Arunachal Pradesh:

Arunachal Pradesh, the largest of the Seven Sisters located in the North Eastern region of India (83,743 sq. km.) shares its borders with China and Myanmar in the north and east respectively, Bhutan in the east and Assam and Nagaland in the south. The state has a low temperature regime and very limited plains but ample scope for augmentation of fish production. In collaboration with the Defence Research Laboratory, Tezpur, Assam headed by the Director, Dr. M. P. Chacharkar and supported by the Directorate of Fisheries, Arunachal Pradesh and Arunachal Vikas Parishad, Itanagar, an NGO, a team of scientists and technical staff carrying a mobile chemical laboratory from the Regional Research Centre of CIFA, Kalyani visited remote areas of Arunachal Pradesh to conduct a thorough survey on productivity and assess production of fish in the existing water bodies. The results obtained were analysed and suitable management procedures were designed for maximisation of fish production from the available water area.

Composite fish culture demonstrations

● Pilot scale composite fish culture demonstrations using specific nutrient balance were conducted in 22 ponds covering 2 districts

●Fish production of CIFA demonstration over State FFDA production has increased from 800kg/ha/yr to 4000kg/ha/yr

2015-2016: Demonstration on broodstock development at Sonajuli and Midpu village, Papumpare Dist. - 2 units

Ornamental Fish:

- The package-of-practices/technology on 'Ornamental fish breeding and its culture' was disseminated to the unemployed youth, breeders and private entrepreneurs and students of North Eastern states of India at Silcher, Assam organised by Assam University and sponsored by MPEDA, Cochin during 24-25 January 2001. There were 30 participants (22 male and 8 females).Same type of programe was also conducted at Agartala, Meghalaya (Shilong) and Arunachal Pradesh (Doimukh).

Integrated Fish culture

Modified technology in nutrient rescheduling in pond soil sediment and water parameters in acidic north eastern Hilly States for Integrated Fish culture resulted increase in production in following States.

Arunachal Pradesh:

● Pilot scale experimentation on Pig-cum fish culture were conducted in 32 locations covering all 16 districts . Fish production achieved 3000 kg to 3500 kg/ha/yr in comparison to earlier average 800 kg/ha/yr

2015-2016:

Demonstration on integrated fish-crop-pig farming system at Sonajuli, Papumpare District- 1 unit.

Demonstration on broodstock development at Sonajuli and Midpu village, Papumpare Dist.- 2 units.

Seed Production of *L. bata* in FRP carp hatchery- 2lakh Nos.

Demonstrations

Year	**Place**	**Technology**	**No. of Ponds**	**Size (ha)**	**Production** (kg/ha/yr)
2000-01	Doimukh	Tara Akin Tara, Midpu Village, Doimukh, Dist.- Papumpare	1	0.4	3250
2000-01	Ziro	Widow wale fare society, Ziro, Dist.- Subanasiri	1	0.1	2500
2003-04	Papumpare	Composite fish culture	17	2.7	3700-4450
	L.Subansiri	Composite fish culture	5	0.8	2800-3825
2004-05	16 districts	Pig-cum- Fish culture	25	2.5	Fish:3000-3500 kg (lower belt) 4000-4500 kg /ha/yr(higher belt) Pig : 4000 kg to 4500 kg/yr from 3 pigs and produced piglets in each unit

- Demonstration of "Brood stock development of carps" was initiated in collaboration with the Department of Fisheries, Govt. of Arunachal Pradesh in the ponds of Mr. Tana Nikom Tara (at Sonajuli Village) and Mr. Tana Akin Tara (at Midpu Village, Doimukh) of Papumpare District during 6-8 October 2015. A total of 400 kg carp feed, 170 kg lime,

250 kg urea, 250 kg SSP and 200 kg mustard oil cake were distributed between these two farmers. Prospective brood fish of Indian major carps weighing 50 kg was released in both the ponds under demonstration.

- Demonstration programme on "Integrated fish-crop-pig farming system" was initiated in collaboration with the Department of Fisheries, Govt. of Arunachal Pradesh in a pond of Mr. Tana Nikom Tara covering water spread area of 0.2 ha at Sonajuli, Papumpare District during 6-8 October 2015. A total of 2500 IMC fingerlings were stocked in the pond and 200 kg carp feed, 6 piglets, 4 packets vegetable seed, 117 kg pig feed and 2 numbers vermin-compost unit were supplied to Mr. Nikom for the purpose.
- Demonstration on induced breeding of Bata (*Labeo bata)* was undertaken in the month of August 2016. In this demonstration 3.0 kg of female and 2.5 kg of male were taken for administering synthetic hormone (Ovatide). One lakh bata spawn was recovered from the breeding programme. Demonstration on nursery pond preparation was also done at the place and harvested spawn was released for further rearing.

HRD development:

Place	Duration	Subject	No. of participants
Balijan Circle, Papum Pare District	10-11 February, 1999	Paddy-cum-fish culture	11
Doimukh, Papum Pare District	28 January - 01 February 2000	Grassroots training on improved aquaculture	22
Ziro, Lower Subansiri District	03 - 07 February 2000	Paddy-cum-fish culture	36
Doimukh, Itanagar, Ziro	26 - 27 September 2000	Improved aquaculture	25
High Altitude Fish Farm, Tarin, Ziro	28 - 29 September, 2000	2-day Farmers Meet to increase awareness about scientific fish culture and get a first hand knowledge about problems faced by fish farmers	37
Doimukh & Ziro	22 March-7 April, 2001	Grassroots training on scientific fish culture	33
Sunpura	18 - 22 June 2001	Training on fish breeding and culture	37
Itanagar & other places	21-26 December,2003	Advanced aquaculture techniques	55
Namsai	06^{t}– 09	Integrated Pig-cum-Fish	25

Dist.-Lohit	February, 2005	culture	
01 – 03 March, 2005	Bomdila	Advanced aquaculture techniques for the grass root farmers	45
2015-16	CIFA technologies & recent advances in aquaculture at Emchi, District Fisheries Training Centre, Papumpare District		50
	Management of FRP hatcheries and fish culture in seasonal ponds at Sonajuli, Papum Pare district		54
	FRP hatchery operation, fish culture in seasonal ponds, CIFA technologies and recent advances in aquaculture		104 participants including 20 officials
	1. Demonstration on Broodstock development of carps = 2 units 2. Demonstration on integrated fish farming with high value crops- 1 unit		
2016-17	During 2016, two FRP carp hatcheries were supplied to Sonajuli (farm of Mr. Tana Nekam Tara) and Doimukh (farm of Mr. Akin Tara). Dr Ajmal Hussan, Dr P.P. Chakrabari and Dr B.C. Mohapatra visited Sonajuli, Arunachal Pradesh and installed the hatchery in August 2016 in the presence of officials of Department of Fisheries, Govt. of Arunachal Pradesh.		
	A training programme was organized on "Breeding and seed production of carps in FRP hatchery" during 2-4 August 2016		22 participants

MEGHALAYA

Meghalaya, the abode of clouds, is a state with land area (22,489 sq.km.) almost equally divided into three topographies of low, medium and high altitude and elevations ranging between 170 to 1961 m from sea level. Fishery resources comprising of about 10,000 of lentic, 1761 ha of reservoirs and 5600 km of lotic surface are distributed in the three topographies. However, in spite of the state being blessed with immense lentic resources next only to Assam in the region, percentage of utilization for fishery purpose is not even 10% and that too mostly through traditional methods resulting in low productivity., the lowest in the region and a very poor per capita availability(2.95 kg/yr).

Future programmes in the State shall focus on manpower development involving the officials of the State Fisheries Department and progressive farmers, follow-up action on the completed programmes and proper redressal of the need-based requirements of the local people.

CIFA, in collaboration with DRL(DRDO), Tezpur and the State Fisheries Department organised the following training programmes in Meghalaya to impart the knowledge of scientific fish culture to the fish farmers :

Pig-cum fish culture through nutrient management were conducted in16 locations covering all 7 districts Fish production achieved 2100 kg to 8400 kg/ha/yr in comparison to earlier average 1000 kg/ha/yr and gain of weight of pig ranged from 75-100kg/yr.

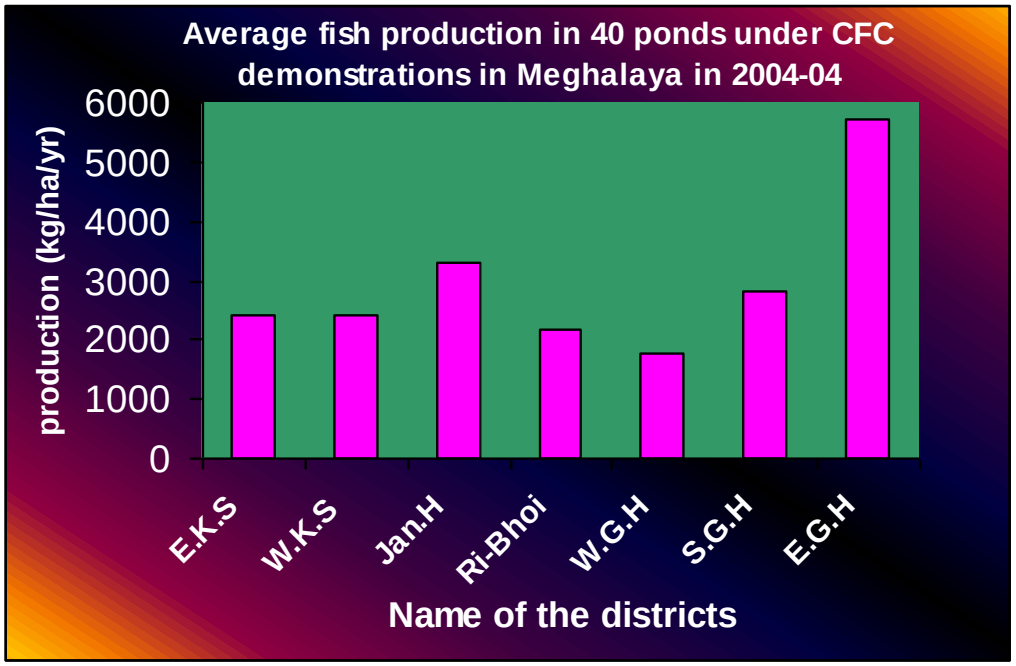
Demonstration of composite fish culture:

Development of region specific input balance practice for composite fish culture in selected NEH states using modified technology of nutrient management in these acidic pond environment.

