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Resource use pattern, institutional arrangements and socio-economic analysis of fish farming in Manipur, India

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Abstract
North East (NE) India produced 0.34 million metric tonnes (mmt) of fish from the total inland water bodies of 0.56 million hectares during 2012-13 registering a productivity of about 600 kg/ha. To bridge the supply demand gap, NE India depends on 90,000 tonnes of fish brought in from other states of India. This study examines the resources, resource use pattern and, socio-economic conditions of fish farmers in Manipur. It also examines the institutional and credit arrangement for fisheries in NE India; potential linked credit plans, projection for fisheries sector as well as refinance disbursement in the fisheries sector in NE Indian states in general and Manipur in particular. Fish production in NE Indian states ranged from 0.24 mmt in 2005 and increased to 0.36 mmt in 2013. Socio-economic analysis of fish farmers of Manipur revealed that aquaculture of Indian major carps (IMC) was an engaging economic activity among the stake holders sampled. Fish farmers identified IMC aquaculture as a safe and sustainable means of livelihood.

Keywords: Compound growth rate, Kruskal-Wallis test, Socio-economic characteristics, Institutional Arrangements, Manipur, India

Introduction
Aquaculture is the fastest growing food producing sector in the world with an annual growth of around 7 percent. India is the second largest producer of fish both in total and from aquaculture in the world contributing to 5.43% of global fish production. The total fish production in India during 2014-15 is at 9.58 mmt while the contribution of North east states was only 0.377 mmt at the same period. Fisheries sector occupies a very important place in the socio-economic development of the state, Manipur. Fish is not only an important source of protein in Manipur but it serves an important part in the local cuisine in any social functions and ceremony. Fish production in the state for the year 2013-14 was estimated at about 28,540 tonnes (Department of Fisheries, DoF, Manipur, 2014-15). Among this, the aquaculture fish production contributes about 92 percent of the total fish production of the state. Though vast resources are available to boost the inland fish production of the Manipur, one or more constraint exists as a hurdle in attaining it. One of the most vital and limiting factor is the credit available for the fish farmers. The large farmers may not find it difficult to get the required credit to finance their operations, whereas the small and the medium scale farmers may have to face a lot of difficulties in availing credit (Hamlish 1979) [9]. As financing institutions, several banks (commercial and rural) are engaged in investing or lending money for development oriented, but commercially viable aquaculture projects which form part of the agriculture sector (Gosh 2008) [6]. Therefore, taking into consideration the importance of the fisheries in the state and its role in the socioeconomic and cultural life of the fishers, this study analysed the resource use pattern, institutional arrangement for financing fisheries and socio-economic profile of the fish farmers in Manipur.

Data and Methodology
In order to study the status of resource used pattern, socio-economic and institutional arrangement, primary data was collected from 150 farmers out of which, 50 fish farmers were marginal, small, and medium & large respectively.

The statistical tools followed for the study were compound growth rate, percentage analysis and Kruskal Wallis test.

Compound growth rate

Compound growth may be contrasted with simple growth rates, where the rate is not added to the principal (there is no compounding). Compound growth is used in estimation of growth rates related to production with respect to time and simple growth is used infrequently. Compounding essentially implies the frequency with which the growth is compounded and the periodic rate which is used for estimation. Exponential growth occurs when the growth rate of the value of a function is more than in proportion to the function's current value. Economic growth is thus expressed in percentage terms (Thomson 2005). The parametric approach to growth rate analysis assumes multiplicative error-term. In simple linear regression, by denoting Y_t the observation of fish production at time t and r as the compound growth rate, the model employed for estimating r is based on Eq. (1): (Katiha 1994; Gujarati 2003; Prajneshu and Chandran 2005) [10, 7, 14].

$$Y_t = ab^t \quad \text{eq. (1)}$$

The model is linearized by means of logarithmic transformation, as shown in giving Eq. (2):

$$LnY_t = A + Bt + \varepsilon \quad \text{eq. (2)}$$

Where

Y_t ..... fish production at time t

A ….. Ln(a) …intercept

B ….. Ln(b) or Ln(1+r) rate of change with change in time

T ….. time period (in years)

