

Original Research Article

Sources of Growth and Emerging Trends In Fisheries Sector Of Jammu and Kashmir

ABSTRACT

This study examines the growth trends of Fisheries sector in UT of Jammu and Kashmir (J&K) from year 1980 to 2020. The study was conducted during the academic year 2021-22 at Skuast-k Shalimar. The research study is exclusively based on secondary data. It investigates the factors influencing the growth of total fish production over the decades in UT of Jammu and Kashmir and identifying areas of strength and weakness. The study employs log linear production function ($\text{Log } Y_t = A + Bt$) for computing compound annual growth rate (CAGR) to assess the performance of the sector. The findings revealed slow to moderately high growth patterns from decadal phase I to III in total fish production and during phase IV a slight increase in total fish production was observed. Moreover, state and centrally sponsored schemes by the government, infrastructural development like introduction of cage culture, creation of facilities for capacity building programmes etc has proved be drivers of growth over the years but causes like less attention and lack recognition, mal practices etc has turned out to be its major causes of being under developed sector. This study underscores the need for targeted interventions to improve fish production and improves sector's resilience and contribution to rural livelihoods in UT of J&K.

Keywords: Fisheries growth, Jammu and Kashmir, Compound Annual Growth Rate (CAGR), wayforward and suggestions.

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INTRODUCTION

Agriculture — a deeply rooted and multifaceted term goes far beyond the simple act of growing crops. It is one of the oldest and most essential human activities, not only crucial for economic progress but fundamental to human survival itself (Mahendra, 2020). Life without agriculture is unimaginable, as it forms the backbone of food security, livelihoods, and rural development.

For centuries, agriculture has provided the sustenance necessary for civilizations to emerge, grow, and flourish. It is intricately linked to the culture, identity, and economy of societies around the globe. Particularly in developing countries like India, agriculture continues to be a major source of employment and income, especially in rural areas where a majority of the population depends on it directly or indirectly. Agriculture in India is more than a livelihood; it is the backbone of the country's socio-economic framework. It not only feeds the vast population but also sustains millions of households, especially in rural India. With a diverse range of agro-climatic zones, India is uniquely positioned to cultivate a wide variety of crops throughout the year. Over the decades, agricultural growth has been shaped by policy reforms, Green Revolution technologies, expansion of irrigation, and access to institutional credit. However, challenges like small landholdings, declining soil fertility, unpredictable monsoons, and market volatility continue to affect the sector's performance. Nonetheless, agriculture remains central to India's development narrative, serving as a critical sector that supports food security, exports, raw materials for industries, and employment generation. Thus, evaluating the growth dynamics of agriculture and its allied sectors is crucial to understanding broader development patterns in the country.

Agriculture being a dynamic and broad-based sector, encompassing a wide range of interconnected fields (Manikandan, 2020). It includes not just crop production but also vital allied sectors such as horticulture, animal husbandry, sericulture, agroforestry, and significantly, the fisheries sector. Moreover, the agriculture and allied sectors are deeply interconnected and represent an amplified domain that plays a vital role in ensuring food and nutritional security, livelihood generation, and rural transformation. The agriculture and allied

sector acts as a powerful engine for inclusive growth, poverty reduction, and employment generation in India, especially in rural regions. It supports nearly half of the country's workforce and contributes significantly to the national GDP. Beyond its traditional role, the sector has expanded to include agribusinesses, value-added services, and technology-driven innovations such as precision farming, remote sensing, digital marketing, and smart irrigation. Government schemes like PM-KISAN, e-NAM, and the Holistic Agriculture Development Programme (HADP) are further accelerating transformation in the sector by integrating sustainability, entrepreneurship, and capacity-building. Moreover, allied activities such as horticulture, livestock, sericulture, apiculture, and fisheries offer diversified income opportunities, reduce risk for farmers, and promote climate-resilient farming practices. The synergy between these domains has now become critical to achieving the goals of Atmanirbhar Bharat and Sustainable Development Goals (SDGs). Among these, the fisheries sector has emerged as a major growth engine due to its rapid expansion, export potential, and ability to address hidden hunger through protein-rich food sources (Kumar et al., 2023). With increasing investments, technological adoption, and supportive government schemes, the sector is witnessing a positive shift in productivity and sustainability (Patra & Singh, 2023). In the Indian context, integration across fisheries, horticulture, livestock, and sericulture is now seen as a promising pathway to doubling farmers' income and building climate resilience (Rathore et al., 2024). Hence, sector-specific research becomes indispensable to understand evolving trends, gaps, and opportunities across each allied domain.

