



# CURRENT STATUS OF RAINBOW TROUT (*ONCORHYNCHUS MYKISS*) PRODUCTION IN INDIA AND GLOBAL WORLD.

Shafiya Zahoor\*,  
Asifa Jan,

Dr.Nasir Husain

Shere Kashmir University of Agricultural Sciences & Technology, Kashmir, Rangil, Ganderbal, Jammu and Kashmir, India, 190006

## Abstract

The Rainbow trout (*Oncorhynchus mykiss*) holds significance in both Indian and global aquaculture. In India, rainbow trout production has witnessed steady growth, particularly in regions with suitable environmental conditions, such as Himachal Pradesh and Jammu and Kashmir.

Aquaculture production of rainbow trout is being carried out in several parts of the world (South America, Europe, Asia, Africa and Oceania) outside its native range in North America. According to FAO FishStat, more than 75 countries are officially represented in the Rainbow trout production statistics. Technological advancement in aquaculture practices, selective breeding for improved traits, and sustainable farming methods have contributed to increased production efficiency worldwide.

**Keywords:** Rainbow trout; Trout Farming; Trout Production

## Introduction

The Rainbow trout (*Oncorhynchus mykiss* Walbaum 1792) is undisputedly the most widely introduced and cultured salmonid fish across the globe, besides being extremely popular as a sport fish and an experimental fish (Ortega and Valladares, 2015). Highly oxygenated cold freshwater excellent for rainbow trout is naturally abundant in the mountainous regions of India and hence it was introduced in the early 20th century during the British colonial rule for developing recreational fisheries (Singh and Lakra, 2011). Eventually over the years, the exotic Rainbow trout has become the most relevant and remunerative coldwater fish farmed in Indian uplands and trout culture is garnering more significance as a source of employment, food security and income generation.

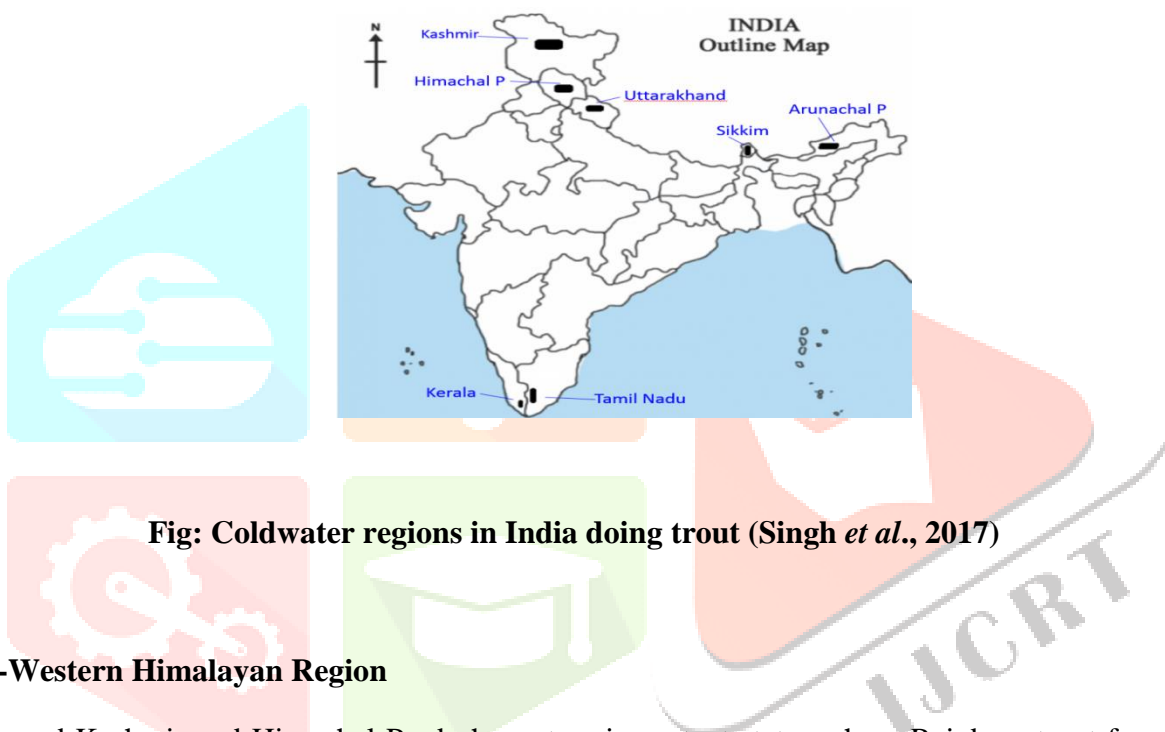
The state of Jammu and Kashmir, especially Kashmir region is the major contributor in trout farming, with 447 km of streams, 486 km of rivers and about 157 sq.km of lakes. The river of Kashmir valleys are rich in fish fauna, many of which are commercially important. The rainbow trout is reared at various trout rearing units of

