

Profile of Dr. D. N. Chattopadhyay

Name	Dr. D. N. Chattopadhyay
Designation	Principal scientist (Aquaculture)
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Division	Aquaculture Production & Environment Division
Institute	ICAR-Central Institute of Freshwater Aquaculture, Kausalyaganga, Bhubaneswar-751002, Odisha, India
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Educational Qualifications				
Sl. No.	Degree	Specialization	Year of passing	Institution
1.	Ph.D. (Zoology)	Aquatic Pollution (Effects of detergents on fish and fish food organisms)	1989	University of Kalyani, Kalyani, West Bengal, India
2.	M.Sc. (Zoology)	Fisheries	1980	University of Kalyani, Kalyani, West Bengal, India
3.	B.Sc. (Hons in Zoology)	Zoology	1978	University of Kalyani, Kalyani, West Bengal, India

Experience gained before entry in ICAR service	<p>Research</p> <ul style="list-style-type: none"> • Toxicological studies of different pollutants on fish and fish food organisms • Three years research experiences on the “Bio-ecological studies of the river Ganga in relation to fish fauna as affected by pollutants and restoration of normal population density” under the Dept. of Environment’s (Govt. of India) „Integrated Eco-development project on river Ganga basin”. • Co-investigator in “Mathabhanga-Churni river pollution control project” financed by the Dept. of Environment, Govt. of W.B. in the Dept. of Zoology, University of Kalyani for 2 years. <p>Carp breeding</p> <ul style="list-style-type: none"> • One month experience in Induced breeding of IMC and exotic carps in a private fish farm (Nilu Ghosh Fish Farm at Naihati, W.B.)
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	Aquaculture extension <ul style="list-style-type: none"> • Three years experience in fishery extension service in rural villages as a reporter in Bengali Patrika (MAACHH). 			
Experience gained after entry in ICAR service (Professional Experience)	Post held	Institution	Period	Experience
	Technical Assistant (Fisheries)	Krishi Vigyan Kendra (KVK), ICAR-Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar, India.	1989-1994 (5 years)	Training, Aquaculture Extension, Management of KVK Instructional Fish Farm & Research
	Technical Officer (Fisheries)	KVK, ICAR-CIFA, Bhubaneswar, India.	1995-2000 (6 years)	Training, Aquaculture Extension, Management of KVK Instructional Fish Farm & Research
	Subject Matter Specialist (Fisheries)	KVK, ICAR-CIFA, Bhubaneswar, India.	2000-2007 (7 years)	Training, Aquaculture Extension, Management of KVK Instructional Fish Farm & Research
	Senior Scientist (Aquaculture)	ICAR-CIFA, Bhubaneswar, India.	2007-2014 (7 years)	Research, Cage Aquaculture, Diversification and Wastewater Management, Aquaculture Extension & Training
	Principal Scientist	ICAR-CIFA, Bhubaneswar, India.	2014- till date (6 years continuing)	Aquaculture, Breeding, seed production and culture of hilsa, Aquaculture Extension & Training
Research Experiences	<ul style="list-style-type: none"> • Breeding and culture of carps • Cage aquaculture • Wastewater aquaculture • Fish brood stock management and nutrition • Breeding, seed production and culture of hilsa • Integrated aquaculture • Aquaculture Extension 			
Research Interests	<ul style="list-style-type: none"> • Integrated aquaculture • Cage aquaculture • Breeding and culture of carps, hilsa and small indigenous fish • Waste water aquaculture • Rural aquaculture 			

