

Growth of Indian Fisheries: Problems & Prospects

Abstract

Indian fisheries is a very important sector having many-fold resources and potentials. It is the source of livelihood for millions of people and one of the top export items among agricultural products of the country. India earns lucrative foreign exchange by exporting fish and fisheries products. The sector has shown steady growth since independence and has provided food security to the nation in the form of blue revolution. But overfishing and some infrastructural problems are imposing threats to overall success of the industry.

Keywords: Indian Fisheries, Growth, Fish Production, Problems & Prospects.

Introduction

Fisheries in India is a promising sector and plays very important role in the socio-economic life of the nation. It is the source of livelihood of millions of economically backward people of rural India especially women. Fishes provide one of the cheapest and highly nutritious foods in the form of high quality protein (Ayyappan and Krishnan, 2004). It has an ever-increasing demand in domestic market with 250 million strong consumers. Indian fisheries industry is now undergoing very rapid transformation which can be visualized by the 12-fold growth in just 60 years after independence (Ganesh Kumar et. al., 2010). India contributes 5.68 % to the world fish production in which shares of inland and marine sectors are 10.19 % & 3.23 % respectively. The country ranks 2nd in the world only after China in aquaculture production. It shows average annual growth rate of around 6 % and total catch of 9.58 million metric tonnes in 2013--14 (Handbook on Fisheries Statistics, 2014).

In spite of overall progress throughout the years Indian fishery has not achieved the production target so far. There are some weaknesses and threats which impede the production success of this flourishing sector. The present paper analyzes the status quo of fisheries sector in Indian economy and looks into the constraints hampering its growth and development.

Aim of the Study

The principal objective of the present study is to find out the growth & development of Indian fishery after independence. The vast resources of both inland and marine fisheries of India are indicative of immense growth potential of the sector. The present study aims at to point out the hitherto unexplored potentials of Indian fisheries upon which policy makers, Govt. officials, NGOs, Research scholars and other interested persons would work hand to hand to put the sector in a new dimension. .

Methodology

This is a review article and major part of this study is based on various published sources. Fisheries statistics, Report of the Working Group on Xii-th Five-Year Plan, Journals, NMFC, 2005; CMFRI Census, 2010; MPEDA, ICAR publications and other contemporary sources have been consulted and analyzed for the preparation of the paper.

Review of Literature

Indian fisheries industry, a sunrise sector, has faster growth rate than other agricultural fields (Kumar et. al., 2006). It is a source of cheaper proteins and foreign exchange earnings (Ayyappan and Krishnan, 2004). Fish production from riverine sources has declined after eighties due to water control and habitat fragmentation (Katiha and Bhatta, 2002). But growth of inland sector increased after post-WTO period (GoI, 2007). Share of developing countries like China and India in the total world fish production has increased from 43 % in 1973 to 73 % in 1997 (Delgado et. al. 2003). But, fisheries in India will have to face competition from other users of water (Rosegrant et. al., 2002). Similarly marine sector



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will face energy crisis (Ganesh Kumar et. al. 2010). As the sector will expand, it will face disease outbreak (Subasinghe et. al., 2001). Mahapatra et. al.

(2014) reviewed the threats and challenges of fish biodiversity of West Bengal.

Fisheries Resources of India

Table 1 shows a glimpse of Indian fisheries resources.

Table 1. Resources of Indian Fisheries

A. Inland Fisheries Resources	
Rivers & Canals (Km.)	195,210
Reservoirs (Lakh ha.)	31.50
Ponds & Tanks (Lakh ha)	24.14
Flood plains / derelict waters (Lakh ha)	8--12
Brackish water (Lakh ha)	12.40
Saline area (Lakh ha)	12.00
B. Marine Fisheries Resources	
Coastline (km)	8,118
EEZ (m km ²)	2.02
Continental shelf (m km ²)	0.53
Fish Landing Stations	1,914
Fishing Villages	3,827
Fishermen Families (NMFC, 2005)	764,868
Fishermen Population (NMFC, 2005)	3,574,704

Source: Report of the Working Group on Development and Management of Fisheries and Aquaculture, Planning Commission, January, 2012. 12th Five Year Plan (2012—17).