- Pilot scale composite fish culture demonstrations using specific nutrient balance were conducted in 40 ponds covering all the 7 districts

- Fish production of CIFA demonstration over State FFDA production has increased from 1000kg/ha/yr to 4500kg/ha/yr.

- Demonstration and stocking of ornamental fish breeding and proper guidance was given to Killing private farm in presence of state fisheries officials of Nongpoh, Revoi Dist of Meghalaya on 26-27th October 2007at Killing, Ri-Bhoi District



Average fish production under CFC demonstration in Meghalaya 2004

❖ Training on Fresh water aquaculture By CIFA in Meghalaya State

Period	Type	No. of Trainee
1999-2000	Grassroots training breeding and carp culture at Eastern Air Command HQ, Shillong on 19-24 April 1999	30 participants trained
	Grassroots training on fish breeding and culture at Trout Research Farm, Shillong on June,2000	50 participants trained
	Training on freshwater aquaculture and demonstration on carp breeding at Dighrichiring Fish Farm, Tura on June,2000	42 participants trained
2003-04	Different Aspects of Scientific Fish Culture at Digrichiring Fish Farm, Tura 05 – 09 May, 2003	25 participants trained
	Training on Advanced Aquaculture at Trout Research Farm, Shillong Nov. 2003	48 participants trained

	Training on Advanced Aquaculture at Community Hall, Cleve Colony, Shillong23 – 27 March, 2004	50 participants trained
2004-05	Cat fish culture at Nongpoh at 17-19 Aug, 2004	29 participants trained
	Ornamental fish culture at Nongpoh17-19 Aug, 2004	30 participants trained
2005-06	integrated fish farming, catfish culture, breeding and culture of common carp at Shillong23-27 January, 2006	25 participants trained
2006-07	Freshwater Aquaculture at Shillong 20-24, Nov., 2006	25 participants trained
2007-08	Farmers and officers, were given exposure visit and field demonstration on ornamental fish breeding and culture possibility in Assam on 5th April 2008.	15 farmers
2009-10	Workshop to develop priorities and strategies for development of livelihood through aquaculture conducted at Shillong 16-17, Sept 2009	100 participants trained
	Livelihood development through aquaculture practices. 3-4 Dec., 2010 at Shillong	16 participants trained
	A training programme as a major resource person in the respective fields like Magur breeding, Integrating farming and ornamental fish farming during 8-11 December 2009 at Trout fish farm, Shilong, organized by State fisherty department and CIFA.	26 participants
	Induced breeding and hatchery management of carps. 30 July- 08 Aug., 2011 at CIFA headquarter	31 participants trained
	Training on Aquaculture livelihood fish farming in Nongpoh, Meghalaya where Carp, Murrel and Ornamental Farming was	19 participants

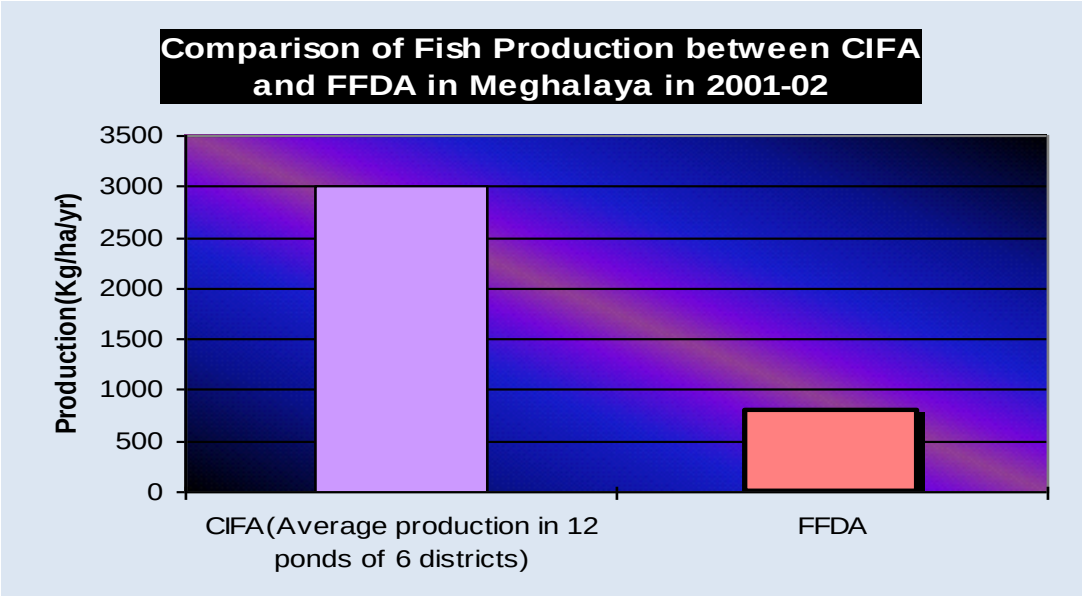
2010-11	given emphasis.Department officials were given separate orientation for improving aquaculture in the region (3-4 December 2011)	
	Exposure visit to ornamental fish breeding and culture unit, CIFA from Meghalaya during 6-9 Feb 2011sponsored by State Govt	26 farmers
2011-12	Consultation for development of aquaculture 30.6.2011 at Shillong	100 participants attended the programme. Developed the strategy
2012-13	Workshop conclave on "Aquaculture development for the stakeholders of North Eastern Region" at Shilong, Meghalaya on 11 September, 2012.	100 participants attended the programme Developed strategy
2015-16	**Training** conducted on "Broodstock Management and installation of FRP hatchery" at MSFR&TI, Mawpun, Shillong.	50 participants from different districts

- **Carp culture demonstration programmes conducted in the Meghalaya**

Year	Place	Technology	No. of Ponds	Size (ha)	Production
2001-2002	6 districts	Composite fish culture	12	1.37	2.5-3 Mt/ha/yr
2003-2004	7 districts	Pig-cum- Carp culture	16	2.13 (0.1-0.2)	Fish 2.8 Mt /ha/yr and 80-90 kg/pig.
2004-2005	7 districts	Composite fish culture	40	4.0	2.5-2.7 Mt/ha/yr

- As per demand of the Fishery Department of Meghalaya, CIFA, Kalyani has started a demonstration on composite fish culture in 40 ponds and covering 4.0 hac. area of all the seven districts of the State in 2004-05. The physical coverage of seven districts like Ri-Bhoi: 10 unit, 1.0 ha, East Khasi Hills: 6 unit, 0.6 ha. , West Khasi Hills: 4 unit, 0.6 ha, East Garo Hills: 4 unit, 0.4ha, West Garo Hills: 8 unit, 0.8 ha, South Garo hills: 4 unit, 0.4 ha and Jayantia Hills: 4 unit, 0.4 ha. Final harvesting was conducted in the experimental ponds in 2004-2005 the fish production varied between 1487 to 6500 kg/ha/yr. The average production of the State were

recorded 2956 kg/ha/yr, much above that achieved by FFDA(700 kg/ha/yr).



Pig – Cum – Fish culture demonstration in Meghalaya: 2003-04

❖ **Cage culture programme 2005-06:**

The department of Fisheries, Meghalaya in association with the Central Institute of Freshwater aquaculture, Bhubaneswar has initiated floating cage culture, the first of its kind in the State in Nongmahir reservoir in Ri-Bhoi district by installing 19 cage complex (total area of all the cages together 200m^2). The project was launched on 4 May 2005 by shri J.D.Rymbai, Hon'ble Chief Minister for Fisheries, Govt. of Meghalaya in the presence of Shri F. Lyngdoh, Hon'ble Minister for Urban Affairs. Sri G.P. Wahlang, IAS, Agricultural Production Commissioner, Smt. C.T.Sangama, Director of Fisheries, Shri K.N. Kumar, IAS, Commissioner and Secretary, Department of Fisheries, Govt. of Meghalaya. Dr. S.Ayyappan, Deputy Director General (Fy.), ICAR, New Delhi; Dr. N. Sarangi, Director, CIFA, Bhubaneswar; Dr. K.M.Bujarbaruah, Director, ICAR Complex for NEH region, Barapani, Meghalaya graced the occasion.

❖ A folder on 'Cage Aquaculture in North-east India –A Beginning in Meghalaya' was released on the occasion. The cage culture programme was regularly monitored and some of the salient observations are given below:

❖ **Fish farmers Day:**

12th October, 2006: Mr. J. D. Rymbai, Hon'ble Chief Minister of Meghalaya and Mr. Sengran Sangma, Fisheries Minister of the State inaugurated fish farmers Day, ornamental fish and magur hatcheries along with an exhibition on Ornamental Fish was organized during the occasion.

Smt. C. T. Sangma, Director of Fisheries, Sri W. Mynsong, C.E.M. KHADC; Sri B. Dhar, Depty Commissioner, Ri-Bhoi District and Dr. N. Sarangi, Director, CIFA were present at Killing Village, Ri-bhoi District, Meghalaya on 12th October, 2006. In this occasion

In this occasion **two publications** on Ornamental Fish Farming and Magur hatchery was released by the Chief Minister and Fisheries Minister respectively.