Important achievements	<ul style="list-style-type: none"> • Aquaculture extension • On Farm Testing and Front Line Demonstration of breeding and fish culture technologies in rural areas of Odisha • Development of Portable FRP eco-carp hatchery for small farmers in KVK, ICAR-CIFA. • Development of eco-carp hatchery complex in rural areas of Odisha. • Development of integrated agri-fish crop diversification in rural pond. • Aquaculture Extension for breeding, seed production, nursery pond management and grow-out culture of Indian Major carps and Exotic carps. • Development of cage aquaculture at Kuanria Reservoir near Daspalla of Nayagarh District of Odisha and Saguna beel of Nadia district of West Bengal. • Establishment of two FRP carp hatcheries at Kendrapara and Keonjhar district of Odisha and breeding of carps. • Development of breeding, seed production and culture of hilsa.
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Current Research Projects	<ol style="list-style-type: none"> 1. Growth performance of Hilsa, <i>Tenualosa ilisha</i> in captivity (I-98-F) as PI (2018-2021) 2. Efficient use of critical inputs towards sustainable aquaculture in the Moyna of Purba Midnapore, West Bengal through cluster approach (I-98-E) as CO-PI (2018-2021)
Research Projects Completed	<ol style="list-style-type: none"> 1. Cage aquaculture and its impact on ecosystem (Institute project as PI). 2. Breeding and culture of <i>Rhinomugil corsula</i> and its incorporation in polyculture (Institute project as Co-PI) 3. Economic and livelihood development of SC/ST population through freshwater aquaculture technologies (DBT project, GOI as Co-PI) 4. Aquaculture Diversification and Wastewater Management (Institute project as Co-PI) 5. Characterization and Utilization of wastes in Aquaculture (Institute project as Co-PI) 6. Transfer of technology of composite carp culture through demonstration among SC/ST women in Boudh and Purulia (DST project as Co-PI) 7. Outreach activity on fish feed Activity -2: Feed technology development for pond and cage culture of IMC and peninsular carps (ICAR project as Co-PI)

	<p>8. Performance of few high values regionally preferred fishes along with small indigenous freshwater fish species (SIFFS) in agri-horti-livestocks integrated culture system (Institute project as Co-PI)</p> <p>9. Stock characterization, captive breeding, seed production and culture of hilsa (<i>Tenuialosa ilisha</i>) (Externally funded project, funded by NFBSFARA, ICAR as CCPI)</p>
Publications	<p>1. Full Research Papers: 36</p> <p>2. Book: 01</p> <p>3. Book chapter: 06</p> <p>4. Technical bulletin/Booklet: 07</p> <p>5. Extension Folder: 06</p> <p>6. Popular Article: 31</p> <p>7. Training Manual: 06</p> <p>8. Chapter in Training Manual: 24</p> <p>9. Audio cassette: 03</p> <p>10. CD: 01</p>
I. Full research papers	<p>1. Chattopadhyay D.N. 1983. Acute toxicity of detergents to fish, plankton and worm. <i>Environ. Ecol.</i> 1: 115-116.</p> <p>2. Chattopadhyay D.N. 1983. Acute toxicity of detergents to fish and worm. <i>Environ. Ecol.</i> 1: 23.</p> <p>3. Chattopadhyay D.N. and S.K.Konar. 1984. Influence of an anionic detergent on fish. <i>Environ. Ecol.</i> 2: 257-261.</p> <p>4. Chattopadhyay D.N. and S.K.Konar. 1985. Chronic effects of an anionic detergent on aquatic ecosystem. <i>Environ. Ecol.</i> 3: 82-85.</p> <p>5. Chattopadhyay D.N. and S.K.Konar. 1985. Acute and chronic effects of linear alkyl benzene sulfonate on fish, plankton and worm. <i>Environ. Ecol.</i> 3: 258-262.</p> <p>6. Chattopadhyay D.N. and S.K.Konar. 1985. Chronic effects of linear alkyl benzene sulfonate on aquatic ecosystem. <i>Environ. Ecol.</i> 3: 428-433.</p> <p>7. Chattopadhyay D.N. and S.K.Konar. 1986. Acute and chronic effects of a nonionic detergent on fish, plankton and worm. <i>Environ. Ecol.</i> 4: 57-60.</p> <p>8. Chattopadhyay D.N. and S.K.Konar. 1986. Chronic effects of a nonionic detergent on aquatic ecosystem. <i>Environ. Ecol.</i> 4: 105-108.</p> <p>9. Chattopadhyay D.N. and S.K.Konar. 1987. Some bio-ecological studies of the river Ganga in relation to water pollution. <i>Environ. Ecol.</i> 5: 494-</p>

