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ORIGINAL RESEARCH ARTICLE

Research Productivity on Fish and Fishing industry in India

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ABSTRACT

This study examines the Research Productivity on Fish and Fishing Industry by Indian scientist in which published literature on fisheries growth trend accounted. In 1980, Fish research output was 370 at the national level and it rose to 3971 by the end of 2009, which was a phenomenal increase in numbers. It helps to contribute to economic growth at national and local Levels, with examples from the Fisheries Management Science Programme (FMSP), and considers the Implications for fisheries policy in developing countries.

Key words: Fish research, Fishing industry, Fish research, Research in India and Research Productivity.

1. INTRODUCTION

Analysis of scientific activity is based on the assumption that carrying out research and communicating the results go hand in hand. Scientific progress is attained by researchers getting together to study specific research topics, steered by the previous work of colleagues. The classic input - output model used to describe the scientific research process suggests that publications can be taken to represent the output of science. Publications, most commonly in the form of the refereed article and the scholarly monograph, are regarded as the definitive statements of the results of research projects. This production can be quantified and analyzed to determine the size and nature of the research carried out. Studies can be performed at macro level to measure global, regional, or national trends or at the micro level of institutions or groups.

2. FISH AND FISHING INDUSTRY

Fish production has increased many folds since independence. According to the Food and Agriculture Organization (FAO) of the United Nations, fish output in India doubled between 1990 and 2010. Special efforts have been made to promote extensive and intensive inland fish farming, modernize coastal fisheries, and encourage deep-sea fishing through joint ventures. Great potential exists for expanding the nation's fishing industry. Fisheries research and training institutions are supported by central and state governments that deserve much of the credit for the expansion and improvements in the Indian fishing industry.

Fishing in India has a long history. For centuries, India has had a traditional practice of fish culture in small ponds in Eastern India. Significant advances in productivity were made in the state of West Bengal in the early nineteenth century with the controlled breeding of carp in Bundhs (tanks or impoundments where river conditions are simulated). Fish culture received notable attention in Tamil Nadu as early as 1911, subsequently, states such as West Bengal, Punjab, Uttar Pradesh, Gujarat, Karnataka and Andhra Pradesh initiated fish culture through the establishment of Fisheries Departments. In 2006, Indian central government initiated a dedicated organization focussed on fisheries, under its Ministry of Agriculture. Despite rapid growth in total fish production, a fish farmers' average annual production in India is only 2 metric tonnes per person, compared to 172 tonnes in Norway, 72 tonnes in Chile, and 6 tonnes per fisherman in China.

3. LITERATURE REVIEW

Publication awareness of the importance of fish and fishing industry and its usefulness is growing very much thanks to role of the modern

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technological development in that field. Yeoh and Kaur (2008) examined research productivity/ collection development in the light of growing interest in diversified domains of research in higher education. Jacsó (2011) explored the perspective of the choice and reliability of the source base, and the bibliometric and Scientrometric indicators. Rodríguez - Navarro (2011) uses several analytical treatments of the data to investigate. Shari *et al*. (2012) did research on bibliometric and webometric methods to publications and web sites affiliated with Malaysian institutions

4. DATA COLLECTION

The data was collected from ASFA database. The publications of fish and fishing research covered by ASFA database and from addresses in national were down loaded from the above databases. For analysis all papers published during 1980 - 2009 were considered. Furthermore, the survey has been restricted to articles containing the topic fish and fishing industry only.

5. LEADING FISH PRODUCING STATES IN INDIA, 2007–2008

Fishing is a diverse industry in India. The table below presents the top ten fish harvesting states in India, for the 2007 - 2008 agriculture years.

Table 1:- Fish Production in India during the period 2007-2008

S. No	State	Production (Metric tons)	Percentage	Cumulative Production (Metric tons)	Cumulative Percentage
1	West Bengal	1,447,260	23.136	1,447,260	23.136
2	Andhra Pradesh	1,010,830	16.159	2,458,090	39.296
3	Gujarat	721,910	11.541	3,180,000	50.836
4	Kerala	667,330	10.668	3,847,330	61.505
5	Tamil Nadu	559,360	8.942	4,406,690	70.447
6	Maharashtra	556,450	8.896	4,963,140	79.342
7	Orissa	349,480	5.587	5,312,620	84.929
8	Uttar Pradesh	325,950	5.211	5,638,570	90.140
9	Bihar	319,100	5.101	5,957,670	95.241
10	Karnataka	297,690	4.759	6,255,360	100.000
Total		**6,255,360**	**100**	**6,255,360**	**100.00**

"Annual Report: India , 2008-2009". Department of Animal Husbandry Dairying and Fisheries, Ministry of Agriculture, Government of India. 2009.