In Jammu and Kashmir, agriculture forms the backbone of the rural economy and has long been a primary source of livelihood for a large section of the population. With fertile valleys, diverse agro-climatic conditions, and a tradition of farming passed down through generations, agriculture continues to play a central role in shaping the lives of people in both Jammu and the Kashmir Valley. From growing rice, maize, and wheat to cultivating various vegetables and fruits, the region offers immense potential for both food and commercial crop production. The daily life and cultural practices of many communities revolve around farming, making it not just an occupation but a way of life. Seasonal rhythms and festivals are often connected to the sowing and harvesting cycles, reflecting the deep-rooted importance of agriculture in the region.

Alongside agriculture, allied sectors such as horticulture, animal husbandry, sericulture, and fisheries have steadily emerged as important contributors to rural development and income generation. These sectors provide employment to thousands of families, often supporting them during times when crop farming alone is not sufficient. The cultivation of fruits like apples, pears, cherries, and walnuts, particularly in the hilly areas, adds diversity and value to the agricultural output. Similarly, rearing cattle, sheep, and goats offers dairy products, meat, and wool, which not only support household nutrition but also offer opportunities for small-scale trade. These allied sectors complement agriculture and help improve overall income stability for farming households, especially in areas with small landholdings or challenging terrain.

One of the most remarkable features of Jammu and Kashmir is its abundance of freshwater resources. The region is home to a vast network of rivers, streams, lakes, and springs, which not only enhance the natural beauty of the landscape but also provide valuable support to agriculture and allied sectors. These water bodies are essential for irrigation, enabling farmers to cultivate even during dry spells. Moreover, they create favorable conditions for inland fisheries, offering another source of food and livelihood to local communities. The presence of such clean and cold water sources supports a variety of aquatic life and contributes to maintaining ecological balance. In many areas, these waters also support traditional practices like fish farming, watercress cultivation, and the use of floating gardens, all of which have been part of the local way of life for decades.

The UT's unique geography and abundance of freshwater bodies make fisheries a key pillar of the agricultural ecosystem. As agricultural practices evolve to meet the demands of sustainability, climate adaptation, and economic diversification, the inclusion and promotion of sectors like fisheries become even more vital. It plays a critical role in ensuring nutritional security, generating employment, and boosting income, especially in regions with rich water resources like Jammu and Kashmir (Bhat and Wani 2022). Furthermore, the genetic improvement of aquatic species, particularly through selective breeding and biotechnological interventions, has opened new avenues for enhancing productivity and disease resistance in the fisheries sector. These advancements are critical in states like Jammu and Kashmir, where native fish species such as have significant ecological and economic value. Scientific efforts toward conservation and genetic enhancement can lead to sustainable aquaculture practices

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while preserving biodiversity. Understanding agriculture in its full scope including its allied sectors is essential for holistic rural development and policy planning (FAO 2021).

METHODOLOGY

The present study is based on secondary data collected from Directorate of Economics and Statistics, Jammu and Kashmir. Different periods of study have been considered according to availability of decadal data of fisheries sector. The time-series data ranging from 1980-81 to 2019-20 have been taken.

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To achieve the objective of the study, statistical approach compound annual growth rate (GACR) was used for data analysis and interpretation. The compound annual growth rate was computed based on the time series data on the total fish production of Jammu and Kashmir UT.

By using log-linear production function compound growth rates were estimated to study the percentage increase or decrease in the selected parameters. The following exponential growth function was used:

$$\text{Log } Y_t = A + Bt$$

Where;

$$B = \text{Log}(1+r) \text{ and } r = \text{antilog } B-1$$

Percentage rate of compound growth per annum will be calculated as:

$$\text{CAGR (\%)} = r = (\text{Antilog } B-1) \times 100$$

RESULTS AND DISCUSSIONS

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The experimental findings of the study are presented below .

