

Fish Provisioning Services

Provisioning Services

Fisheries



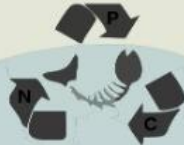
Food



Genetic resources

Regulating Services

Redistribution of fluxes, nutrient regulation (e.g., marine nutrient derived)



Cultural Services



Gastronomic events



Education and research



Community interest in biodiversity and conservation



Leisure and competition angling



Supporting Services



Support of biological cycles (e.g., bivalve larvae)

Bioindicators



Maintenance of nursery habitats and populations



Productivity of the food-web



Chapter 4

Fish Provisioning Services

Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime.

-Maimonides

Introduction-Fisheries Sector

4.1 Fishing is the capture of aquatic organisms in marine, coastal and inland areas. The fisheries and aquaculture sectors have been increasingly recognised for their essential contribution to global food security and nutrition in the twenty-first century. According to the 'The State of World Fisheries and Aquaculture: 2022', Towards Blue Transformation¹ released by FAO, total fisheries and aquaculture production reached a record of 214 million tonnes in 2020, comprising of 178 million tonnes of aquatic animals. Expanding this role requires scaling up transformative changes in policy, management, innovation, and investment to achieve sustainable, inclusive and equitable global fisheries and aquaculture.

4.2 Aquaculture and fishing have a great potential to feed and nourish the world's growing population, but ensuring sustainability is utmost required. As per the above-mentioned FAO's report, it is estimated that 58.5 million people were employed in the primary sector. Including subsistence and secondary sector workers, and their dependents, it is estimated that about 600 million livelihoods depend at least partially on fisheries and aquaculture. 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.

4.3 Factors such as overfishing, pollution, poor management are causing a continuous decrease in the fishery resources. Under such circumstances, it is important to improve global fisheries management to restore ecosystems to a healthy and productive state and protect the long-term supply of aquatic foods. Rebuilding overfished stocks could increase fisheries production by 16.5 million tonnes² and raise the contribution of marine fisheries towards food security, nutrition, economic growth and well-being of coastal communities.

¹ <https://www.fao.org/3/cc0461en/cc0461en.pdf>

² <https://www.fao.org/3/cc0461en/online/sofia/2022/key-messages.html>

4.4 Aquatic food production is forecast to increase by a further 15 percent by 2030, mainly by intensifying and expanding sustainable aquaculture production. Blue Transformation is a vision for sustainably transforming aquatic food systems, a recognized solution for food and nutrition security and environmental and social well-being, by preserving health of aquatic ecosystems, reducing pollution, protecting biodiversity and promoting social equality. Blue Transformation aims to: (i) increase the development and adoption of sustainable aquaculture practices; (ii) integrate aquaculture into national, regional and global development strategies and food policies; (iii) expand and intensify aquaculture production to meet the growing demand for aquatic food and enhance inclusive livelihoods; and (iv) improve capacities at all levels to develop and adopt innovative technology and management practices for a more efficient and resilient aquaculture industry.

Fisheries Sector in India

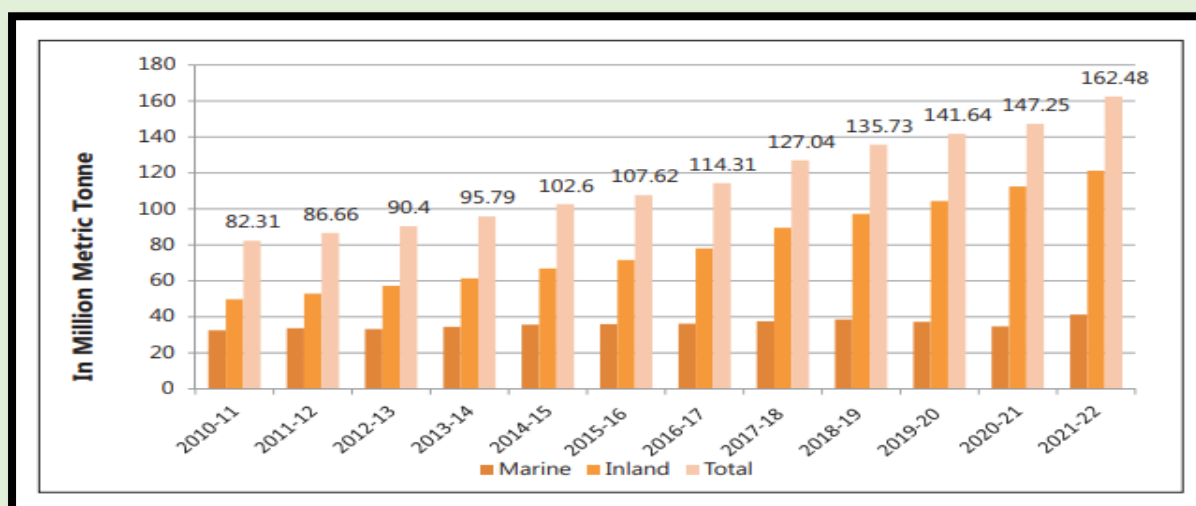
4.5 The history of fisheries in India dates back to the Harappan Civilization. However, the importance and the role of the Fisheries sector was officially recognised in India, through the enactment of the 'Indian Fisheries Act' in 1897³. This Act laid the foundation of the development of the fisheries 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.