J&K state for sale and this variety of trout has so demand in the state that Department of Fisheries fails to cater trout to all the customers. Besides usual customers trout fish is being supplied to hotels and restaurants as it adds to their daily sale having a good respond.

### Status and production trend of Rainbow Trout in India:

Coldwater states have an inherent potential for trout culture due to its suitable climate conditions like cold and well oxygenated water. Perennial coldwater resources are available in the Himalayan states to adopt trout culture as sustainable livelihood option for local people.

Jammu and Kashmir is one of the leading states in rainbow trout farming and seed production in India. Rainbow trout is majorly cultured in Himachal Pradesh, Sikkim and Uttarakhand. Some level of small scale farming also done in the hills of the Arunachal Pradesh, Manna in Kerala, and Ooty in Tamil Nadu.



**Fig: Coldwater regions in India doing trout (Singh *et al.*, 2017)**

### North-Western Himalayan Region

Jammu and Kashmir and Himachal Pradesh are two important states where Rainbow trout farming and seed production has progressed in large scale. In June 2018, Anantnag district was declared as 'trout district of India'. Kokernag is home to Asia's largest trout farm. It has fast emerged as one of the leading producer of Rainbow trout in the world. The farm was set up in 1995 with support from the European Economic Committee and started with a single hatchery. The State Fisheries Department has consistently worked for the development of trout farming and production enhancement and also establishes excellent infrastructure for trout grow-out as well as seed production (Hassan and Pandey, 2012).

Total production of trout in himachal pradesh was 0.54 tonnes in the year 1996-97 and increased to 25 tonnes in 2005-06 while it reaches 849.7 tonnes in 2021-22.

