



FISHCULTURE AS A SOURCE OF EMPLOYMENT AND INCOME IN INDIA WITH SPECIAL REFERENCE TO ASSAM

Dr. Manjit Das* Bhabananda Bayan**

*Associate Professor, Department of Economics, Bodoland University, Kokrajhar, Assam.

**Research Scholar, Department of Economics, Bodoland University, Kokrajhar, Assam.

Abstract

Fishculture has been a source of livelihood to a large section of rural poor people in India and especially in Assam for a long period of time. The prime objective of the present study is to found out the role of fishculture in the generation of employment and income in India and especially in Assam. The present study is based exclusively on secondary data collected from different sources. Simple statistical tools like percentage have been used for analysing the data. Optimum use of available water resources can generate employment opportunity to unemployed rural youth and raise their living standard in Assam.

Keywords: *Fishculture; Assam; NSDP; Employment; India.*

Introduction

In India, production of fish can be broadly divided into two groups, viz. inland fishery and marine fishery. India is home to more than 10 per cent of global fish biodiversity with 2200 species of fish and shellfish in the marine and inland water (Ayyapan, 2007). India ranks second in the production of fish in total and inland fish in the world next to China. With water resources in terms of 29000 K.M. of rivers, 3.15 million hectares of reservoirs, 2.35 million hectares of ponds and tanks and 0.2 million hectares of floodplains wetlands, the potential production levels are estimated at over 4.5 million M.T. annually (Ayyapan, 2007). In India, fishery sector provides employment to about 1210.19 million as fishermen and fishery related activities in 2011 (*Handbook on Fisheries Statistics 2011*). That is, about one per cent of the total population of India depends upon fishery sector in India.

Fishculture is one prime occupation of most of the rural people along with agriculture. Assam is a land of 216 species of fish. The most important thing is that 76 species of fish of Assam are considered as ornamental fish and most of them are able to establish demand in the international market (Das and Biswas, 2008). Among the fish farming environments in state, semi-intensive polyculture is the dominant system practiced. Basically, Assam fishculture is carp-oriented and the contribution of other species is marginal. Major culturable species are Indian carps, viz. Rahu, Catla, Mrigal, Calbasu, Kurhi, Bhangan and exotic carps viz. Grass carp, Silver carp and Common carp. Introduction of other species like Chital, Magur, Sol, Kawoi, freshwater prawn, etc. in the culture system has also been coming up (Department of Fisheries, 2015). Among all the states and union territories of India, Assam ranked 11th position in the production of fish in 2014-15. However, Assam stood 6th in the production of inland fish among all the states and union territories in the same year (Government of India, 2015-16). In Assam, there are two main rivers (Brahmaputra and Barak) and 53 tributaries with 4820 KM water spread areas. There are 430 registered beels and 767 unregistered beels with 60215 Ha and 40600 Ha water spread area respectively. There are also 71 forest fisheries with 5017 Ha water area; two reservoir fisheries with 2553 Ha water area; 361393 individual ponds with 55089 Ha water area; 6308 community tanks with 5141 Ha water area and 3887 derelict water bodies/swamps/low-lying covering an area of 116444 hectares of water bodies in 2012-13 which are highly useful for aquaculture in Assam (Department of Fisheries, Government of Assam, 2013-14). In spite of large scale production, supply of fish falls short of its demand. As a result Assam has to import fish 20000 tonnes of fish every year spending around Rs 200 crs annually (Barua, 2010).

The prime objective of the present study is to found out the role of fishculture in the generation of employment and income in India and especially in Assam.