It is observed from Table 1 that Indian river system (14 major, 44 medium and numerous tributaries with total length of 45,000 km), comprising 20,000 km² catchment area, harbor one of the richest fish germplasm (930 species under 326 genera) of the world. Indian reservoirs (small—19134; medium—180 & large—56) have a combined area of 3,153,366 ha. The flood plain lakes, in the form of oxbow lakes are found in the states of Bihar, Assam, Manipur & W.

B.The Hooghly-Matla (largest), Mahanadi & Narmada estuaries are major estuaries of the country. The cold water fisheries comprise 8253 km riverine & 41600 km. Lakesterine resources.

Production

Total fish production in India has increased from 7.52 lakh tonnes in 1950—51 to 95.8 lakh tonnes in 2013—14 showing 12—fold increase with average annual growth rate of 6 %. (Table—2).

Table 2. Fish Production in India for Selective Years

Year	Fish Production ('000 tonnes)			Av. Annual Growth rate (%)			India's share to world production (%)
	Marine	Inland	Total	Marine	Inland	Total	
1950-51	534	218	752	----	----	----	3.83
1960-61	880	280	1160	9.53	3.05	7.65	3.27
1970-71	1086	670	1756	6.36	6.43	6.39	2.69
1980-81	1555	887	2442	4.22	4.60	4.36	3.40
1990-91	2300	1536	3836	1.10	9.56	4.32	3.89
2000-01	2811	2845	5656	-1.44	0.78	-0.33	4.45
2010-11	3250	4981	8231	4.70	1.78	2.91	5.73
2013-14	3443	6136	9579	3.67	7.29	5.96	---

Source: Hand book on Fisheries Statistics, 2014.

Among Indian states Andhra Pradesh comes first (Table 3) with 20.18 lakh tonnes of fishes (2013-14) followed by West Bengal (15.80 lakh tonnes.).

Table 3: Fish Production of First 12 Indian States from 2010-11 to 2013-14

(In lakh tonnes)

Sl. No.	States	2010-11	2011-12	2012-13	2013-14
1	Andhra Pradesh	13.68	16.03	18.08	20.18
2	West Bengal	14.43	14.72	14.90	15.80
3	Gujarat	7.74	7.83	7.88	7.93
4	Kerala	6.81	6.93	6.79	7.08
5	Tamil Nadu	6.14	6.11	6.20	6.24
6	Maharashtra	5.95	5.78	5.86	6.02
7	Karnataka	5.26	5.46	5.25	5.55
8	Uttar Pradesh	4.17	4.29	4.49	4.64
9	Bihar	2.99	3.44	4.00	4.32
10	Odissa	3.86	3.81	4.10	4.13
11	Chattisgarh	2.28	2.50	2.55	2.84
12	Assam	2.27	2.28	2.54	2.66

Source :Hand book on Fisheries Statistics , 2014.

Export of Marine Products

Table 4 provides a snapshot of export of marine products from India.

Table 4. Export of Marine Products from 2010-11 to 2014-15

Year	Marine Products Export	
	Quantity ('000 tonnes)	Values (Rs. Crores)
2010-11	813	12,901
2011-12	862	16,597
2012-13	928	18,256
2013-14	983	20,213
2014-15	1050	\$ 5.51 billion

Source : MPEDA, Kochi

The higher turnover of export occurred due to excess production of tiger prawn and white leg shrimp along with better price realization of squids, cuttlefishes and sea weeds (Ababouch and Karunasagar, 2013). In 2013-14, Indian export of marine commodities was highest in South-east Asia both in terms of quantity (455,000tonnes) and value (Rs. 9813 crores) followed by European Union.

Employment

As per CMFRI census, 2010, there are 3288 marine fishing villages and 1511 fish landing centres in 9 maritime states and 2 UTs. Total marine fisher-folkpopulation was about 3,999,214 comprising 864,550 families (Table 5).

