CHAPTER-5

DISTRICT WISE VARIATION IN FISH CULTURE IN ASSAM

5.1. INTRODUCTION:

Presently, Assam has 26 Districts[1]. Practice of fish culture, however, is not evenly distributed among all the districts of Assam. In some of the districts, fish culture is practiced extensively by thousands of families, while in some other districts there is a limited practice of it involving small number of families within a small area. Generally, it is cultured by the poor rural households belonging to all communities. However, it is apparent that it is concentrated more in the plain areas specially among the Muslim community.

There is a discussion here about district wise variation in contribution of fish production to total state production during 1995-96 to 2015-16. After this, district wise variation in contribution of seed fish production to total state production during 1995-96 to 2015-16 has been discussed. Thereafter, analysis of the reasons behind the district wise variation in fish culture in Assam have been made. The last section consists of the concluding observations.

For analytical purpose, first of all, spatio-temporal variation in the production of fish in the state has been estimated by using the data collected from Directorate of Economics and Statistics, Government of Assam. A computation has been made for proportional contribution of each district and its variation overtime by using tabular method. By using co-efficient variation, inter-district disparity in contribution of fish production to state total has been measured. An analysis of the impact of various factors on the variation in fish production has been analysed by using multivariate regression equation.

[1] In the year 2005, three extra districts were created in Assam, viz. Baska, Udalguri, and Sirang. But the figures of these districts are available only from 2008. Therefore, the former 23 districts are considered here.

5.2. DISTRICT WISE VARIATION IN CONTRIBUTION OF FISH TO TOTAL STATE PRODUCTION:

It has been observed that volume of fish production is uneven across the districts of Assam. In some districts, production is very high while in some others the volume of production is very low. District wise variation in contribution of fish to total state production during 1995-96 to 2015-16 has been presented in table-5.1 below.

From table-5.1, it is observed that Nagaon district has always been at the top position in terms of contribution to total production of the state. The district contributed maximum 8.24 per cent of the state total production of fish in the year 1995-96. It was followed by Dhubri, Karimganj, Cachar and Barpeta with 7.48, 6.5, 6.19 and 6.14 per cent contribution respectively. These five districts together contributed about 34.55 per cent of the total fish production of the state during 1995-96. In the year 2002-03, share of Nagaon district to total state production increased to 8.69 per cent, which was followed by Cachar (7.22 %), Dhubri (6.53%), Barpeta (6.41%) and Kamrup (6.29 %) respectively. In the year 2009-10, the share of Nagaon increased further to 10.33 per cent followed by Kamrup (7.62%), Cachar (7.35%), Karimganj (6.46%) and Barpeta (6.30%). In the year 2015-16 also, Nagaon district was at the top again with an increasing share of 10.70 per cent to state total followed by Cachar, Kamrup, Barpeta, and Karimganj in the rank of 2^{nd}, 3^{rd} , 4^{th} and 5^{th} respectively. Thus, there were no radical changes in the composition of top five districts during 1995-96 to 2015-16. The districts at the bottom two positions in terms of contribution to total state production were Dima Hasao[2] and Karbi Anglong throughout the whole period 1995-96 to 2015-16. In the year 1995-96, it was followed by Dhemaji, Bongaingaon and Kokrajhar having shares 2.25 per cent 2.52 percent and 2.95 per cent respectively.

[2] Previously Dima Hasao district was known as North Cachar Hills (N.C. Hills)

Table-5.1: District-wise Variation in Contribution of fish to Total State Production during 1995-96 to 2015-16								
1	2	3	4	5	6	7	8	9
	Percentage to State Total				Growth Rate of Production (%)			
District	1995-1996	2002-2003	2009-2010	2015-2016	1995-96 to 2002-03	2002-03 to 2009-10	2009-10 2015-16	1995-96 to 2015-16
Dhubri	7.48	6.53	6.27	5.36	-12.80	-3.94	-14.55	-28.42
Kokrajhar	2.95	1.54	2.86	1.47	-47.99	86.11	-48.61	-50.25
Bongaigaon	2.52	3.19	2.46	2.58	26.85	-22.94	4.93	2.57
Goalpara	3.72	3.38	2.79	2.85	-9.32	-17.43	2.13	-23.53
Barpeta	6.14	6.41	6.30	6.71	4.37	-1.73	6.41	9.14
Nalbari	5.48	5.10	3.61	4.06	-6.99	-29.20	12.42	-25.97
Kamrup	5.15	6.29	7.62	7.69	22.23	21.12	0.92	49.41
Darrang	5.18	6.14	3.14	3.56	18.38	-48.89	13.65	-31.24
Sonitpur	4.01	4.53	3.46	2.92	12.87	-23.70	-15.49	-27.23
Lakhimpur	3.94	5.08	5.24	4.53	28.93	3.03	-13.50	14.91
Dhemaji	2.25	2.48	1.83	1.97	10.37	-26.18	7.61	-12.33
Marigoan	4.43	4.65	4.52	4.86	4.81	-2.81	7.56	9.56
Nagaon	8.28	8.69	10.33	10.70	4.99	18.81	3.63	29.26
Golaghat	3.05	3.09	3.33	3.01	1.49	7.79	-9.68	-1.19
Jorhat	4.29	4.10	5.20	4.84	-4.46	26.91	-6.93	12.85
Sibsagar	3.43	3.44	3.87	4.03	0.35	12.46	4.06	17.43
Dibrugarh	5.27	4.50	3.07	3.82	-14.62	-31.73	24.15	-27.63
Tinsukia	3.47	3.21	1.42	2.61	-7.42	-55.89	84.15	-24.80
Karbi Anglong	2.01	1.51	0.98	0.79	-24.69	-34.83	-20.23	-60.85
Dima Hasao	0.72	0.30	0.12	0.28	-58.12	-60.75	137.44	-60.97
Karimgang	6.50	5.53	6.46	6.25	-14.86	16.84	-3.29	-3.79
Hailakandi	3.52	3.08	3.81	3.69	-12.41	23.61	-3.21	4.80
Cachar	6.19	7.22	7.35	7.83	16.57	1.82	6.49	26.39
Assam	100	100	100	100	6.74	32.20	34.45	89.73
Coeff. of Variation	41.91	46.31	57.46	58.16	-801.7099	-5.3136	4.6624	0.0042
Correlation	R_{23} = 0.94; R_{34} = 0.88; R_{45} = 0.97; R_{25} = 0.86				R_{67} = -0.058; , R_{78} = -0.66, R_{89} = -0.25; R_{69} = 0.69			