The present study is based on secondary data. Data on GDP at current prices of India and contribution of fishery sector to GDP at current prices; whole sale price indices of inland and marine fish; NSDP at constant price and current price of Assam and contribution of fishery to NSDP of Assam; Number of family members engaged in fishing occupation in India and in Assam in 1992 & 2003; State/UT wise fishermen population in India (1993 and 1994); Distribution of fishermen in different fishing activities in Assam/India in 1992 and 2003 have been collected from Central Statistical Organisation, Government of India; Office of Economic Advisor, Ministry of Commerce and Industry, Govt of India; Statistical Handbook, Govt. of Assam; Directorate of Economics and Statistics, Department of Agriculture and Co-operation, Ministry of Agriculture,



Government of India; Department of Animal Husbandry and Dairying, Ministry of Agriculture, Government of India; Agricultural Research Data Book 2004, Indian Council of Agricultural Research; Directorate of Economics and Statistics, Department of Agriculture and Co-operation, Ministry of Agriculture, Government of India respectively. Simple statistical tools like percentage have been used for analysing the data.

Contribution of Fisheries to GDP at Current Prices of India

In India, GDP at current prices increased from Rs.39708/ crores in 1970-71 to Rs. 10477140/ crores in 2013-14 while value of fishery increased from Rs.245 crores in 1970-71 to Rs. 96824 crores in 2013-14 (Table-1). Thus, fishery sector has been contributing a good amount to GDP of India for a long time. Though there is a drastic fall of share of agriculture to GDP of India since 1970-71, the contribution of fisheries to GDP at current prices has been increasing. The share of fishery sector to GDP at current prices of India had increased from 0.62 per cent in 1970-71 to its peak level at 1.18 in 2000-01 and then fell to 0.92 per cent in 2013-14. It was due to both increase in production of especially inland fish and prices of fish. During the same time, the share of fishery sector to the GDP from agriculture had increased tremendously from 1.46 per cent in 1970-71 to 5.58 per cent in 2013-14. It was due to faster growth of fishery sector than other sectors of agriculture like food grains, milk, eggs and many other food items in one hand and rise in prices of fish on the other.

Table-1, Contribution of Fisheries Sector to GDP at Current Prices of India during 1970-71 to 2013-14 (Rs in crore)

Year	Total GDP	GDP from		GDP from fisheries as % of	
		Agriculture	Fisheries	Total GDP	GDP from Agriculture
1970-71	39708	16821	245	0.62	1.46
1975-76	71201	26651	567	0.80	2.13
1980-81	122427	42466	921	0.75	2.17
1985-86	233799	69964	1974	0.84	2.82
1990-91	475604	135162	4556	0.96	3.37
1995-96	1103238	312791	12729	1.15	4.07
2000-01	1902998	423522	22535	1.18	5.32
2005-06	3390503	637772	31699	0.93	4.97
2006-07	3953276	722984	35182	0.89	4.87
2007-08	4582086	836518	38931	0.85	4.65
2008-09	5303567	943204	44073	0.83	4.67
2009-10	6108903	1083514	50370	0.82	4.65
2010-11	7266967	1306942	57369	0.79	4.39
2011-12	8353495	1465753	65541	0.78	4.47
2012-13	9252051	1668676	78053	0.83	4.75
2013-14	10477140	1881152	96824	0.92	5.58

Source: Central Statistical Organisation, Government of India

From Table-2, it is observed that whole sale inland fish price index considering 1993-94=100 has increased more than three times from 127.30 in 1996 to 389.70 in 2009 while whole sale price index of marine fish increased slightly higher than double from 143.30 in 1996 to 298.90 in 2009. It means that whole sale price index of inland fish increased more than marine fish during 1996 to 2009 based on 1993-94 as base year. Initially during 1996 to 1997, although whole sale price index of marine fish was higher than that of inland fish, it was relegated in the successive years. It may be because of lower demand of Indian marine fish both in national and international market in comparison to inland fish.

On the other hand, considering 2004-05 as base year whole sale price index of marine fish increased at a higher rate than inland fish during 2005-2011. Considering 2004-05 as base year, whole sale price index of inland fish has increased more than double from 113.70 in 2005 to 230.60 in 2011 while whole sale price index of marine fish increased from 98.40 to 236.60 during 2005 to 2013.

