

FISH PROVISIONING SERVICES



Chapter 5

Fish Provisioning Services

When the last tree has been cut down, the last fish caught, the last river poisoned, only then will we realize that one cannot eat money.

-Anonymous

Introduction-Fisheries Sector

5.1 Fishing¹ is the capture of aquatic organisms in marine, coastal and inland areas. Marine and inland fisheries, together with aquaculture provide food, nutrition and a source of income to around 820 million people around the world, from harvesting, processing, marketing and distribution. For many, it forms the part of their cultural identity. Currently, the Global fisheries and aquaculture production is at a record high and the sector plays a significant role in providing food and nutrition in the future.

5.2 According to the latest edition of FAO's 'The State of World Fisheries and Aquaculture'², global fisheries and aquaculture production totalled 178 million tons (with capture fishing amounting to nearly 90 million tonnes) in 2020, making fish and seafood amongst the most traded food commodities and around 86 percent of the total fish production (157 million out of 178 million tonnes) was for direct human consumption. This share, which was 67 percent in the 1960s, has increased significantly in recent decades. In fact, annual growth rate of food fish consumption has surpassed that of meat consumption from all terrestrial animals, combined. Fishing – both in capture fisheries (at sea) and in aquaculture (fish farming) – if sustainably managed, has an important role to play in providing jobs and feeding the world. Aquaculture growth has the potential to feed and nourish the world population but ensuring sustainability is utmost required.

5.3 According to FAO's report, per capita fish consumption has soared from 10 kg in the 1960s to more than 20.5 kg in 2019 and projected to reach 21.5 kg in 2030 with the growing trend in the world's consumption of aquatic food and this poses tremendous pressure on the aquatic resources. In addition, other factors such as overfishing, pollution, poor management are causing a continuous decrease in the fishery resources. Under such circumstances, it is important to maintain the stock of fish reserves and address the concerns of sustainability.

¹ <https://www.fao.org/fisheries/en/>

² <https://www.fao.org/3/cc0461en/cc0461en.pdf>

5.4 Over the last two decades, the fisheries and aquaculture sectors have been increasingly recognized³ for their essential contribution to global food security and nutrition. Expanding this role requires scaling up transformative changes in policy, management, innovation, and investment to achieve sustainable, inclusive and equitable global fisheries and aquaculture. One of the greatest threats to the sustainability of global fishery resources is illegal, unreported and unregulated fishing.

Fisheries Sector in India

5.5 Fishery sector occupies an important place in the socio-economic development of the country as far as India is concerned. The importance and the role of fisheries sector⁴ was officially recognized in India, through the enactment of the 'Indian Fisheries Act' in 1897⁵. This Act laid the foundation of the development of the fisheries sector in India and delineated the responsibility of the provinces, towards the development and conservation of fisheries in the country. Through this Act, the provinces were empowered to formulate Rules/Laws for the conservation of the fish and fisheries resources. As Fisheries is a State Subject, so historically investments in the sector, particularly in the fishing villages/coastal fishing villages, fishing harbours and ports have been made by the states 'for the welfare and support of the fishermen community'. However, with the growing requirements for resources, technological transfer/ advice and policy orientation the efforts of State Governments/UT Administrations are supplemented by the Government of India towards the development of the fisheries sector.

5.6 Fisheries has emerged as a sunrise sector and has been an important sector that provides food, nutrition, employment, income and livelihood in India. The fisheries sector plays an important role in the national economy and the sector has been one of the major contributors of foreign exchange earnings, with India being one of the leading seafood exporting nations in the world. According to FAO's 'The State of World Fisheries and Aquaculture 2022' report, India ranked in first in Inland water capture production and ranked sixth in Marine water capture.