4.6 Fisheries sector have emerged as a sunrise sector and have 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.

³ <http://nbaindia.org/uploaded/Biodiversityindia/1.%20Fisheries%20Act.pdf>

4.7 An expansion in the farmers income cannot be achieved only through the Agriculture sector. Allied agricultural activities also need to play a vital role. Fisheries sector has a great potential and that needs to be tapped. The Central Government and the State Government has been continuously coming up with several schemes to encourage fisheries activities and also to provide social security measures in the States as well as to develop fisheries as the primary source of livelihood.

Figure 4.1 Fish Production of India over the years



Source: Ministry of Fisheries, Animal Husbandry and Dairying

4.8 India is the 3rd largest fish producing country⁴ in the world and accounts for 7.96% of the global production. India is also a major producer of fish through Aquaculture and ranks second in the world after China. The fish production has increased from 5.66 MMT in 2000-01 to 8.67 MMT in 2011-12 and further to 16.25 MMT in 2021-22 and has immense potential for growth. The fisheries sector plays an important role in the national economy and according to FAO's 'The State of World Fisheries and Aquaculture 2022' report, India ranked first in Inland water capture production and ranked sixth in Marine water capture.

4.9 Fish, being an affordable and rich source of animal protein, is one of the healthiest options to mitigate hunger and nutrient deficiency. The sector has been recognized as a powerful income and employment generator as it stimulates growth of a number of subsidiary industries. Also, it is an instrument of livelihood for a large section of economically backward population of the country providing income and employment to a large chunk of population. Therefore, a sustained and focussed

⁴ https://dof.gov.in/sites/default/files/2023-04/Final_Annual_Report_2022-23_English.pdf

attention is given to the fisheries sector by the Union Government through policy and financial support to accelerate its development in a sustainable, responsible, inclusive and equitable manner. They include:

- **Pradhan Mantri Matsya Sampada Yojana (PMMSY):** The scheme aims to address critical gaps in fish production and productivity, infuse innovation and modern technology, improve post-harvest infrastructure and management, modernize and strengthen value chain and traceability, establish framework for a robust fisheries management and fishers' welfare. Emphasis has been laid towards creating awareness for harnessing of fisheries potential in a sustainable, responsible, inclusive and equitable manner. The scheme envisages to bring about Blue Revolution⁵ 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 a fund namely FIDF with a total funds size of Rs 7522.48 crore⁶. 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 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

4.10 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 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

⁵ https://dof.gov.in/sites/default/files/2020-07/PressReleasebyPIBonPMMSY_0.pdf

⁶ <https://dof.gov.in/index.php/related-links/fidf>

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 14).

4.11 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.
- (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.

4.12 In order to estimate the Fish Provisioning Services, one of the approaches suggested in the SEEA is the resource rent method. Using this method, Fish Provisioning Services for the States of Andhra Pradesh, Rajasthan and Haryana were estimated and published in the issue “EnviStats India 2022: Vol II Environment Accounts”. In the current publication, an attempt has been made to estimate the fish provisioning services for other States. Based on the information received from States, the resource rent has been calculated using the rental price approach for the States of Bihar, Kerala and Tamil Nadu. 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. Since the subject matter of ‘Fisheries’ is listed in the State List (entry

21 under 7th Schedule of article 246⁷) of the Constitution of India, data has been from the State Fisheries Department.

Bihar

4.13 Traditionally, Bihar's economy is dominated⁸ by the rural sector. Around 88% of the population live in the rural areas. River Ganga is the main river which is joined by tributaries such as Ghagra, Gandak, Burhi, Gandak, Bagmati, Kamla-Balanm, Kosi and Mahananda. The species of major and minor carps found in the Ganges river system are extensively used for the culture in ponds, lakes, reservoirs and enclosures throughout the country. The state is endowed with adequate freshwater resources. The state's average rainfall of 1091mm is considered to be adequate; however, owing to change in climate over the years, droughts and floods are adversely affecting the agriculture, fisheries output and Gross State Domestic Product (GSDP). Capture and culture of fish are traditional activities of Bihar.