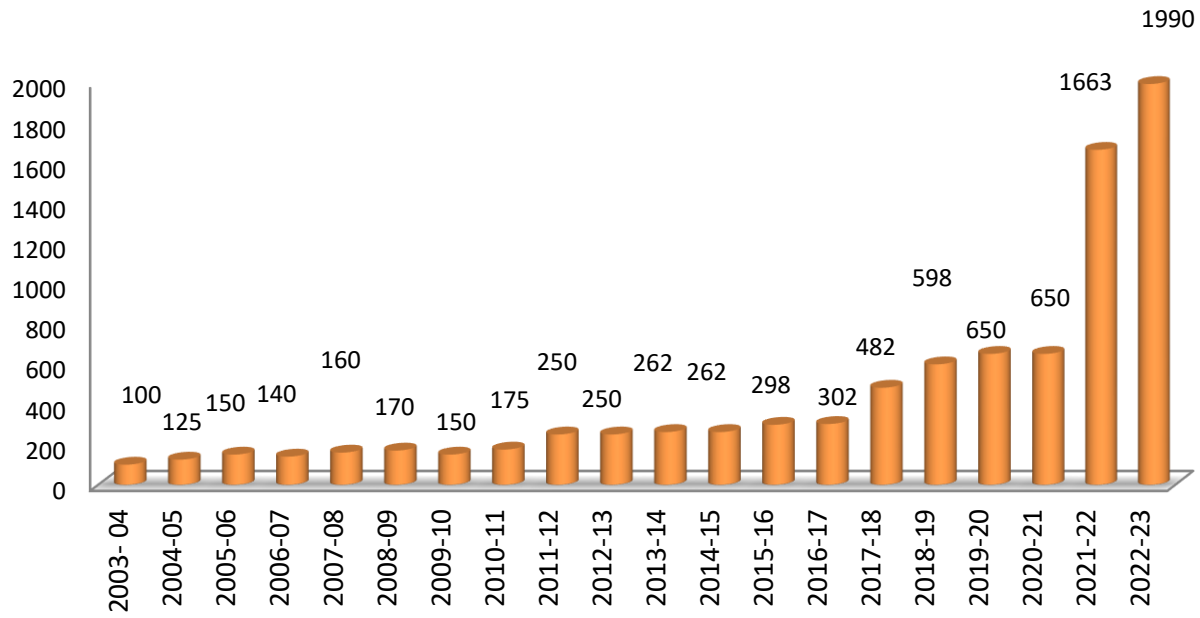


Fig 1:-

Trout production trend in Jammu and Kashmir (tons)

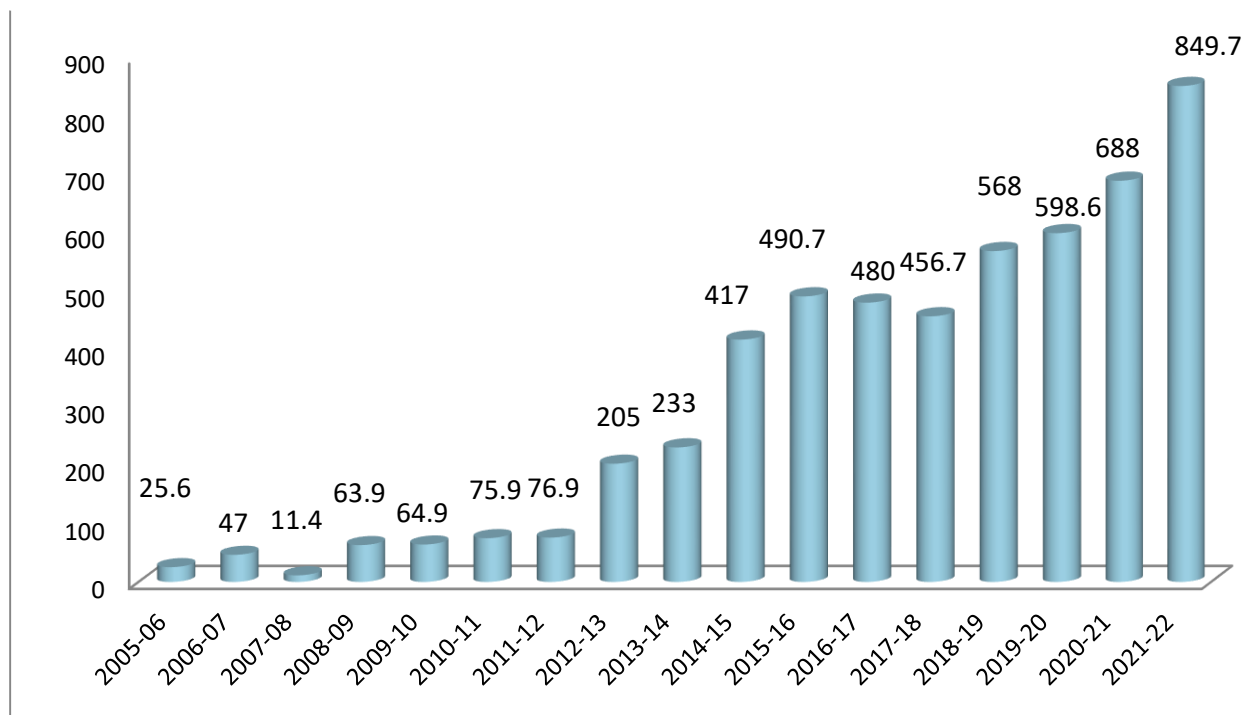


Fig 2:- Trout production trend in Himachal Pradesh (tons).

