

# Growth Trends of Fisheries Production in India: An Economic Overview

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**Abstract - Subject and purpose of work:** The study has been conducted to analyze the growth and variation of fisheries production in India and its contribution to the world's fisheries production.

**Materials and methods:** For analyzing the growth of fisheries production, secondary data have been used for the periods 1981-82 to 2023-24. The compound average growth rate (C.A.G.R.) and coefficient of variation (C.V.) ratio have been calculated by using descriptive statistics and regression methods.

**Results:** The study's findings show increasing growth in fisheries production, with an 8.92 percent share of the world's fisheries production. However, higher growth is seen in inland production with 6.5 percent C.A.G.R. compared to marine production with 2.3 percent C.A.G.R. The C.V. ratio is also found to be higher in inland compared to marine production in the country.

**Conclusion:** Fishing is one of the most rapidly-growing sectors of India with a significant contribution to the world's fisheries production.

**Keywords:** Fisheries production, India, world, C.A.G.R. and C.V.

## INTRODUCTION

In the Indian economy, the main economic sector is agriculture as a large part of the population relies on this sector for their livelihood, food and raw materials. Fisheries is one of the emerging sectors in India. It provides nutritional and food security as well as a source of employment for the millions of people in the country. With about an 8.9 per cent proportion of the world's fish production, India ranked third among all fish-producing nations. India is one of the world's leading nations for the production and export of shrimp, ranking second in aquaculture globally. (Ministry of Fisheries, Animal Husbandry and Dairying, 2023).

India has abundant resources of fisheries, with contributions from both marine and inland sectors. India has a vast coastline area of about 8118 kilometers as well as 191,024 km of rivers and canals, ponds and tanks 2.36 million hectares, floodplain lakes 1.2 million hectares, reservoirs 3.54 million hectares, brackish water resources 1.24 million hectares, cold water resources and other inland resources are available in the country (NABARD, 2018). The abundant resources provide many opportunities for enhancing fisheries production, along with job creation, for bringing about economic prosperity. (Raghav *et al.*, 2013) also mentioned in their study that vast fisheries resources offered opportunities for the sustainable growth of the country's fisheries sector.

As India has a wide scope for the development of the nation's fisheries sector, it has been seen that from 1950-51 to 2023-24, there has been a tremendous growth in fisheries production from 75 lakh tonnes to 184 lakh tonnes. The fisheries sector's contribution to agriculture and the Indian economy is 6.72 percent and 1.1 percent, respectively, during the year 2021-22. The annual growth rate of the fisheries production was analyzed at 10.34 percent in the FY 2021-22 (Handbook on Fisheries statistics, 2022), while the agricultural sector growth rate was 4.18 percent in the FY 2022-23 (NABARD, 2023). Nowadays, Farmers are more attracted to the fisheries sector as it is not only a source of income but also provides nutritional food for them; the fisheries' growth rate is also high compared to the agricultural sector.

The fisheries sector not only provides employment and food security but also is a major source of foreign income. India is a prominent exporter in the world. During the period 2021-22, India's fish products export was 17,35,286 tonnes with a value of INR 63,969.14 crore (Handbook on Fisheries Statistics, 2023). India is the world's second-largest producer of aquaculture after

China and one of the top countries in the production of shrimp exporting nations (FAO, 2022). The fisheries sector has been recognized as an emerging sector in India that is an alternate source of income for farmers in the country. The present study has been conducted to analyze the growth trends of fisheries production in India as well as the fisheries export to the world from India.

### OBJECTIVES OF THE STUDY

The following specific objectives have been analyzed in the study:

1. To study the shares of India in the world's fisheries production.
2. To estimate the growth of fisheries production in India in the different decades.
3. To measure the fluctuation in fisheries production in the different periods in India.

### MATERIALS AND METHODS

Time series data on the fisheries production in the world, as well as India, have been calculated from the different editions of the Handbook of Fisheries Statistics published by the Department of Animal Husbandry, Dairying and Fisheries, Government press release reports and notes, etc. For evaluating the trends of fisheries production, the entire periods have been divided into four decadal groups 1981's (1981-82 to 1990-91), 1991's (1991-92 to 2000-01), 2001's (2001-02 to 2010-11), 2011's (2011-12 to 2023-24) and the overall period 1981-82 to 2023-24 in the present study.