ε ….. error term

Eq. (2) is then fitted to data using "method of least squares" and finally, the compound growth rate (r) is estimated by Eq. (3)

$$r = [\text{antilog}(B) - 1] * 100 \quad \text{eq. (3)}$$

Kruskal-Wallis test

The Kruskal-Wallis test is a non-parametric test equivalent to the one-way ANOVA, and is attempted to compare more than two independent groups of constraints (Kruskal, 1953; McKight and Najab (2010) [11, 13]. Here three or more sets of scores are compared that come from different groups and following formula is used (Gupta 1989),

$$H = \frac{12}{N(N+1)}\left(\frac{R_1^2}{n_1} + \frac{R_2^2}{n_2} + \cdots + \frac{R_k^2}{n_k}\right) - 3(n+1)$$

where,

$$N = n_1 + n_2 + \cdots + n_k$$

$n_1, n_2, ….., n_k$ are the numbers in each of k samples,

$R_1, R_2, ….., R_k$ are the rank sums of each sample.

Results and Discussion

The total fisheries resources in Manipur occupy 56,461 ha water spread (Table 1). It can be seen that rivers and streams followed by lakes and reservoirs and marshy and swampy lands, beels occupy the maximum area in the order of magnitude. The other resources are biomass followed by low lying paddy fields, submerged cropped land and waterlogged areas.

Table 2 gives the district wise fisheries resources in Manipur. The total fisheries resources in terms of water spread area of the valley districts extend to 44,000 ha. Both Bishnupur as well as Imphal West enjoy resources, extending more than 14,000 ha respectively, while Thoubal enjoys 12,000 ha of water spread fisheries resources, Imphal East has the least amount of resources extending to less than 3,000 ha. Therefore, factor endowments in terms of fisheries, water spread area are inequitably distributed among the valley districts of Manipur.

The hill districts enjoy a little over 12,000 ha of the fisheries, water spread area in the hill districts of Manipur. Table 2 indicates that fisheries, water resources among the hill districts of Manipur are more or less evenly spread. It ranged from a water spread area of 2,000 ha in Ukhrul to 2,900 ha in Churanchandpur. Therefore, it can be seen that resources are more evenly distributed in hill districts and less so in valley districts.

However the total water spread area of fisheries resources in Manipur extends to about 56,500 ha. The abundance of lakes in the valley districts is obvious from the fact that more than 23,000 ha of the lakes and beels of a total of 24,500 ha of the same resources lies in the valley districts. It can also be seen that lakes and beels constitute almost 50% of the total fisheries resources of Manipur followed by rivers and streams, ponds and tanks, paddy fields and reservoirs.

Socio-economic profile of fish farmers of Manipur

It may be seen from table 3 that aquaculture of IMC is a primary occupation in the middle aged. Forty six percent of marginal, 48% of small and 38% medium & large farms were owned and operated by middle aged farmers belonging to the age group of 41-50. Twenty six percent marginal, 14% small and 18% medium & large farms were owned and operated by fish farmers in the age group of 51-60. It may be also be noted 22% of the small farms and 36% of the medium & large farms belonged to farmers above 60 years of age. Therefore the importance and scope of aquaculture were realized by the middle aged fish farmers and those farmers who had the financial strength as well as experience in this activity.

Education has an important influence on the type of enterprise one chooses to engage in. The sampled fish farmers were all educated except a very minor portion among them (Table 3). Forty percent of the marginal farmers, 60% of the small farmers as well as 36% of the medium & large farmers were high school educated. It is also interesting to note that 22% of the marginal, 20% of the small and 36% of the medium & large farmers were graduates. A small percentage of the sampled farmers also held higher degrees therefore in absolute terms, education had a positive influence on stake holders opting for aquaculture as their primary occupation.