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10. **Chattopadhyay D.N.** and S.K.Konar. **1989**. Removal of detergent toxicity through adsorption by soil particles. *Environ. Ecol.* 7: 441-445.
11. **Chattopadhyay D.N.** and S.K.Konar. **1990**. Removal of detergent toxicity through culture of *Azolla caroliniana* and *Spirodela polyrhiza*. *Environ. Ecol.* 8: 1265-1268.
12. **Chattopadhyay D.N.** and S.K.Konar. **1990**. Removal of toxicity of linear alkyl benzene sulfonate through aging. *Environ. Ecol.* 8: 352-355.
13. **Chattopadhyay D.N.** and S.K.Konar. **1991**. Removal of toxicity of linear alkyl benzene sulfonate through algae culture. *Environ. Ecol.* 9: 342-344.
14. Radheyshyam, B.K.Sharma, S.K.Sarkar and **D.N.Chattopadhyay**. **1993**. Environmental stress associated with disease outbreak in fish in an undrainable weed infested pond. *Environ. Ecol.* 11: 118-122.
15. Radheyshyam, **D.N.Chattopadhyay** and S.K.Sarkar. **1994**. Loss in weight gain due to occurrence of Diplostomiasis disease in the fingerlings of *Labeo rohita* in nursery pond. *Appl.Zool.Res.* 5: 59-62.
16. Radheyshyam, S.K.Sarkar, S.Sarkar, J.P.Verma, **D.N.Chattopadhyay** and P.K. Mukhopadhyay. **1996**. On-farm trial to study the efficacy of formulated feed for fingerlings of *Labeo rohita* in monoculture system. *J. Aqua.* 4: 19-28.
17. Nandi S., **D.N.Chattopadhyay**, J.P.Verma, S.K.Sarkar and P.K.Mukhopadhyay. **2001**. Effect of dietary supplementation of fatty acids and vitamins on the breeding performance of the carp *Catla catla*. *Repro. Nutr. Dev.* 41:365-375.
18. **Chattopadhyay D.N.**, K. Marandi, J.P. Verma, S.K. Sarkar, P.K. Mukhopadhyay and S.S.Giri. **2002**. Effect of dietary vitamin supplementation on performance of Indian major carps under semi-intensive polyculture system. *Ind. J. Fish.* 49: 179-186.
19. Radheyshyam, **D.N. Chattopadhyay**, B.B. Satpathy and S.K. Sarkar. **2003**. Study on pond fertilization for sustainable carp fry production in rural area. *Aquacult.* 4: 231-236.
20. Radheyshyam, B.K.Sharma, **D.N.Chattopadhyay**, S.K.Sarkar and B.B.Satpathy. **1993**. Effects of phased increase in water level on the survivability of *Cyprinus carpio* (L.) fry in nursery ponds. *Third Indian*

Fish. Forum Proc., 11-14 Oct. 1993. Pantnagar. 59-63.

21. Adhikari S., B.Sarkar, A.Chattopadhyay, **D.N.Chattopadhyay**, S.K.Sarkar and S.Ayyappan. **2006**. Effect of cypermethrin on breeding performances of a freshwater fish, *Labeo rohita* (Hamilton). *Chemistry & Ecology*.22: 211-218
22. Adikari S., B.Sarkar, A.Chattopadhyay, **D.N.Chattopadhyay**, S.K.Sarkar and S.Ayyappan. **2008**. Carbofuran induced changes in breeding of a freshwater fish, *Labeo rohita* (Hamilton). *Toxicological & Environmental Chemistry*. 90:457-465.
23. **Chattopadhyay D.N.**, J.P.Verma, Radheyshyam, B.Behera, S.Sarkar and P.K.Mukhopadhyay. **2011**. On-farm evaluation of formulated feeds on the breeding performance of Catla catla reared in rural ponds. *Aquaculture Nutrition*. 17 (2): e30 – e38. (Article first published on 20 Nov. 2009 pp. 1-9. doi: 10.1111 / j. 1365-2095. 2009.00723.x on line publication).
24. Paul B.N., A.K.Datta, S.Das, **D.N. Chattopadhyay**, S.S.Giri and S.N.Mohanty. **2011**. Effect of dietary lipid levels on growth and carcass composition of *Ompok pabda* (Siluridae) fry. *Indian Journal of Animal Nutrition*. 28 (2):198-202.
25. **Chattopadhyay D. N.**, B. C. Mohapatra, S. Adhikari, K. C. Pani, J. K. Jena and A. E. Eknath. **2013**. Effects of stocking density of *Labeo rohita* on survival, growth and production in cages. *Aquaculture International*. 21 (1): 19-29.
26. Paul B.N., S.Das, S.S.Giri, **D.N.Chattopadhyay**, R.N.Mandal, P.P.Chakrabarti. **2012**. Performance of *Cirrhinus mrigala* Fingerlings on Feeding Dried Distillers Grain Soluble. *Indian Journal of Animal Research*. 46 (3):272-275.
27. De H. K., **D. N. Chattopadhyay**, Radheyshyam, G. S. Saha, A. K. Dash, S. Pal and T. S. Satpati. **2012**. Strengthening the livelihoods of rural women through polyculture of carps in seasonal ponds. *Indian J. Fish*. 59 (3): 137-141.
28. Mandal R.N., **D.N.Chattopadhyay**, B.N.Paul and P.K.Mukhopadhyay. **2012**. The duck weed (*Wolffia arrhiza*) as feed ingredient for nursery rearing of *Labeo rohita* and *Labeo calbasu*. *J.Inland Fish. Soc. India*. 44 (2): 21-27.
29. Mandal R.N., S. Adhikari and **D.N.Chattopadhyay**. **2012**. Influence of Nutrients on Growth of Water hyacinth, *Eichhornia crassipes* (Mart.)