- The compound average growth rate (C.A.G.R.) has been estimated to find out the growth trends of Indian fisheries production and exports. (Sharma, 2017); (Siby and Arunachalam 2020) and (Das *et. al*, 2016) also calculated C.A.G.R. and instability for the evaluation of growth and fluctuation in fisheries production in India. The following regression analysis has been used for the calculation of fisheries production and export by using the SPSS tools:

$$Y = A [1+r]^t$$

Where, Y = dependent variable

A = Constant, B = 1+r, r = Compound average growth rate.

t = time variable in years (1981-82 to 2023-24)

$$\log Y = \log A + t \log [1+r]$$

$$\text{OR } Y^* = a + bt$$

Where  $Y^* = \log Y$

$$a = \log A$$

$$b = \log [1+r]$$

$$[1+r] = \text{Antilog } b$$

$$r = \text{Antilog } b - 1$$

$$\text{In percentage term } r = [\text{Antilog } b - 1] \times 100$$

- The simple arithmetic mean is calculated as follows:

$$\bar{X} = \frac{\sum X}{N}$$

Where  $\sum X$  = sum of the values of the variables considered,

N = number of observations

- Fish production has been widely fluctuating over different periods. We cannot reach a general conclusion based on the mean, so the coefficient of variation has been calculated to find out the variations in fish production in different periods. The C.V. is calculated by:

$$C.V. = \frac{\sigma}{\bar{X}}$$

$$\sigma = \sqrt{\frac{\sum(x - \bar{X})^2}{N}}$$

$$x = (X - \bar{X})$$

C. V. = Coefficient of variation,

$\sigma$  = Standard deviation,

X = Observation of the series,

$\bar{X}$  = Average of observations,

N = Number of observations

## RESULT AND DISCUSSION

### Fish Production in the World and India

In the national as well as international economy, the role of the fisheries sector is important. Approximately, 58.5 million people in the world were involved in the fisheries sector for their family earnings, 35 per cent of people of the world were employed in aquaculture and 65 per cent were engaged in capture fisheries in 2020 (FAO, 2022) and about, 16 million people of India were worked in Fisheries sector in India for their earnings (NABARD, 2018). Based on the data analysis in (Table 1), it is revealed that the world's fisheries production has increased from 19.31 MMT to 182.05 MMT in the year 1950 to 2021.

The total production of fish in India touched 16.24 MMT in the year 2021 from a mere 0.74 million metric tonnes in 1950 (Table 1). It can be said that fisheries production is

**Table 1**  
**Fisheries Production of the World and India, 1950 to 2020**

(in MMT)