Table 3 also shows the different kinds of occupation that the farmers were engaged in. This query was only asked to the respondent or the fish farmer in the family. It may mean that other members of the family may be engaged in other occupations. In absolute terms there are more number of fish farmers in medium & large farmer category (66%) followed by marginal farmers (46%) and small farmer category (36%). Therefore, 49% of the total respondents were engaged only in

fish farming. It may be noted that 46%, 36% and 66% of the marginal, small and medium & large farmers were engaged in only fish farming as their primary economic activity. A minor percentage of the sample farmers were engaged in fish farming with business, with government services and with other occupations. Therefore, it may be concluded with the reasonable amount of confidence that aquaculture of IMC was an engaging economic activity among the stake holders sampled (Singh 2014) [16].

Table 3 shows the pattern of ownership of fish farms among the sampled fish farmer in Bishnupur district of Manipur. Eighty percent of the total sampled farms were owner operated and only 20% were leased operated. Therefore, it can be safely surmised that the fish farmers saw IMC aquaculture as a safe and sustainable means of livelihood since they were putting their own lands under aquaculture operations.

There are always several sources of credit available to entrepreneurs. The sources of credit as well as the percentage of stake holders across different sizes of farms availing credit from various sources for aquaculture operation are shown in Table 3. It is very interesting to note that 94%, 92% and 90% of all fish farming operations were being conducted with owned capital. The other sources of credit like friends and relatives, money lenders and local sources and institutional finance were being hardly used. Ten percent of medium & large farmers were availing institutional finance for fish farming operation. This situation does not necessarily indicate a healthy financial environment among the sample farmers. So, farmers should be encouraged through extension education to cultivate more hectares of farmland and increase their innovation adoption rate in order to step up their farm profit. This will further influence their accessibility to and utilisation of micro-credit (Kuye 2008) [12]. Does it indicate that fish farming was a relatively risk free enterprise or does it mean that the stake holders were having some constraints in availing institutional credit or does it mean that institutional financial agencies have not been able to capture this opportunity of financing aquaculture in Manipur owing to specific constraints? Does the present farmers and artisans who the back of the rural population does not get adequate and timely loans from financial institutions and they have no collateral and equally they do not get supplies of raw materials of standard quality even at the market place as they come under the ditches of rich farmers and sellers in the urban areas (Adekanya 1986) [1]. It does appear that fish farming in Manipur is a low investment activity since even the marginal farmers were able to depend on their own funds for fish farming.

Table 3 gives the opinion of the stake holders in respect of the timeliness of institutional funds available for fish farming in Manipur. It can be seen that 46% of the respondent have opined that the biggest constraint on availing institutional credit was that it was not available on time. 56% of medium and large, 45% of marginal and 40% of small have expressed this opinion.

Thirty eight percent feel that institutional funds are available to fish farming in moderately sufficient amounts. But it is also felt according to 35% of the respondents that institutional funds are available in sufficient amounts. Only 46% of the respondents felt that the cost of institutional funds for fish farming in Manipur was reasonable.

The average fish production in Bishnupur district, Manipur was 1640.84 Kg/ha, which ranged from 1372.50 Kg per ha on medium & large farms to 2187.22 Kg per ha on small farms and 2599.30 Kg per ha on marginal farms (Table 3). Fish production is higher in case of marginal fish farms than in small and medium & large farms. Obviously the productivity of large farms is much lower compared to small and marginal farms. This may be due to the fact that large farms need to be managed better. It also appears that medium & large farms could be following extensive fish culture in the farms while the marginal and small farm practice fish farming at higher stocking densities resulting in higher productivity. The net returns (INR/ha) were higher in marginal than small and medium & large fish farms, this can be attributed to proper management and fully utilization of available resources.