Table 5. Occupational Profile of Marine Fishermen

States/ UTs	Active Fishermen	Fishing - related Jobs							Total
		Marketing	Making/ Repairing Nets	Processing	Peeling	Labourer	Others	Other than fishing	
Andhra Pradesh	150,868	39324	14082	16,848	2904	64,141	2790	10999	301,956
Tamil Nadu	214064	37440	6995	7125	3076	12,828	4077	9847	295,452
Odissa	162411	32637	17872	8492	2200	27,707	753	8138	260,210
Kerala	145396	20418	3368	5677	9817	14,391	736	10,93	210,496
Maharashtra	76345	45971	14477	9554	6493	28,873	5908	5657	193,278
West Bengal	95283	7820	18418	2543	1532	16,177	785	3632	146,191
Gujarat	82901	17975	8153	1596	4550	18,758	762	4222	138,917
Karnataka	40756	14876	1790	1416	1058	13938	1208	4786	79,819
Puducherry	12,209	3832	390	179	41	1219	349	1,271	19,490
Daman & Diu	7,480	1541	1041	37	28	1111	6	3,188	14,432
Goa	2,370	1481	117	0	0	3	0	1130	5,101
Total	990,083	223,306	86,04	53,467	31,699	199,146	17,374	63,563	1,665342

Source : Marine Fisheries Census , 2010

Contribution of Fisheries in Indian Economy

It is observed from Table 6 that India earnedRs, 30213.26 crores by exporting fish and fisheries products during 2013—14. Contribution of fisheries to GDP (%) at 2012—13 price rate is 0.83 and that of agricultural GDP (%) is 4.75. Average per capita fish consumption increased to 9 kg and Indian fisheries industry provided employment to about 14 million people.

Table 6. Role of Fisheries in Indian Economy

Export of Fisheries Products (2013—14 ; in Rs. Crores)	30213.26
Contribution of Fisheries to GDP (%) at 2012—13 price rate	0.83
Contribution to Agri. GDP (%)	4.75
Fish Consumption / capita (kg)	9.0
Employment Generation (million)	14.0

Source: i) Hand book on Fisheries Statistics, 2014. ii) Report of the Working Group on Development and Management of Fisheries and Aquaculture, Planning Commission, January, 2012. 12th Five Year Plan (2012—17).

Problems of Indian Fisheries

Problems of Indian fisheries in general, can be categorized as :

**Resource Crunch / Threats to Fish Diversity
Habitat Alteration**

Change of hydrology of river waters by dams / barrages, diversion of water, industrial use of water etc. change migratory routes for spawning of some fishes (Farakka barrage for Tenualosailisha and Tehri dam for Tor putitora).

Random Killing

Wanton killing of young fishes by the use of dynamite, fish poison etc.may lead to mass extinction of many fishes. Approx. 400 seeds of other aquatic organisms are destroyed for selection of one single seed of tiger prawn (Mahapatra et. al.,1995).

Overfishing

A large no. of fish species are alarmingly declining day by day simply by overfishing. Principal causes of overfishing are insufficient protected areas, open access fishing, poor fisheries management,

illegal fishing etc.(Scales, 2007). Table 7 enlists some vulnerable Indian species of different habitats.

Table 7. Fish Vulnerable by Overfishing

Ecosystems	Vulnerable species
Fresh water	Ompakpabda, Chitalachitala, Pangassiuspangassius, Eutropichthysvacha etc
Brackish water	Liza tade, Latescalcarifer, Mugilcephalus etc.
Marine	Rhinodon typhus, Polynemusindicus, Carcharhinushemiodon, Pristimicrodon, Anoxypristiscuspidata many skates & rays.

Source: IUCN Red List Version, 2016.

Introduction of Exotic Invasive Species

Exotic invasive species can exterminate indigenous fishes and take over the ecosystem. At least 7 risk factors from invasive species have been identified :

1. Ecological threats (invasiveness) ,
2. Hybridization with local fauna,
3. Environmental (change of ecosystem) ,
4. Introduction of newer pathogens ,
5. Food safety and public health ,
6. Financial ,
7. Social (Mahapatra et. al., 2014).. Common carp has already eliminated Schizothorax sp. in Dal Lake of J & K. and silver carp has almost replaced catla in Govindsagar reservoir (Pathak and Tyagi (2010)).

Climate Change

Indian Report to the UN indicates extinction of 75 % of fresh water fish diversity by the year 2070 due to reduction of river water discharge by combined effect of climate change and water withdrawal (Xenopoulos et. al. 2005). Change of water flow due to sedimentation, embankments and vanishing of wetlands will adversely affect spawning and species distribution. Reduction in the catch of major carps, large catfishes and migratory hilsa from river Ganges at Patna was reported by Pathak and Tyagi(2010). Coastal people are severely affected by the rise.ofsea level.

Anthropogenic

Marine debris / litter, eutrophication, bio-accumulation of pesticides, heavy metals, discharge from large industries (BOD load--- 200 tonnes / day in the Ganges).