4.14 During sixties and seventies, Bihar was the biggest supplier of Indian major carp seed from its riverine resources to the entire country to meet the seed requirement of growing freshwater aquaculture sector. Unfortunately, the riverine fisheries have collapsed due to overfishing and destructive fishing, population pressure, pollution, siltation and reduction in water flow and other anthropogenic activities. The state has also extensive network of irrigation canals which retains water for considerable period and offer opportunities for aquaculture through cage and other enclosure-based aquaculture. However, this potential is still lying untapped even at national level. Besides, vast area of lands adjoining the canals often remains water logged for several months which could also be developed for aquaculture and fish seed production. Fisheries resources of the state such as reservoirs are common public property which provide productive source of livelihoods for a large number of resources to poor landless and marginal farming communities, especially traditional fishing communities. Chours, on the other hand, are largely multi-ownership-based resources which offer an additional crop of fish during the period of water availability. So far, this resource is lying unutilized.

4.15 The main culture fishery resources of Bihar lie in the ponds and tanks of variable sizes which are distributed throughout the state. Most of the ponds are seasonal while some are also perennial. These perennial ponds offer vast potential

⁷ <https://www.mea.gov.in/Images/pdf1/S7.pdf>

⁸ <http://fisheries.bihar.gov.in/Introduction.aspx>

for the development of aquaculture while seasonal ponds are highly suitable for rearing of sees-fry, fingerlings and yearlings.

4.16 As regards the water bodies, according to the 1st Census of Water Bodies (2018-19)⁹ released by M/o Jal Shakti in 2023, 45,793 water bodies have been enumerated in the State of Bihar, out of which 95.7% are in rural areas and the remaining 4.3% are in urban areas. Majority of the water bodies are ponds, followed by tanks and lakes. The key parameters of the 1st Census of Water Bodies (2018-19) in Bihar are presented in the **Table 4.1** below:

Table 4.1: Key Parameters of First Census of Water Bodies (2018-19) - Bihar

| S. No. | Parameter | Unit | Value |
|--------|---|---------------|---------------|
| 1. | Water Bodies | Number | 45,793 |
| | Rural | | 43,831 |
| | Urban | | 1,962 |
| 2. | Type of Water Bodies | Number | 45,793 |
| | Ponds | | 35,027 |
| | Tanks | | 4,221 |
| | Lakes | | 2,693 |
| | Reservoirs | | 2,126 |
| | Water Conservation Schemes / Percolation Tanks / Check Dams | | 312 |
| | Others | | 1,414 |
| 3. | Distribution of Water Bodies by Water Spread Area (Ha) | Number | 45,713 |
| | Less than 0.5 hectares | | 24,187 |
| | 0.5 hectare to 1.0 hectare | | 8,964 |
| | 1 hectare to 5 hectares | | 11,026 |
| | 5 hectares to 10 hectares | | 983 |
| | 10 hectares to 50 hectares | | 353 |
| | More than 50 hectares | | 200 |
| 4. | Water Bodies not in use due to reasons | Number | 22,440 |
| | Dried up | | 3,975 |
| | Construction | | 5,830 |
| | Siltation | | 3,560 |
| | Destroyed beyond repair | | 1,742 |
| | Salinity | | 489 |
| | Due to industrial effluents | | 129 |
| | Others | | 7,093 |

⁹ <https://cdnbbsr.s3waas.gov.in/s3a70dc40477bc2adceef4d2c90f47eb82/uploads/2023/05/2023051279.pdf>

4.17 In the State of Bihar, the term “Jalkar” means Tank, Pokhar, Ahar, River, Water Course Channel, ‘Chaur’, ‘Dhav’, Reservoir Lake, Ox-bow Lake etc. under Department of Animal Husbandry and Fisheries, Bihar where Makhana, Singhara and Fish is reared. The ‘Reserve Deposit Fixation Committee’ fixes the Government selling price of different types of aqua-product, after every five years evaluating the data of the market selling rate of different types of aqua-product placed by the District Fisheries Officer. On the basis of the selling price, reserve deposit amount of all Jalkars will be fixed by ‘Reserve Deposit Fixation Committee’ after 5 years, provided that the annual reserve deposit amount of any Jalkar will not be more than 15% or less than 10% of the value of its annual production. The ‘Reserve Deposit Fixation Committee’ shall have the right to fix any percentage, which is not more than 5% of the annual enhancement of Reserve Deposit Amount of the consecutive year. This is the amount which is to be deposited by the cooperative federation as rent/lease of the Jalkar.