Establishment of Ornamental Fish Unit at Killing, Meghalaya

By keeping the view of entrepreneurship development, The state like Meghalaya under the NEH development programme, training programmes are organized exclusively on ornamental fishes, at Shillong and Nongpoh during last five years, where a large number of fish farmers, hobbyists were participated. By seeing the interest of the farmers, a demonstration unit has been established by the help of State Fisheries Dept. Shillong at Killing at Mr P. Suchiang's Farm to encourage ornamental fish farming among the farmers community. The unit is consists of 12 breeding cum rearing FRP tanks of 700 l capacity along with one circular tanks for breeding. To begin with few five bearer species like veil tail black molly, red tailed guppy, red swordtail and wag tailed platies were stocked for brood stock development and seed production. The egg layers like gold fishes of different varieties like black moor, pearl scale gold, oranda gold and fan tail gold were stocked. The demonstration and technical guidance on breeding and larval rearing of the species was provided to the farmer along with the feed preparation method at CIFA, Kausalyaganga and practical demonstration at the farmer's hatchery.

Production of Ornamental Fish from December, 2006- April 2007:

With reference to the reports send by the Director of Fisheries, Meghalaya it is mentioned that the farmer is able to produce 7,000 seed of live bearers and 3,000 seed of gold fish at his farm. The whole family along with the farmer has engaged himself in the farming practice.

2005-2007: Survey of ornamental fish species in lower part of Meghalaya

The Northeast India provided with 250 ornamental fish species is one of the global hot spot for ornamental fish trade. Out of which Meghalaya is having 159 species. In relation to the total number of fish species available and the fishes having ornamental value, the percentages in Meghalaya state is 90.86%.The following species were found with specific ornamental character in lower part of Meghalaya.

Successful breeding of *Badis badis*

Breeding of *Badis badis* (size-2.0-2.5 inches) was attempted for the first time in India by simulating natural condition, where fish were exposed to a biotope environment. The aquarium was maintained like a paludarium. Adequate shelters were provided in the breeding aquaria. The water quality parameters were studied. The larvae were counted after 2 months of spawning. The fish bred successfully in the aquarium and the fry were counted to 65 nos from each set. Efforts are being made to plant some more other type of plant and shelter so that the young ones after hatching they can hide.

NAGALAND

Nagaland, the second smallest state of the North Eastern Region(16,579 sq. km.) lies at the extreme eastern side of the Indian Union, sharing its borders with Assam, Manipur, Arunachal Pradesh and Myanmar. However, the productivity of the ponds is more in comparison to other states of the region. With a stupendous annual population growth rate of 5.7% and per capita availability of 2.35 kg of fish, Nagaland has to switch to adoption of scientific practices for maximisation of fish yield from the available pond area of 2000 ha and also utilize the paddy fields for integrated farming. Keeping this in focus, CIFA has taken up the task of transfer of technology according to the needs of the State. Initially, a training programme on scientific fish culture (including various topics of composite fish culture, fish breeding, prawn culture, feed and fertilizer management etc.) along with practical demonstration has been conducted in Khekiho village near Dimapur under the aegis of Mr. H. Khekiho Zhimomi, Ex-industry minister of Nagaland in collaboration with Defence Research Laboratory(DRDO), Tezpur. The programme was attended by 58 farmers and was met with overwhelming response. The profuse areas of wetlands present in the area were cleared of weeds with the help of elephants and a programme has been launched to demonstrate the various aspects of carp breeding and culture in a 0.30 ha pond. Subsequent sampling has shown very encouraging results as far as the growth rate of fish is concerned. Buoyed by the success of the initial enterprise, a demonstration of paddy-cum-fish culture has also been started at Khekiho village after proper and scientific preparation of a plot of land. Fresher initiatives involving more people including the officers of the State Fisheries Department in training programmes, demonstrations on breeding and carp culture in different corners of the State, follow-up action on previous initiatives and addressing other needs of the fisherfolk in the aquaculture sector are in the pipeline.

Year	Purpose	Nos. Participants
2001-2002	Different aspects scientific fish culture at Khekiho village, Dimapur on 17-20 March, 2002	57
2007-08	Ornamental fish breeding and pig-fish farming at Brood fish farm, Dimapur during 30th October, 2007	5
	Ornamental fish breeding and culture at CIFA, HQ on 13-19 February 2008	2
2011-12	Fish disease diagnosis and management 17-22 Oct. 2011	30 participants trained at CIFA
	Freshwater aquaculture for nutritional and livelihood security during 23-24 March 2012 at Dimapur	35 participants trained

2015-16	**Training** conducted on "Feed management to enhance aquaculture production in Nagaland." at KVK, Phek, during 2-3 Nov 2015	70 participants
2016-17	A training programme scheduled to be held at Nagaland during 5-7th July, 2016.	

Carp culture demonstration programmes conducted in the Nagaland

Year	Place	Technology	No. of Ponds	Size (ha)	Production (kg/ha/yr)
2001-2002	Khekiho village	Composite fish culture	1	0.3	3500
2002-2003	Khekiho village	Paddy-cum-fish culture	1	1.0	1500

Demonstration on Paddy Cum Fish Culture Nagaland (2002-03)

Location	Culture area (ha)	Variety of paddy used	Species of fish stocked	Nos. of fingerlings stocked	Production after 4 months
Khekiho village near Dimapur	1.0	Deepwater Nagaland Special	Rohu Catla Mrigal Silver carp Common carp @ 6000 nos	1200 1800 1200 1200 600	Paddy - 2000 kg Fish - 1500 kg (Av. size - 400 g/fish)

Demonstration of Pig cum fish farming in 2007-08

Place	Water area (ha)	Fish production kg/ha/yr	No of piglets reared (Male: Female)	Average wt of pigs/yr	Pig died in epidemic	Piglets produced
Toshiho village, Dimapur	0.5,	3000	9 (5:4)	132	3	--
Dimapur town	0.4	3085	7 (4:3)	133	--	11

Suhoi village	0.4	2923	8 (4:4)	81	2	--
Suhoi village	0.3	2960	8 (5:3)	128	2	3

Carp culture demonstration programmes conducted in the Nagaland

Year	Place	Technology	No. of Ponds	Size (ha)	Production
2001-2002	Khekiho village	Composite fish culture	1	0.3	
2002-2003	Khekiho village	Paddy-cum-fish culture	1	1.0	Paddy - 2000 kg Fish - 1500 kg In 4 months
2007-08	Dimapur Suhoi, Nihaoto	Pig cum-fish culturte	4	1.2	2900-3200 kg/ha/yr. 70-95 kg/pig/year

Human Resource Development

Year	Location	Training	No. of Trainee
2001-2002	Khekiho village, Dimapur	Different aspects scientific culture	57
2011-12	Dimapur	Fish disease diagnosis and management	30
2011-12	Dimapur	Feshwater aquaculture for nutritional and livelihood security	35

Exhibition:

- P.P. Chakraborty, S.K.Swain organised a Fisheries stall of ICAR at **North East AGRI EXPO, 2006** at Dimapur, Nagaland during 27-31 March 2006 along with CIFRI, CIFT.

Sikkim

- On 5 December 2012, the fitting of FRP carp hatchery was demonstrated at State Dept. Fish Farm, Rengpo, Sikkim.
- Training Programme on "Sensitizing Fish Farmers on Small Scale Aquaculture in Sikkim" was conducted during 6-7 December, 2012 at Gangtok. All the state functionaries of Fisheries Department of Govt. of Sikkim were present in the inaugural function on 6 December 2012. Addressing the gathering the Hon'ble Secretary to the Govt., Fisheries Department thanked CIFA for its wholehearted support to the state for fisheries development. He informed that the Hon'ble Chief Minister wishes to see the local fish in the state markets in two years. This herculean task has to be addressed by us. From state side Director of Fisheries; joint Director; Deputy Directors and other functionaries: and from CIFA side Dr A.K. Sahu, HoD, APED; Dr Kuldeep Kumar, Dr S.K. Swain, Dr P.P. Chakraborty and Dr B.C. Mohapatra, Pr. Scientists were present.

Sikkim		
2009-10	Network meeting of aquaculture scientists of N.E. region during 11-12 March 2010 at Gangtok	40 participants trained
2010-11		
2011-12	Ornamental fish farming for entrepreneurship development 26-29 April 2011at Gangtok	27 participants trained
	Ornamental fish farming for entrepreneurship development during 26 May-2 June 2012 at CIFA headquarter	12 participants trained

MIZORAM

Mizoram		
2010-11	Aquaculture for livelihood and Nutritional security 11-13 Jan. 2011at Aizwal	52 participants trained
2011-12	Organized & imparted farmers training on Livelihood through freshwater aquaculture for the tribal people of Mizoram at Izwal, Mizoram during 31 January - 4 February, 2012	
2012-13	Aquaculture for entrepreneurship development 1-3 Feb 2012 at Aizwal	27 participants trained
	Farmers training on livelihood through freshwater aquaculture for the tribal people of Mizoram at Aizwal, Mizoram during 31 January, 2012 to 4 February, 2012.	50 participants trained
2013-14	A meeting was held during 13 -14 June, 2014 in the office of the Director, Dept. of Fisheries,	
2014-15	A team of scientists imparted training on freshwater aquaculture for skill development of proposed CFC demonstration farmers from during 8-12 December 2014.	30 farmers attended.
	FRP hatcheries from KVK were transferred to Dept. of Fisheries, Govt. of Mizorum. Installation of one such hatchery was made at Isac fish farm, Buchang cluster	
	Feasibility of setting FRP magur hatcheries was studied for Mizofa fish seed farm, Chempphai, Kolasib Districts. ICAR-CIFA scientists visited Buchang cluster, Kolasib, Chempai, Lengpui & Aizawl, Mizoram during 8 -12 December 2014	
	An awareness programme on ornamental fish farming on livelihood development of Mizoram was organized on 11 December 2014 at Dept. of Agriculture conference hall, where 25 participants attended the programme. Among the participants State Fisheries officials, Private entrepreneurs, Farmers and Traders were participated the discussion.	
	Dr. P.P. Chakrabarti visited Kolasib, Mizoram for	