**Table 1:-Trout Production /Revenue Trends in J&K**

Sector	units	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
<b>Revenue from trout sale (Deptl. unit)</b>	lacs	276.01	221.56	294.52	329.05	360.16	403.13	422.79	427.37
<b>Trout production (biomass)</b>	tonnes	298	302	482	598	650	650	1663	1990
<b>Trout egg production</b>	lacs	120.00	130.00	132.00	137.00	145.00	147.50	147.80	150.00
Trout unit estd in private section	Nos	388	485	513	533	534	718	934	1144

Sources:DOF 22

**North- Eastern Himalayan Region:**

In Northeastern Himalayan states such as Sikkim and Arunachal Pradesh trout production infrastructure as well as trout ova production units in the state were developed with the technical support of DCFR. According to senior fisheries officials, Sikkim which has a population of around 0.67 million (census 2011) has 760 rainbow trout raceways with an annual production of 340 tonnes (2022-23), while the production was just 95 tonnes in 2014-15.

Sikkim also has nine hatcheries, including three belonging to the government and the rest owned by farmers. The total fingerling production in the state was 619,000 in 2022-23, well above the 253,000 produced in 2018-19.

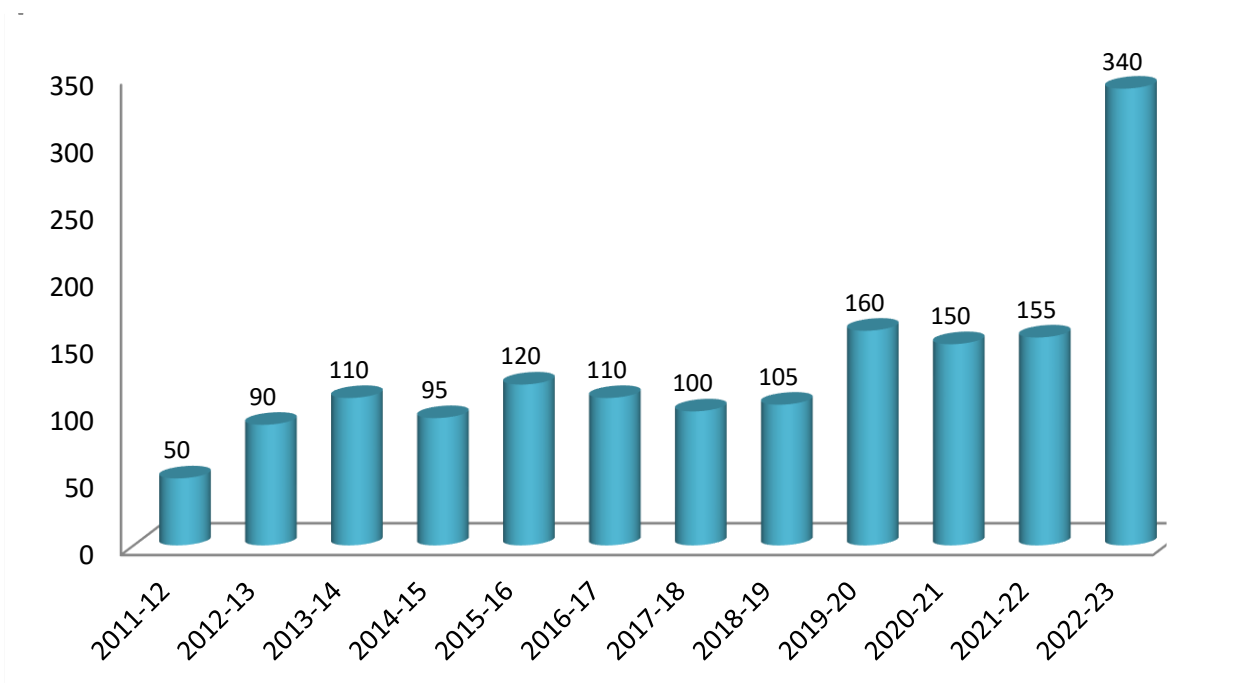


Fig 3:- Trout production trend in Sikkim (tons)