Infrastructural

1. Poor rural roadways.
2. Insufficient cold storage.
3. Insufficient post—harvest processing plants of aquaproducts except for shrimps and fresh water prawns.

Management

1. Absence of organized retail in most part of the country.
2. No regulatory control over the domestic market and price isinfluenced by demand and supply.
3. Educated, new generation fishermen are reluctant to fishing.

4. No certification system for the sale of fish & fish products.

Weaknesses of Indian Marine Fishing Industry

Production of Indian marine fishery has shown a gradual declining trend from an all-time record catch of 3.94 million tonnes in the year 2012 until 2016, only when the sector recorded 6.6% increase in growth.Till the industry is far behind the recommended potential of 4.40 m tonnes. Marine fish landings in 2015 sharply declined (3.40 m tonnes with a fall of 5.3 %). Principal causes of this loss of production were rising water temperature, El Nino effect, over fishing, juvenile catch, algal bloom etc. (CMFRI report, 2016).Following constraintsof Indian marine fisheries have been reported.

1. Delay in shipment of shrimp for chemical testing affects profitability of the exporters (Shyam,2012).
2. Increase in cost of establishment of processing plant over the years for stringent quality standards of International market (Venkatesh, 2004).
3. Higher purchase price and other incidental costs like labour charge, water and electricity charge etc. have increased the cost of production (Shyam, 2012).
4. Inability of Indian exporters to charge higher prices due to rising production costs , different standards imposed by importers and insecured payment are some of the other problems (MPEDA, 2007).
5. Explorationof off-shore and deep sea fisheries are considered to be highly capital intensive venture (Ramachandra , 2005)

Prospects

Sustainable growth of Indian fishery is possible by combined efforts of technology, infrastructure and market along with research & development.

Technology

1. Selective breeding of commercially important fishes and production of quality seeds.
2. Use of locally available ingredients to formulate low-cost supplementary feed for fishes.
3. Fabrication of nets of different mesh size for various age –groups of fishes.

Infrastructure

1. Construction of fish landing stations at potential coastal areas.
2. Establishment of cold storages near to the fish landing centres.
3. Modernization of crafts and gears.
4. Provisions for readily available ice—boxes.

Market

1. Formation and / or upgradation of domestic markets.
2. Establishment of marketing societies among true fishermen.
3. Certification, gradation and branding of fish products.
4. Implementation of existing laws and constant surveillance (Nicholas et. al. , 2015)..

The Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Govt. of India has merged all the existing schemes of

fisheries and started a Rs. 3000 crores umbrella scheme “Blue Revolution : Integrated Development and Management of Fisheries”. The Department has prepared a National Fisheries Action Plan, 2020 to increase fish production and to achieve the target of Blue Revolution. It has included all the fisheries resources of the country. Indian Govt. through MPEDA provided assistance for setting cold storage, refrigerated trucks, seafood unit up-gradation, antibiotic testing kits, insurance coverage for workers etc. for all round development of the sector (MPEDA, 2013). Indian seafood quality has broadly been accepted in International market and marine products export for 2014—15 earned US \$ 5511.12 million (MPEDA, 2014—15). Indian marine fisheries have risen from the 2015 catastrophe and estimated marine fish landings in 2016 at landing centre level was Rs. 48,381 crores with 20.7 % increase over 2015 (CMFRI, May’ 2017).

Discussion and Suggestion

The unparallel growth of Indian fisheries has placed the sector in the forefront of global scenario. It not only fulfills the domestic demand but also earns foreign exchange (US \$ 3.51 billion during 2012-13). Dependence of nearly 14.5 million people on this industry amply justifies its importance in the economy and livelihood security of the nation. The principal support behind this revolutionary achievement of Indian fisheries is the country—wide net-works of FFDA, BFFDA, Research & Development Programmes of ICAR along with various State Govts. and NGOs.

Conclusion

Although India is blessed with diverse geographic and climatic conditions favourable for fish production, more modern innovative models of fish culture are very much necessary for all round development of this sector. In order to overcome the existing limitations of Indian fisheries industries and enhance its growth, systematic progress on the dynamics of fisheries are urgent.