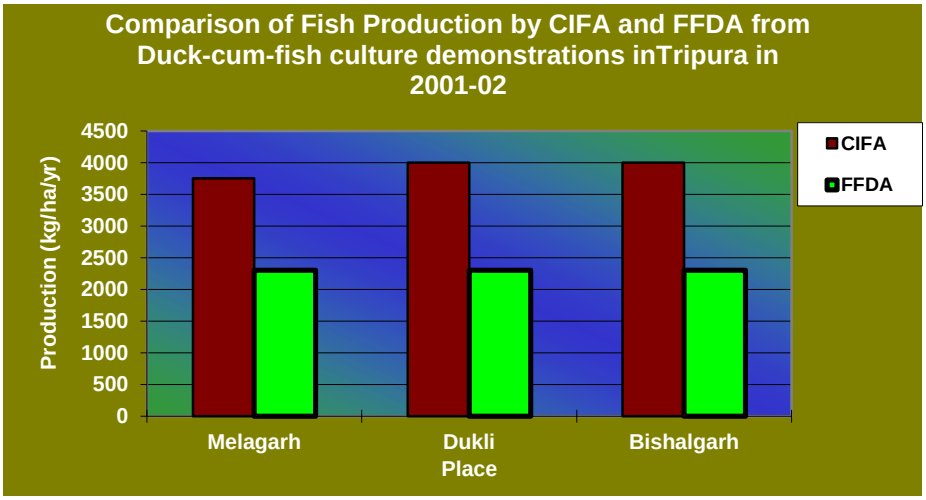
	searching suitable place for installation of Portable FRP hatcheries (Carp, Magur & Pabda), CFC and integrated pig-cum-fish demonstration, IFS in pond dykes	
2015-16	Broodstock management and FRP hatchery operation	50 participants

Exhibition

CIFA organised a Fisheries stall in ICAR pavillion at North East AGRI EXPO, 2006 at Dimapur, Nagaland during 27-31 March 2006 along with CIFRI, CIFT.

TRIPURA

Tripura is the smallest state of the North Eastern Region (area of 10,477 sq. km.) but the most developed from the viewpoint of fisheries development. It has the largest area of utilized water bodies under its jurisdiction (11,278 ha) and the highest per capita availability of fish (8.18 kg/yr) in the entire region. However, in order to augment fish production from the available culturable area and to bring more water bodies under aquaculture jurisdiction, scientists from CIFA analysed the information about status of fisheries development in the State provided by the Department of Fisheries, Govt. of Tripura. Based on this information, the target areas in the aquaculture sector requiring redressal were identified and appropriate steps were taken in order to help Tripura to achieve its full potential. One of the principal causes of not being able to realise the full potential is the paucity of suitable amounts of organic manure required for increasing the natural productivity level of ponds. In order to solve this problem to a considerable extent, a programme was designed by CIFA scientists in collaboration with the Fisheries Department to demonstrate the importance and practicability of integrated farming in such a scenario. **A 0.1 ha pond** at Indranagar near Agartala was selected for the purpose to launch a programme on duck-cum-fish farming. Droppings of duck may act as an important source of nutrient input in absence of normally used manures like raw cowdung. Not only that, raising of ducks with fish fits very well since the ducks prey on the insect larvae, tadpoles and weeds which create impediment for fish culture where a productivity of around 4 tonnes/ha/yr has been achieved. At present, demonstrations on carp polyculture are under progress in 3 sub-divisions of Tripura. In Melaghar Block of Sonamura sub - division, carp culture is being practised in a pond of 0.16 ha area; in Dukli and Bisalgarh sub-divisions one pond each of 0.1 ha has been selected for demonstration of carp polyculture. A productivity of 3750 kg/ha/yr has been achieved from the pond in Sonamura whereas the Dukli and Bisalgarh ponds have both given a production rate of 4000 kg/ha/yr. In all these instances, productivity has been shown to be far higher as compared to FFDA ponds (2300 k/ha/yr).



Place	Duration	Subject	No. of participants
Agartala	24-27 July, 2000	Integrated fish culture (fish-cum-duck farming)	20
Agartala	26-27 July 2002	Ornamental Fish breeding	24
Lembuchera	15-17 December 2004	Mass production of Indigenous and exotic ornamental fishes at Tripura	35
Dharmanagar	06-09 September 2005	Feed formulation in freshwater aquaculture	23

Tripura		
2011-12	Water quality of brooder's pond from State fish farm ponds at Lembuchera and Melagarh were monitored for improvement. Pabda seeds were distributed to 20 progressive fish farmers of West Tripura by CIFA and State Fishery Officers of Tripura on 26 June 2011. 24 progressive farmers including state Govt. fishery officials of Tripura got training on pabda breeding and culture on 26 June 2011.	40 participants trained
	Workshop on "Popularisation of Pabda culture in Eastern and North Eastern States of India" at Tripura on 18.08.2012.	
2012-13	A National workshop on popularization of pabda culture	
2013-14	Consultation workshop at Tripura Maach- Prani- Ucchamulya sabjir Samanwita Palan" have been released in local language i.e. Bengali for easy understanding amongst the local farmers of Tripura.	
	A consultative workshop on "Self-sufficient and sustainable aquaculture in North Eastern Region" was held at Agartala, Tripura on 5 February, 2014,	100 partcipants attended the proggarmme Strategy was developed for 12^{th} five year plan
	Magur breeding at Mahuripukur	37 participants
2014-15	Farmers-Scientist interaction meet	83 farmers attended
	Tubifex unit established - 2 units	
2015-16	Brood stock development and quality seed	100 participants

	production of carps ” at Kanchanpur, North Tripura of Tripura Tribal Areas Autonomous District Council (TTAADC).	
2016-17	“Broodstock Development for Quality Fish Seed Production” at Directorate of Fisheries, Tripura during 2 – 3 Nov., 2016.	30 participants

Carp culture demonstration programmes conducted in the Tripura

Year	Place	Technology	No. of Ponds	Size (ha)	Product-ion kg/ha/yr
2000-01	Agartala	Fish-cum-duck farming	1	0.1	4000
2001-02	Agartala	Composite fish culture	3	0.36	

Demonstration on Composite Fish Culture In Tripura (2001-02)

Location	Area of pond (ha)	Stocking density (nos./ha)	Production (kg/ha/yr)
Bisalgarh	0.1	6000	3980
Dukli	0.1	10,000	4000
Sonamura	0.16	7000	3750

Identification of need based aquaculture technologies for dissemination in Tripura during the current year 2016-17 and upcoming financial years.

Need based aquaculture technologies for dissemination in Tripura during the current and upcoming financial years have been identified through a self-structured questioner survey involving officials of Department of Fisheries, Govt. of Tripura (Fishery Officers/ Supdt. of Fisheries).

Table 1: Top six technologies identified which are most important and relevant for the fish farmers in Tripura

S. No.	Name of the technology	Percentage of participants listed the technology in top five
1	Quality seed production of Indian major carps	**57.14**

2	Seed production and culture of catfishes (Magur *Clarias magur*, Pabda *Ompok bimaculatus*, Tangra *Mystus* sp. and Singhi *Heteropneustes fossilis*)	**57.14**
3	Seed production and culture of monosex tilapia (GIFT)	**47.62**
4	Fish feed management in aquaculture	**42.89**
5	Seed production and culture of small indigenous fish species (SIFS) such as *A. mola*, *Puntius* sp., etc.	**33.33**
6	Seed production and culture of Koi (*Anabas testudineus*)	**28.57**

Table 2: Top five technologies on which officials of Department of Fisheries need training

S. No.	Name of the technology	Percentage of participants listed the technology in top five
1	Seed production and culture of catfishes (Magur *Clarias magur*, Pabda *Ompok bimaculatus*, Tangra *Mystus* sp. and Singhi *Heteropneustes fossilis*)	**42.89**
2	Seed production and culture of monosex tilapia (GIFT)	**38.10**
3	Seed production and culture of small indigenous fish species (SIFS) such as *A. mola*, *Puntius* sp., etc.	**28.57**
4	Freshwater pearl culture	**28.57**
5	Seed production and culture of Koi (*Anabas testudineus*)	**14.29**

MANIPUR

Manipur, the fourth largest State of the North-eastern Region (22,325 sq. km) sharing its borders with Nagaland, Assam, Mizoram and Mynamar. According to the needs of the State farmers, CIFA has taken up task to transfer of technology. Initialy, CIFA were conducted a training programme at Imphal on breeding and culture of Mangur in the 2005. The programme was attended by 58 selected farmers of entire State. Recently, a demonstration programme was organised by CIFA on Hi-tech aquaculture in 2005-06.

Place	Duration	Subject	No. of participants
Imphal	12 January, 2005	Breeding and culture of Magur	70

Carp culture demonstration programmes conducted in the Manipur

Year	Place	Technology	No. of Ponds	Size (ha)	Av.Production (kg/ha/yr)
2006 - 07	Imphal	Hi-tech aquaculture	4	0.5 each	11000

Integrated pig cum fish culture demonstration

Year	Place	Technology	No. of Ponds	Fish production (kg/ha/yr)	Pig weight kg/pig/yr
2007-08	Imphal	Pig-fish farming	2	3500 4000	60 65

Place	Duration	Subject	No. of participants
Khekiho village, Dimapur	17-20 March, 2002	Different aspects scientific culture	57

Assam

Training in Assam during 1998-2006

Place	Duration	Subject	No. of participants
Barpukhuri, Tezpur	24 - 27 August, 1998	Grassroots training on breeding and carp culture	30
DRL, Tezpur	28-29 August, 1998	Freshwater aquaculture training	9
DRL,Tezpur Barpukhuri	23 - 28 April, 2000	Freshwater aquaculture training	30
DRL, Tezpur	10 - 13 August, 2000	Practical training on scientific fish culture	25
Tezpur, Dhekiajuli	24 - 25 September, 2000	Improved aquaculture	26
Silchar	24-25 January 2001	Ornamental fish breeding	30
Dhekiajuli	11 - 15 June 2001	Improved aquaculture	41
Silcher	10-15 Sept, 2002	Ornamental fish breeding	45
NERC, (CICFRI), Guwahati, Assam	8-9 March 2004	Ornamental fish trade in NEH region	27
AAU, Raha, Nagaon, Assam	9-12 March, 2004	Ornamental fish farming	35
AAU, Fishery. College, Nagaon	22-25 February 2005	Ornamental fish culture and trade	32
AssamUniversity Silcher and MPEDA	24-25 January 2001	Ornamental fish culture	30
NERC, (CICFRI), Guahati, Assam	8-9 March 2004.	Salient aspects of setting up of a unit for ornamental fish culture and trade	27
AAU, Raha, Nagaon, Assam	9-12 March, 2004.	Captive breeding of exotic ornamental fish species and entrepreneurship development College of Fisheries,	35
Assam Agricultural University, Fisheries College, Raha, Nagaon and MPEDA	22-25 February 2005,	ornamental fish culture and trade" during Participants	"32
Fisheries Department of Meghalaya and MPEDA	16-17, March, 2006	ornamental fishes at Meghalaya	89