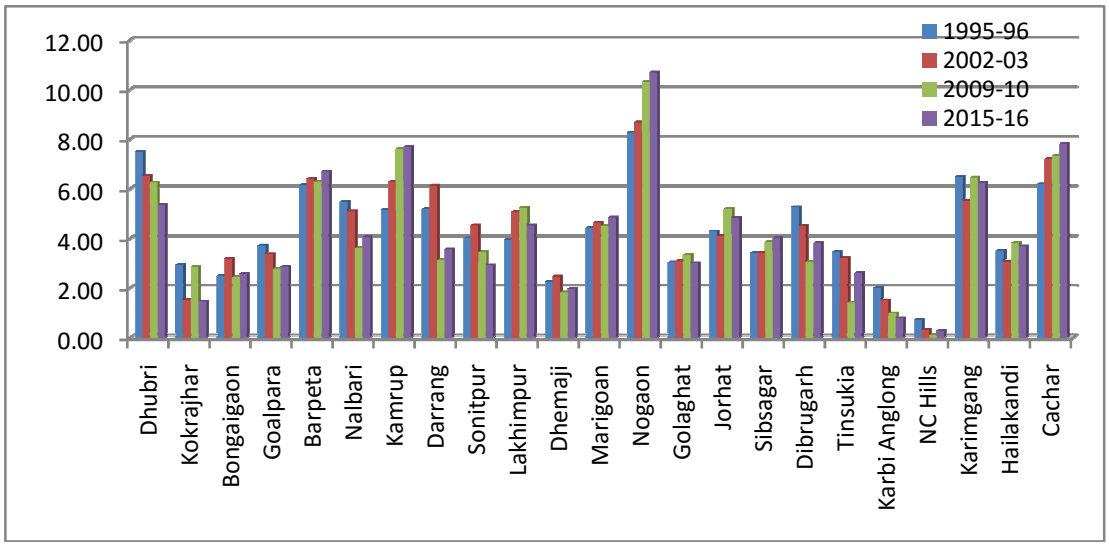
Source: Directorate of Economics and Statistics, *Statistical Handbook,* various issues, Government of Assam, Guwahat.
Notes: See Appendix-5.1.

The lowest contribution made by Dima Hasao and Karbi Anglong may be due to the difficulty of adopting fish culture in those two hilly districts. It has also been observed that Dhemaji has always been among the bottom five districts

throughout the period. This is due to the adverse impact of recurring flood on fish production in the entire district every year.

This is one of the main reasons why the rural people of the district Dhemaji never been interested to accept fishculture as the prime source of livelihood despite having much water bodies.

Diagram-5.1
District-wise Variation in Contribution of fish to Total State Production during 1995-96 to 2015-16



The districts with higher contribution to the total state production in earlier years, continued to produce and contribute more. The reason behind their higher production may be attributed to natural advantage of climatic conditions, better marketing facilities, better finance and proper technical knowledge etc. On the other hand, those who had smaller contribution earlier are still contributing less as they are deprived of these facilities and natural advantages like low water bodies or higher incidence of flood.

During the period from 1995-96 to 2015-16, overall growth in percentage contribution to total state fish production was the highest in Kamrup district with 49.41%, followed by Nagaon district with 29.26% and Cachar district with 26.39%. On the other hand, growth rate of percentage contribution to total fish production of

the state during the same period was the lowest with negative value in Dima Hasao (-60.97%) followed by Karbi Anglong (-60.85%) and Kokrajhar (-50.25%).

