and flood plain fisheries to considerably boost fish output. At the very least, further degeneration should be avoided. A number of aquatic species are endangered including the Snow Trout, some of the bigger Masheer species, and the Indus River Dolphin (Platanista minor).

Difficulties in Aquaculture Development

In Punjab, a freshwater aquifer is frequently used to replenish canal water, but there is a chance of arsenic contamination when drawing water from fresh sediments[27]. Concern is also growing over the accumulation of heavy metals in cultured fish and their pollution from industrial and agricultural sources.

Hygiene and Health Barriers to Trade in Fisheries Industry

Aquaculture and capture fisheries are intertwined on a global and national scale, and understanding these connections can aid decision makers in selecting and implementing policies that block negative spill over effects. Pakistani aquaculture should take into account four crucial links: demand substitution, demand in supply chain [28]. Aquaculture supply helps keep fish costs low, resulting in more fish consumption in households of all income levels. To reduce this danger, policy changes are necessary. To prevent overfishing to meet the growing demand for fish-meal, marine stock management must be enhanced. Regulating the post-harvest production of fish-meal may also help to decrease this trade-off. Aquaculture and capture fisheries are key economic complements to one another, and aquaculture development must be planned to minimize environmental trade-offs. To ensure that these techniques are utilized to their full potential in Pakistan, market-development initiatives are necessary. Aquaculture and capture fisheries are key economic complements to one another, and growth in aquaculture can increase the value-added potential available from the catch fisheries[29].

Habitat Degradation Influence on Fisheries Industry

The melting of glaciers, fluctuating monsoons, sea water and rising temperatures, are climate-related problems Pakistan is facing[30]. More than 18 million people in Pakistan were impacted by floods in 2010, which cost the country an estimated $10 billion in damage. Pakistan's aquaculture and fishing industries are particularly impacted by climate change, with fish spawning areas in the Indus Delta being harmed by increased salty water intrusion and lower river flows as a result of rising temperatures[31]. Mangrove ecosystems, which are essential for the reproduction of wild shrimp, are in danger due to projected sea level rise and increasing cyclonic activity brought on by rising sea surface temperatures.

The vulnerability of rural populations relying on this resource is growing as a result of climate change, including increased weather variability and pressures on fishing stocks. The diversity, quality, and number of captures provide evidence of how fish species are adapting to climate change. It is anticipated that there will be a significant increase in the rate of fish extinction in the tropical oceanic regions of the planet, which includes Pakistan's ocean area. Pakistan's National Climate Change Policy makes an effort to outline a future course for overcoming these difficulties through adaption strategies, but more widespread application is required[32]. The objectives of the fisheries policy include fostering aquaculture, maintaining water flow for healthy rivers, recovering mangroves, and decreasing water pollution. The conversion of the governments' climate change promises into concrete adaptation results must be funded and put into action.

Gender Discrimination in Fisheries Industry

Women have a significant role in capture fisheries, especially in small-scale enterprises[33, 34]. They maintain aquaculture wetlands, maintain fishing equipment, and engage in fishing themselves during the pre-harvest stages. Female working in aquaculture & fisheries usually has less pay, with a significant gender wage gap. Additionally, women who engage in fishing and aquaculture operations can encounter gender-related push-back due to access to fishing sites, fishing quotas, and permits being sometimes traditionally restricted for men. Women have terrible working conditions in the fish processing and retail industries, which can cause exhaustion, stress, and occupational injuries. It is difficult to develop gender-inclusive policies and initiatives, as there are little official statistics on the contribution of women to local economy and family nutrition. Governments have established organizations[35] and initiatives to support women economic activates, such as BISP. Pakistan is urged to take action to raise women's visibility and engagement throughout the value chain after pledging to adopt the FAO's Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines). The SSF Guidelines are an international agreement on the fundamentals and best practices for gender discrimination issues [36].

5. CONCLUDING REMARKS FOR ACHIEVING SUSTAINABLE DEVELOPMENT

To ensure the pertinent training related to the commercial sector, the major educational institutions may need to restructure and upgrade[37]; by establishing fresh alliances with international universities and enhancing the provision of extension services by local institutions, the instructional materials may be improved. To achieve this, Pakistan needs a program to reduce fleet capacity that would use licensing and associated enforcement to limit growth in vessel numbers and effort, phase out specific vessel types, and introduce spatial and temporal restrictions on fishing activity. Policymakers will need to weigh the pros and cons of direct capacity management vs indirect management. Fishery company owners who suffer damages to their operations or prior investments as a result of regulatory changes may be entitled to compensation, based on equity, and prior regulatory compliance, to uphold investor trust in the regulatory environment[38, 39].

Pakistan can avail benefit from implementing Fisheries Management Plans (FMPs), comprehensive frameworks that match fishing efforts, precise rules, and scientific advice on stock health with economic goals; strategies should be adaptable and burden-free to decrease effort as much as feasible. The regulatory framework must be compatible with the amended national framework for fisheries management; in response to regional problems, provinces, and municipal governments can seek to create additional fisheries-specific ordinances. In Pakistan, the Pakistan Maritime Security Authority has a well-established function in territorial waterways, but its power and capacity to act in shallow coastal waters are limited. Sindh Province should build its own capacity to police the Indus Delta Creek network, to respond to violations using quick, shallow draft patrol boats and local intelligence. An agreement on this might be

made through a National Plan of Action (NPOA) for illicit, unreported, and unregulated (IUU) fishing that affirms institutional obligations and lays out guidelines for addressing these activities. Pakistan is currently using innovative management practices to foster healthier ecosystems, but it could do much more to ensure a robust and productive marine ecology. International NGOs have pioneered a large number of ecosystem management initiatives, but in many ways, ecosystems are still not adequately protected.

The ecosystem approach to fisheries is a cutting-edge, preventative strategy for managing natural resources that has the potential to increase Pakistan's fisheries' sustainability. Freshwater aquatic habitats in Pakistan generate products and services that directly benefit fishing, but they are also vulnerable to a number of problems, such as water diversions, pollution, and exotic species. For Pakistan's fisheries to remain productive and sustainable over the long run, research and policy initiatives that protect ecosystems are required. The lack of regular data collection on inland fisheries makes ecosystems-based management difficult, and more thorough data collecting would help with adaptive co-management between local governments and territorial and provincial governments.

The potential of Pakistan's fish products on the market has not yet been fully realized due to the limited value chain development. Investments in infrastructure, workforce skills, business productivity, and market expansion would aid businesses in their attempts to improve the quality of their products, satisfy customers, and compete globally. At Korangi Harbour, there is potential to create a "blue growth centre" which would increase productivity through new economic activities; public investment in places like auction halls, loading docks, cold storage facilities, and sales areas would increase competition and boost product value and quality. Pakistan's abundant fisheries resources have the capacity for a huge development opportunity, with the potential to become a growth engine and create new, higher-paying employment. Additionally, Pakistan's fisheries may help with vital social objectives such as improving small-scale farmers' livelihoods, expanding possibilities for women, and ensuring adequate nutrition and food security. To better comprehend prospects for targeted fish marketing, it is necessary to evaluate fish consumption and preferences among various consumer subgroups.

Competing Interests

The authors did not declare any competing interest.

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