	<p>Solms. <i>J. Indian Soc. Coastal agric. Res.</i> 30 (1): 28-32.</p> <p>30. Ghosh T.K., B.K.Paul, D.N.Chattopadhyay and R.N.Mandal. 2013. Duckweed (<i>Lemna minor</i>) as feed ingredient for fry of common carp (<i>Cyprinus carpio</i>). <i>J.Inland Fish. Soc. India.</i> 45 (1): 19-25.</p> <p>31. Mandal, R.N., R. Bar and D.N.Chattopadhyay. 2014. Shola, <i>Aeschynomene aspera</i> L. used for making indigenous handicrafts revealing traditional art needs conservation. <i>Indian Journal of Traditional Knowledge.</i> 13 (1): 103-110.</p> <p>32. De H. K., D. N. Chattopadhyay, Radheyshyam, G. S. Saha, A. K. Dash, T. S. Satpati and S. Pal. 2013. Grow out carp polyculture by women: a case study from Odisha. <i>Indian J. Extension Education.</i> 49 (1 & 2): 78-82.</p> <p>33. Mandal, R.N., S.Kar, D.N.Chattopadhyay, J.Maity, B.N.Paul, P.P.Chakrabarti and P.Jayasankar. 2016. Tubifex production using agro-industrial wastes and raw cattle dung. <i>Journal of Applied Aquaculture.</i> 1-6. DOI: 10.1080/10454438.2016.1169729 (published online on 02 May 2016).</p> <p>34. Chattopadhyay, D. N., A. Chakraborty, P. K. Ray, R. N. Mandal, V. R. Suresh and S. K. Banik. 2018. First ever weaning and feeding behavior of hilsa shad, <i>Tenuulosa ilisha</i> (Hamilton, 1822) fry under captive culture in freshwater pond. <i>Environ. Ecol.</i> 36 (2): 508-513</p> <p>35. Chattopadhyay, D. N., A. Chakraborty, P. K. Ray, R. N. Mandal, S. K. Banik, V. R. Suresh and K. Ghosh. 2019. Larval rearing of hilsa shad, <i>Tenuulosa ilisha</i> (Hamilton 1822). <i>Aquaculture Research</i>, 50 (3): 778-785.</p> <p>36. Chattopadhyay, D. N., A. Chakraborty, P. K. Ray and P.Jayasankar. 2019. Preliminary observations on artificial fecundation, hatching and developmental stages of embryo and larvae of the Indian shad <i>Tenuulosa ilisha</i> (Hamilton, 1822). <i>Indian J. Fish.</i> 66:125-135.</p>
II. Book	<p>Suresh, V.R., A.M.Sajina, S.Dasgupta, D.De, D.N.Chattopadhyay, B.K.Behera, R. Ranjan, V. Mohindra and S.Bhattacharya. 2017. Current status of knowledge on Hilsa. ICAR-CIFRI, Barrackpore, 108 p.</p>
III. Book chapter	<p>1. Radheyshyam, D.N.Chattopadhyay, L.Safui, B.B.Satpathy, S.K.Sarkar and A.K.Dash. 2005. Integrated agri-fish crop diversification in newly constructed pond for higher production and income generation. Zoology and Human Welfare (Ed. Dr. Ashok Verma). Dept. of Zoology, Dr. Shyama Prasad Mukherjee Govt. Degree College, Phaphamau, Allahabad, Univ. of Allahabad. p.p. 411. Section IV: 267-273.</p>