Another observation from the table has been made that correlations between district wise percentage contributions to total state production of fish of various years are positive significantly. It indicates that the formerly advanced districts in terms of contribution to total state production remain in advantageous position in the later years and vice versa. Moreover, the gap between advanced and poor districts has been increasing. Changes in the districts belonging to top five and bottom five positions in terms of contribution to state total production of fish during 1995-96 to 2015-16 is also presented in table-5.2.

It is seen from table 5.2 that, Nagaon, Dhubri, Karimganj, Cachar & Barpeta were the top 5 districts in terms of production of fish during 1995-96. Of these districts, the percentage contribution of each district to total fish production of the state was at least 6.14% and the 5 bottom districts were Dima Hasso Karbi Anglong, Dhemaji, Bongaigaon kand Kokrajhar. The percentage contribution of each bottom districts of state total production was barely 3%. During the period between 1995-96 to 2015-16, no change has been found in respect of the top five positions. Throughout the whole period, Dima Hasao and Karbi Anglong have been found always in the lowest position.

Table-5.2: Changes in percentage of Top Five and Bottom Five districts in the Ranking of Production of Total Fish of Assam during 1995-96 to 2015-16

	1995-96	2002-2003	2009-2010	2015-2016
Top Five Districts	Nagaon, Dhubri, Karimganj, Cachar and Barpeta (≥6.14)	Nagaon, Cachar, Dhubri, Barpeta and Kamrup (≥6.29)	Nagaon, Kamrup, Cachar, Karimganj and Barpeta (≥6.30)	Nagaon, Cachar, Kamrup, Barpeta, and Karimganj (≥6.25)
Bottom Five Districts	N. C. Hills, Karbi Anglong, Dhemaji, Bongaigaon and Kokrajhar (≤2.95)	N. C. Hills, Karbi Anglong, Kokrajhar, Dhemaji, and Hailakandi (≤3.08)	N. C. Hills, Karbi Anglong, Tinisukia, Dhemaji and Bongaigaon (≤2.46)	N. C. Hills, Karbi Anglong, Kokrajhar, Dhemaji and Bongaigaon (≤2.58)

Source: Directorate of Economics and Statistics, *Statistical Handbook,* various issues, Government of Assam, Guwahati.
Note: Figures in the parentheses represents minimum or maximum percentage to total production of fish in Assam.

5.3. DISTRICTWISE VARIATION IN CONTRIBUTION OF SEED FISH TO TOTAL STATE PRODUCTION:

As like fish production, a wide variation in the production of seed fish across the districts of Assam during the period 1995-96 to 2015-16 had been found. Districtwise variation in the percentage contribution to total fish production of the state and the growth rate of the seed fish production has been presented in table 5.3. It is observed from table 5.3. that in the year 1995-96, the contribution of Nagaon district alone was 50 percent of the state total seed fish production. It is followed by Karimganj with contribution of 21.04 percent and Barpeta with contribution of 12.45 percent. On the contrary, the least contributed district to state total were Sibasagar with nil followed by Dima Hasao with 0.2 percent and Kamrup with 0.6 percent. However, in the year 2002-03, Nagaon district came to second position with a fall in the contribution of 22.80 percent to state total and Barpeta came to 1st position with the increase in the contribution to 38.33 percent to state total. Though the contribution of Karimganj district decreased to 12.84 percent; yet position remains at 3rd as before. In 2009-10, there is a fall of share of Barpeta district to state total from 38.33 percent to 30.54 percent but still remains at top position followed by Nagaon and Karimganj district with 25.88 and 12.82 percent. In the year 2015-16, Nagaon district recaptured its glorious top position which may be attributed to its fast and steady growth over the years. The top Nagaon district was followed by Karimganj district with the increase in contribution to 29.89 percent and Barpeta with decreased contribution of 16.32 percent. Among the least contributors, Dima Hasao and Kokrajhar to state total seed fish production were nil over the years. Contribution of production of seed fish is not easy in these two districts, being hilly. Kokrajhar district is a Bodo tribal dominated district and tribal people are not interested in pursuing fish culture. As a result, production is almost nil as shown in diagram 5.2.