4.18 On the basis of the district wise details of area of leased water bodies (Jalkar) and its revenue in terms of ‘Reserved Deposit’ provided by the Directorate of Fisheries, Bihar, Fish Provisioning Services for the State for the years 2017-18 to 2021-22 have been computed and is presented in the **Table 4.2** below:

Table 4.2: Year-wise Fish Provisioning Services- Bihar

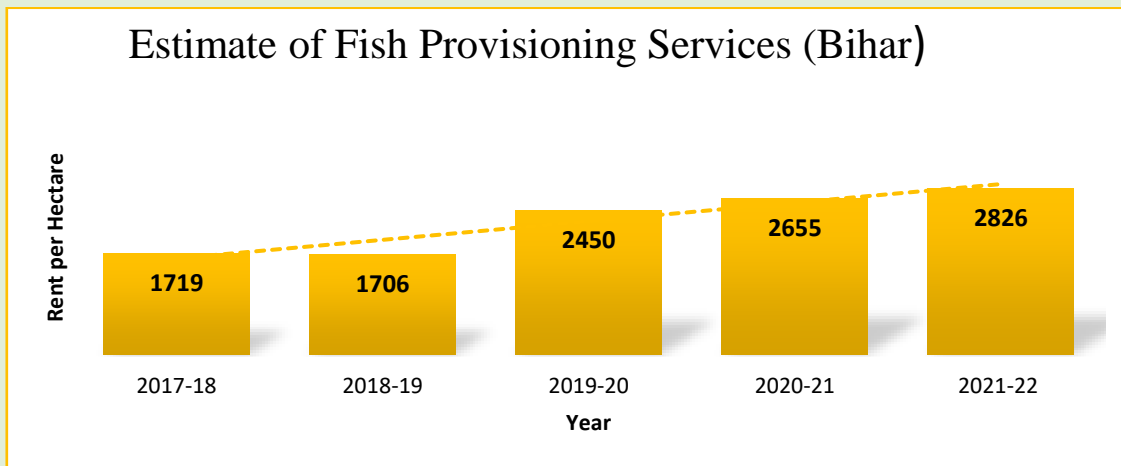
| S. No. | Year | Total Resources* | | Total Rent/Lease Amount | Rent per Hectare |
|--------|---------|------------------|----------------|-------------------------|------------------|
| | | No. of Resources | Area (Hectare) | (Rs.) | (Rs. / Hectare) |
| 1 | 2017-18 | 30,384 | 58,447 | 10,04,62,600 | 1,719 |
| 2 | 2018-19 | 31,120 | 60,481 | 10,32,00,400 | 1,706 |
| 3 | 2019-20 | 30,918 | 60,169 | 14,74,37,800 | 2,450 |
| 4 | 2020-21 | 30,879 | 60,469 | 16,05,41,956 | 2,655 |
| 5 | 2021-22 | 30,680 | 56,881 | 16,07,26,900 | 2,826 |

*Resources include Tanks, Ponds, Lake, Reservoirs

4.19 The year-wise estimates of Fish Provisioning Services for the years 2017-18 to 2021-22 are presented in the **Figure 4.2**. From the graph presented below, it can be seen that in general there is an upward trend in the Fish Provisioning Services for the State of Bihar despite decrease in number of water resources as well as area. The rent/ lease amount is fixed by ‘Reserve Deposit Fixation Committee’ based on selling

price of different aqua product. The actual rent depends upon several factors such as water availability, water quality and other condition such as presence of fence etc.

Figure 4.2 Estimates of Fish Provisioning Services (Rs./Hectare) for Bihar



4.20 The district-wise estimates of the Fish Provisioning Services for the years 2017-18 to 2021-22 have also been computed for the State, the details (district-wise lakes, ponds, reservoirs etc. along with area) of which have been presented in the **Annexure 4.1 to 4.5**. For the year 2021-22, the district wise estimates have been presented in the **Maps 4.1 and 4.2** below:

Map: 4.1 District wise Fish Provisioning Services (Rs/Hectare) for Bihar for 2017-18