Assam		
2009-10	Training on farming of ornamental fishes, Assam University, Silchar, 25-26 November, 2009	37 participants trained
	Hands on Training on Magur and Anabas farming for the farmers of Kokrajhar, Assam on 19-21 July 2010	20 participants trained
2010-11	One day Awareness program on Murrel culture at Nankar Bhaira, Nalbari, Assam on 21 October, 2010	21 participants trained
2011-12	Workshop on popularization of Murrel culture and other economic species in Assam, Sonapur, Kamrup (M), Assam on 11 Sept., 2011	53 participants trained
	Best management practices for Murrels and other economical species in Assam, Nalbari on 12 Sept., 2011.	56 participants trained
	Entrepreneurship development in aquaculture for livelihood security on 20-21 Dec. 2011	21 participants trained
	Hands on training on Soil and water analysis on 20-23 Dec., 2011	9 participants trained
	State soil water testing laboratory was established, instruments were installed at Meen Bhavan, Guwahati.	-
	Two workshops were arranged at Bagibari, Nowgaon district on 12th Sept., 2011 and Mithajal, Nalbari district on 13th Sept., 2011	109 farmers trained (Dept. of Fisheries, Govt. of Assam, Kalong Kapali, NGO; NABARD, and Gramin Bank when 56 farmers attended at Mithajal and 53 farmers attended at Bagibari.)
	Aquaculture Practices for resource dependent farmers of Bodoland, Assam on 28 May-02 June 2012	32 participants trained
	2 lakhs of advance fry of Jayanti rohu were reared at the farm pond of Kalong Kapili.	Demonstration of Jayanti culture
	1 lakh spawn of *Puntius sarana* was distributed to the farm pond of Kalong Kapili.	Demonstration of Sarana culture
	Training on entrepreneurship development in aquaculture for livelihood security was imparted to 21 Nos. farmers of Darang and Nalbari District, Assam at Mean Bhavan from 20th to 21st December, 2011	21 participants trained

	Water & soil testing (10 nos.), others (130 nos.) 3 training programmes	140 nos. farmers
2012-13	Workshop on popularization of Jayanti Rohu, Minor carp and catfish during June 2012 at Guwahati. Demonstration of Jayanti at Kolong Kapili (NGO)	Comparison study Jayanti - Normal Rohu (1200g-650g/ 10 months) 38 participants trained
	Two multiplier units of Jayanti provided (Sri Debojit Burmon, Nalbari and TATA Tea, Jorhat)	Multiplied units established
	Integrated fish farming, and composite fish farming in April 2012 at Kalyani for Bodo land, Kokrajhar	60 participants trained
	Aquaculture practices for resource development farmers" and "Ornamental fish farming for entrepreneurship development, CIFA, Bhubaneswar on 26.05.2012,	44 participants trained (32 trainees from Kokrajhar (BTC), Assam and 12 from the Dept. of Fisheries, Govt. of Assam)
	Training at ICAR-CIFA, H.Q. on various aspects of fish culture	75 participants including 12 officials
2013-14	Demonstration on pig-cum-fish culture :	= 5 units
	Pig-cum-fish culture demonstration started at BTC. Integrated pig cum fish culture at BTC, Assam showed	Demonstration of fish production of 2.7 MT/ha/yr from benchmark production of 0.9-1.0 MT/ ha/yr.
	Trainings on "Integrated farming system with fish seed production and pisciculture" were held at Baksa, Udalguri and Tongla districts of BTC, Assam during 24 -26 November 2013	60 participants trained The team surveyed 130 ponds (81 ha) and a proposal was submitted to the Director for adoption.
	Seed production of carp and magur were reported to start from the FRP hatcheries. This has given a big boost towards seed sufficiency of NEH States.	
	CIFAX and Immunoboost were sent to five NEH States as a measure of prophylactic measures in fish farming and to avoid fish diseases.	
	Workshop on BMPs: quality seed production.	
2014-15	Demonstration on jayanti rohu production = 2 units	
	National Sensitization workshop on Best Management practices in quality seed production	

	was held at Guwahati, Assam during 25-26 February 2014. In addition to the farmers of Assam other participants from Manipur and Tripura also attended in it.	
	Jyotish Talukdar, Secretary, Kalongkapali NGO, Baghibari, Kamrup District was supplied with FRP carp hatchery. Moreover one multiplier unit of Jayanti rohu was established by ICAR-CIFA at his farm. He was also provided brooders of *Puntius sarana* and *Catla catla* from ICAR-CIFA. He produced Jayanti Rohu fry-5.20 lakh, *P. sarana* fry- 2.15 lakh & Catla fry- 4.10 lakh. These quality seeds produced from CIFA hatchery were distributed to 100 nos. farmers of Damoria Dev. Block under Kamrup Metro District @1000 nos each by MIC Fisheries & Director of Fisheries, Govt. of Assam.	
	Utilizing FRP Magur hatcheries supplied by ICAR-CIFA, Mr. Ratul Das of Nalbari District, Assam produced about 2 lakh of fingerlings of magur and he has been awarded the best fish farmer of Assam in 2014 by Department of Fisheries, Govt. of Assam on 10 July for his remarkable success in magur breeding and fingerling production	
	Farmers-scientist interactions meet.	71 farmers attended
	Improved rohu "Jayanti" was supplied to Kalongkapali (NGO), M/s Amalgamated plantation private limited (TATA enterpriser) and Sri Dabajit Barman, Fish seed producer & supplier, Nalbari of Assam. Growth performance was evaluated in all the places. Kalongkapali reported 50% higher growth of Jayanti rohu over normal rohu. M/s Amalgamated plantation private limited (TATA enterpriser) have reported 60% higher growth performance. They have developed brood fishes and initiated breeding program for the same.	
2015-16	Integrated farming systems	134 nos.
	scientist interaction meet with the farmers of Bodo Territorial Council, Assam and State	Total 74 farmers and state officials participated in the

	Government officials of Assam was organized at Guwahati on 23 February 2015. The theme area of the meet was "Installation and operation of FRP hatcheries in Assam". All the participants thanked ICAR-CIFA for providing two useful gadgets like FRP carp and magur hatcheries to the state of Assam and both are performing very well in the state..	meet
	1. Demonstration on composite fish culture started in 8 ha water bodies. 2. FRP carp hatcheries procured 8 nos. for supply to the farmers of Nalbari District, Assam.	
	A two days training programme on "Efficient water, land and waste utilization in integrated fish farming systems" was organized at Kalaigaon, Udalguri District, Bodo Territorial Council, Assam during 17-18 June, 2015	134 farmers attended the training programme.
	ICAR-CIFA Team visited the pond sites of "Composite fish culture" programme taken in 8 ha water bodies in BTC, Assam under NEH programme of the institute. The team inspected the application of important inputs to the pond culture system and monitored the growth of fishes. The weight of stocked carps was in the range of 200-300 g approximately within a growth period of four months. Fingerlings were stocked in the month of February 2016.	
	Memorandum of Understanding was signed between ICAR-CIFA and Bodo Territorial Council (BTC) on 23 October 2015 in a small function held at ICAR-CIFA, Bhubaneswar for scientific freshwater aquaculture demonstration and training by the institute in BTC during 2015-16.	
2016-17	A training programme on "Grow-out pond management of carps" for the fish farmers of Bodo Territorial Council (BTC) & Tiwa Autonomous Council (TAC**)** was organized at Guwahati, Assam during 27-29 June 2016. A total of 54 participants attended the training programme.	

	Training programme on "Breeding and seed production of carps in FRP hatchery" was organized by ICAR-CIFA, Bhubaneswar in collaboration with Department of Zoology, Gauhati University, Guwahati, Assam and Department of Fisheries, Government of Assam at Aquaculture and Biodiversity Center, Department of Zoology, Gauhati University during 30 July - 01 August 2016	• Total 57 progressive fish farmers of Assam were participated in this programme.
	A hands-on demonstration on installation and operation of FRP carp hatchery was conducted on 30 July 2016. On 31 July 2016 practical was conducted on broodfish selection and identification. Installed hatchery was operated with 5 pairs of male-female *Labeo rohita* weighing on an average 1.5 kg for breeding demonstration. About 6.0 lakh fertilized eggs was released from the hatchery operation and in due course developed to spawn.	

Demonstrations on composite fish culture

- A demonstration on fingerling raising was carried out at Natun Sirajuli, Dhekiajuli on a 0.2 ha Nursery pond. A survival of around 57 % was achieved in the experiment.

Training conducted in CIFA for Assam participants

Sl No	Subject	Duration	Number of participants
1.	Sustainable aqua farming	18-22 February 2002	12
2.	Ornamental fish Breeding and Culture	2-6 July 2002	13
3.	Magur Breeding And Culture	29 July-01 August, 2003	14
4.	Aquatic Environment Management In Freshwater Aquaculture	19-25 November., 2003	06
5.	Refresher Course On Freshwater Aqua-Farming,	19-24 Dec., 2003	17

Demonstrations:

i.	**Training** conducted on "Efficient water, land and waste utilization in integrated fish farming systems" at Kalaigaon, Udalguri district, BTC with 134 fish farmers.