	<ol style="list-style-type: none"> 2. Mandal R.N., R. Bar, D.N.Chattopadhyay and A.K.Datta. 2011. Assessment of impact of water hyacinth (<i>Eichhornia crassipes</i>) on ecology and socio-economy. In: Evaluation and impact assessment of technologies and developmental activities in agriculture, fisheries and allied fields (Ed. A.K.Roy). 291-312. 3. Das B.K., B.C. Mohapatra, H. K. De, D.N. Chattopadhyay, N. Sarangi, A.E.Eknath, S. Chandra, P. Patnaik, A. Mallick, D.K. Swain and S. Ghosh. 2011. Women self help group in aquaculture at Tanar, Kendrapada Sadar, Orissa-a case study. Aquaculture Innovators. Published by Dr. P. Jayasankar, Director, CIFA. Edited by Radheyshyam, G.S. Saha and H.K.De. pp 78-86. 4. Jayasankar, P. and D.N. Chattopadhyay. 2014. Recent advances in enclosure and raceway systems of aquaculture: Prospects and constraints. In Sinha, V.R.P. and P. Jayasankar (Eds) Aquaculture – New Possibilities and Constraints. Narendra Publishing House, Delhi, India, pp. 97-117. 5. Mandal R.N., D.N. Chattopadhyay, B.K. Pandey, B.N. Paul, P.P. Chakraborti and P.Jayasankar. 2015. Promotion of sewage-fed Aquaculture through public Private partnership. In : Public Private Partnerships in Aquaculture (Sinha, V.R.P., P. Keshavanath, A.P. Sharma and B.P. Mohanty, Eds). Narendra Publishing House, Delhi, India, pp. 235-247. 6. Mandal, R. N., P. P. Chakrabarti, B. N. Paul, D. N. Chattopadhyay, A. Das, A. Hussan and P. Jayasankar. 2018. Recycling of sewage in aquaculture: Decadal technical advancement. In: Wastewater management through aquaculture (Eds. B.B.Jana, R.N.Mandal and P.Jayasankar), 335 p., Springer Publ. Chapter 5: 95-118.
<p>IV. Technical bulletin (Booklet)</p>	<ol style="list-style-type: none"> 1. Chattopadhyay D.N. 2003. <i>Nursery pond management</i>. ATIC (NATP) of CIFA (ICAR) publication, bulletin series-1, 28pp. 2. Sarkar S.K., B.B.Satpathy, Radheyshyam, D.N. Chattopadhyay, J.P.Verma, B.K.Sharma, B.Behera, P.K.Nayak, S.C.Rath and S.Ayyappan.2003. Portable eco-carp hatchery for small farmers-an innovative, feature packed and field-tested device. CIFA Bull.34 pp. 3. Chattopadhyay D.N., P.K.Mukhopadhyay, R.N.Mandal, B.N.Paul, P.P.Chakraborti, S.C.Rath and S.S.Giri. 2011. Ponamachher paripurak khadya (Supplementary Feed of carps). Published by CIFA & Fisheries Division of ICAR: Booklet No. 4: 16 pp. 4. Chakraborti P.P., S.C.Mandal, D.N. Chattopadhyay, R.N.Mandal, B.N.Paul and P. Jayasankar. 2012. Pabda – seed production & culture. Published by CIFA. 44 pp.