5.7 The fisheries sector has been recognized as a powerful income and employment generator as it stimulates growth of a number of subsidiary industries and is a relatively non-expensive source of nutritious food. At the same time, it is an instrument of livelihood for a large section of economically backward population of the country providing income and employment to more than 28 million people. Fisheries sector has been recognized as a 'Sunrise Sector' and has demonstrated a double-digit average annual

³ <https://www.fao.org/3/cc0461en/online/sofia/2022/executive-summary.html>

⁴ Depart of Fisheries, Annual Report 2021-22

⁵ <http://nbaindia.org/uploaded/Biodiversityindia/1.%20Fisheries%20Act.pdf>

growth of **10.87%** since 2014-15⁶. The sector has reached record fish production of 147.3 lakh tons in FY 2020-21 and has immense potential for growth.

5.8 India is the third largest ⁷ fish producing country in the world accounting for 7.96% of global production and contributing about 1.3% to the country's Gross Value Added (GVA) in 2020-21 and around 6.4% to the Agricultural, Forestry and Fishing GVA⁸. Export of marine products stood at 11.5 lakh tons and valued at Rs. 43,717.26 Crores during 2020-21 despite the market uncertainties raised by the Covid-19 pandemic outbreak.

5.9 Fish being an affordable and rich source of animal protein, is one of the healthiest options to mitigate hunger and nutrient deficiency. The Government of India has initiated several schemes to promote the fisheries sector. They include:

- **Pradhan Mantri Matsya Sampada Yojana (PMMSY)**: The scheme aims to enhance fish production through expansion, intensification, diversification & productive utilization of land and water which will result in doubling fisher's and fish farmer's incomes and generation of employment. The scheme envisages to bring about Blue Revolution⁹ through sustainable and responsible development of fisheries sector in India.
- **Fisheries and Aquaculture Infrastructure Development Fund (FIDF)**: In order to address the infrastructure requirement for fisheries sector, the Department of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying during 2018-19 has created dedicated fund namely FIDF with a total funds size of Rs 7522.48 crore¹⁰. FIDF provides concessional finance / loan to the Eligible Entities (EEs), including State Governments/UT Administrations and State entities for development of identified fisheries infrastructure facilities.
- **Kisan Credit Card (KCC)**: The Government of India announced Rs.2 lakh crore concessional credit boost to Rs.2.5 crore farmers including fishers and fish farmers under Kisan Credit Card (KCC) Scheme as a part of Atmanirbhar Bharat Package. KCC aims to help animal husbandry and fisheries farmers for meeting their working capital requirements.

Ecosystem Services

5.10 The Ecosystem Services are central in the ecosystem accounting framework since they provide the link between ecosystem assets on the one hand, and the benefits used and enjoyed by people on the other hand. A fundamental aspect of ecosystem accounting

⁶ <https://pib.gov.in/PressReleasePage.aspx?PRID=1786303>

⁷ Department of Fisheries, Annual Report 2021-22, <https://pib.gov.in/PressReleasePage.aspx?PRID=1786303>

⁸ <https://mospi.gov.in/web/mospi/reports-publications/-/reports/view/templateFive/27503?q=RPCAT>

⁹ https://dof.gov.in/sites/default/files/2020-07/PressReleasebyPIBonPMMSY_0.pdf

¹⁰ <https://dof.gov.in/index.php/related-links/fidf>

is recognising the fact that a single ecosystem will generate a range of ecosystem services thus contributing to the generation of a number of benefits. For accounting purposes, it is most useful to consider ecosystem services in the context of a chain of flows that connect ecosystems with well-being. Starting at the individual and societal well-being, the chained approach recognises that well-being is influenced by the receipts of benefits. In the context of ecosystem accounting, benefits comprise of SNA and Non-SNA benefits. (Refer to Chapter 1 para 13).

5.11 SEEA- Ecosystem Accounting classifies the Ecosystem services into three broadly agreed categories:

- (i) Provisioning Services: those ecosystem services representing the contribution to benefits that are extracted or harvested from ecosystems, for example a fish or a plant with pharmaceutical properties.
- (ii) Regulating and maintenance Services: those ecosystem services resulting from the ability of ecosystems to regulate biological processes and to influence climate, hydrological and biochemical cycles, and thereby maintain environmental conditions beneficial to individuals and society. These services often have an important spatial aspect. For instance, the flood control service of an upper watershed forest is only relevant in the flood zone downstream of the forest.
- (iii) Cultural Services are generated from the physical settings, locations or situations which give rise to intellectual and symbolic benefits that people obtain from ecosystems through recreation, knowledge development, relaxation, and spiritual reflection. This may involve actual visits to an area, indirectly enjoying the ecosystem (e.g. through nature movies), or gaining satisfaction from the knowledge that an ecosystem containing important biodiversity or cultural monuments will be preserved.