Figure 1 shows the input used per ha by the fish farmer in a fish production cycle. The inputs used composite feed, other supplementary feed, inorganic fertilizer and lime are drawn on the primary axis while the used of mustard oil cake (MOC), rice bran and organic manure are shown on the secondary axis. The average use of MOC increased across marginal, small and medium & large fish farms. The average use of rice bran and inorganic fertilizer gradually increased across marginal, small and medium & large fish farms. Similarly, the used of composite feed and other supplementary feed seemed too negligible in the case of marginal and small fish farms.

It can be seen from the figure that only large farms use the composite feed as well as supplementary feeds. The use of organic manure appears to be low in case of small fish farms. Again the practice of liming appears to be minimal in the case of medium & large farms followed by small farms.

Table 4.1 and table 4.2 shows the relationship of the variables age, education, occupation and source of credit among the three groups of sampled fish farmers in Bishnupur district Manipur. It can be seen that there is no significant difference in the educational qualifications and source of credit between fish farmers' groups.

Similarly, it can be seen from Kruskal Wallis Test results that there is significant divergence in the age composition as well as an occupational pattern between fish farmers.

Therefore Kruskal Wallis Test helps us to establish that there is no significant difference in the source of credit being availed by the three groups of fish farmers.

It also implies that higher the mean rank in case of age implies higher the average age, i.e. average age is higher in case of medium & large fish farmers than small and marginal fish farmers.

Similarly, it can be seen that there is higher divergence of occupation from fish farming in case of small than marginal and medium & large fish farmers.

Fish Production in NE India

There is a great potential in the NE India in the fishery sector. Due to various reasons currently there is a low fish production in the NE India. The annual growth rate of fish production in NE India has registered a positive growth over the years, indicating a healthy trend (Baik *et al*. 2009) [4]. At present NE India sources around 90,000 tonnes of fish from outside the region.

Table 5 shows the details of fish production in NE India during 2004-05 to 2012-13. Assam registered the highest fish production among north east states, i.e. 254.27 thousand metric tonnes, followed by Tripura, Manipur, Nagaland, Meghalaya, Arunachal Pradesh, Mizoram, and Sikkim respectively.

The total current fish production in NE India is 0.36 million tonnes, while the Government of India aims to produce 0.7 million tonnes of fish in NE India by 2020 and also aims to double the per capita fish availability in NE India to 15 Kg.

In the year 2012-13 India recorded a total fish production of 9.08 million tonnes, while in NE India produced only 0.36 million tonnes during the same year. NE India is contributing only 3.95% of the total fish produced in India. Based on the fish produced in India and NE India for the period 2004-2013, the compound growth rate of fish production in India was 4.67% while that of NE India was 5.10%. It can also see from the table 4.3 that the annual growth rate of fish production in NE India has been registering positive growth over years indicating a healthy trend.

It can also be seen from the table 6 that, except for Meghalaya all the other states have recorded positive growth rate for the period 2006 – 2013. It can be seen that growth rate for the period was highest in Tripura at 14.08% followed by Sikkim at 12.62%. Despite being large states, the performance of Assam and Arunachal Pradesh left much to be desired. While Assam grew at 4.54% and Arunachal Pradesh at 3.31% for the same period of time, the performance of Nagaland and Manipur were 4.26% and 3.65% respectively. Mizoram grew at 0.25% and the performance of Meghalaya was marginally negative.

Current status of institutional and credit arrangements for fisheries in NE India

The total number of commercial banks in India was 93080 while for NE India was only 2479 which was only 2.7%**.** Assam has the highest number of commercial banks, i.e. 1558 among north eastern states followed by Tripura, Meghalaya, Mizoram, Nagaland, Arunachal Pradesh, Manipur, and Sikkim respectively. Manipur had only 84 commercial bank branches which engaged in regular banking operations and were not servicing the fisheries sector exclusively.

Agriculture is the backbone of states of NE India like the rest of the country. As a component of agriculture, fisheries have great scope in improving the performance of the agricultural sector in the years to come. But higher rate of default arising from poor management procedures, loan diversion and unwillingness to repay loans has been threatening the sustainability of most public agricultural credit schemes (Awoke 2004) [2].