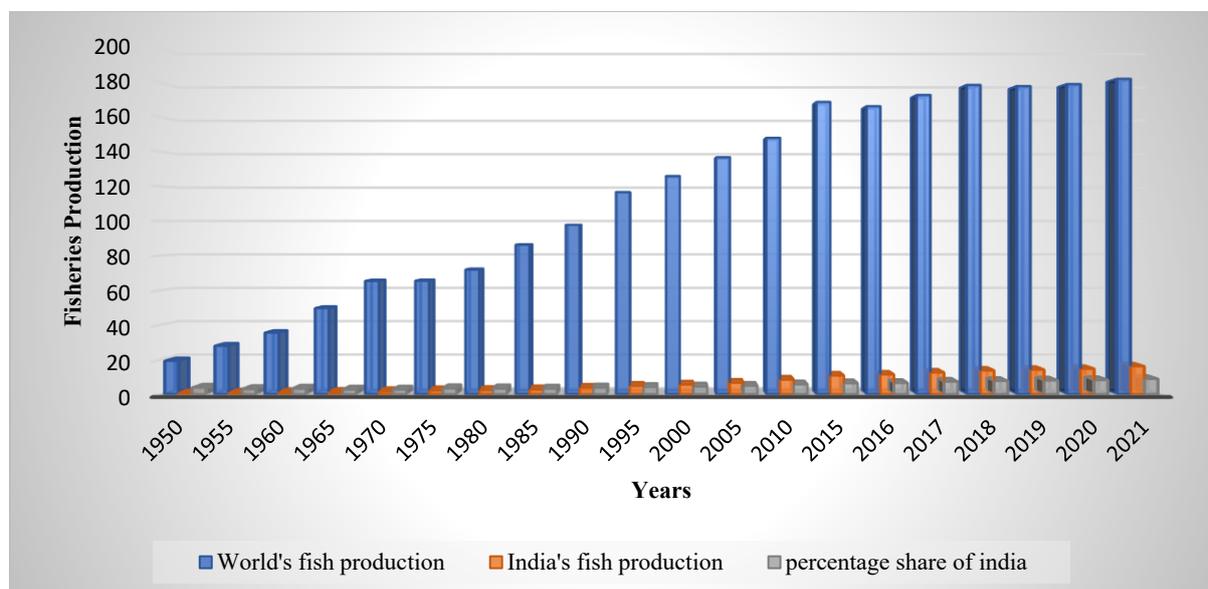
Fisheries Production of the World and India							
Fisheries Production of the World				Fisheries Production of India			
Years	Total	Marine	Inland	Total	Marine	Inland	Shares of India *
1950	19.31	17.08	2.24	0.74	0.53	0.21	3.83
1955	27.96	24.30	3.66	0.84	0.60	0.24	3.00
1960	35.54	24.30	3.66	1.16	0.88	0.28	3.27
1965	49.67	44.55	5.13	1.33	0.82	0.51	2.68
1970	65.38	59.31	6.07	1.76	1.09	0.67	2.69
1975	65.47	58.51	6.96	2.27	1.48	0.79	3.46
1980	71.94	64.19	7.76	2.45	1.55	0.90	3.40
1985	86.28	75.48	10.80	2.84	1.73	1.11	3.29
1990	97.74	82.57	15.17	3.80	2.19	1.61	3.89

1995	116.75	94.60	22.14	4.92	2.66	2.27	4.22
2000	125.94	96.88	29.06	5.61	2.76	2.85	4.45
2005	136.78	98.25	38.53	6.66	2.87	3.79	4.87
2010	147.99	95.87	52.13	8.48	3.28	5.19	5.73
2015	168.70	108.70	60.00	10.82	3.64	7.18	6.41
2016	166.20	106.80	59.40	11.43	3.63	7.81	6.56
2017	172.70	111.20	61.50	12.59	3.69	8.90	7.29
2018	178.50	115.20	63.30	13.76	4.18	9.58	7.70
2019	177.83	112.40	65.43	14.2	3.80	10.4	7.98
2020	179.00	112.00	67.00	14.73	3.50	11.23	8.22
2021	182.05	114.46	67.59	16.24	4.13	12.12	8.92
<b>C.A.G.R.*</b>	11.40	9.00	21.60	18.80	11.40	26.10	-
<b>C.V.*</b>	51.31	41.60	84.82	80.12	52.11	98.99	-
<b>Mean</b>	113.59	80.83	32.38	6.83	2.45	4.38	-
<b>S.D.</b>	57.24	32.98	26.54	5.42	1.27	4.24	-
<b>Minimum</b>	19.31	17.08	2.24	0.74	0.53	0.21	-
<b>Maximum</b>	182.05	115.20	67.59	16.24	4.18	12.12	-
<b>Range</b>	162.74	98.12	65.35	15.50	3.65	11.91	-

Source: Handbook of Fisheries and Statistics 2018, 2022, 2023  
 Department of Animal Husbandry, Dairying and Fisheries, Government of India  
 \*Shares of India, C.V. and C.A.G.R. in percentage

continuously increasing in India. An interesting fact emerges that the shares of marine fish production were higher compared to inland fish production in the total fisheries production in India from 1950 to 1995. But after the year 2000, the contribution of inland fish production was high compared to marine fish production in India.