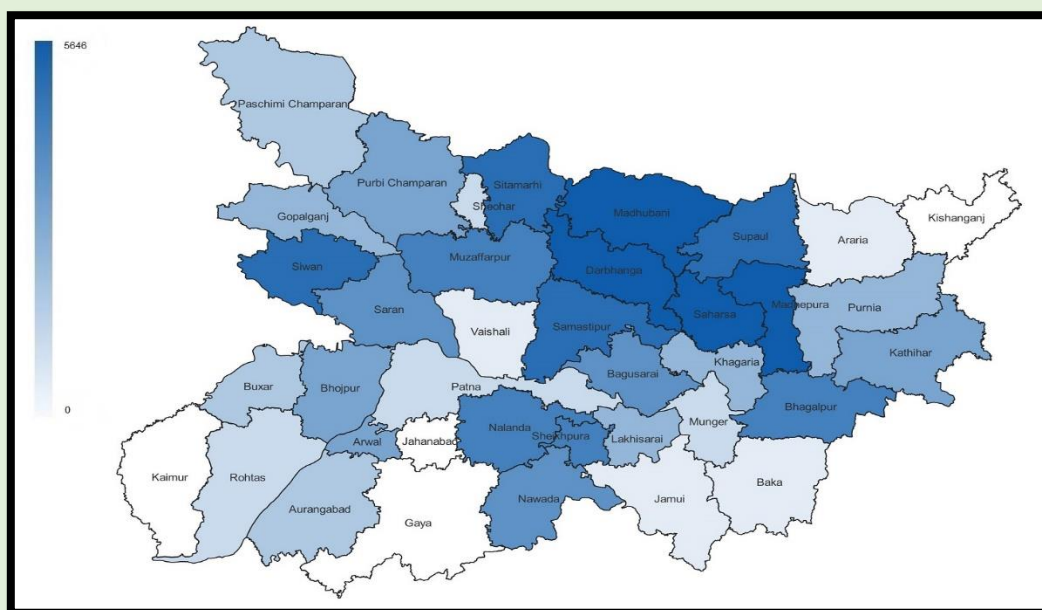


Table 4.3: Key Parameters of First Census of Water Bodies (2018-19) - Kerala

| S. No. | Parameter | Unit | Value |
|--------|---|---------------|--------------|
| 1. | Water Bodies | Number | 55,734 |
| | Rural | | 49,725 |
| | Urban | | 6,009 |
| 2. | Type of Water Bodies | Number | 55,734 |
| | Ponds | | 51,007 |
| | Tanks | | 848 |
| | Lakes | | 4 |
| | Reservoirs | | 63 |
| | Water Conservation Schemes / Percolation Tanks / Check Dams | | 3,349 |
| | Others | | 463 |
| 3. | Distribution of Water Bodies by Water Spread Area (Ha) | Number | 55,725 |
| | Less than 0.5 hectares | | 54,054 |
| | 0.5 hectare to 1.0 hectare | | 1,077 |
| | 1 hectare to 5 hectares | | 466 |
| | 5 hectares to 10 hectares | | 45 |
| | 10 hectares to 50 hectares | | 32 |
| | More than 50 hectares | | 51 |
| 4. | Water Bodies not in use due to reasons | Number | 9,184 |
| | Dried up | | 642 |
| | Construction | | 183 |
| | Siltation | | 2,126 |
| | Destroyed beyond repair | | 1,326 |
| | Salinity | | 287 |
| | Due to industrial effluents | | 43 |
| | Others | | 4,577 |

4.24 In the State of Kerala in majority of the districts, the rental/lease rate are fixed for a period of 5 years or above. The rental/lease rate of the water bodies vary in each district of the State depending on the geographical nature of the districts. In addition to this, the rental rate varies within the districts also depending on the terrain. Further, the water bodies are not given for rent in all the districts. For example, there is no rent/lease method practiced in Kannur district. Also, in Kasaragod district, at present fish farmers are permitted aqua culture activities in public ponds at panchayath level, but no cash transactions are done in this connection. When private

persons contact the authorities for aqua culture practice in these ponds on lease, only written permission is demanded and no rent is charged.