In addition to this development, institutions like the National Fisheries Development Board (NFDB) and Marine Product Development Authority (MPDA) are playing a major role in developing fisheries in NE India. Similarly the Department of Fisheries (DoF) and responsible NGO's are also contributing in a large way to fisheries development in NE India.

Table 7 gives the state wise and sector wise potential linked credit plans, projection for the fisheries and the total agricultural credit under priority sector for 2011 to 2014. The credit plans for the priority sector has been positive for all the eight NE India states for the years 2011- 2014. Similarly the prediction in respect of both fisheries and agriculture is also positive in absolute terms.

In 2010-11 the potential linked credit plan for fisheries ranged from 0.22% to 11.47% of total agricultural credit in the eight states of NE India. This improved to a range of 0.36% to 12.02% in 2011-12. In 2013-14 the share of fisheries in total agricultural credit ranged only from 0.45% to 5.49%. This indicated the decline in the share of fisheries in total agricultural credit overtime.

It can be seen that the potential linked credit plan projection for 2010-11 was 5.48% for the NER of India against the total agricultural credit extended in the country. This was 5.01% in 2011-12 and only 3.52% in 2013-14. Therefore the proportion of projected credit to the fisheries sector does not appear to be encouraging.

The share of fisheries in total agricultural credit for Arunachal Pradesh was only 3.34%, 3.11% and 4.17% during the years 2011 – 2014. In case of Assam this share was 4.97%, 4.70% and only 3.21% respectively. It was 11.47%, 12.02% and 5.49% in the case of Manipur. While in the case of Meghalaya the percentage share of fisheries in total agricultural credit during 2011-14 was 3.36%, 2.13% and 2.28%. In the case of Mizoram it was 5.66%, 5.10% and 2.19% during the three years 2011-14. In case of Nagaland it was 4.16%, 3.45% and 2.67%. In case of Tripura the share of fisheries in total agricultural credit was 7.61% in 2010-11, 6.40% in 2011-12 which further declined to 5.32% in 2013-14. In case of Sikkim the allocations were quite marginal. It was lowest among all the states in NE India. The share of fisheries in agricultural credit in Sikkim during the year 2010-11 was only 0.22%; it was 0.36% in 2011-12 and was only 0.45% in 2013-14.It can be summarized that though, the total projection in absolute terms has been positive, but in relative terms to agricultural credit there is a lot of gaps to be filled.

Table 8 gives the state wise refinance distribution in fisheries during 2001 to 2012. At all India level the refinance disbursement to fisheries during 2001-12 ranged from INR 156 million to INR 315 million in the inland fisheries sector. As far as state wise refinance disbursement is concerned with NE Indian states the maximum amount of refinance disburse was INR 17.5 million. In 2006-07 only 7.55% of the total refinance capital disburses for inland fisheries were given to NER. The state wise refinance disbursed for inland fisheries in the NE Indian states appeared to be quite paltry. It can also be seen that of the total purpose wise refinance disbursed for the last 12 years by NABARD, the share of inland and marine fisheries has been pathetic. The share ranged from 0.1% to 0.5% for the inland fisheries sector and ranged from negligible to 0.1% as far as marine fisheries sector is concerned.

Table 1: Fishery resources in Manipur

Particular	Water area (Ha)
Lakes, reservoirs, tanks, canals etc.	13221.45
Waterlogged marshy and swampy land, beels	11536.23
Biomass	8596.5
Submerged cropped lands	3480.5
Rivers and streams	13888.27
Waterlogged area converted into agricultural land	1738.1
Low lying paddy fields	4000
Total	56461.05

Source: DoF, Manipur

Table 2: District wise fisheries resources in Manipur (water spread area in ha)