	<p>5. Chakraborti P.P., S.C.Mandal, D.N. Chattopadhyay, R.N.Mandal, B.N.Paul and P. Jayasankar. 2012. Pabda Machher prajanan O Chash Paddhati. Published by CIFA. 44 pp. (in Bengali).</p> <p>6. Chakraborti P.P., D.N. Chattopadhyay, R.N.Mandal, B.C. Mohapatra, K. Kumar, S. Mitra, A. Ghosh and P. Jayasankar. 2013. Aquaculture development plan for Aila affected Bali island of Sundarban-A study through participatory rural appraisal. 26th July, 2013. Published by Dr. P. Jayasankar, Director, CIFA. 40 pp.</p> <p>7. Chakraborti P.P., R.N.Mandal, S. Mitra, A. Ghosh, A.K.Jha, D.N. Chattopadhyay and P. Jayasankar. 2014. Maachh-Prani-Ucchamulya Sabjir Samanwita palan, CIFA, BBSR. 44 pp.</p>
<p>V. Extension Folder</p>	<p>1. Chattopadhyay D.N. and Radheyshyam. 2004. Argulosis control in fish. KVK (ICAR) publication.</p> <p>2. Chattopadhyay D.N. and Radheyshyam. 2004. Common carp breeding. KVK (ICAR) publication.</p> <p>3. Chattopadhyay D.N. and J.P.Verma. 2006. Preventive measures of common diseases of carp. KVK (ICAR) publication.</p> <p>4. Nandi S., S.Dasgupta, D.N. Chattopadhyay and P.K.Mukhopadhyay. 2008. CIFABROOD A proven broodstock feed for Indian major Carps. CIFA publication.</p> <p>5. Datta A.K., D.N. Chattopadhyay, R.N.Mandal, B.N.Paul, and B.K.Pandey. 2010. Borjya jale jibpalan Kendra-ek nazare (in Bengali). WAD of CIFA (ICAR), Rahara publication.</p> <p>6. De H.K., D.N. Chattopadhyay, Radheyshyam, G.S.Saha, A.K.Dash, P.P.Mondal, and F.Kora. 2010. Mishra machh chash (in Bengali). CIFA (ICAR) publication.</p>
<p>VI. Popular article</p>	<p>a) English language</p> <p>1. Sarkar S.K., B.K. Sharma, B.B.Satpathy, Radheyshyam, D.N.Chattopadhyay, B.Behera and P.K.Nayak. 1995. A simplified FRP carp hatchery for rural farmers. <i>Fishing Chimes</i>. Sept. 1995. P. 23-24.</p> <p>2. Mukhopadhyay P.K. and D.N. Chattopadhyay. 2002. Feed strategies for carps. <i>Aqua feed international</i>. 5: 23-25.</p> <p>3. Mukhopadhyay P.K., D.N. Chattopadhyay and Gopa Mitra. 2003. Broodstock nutrition- the key to quality seed production. <i>Infofish</i></p>

International. 3:25-31.

4. Mitra G., **D.N. Chattopadhyay** and P.K.Mukhopadhyay. **2005**. Nutrition and feeding in freshwater prawn (*Macrobrachium rosenbergii*) farming. *Aqua Feeds: Formulation & Beyond* 2:17-19.
5. Radheyshyam, L.Safui, **D.N.Chattopadhyay** and B.B.Satpathy. **2007**. Woman-friendly rural aquaculture. *Indian Farming*. 56 (10) : 50-55.Jan. 2007.
6. Sarangi N., B.C. Mohapatra, S. Chandra , H. K. De, **D.N. Chattopadhyay**, A. Mallick, P. Patnaik, D. K. Swain, S. Ghosh and B.K. Das. **2009**. Floriculture-cum-pisciculture: An Income generation opportunity for Tribal Women of Keonjhar, Orissa. *e-planet* 7(1): 47-49.
7. Mandal R.N., **D.N. Chattopadhyay**, G.S.Saha and P.K.Mukhopadhyay. **2010**. Water chestnut cum fish culture: a viable integration for rural aquaculture. *Agrovet Buzz*, 3: 53-56.
8. De H.K., **D.N.Chattopadhyay**, G.S. Saha, Radheyshyam, P.P.Mondal and S.Pal. **2011**. Status of aquaculture in Purulia district, West Bengal. *Fishing Chimes*. 31 (5): 28-29, 33.
9. Radheyshyam, **D.N. Chattopadhyay** and S.K.Sarkar. **2011**. Culture feasibility of freshwater mullet *Rhinomugil corsula* in ponds in India. *Aquaculture Asia*. 16: 23-26.
10. **Chattopadhyay D.N.**, H.K. De, G.S. Saha, Radheyshyam, S.Pal and T.S.Satpati. **2012**. Freshwater aquaculture in Boudh district of Odisha: Prospects and potentials. *Fishing Chimes*. 31 (11): 20-23.
11. Mandal, R. N., B.K.Pandey, **D.N. Chattopadhyay** and P. K. Mukhopadhyay. **2012**. Azolla-an aquatic fern of significance to small-scale aquaculture. *Aquaculture Asia*. 17 (1): 11-15.
12. Mandal, R. N., **D.N. Chattopadhyay** and P. K. Mukhopadhyay. **2012**. Potential of aquatic plant bio-resources. *The Water Garden Journal*. 27 (1):12-19.
13. Mandal, R. N., **D.N. Chattopadhyay**, P.P. Chakrabarti, B.K. Pandey and P. Jayasankar. 2015. Bio-remediation of domestic sewage recycled in aquaculture: A Central Institute of Freshwater Aquaculture Model. *Aquaculture Asia*. 20 (3): 14-19.
14. Mandal, R. N., S. Kar, P.P. Chakrabarti, **D.N. Chattopadhyay**, B.N. Paul, S. Adhikari, J. Maity and B.R. Pillai. 2018. Production of tubifex - a new