Table-5.3: District-wise Variation in Contribution of Seed Fish to Total State Production during 1995-96 to 2015-16								
1	2	3	4	5	6	7	8	9
	Percentage to State Total					Growth Rate of Production (%)		
District	1995-1996	2002-2003	2009-2010	2015-2016	1995-96 to 2002-03	2002-03 to 2009-10	2009-10 to 2015-16	1995-96 to 2015-16
Dhubri	1.19	0.24	0.431	0.146	-80.06	80.76	-66.05	-87.76
Kokrajhar	0.13	0.00	2.150	1.180	-100.00	0.00	-45.12	776.22
Bongaigaon	0.46	0.00	0.239	0.290	-100.00	0.00	21.50	-36.88
Goalpara	0.11	3.00	0.459	2.279	2626.67	-84.68	396.39	1973.35
Barpeta	12.45	38.33	30.54	16.32	207.94	-20.33	-46.56	31.11
Nalbari	5.93	8.34	3.307	0.233	40.77	-60.37	-92.94	-96.06
Kamrup	0.2	0.052	1.909	1.625	-74.51	3605.12	-14.90	703.63
Darrang	0.31	0.13	1.350	0.166	-59.13	978.76	-87.74	-45.93
Sonitpur	0.74	1.98	0.616	0.847	165.55	-68.85	37.57	13.80
Lakhimpur	1.97	1.69	1.718	0.765	-14.11	1.58	-55.47	-61.15
Dhemaji	0.15	1.48	0.238	0.160	897.83	-83.96	-32.53	8.01
Marigoan	1.2	5.53	0.571	2.599	359.47	-89.67	355.05	115.91
Nagaon	49.37	22.80	25.88	33.873	-53.83	13.52	30.86	-31.41
Golaghat	0.47	0.60	0.646	0.537	28.55	7.37	-16.90	14.70
Jorhat	0.17	0.19	0.448	0.173	16.48	132.15	-61.32	4.61
Sibsagar	0.6	0.19	0.403	0.542	-67.48	107.50	34.56	-9.21
Dibrugarh	0.44	0.33	0.072	0.446	-24.79	-78.22	517.50	1.16
Tinsukia	0.34	0.40	0.352	0.361	19.79	-13.11	2.63	6.82
Karbi Anglong	0.05	1.52	2.495	0.013	33.94	63.66	-99.47	-98.84
Dima Hasao	0	0.00	0.000	0.000	-25.59	-100.00	0.00	-100.00
Karimgang	21.04	12.84	12.82	29.89	-38.99	-0.16	133.14	42.02
Hailakandi	1.34	1.05	7.045	4.209	-21.81	572.35	-40.26	214.07
Cachar	1.32	0.79	1.777	0.616	-40.19	124.70	-65.31	-53.38
Assam	100	100	100	100	-25.34	74.88	70.72	122.90
Coeff. of Variation	249.27	206.63	195.98	221.59	359.97	350.93	469.56	321.32
Correlation	R_{23} = 0.68; R_{34} = 0.95; R_{45} = 0.84; R_{25}= 0.93				R_{67} =---0.153, R_{78} = --0.165, R_{89} = 0.417, $R_{96,=}$ 0.786			

Source: Directorate of Economics and Statistics, *Statistical Handbook,* various issues, Government of Assam, Guwahati. **Note:** See Appendix-5.2.

During 1995-96 to 2015-16, overall growth in percentage contribution to total state fish production was the highest in Goalpara with 1973.35 percent followed by Kokrajhar with 776.22 percent and Kamrup with 703.63 percent. In respect of growth rate, Goalpara district ranked top among all the districts. However, its contribution to total state fish production was even lower than 3

percent throughout the years. This highest growth rate is because of the start from a very low level to a reasonably high level. On the other hand, Dima Hasao, Karbi Anglong and Nalbari had the lowest overall growth in percentage contribution to total state fish production during the same period with -100 percent, -98.84 percent and -96.06 percent respectively. It may mainly be due to geographical location and tribal domination as stated earlier.

Table 5.3 also reveals that correlations between district wise percentage contributions to total state production of seed fish of various years are significantly positive. It is an indication that formerly advanced districts in terms of contribution to total state production remain in advantageous position in the later years and vice-versa. Besides, the gap between advanced and poor districts is going to increase.

Diagram-5.2
District-wise Variation in Contribution of Seed Fish to Total State Production during 1995-96 to 2015-16