Name of district	Ponds/ Tanks	Lakes/ Beels	Rivers/ Streams	Paddy Fields	Reservoirs	Total
Valley Districts:						
Imphal West	2869	8125	2186	1125	216	14521
Imphal East	825	237	859	697	251	2869
Thoubal	2016	6728	1987	1168	268	12167
Bishnupur	2356	8016	2789	1286	0	14447
Total for valley districts	8066	23106	7821	4276	735	44004
Hill Districts:						
Chandel	869	362	806	494	0	2531
Churanchandpur	864	384	1289	256	100	2893
Senapati	532	186	1457	315	0	2490
Tamenglong	258	187	1608	268	125	2446
Ukhrul	853	208	907	129	0	2097
Total for hill districts	3376	1327	6067	1462	225	12457
Grand Total	11442	24433	13888	5738	960	56461

Source: DoF, Manipur

Table 3: Socio-economic profile of fish farmers in Manipur

		Marginal (%)	Small (%)	Medium and Large (%)	Total (%)
Age	≤ 30	0	2	0	1
	31-40	24	14	8	15
	41-50	46	48	38	44
	51-60	26	14	18	19
	Above 60	4	22	36	21
Qualification	Illiterate	12	10	6	9
	Middle school	24	8	16	16
	High School	40	60	36	45
	Graduate	22	20	36	26
	Higher degrees	2	2	6	3
Occupations	Only Fish farming	46	36	66	49
	Both FF and Agri	44	50	22	39
	FF along with business	2	2	2	2
	FF along with Govt. service	4	10	6	7
	FF along with others occupation	4	2	4	3
Ownership of FF	Owned	60	90	90	80
	Leased	40	10	10	20
Source of credit	Owned	94	92	90	92
	Friends/relatives	0	2	0	1
	Money lenders/local sources	6	6	0	4
	Institutional finance	0	0	10	3
Timely availability of fund	Timely available	10	20	13	14
	Moderately	45	40	31	39
	Delayed	45	40	56	46
Sufficiency of fund	Sufficient	40	35	25	35
	Moderate	35	35	44	38
	Insufficient	25	30	31	29
Cost of Fund	Reasonable	55	40	44	46
	Moderate	35	30	31	32
	Expensive	10	30	25	21
Economics	Production (Kg/Ha)	2599	2187	1373	1641
	Cost of production (INR/Ha)	194,287	174,148	106,792	127,707
	Net returns (INR/Ha)	229,633	186,842	122,308	144,483
	B:C ratio	2.18	2.07	2.15	2.13

Table 4.1: Test of significance for variables across size groups of fish farms (Ranks)

Ranks			
	Farmer Type	**N**	**Mean Rank**
Age	Marginal	50	62.62
	Small	50	73.26
	Medium & Large	50	90.62
	Total	150	
Occupation	Marginal	50	77.01
	Small	50	84.94
	Medium & Large	50	64.55
	Total	150	

Table 4.2: Test of significance for variables across size groups of fish farms

	Age	Qualification	Occupation	Source of credit
Chi-Square	11.779	5.375	6.811	.730
df	2	2	2	2
Asymp. Sig.	.003	.068	.033	.694

Table 5: Fish production in NE India (in '000' MT)

State	2005	2006	2007	2008	2009	2010	2011	2012	2013
Arunachal Pradesh	2.70	2.75	2.77	2.83	2.88	2.65	3.03	3.15	3.71
Assam	186.31	187.38	181.48	190.32	206.70	218.00	232.34	243.87	254.27
Manipur	17.80	18.22	18.60	18.65	18.80	19.20	20.22	22.22	24.99
Meghalaya	5.64	4.12	5.49	4.00	3.96	4.33	4.56	5.42	5.42
Mizoram	3.68	3.75	3.76	3.76	2.89	3.24	2.90	2.93	5.43
Nagaland	4.90	5.50	5.80	5.80	6.18	6.36	6.59	6.84	7.13
Sikkim	0.14	0.15	0.15	0.18	0.16	0.16	0.18	0.28	0.49
Tripura	19.84	23.87	28.63	36.25	36.00	42.28	49.23	53.34	57.46
NER	241.01	245.74	246.68	261.79	277.57	296.22	319.05	338.05	358.9