Table-2 Indices of Whole Sale Prices of Fish

Year	Inland Fish	Marine Fish
Base 1993-94=100		
1996	127.30	143.30
1997	150.80	186.60
1998	166.70	201.70
1999	182.30	186.50



2000	237.00	192.90
2001	245.70	193.60
2002	291.50	180.80
2003	258.40	206.50
2004	265.00	202.20
2005	318.30	202.30
2006	332.30	233.40
2007	299.40	274.50
2008	289.90	300.30
2009	389.70	298.90
Base Year 2004-05=100		
2005	113.70	98.40
2006	112.50	118.60
2007	101.90	125.20
2008	101.00	139.20
2009	135.50	151.40
2010	186.70	212.80
2011	230.60	236.60

Source: Office of Economic Advisor, Ministry of Commerce and Industry, Govt of India.

Contribution of Fisheries to NSDP at Current Prices of Assam

The NSDP of Assam at factor cost by industry of origin at current prices increased from Rs.4718075 lakh in 2004-05 to Rs. 17521000 lakh in 2014-15 which means it increased by nearly four times while at constant price of 2004-05, it increased from Rs. 4718075 lakh in 2004-05 to Rs. 7377923 lakh in 2013-14 which is even less than two times. It means that price rise is very high in Assam for which NSDP at current price is around double of NSDP at constant prices. Contribution of fishery sector to NSDP at current prices increased from Rs. 69139 Lakh in 2004-05 to Rs. 550751 lakh in 2014-15. In terms of percentage to NSDP, its contribution also increased from 1.46 per cent in 2004-05 to 3.14 per cent in 2014-15. In absolute terms, it increased by nearly eight times while in percentage to NSDP, it increased by two times. But at constant prices of 2004-05, contribution increased from Rs. 69139 lakh to Rs. 94383 lakh in 2013-14 and in percentage terms, it decreased from 1.46 per cent in 2004-05 to 1.28 per cent in 2013-14. Although the contribution of primary sector to NSDP both at current prices and constant prices of 2004-05 decreased from 35.04 in 2004-05 to 28.72 percent and 25.98 per cent in 2013-14 respectively, percentage contribution of fishing to primary sector at current prices and constant prices increased from 4.18 per cent in 2004-05 to 6.91 per cent and 4.93 per cent in 2013-14 respectively. It is because of higher growth rate of fish and its price level than other sectors of the economy of the state.

Table-3 NSDP at Factor Cost by Industry of Origin, Assam (at 2004-05 price)

(Rs in Lakh)

Year	At Current Price	At Constant Price	Fishing at Current Price	Fishing at Constant Price	Primary Sector at Current Price	Primary Sector at Constant Price	% of Fishing to Primary Sector at Current Price	% of Fishing to Primary Sector at Constant Price
2004-05	4718075	4718075	69139 (1.46)	69139 (1.46)	1653028 (35.04)	1653028 (35.04)	4.18	4.18
2005-06	5243969	4860162	101172 (1.93)	70634 (1.45)	1969407 (37.56)	1676133 (34.49)	5.14	4.22
2006-07	5703346	5079653	128583 (2.25)	65438 (1.28)	1993497 (34.95)	1702660 (33.52)	6.45	3.84
2007-08	6234163	5296798	128814 (2.07)	63561 (1.20)	2138656 (34.31)	1765899 (33.34)	6.03	3.59
2008-09	7147811	5612296	136827 (1.91)	69321 (1.24)	2400363 (33.58)	1716439 (30.58)	5.70	4.04



2009-10	8525310	6129390	156525 (1.84)	79891 (1.30)	2844214 (33.36)	1795999 (29.30)	5.51	4.44
2010-11	10062671	6572602	202084 (2.01)	73644 (1.12)	3252687 (32.32)	1813230 (27.59)	6.22	4.06
2011-12	11183282	6694188	222245 (1.99)	75509 (1.13)	3472052 (31.05)	1865089 (27.86)	6.40	4.45
2012-13	12137973	6941707	265472 (2.19)	93880 (1.35)	3598998 (29.65)	1893535 (27.28)	7.37	4.96
2013-14	13960400	7377923	276686 (1.98)	94383 (1.28)	4009051 (28.72)	1916733 (25.98)	6.91	4.93
2014-15	17521000		550751 (3.14)					

Source: Statistical Handbook, Govt. of Assam, various issue.