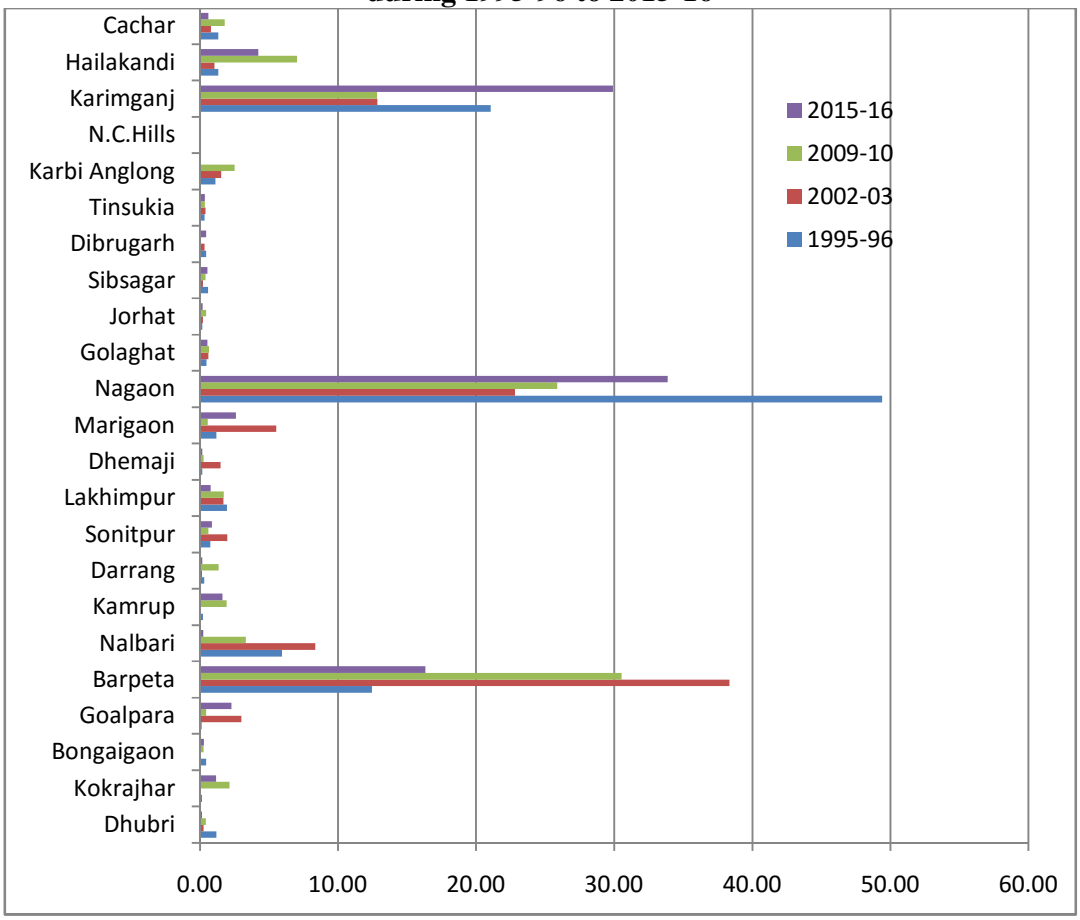


Table-5.4: Changes in percentage of Top Three and Bottom Three districts in the Ranking of Production of Total Seed Fish of Assam during 1995-96 to 2015-16				
	1995-96	2002-2003	2009-2010	2015-2016
Top Three Districts	Nagaon, Karimganj, and Barpeta (≥12.45)	Barpeta, Nagaon and Karimganj (≥12.84)	Barpeta, Nagaon and Karimganj (≥12.82)	Nagaon, Karimganj, and Barpeta (≥16.32)
Bottom Three Districts	Dima Hasao, Goalpara and Kokrajhar (≤0.13)	Dima Hasao, Kokrajhar, and Bongaigaon(≤00)	Dima Hasao, Dibrugarh and Dhemaji (≤0.238)	Dima Hasao, Karbi Anglong and Dhubri (≤0.146)

Source: Directorate of Economics and Statistics, *Statistical Handbook,* various issues, Government of Assam, Guwahati.
Note: Figures in the parentheses represents minimum or maximum percentage to total production of seed fish in Assam.

5.4. REASONS BEHIND INTER-DISTRICT VARIATION IN PRODUCTION OF FISH IN ASSAM:

Reasons behind the inter-district variation in production of fish in Assam is examined by running an OLS regression of the form $Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \beta_5 X_{5i} + \beta_6 X_{6i} + \beta_7 X_{7i} + \beta_8 X_{8i} + \beta_9 X_{9i} + U_i$. Here, X_{2i}, X_{3i}, X_{4i}, X_{5i} , X_{6i} , X_{7i} , X_{8i} , and X_{9i} are number of hatchery for the production of fish seed, population density, number of registered bill fisheries, number of registered river fisheries, proportion of rural population, rural literacy, proportion of Muslim population, per capita net district domestic product (NDDP) and annual average rainfall of i^{th} district respectively in 2011. Y_i is per capita production of fish in the i^{th} district during 2011-12. U_i is the random disturbance term having usual classical linear regression properties. Here, all the variables are expressed in logarithmic term and thus each coefficient represents the elasticity of the respective variables.

The result displayed in table 5.5 reflects that population density, registered river fishery, percentage of rural population have significant positive impact on fish production in Assam. Fish culture is a highly labour intensive economic activity which is mostly carried on in rural areas. Therefore, high population density and high percentage of rural population imply more people are getting the chance to engage in lucrative fish culture and hence more production. The common experience is that growth of fish is much higher in river than in closed water like pond. Moreover, consumer has a preference over river fish to pond fish and even

pays higher prices for it's taste. So, the conclusion may be derived that registered river fishery has a positive impact on fish production. On the other hand, per capita NDDP, proportion of Muslim to total population as well as registered *beel* fishery have significant negative impact on production of fish. Fish culture is a laborious and risky job because of its high dependence on nature. This is the reason why high income group people are not interested in this venture.

