Fishery Productivity of Inland Waters of India

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Abstract

Inland fisheries of India harbours great potential and caters the protein requirement of the masses yet the vast potential is still underutilized due to the technical constraints associated with it. Limited information on the inland aquatic resources in turn limits its efficient utilization. Knowledge on the state-wise inland fishery potential was estimated in this study. Haryana recorded more productivity than any other Indian state owing to more fish production per area. The lack of utilization of fishery resources leads the top fish producing states like Andhra Pradesh and West Bengal to trail behind. The evaluation of estimates of fishery productivity of inland water resources helped in identifying the potential productive inland aquatic zones.

Introduction

Inland fisheries, identified as a sunrise sector of India, were overshadowed in the past by the vast potential of the marine resources in the country. But the stagnant marine production since the 1980's has put attention on the inland sector. Updated estimates of Indian inland resources recorded 1.95 lakh km of rivers and canals, 8.12 lakh ha of floodplain lakes, 24.1 lakh ha of ponds and tanks, 31.5 lakh ha of reservoirs, 12.4 lakh ha of brackish water area and 12 lakh ha of alkaline affected areas (DOF, 2020).

Limited information on the potential of the resources in turn limits the efficient utilisation of aquatic resources of the country. The study attempts to extract information on inland fish productivity from various literatures and other published sources. Knowledge on the state wise productivity of inland aquatic resources would help in better fishery enhancement strategies with the help of central and state government policies. This paper attempts to estimate the inland fishery productivity of the country.

Constraints in Inland Fishery Productivity

Extreme variability in fishing operations, improperly co-ordinated data collection and analysis, lack of information about fishing villages and inventories, inappropriate data collection methods including insufficient use of sample survey, lack of attention to small-scale fishing activities, errors in catch reporting, the innumerable landing places and migration of fishermen are the major constraints associated with evaluation of accurate inland fishery productivity (De Graaf *et al*., 2012).

Regional Assessment of Inland Fisheries Productivity

The study segregated the inland fishery resources into four regional sectors mainly North, South, Western and Eastern states (Table 1). The study analysed that Eastern region comprising North-Eastern states and West Bengal recorded more productivity (2.65 tonnes ha^{-1}) followed by Northern states compared to other regions.

Table 1: Region wise inland fishery productivity

Name of Region	Productivity ha^{-1} (in tonnes)
Northern States (Ra, UP, Uk, Ch, Ct, De, Ha, HP, JK, Jh)**	1.30
Western States (DDN, DD, Go, Gu, Ma)	0.21
Southern states (Ka, Ke, TN, Te, AP, Pu)	1.27
Eastern States (As, Bi, AN, Ma, Me, Mi, Na, Si, Tr, WB, AP, Od)	2.66

[Note: Ra - Rajasthan, UP – Uttar Pradesh, Uk - Uttarakhand, Ch - Chandigarh, Ct - Chhattisgarh, De - Delhi, Ha - Haryana, HP - Himachal Pradesh, JK - Jammu and Kashmir, Jh - Jharkhand, DDN - Dadra and Nagar Haveli, DD - Daman and Diu, Go - Goa, Gu - Gujarat, Ma - Maharashtra, Ka - Karnataka, Ke - Kerala, TN - Tamil Nadu, Te - Telangana, AP - Andhra Pradesh, Pu - Puducherry, As - Assam, Bi - Bihar, Ma - Manipur, Me - Meghalaya, Mi - Mizoram, Na - Nagaland, Si - Sikkim, Tr - Tripura, WB - West Bengal, AP - Arunachal Pradesh, Od - Odisha]

State-Wise Assessment of Fish Productivity of Indian States

State-wise assessment of fish productivity estimates revealed that Haryana recorded maximum productivity of around 7.25 tonnes per hectare from 33,000 ha of the inland water body of the state. This is inclusive of the culture of inland saline soils and capture from other water bodies. Haryana is followed by Andhra Pradesh where productivity is recorded at 2.54 tonnes ha^{-1} from an area of 6,27,892 ha. Though West Bengal recorded a production of a very high production of 1.5 million t, the vast area of water body of around 5,70,429 ha has resulted in showcasing a low productivity from the state (Table 2).

Resource-Wise Assessment of Inland Fishery Productivity

Indian inland resources are blessed with a wide range of diverse aquatic resources such as rivers, lakes, estuaries, reservoirs and lagoons.