Note: Figures in the parentheses represent percentage to NSDP

Employment in Fisheries Sector in India

Fishery sector provides employment opportunities to different types of people of society at different level. In India, male, female and even children are engaged in different activities of fishery like marketing, repairing of nets, processing of fish, etc. Total number of family members engaged in this primary occupation in India in 1992 and 2003 are presented in table-4.

Table-4 Number of Family Members Engaged in Fishing Occupation in India in 1992 & 2003 (in Hundreds)

Year	Location	Male	Female	Children	Total
1992	Rural	21181(35.71)	17479 (29.46)	20669 (34.84)	59330
	Urban	2680 (33.62)	2321 (29.11)	2973 (37.29)	7973
	Total	23861(35.44)	19800 (29.42)	23642 (35.13)	67303
2003	Rural	42838 (32.24)	36870 (27.75)	53159 (40.01)	132867
	Urban	4123 (34.39)	3470 (28.95)	4393 (36.65)	11986
	Total	46962 (32.42)	40340(27.85)	57552(39.73)	144854

Sources: (1)15th Indian Livestock Census 1992, Vol-1, Directorate of Economics and Statistics, Department of Agriculture and Co-operation, Ministry of Agriculture, Government of India.

(2): Department of Animal Husbandry and Dairying, Ministry of Agriculture, Government of India.

Note: The figures in the parenthesis represent percentage to the total.

From table-4, it is observed that total number of family members engaged in fishing occupation was 67,30,300 in 1992 which increased to 1,44,85,400 in 2003. In other words, the growth was more than double within the period. In the year 1992, out of total fishermen, share of male was the highest with 35.44 per cent, followed by children and female with 35.13 per cent and 29.42 per cent respectively. In the same year, the distribution of fishermen between rural and urban varied widely. The share of rural fishermen in total fishermen was 88.15 per cent while remaining 11.65 per cent were in urban areas. It was because fish-culture was rural oriented and the fishermen stayed in the rural areas. In the year 2003, the share of male and female declined to 32.42 per cent and 27.85 per cent respectively, while that of children went up to 39.73 per cent. Similarly, the distribution of fishermen between rural and urban areas had also widened. The share of rural fishermen went up to 91.73 per cent in 2003. In other words, the share of urban fishermen declined to 8.27 per cent.

State-Wise Distribution of Fishermen Population in India

The distribution of fisherman is not uniform across the state. Total number of people engaged in fishculture in India was 57,17, 760 in 1993 out of which 20,45,705 adopt it as full time occupation, 16,09,220 adopts it as part time and 20,62,835 take it as occasional occupation (Table-5). Total number of people engaged in fishculture decreased to 5959144 in 1994 out of which 2394574 take it as full time occupation while 1443223 adopts it as part time and 2121347 as occasional occupation. Out of all states and Union territories, maximum number of fishermen were in Bihar both in 1993 and 1994 with 1085871 and 1113018 respectively followed by Karnataka in 1993 and Kerala in 1994 (Table-5 & 6). The third place is occupied by West Bengal both in 1993 and 1994. The position of Assam among all the states and Union territory was 6th both in 1993 and 1994. However, number of people adopting fishery as a full time occupation was the highest in Assam in 1993 and second following Kerala in 1994. The bottom six states were Dadra & Nagar Haveli, Chandigarh, Sikkim, Mizoram, Delhi,



Andaman & Nicobar Islands in 1993 and Dadra & Nagar Haveli, Chandigarh, Sikkim, Mizoram, Andaman & Nicobar Islands and Punjab in 1994 (Table-6).