4.25 Based on the district-wise rent/lease data and data on lakes, ponds, reservoirs etc. along with area data received from the Department of Fisheries, Kerala, the estimates of the Fish Provisioning Services for the years 2020-21 have been compiled. Fish Provisioning Services at the State level for the block year 2020-21 to 2025-26 is shown in the **Table 4.4** given below:

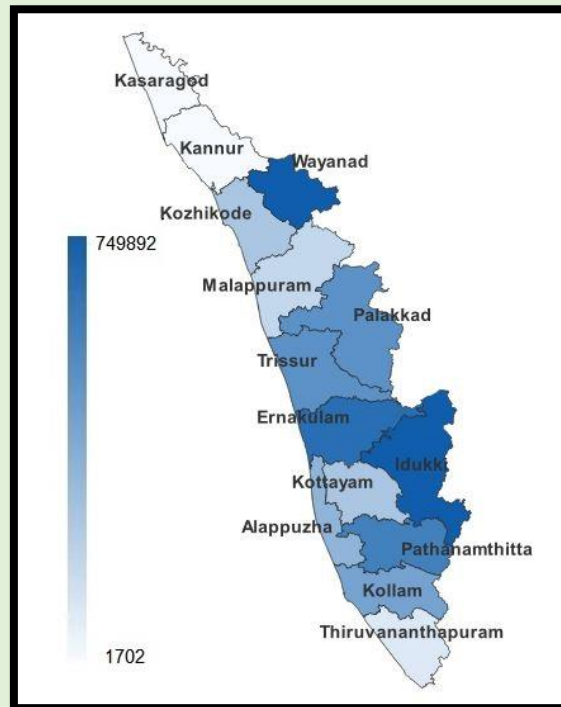
Table 4.4: District-wise Fish Provisioning Services- Kerala (From 2020-21 to 2025-26)

| S. No. | District | Total Resources* | | Total Rent/Lease Amount | Rent/Hectare |
|--------|--------------------|------------------|----------------|-------------------------|--------------|
| | | No of Resources | Area (hectare) | (Rs) | (Rs/Hectare) |
| 1 | Thiruvananthapuram | 1,810 | 2,659 | 45,25,000 | 1,702 |
| 2 | Kollam | 811 | 2,864 | 14,14,81,600 | 49,400 |
| 3 | Pathanamthitta | 466 | 2,568 | 25,37,18,400 | 98,800 |
| 4 | Alappuzha | 646 | 383 | 1,42,84,751 | 37,297 |
| 5 | Kottayam | 515 | 64 | 19,91,808 | 31,122 |
| 6 | Idukki | 152 | 9,869 | 7,40,06,84,148 | 7,49,892 |
| 7 | Ernakulam | 1,047 | 1,128 | 14,85,02,328 | 1,31,651 |
| 8 | Trissur | 1,503 | 4,607 | 34,13,78,700 | 74,100 |
| 9 | Palakkad | 1,039 | 8,005 | 39,94,01,470 | 49,894 |
| 10 | Malappuram | 872 | 62 | 10,87,294 | 17,537 |
| 11 | Kozhikkode | 397 | 2,156 | 7,56,19,544 | 35,074 |
| 12 | Wayanad | 118 | 2,960 | 81,15,43,200 | 2,74,170 |

*Resources include Tanks, Ponds, Lake, Reservoirs

4.26 From the Table 4.4 present above, it can be seen that Fish Provisioning Services in district Idukki is the highest whereas Thiruvananthapuram has the lowest Fish Provisioning Services. The district-wise estimates of the Fish Provisioning Services have also been depicted in the following **Map 4.3**.

Map 4.3: District wise Estimate of Fish Provisioning Services (Rs/Hectare) for Kerala (2020-21 to 2025-26)



4.27 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. Within the districts also, there is wide variation in the rent structure due to the following reasons:

- a. Rent/lease amount depends on the species farmed, or type of farming practices.
- b. Farms where extensive farming is practiced have less rent/ lease amount compared to intensive farming area.
- c. Road access, Availability of electricity, nearness to markets etc affects the rent/lease amount.
- d. Species used in farming also affects the rent or lease amount. Shrimp farms and brackish water farms fetches moderately high rent or lease amount compared to fresh water fish farms.
- e. Eastern side of the district is a Ghat area where fish farming is not as common as on the western side. Only fresh water fish farming is practiced in the eastern area and hence the rent/lease amount is less. Brackish water farming is practiced in the central and western area where rent/lease amount of the fish farms is high.
- f. In areas like Munrothuruth and Paravoor which are enriched with lot of brackish water farms due to the nearness of Ashtamudi and Paravur backwaters. Such areas possess high rent/lease amount.

- g. Possibility of Aqua tourism also plays a role in fixing the rent/lease amount in the district.

Tamil Nadu

4.28 Tamil Nadu is enriched with Marine, Brackish water and Inland fishery resources amenable for capture and culture fisheries. Substantial focus is being given on the economic and social dimensions of fishery resources by the Government of Tamil Nadu. The Indian Fisheries Act, 1897 enacted by the then Madras Presidency paved the way for the formulation of fisheries legislations across India. The Fisheries sector plays an important role in the socio-economic development of the country by providing livelihood to large number of fishers, generating employment opportunities in allied sectors and ensuring nutritional security.