Table 2: State wise assessment of fish productivity estimates

States	Fish production ha^{-1} (tonnes)	States	Fish production ha^{-1} (tonnes)
Andhra Pradesh	5.40	Manipur	0.75
Arunachal Pradesh	0.30	Meghalaya	0.0009
Assam	1.30	Mizoram	0.53
Bihar	2.03	Nagaland	1.32
Chhattisgarh	2.56	Odisha	0.57
Delhi	0.19	Puducherry	1.94
Goa	1.33	Punjab	6.64
Gujarat	0.16	Rajasthan	0.13
Haryana	7.25	Sikkim	0.10
Himachal Pradesh	0.29	Tamil Nadu	0.24
Jammu and Kashmir	1.28	Telangana	0.57
Jharkhand	1.03	Tripura	3.68
Karnataka	0.27	Uttar Pradesh	1.97
Kerala	0.30	Uttarakhand	0.22
Madhya Pradesh	0.51	West Bengal	2.78
Maharashtra	0.24		

Riverine System

Lacunae in the data on riverine fishery productivity of Indian major river system are very obvious. With the available data, it may be stated that the Deccan river system comprising River Cauvery recorded the maximum productivity of 4.45 t km^{-1}. In Himalayan river system, River Ganga recorded the maximum productivity of 1.16 t km^{-1} (Table 3).

Table 3: Fish production per kilometer of major rivers

River system	River	Length (Km)	Productivity (tonnes Km^{-1})
Himalayan	Yamuna	1,376	0.03
Himalayan	Ganga	2,510	1.17
Deccan	Cauvery	860	4.45
Himalayan	Brahmaputra	900	0.11

Reservoirs

Based on the area of the reservoirs, Indian reservoirs are categorised as small, medium and large reservoirs. Small reservoirs with an average productivity of 173.8

kg ha⁻¹ are known to have higher productivity in contrast to their area. Large reservoirs with an extensive area of 31.5 lakh ha have a productivity of 33.34 kg ha⁻¹ indicating unutilised potential for fishery enhancement activities (Table 4).

Table 4: Fish productivity of reservoirs

Category	River	Production (Lakh tonnes)	Estimated Productivity per Area (Kg ha⁻¹)
Small	14.9	2.59	173.80
Medium	5.3	0.50	94.34
Large	11.4	0.38	33.34
Total	31.5	3.47	110.15

Floodplain Wetlands

Floodplain wetlands are located mostly in the states of Uttar Pradesh, Bihar, West Bengal and Assam along the rivers Ganga and Brahmaputra. The fisheries potential of these ecologically sensitive water bodies can be harnessed in a sustainable manner with proper management practices. The studies indicated that maximum productivity is exhibited by the flood plains of West Bengal (0.23 tonnes ha⁻¹) followed by Bihar (0.125 tonnes ha⁻¹) and Uttar Pradesh (0.177 tonnes ha⁻¹). Being a key breeding ground for certain indigenous species, adequate restoration is necessary for enhancing these weed infested shallow water bodies (Table 5).

Table 5: Fish productivity of floodplain wetlands

State	Area (lakh ha)	Production (Lakh tonnes)	Production per area (tonnes ha⁻¹)
West Bengal	0.425	0.10	0.230
Bihar	0.400	0.05	0.125
Assam	1.000	0.15	0.150
Uttar Pradesh	1.520	0.27	0.177
North Eastern States	0.192	0.01	0.050
Total	3.537	0.57	0.160

Estuaries

Estimates of fishery productivity of estuaries and lagoons indicated that the saline berries of West Bengal are the most productive estuarine system in the country with a productivity of 0.757 tonnes ha⁻¹. This indicates the huge fishery potential of these inland water bodies and proper culture based fishery programmes would help in harnessing the full potential of the resource in a sustainable manner (Table 6).

Table 6: Fish productivity of estuaries

Estuarine system	Estimated Area (ha)	Production (t)	Production per Area
Hooghly-Matlah	2,34,000	20,000-26,000	0.08-0.11
Godavari estuary	18,000	5000	0.27
Mahanadi	3,000	550	0.18
Narmada estuary	30,000	4,000	0.13
Chilka lagoon	1,03,600	4,000	0.03
Pulikat lake	36,900	760-1,370	0.02-0.03
Vembanad and Kerala backwaters	50,000	14,000-17,000	0.28-0.34
Freshwater Bheries of West Bengal	9,600	10-14	0.001
Saline Bheries of West Bengal	33,000	25,000	0.757

Conclusion

The evaluation of estimates of fishery productivity of inland water resources helped in identifying the potential productive inland aquatic zones. ICAR-CIFRI has been in the forefront for improving the fishery potential of inland water bodies through Culture based fisheries (CBF) and other inland fisheries development technology like cage and pen culture, in-situ seed raising, canal fisheries *etc*. The three pronged strategies adopted by CIFRI including input, infrastructure and information dissemination to implement fisheries enhancement protocol has also brought in enhanced fisheries.

References

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