Table-5.5: Results of Regression of per capita Fish Production on Various Explanatory Variables

Variables	Coefficient	Std. Error	T Statistic	Significance
Constant	-16.771	7.123	-2.355	.036
Population Density	1.247	.192	6.485	.000
Registered *Beel* Fishery	-.232	.128	-1.812	.095
Registered River Fishery	.210	.067	3.149	.008
Percentage of Rural Population	1.705	.929	1.836	.091
Rural Literacy Rate	3.002	.905	3.316	.006
Proportional of Muslim Population to total Population	-.104	.096	-1.084	.300
Per Capita NDDP	-.884	.282	-3.133	.009
$R^2 = 0.941$, $Rbar^2 = 0.901$, F = 23.833 (Significant at one per cent level)				

Table-5.6: Results of Regression of Seed Fish Production on Various Explanatory Variables

Variables	Coefficient	Std. Error	T Statistic	Significance
Constant	-51.697	21.775	-2.374	.032
Number of Hatchery	.725	.256	2.833	.013
Registered *Beel* Fishery	.419	.417	1.006	.332
Registered River Fishery	.575	.246	2.343	.034
Percentage of Rural Population	8.103	2.604	3.112	.008
Rural Literacy Rate	3.518	3.220	1.092	.293
Proportional of Muslim Population to total Population	.384	.299	1.283	.220
$R^2 = 0.866$, $Rbar^2 = 0.809$, F = 15.115 (Significant at one per cent level)				

5.5. CONCLUSION:

Now, it can be concluded that fish culture is not uniformly practiced in different districts of Assam. If we consider in terms of percentage contribution to total state

production of fish, Nagaon, Cachar and Barpeta are the 3 top fish producing districts of Assam while, Diam Hasao and Karbi Anglong are the bottom 2 districts during 1995-96 to 2007-08. Besides, the gap between contribution of top 5 and bottom 5 districts to total fish production of the state has increased during the period. This disparity may be attributed to population density, registered river fishery and percentage of rural population. There is wide disparity in seed fish production also among the districts. Barpeta, Nagaon, Karimganj are the top seed fish producing districts of Assam while Dima Hasao, Karbi Anglong, Hailakandi and Kokrajhar are the least seed fish producing districts. The inequality arises due to various factors like number of hatchery, registered river fishery, percentage of rural population and proportion of Muslim population.

References:

Government of Assam, Directorate of Economics and Statistics, *Statistical Handbook*, various issues.

Appendix-5.1 District wise Production of Fish in Assam during 1995-96 to 2015-16

District	1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05
Dhubri	11605.3	9978.84	10088.8	10667.88	9429	8515	7475	10802	11580	10986
Kokrajhar	4576.85	4049.5	4150.3	4117.18	4561	1266	2401	2541	3150	3148
Bongaigaon	3900.1	5050	5243	5808.9	5775	5215	5237	5281	5762	5794
Goalpara	5776.05	5812.2	5873.83	5635.25	5906	5512	5547	5591	5840	4735
Barpeta	9528	9760	9956.95	10448	9984	10095	10122	10615	12533	13285
Nalbari	8501.15	8650	8766.1	9105.2	9022	9105	8101	8440	8850	8850
Kamrup	7983.3	9960	9985	9644	10275	10432	10413	10416	10770	12147
Darrang	8037.03	6727.75	6089.1	6189.32	6123	6854	7012	10156	10520	8582
Sonitpur	6225.04	5809.17	5802.51	5776.84	5836	5499	5535	7500	8100	7282
Lakhimpur	6114.37	6098	5732	6086.42	7174	9676	17361	8415	9120	9808
Dhemaji	3486.89	3673.2	3857.7	4905.45	4658	5071	4082	4108	4460	3626
Marigoan	6874.44	6846	6892.5	6945	7099	7195	7195	7691	7969	8066
Nagaon	12838	12935	13065.2	12986.18	13305	14322	14346	14388	15570	16776
Golaghat	4726.19	4172	4178.55	4765.6	4720	4352	5092	5120	5970	6029
Jorhat	6653.09	6427.82	6488.32	7159.67	7572	6738	6753	6785	7894	8051
Sibsagar	5318.66	5455	5570.1	5608.03	5581	5510	5530	5697	6450	6656
Dibrugarh	8177.02	7837	7870	7458.65	7364	7403	7468	7452	8809	8339
Tinsukia	5379.51	7321	7775.12	7824.8	7815	7517	5304	5316	7518	7570
Karbi Anglong	3110.03	2808	2245.2	2280.03	8259	2267	832	2500	1180	3200
Dima Hasao	1120.78	720.78	755.4	798.12	5464	796	70	501	540	516
Karimgang	10076.5	9457.54	9470.97	6320.65	10817	8776	9093	9158	9510	9421
Hailakandi	5455.83	5303.56	5485.88	5342.91	2253	5520	4982	5101	5730	6196
Cachar	9601	9765	9790.3	9837.2	776	10985	11499	11947	13120	17251
Assam	**155065**	**154611**	**155133**	**155714.3**	**159768**	**158621**	**161450**	**165521**	**180945**	**186314**

Source: Directorate of Economics and Statistics, *Statistical Handbook,* various issues, Government of Assam, Guwahati.