Table-5 State/UT wise Fishermen Population in India (1993 and 1994)

State/Union Territories	1993				1994			
	Full Time	Part Time	Occasional	Total	Full Time	Part Time	Occasional	Total
Andhra Pradesh	151425	132320	212986	496731	151425	132320	212986	496731
Arunachal Pradesh	0	4610	954	5564	0	4751	965	5716
Assam	362819	112181	0	475000	362819	112181	0	475000
Bihar	288034	475736	322101	1085871	295235	487629	330154	1113018
Goa	15709	2439	688	18836	15709	2439	688	18836
Gujarat	52388	24051	63769	140208	52388	24051	63769	140208
Haryana	6814	5046	3940	15800	7050	5094	3890	16034
Himachal Pradesh	3300	5801	4220	13321	3294	3718	1443	8455
Jammu & Kashmir	8302	2449	2249	13000	8302	2449	2249	13000
Karnataka	20688	9849	779931	810468	20688	9849	779931	810468
Kerala	345913	107352	143137	596402	412091	127891	170520	710502
Madhya Pradesh	28856	88916	0	117772	130982	0	0	130982
Maharashtra	67930	46042	311680	425652	67930	46042	311680	425652
Manipur	14961	8362	8677	32000	18675	8112	5563	32350
Meghalaya	2291	3667	4531	10489	2321	3836	4940	11097
Mizoram	0	0	600	600	-	600	-	600
Nagaland	80200	0	82140	162340	90100	0	95250	185350
Orissa	99074	69352	29723	198149	101000	72760	28352	202112
Punjab	1100	2050	950	4100	1200	2050	950	4200
Rajasthan	6576	4853	1654	13083	6170	4649	2738	13557
Sikkim	0	300	250	550	0	300	250	550
Tamil Nadu	111449	111449	-	222898	267309	-	-	267309
Tripura	18561	16786	14463	49810	18853	16815	15287	50955
Uttar Pradesh	30042	71089	59692	160823	30042	71089	59692	160823
West Bengal	298590	298590	-	597180	298590	298590	0	597180
Andaman & Nicobar Islands	2940	510	200	3650	2960	518	200	3678
Chandigarh	200	0	50	250	200	-	50	250
Dadra & Nagar Haveli	120	10	0	130	120	10	-	130
Daman and Diu	14500	3150	12950	30600	14520	3150	13330	31000
Delhi	1030	344	0	1374	1030	400	15000	16430
Lakshadweep	3600	800	1300	5700	3700	830	1470	6000
Pondicherry	8293	1116	0	9409	9871	1100	-	10971
India	2045705	1609220	2062835	5717760	2394574	1443223	2121347	5959144

Source: Agricultural Research Data Book 2004, Indian Council of Agricultural Research



Table-6 Top and Bottom Six States/UTs in 1993 & 1994

Year	Top Six States/UTs in Descending Order	Bottom Six States/UTs in Ascending Order
1993	Bihar, Karnataka, West Bengal, Kerala, Andhra Pradesh, Assam	Dadra & Nagar Haveli, Chandigarh, Sikkim, Mizoram, Delhi, Andaman & Nicobar Islands
1994	Bihar, Karnataka, Kerala, West Bengal, Andhra Pradesh, Assam	Dadra & Nagar Haveli, Chandigarh, Sikkim, Mizoram, Andaman & Nicobar Islands, Punjab

Source: Agricultural Research Data Book 2004, Indian Council of Agricultural Research

Employment in Fisheries Sector in Assam

In Assam, agriculture and allied activities like fishery, forestry, etc. are the primary occupation of majority of population. The number of family members engaged in fishing occupation in Assam in 1992 and 2003 are presented in table-7.

In the year 1992, 3,14,000 people consisting of male, female and children were engaged in fishing occupation. It is observed from table-7 that in 1992, fishing occupation were male dominated and rural centric. Out of total fishermen, 48.99 per cent were male, 25.71 per cent female and remaining 25.32 per cent were children in 1992. Again out of total fishermen, 93.54 per cent were from rural area and remaining 6.46 per cent were from urban areas. In the same Census, out of total male fishermen,

Table-7 Number of Family Members Engaged in Fishing Occupation in Assam in 1992, 2003 & 2014 (in Hundreds)

Year	Location	Male	Female	Children	Total
1992	Rural	1452	745	740	2937
	Urban	86	62	55	203
	Total	1538	807	795	3140
2003	Rural	1236	945	1563	3744
	Urban	77	35	48	160
	Total	1313	980	1611	3904
2014*		NA	NA	NA	6109

Sources: (1) 15th Indian Livestock Census 1992, Vol-1, Directorate of Economics and Statistics, Department of Agriculture and Co-operation, Ministry of Agriculture, Government of India.