6. FISH OUTPUT AT THE NATIONAL LEVEL (INDIA)

A perusal of (**Table 2**) will show that with 370 outputs on Fish in the year 1980 the number has been more or less static upto 1984 in which year there were 354 (8.91%) papers on the subject. It continues to be a very slow growth rate till the year 2004 when it was 10 papers that year. It was curious that the number of articles decreases more or less steadily and 2004 they touch the lowest, two digit level.

Table 2:- Distribution of Fish and Fishing Industry Publication at the National Level(India)

S. No	Year	No of Articles	Percentage	Cumulative Articles	Cumulative Percentage
1	1980	370	9.32	370	9.32
2	1981	384	9.67	754	18.99
3	1982	325	8.18	1079	27.17
4	1983	343	8.64	1422	35.81
5	1984	354	8.91	1776	44.72
6	1985	272	6.85	2048	51.57
7	1986	155	3.90	2203	55.48
8	1987	51	1.28	2254	56.76
9	1988	83	2.09	2337	58.85
10	1989	104	2.62	2441	61.47
11	1990	123	3.10	2564	64.57
12	1991	66	1.66	2630	66.23
13	1992	56	1.41	2686	67.64
14	1993	104	2.62	2790	70.26
15	1994	130	3.27	2920	73.53
16	1995	46	1.16	2966	74.69
17	1996	13	0.33	2979	75.02
18	1997	65	1.64	3044	76.66
19	1998	77	1.94	3121	78.59
20	1999	79	1.99	3200	80.58
21	2000	39	0.98	3239	81.57
22	2001	41	1.03	3280	82.60
23	2002	65	1.64	3345	84.24
24	2003	36	0.91	3381	85.14
25	2004	10	0.25	3391	85.39
26	2005	77	1.94	3468	87.33
27	2006	105	2.64	3573	89.98
28	2007	117	2.95	3690	92.92
29	2008	129	3.25	3819	96.17
30	2009	152	3.83	3971	100.00
Total		**3971**	**100.00**	**3971**	**100.00**

6.1. Five Year break wise growth rate of research output on Fish

For the purpose of the analysis with regard to the study of research productivity five year block periods were taken up. Accordingly data have been presented in (**Table 3**).

Table 3:- Five year break-wise distribution has Fish output at the National (INDIAN) level

S. No	Block Year	No of articles	Percentage	Cumulative articles	Cumulative per cent age
1	1980-1984	1776	44.72	1776	44.72
2	1985-1989	665	16.75	2441	61.47
3	1990-1994	479	12.06	2920	73.53
4	1995-1999	280	7.05	3200	80.58
5	2000-2004	191	4.81	3391	85.39
6	2005-2009	580	14.61	3971	100.00
Total		**3971**	**100.00**	**3971**	**100.00**

It can be observed from a scrutiny of the (**Table 3**) that there is a decrease in the research output from between two block periods specifically the

block year 2000 - 2004 is less productive than the other block years periods.

6.2. Relative growth rate and doubling time of Fish research Literature at the national (Indian) level

One of the objectives of the present study is to evaluate the performance of research and development in fish research. The analysis of the growth rate of fish research output aims at identifying the growth rate prospects of the subject. However, proliferation of literature in general makes it difficult for scientists to keep in touch with recent advances in that field. Hence the prime duty of the library professionals is to meet the information needs of scientists of various disciplines. Published literature is a yardstick to measure the knowledge in a discipline, and the study of growth rate output would provide some useful information. The rate of growth of fish literature is determined by calculating relative growth rate rates and doubling time of output. (**Table 4**) presents data on the relative growth rate and doubling time of research output on fish at the national level.