Appendix-5.1

District wise Production of Fish in Assam during 1995-96 to 2015-16

District	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Dhubri	9326	13360	12592	13718	13718	14680	16598	13350	13600	15630	15760
Kokrajhar	3718	1927	5196	5112	6252	6440	3193	3761	3911	4100	4320
Bongaigaon	4229	4270	4915	5077	5380	5600	5800	6070	7147	7210	7590
Goalpara	4229	4555	4588	5347	6103	6520	7334	7650	7880	7960	8380
Barpeta	13677	11830	12405	13296	13791	14750	15635	16416	16550	18730	19730
Nalbari	8890	9358	9080	7850	7900	8380	9026	10200	10800	11340	11940
Kamrup	11775	12174	10940	13109	16678	18295	19392	19729	20350	22150	22630
Darrang	7460	5042	5550	6375	6862	7120	7547	11273	12000	10050	10485
Sonitpur	7311	6130	7250	7326	7565	7800	7002	7205	7984	8160	8595
Lakhimpur	13329	11787	10672	10672	11462	12000	12140	12315	12350	12850	13330
Dhemaji	3523	3402	3364	3769	4009	4830	5096	5100	5260	5510	5800
Marigoan	7525	7981	9376	9882	9882	10370	10990	11250	13650	13950	14290
Nagaon	17502	17048	18757	18650	22599	22671	24262	26184	27030	29896	31485
Golaghat	5085	5971	6445	7243	7296	7940	8578	8750	9300	8603	8860
Jorhat	7920	8551	9462	10469	11384	12468	13010	13200	13170	13720	14245
Sibsagar	6865	6945	7686	7612	8470	9950	9610	9800	10190	11260	11850
Dibrugarh	8698	8840	8865	10089	6726	7130	7560	7860	9175	10660	11227
Tinsukia	7585	4536	2265	2747	3100	3500	6607	6689	7100	7289	7675
Karbi Anglong	3210	1037	1050	1150	2154	2160	2200	2260	2280	2290	2310
Dima Hasao	181	228	235	250	260	270	280	750	760	790	830
Karimgang	9916	11012	13165	12841	14146	15150	14304	17710	17074	17750	18393
Hailakandi	7089	7556	9512	6874	8336	9175	9358	10053	10317	10680	10848
Cachar	18335	17939	16950	18062	16081	16970	18150	18920	20350	22050	23023
Assam	**187378**	**181479**	**190320**	**206700**	**218824**	**232339**	**243869**	**254270**	**266700**	**282700**	**294200**

Source: Directorate of Economics and Statistics, *Statistical Handbook,* various issues, Government of Assam, Guwahati.

Appendix-5.2 District wise Production of Seed Fish in Assam during 1995-96 to 2015-16

District	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Dhubri	30.43	30	4.68	11.85	6.41	20.76	83.95	4.53	7.85	17.9	3.6
Kokrajhar	3.43	4	0	0	0	0	0	0	0	0.04	0
Bongaigaon	11.72	10	15.51	1.9	26.72	0	3	0	6.61	18.22	7.53
Goalpara	2.8	3	2.9	4.48	4.24	3.12	24.55	57	9.17	1.11	17.49
Barpeta	317.12	233.5	198.67	172.29	270.81	237.71	283.87	729.07	531	705.43	764.5
Nalbari	151	150	153.09	146.61	190.5	159.8	187.08	158.7	207.1	211	244.19
Kamrup	5.15	5.5	0.29	0.5	1.5	0.69	8.26	0.98	0.42	1.06	32.24
Darrang	7.8	25	6.93	2.71	15.41	16.66	5.26	2.38	4.54	9.92	6.76
Sonitpur	18.97	14	20.23	48.62	69.05	22.86	70.73	37.61	40.82	26.88	39.81
Lakhimpur	50.17	50	70.47	87.1	33.18	46.57	131.12	32.17	72.65	38.4	50.27
Dhemaji	3.78	4	0.97	10	3.15	0	4	28.16	0	2.6	0.02
Marigaon	30.67	30	6.08	19.76	41.46	30.32	97.95	105.21	81	80.9	169.56
Nagaon	1258.06	1404	1452.85	645.58	609.47	530.92	332.98	433.69	659.93	856.8	1207.26
Golaghat	11.93	10	8.2	9.19	11.47	10.49	10.24	11.45	11.4	12.4	12.24
Jorhat	4.22	5	16.2	9.78	10.92	6.49	16.4	3.67	19.89	11.05	6.04
Sibsagar	15.2	12	18.35	9.56	16.92	10.27	16.76	3.69	3.56	13.64	2.92
Dibrugarh	11.22	7	17.71	4.2	4.82	7.33	3.6	6.3	5.1	5.59	5.1
Tinsukia	8.61	10	8.54	8.1	8.4	8.65	8.8	7.7	10.75	0	9.72
Karbi Anglong	1.2	0.75	1.77	1.15	0.87	0	0	0.43	0	1.2	0
N.C.Hills	0.09	0.25	0.09	0	0.12	0.09	0.05	0.05	0	0.08	0.15
Karimganj	536.15	430	163.25	424.11	704.66	308.61	449	244.22	406.92	659.29	508.1
Hailakandi	34.14	32	67.67	55.07	54.69	64.33	27.75	19.93	133.63	29.05	76.7
Cachar	33.68	30	11.12	31.5	29.37	0.01	36.2	15.04	16	38.91	40.2
Assam	**2547.54**	**2500**	**2245.57**	**1703.06**	**2114.14**	**1485.68**	**1801.55**	**1901.98**	**2228.34**	**2741.47**	**3204.4**

Source: Directorate of Economics and Statistics, *Statistical Handbook,* various issues, Government of Assam, Guwahati.