5.12 In the publication, an attempt has been made to estimate the Fish Provisioning Services of some of the States of India. One of the approaches suggested in the SEEA for the calculation of the Fish provisioning service is the resource rent method. In the current publication, the resource rent method has been calculated using the rental price approach for the States of Andhra Pradesh, Rajasthan and Haryana. The estimates compiled in the publication are limited to tanks, ponds, lakes, reservoirs etc. that are provided for lease/rent. The information on the marine areas has not been considered due to paucity of information on the coastal boundaries and the availability of rent structure for coastal fishing. Data were collected from State Fisheries Department.

Andhra Pradesh

5.13 Andhra Pradesh state is endowed with a long coastline of 974 Kms with a continental shelf area of 33,227 Sq. kms. As per Central Marine Fisheries Research Institute (CMFRI) census, 2016, the marine fishermen population in 9 coastal districts of Andhra Pradesh is estimated at 5.17 lakh with 1.55 lakh fishermen families and 1.52 lakh traditional fishermen families. There are 533 marine fishing villages situated along the coast and 349 fish landing centers scattered in 9 coastal districts of Andhra Pradesh.

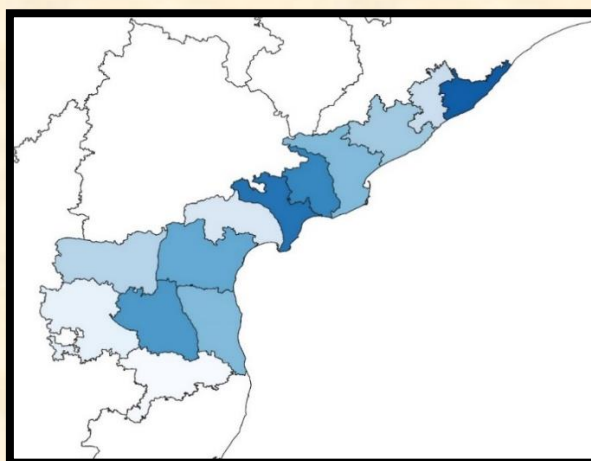


5.14 As far as the inland fisheries¹¹ are concerned, Andhra Pradesh is a major producer of fish in India with production of 36.1 lakh tones in 2019-20¹². Total number of reservoirs in Andhra Pradesh is 116 with effective water spread area (EWSA) as 1.66 lakh hectares and 3.87 lakh hectares of Tanks & Ponds and Brackish water. Average production of the State is 150 kg/ha.

5.15 On the basis of the rent/lease amount provided by the State, district wise Fish provisioning services for the year 2015-16 to 2021-22 have been

computed for the State and is given in **Annexure 5.1 to 5.7**. The District wise Rent per hectare for 2021-22 is shown in Figure 5.1.

Figure 5.1: District wise Fish Provisioning Services for Andhra Pradesh 2021-22



Note: Darker shade represent higher value.

¹¹ Department of Fisheries, Handbook of Fisheries Statistics 2020.

¹² Handbook on Fisheries Statistics: 2020

5.16 The details of the district-wise lakes, ponds, reservoirs etc. along with area present in the state for the year 2015-16 to 2021-22 are also provided in the **Annexure-5.1 to 5.7**. Year-wise estimates of Fish Provisioning Services for the years 2015-16 to 2021-22 are presented in the **Table-5.1** below.