**Figure 1**  
**India's share in the world's fisheries production**



From the analysis of the data (**Table.1**), it is revealed that the shares of inland fish production are continuously increasing in the total fisheries production in the world, which has increased from 11.6 per cent in 1950 to 37.13 per cent in 2021. However, the world's fisheries production pattern has been seen as completely different from that of India. In India, the inland fisheries production contributed 12.12 MMT (74.60 percent), which was higher compared to the marine fish production of 4.13 MMT (25.40 percent) in the year 2021. However, the shares of marine fisheries production were 114.46 MMT (62.87 percent) high compared to inland fisheries production, which was 67.59 MMT (37.13 percent) in the world's total fisheries production for the year 2021. The mean value of the total fisheries production was measured at 113.59 MMT and 6.83 MMT for the world and India, respectively. The minimum total fisheries production of the world and India was calculated to be 19.31 MMT and 0.74 MMT, respectively, while the maximum fisheries production was 182.05 MMT and 16.24 MMT, respectively.

Moreover, (**Figure1**) indicates that the share of Indian fisheries production in the world's fisheries production increased from 3.83 percent in the year 1950 to 8.92 percent in the year 2021. From the analysis of the data, it can be said that the share of India in the total fish production has been continuously increasing since 1950. The second largest producer of fish is India after China, with a share of 8.92 percent in the total fish production of the world in the year 2021. The compound average growth rate of India and the world has been measured at 18.80 percent and 11.40 percent, respectively. There is found a wide difference is found in the coefficient of variation in the total production in India (80.12 percent) and the world (51.31 percent). The difference in C.V. exists because of the continuously increasing share of inland fisheries in the country; as a result, India has the second position at the global level. The result of the study shows that India's fish production has been growing much faster than the world's fish production. (Kumar, 2020) and (Krishnan and Birthal. 2002) also analyzed that India's fisheries production growth is higher than the world's fisheries production. It can be concluded that at present, inland fisheries have been playing a vital role in the fish production of India as well as in the world.

### PRODUCTION STRUCTURE AND GROWTH TREND OF FISHERIES

The fish production of India has been analyzed to visualize the growth trends in India. Growth performance of fisheries production has been calculated from the period 1981-82 to 2023-24. The whole period has been divided into four decades. Fisheries production in India has been growing much faster since independence. The fish production has increased from 24.44 lakh tonnes in the year 1981-82 to 184 lakh tonnes in the year 2023-24. It has been studied that the shares of marine and inland fish production patterns have changed after the period 1981-82 (Handbook on Fisheries and Statistics, 2018). As per the analysis of the data, it is calculated that the shares of marine and inland fisheries production were 14.45 lakh tonnes and 9.99 lakh tonnes, respectively, in the total fish production in the period 1950-51. However, the shares of marine and inland fish production are 44.90 lakh tonnes and 139.10 lakh tonnes in the total fish production in the period 2023-24 (Handbook on Fisheries and Statistics, 2025). However, the positive compound average growth rate of marine as well as inland fisheries production has been noted in the total fisheries production in the country since 1950-51.

The C.A.G.R. (compound average growth rate) and C.V. (coefficient of variation) have been observed in (**Table 2**). It is calculated for the period 1981-82 to 1990-91 that the C.A.G.R. of marine, inland and total fish production was 5.1 percent, 5.40 percent and 5.30 percent, respectively. The growth rate of both marine and inland is above 5 per cent in the period 1981-82 to 1990-91. The C.V. of marine and inland and total fish production is 17.42 percent, 16.34 percent and 16.61 percent, respectively. The findings show that the high level of instability of marine fish production is due to the higher share of marine fish production in the country's total fisheries production. It has been observed that the practices of the fish production of captured fish are higher compared to culture fish in the period 1981-82 to 1990-91. The mean value of marine, inland and total fisheries production was found to be 17.56 lakh tonnes, 11.99 lakh tonnes and 29.56 lakh tonnes, respectively. The maximum value noted for marine fish production was 23 lakh tonnes and inland fish production 15.36 lakh tonnes, while the minimum value of marine was 14.27 lakh tonnes and 9.40 lakh tonnes during the period 1981-82 to 1990-91.

The second period (1991-92 to 2000-01) of the study revealed that the C.A.G.R. of marine and inland fisheries production was calculated at 1.5 percent and 6 percent, followingly and the total fisheries production C.A.G.R. was 3.5 percent. Here it is seen that the C.A.G.R. of marine fish production has decreased; it is merely 1.5 per cent compared to 5.1 per cent in the first period in the present study, while the compound average growth rate of the inland sector is continuously increasing in the country. The transition from marine to inland fisheries has been brought about by overcapitalization and stagnation in the marine sector, which is mainly capture-oriented, while aquaculture has allowed the inland sector to grow at a quicker rate.