4.29 Tamil Nadu possess 3.83 lakh hectares¹¹ effective inland water spread area comprising reservoirs, major and minor irrigation tanks, ponds, rivers, backwaters and other water bodies of which, 3.7 lakh hectare of water-spreads is suitable for fish culture. It comprises of major reservoirs (52,000 ha.) Big/small Irrigation tanks (98000 ha.), small lakes and Rural Fishery Demonstration tanks (158000 ha.) and Brackish water areas, swamps, estuaries (63,000 ha.). Tamil Nadu is also endowed with rich cold-water fishery resources. Apart from this, 7,400 km length of rivers and canals offer good scope for fisheries development. The Inland Fisheries policy of the state focuses in maximizing the fish production utilizing available inland water resources by adopting scientific freshwater aquaculture management and quality seed production. The inland programmes initiated are focused to bring additional water bodies for fishery development. In Tamil Nadu, the Inland Fishermen population is 1.83 lakhs and there are 270 number of Inland Fishermen Co-operative Societies with a total registered membership of 59,000 actively engaged fishermen in fishing activities in the inland water spread areas.

4.30 As regards the water bodies, according to the 1st Census of Water Bodies (2018-19)¹² released by M/o Jal Shakti in 2023, 1,06,957 water bodies have been enumerated in the state, out of which 92.9% are in rural areas and the remaining 7.1% are in urban areas. The majority of the water bodies in the State are ponds and tanks. The key parameters of 1st Census of Water Bodies (2018-19) in Tamil Nadu are presented in the **Table 4.5**.

¹¹ <https://www.fisheries.tn.gov.in/InlandFisheries>

¹² <https://cdnbbsr.s3waas.gov.in/s3a70dc40477bc2adceef4d2c90f47eb82/uploads/2023/05/2023051279.pdf>

Table 4.5: Key Parameters of First Census of Water Bodies (2018-19) – Tamil Nadu

| S. No. | Parameter | Unit | Value |
|--------|---|---------------|---------------|
| 1. | Water Bodies | Number | 1,06,957 |
| | Rural | | 99,414 |
| | Urban | | 7,543 |
| 2. | Type of Water Bodies | Number | 1,06,957 |
| | Ponds | | 38,321 |
| | Tanks | | 43,837 |
| | Lakes | | 13,629 |
| | Reservoirs | | 111 |
| | Water Conservation Schemes / Percolation Tanks / Check Dams | | 2,782 |
| | Others | | 8,277 |
| 3. | Distribution of Water Bodies by Water Spread Area (Ha) | Number | 1,06,292 |
| | Less than 0.5 hectares | | 74,673 |
| | 0.5 hectare to 1.0 hectare | | 11,577 |
| | 1 hectare to 5 hectares | | 12,211 |
| | 5 hectares to 10 hectares | | 5,971 |
| | 10 hectares to 50 hectares | | 1,152 |
| | More than 50 hectares | | 708 |
| 4. | Water Bodies not in use due to reasons | Number | 31,299 |
| | Dried up | | 21,449 |
| | Construction | | 5,621 |
| | Siltation | | 2,808 |
| | Destroyed beyond repair | | 1,095 |
| | Salinity | | 326 |
| | Due to industrial effluents | | - |
| | Others | | - |

4.31 The Government has always paid attention towards increasing the fish production from inland waterbodies by stocking quality fish seeds in the reservoirs. Also, the Government is encouraging leasing of tanks owned by Water Resources Department (WRD) through intensive inland fish culture scheme in five Districts such as Villupuram, Kallakurichi, Cuddalore, Madurai and Theni; promotion of fish culture in irrigation tanks through District Fish Farmers Development Agencies (DFFDAs); and by insisting the water body owning Departments to lease out the potential water bodies for fish culture. The Government has also taken special measures for stocking of fish seeds in inland water bodies through various schemes.

4.32 In Tamil Nadu, district-wise lakes, ponds, reservoirs etc. along with area

are maintained by two departments of State governments-namely Directorate of Fisheries and Public Works Department (PWD). Those districts with lakes, ponds etc. maintained in the PWD are used primarily for the agriculture and irrigation purposes. The remaining districts are maintained by the Directorate of fisheries and have been leased out for fish production. Accordingly, the estimation of Fish Production Services for those districts maintained under Directorate of Fisheries have been considered for the estimation of the FPS.