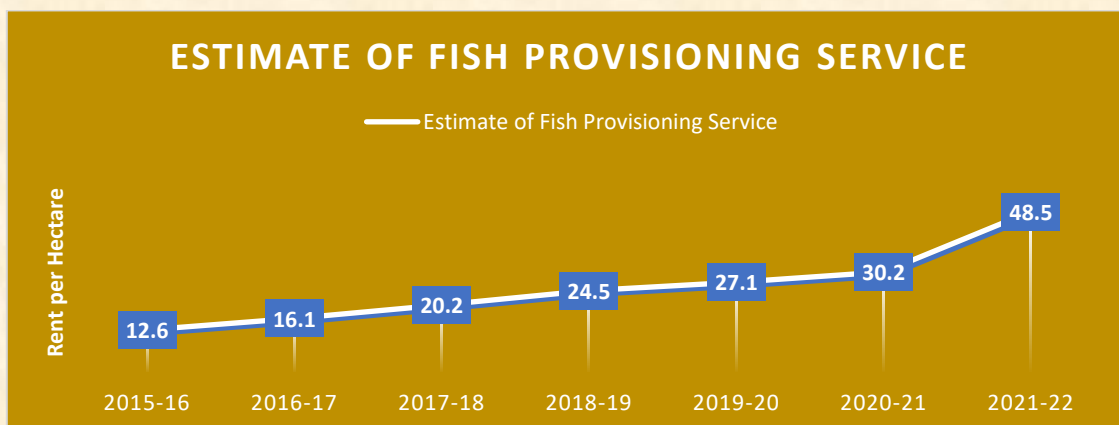
Table-5.1: Year-wise Fish Provisioning Services- Andhra Pradesh

Sr. No.	Year	Total Resource Area		Rent/Lease Amount	Rent per Hectare
		No of Resources	Area (Hectare)	(Rs.)	(Rs. / Hectare)
1	2015-16	3,397	3,89,262	49,04,343	13
2	2016-17	3,398	3,89,803	62,89,835	16
3	2017-18	3,398	3,89,803	78,71,066	20
4	2018-19	3,405	3,80,170	93,00,601	24
5	2019-20	3,428	3,80,345	1,02,94,244	27
6	2020-21	3,401	3,23,965	97,92,914	30
7	2021-22	3,317	2,91,399	1,41,28,320	48

Resources include Tanks, Ponds, Lake, Reservoirs

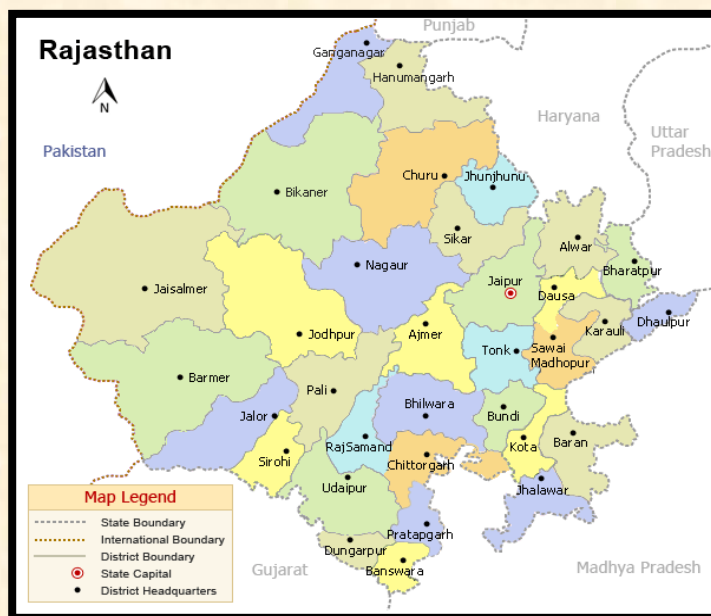
5.17 It can be observed that there has been reduction in the rent/lease amount in 2020-21. The reasons for the same may be primarily attributed to the reduction in the number of the major reservoirs. According to the information received from the State Fisheries Department, 2 reservoirs in the SPSR district has been identified for open auction vide GO Rt No217/2021 of Department of AHDD7 Fisheries, Government of AP in 2020-21. Therefore, these two reservoirs were not considered under rent/lease of 2020-21, thus decreasing the rent amount. However, there is an increase in the overall trend of the Fish Provisioning Services (Rent/hectare) over the years as depicted in the following graph:

Figure-5.2: Estimates of Fish Provisioning Services for Andhra Pradesh



Rajasthan

5.18 The State of Rajasthan¹³ is endowed with four major river basins viz. Chambal river basins, Mahi river basin, Luni river basin and Ghaghghar river basin. About seventy rivers connect these major river systems with large number of tanks, ponds and reservoirs during monsoon season regulating the natural recruitment of fish and other aquatic fauna throughout the State. The state has fresh water as well as saline water resources. It has 4.23 lakh ha. fresh water area covering 15,561 water bodies besides 30,000 ha. area as river and canals, 80,000 ha. waterlogged and 1.80 lakh ha. salt affected areas at full tank level. Average production of the State is 200 kg/ha. About 16500 farmers and fishers are engaged in fisheries related activities but with the targeted fish production.



5.19 Rajasthan has good aquatic resources¹⁴ to become a leading fish producer in the country. As per the study conducted by the Central Institute of Fisheries Education, Mumbai (2010) the fish production potential of Rajasthan is more than 80,000 metric tonnes annually.

5.20 The Rajasthan Department of Fisheries is providing assistance for different welfare schemes as per the guideline of state and Government of India to promote fish culture in the State in order to uplift the socio-economic conditions of the fishermen. Some of the schemes related to the Fisheries sector in Rajasthan are (i) Scheme on 'livelihood model', which is a 'zero revenue' model for the upliftment of tribal fishermen in three reservoirs- Jaisamnand (Udaipur), Mahi Bajaj Sagar (Banswara) and Kadana Backwater (Dungarpur) (ii) National Mission for Protein supplement (iii) Rashtriya Krishi Vikas Yojana.

5.21 The district-wise lakes, ponds, reservoirs etc. along with area and estimates of the Fish Provisioning Services have been estimated for the years 2015-16 to 2020-21 using data received from Department of Fisheries, Rajasthan. These estimates are provided in the **Annexure-5.8 to 5.13**. Fish Provisioning Services at the State level estimates for the years 2015-16 to 2020-21 are presented in the **Table-5.2** below:

¹³ <https://fisheries.rajasthan.gov.in/>

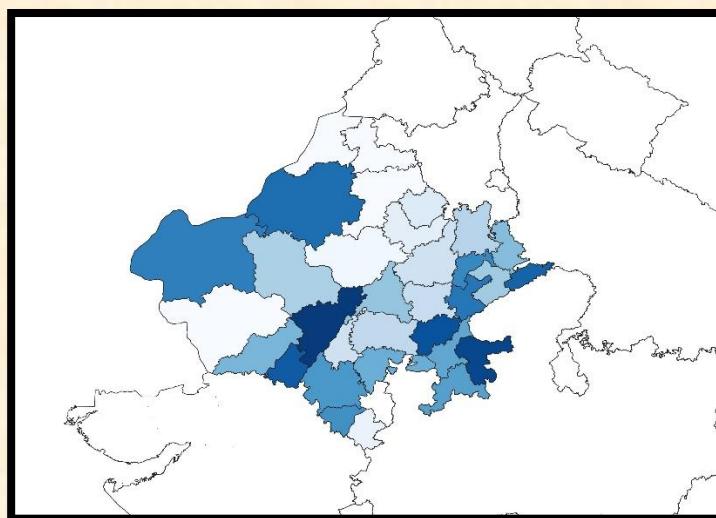
¹⁴ <https://www.rajras.in/rajasthan/economy/fisheries/>

Table-5.2: Year-wise Fish Provisioning Services- Rajasthan

Sr. No.	Year	Total Resource Area		Rent/Lease Amount	Rent per Hectare
		No	Area (Hectare)	(Rs.)	(Rs. /Hectare)
1	2015-16	15,561	4,30,784	45,19,36,462	1,049
2	2016-17	15,561	4,30,784	57,92,38,409	1,345
3	2017-18	15,561	4,30,784	72,03,68,982	1,672
4	2018-19	15,561	4,30,784	57,85,25,703	1,343
5	2019-20	15,561	4,30,784	63,41,01,651	1,472
6	2020-21	15,561	4,30,784	64,87,09,990	1,506