(2) Department of Animal Husbandry and Dairying, Ministry of Agriculture, Government of India.

(3) *Lok Sabha Unstarred Question No. 4765, dated on 12.08.2014.

94.41 per cent were from rural area and remaining 5.59 per cent were from urban areas. Similarly, out of total fisherwomen, 92.32 per cent were from rural area and 7.68 per cent were from urban areas. In the distribution of children between rural and urban areas were of the same pattern. Here, 93.08 per cent were from rural areas and 6.92 per cent were from urban areas.

In the year 2003, though the number of fishermen increased to 390400, the composition of male, female and children as well as rural and urban changed a lot. The percentage share of male fishermen to total fishermen declined drastically to 33.62 per cent, while that of children increased to 41.26 per cent and that of female declined marginally to 25.11 per cent. The fall in male fishermen in absolute figure and in percentage may be due to migration of labour from rural to urban areas in search of better opportunity and income. Out of total male fishermen, 94.28 per cent were from rural areas and remaining 5.72 per cent from urban areas. On the other hand, out of total male fisherwomen, 96.43 per cent were from rural area. Similarly, out of total children engaged in fishing activity, 97.03 per cent were from rural area. The increase in the percentage of rural women in fishing activity was due to lack of other attractive opportunity.

In 2014, 6109 family members are engaged in fishing activities. It means number of family members engaged in fishing occupation has increased by two times during 1992 to 2014.

Employment in Different Activities of Fishery in India/Assam

Fish culture is a diversified activity. People participate in fish culture as a part time as well as full time occupation. They are involved in marketing of fish, repairing of nets, processing of fish, etc. The participation of people in different fish related activities as part time and full time occupation in rural and urban Assam and India is presented in table-8.



It is observed from table-8 that in rural area engagement of people in actual operation of fishing or fish seed collection or both in 1992 was much higher than urban area with a ratio of 94.94:5.06. In case of engagement in other fish related activities also, percentage of people from rural area was higher than that of urban area. In India, engagement of people

Table-8 Distribution of Fishermen in Different Fishing Activities in Assam/India in 1992 ('00 number)

Assam / India	Location	Number of Family Members Engaged in Different Fishing Occupations					
		In Actual Operation of Fishing or Fish Seed Collection or Both		Engaged in Other Occupation			Others
		Full Time	Part Time	Marketing of Fish	Repairing of Nets	Processing of Fish	
Assam	Rural	236	184	123	101	20	-
	Urban	18	17	9	12	6	-
	Total	254	201	132	113	26	-
India	Rural	6087	6776	4042	1944	671	2164
	Urban	1297	361	605	313	204	398
	Total	7384	7137	4647	2257	875	2562

Source: (1)15th Indian Livestock Census 1992, Vol-1, Directorate of Economics and Statistics, Department of Agriculture and Co-operation, Ministry of Agriculture, Government of India.

In actual operation of fishing or fish seed collection or both in 1992 as full time occupation was slightly higher than that of part time occupation. In case of other occupation, engagement of people in marketing of fish were the highest followed by repairing of nets and processing of fish.

From table-8, it is also observed that in Assam percentage of people engaged in actual operation of fishing or fish seed collection or both in 1992 as full time occupation was higher than that of part time occupation as a whole and rural and urban basis also. Engagement of people in fishery related activities like marketing of fish was the highest, followed by repairing of fish and processing of fish as a whole and rural area. However, in case of urban area, engagement of people in repairing of nets stood first followed by marketing and processing of fish.