References

1. Ababouch, L. and Karunasagar, I. (2013). *Global Fisheries and Aquaculture: Opportunities and Challenges*, 10th World Seafood Congress, Canada.
2. Ayyappan, S. and Krishnan, M. (2004). *Fisheries Sector in India : Dimensions of Development*. *Indian Journal of Agricultural Economics*. Vol. 59 : pp. 392—412.
3. FAO, 2002. *Fisheries Statistics*. <http://www.fao.org/h/statist/fishoft/fishplus>.
4. Ganesh Kumar, B., Dutta, K. K., and Joshi, P.K., (2010). *Growth of fisheries and Aquaculture Sector in India : Neded policy directions for future*.
5. Gol (Govt. of India). 2007. *Economic Survey, 2006—07*, New Delhi, India.
6. Kumar, P., Dey, M. M., and Paraguas, F. (2006). *Fish supply projections by production, environments and species types in India*. *Agricultural Economics Research Review*. Vol. 19 : pp. 327—351.
7. *Handbook of Fisheries and Aquaculture, 2013*, ICAR Pub. India.

8. *Handbook on Fisheries Statistics, 2014*. Deptt. of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Govt. of India.
9. *Annual Report, 2011—12*. Deptt. of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Govt. of India.
10. Katiha, P. K, and Bhatta, R. C. (2002). *Production and Consumption of Aquacultural Products in India: Past Trend, Present Status and Future Prospects*. Presented at special session on *Strategies and Options for Sustainable Agricultural Development at World Aquaculture*. Beijing, China.
11. Mahapatra, B. K., Saha, D, and Datta, N. C. (1995). *Destruction of Shellfish and Finfish Seed Sources of the Sundarban, West Bengal and Suggestions of their Conservation*. *Inland Fish Society. India*. 27: 35—39.
12. Mahapatra, B. K., Sarkar, U. K., and Lakra, W. S. (2014). *A Review of Status, Potentials, Threats and Challenges of the Fish Biodiversity of West Bengal*. *J. Biodivers. Biopros. Dev*. Vol. 2. 140.
13. *Marine Fisheries Census, 2010*. CMFRI, Kochi. Deptt. of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, Govt. of India, New Delhi.
14. *Marine Fish Landings in India, 2016*. ICAR—CMFRI, Department of Agricultural Research and Education, Govt. of India. May’ 2017.
15. MPEDA, 2007. *Export Promotion Schemes for Fisheries*.
16. MPEDA. *Fisheries Profile of India, 2013*.
17. MPEDA. *Press Release. MPEDA Stats. 2014-15*.
18. Nedumaran, G. (July, 2014). *Growth and Development of Indian Fishing Industry*. *Review of Research*. Vol.3 (10).
19. Nicholas, S. S., Maheswaran, S. and Gunalan, B. (2015). *Indian Seafood Industry Strength, Weakness, Opportunities and Threat in the Global Supply Chain*. *International Journal of Fisheries and Aquatic Studies*. Vol.3 (2) pp. 199—205.
20. Ramachandra, B. (2005). *Marine Fish Marketing System in Karnataka*. *Indian Journal of Agriculture*. Vol. iv, 2005.
21. Rosegrant, M., Cai, X., and Cline, S. (2002). *World water and food to 2025: Dealing with Scarcity*. *International Food Policy Research Institute*. Washington, District of Columbia, USA.
22. Scales, H. (Mar, 2007). *Shark Declines Threaten Shellfish Stocks*. *National Geographic News* (Retrieved 01—05—2012).
23. Shyam, S. S. and Narayanaumar, R. (2012). *Manual on World Trade Agreements and Indian Fisheries Paradigms: A Policy Outlook*. pp. 329—345.
24. Subasinghe, R. P., Bondad- Reantaso, M. G. and McGladdry, S. E. (20—21 Feb 2002). *Aquaculture development, health and wealth*. In *Technical Proceedings of the Conference on Aquaculture in the Third Millenium*, Bangkok, Thailand..
25. Venkatesh, S. (2004). *Policy Research: Implications of Liberalization of Fish Trade for Developing*

Countries. Project PR 26109. Integrated Coastal Management.

26. Xenopoulos, M. A., Lodge, D.M., Alcano, J., Marker, M., and Schultz, K. (2005). Scenerios of

Fresh water Fish Extensions from Climate Change & Water Withdrawal. Global Change Biology. Vol.11, pp.1557—1564.

27. *m.thehindubusinessline.com>economy.*