**Central Himalayas:**

In central Himalayan region, Uttarakhand is one of the promising states where trout farming has good prospects. In this region, trout culture commenced with the transplantation of eyed-eggs from Kashmir to Tablewari and Kaldayani hatcheries. The trout thrived in the hatcheries and some tributaries in the Garhwali but could not survive in kumaun hills, due to comparatively high summer temperature.

**Peninsular India:**

In Tamil Nadu trout fishery development in the Nilgiri water remained primarily to promote recreational fishing such as angling and sports. Fry and fingerlings produced were mainly stocked in streams, lakes and reservoirs. In Kerala, a trout farm was established in 1941 at Eravikolam and another at Rajamallai. Although trout have been successfully introduced in Southern India, they are currently endangered and no sufficient studies on the Southern Indian stocks are available (Deva *et al.*, 2021; Devaa and Ramesh, 2022)

**Global Scenario of Rainbow Trout Production**

In 2020, the world trout production was 981.239 tonnes, with a 21% increase since 2011 (811.750 tonnes in 2011). Almost all the production is from aquaculture (99%). The main species is rainbow trout (*Oncorhynchus mykiss*) (source: FAO).

Most of the world production of farmed trout occurs in freshwater (77%, 754.986 tonnes in 2020), while 22% comes from marine production (220.703 tonnes in 2020). The freshwater production has increased significantly over the past decade (+47%) while the marine production has decreased (-26%). Production of trout in brackish water has been registered since 2018, accounting for 5.500 tonnes in 2020 (1% of the world production). At a global level, the main trout producer is Iran, which accounted for 20% of world production in 2020, followed by the EU-27, Turkey, Norway and Chile. Iran, the EU-27, and Turkey accounted for more than half (54%) of the world production in 2020.

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The production in Islamic Republic of Iran has increased by 85% over the past decade. The country became the biggest trout producer in the world in 2020 (197.370 tonnes). The EU-27 was the second largest world producer in 2020 (187.936 tonnes), with a production relatively stable over the last decade (+8% compared to 2011). Turkey was the third largest trout producer (146.594 tonnes in 2020) with a strong production increase since 2011 (+36%).

Among other major producers, trout production has significantly increased over the last decade (2011- 2020) in Norway (+64%), Peru (+171%), the Russian federation (+140%) and China (+104%), with a production ranging from 37.000 to 96.000 tonnes in each country in 2020.

However the production in Norway fell by 2% in 2021 compared to 2020 according to the Norwegian Directorate of Fisheries. The Russian production is also expected to drop in 2022 as a result of the sanctions imposed on the Russian Federation and the resulting shortage in feed, juveniles and other equipment.

Chile is the only major producer where the production has decreased between 2011 and 2020: -61%, due to disease issues, it reached 87.724 tonnes in 2020.

**Table: -2 Evolution of farmed trout production in the main producing countries (tonnes)**

Country	2011	2020	%total 2020	Evol. 2011/2020
Iran(Islamic Rep. of)	106,409	197,370	20%	+85%
EU-27	173,929	187,936	19%	+8%
Turkey	107,936	146.594	15%	+36%
Norway	58,545	96.263	10%	+64%
Chile	224,448	87,724	9%	+61%
Peru	19,962	54,188	6%	+171%
Russian Federation	21,180	50,917	5%	+140%
China	18,575	37,841	4%	+104%
other	80,766	122,406	12%	+52%
<b>Total</b>	<b>811.750</b>	<b>981,239</b>	<b>100%</b>	<b>+21%</b>