The C.V. of marine fish production (5.96 percent) is lower compared to inland fish production (17.41 percent) and the overall fluctuation of fish production is 10.54 percent. There was a remarkable growth in inland fish production after the commercialization of shrimp aquaculture in the country. Many commercial hatcheries and farms have been set up with the desired seeds and formulated feeds during this period, which is also helpful to increase fish

**Table 2**  
**Growth of Fish Production in India**

(in Lakh tonnes)

Year	Fish Production in India		
	Marine	Inland	Total
<b>Period-1 (1981-82 to 1990-91)</b>			
<b>C.A.G.R.*</b>	5.1	5.40	5.30
<b>C.V.**</b>	17.42	16.34	16.61
<b>Mean</b>	17.56	11.99	29.56
<b>S.D.</b>	3.06	1.96	4.91
<b>Minimum</b>	14.27	9.40	23.67
<b>Maximum</b>	23.00	15.36	38.36
<b>Range</b>	8.73	5.96	14.69
<b>Period-2 (1991-92 to 2000-01)</b>			
<b>C.A.G.R.*</b>	1.5	6.00	3.5
<b>C.V.**</b>	5.96	17.41	10.54
<b>Mean</b>	27.34	22.92	50.27
<b>S.D.</b>	1.63	3.99	5.29
<b>Minimum</b>	24.47	17.10	41.57
<b>Maximum</b>	29.67	28.45	56.75
<b>Range</b>	5.20	11.35	15.18
<b>Period-3(2001-02 to 2010-11)</b>			
<b>C.A.G.R.*</b>	1.1	5.7	3.7
<b>C.V.**</b>	4.8	17.21	11.42
<b>Mean</b>	29.63	39.64	69.27
<b>S.D.</b>	1.42	6.82	7.9
<b>Minimum</b>	27.79	31.26	59.56
<b>Maximum</b>	32.50	49.81	82.31
<b>Range</b>	4.71	18.55	22.75
<b>Period-4 (2011-12 to 2023-24)</b>			
<b>C.A.G.R.*</b>	1.1	9.00	6.5
<b>C.V.**</b>	10.12	31.90	25.21
<b>Mean</b>	37.53	91.00	128.54
<b>S.D.</b>	3.80	29.03	32.40
<b>Minimum</b>	33.21	52.94	86.66

<b>Maximum</b>	44.90	139.10	184.00
<b>Range</b>	11.69	86.16	97.34
<b>Overall Period (1981-82 to 2023-24)</b>			
<b>C.A.G.R.*</b>	2.3	6.5	4.6
<b>C.V.**</b>	27.19	80.16	58.56
<b>Mean</b>	28.68	44.85	73.53
<b>S.D.</b>	7.84	35.95	43.06
<b>Minimum</b>	14.27	9.40	23.67
<b>Maximum</b>	44.90	139.10	184.00
<b>Range</b>	30.63	129.70	160.33