Source: www.dahd.nic.in/dahd

Table 6: Growth of fish production in NER and India (Percent)

Year	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	NER	India
2005-06	1.85	0.57	2.36	-26.95	1.90	12.24	7.14	20.31	1.96	4.23
2006-07	0.73	-3.15	2.09	33.25	0.27	5.45	0.00	19.94	0.38	4.52
2007-08	2.17	4.87	0.27	-27.14	0.00	0.00	20.00	26.62	6.13	3.76
2008-09	1.77	8.61	0.80	-1.00	-23.14	6.55	-11.11	-0.69	6.03	6.86
2009-10	-7.99	5.47	2.13	9.34	12.11	2.91	0.00	17.44	6.72	5.02
2010-11	18.87	6.58	5.31	5.31	-10.49	3.62	12.50	16.44	7.75	2.91
2011-12	4.76	4.96	9.89	4.61	1.03	3.79	55.56	8.35	5.76	5.28
2012-13	12.42	4.26	12.47	13.63	85.32	4.24	75.00	7.72	6.32	4.57
Compound Growth rate	3.41	4.54	3.65	-0.02	0.25	4.26	12.62	14.08	5.10	4.67

Data sources: www.dahd.nic.in/dahd

Table 7: State-wise Potential Linked Credit Plans Projections in NE India \ (2011-14) (INR in Millions)

Years / States	2010-11			2011-12			2013-14		
	Fisheries	Total Agriculture Credit	Total Priority Sector	Fisheries	Total Agriculture Credit	Total Priority Sector	Fisheries	Total Agriculture Credit	Total Priority Sector
Arunachal Pradesh	26(3.34)	777	1234	31(3.11)	996	1816	70(4.17)	1672	3146
Assam	654(4.97)	13158	32560	847(4.70)	18014	41780	1527(3.21)	47614	81427
Manipur	194(11.47)	1693	45479	243(12.02)	2022	4986	292(5.49)	5324	10839
Meghalaya	51(3.36)	1521	5285	45(2.13)	2141	6363	107(2.28)	4715	16849
Mizoram	37(5.66)	653	3067	36(5.10)	707	3601	42(2.91)	1443	5088
Nagaland	45(4.16)	1087	2620	53(3.45)	1546	3292	71(2.67)	2677	5834
Tripura	206(7.61)	2710	9224	240(6.40)	3752	12202	454(5.32)	8524	19681
Sikkim	1(0.22)	564	2331	3(0.36)	751	2961	5(0.45)	1034	3879
NER	1215(5.48)	22163	60869	1498(5.01)	29930	77002	2569(3.52)	73002	1467492

Source: Compiled from NABARD. Figures in parenthesis are percentage of fisheries to total agricultural credit

Table 8: State wise refinance disbursement in fisheries in NE India during 2001 - 2012 (INR in Millions)

States	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Tripura	Sikkim	NER	India		Total refinance disbursement propose wise
Years	IF	IF	IF	IF	IF	IF	IF	IF	IF	MF	IF	
2000-01	0	0.4	0	0	0.9	0.8	0	0.1	2.2	36.3(0.1)	306.2(0.5)	61581
2001-02	0	0.3	0	0.1	0	0.7	0.1	0.1	1.3	48.2(0.1)	315.3(0.5)	66829
2002-03	2	0	0.2	0	0	0.2	0.4	0.1	2.9	20.8	288.4(0.4)	74188
2003-04	0	2	0	0	0	0	0.1	0	2.1	2.3	175.2(0.2)	76053
2004-05	0	1	3.9	0.7	0.2	0	0	0	5.8	29.5	166.4(0.2)	85775
2005-06	0	1.2	0	0	0	0.2	5.3	0	6.7	14.3	203.4(0.2)	86224
2006-07	1.5	10	3.6	0	2.3	0	0	0	17.5	59.8(0.1)	231.9(0.3)	87950
2007-08	0	1.8	1.4	5.8	0	0	0	0	9	41.6	180.5(0.2)	90463
2008-09	0	6.1	0.2	0	0	0	0	0	6.3	28	192(0.2)	105353
2009-10	0	0.5	0	0	0	0.2	0	0	0.7	2.2	315.2(0.3)	120091
2010-11	0	7.5	0	0	0	0.1	0.9	0	8.5	3.2	156.3(0.1)	134859
2011-12	0	0	0	0	0	0	0.2	0	0.2	203.6(0.1)	567.6(0.4)	154217