Appendix-5.2 District wise Production of Seed Fish in Assam during 1995-96 to 2015-16

District	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Dhubri	0.2	5.3	20.3	14.32	5	50	14	14.69	9.51	8.3
Kokrajhar	0	0	32.5	71.5	4	60	66	66.35	45.7	66.99
Bongaigaon	7.85	11.3	7.9	7.95	8	8	13	14.18	18.5	16.49
Goalpara	4.83	10.2	22.8	15.27	31	20	27	15.02	117.5	129.4
Barpeta	495.37	987.71	881	1015.8	1362	1723	1833	1833.9	2328.33	926.73
Nalbari	2.14	11.39	216.6	110	35	46	7	26.8	8.6	13.25
Kamrup	0.4	10.97	47	63.5	40	15	2	2.41	127.65	92.25
Darrang	7.68	27.18	11.3	44.9	7	1	66	70.35	24.07	9.4
Sonitpur	41.05	26.99	19.2	20.49	10	9	48	43.17	19.48	48.12
Lakhimpur	44.56	39.12	7.7	57.15	25	20	22	28.74	29.9	43.45
Dhemaji	2.27	2.36	12	7.9	5	7	8	13.7	17	9.1
Marigaon	181.28	196.45	187	19	2	46	37	120.3	63.77	147.6
Nagaon	748.36	952.53	1315.6	861	1226	1002	601	1076.98	1174.5	1923.46
Golaghat	15.31	22.26	9.8	21.5	28	28	30	29	30.05	30.5
Jorhat	3.57	19.45	8.4	14.9	31	11	11	36.64	8.16	9.84
Sibsagar	0.73	0.22	98.7	13.39	49	44	6	14.19	29.81	30.76
Dibrugarh	3.82	6.5	7	2.4	5	19	19	52.41	22.7	25.3
Tinsukia	7.65	8.8	7	11.7	15	23	20	17.26	15.75	20.5
Karbi Anglong	0	0	0	0.47	0	0	0	0	0	0
N.C.Hills	0.19	0	0	0	0	0	0	0	o	0
Karimganj	453.35	832.63	121.5	426.43	782	1021	716	820	90	1697.2
Hailakandi	0	0	182	234.34	531	144	480	21.8	212.92	239
Cachar	42	35	47.5	59.1	59	69	101	83	10	35
Assam	**2062.61**	**3206.36**	**3429.3**	**3326.22**	**4264**	**4490**	**4364**	**4555.72**	**4585.07**	**5678.39**

Source: Directorate of Economics and Statistics, *Statistical Handbook,* various issues, Government of Assam, Guwahati.

Appendix-5.3 District wise Economic Indicators of Assam

District	Area under Fisheries 2014-15	Rural Literacy rate 2011	Rural population 2011	Muslim population 2011	Average Actual Rainfall 2011	Density of Pop 2011	NDDP Per capita	No. of Eco Hatcheries 2011-12
Dhubri	18113	55.25	89.55	79.67	149.51	896		10
Kokrajhar	3052	63.63	93.81	28.44	222.88	269		1
Bongaigaon	7003	66.42	85.14	50.22	148.17	676		1
Goalpara	9081	65.93	86.31	57.52	135.92	553		3
Barpeta	16423	61.47	91.30	70.74	166.76	742		11
Nalbari	8588	77.22	89.28	35.96	124.71	733		9
Kamrup	4950	74.21	90.62	39.66	119.08	489		6
Darrang	12372	61.50	94.02	64.34	5.51	586		14
Sonitpur	9476	64.98	90.96	18.22	141.89	370		4
Lakhimpur	13370	76.22	91.24	18.57	230.46	458		11
Dhemaji	6648	71.81	92.96	1.96	11.26	212		7
Marigaon	12541	66.60	92.34	52.56	104.19	617		7
Nagaon	40215	69.96	86.91	55.36	93.87	711		109
Golaghat	5857	75.94	90.84	8.46	128.76	305		3
Jorhat	14907	80.01	79.81	5.01	148.06	383		7
Sibsagar	12279	79.27	90.44	8.30	113	431		4
Dibrugarh	6424	72.75	81.62	4.86	222.34	392		6
Tinsukia	5121	65.05	80.06	3.64	148.08	350		3
Karbi Anglong	1823	66.69	88.19	2.12	70.35	92		00
N.C.Hills	1839	71.13	70.81	2.04	81.37	44		00
Karimganj	38554	76.66	91.07	56.36	157.1	679		13
Hailakandi	10241	72.73	92.70	60.31	102.34	497		1
Cachar	19816	77.08	81.83	37.71	191.58	459		6
Assam		**69.34**	**85.90**	**34.22**		**398**		**243**