**Source: FAO**

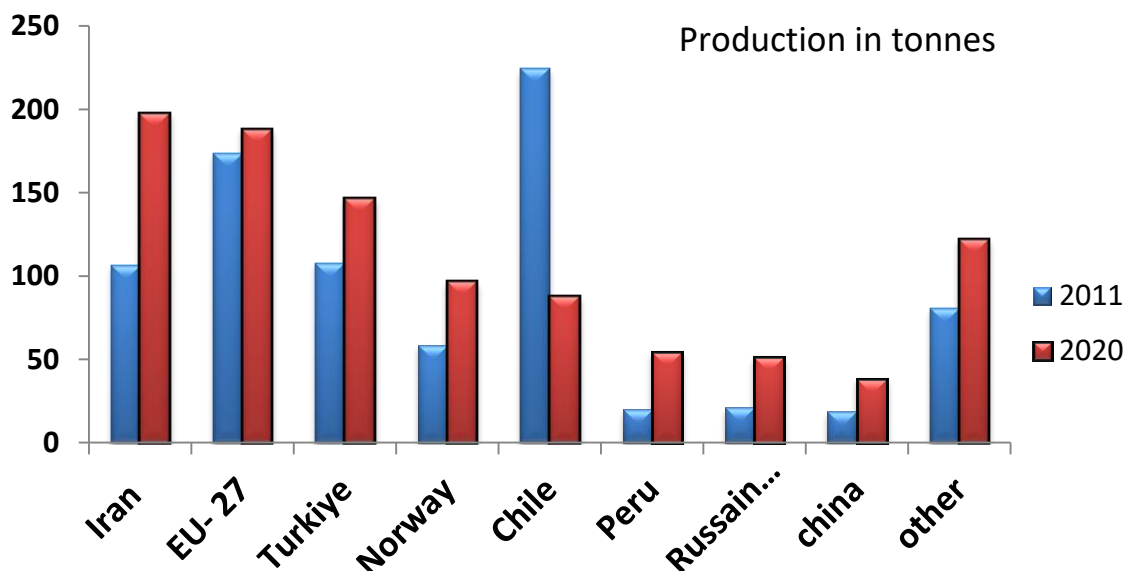


Fig:4 Comparison of farmed trout production in 2020 and 2011

### Challenges and Prospects of Trout Farming:

There are vast water resources in India which are virgin and unutilized. The perennial springs and streams in the Himalaya are flowing from the uplands to low lands are not properly and fully utilised. In States like Jammu and Kashmir and Sikkim, fisheries sector is facing the problems like poor accessibility, difficulty hilly terrain, lack of transportation and improper market, lack of infrastructure for aquaculture etc as a result this sector could not foster to the expected and extensive level. The major problems faced by the trout farmers in these states are non availability of fish feeds on time, high cost of feeds and lack of required fish seeds on time etc. Even though such problems exist, there is a huge prospect of fisheries and fish farming in the hilly state and can enhance the level of production, if some of the following strategies are taken into consideration.

- ▶ The available water resources could be bringing into fish farming and aquaculture development by utilizing these resources efficiently and properly rather than going into waste.
- ▶ Awareness of the importance and role of fisheries and aquaculture for the rural development and nutritional value can motivate the younger generations that could result in greater participation of people in fish farming.
- ▶ Fish is a highly perishable product, proper accessibility, cold storage, proper transportation and marketing facilities in the rural areas could foster this sector so that local fish can be easily available in the market. The use of modern technology and training for farmers can increase the level of production and productivity.
- ▶ The retail local fish shop should be started at the district level so that the local fishes will be easily available in the market and this will also encourage fish farmers to produce local fishes.
- ▶ Although water resources are plentiful, many problems need immediate attention from the government as well as the management teams to get better results in terms of steady growth in production, productivity, profitability and sustainability etc.

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