Carp culture demonstration programmes

Year	Place	Technology	Stocking density	No. of Ponds	Size (ha)	Production (kg/ha/yr)
1999-2000	Barpukhuri Tezpur	Composite fish culture	7000	1	4.0	3000
2002-2003	Barpukhuri,Tezpur	Composite fish culture	7000	1	4.0	4200
2006-2007	State Govt. farm , Ulubari Guwahati	Integrated pig cum fish farming	10,000	1	0.5	5300
2016-17	Bodoland	Composite fish culture	10,000	13	8	ongoing

Extension Pamphlet/ Manual Published

Pamphlet

1. Integrated Fish Culture with Piggery as an economic enterprise : In English, Bengali, Khasi, Garo and Assamese language
2. Breeding and larval rearing of Ompok pabda (Ham) : In English, Bengali, Khasi, Garo and Assamese language
3. Composite culture of carps – an easy accessible and economic enterprise : In English, Bengali, Khasi, Garo and Assamese Language.

Booklet

CIFA leading the North Eastern States & West Bengal Towards Blue Revolution
Details of material developed :

1. Flake banner :
   Pig - cum - fish culture in Meghalaya,

2. Board lamination :
   Aquaculture training programme in North- East & Pig - cum - fish culture demonstration in beneficiaries' ponds of Meghalaya.

a) Research papers

Publications

1. N. M Chakrabarty, P. P Chakrabarti, S. C Mondal and N. K Das. Aquaculture Development in North-East India :CIFA' S role. Fishing Chimes Vol 24 No. 1 (April, 2004) page 114 – 116.
2. N. M Chakrabarty, N. K Das , P. P Chakrabarti and S C Mondal . On Mass demonstration of Integrated Fish – cum -Pig Farming at Meghalaya : Accepted for publication in the Journal of Interacademicia (Quarterly Inter disciplinary Research journal).
3. N. M Chakrabarty, N. K Das. P. P Chakrabarti, and S. C Mondal ,2005 On mass demonstration of Integrated Fish cum-Pig farming in Meghalaya, J. Interacad. 9(1) : 110 – 116.
4. N. M Chakrabarty, N. K Das. P. P Chakrabarti, and S. C Mondal ,2005. Integrated Fish culture with piggery in different district of Meghalaya – An Enterprising Approach for Economic benefit of Tribal Community. In natural Seminar on Strategies for improved Farming and Ecological security of coastal region hold at CTCRI. Thiruvanthapuram 21 – 24 December, 2005 (Abstract_).
5. S.K.Swain and P.P. Chakraborty (2006) Ornamental fish farming-A lucrative aqua business for NEH region, realeased during the inauguration of Ornamental fish hatchery at Killing, Meghalaya on 12 th October, 2006 by the hon'ble chief minister and Fisheries minister of the state of Meghalaya
6. Saroj K. Swain (2004) Ornamental fish breeding and culture for entrepreneurship development, exclusively for the participants of Meghalaya under Northeast Development Programme organised by CIFA, Bhubaneswar. 83pp (Abs)
7. Saroj K. Swain (2004) Prospects and constraints of freshwater ornamental fish farming in India. In Ornamental fish culture and trade in Northeastern India, *edited by Bhattacharya and Choudhury*. CIFRI, NERC, Guwahati,16-21pp.
8. Saroj K. Swain (2004) Establishment of an ornamental fish breeding cum rearing unit for entrepreneurship development. In Ornamental fish culture and trade in Northeastern India, *edited by Bhattacharya B.K and Choudhury M*. CIFRI, NERC, Guwahati,80-84.
9. Saroj K. Swain (2004) Captive breeding of exotic ornamental fish species and entrepreneurship development. In regional training on Prospects of ornamental fish trade in the North east India, *edited by Das, S. K*. College of Fisheries, AAU, Raha, Nagaon, Assam, 12-15pp.
10. Saroj K. Swain (2005) Breeding of ornamental fish species and entrepreneurship development. In training cum workshop on ornamental fish culture and trade, *edited by Das, S. K*., College of Fisheries, AAU, Raha, Nagaon, Assam, 32-38pp.
11. S.K.Swain and P.P. Chakraborty (2004) Ornamental fish breeding and culture, compendium of lectures, for Meghalaya participants, 85 pp

12. S.K.Swain, S.K.Sarkar, G.S,Saha and R.K.Jana(2003) Ornamental fish farming – An income source for unemployed youths, National seminar on prospects of ornamental fish breeding and culture in eastern and northeastern India,Kolkata Centre, CIFE, Kolkata during 16-17 February,2004(Abs)

13. Saroj K Swain , Kuldeep Kumar and S.K.Sarkar (2003) Ornamental fish breeding and culture – special training programme for North Eastern States of India during 2-6 July, 84p.

14. Saroj K Swain and B.K.Das (2001) Captive breeding of dwarf Gourami *Colisa lalia* in the cement cisterns. Contributed a paper in a Workshop "Captive breeding of priortised cultivable and ornamental fishes for commercial utilisation and conservation "NBFGR, Lucknow, NBFGR-NATP Publ.No.3 (paper no.10), 29-30 July2001.

15. B.K.Das and Saroj K. Swain (2001) Saprolegniasis of dwarf Gourami, *Colisa lalia* (Hamilton-Buchnan) brood stock during acclimatisation for captive breeding. Contributed a paper in a Workshop "Captive breeding of priortised cultivable and ornamental fishes for commercial utilisation and conservation" NBFGR, Lucknow, NBFGR-NATP Publ.No.3 (paper no.45), 29-30 July2001.

Portable FRP Carp Hatchery
NEH Region Status Report

ICAR-Central Institute of Freshwater Aquaculture
Kausalyaganga, Bhubaneswar-751002, Odisha

Specifications of Portable FRP Carp Hatchery

Capacity: Breeding Pool (3409 L); Hatching Pool (1400 L); Egg Collection Chamber (250 L)

Dimensions: Breeding Pool (2.15 m (D), 0.9 m (H), 1:22 bottom slope) Hatching Pool (1.4 m (D), 0.98 m (H)) with a FRP inner chamber of 0.4 m diameter and 90 cm height covered with nylon bolting cloth to filter the excess water to the drain. Egg collection chamber (1.0 m (L) × 0.5 m (B) × 0.5 m (H))

Material of Make: Fibre Reinforced Plastic (FRP)

Advantages of FRP Carp Hatchery:

- Easy for transportation to different locations
- Easy to install and operate
- Require less space (6.0 x 3.0m) for installation and can even be placed on a pond dyke
- Easy to repair and replace minor fittings
- It is suitable for small scale breeding with production capacity of 1.0-1.2 million spawn of Asiatic carps in one operation.
- Its efficiency is above 85%. With the spawn availability, about 500 ha

Status of the technology in different NEH States

Arunachal Pradesh:

Place of hatcheries supplied	Year	No.	Remarks
State Fisheries Department, Itanagar, Arunachal Pradesh	2007, 2010	4	• Training Programme was organized by ICAR –CIFA at Emchi, Arunachal Pradesh • Training Programme conducted at ICAR Arunachal Centre , Basar • Training programme conducted at Arunachal. News published in ICAR-CIFA, News Vol. 22, No.2, April-June, 2015
Krishi Vigyan Kendra, Tirap District, Arunachal Pradesh - 1	2010	1	
Krishi Vigyan Kendra, West Kameng, Dirang, Arunachal Pradesh	2011	1	
Govt. of Arunachal Pradesh, Itanagar	2013	4	

Training on 'Breeding techniques of carp seed production and hatchery management for paddy-cum-fish culture' at ICAR Arunachal Pradesh Centre, Basar

A training programme on breeding techniques of fish with special reference to common carp seed production and latest technology on paddy-cum-fish culture was organized by ICAR-RC-NEH Region, Arunachal Pradesh Centre, Basar in collaboration with Department of Fisheries, at Regional High Altitude Fish Farm, Tarin, Ziro on 9-10th April, 2013 under NICRA (R) project.

Dr. R. Bhagawati, Joint Director, ICAR, AP Centre, Basar explained the purpose and objectives of the training programme and also delivered a lecture on importance of paddy-cum-fish culture and adoption of new climate resilient agricultural technology for sustaining the productivity.

Dr. Sanjay Kumar Das, Principal Scientist (Fishery), ICAR-RC-NEH Region, Meghalaya delivered lecture on breeding techniques of 'Amur' an improved strain of common carp. He also suggested the fish farmers to replace German and Bangkok strains with improved 'Amur' strain which originated from Amur River in Russia. This improved fish strain has higher growth rate and late sexual maturity. He also showed some visuals on common carp breeding techniques, food and feeding habits of common carp species.

Agricultural inputs like Outer Hatching Happa (75), maize and vegetable seeds kits (50), Khasi mandarin (20), banana seedlings (10), shade net and polyhouse sheet were also distributed to the farmers during the programme.

Installation and demonstration of portable hatchery for carp breeding was conducted in a farmer's field for fishery officers and farmers.

The training programme was coordinated by Dr. D. Ramajayam, Senoir scientist (Hort.), Pani Odyssey, DFDO, N.K. Purkayastha, Fishery Officer, M. Ranka and M. Dolla, AFO and P. Mahanta, Research Associate.

Farmer's participatory in the programme.

DDG. Kran.nic.27

NEH file

GOVERNEMNT OF ARUNACHAL PRADESH
DIRECTORATE OF FISHERIES
ITANAGAR

No. FISH/DEV/ICAR-140/07-08/6503
Dated Itanagar the 8th October, 2015

To

The Director
Central Institute of Freshwater Aquaculture (CIFA)
ICAR, P.O- Kausalyaganga,
Bhubaneswar 751002
Odisha.

Sub: - **Proposal for assistance under various scheme regarding.**

Sir,

State of Arunachal Pradesh is moving towards sustainable development of Aquaculture/Fishery. It has vast aquatic resources and has rich repository of fish species. Most of the resources are still in their pristine condition and needs to be exploited for the welfare of farmers and augmenting aquaculture activities in the state. For systematic exploration, huge amount and sound technological backup is required which the department is lacking. It would be of great help if financial and technical support from your end under various schemes/ outreach activities is generously provided enabling to establish this farm sector activity firmly in the state.