The fish-farm sector in Jammu and Kashmir exhibited varied trends across the years from 1980-2020. The results showed that there has been consistent growth in total fish production with overall compound annual growth rate of 2.04 per cent which reflected a positive but slow growth over time. The growth drivers may be because of the state and centrally sponsored schemes by the government, infrastructural development like introduction of cage culture, creation of facilities for capacity building programmes, setting up of fish farms, hatcheries for

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breeding and aquarium cum awareness centres, introduction of RAS culture. For instance the introduction and gradual adoption of scientific fish farming practices — including composite fish culture, polyculture techniques, and induced breeding — acted as key technological drivers during the study period. These methods helped improve seed availability, survival rates, and stocking densities. In UP, scientific training of farmers and availability of institutional credit further enabled adoption of semi-intensive and intensive aquaculture practices. Meanwhile, J&K benefited from the growth of cold-water fisheries, especially in the cultivation of rainbow and brown trout, supported by research inputs from ICAR-Central Institute of Cold Water Fisheries (ICAR-CIFRI). Furthermore, the role of institutional support, training workshops and fisheries extension services can not be overlooked. The department of fisheries has increasingly provided awareness and hands on training for local fishermen particularly in areas involving hatchery management, feed technology, disease control and post harvest practices. These initiatives have helped in the gradual transition from traditional fishing methods to more scientific aquaculture techniques. Additionally, schemes such as Pradhan Mantri Matsya Sampada Yojana (BMMSY) have catalysed both infrastructural investment and capacity building, contributing to a more resilient and commercially-oriented fisheries ecosystem. Another significant and impactful driver of fisheries sector growth during 1982–2002 was the strengthening of institutional support mechanisms, including the establishment of fisheries departments at state levels, the formation of cooperative societies, and targeted subsidies through centrally sponsored schemes like the Fish Farmers Development Agency (FFDA). These initiatives helped promote pond aquaculture, especially in land-abundant states like Uttar Pradesh. In Jammu & Kashmir, the government played a pivotal role in developing trout fisheries by providing hatchery infrastructure, feed inputs, and technical support under the Hill Area Development Programme (HADP) and state plan schemes. These interventions created a sustainable foundation for increasing fish productivity and culture area. Despite a general upward trend in fish production, the data revealed noticeable regional disparities in growth performance. Lowland districts with access to perennial water bodies showed relatively better gains compared to high-altitude or arid zones as per studies. This divergence is primarily attributed to infrastructure concentration, ease of resource availability, and better institutional penetration in lowland areas. Conversely, regions lacking cold chain logistics and consistent electricity supply continue to face significant operational bottlenecks. Therefore, regional customization of schemes and technologies remains essential to unlocking untapped potential in underperforming zones. The slow pace of growth in some periods can also be traced to fragmented policy implementation and inconsistent funding across planning cycles. While

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some centrally sponsored schemes were impactful, their benefits were diluted by frequent changes in local leadership, overlapping departmental jurisdictions, and limited convergence with agricultural and rural development missions. For example, delays in subsidy disbursement or mismatches between training and actual field conditions led to underutilization of resources. Ensuring policy continuity, accountability, and cross-sector coordination is thus crucial to achieving sustained momentum in the fisheries sector. Another important, yet often ignored, factor influencing fisheries growth in Jammu and Kashmir is the low participation of women and the prevailing social stigma associated with fish handling. Cultural perceptions continue to limit women's roles in fish production, processing, and marketing. However, recent interventions like self-help group mobilization, women-focused training modules, and income diversification efforts through backyard fish farming have begun to shift this narrative. Mainstreaming women into fisheries value chains could not only bridge labor shortages but also enhance household-level nutritional security and resilience. The slow growth can also be attributed to reasons like degradation of water resources, loss of breeding grounds, malpractices of fishermen, lack of glamour and strong social taboos, outmigration of people etc. However, In recent years, the focus has also shifted towards improving market linkages, cold chain infrastructure, and digital platforms to support fishery product marketing in Jammu and Kashmir UT. This transformation is crucial for minimizing post-harvest losses, enhancing value addition, and expanding market access both within and outside the Union Territory. Strengthening the fisheries value chain ensures better price realization for fishermen and contributes significantly to livelihood security in rural areas.