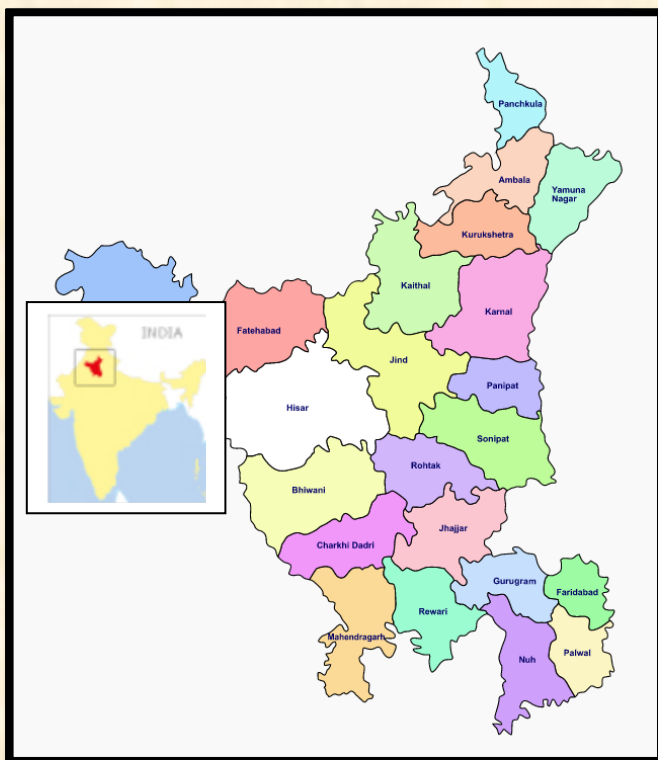
5.22 The fluctuation in the rent amount in the State can be attributed to the water availability of reservoirs which in turn depends on the rainfall patterns in the State. The district wise estimates of the Fish Provisioning Services for 2020-21 have been depicted in the map given below:

Figure 5.3: District wise Fish Provisioning Services for Rajasthan for 2020-21



Note: Darker shade represent higher value.

Haryana



5.23 The State of Haryana¹⁵ has good water resources in the shape of rivers, canals, drains, natural and man-made lakes/reservoirs / micro-water sheds, and village ponds to enable the promotion of fisheries. Fish culture in Haryana is little difficult due to the non-availability of the fishermen community and the prevalence of mostly vegetarian population. In the year 1966-67, only a 58-hectare pond water area was under fish culture by stocking of 1.5 lakh fish seeds and the total annual fish production was only 600 tonnes, which has been increased by covering 18207.06-hectare area under fish culture by stocking 6346.50 Lakh fish seed raising

209033.32 MT of fish during the year

2021-22¹⁵. It is proposed to stock 4400 lakh Fish Fingerling to produce 220000.00 MT fish during the years 2021-22 by covering a 22000.00-hectare water area. It is envisaged to provide technical and financial assistance to 2500-3000 families in the fisheries sector during the year 2021-22.

5.24 The Fish farming has increased manifold in the State in recent years. More than 80% of the village ponds available in the State are under fish culture. Village Panchayats are earning more than Rs. 125 Crores ¹⁶every year from leasing the village ponds for fish farming. In addition to this more than 2,500 pond units have been constructed by the fish farmers in their own land. The average productivity of fish is 7000 Kg per hectare as against the national level of 2,900 Kg. Haryana ranks 2nd in the Country for per hectare fish production.

5.25 Under the Centrally sponsored scheme, Strengthening of Post-Harvest Infrastructure, Govt. of India provides assistance to the Govt. undertakings, NGO's/Cooperatives/Joint Sector/Assisted Sector/Private Sector for establishing marketing infrastructure in the State. The state gets assistance for development of Fisheries Sector through some other Centre Sector Scheme and Centrally Sponsored schemes and Blue Revolution Scheme. Providing skill training to fish farmers & other

¹⁵ <http://harfish.gov.in/about-us>

¹⁶ <http://harfish.gov.in/fish-marketing>

stakeholders and providing assistance to bring area under aquaculture are some of the initiatives taken by the state for the development of fisheries.