6.3. Relative Growth rate of Fish research Literature at the national (indian) level

In 1980, Fish research output published was 370 at the national level, and it rose to 3971 by the end of 2009, which is a phenomenal increase in numbers. The relative growth rate has shown a declining trend. It could be seen that the relative growth rate has decreased gradually from 071 in 1980 to 0.01 in 2004. The study period records the mean relative growth rate of 0.08.

Period	Relative Growth rate
1980-1984	0.31
1985-1989	0.06
1990-1994	0.04
1995-1999	0.02
2000-2004	0.01
2005-2009	0.03

6.4. Doubling time of Fish research Literature at the national (indian) level

Contrarily to relative growth, the doubling time of output on Fish research has increased from 0.96 in 1981 to 23.10 in 2007.

Period	Doubling time
1980-1984	1.71
1985-1989	16.58
1990-1994	21.71
1995-1999	46.20
2000-2004	41.58
2005-2009	23.10

The doubling time output at the aggregate level has been computed as 25.15 years.

It could be deduced that in general there is a progressive increase in the number of output of research on fish. However, its relative growth rate has shown a declining trend, which means the rate of increase is low in terms of proportion, and this has been highlighted by the doubling time of output, which is more than the relative growth rate.

7. CONCLUSION

Directly and indirectly, fisheries provide employment for hundreds of millions of people. The vast majority of these people are in developing countries where the sector often plays a key role in preventing and reducing poverty; it is likely that millions more people are involved in fishing activities than what is shown by official statistics. Hence, quantification of scientific communication was required to enhance the proper research in this area. It could be deduced that in general there is a progressive increase in the number of research output on fish in India. However, its relative growth rate has shown a declining trend, which means the rate of increase is low in terms of proportion, and this has been highlighted by the doubling time of output, which is more than the relative growth rate.

Table 4:- Relative Growth rate and Doubling Time of Fish research Literature at the National (India) level

S. No	Year	No of Articles	Cumulative number of Articles	W1	W2	R(a)	Mean R(a)	Doubling time Dt (a)	Mean Doubling time
1	1980	370	370		5.91			0	
2	1981	384	754	5.91	6.63	0.72		0.96	
3	1982	325	1079	6.63	6.98	0.35		1.98	
4	1983	343	1422	6.98	7.26	0.28		2.48	
5	1984	354	1776	7.26	7.48	0.22	0.314	3.15	1.71
6	1985	272	2048	7.48	7.62	0.14		4.95	
7	1986	155	2203	7.62	7.7	0.08		8.66	
8	1987	51	2254	7.7	7.72	0.02		34.65	

9	1988	83	2337	7.72	7.76	0.04		17.33	
10	1989	104	2441	7.76	7.8	0.04	0.064	17.33	16.58
11	1990	123	2564	7.8	7.85	0.05		13.86	
12	1991	66	2630	7.85	7.87	0.02		34.65	
13	1992	56	2686	7.87	7.9	0.03		23.10	
14	1993	104	2790	7.9	7.93	0.03		23.10	
15	1994	130	2920	7.93	7.98	0.05	0.036	13.86	21.71
16	1995	46	2966	7.98	7.99	0.01		69.30	
17	1996	13	2979	7.99	8	0.01		69.30	
18	1997	65	3044	8	8.02	0.02		34.65	
19	1998	77	3121	8.02	8.05	0.03		23.10	
20	1999	79	3200	8.05	8.07	0.02	0.018	34.65	46.20
21	2000	39	3239	8.07	8.08	0.01		69.30	
22	2001	41	3280	8.08	8.1	0.02		34.65	
23	2002	65	3345	8.1	8.12	0.02		34.65	
24	2003	36	3381	8.12	8.13	0.01		69.30	
25	2004	10	3391	8.13	8.13	0.00	0.012	0.00	41.58
26	2005	77	3468	8.13	8.15	0.02		34.65	
27	2006	105	3573	8.15	8.18	0.03		23.10	
28	2007	117	3690	8.18	8.21	0.03		23.10	
29	2008	129	3819	8.21	8.25	0.04		17.33	
30	2009	152	3971	8.25	8.29	0.04	0.032	17.33	23.10
Total		**3971**	**3971**			**0.08**	**0.08**	**25.15**	**25.15**

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