Table-9 Distribution of Fishermen in Different Fishing Activities in Assam/India in 2003 ('00 number)

Assam / India	Location	Actual Operation of fishing						Other Occupations				
		Male		Female		Total		Male				
		Full time	Part time	Full time	Part time	Full time	Part time	Marketing of fish	Repairing of nets	Processing of fish	Fish and Prawn seed	Others
Assam	Rural	626	382	385	215	1010	507	278	96	36	20	2
	Urban	35	46	11	22	46	68	35	12	8	0	0
	Total	661	427	396	237	1057	664	313	108	44	20	3
India	Rural	7081	8316	1019	1342	8100	9658	3331	2207	391	291	2603
	Urban	1069	882	163	181	1232	1063	579	243	71	316	137
	Total	8150	9198	1182	1523	9331	10721	3910	2451	462	607	2740

Sources: Department of Animal Husbandry and Dairying, Ministry of Agriculture, Government of India.

From table-9, it is observed that in India engagement of male and female in actual operation of fishing as part time and full time occupation in rural area was much higher than in urban area in 2003. The participation ratio of rural and urban people to total employment was 10.08:09.92. The participation of both male and female in actual operation of fishing as part time occupation is slightly higher than full time occupation. In rural areas, the participation of both male and female in actual operation of fishing as part time occupation was also slightly higher than full time occupation. However, in urban area the participation of both male and female in actual operation of fishing as part time occupation was lower than full time occupation. In case of other occupation, the engagement of people in marketing of fish is higher followed by repairing of nets, others, fish and prawn seeds and processing of fish. In case of other occupation, the percentage share of rural area was higher than that of urban area except prawn and seed fish in 2003.



Like all India level, engagement of male and female in actual operation of fishing as part time and full time occupation in rural area in Assam was much higher than in urban area in 2003. However, the participation of male and female in actual operation of fish in Assam in 2003 was completely different from the overall all India level. In Assam, engagement of people in fish culture was a full time occupation rather than a part time occupation. It was because of absence of other remunerative occupation in rural area and higher demand for fish and hence higher prices. In case of male as well as female engaged in actual operation of fishing in rural area, the participation as full time occupation was higher than part time occupation. On the contrary, in urban area, the participation of male and female in actual operation of fishing as part time is higher than that of full time. It was because of the fact that in urban areas people had alternative occupations which could enhanced their family income a lot. In case of other occupation, the engagement of male is the highest in marketing of fish, followed by repairing of nets, processing, fish and prawn seed and others. In case of distribution of engagement of male in other occupation in between rural and urban areas, the percentage of rural area was higher than that of urban area.

In a nutshell, one can say that fishculture has been providing employment and income to a large section of the society both at national level and at state level. Although its contribution to GDP is meager (below 1%), its share in the primary sector is significant (above 5 %) and has been increasing over the years because of increase in both production of inland fish and its price. However, at state level its importance is more significant as it has contributed more than three percent to NSDP at current prices and around seven percent to primary sector of the state. In terms of generation of employment, fishery sector provided employment to 67303 number of family members in 1992 which increased to 144854 in 2003 in India. Although the number is not so significant in terms of total workforce of India, but it is providing employment to the specially rural poor. Among all the states and UTs, Bihar occupied top most position providing employment in fishery sector in 1993 and 1994. However, Assam stood first in 1993 and Kerala in 1994 in providing full time employment opportunity in fishery sector among all the states and UTs. In Assam, number of family members engaged in fishing occupation increased by two times during 1992 to 2014. However, there is a shortfall of production in comparison to demand for fish in the state. If all the water resources of the state is used for fishculture, Assam would not only be able to meet its own demand but will also be able to export to other states of India.

References

1. Ayyapan, S. (2007), “India Ranks Second in Inland Fish Production”, article published in *The Economic Times*, on Friday, November 02.
2. Barua, P.G. (2010) “Blue Revolution”, article published in English daily news paper *The Assam Tribune* on 11-10-2010.
3. Das, J.N. and Biswas, S. P. (2008), *Handbook of Ornamental Fishes of the Brahmaputra Basin*, Eastern Book Publishing House, Guwahati.
4. Government of Assam, Department of Fisheries, (2015), *Annual Report, 2013-2014*, P-2.
5. Government of Assam, Directorate of Economics and Statistics, *Statistical Handbook*, various issues.
6. Government of India, Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, New Delhi
7. Government of India, Directorate of Census operation, *Census of India*, 2001.