Table 1: Changes in the total fish production over the decadal years of UT of Jammu and Kashmir

Phase	Year	Fish Production
Phase I	1980-81	95148
	1981-82	97018
	1982-83	99485
	1983-84	99006
	1984-85	100155
	1985-86	105174
	1986-87	109114
	1987-88	110022
	1988-89	119670
	1989-90	130005
CAGR (%)		3.20

Phase II	1990-91	135011
	1991-92	140513
	1992-93	145011
	1993-94	139475
	1994-95	161000
	1995-96	165200
	1996-97	175801
	1997-98	185045
	1998-99	188510
	1999-00	189608
CAGR (%)		3.45
Phase III	2000-01	184667
	2001-02	188065
	2002-03	190100
	2003-04	190500
	2004-05	190557
	2005-06	191500
	2006-07	192000
	2007-08	192500
	2008-09	192600
	2009-10	193000
CAGR (%)		0.45
Phase IV	2010-11	197000
	2011-12	198551
	2012-13	199531
	2013-14	200001
	2014-15	203001
	2015-16	203780
	2016-17	203900
	2017-18	207071
	2018-19	210679
	2019-20	213273
CAGR (%)		0.80
OVER ALL CAGR (%)		2.04

Source: Directorate of Economics and Statistics, Jammu and Kashmir

The Table 1 indicated the trends in total fish production by using compound annual growth rate. It is concluded from the Table that in phase I the overall production of fish has shown a steady growth pattern. In phase II moderate to high pattern of growth was seen mostly. In phase III the same pattern of growth continued throughout the decadal years. In phase IV entirely an increasing trend was observed.

Thus, from the beginning to the end it has observed moderate to slightly high rate of growth over the decadal phases. The estimates of compound annual growth rate for phase I, II, III and IV resulted as 3.20, 3.45, 0.45 and 0.80 per cent respectively which indicated phase II to attain maximum growth and phase III to attain minimum. The overall compound annual growth rate

was estimated as 2.04 per cent. These findings are in accordance with the findings of Baba *et al.* (2019), (Mir and Bhat 2021), (Sharma and Gupta, 2022) and (Department of Fisheries, 2023), (Kumar *et al.*, 2023).

CONCLUSION

The present study analyzed the growth trends of the fisheries sector in the Union Territory of Jammu & Kashmir using the compound annual growth rate (CAGR) method, which revealed an overall growth rate of 2.04 per cent over the observed period. This moderate pace of expansion reflects both the sector's untapped potential and the existing limitations. The key drivers of growth have included the gradual adoption of improved aquaculture practices, increased demand for fish protein, government schemes under centrally sponsored programs, and the development of cold-water fisheries suited to the region's unique ecology. However, the growth has been held back by challenges such as insufficient infrastructure, fragmented policy implementation, limited access to credit and quality inputs, a lack of trained human resources, and other reasons that often affect water availability and quality. Moreover, remote geographies and inadequate market linkages have further constrained the commercialization of fisheries in rural pockets. To fully harness the potential of this sector, there is a need to shift from traditional methods to modern, technology-driven aquaculture, backed by strong institutional support, better extension services, and enhanced cold-chain and transportation facilities. Capacity-building programs for farmers, especially women and youth, need to be scaled up to ensure inclusive development. A region-specific policy framework integrating the fisheries sector into the broader goals of sustainable agriculture, blue economy, and climate resilience would help transform this allied activity into a key driver of rural prosperity in Jammu & Kashmir UT.

Way Forward and Policy Implications

The findings of this study indicate that while the fisheries sector in Jammu and Kashmir UT has shown positive growth, the pace remains slow and uneven. To unlock the full potential of this sector, a focused and area-specific policy approach is essential.

1. Investment in infrastructure : such as cold storage facilities, fish feed units, and hatcheries—is needed to overcome post-harvest losses and ensure year-round productivity.

2. Strengthening extension services : A dedicated fisheries extension workforce, equipped with digital tools and local language communication, can help transfer scientific practices, ensure compliance with environmental standards, and promote community-based resource management.

3. Credit support and market linkages : must be strengthened to provide financial stability and better price realization for small and marginal fishers.

4. Data collection and monitoring mechanisms : needs to be improved to enable better planning, evaluation, and policy corrections.

5. Eliminating social taboos and cultural barriers : Awareness campaigns, school-level sensitization, and community engagement can help change perceptions, encourage youth and women participation, and integrate fisheries as a socially accepted and economically viable livelihood option.

By addressing these gaps, the fisheries sector in J&K can play a transformative role in ensuring nutritional security, creating rural livelihoods, and contributing to sustainable agricultural growth.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

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