4.33 The Tamil Nadu Fisheries Development Corporations (TNFDC) has 8 reservoirs for fisheries exploitation and the TNFDC has no control over small, medium, large 'tanks/ponds/lakes' in the entire State. If the fishery exploitation was not leased out due to natural circumstances like drought i.e. insufficient water availability for fish culture or due to administrative reasons, the exploitation is carried out by the TNFDC. In addition, for the year 2016-17, due to a pending court case, the lease amount couldn't be collected for the reservoir in the Tiruvallur district.

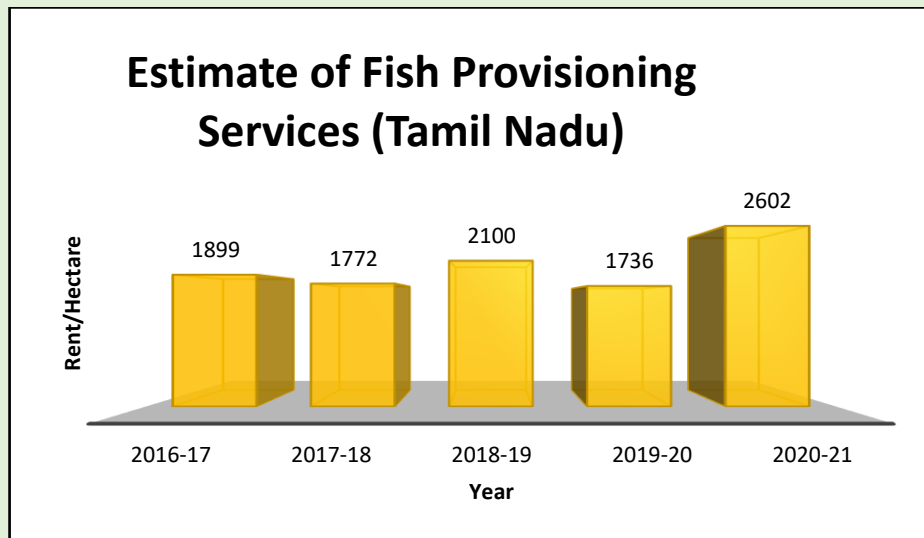
4.34 The district-wise lakes, ponds, reservoirs etc. along with area and estimates of the Fish Provisioning Services for the years 2016-17 to 2020-21 compiled using data received from Department of Fisheries and Fishermen Welfare, Tamil Nadu are provided in the **Annexure-4.6 to 4.10**. The estimates of Fish Provisioning Services for the years 2016-17 to 2020-21 are presented in the **Table 4.6** and **Figure 4.3**.

Table 4.6: Year-wise Fish Provisioning Services- Tamil Nadu

| S. No. | Year | Total Resources* | | Total Rent/Lease Amount | Rent per Hectare |
|--------|---------|------------------|----------------|-------------------------|------------------|
| | | No of Resources | Area (Hectare) | (Rs.) | (Rs. / Hectare) |
| 1 | 2016-17 | 59 | 53,088 | 10,08,26,798 | 1,899 |
| 2 | 2017-18 | 58 | 52,442 | 9,29,13,495 | 1,772 |
| 3 | 2018-19 | 60 | 55,088 | 11,56,78,863 | 2,100 |
| 4 | 2019-20 | 63 | 55,295 | 9,60,03,053 | 1,736 |
| 5 | 2020-21 | 61 | 55,151 | 14,34,89,564 | 2,602 |

*Resources include Reservoirs

Figure 4.3: Estimates of Fish Provisioning Services for Tamil Nadu



Challenges and Way Forward

4.35 India has rich and diverse fisheries resources ranging from deep seas to lakes, ponds, rivers and more than 10 percent of the global biodiversity in terms of fish and shellfish species. The Fisheries sector in India has immense potential to expand and this will be possible only when the waterbodies are in good and healthy conditions. It is therefore essential to have focused attention to the fisheries sector through policy intervention and financial support in order to accelerate its development in a sustainable, responsible, inclusive and equitable manner.

4.36 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, in turn, help to attain progress towards the achievement of sustainability.

4.37 In the current study, the Fish Provisioning Services (Rent/hectare) has been computed for those districts where the water bodies are rented/leased by the Governments. As the 1st Census of the Water Bodies provides a fair idea about the total water bodies in the State categorised in different area classes, the estimates can be further refined if all the water bodies are considered. Moreover, the total Fish

Provisioning Services of the State can be computed using the total area of the water bodies and the Rent/hectare.

4.38 The estimates in the current publication have been confined to three states for a limited number of years. There is scope for 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.