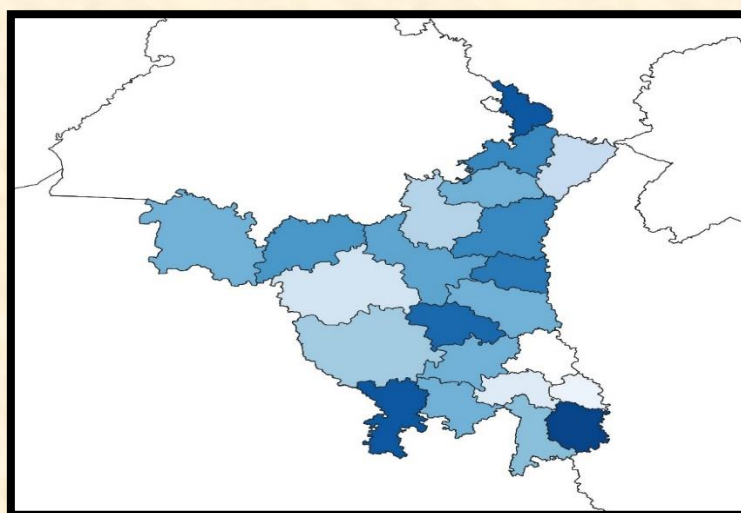
5.26 The district-wise lakes, ponds, reservoirs etc. along with area and estimates of the Fish Provisioning Services for the years 2015-16 to 2020-21 compiled using data received from Department of Fisheries, Haryana are provided in the **Annexure-5.14 to 5.19**. Fish Provisioning Services at the State level estimates for the years 2015-16 to 2020-21 are presented in the **Table-5.4** below:

Table-5.4: Year-wise Fish Provisioning Services- Haryana

Sr. No.	Year	Total Resource Area		Rent/Lease Amount	Rent per Hectare
		No	Area(Hectare)	(Rs.)	(Rs. /Hectare)
1	2015-16	6,004	11,282	4,60,800	50,132
2	2016-17	6,652	12,197	4,66,200	49,734
3	2017-18	6,862	12,531	4,64,400	48,257
4	2018-19	6,890	12,381	5,73,900	59,626
5	2019-20	5,924	11,379	5,85,200	60,001
6	2020-21	6,010	11,999	6,50,300	66,898

5.27 In Haryana, the rent or lease amount for a pond is estimated by the State Fisheries Department. This estimated rent amount is considered to be the base amount for the Panchayats for starting their bidding process of water bodies for fish culture. The actual rent depends upon several factors such as water availability and other condition such as presence of fence etc. Due to this reason, the rent amounts in the state is very high and are subject to inherent fluctuations. The district-wise estimates of the Fish Provisioning Services for 2020-21 have been depicted in the map given below:

Figure 5.4: District-wise Fish Provisioning Services for Haryana for 2020-21



Note: Darker shade represent higher value.

Challenges and Way Forward

5.28 The Fisheries sector in India has immense potential to expand and this will be possible only when waterbodies are in good and healthy conditions. It is essential to have focused attention to the fisheries sector through policy and financial support in order to accelerate its development in a sustainable, responsible, inclusive and equitable manner.

5.29 The estimation of the Fish Provisioning Service is an attempt to measure the value of the waterbodies where the fishes thrive. It is thus the contribution of the water bodies which helps mankind in the generation of huge amount of economic benefit as well as providing employment to people for better livelihood. The valuation of this service will open up avenues for more granular level policy framing to ensure improvement in the health of the water ecosystems which will help in turn to attain progress towards the achievement of sustainability.

5.30 The estimates in the current publication has been confined to three states for a limited number of years. The subject being covered for the first time, has scopes of further improvement and expansion over time. With the availability of more information from other states the estimates can be compiled on a pan-India basis.