dimension of aquaculture in feeding juvenile fish. *Aquaculture Asia*, July-Sept.: 19-22.

b) Bengali language

1. **Chattopadhyay D. N. 1985.** Machher dim uthpadakder ekhon protijogitar bajar sob lukiye shikhte hoy. *Maachh Patrika*. 2: 15-18.
2. **Chattopadhyay D. N. 1985.** Saban o synthetic detergente ebong eai somosto drobyo prostutkari kolkarkhanar dushito borjyo podarther machher upor provab. *Maachh Patrika*. 3: 17-18.
3. **Chattopadhyay D. N. 1985.** Bish bachhor dhore Churni nodite mach dhore char joner songsare bachar lorai korchhi: Kumud Biswas. *Maachh Patrika*. 4: 14-15.
4. **Chattopadhyay D. N. 1985.** Silver carpe HCG dile chokh gholate hoy, gaye gha hoy, pet shokto hoy, stripping hoy na – sob machhei Cyprinuser gland byabohar korechhi: Shyamacharan Chatterjee. *Maachh Patrika*. 7: 11-14.
5. **Chattopadhyay D. N. 1985.** Akashe valo brishti na hole kretar pukure jolt hake na, amar-o dimpona bikri hoy na: Mahadeb Dan. *Maachh Patrika*. 9: 14-15.
6. **Chattopadhyay D. N. 1985.** Nilu Ghosh-er khamare Cyprinus machher projonon paddhati. *Maachh Patrika*. 10: 12-13.
7. **Chattopadhyay D. N. 1985.** Chhoto nodigulio kromei kolkarkhanar nordomay porinito hochchhe. *Maachh Patrika*. 11: 14-15.
8. **Chattopadhyay D. N. 1985.** Dushoner jonyo Damodar nodir mach morche, goriber ruji rojgar noshto hochchhe. *Maachh Patrika*. 12: 12-13.
9. **Chattopadhyay D. N. 1987.** Nilu Ghosh-er khamare machher pronodito projonon paddhati. *Maachh Patrika*. 7: 27-31 & 33.
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12. **Chattopadhyay D. N. 1993.** Joloj udvid domon o tar sodbyabohar. *Maachh Patrika*. 1: 24-30.