Department is expecting support/help for the following specific activity: -

1. Development of integrated hatchery complex consisting of carp, cat fish & ornamental fish hatcheries at Govt. Fish seed farm cum farmers training centre Emchi, Dolmukh in Papum pare District.
2. Exposure visit of departmental technical staff and progressive fish farmers to places of fisheries importance in West Bengal & Odisha.
3. Short term orientation training of departmental staff & progressive farmers on aquaculture technologies & management, quality seed production, installation & operationalisation of FRP carp hatchery etc.
4. Hands on training on ornamental fish culture and breeding, management of ornamental fish farm etc.
5. Establishment of brood bank facilities in all districts in Govt. fish farm & farms of progressive fish farmers of Arunachal Pradesh. Initially to start with Papumpare district and assistance for specialized feed for brood fish rearing/development.
6. Assistance/ expertise for establishment of AFS/FFS in districts where there is high concentration of aquaculture activities.
7. On farm demonstration of composite fish culture & assistance thereof including feed.
8. Assistance for FRP carp hatcheries in four districts, (Upper Subansiri, Changlang, Namsai & East Kameng) since it will help in bridging the huge gap between demand & supply of quality fish seed.

NEH-file
Arunachal

17/10/12

As far as performance of the hatcheries installed in earlier instances, all of them are functioning and producing quality seed which further needs to be scaled up.

Your support will help to tide over the immediate requirement and looking forward to work in tandem in the best interest of aquaculture development in the state.

Positive response from your end is highly solicited.

Yours faithfully

(J.Taba)
Director of Fisheries
Govt. of Arunachal Pradesh
Itanagar.

Memo No. FISH/DEV/ICAR-140/07-08 Dated Itanagar the 8th October, 2015

Copy to: -

1. The Commissioner Fisheries, Govt. of Arunachal Pradesh, Civil Secretariat Itanagar for kind appraisal.
2. Dr. P.P Chakraborty principal scientist, regional research centre, waste water Aquaculture Division, CIFA, P.O Rahra Kolkata. 700118 for information please.
3. P.S to Parliamentary Secretary Fisheries for kind appraisal of Hon'ble Parliamentary Secretary please.
4. File.

Director of Fisheries
Govt. of Arunachal Pradesh
Itanagar.

Assam:

Place of hatcheries supplied	Year	No.	Remarks
Fish farmers of Barpeta, Assam	2008	2	Training programme conducted at ICAR-CIFA on 7th July 2015
Central University, Silchar	2009	6	
Amalgamated Plantations Pvt. Ltd., C/o Tata Tea Ltd., Guwahati, Assam	2010, 2011	7	News published in INFISH (National Fisheries Development Board Newsletter) Vol.6 (4), January- March, 2015
National Research Center on Pig, Rani, Guwahati, Assam	2010	1	Training programme conducted at ICAR-CIFA on 7th July 2015
FISHFEED, Guwahati, Assam	2012	1	
NEHR Component of CIFA	2012	5	
Govt. of Assam, through CIFA-NEH	2013, 2014	11	• Progress Report received from Nodal officer, BTC bearing Letter No. BTC/Fish/C-15/2013-14/76(A) dated 22.07.2015. • Fish seed production of 55.50 lakh crore nos. and Magur 100000 nos. • NFDB Newsletter (INFISH), Vol.6 (4): Jan-March 2015, pp-24.

NEH Activities

A training programme on "Installation of FRP carp hatchery" was organized in the Meen Bhawan, Directorate of Fisheries, Guwahati, Assam during 29-30 May 2013. Thirty two persons participated in the training programme. The Director (Fisheries), Govt. of Assam, Mr. Deka was the chief guest of the inaugural session and others present were Mr S. Purkayastha, Deputy Director of Fisheries (GoA); Dr P.P. Chakrabarty, SIC, Rahara, West Bengal and Dr B.C. Mohapatra, Principal Scientist, CIFA, Bhubaneswar. The participants were shown the installation of FRP carp hatchery, its operation and management at Assam State Farm, Ullubari. The participants were shown the grass carp spawn that were produced in the FRP carp hatchery by the officials of Assam State Government at Ullubari.

Training Programme at Guwahati, Assam

पूर्वोत्तर पर्वतीय क्षेत्रों की गतिविधियां

एफ आर पी कार्प हैचरी की स्थापना पर एक प्रशिक्षण कार्यक्रम 29-30 मई, 2013 के दौरान मीन भवन, मत्स्य निदेशालय, गुवाहाटी, असम में आयोजित किया गया था। बत्तीस व्यक्तियों ने प्रशिक्षण कार्यक्रम में भाग लिया। निदेशक, मत्स्य (असम सरकार), श्री देका उद्घाटन समारोह के मुख्य अतिथि थे और अन्य उपस्थित लोगो में श्री पुरकायस्था, उपनिदेशक, मतस्य (असम सरकार), डॉ पी.पी.चक्रवर्ती, एस आई सी, रहरा, पश्चिम बंगाल और डॉ बी.सी.महापात्र, प्रधान वैज्ञानिक, सीफा, भुवनेश्वर थे। असम राज्य प्रक्षेत्र उलुबाड़ी में एफ आर पी कार्प हैचरी की स्थापना, इसका संचालन और प्रबंधन को दिखाया गया। प्रतिभागी को उलुबाड़ी में असम सरकार के अधिकारियों द्वारा एफ आर पी हैचरी में उत्पादित ग्रास कार्प स्पॉन को दिखाया गया।

Grass carp spawn in FRP carp hatchery at Ullubari, Assam

CIFA NEWS, Vol. 20 No.2,April-June, 2013

NEH

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This is to certify that I have produced 17 lakh nos of Carp seed during 2014-15 session (Monsoon) using ICAR CIFA Portable Carp Hatchery.

No of Carp seed sold:

Spawn: 7 lakh

Fry: 2 lakh

Fingerling: 10,000 nos

Stocked in own pond: 1500 nos

Nityananda Baruah.

Signature of the beneficiary Dehjari

This is to certify that I have produced 2, lakh nos of Magur seed during 2014-15 session (Monsoon) using ICAR CIFA Portable Magur Hatchery.

No of Magur seed sold:

Fry: 5,000 nos.

Fingerling: 40,000 nos.

Stocked in own pond: 15,000 nos.

Ratul Das.

Signature of the beneficiary Naharkatia

28/6/13

OVEM

(152)

KRISHI VIGYAN KENDRA
ASSAM AGRICULTURAL UNIVERSITY
SARIAHTOLI :: NALBARI-781337 :: ASSAM
Phone No:03624298554
Email: kvknlb@gmail.com

No. KVK N/AAU/ 8(6)/2015-16/239 Date: 27/06/2015

This is to certify that ICAR-CIFA portable carp hatchery is being use for training and demonstration of carp breeding at KVK Nalbari, AAU farm.

(Mridul Deka)
Programme Coordinator
KVK nalbari, AAU

28/6/15

BODOLAND TERRITORIAL COUNCIL SECRETARIAT, KOKRAJHAR
DEPARTMENT OF FISHERY, AQUACULTURE

No.BTC/Fish/C-15/2013-14/76 Dated Kokrajhar the 22nd July/2015

From : P. K. Hazarika,
Nodal Officer,
Bodoland Territorial Council, Kokrajhar.

To : Dr. P. P. Chakrabarty,
Principal Scientist, CIFA, Kalyani.

Sub : Submission of Progress Report of Fish Seed Production by FRP Hatcheries during 2015-16.

Respected Sir,

I have the honour to forward herewith the Progress Report of Fish Seed Production by FRP Hatcheries sponsored by CIFA to beneficiaries of BTC for the year 2015-16. The total fish seed production of IMC by the beneficiaries is 55.50 Lakhs crore nos. and Magur, 100000 nos. Lacs. One of the Hatcheries had been damaged in Communal Riot during 2014-15.

This is for your kind information and necessary action.

With regards.

Yours' faithfully,

Nodal Officer, BTC
Central Govt. Schemes Planning &
Development, Aquaculture, Animal Husbandry.

Nodal Officer
Bodoland Territorial Council
Kokrajhar, Assam

No.BTC/Fish/C-15/2013-14/76(A) Dated Kokrajhar the 22nd July/2015

Copy to:

1. The Director, CIFA, Bhubaneswar for favour of information and necessary action.

Nodal Officer, BTC
Central Govt. Schemes Planning &
Development, Aquaculture, Animal Husbandry.

STATEMENT OF PROGRESS REPORT

FISH SEED PRODUCTION BY FRP HATCHERIES

Sponsored by CIFA, Bhubaneswar 2015-16:

Sl. No.	Name of Beneficiaries and Address	Species of Fishes	Breeding period	Total Production achieved	Signature of Beneficiaries	Signature of Surveyors
1	Sri Champak Boro Barama, Baksa district	Rohu, Catla, Mrigal, Kuhi.	April to July 10th - 2015	15.00 Lacs Fry	Champak Boro	
2	Sri Lakheswar Boro Rowta, Udalguri district	Rohu, Catla		11.00 Lacs Fry	Lakheswar Boro	(Dependra Ch. Brahma) Tech. Asstt. to Nodal officer)
3	Sri Baladev Mwshahary Haltugaon, Kokrajhar district	Rohu, Catla Mrigal		11.00 Lacs Fry	Baladev Mochary	
4	Sri Patiram Basumatary Rowta, Udalguri district	Rohu, Catla Kuhi		11.00 Lacs Fry	Patiram Basumatary	
5	Sri Chantala Narzary Barama, Baksa district	Magur		60,000 nos.	Chantala Narzary	
6	Sri Ranjit Mushahary Gopalgaon, Kokrajhar	Magur		40,000 nos.	রঞ্জিত মুছাহারী	22/7/15
7	Sri Jyoty Prasad Deka Tongla, Udalguri	Rohu, Catla, Kalbasa, Kuhi		9.0 Lacs Fry	Jyoty Pr. Deka	
8	Sri Deepak Hazarika Udalguri district	Rohu, Catla, Mrigal		7.5 Lacs Fry	দীপক হাজৰিকা	
9	Sri Mananjay Daimary Karigaon, Kokrajhar	Fired & lost during Communal Riot 2015-15.			Monanjay Daimari	