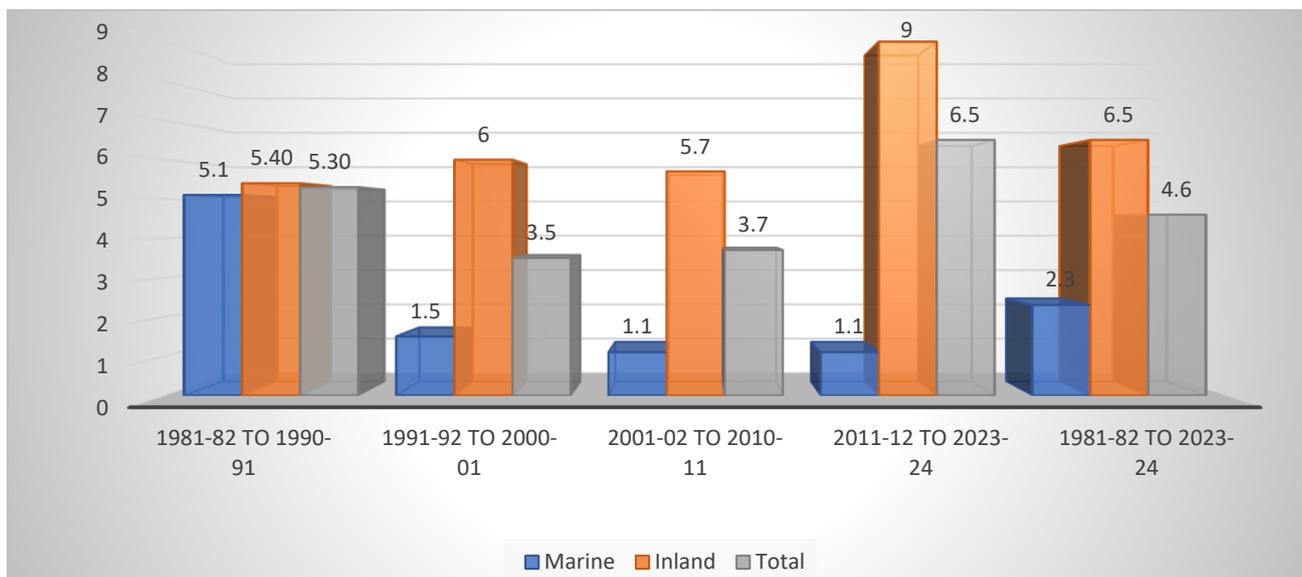
Source: Handbook of Fisheries and Statistics 2018, 2020, 2022, 2023 and 2025  
 Department of Animal Husbandry, Dairying and Fisheries, Government of India

Note: C.A.G.R.\* and C.V.\* has been depicted in percentage form

production. However, India has become the second-largest fish producer in the world, while the growth rate of the marine sector is stagnating. From the analysis of (Table 2), the inland fisheries production had been growing very fast with a C.A.G.R. of 5.7 percent and the C.A.G.R. for marine was 1.1 percent and the total fisheries production was growing with a 3.7 percent C.A.G.R. during the period 2001-02 to 2010-11. The level of fluctuation had been seen higher in the inland sector compared to the marine sector, with the C.V. of inland, marine and total were 4.8 percent, 17.21 percent and 11.42 percent, respectively. Mean of the total fish production was measured at 69.27 lakh tonnes, the maximum value was 82.31 lakh tonnes and the minimum value was 59.5 lakh tonnes in the decade 2001-02 to 2010-11.

The growth in the fisheries sector in India has been possible only because of the growth in the inland sector. Aquaculture has become the most feasible option for increasing fish production in the country, at a time when there is a slow growth rate in the marine sector. (Kumar *et.al*, 2010) and (Krishnan and Birthal, 2002) also counted the increasing volume of inland fisheries production in India after the year 1990-91. Figure 2, it depicts that the inland sector continuously expands at an increasing rate as more involvement of the farmers in the fisheries sector and more areas in the fisheries sector. It is documented from the data that the fisheries sector is growing at an increasing rate. The result of the study showed that the C.A.G.R. of the production of inland fish was 9 percent compared to marine fish production, which was 1.1 percent during the period 2011-12 to 2023-24

Figure 2 - C.A.G.R. of Fisheries Production in India



The C.A.G.R. of the total fisheries production was measured at 6.6 percent, much higher than the previous period, which is only possible due to improved technology, incentives provided by the government and increased public and private investment in this sector. In recent years, fisheries production has gone up with the increasing sharing of inland and aquaculture. The production of freshwater aquaculture as carp and shrimp culture in brackish water areas is responsible for increasing the growth of the fisheries sector in India, at present fisheries culture is being done in traditional areas such as Andhra Pradesh, Tamil Nadu and Kerala etc. as well as brackish water areas like Punjab, Haryana and Rajasthan new areas of the country also helpful for increasing the growth of fisheries production in the country. The C.V. in the volumes of inland fish production and marine fish production were calculated at 31.90 percent and 10.12 percent, respectively, in the period 2011-12 to 2023-24 (**Table 2**). However, the high variation is seen in inland fish production compared to marine fish production, but the low variation in marine production is misleading as it is because of the stagnation in marine production, so it cannot be taken as a positive sign. 128.54 lakh tonnes mean value of the total fisheries production was calculated. The minimum value was 86.66 lakh tonnes and the maximum value was 184 lakh tonnes of the total fisheries production in this period.