Source: Compiled from NABARD. Figures in parenthesis are percentage share of disbursement

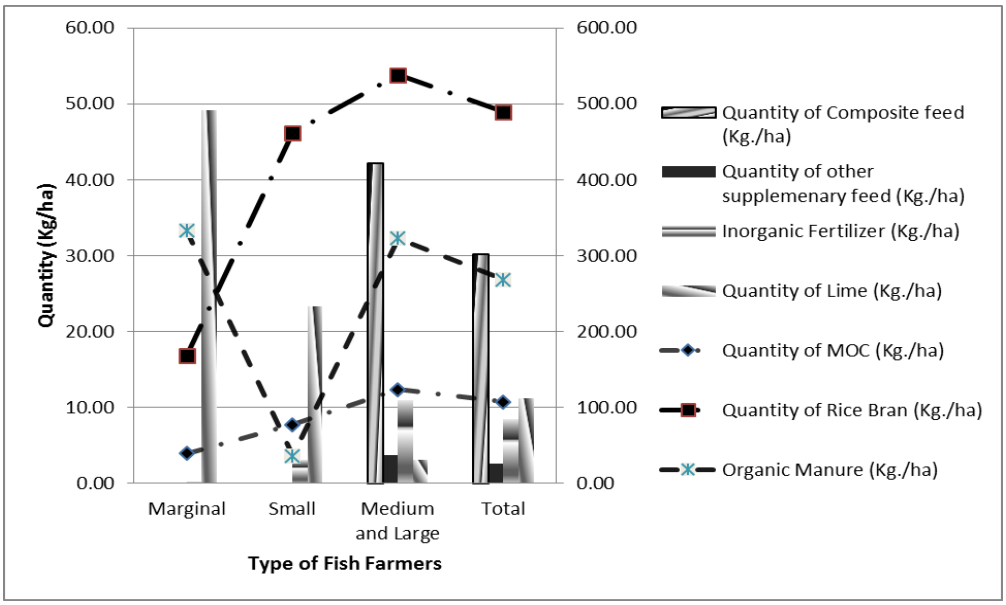

Fig 1: Input use pattern in fish farms at Bishnupur district, Manipur

Conclusion

Fisheries' despite being one of the promising sectors of agriculture and allied activities in Manipur, only a growth rate of 3.54 percent was achieved during 2012-13. But the Government of India aims to produce 0.7 million tonnes of fish in this area by 2020 and has also planned to double the per capita fish availability in NE India to 15 kg (Times of India, 2013). This may be due to the fact that Manipur was not utilizing the resources fully or they were practicing extensive fish culture in the farms or may be due to lack of financial support for fish farming. Also, every segment of agricultural production requires the availability of adequate capital since capital determines access to all other resources on which farmers depend (Ayoola and Oboh, 2000) [3]. The low level of production could not meet the demand for fish in the state. This calls for sourcing fish from other parts of the country to this state. Despite the fact that 92% of the fish farmers used own finance for fish farming operation in Manipur, the state does not show a healthy institutional financial environment. Owing to such reasons fish production in Manipur is low. In fact, the lack of adequate, accessible, and affordable credit is among the major factors responsible for the systemic decline in the contribution of agriculture (Rhaji 2000) [15]. But this can be improved by providing adequate financial assistance. The situation can be improved by proper institutional arrangement for financing fisheries with the National Fisheries Development Board (NFDB), National Bank for Agriculture and Rural Development (NABARD) and other Central and state fisheries departments taking a concerted effort.

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