Checked & Verified

Hebal Mushahary
Joint President
Agriculture Development for
ST/SC and Backward Classes, Assam

Countersigned. 22/7/15

Nodal Officer
Bodoland Territorial Council
Kokrajhar, Assam

Meghalaya:

Place of hatcheries supplied	Year	No.	Remarks
State Fisheries Department, William Nagar and Shilong, Meghalaya	2007	2	News published in IBDLP, Vol.6, October 2014. In conservation with people of Meghalaya
ICAR Research Complex, Umiam	2012	10	
NEHR Component of CIFA	2012	2	
Dr. Donkupar Roy, Shillong	2013	1	
Govt. of Meghalaya, through CIFA-NEH	2013	2	
Dept. of Fisheries, Govt. of Meghalaya, Shillong	2014	14	

Establishment of Portable FRP Hatcheries in the Private Sector

The CIFA of Bhubaneswar has developed Fabricated Reinforcement Plastic (FRP) technology for Carp seed production in 2004 and has supplied 126 hatcheries to different states so far. Being smaller in size, it is easily transported. This technology is being introduced in Meghalaya through the Aquaculture Mission. Progressive fish farmers having a minimum water area of one hectare or SHGs or Fishery Cooperative Societies are being encouraged to take up the scheme. Each hatchery has a production capacity of 30 lakh spawn, which gives 12 lakh fry and finally, 10 lakh fingerlings. The scheme aims to cover 77 beneficiaries. The scheme will provide 60 per cent government assistance and 25 per cent as bank loan. The balance amounting to 15 percent has to be provided by the beneficiary as own contribution.

Seed Production in Private Hatcheries

The Mission is supporting private entrepreneurs to take up fish seed production by establishing modern hatcheries and FRP portable hatcheries. For this, both financial and technical support is being provided. The topography of the land and economic conditions of the people do not permit establishment of large hatcheries. Hence, the project supports private hatcheries of only two hectares and the entrepreneur has to bear the cost for any additional area. The project is supporting establishment of 15 hatcheries, each with a production capacity of 1 crore spawn. The estimated cost of each hatchery is Rs. 16 lakhs. Government is providing an assistance of 60 percent of the total cost and also arranging 25 percent as bank loan. The balance 15 per cent is to be invested by the entrepreneur as margin money.

Tripura:

Place of hatcheries supplied	Year	No.	Remarks
NEHR Component of CIFA	2012	4	• All hatcheries are operational, letter received by State Government. • A interaction cum training programme was organized on 25 Feb 2015, 83 framers with state officials attended. CIFA News published in Vol. 22 No.1, January-March, 2015
Govt. of Tripura	2013	8	
Govt. of Tripura, through CIFA-NEH	2013	4	
Govt. of Tripura	2015	8	

Manipur:

Place of hatcheries supplied	Year	No.	Remarks
State Fisheries Department, Imphal, Manipur	2005, 2006	3	
ICAR Research Complex for NEH Region, Manipur Center, Lamphelpat, Imphal	2010	1	
Krishi Vigyan Kendra, CAU, Imphal East, Andro, Manipur	2010	1	Inaugurated on 25 April, 2012
ICAR Research Complex for N.E.H.Region, Manipur Centre, Lamphelpat, Imphal	2011	1	
NEHR Component of CIFA Manipur	2012	2	
Govt. of Manipur, through CIFA-NEH	2013, 2014	14	

www.icarzcu3.gov.in/news

Zonal Project Directorate-III Successfully organized Annual Zonal Workshop at Imphal, Manipur

On 25th of April, 2012, Annual Zonal Workshop, Zone-III, ICAR Research Complex for NEH, Umiam was organized at Hotel Imphal, Imphal, Manipur. This workshop was jointly organized by Zonal Project Directorate, Zone-III, Umiam, Meghalaya and UtlouJoint Farming cum Pisciculture Society, Utlou, Manipur under the host ship of KVK Bishnupur,Manipur.

The inaugural session was chairedby Shri. Chaoba Singh, Chairman, Utlou Joint Farming cum Pisciculture Society & former Union Minister in the presence of Guests of HonorDr. P.G. Chegappa, former VC of UAS Banglore, Karnataka; Dr. K. K. Jindal, former ADG, ICAR;Dr. B.K.Konwar, VC, Nagaland University; Dr. Palendro Singh, Director of Agriculture, Govt. of Manipur; Dr. H. C. Bhattacharya, Director of Extension Education, AAU, Assam.Representatives of all the KVKs in North Eastern Region including Programme Coordinators and Subject Matter Specialist form different KVKs. Inaugural session was started by Lighting of traditional Manipur lamp & welcome address of Dr. Imotomba Singh, Programme coordinator of KVK Bishnupur.Dr. A. K. Gogoi, Zonal Project Director, Zone-III, Umiam, Meghalaya thrown light on the themes and objectives of Annual Zonal Workshop.Representatives of Department of Agriculture from different states, Scientists of ICAR Research complex, Imphal center, SMS form KVKs etc. attended the session. During the session Guests released different publications of Zonal Project Directorate and publications of KVKs including Booklets, Leaflets, folders and informative calendars published during the last year, were also released by the guests. Vote of thanks was proposed by Dr. A. K. Singha, Senior Scientist, ZPD-III, Umiam.

This workshop is organized to review the progress during 2011-2012 of KVKs in NE region. For the detailed discussion three day chain of technical session is outlined under the chairmanship of panel of experts. Different developmental issues for the XII five year plan were also taken under consideration to uplift the efficiency and outreach of KVKs in region. Dr. Dr. P.G. Chegappa, delivered visionary presentation on topic "Contract Farming and Market Led Extension" to motivate the extension functionaries of NE region. Dr. K. K. Jindal also made presentation for improving the Horticulture sectorof the NE region. He also emphasized on need of developing proper horticulture farming system modules for the shifting cultivated-degraded areas of the region.

During visit to Bishnupur KVK, Guest of Honor Dr. P.G. Chegappa inaugurated the newly established "Carp Hatchery Unit". "Soil Testing Laboratory" and "Mushroom production unit" was also inaugurated by Dr. A. K. Gogoi and Dr. Palendro Singh respectively in presence of all the delegates of workshop.

(Dr. Chengappa inaugurating Carp Hatchery Unit, KVK Bishnupur)

Mizoram:

Place of hatcheries supplied	Year	No.	Remarks
Diroctrate of fisheries	2011	1	
NEHR Component of CIFA, Mizoram	2012	8	
ICAR Research Complex for N.E.H. Region, Mizoram Centre, Mizoram	2013	1	
Govt. of Mizoram, through CIFA-NEH	2013	8	

Nagaland:

Place and No. of hatcheries supplied	Year	No.	Remarks
State Fisheries Department, Nihoto and Kohima, Nagaland	2007	2	
NEHR Component of CIFA Nagaland	2012	2	
Govt. of Nagaland, through CIFA-NEH	2013	2	
Nagaland Centre of ICAR RC NEHR,Dimapur	2014	2	

Sikkim:

Place and No. of hatcheries supplied	Year	No.	Remarks
NEHR Component of CIFA, Sikkim	2012	2	Demonstration of FRP Carp hatchery in Sikkim, News published in CIFA News Vol.19, No.3, October – December, 2012
Govt. of Sikkim, through CIFA-NEH	2013	2	

NORTH-EAST REGION DEVELOPMENT

उत्तर पूर्वी क्षेत्र विकास

Demonstration of FRP Carp Hatchery in Sikkim

On 5 December, 2012, the installation and operation of FRP carp hatchery was demonstrated at State Dept. Fish Farm, Rengpo, Sikkim.

Installation of FRP carp hatcheries in Sikkim

सिक्किम में एफआरपी कार्प हैचरी का प्रदर्शन

5 दिसंबर, 2012 को राज्य विभाग, मत्स्य प्रक्षेत्र, रेंगपो, सिक्किम में एफआरपी कार्प हैचरी की स्थापना और संचालन का प्रदर्शन किया गया।

Training Programme in Sikkim

A training programme on "Sensitizing Fish Farmers on Small Scale Aquaculture in Sikkim" was conducted by CIFA during 6-7 December, 2012 at Gangtok. All the state functionaries of Fisheries Department of Govt. of Sikkim were present in the inaugural function on 6 December 2012. In his inaugural speech, the Hon'ble Secretary to the Govt., Fisheries Department thanked CIFA for its wholehearted support to the state for fisheries development. He informed that the Hon'ble Chief Minister wishes to see the local cultured fish in the state markets in two years. The Director, Joint Director, Deputy Directors of the Fisheries Department, Govt. of Sikkim and other functionaries were present on the occasion.

Inaugural session of training programme at Gangtok

सिक्किम में प्रशिक्षण कार्यक्रम

सिक्किम में लघु स्तर के जलकृषि के प्रति मत्स्य पालकों को संवेदनशील बनाने पर एक प्रशिक्षण कार्यक्रम गंगटोक में 6-7 सितम्बर, 2012 के दौरान संस्थान ने आयोजित किया गया। सिक्किम सरकार, मत्स्य विभाग के सभी राज्य पदाधिकारी 6 दिसम्बर, 2012 के उद्घाटन समारोह में उपस्थित थे। अपने उद्घाटन भाषण में माननिय सरकार के सचिव, मत्स्य विभाग ने राज्य में मत्स्य पालन विकास के लिए सीफा का दिल से समर्थन देने के लिए धन्यवाद दिया। उन्होने बताया कि माननीय मुख्यमंत्री दो वर्ष में राज्य के बाजारों ने स्थानीय मछली देखना चाहते है। मत्स्य निदेशक, संयुक्त निदेशक, उप मत्स्य निदेशक, मत्स्य विभाग। सिक्किम सरकार के और अन्य पदाधिकारी भी इस अवसर पर उपस्थित थे ।