In (**Table 2**) the overall period (1981-82 to 2023-24), the increasing compound average growth rate of culture fisheries (inland and aquaculture) significantly influences the entire performance of the fisheries sector in India. As the marine sector contributed 59.17 percent to the total fish production in 1981-82, which gradually declined to 24.40 percent in the total fish production in India in the year 2023-24. On the other hand, the inland sector contributes 75.60 percent of the total fish production in the year 2023-24 (Handbook on Fisheries and Statistics 2025). The present study shows that the C.A.G.R. of marine and inland fish production is calculated at 2.3 percent and 6.5 percent, respectively and the total growth rate is 4.6 percent for the overall period (1981-82 to 2023-24). The minimum value of inland was 9.40 lakh tonnes and marine was 14.27 lakh tonnes, while the maximum value of inland was 139.10 lakh tonnes and marine was 44.90 lakh tonnes. However, the mean value was compiled as 28.68 lakh tonnes of marine fisheries, 44.85 lakh tonnes of inland fisheries and 73.53 lakh tonnes of the total fisheries production in the country.

India is a leading player in the global fisheries production and has vast potential for expanding the fisheries sector. As per the study, the shares of marine fish production have been decreasing due to the exploitation of marine resources near shore and inshore water areas. As 86 per cent of resources have been exploited in the depth range of 100 meters. For increasing marine production, capital-intensive and improved technology are needed so that it is possible to fish in a depth range beyond 200 meters (NABARD, 2018). On the other hand, there is a large scope for increasing inland fish production by increasing more and more investment in this sector. It is evident from (**Table 2**) that the variation in inland fish production is 80.16 percent, much higher compared to marine fish production at 27.19 percent for the overall period. Low variation in the marine sector is due to slow growth. (Radhakrishnan *et. al*, 2018) also reported a lower variation in marine than inland production in the country. So, it cannot be seen as a positive sign. High fluctuation in the inland sector due to a high growth rate. The variation in the total fish production is also high, with 58.56 percent due to a greater contribution from the inland sector.

## SUGGESTIONS AND CONCLUSION

The fisheries sector is distinguished as a sunrise sector in the Indian economy for sustaining livelihood for the millions of people in the country, especially those who belong to the vulnerable and marginalized communities. It is a major source of earnings and nutrition security in the country. The study indicated that the contribution of the fisheries sector to the world's total fish production has been continuously increasing, with an 8.92 percent contribution to the world's fish production. The study's findings indicated that the shares of the inland sector in the total fish production have been continuously increasing since the 1990s, while the contribution of the marine sector in the total fish production has been decreasing. At present, the shares of the marine sector are only approximately 24.40 percent, while the shares of the inland sector are 75.60 percent in the country in the year 2023-24. This is due to the stagnant growth in the marine sector. The positive growth trends are seen in the study of different decades.

The result of the study indicated that the overall growth rate (C.A.G.R.) of the inland sector (6.5 percent) was higher than the marine sector (2.3 percent) for the period 1981-82 to 2023-24. However, the C.A.G.R. of the marine sector was computed at 5.1 percent in the years 1981-82 to 1990-91, but after that, the growth rate became very slow compared to the inland sector, which grew very fastly with 9 percent C.A.G.R. in the period 2011-12 to 2023-24. Expansion of areas under inland fisheries is also responsible for the upliftment of this sector. The present result of the study shows that the growth rates are directly related to the fluctuation in different types of fish production in the decadal analysis. A high coefficient of variation is seen in inland production compared to marine production, with 80.16 percent and 27.19 percent, respectively.

However, many incentives are provided by the government of India as well as state governments through various schemes, such as the Blue Revolution Scheme and P.M.M.S.Y., for the development of this sector in the country. Despite this, the study recommends eradicating some problems that are responsible for the underutilization of the fisheries resources in the country. There are some issues like lack of species diversification, lack of cold storage facility, lack of organized marketing structure and lack of intensive technology that need to be addressed by government agencies, planners and research and development agencies in the country. Although low variation has been found in the marine sector in different periods in the study, the growth rate is also low in this segment. So, the study advocates for providing suitable infrastructure, fish landing centers and capital-intensive technology to the fishermen so that the marine sector can be reinvigorated in the country.

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