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<p>VII. Training Manuals developed</p>	<p>1. Chattopadhyay, D.N., Das, A., Mandal, R.N., Hussan, A., Chakrabarti, P.P., Pillai, B.R. and Sundaray, J.K. 2018. Training Manual on “Breeding and Seed Production of Hilsa, <i>Tenulosa ilisha</i>”. Training held at Kalyani Field Station of RRC, ICAR-CIFA, Rahara during 13-17 March, 2018. Training manual no. 70: 88 pp.</p> <p>2. Chattopadhyay, D.N., R.N. Mandal, B.N. Paul, A. Das, F. Hoque, S. Adhikari and B.R. Pillai. 2019. Training Manual on “Induced Breeding and Seed Production of Indian Major Carps” held at RRC, ICAR-CIFA, Rahara, WB during 16-20 July, 2019. Training manual no. 75: 82 pp.</p> <p>3. Adhikari, S., P.P. Chakrabarti, R.N. Mandal, B.N. Paul, D.N. Chattopadhyay, A. Das, A. Hussan and B.R. Pillai. 2019. Training Manual on “Advanced aquaculture technologies for doubling farm income” (sponsored by NFDB) held at SSKVK, Sonarpur, South 24 Parganas, W.B. during 27-29 November, 2019 and conducted by RRC, ICAR-CIFA, Rahara, Kolkata, W.B., India. Training manual no. 92: 47 pp.</p> <p>4. Chattopadhyay, D.N., S. Adhikari, R.N. Mandal, B.N. Paul, P.P. Chakrabarti and B.R. Pillai. 2018. Training Manual on “Induced Breeding and Seed Rearing of Indian Major Carps” held at RRC, ICAR-CIFA, Rahara, Kolkata, W.B., India during 23-28 July, 2018. Training manual no. 75: 90 pp.</p> <p>5. Adhikari, S., P.P. Chakrabarti, R.N. Mandal, B.N. Paul, D.N. Chattopadhyay, A. Das, A. Hussan and B.R. Pillai. 2018. Training Manual on “Advanced aquaculture technologies for doubling farm income” held at Ramkrishna Ashram KVK, Nimpith, South 24 Parganas, West Bengal during 27-29 November, 2018 (sponsored by NFDB), conducted by</p>

	<p>RRC, ICAR-CIFA, Rahara, Kolkata, W.B., India. Training manual no. 92: 55 pp.</p> <p>6. Paul, B.N., S. Adhikari, D.N. Chattopadhyay and R.N. Mandal. 2018. Training Manual on “Application of farm made feed for sustainable aquaculture production” held at RRC, ICAR-CIFA, Rahara, Kolkata, W.B., India during 3-7 December, 2018. Training manual no. 65: 106 pp.</p>
<p>VIII. Chapter in Training Manual</p>	<ol style="list-style-type: none"> 1. Chattopadhyay, D.N. 2017. Breeding and larval rearing of hilsa (<i>Tenualosa ilisha</i>). In: <i>Training manual on “Application and practices of fish feed in aquaculture” held at RRC-Rahara, ICAR-CIFA, WB during 23-28 October, 2017. Training manual no. 65</i>: 101-103. 2. Chattopadhyay, D.N. 2017. Breeding and larval rearing of hilsa (<i>Tenualosa ilisha</i>). In: <i>Training manual on “Nutrient management in fish culture with emphasis on soil health and carbon budget management” held at RRC-Rahara, ICAR-CIFA, WB during 11-15 December, 2017. Training manual no. 66</i>: 112-114. 3. Chattopadhyay, D.N. 2018. Small indigenous fish species (SIFS) – role in improving nutritional security for rural poor and strategy for conservation. In: <i>Training manual on “Integrated Fish Farming System Involving Small & Indigenous Fishes, Livestock and Agri-horticulture Crops for Doubling Farmers” Income” held at RRC-Rahara & Kalyani F.S., ICAR-CIFA, WB during 16 -20 Jan., 2018. Training manual no. 69</i>: 1-12. 4. Chattopadhyay, D.N. 2018. Biology of hilsa, <i>Tenualosa ilisha</i>. In: <i>Training manual on “Breeding and Seed Production of Hilsa, Tenualosa ilisha” held at RRC-Rahara, Kalyani Field Station, ICAR-CIFA, WB during 13-17 March, 2018. Training manual no. 70</i>: 19-24. 5. Chattopadhyay, D.N. 2018. Breeding of hilsa, <i>Tenualosa ilisha</i>. In: <i>Training manual on “Breeding and Seed Production of Hilsa, Tenualosa ilisha” held at RRC-Rahara, Kalyani Field Station, ICAR-CIFA, WB during 13-17 March, 2018. Training manual no. 70</i>: 30-36. 6. Chattopadhyay, D.N. 2018. Egg incubation and production of larvae of hilsa, <i>Tenualosa ilisha</i>. In: <i>Training manual on “Breeding and Seed Production of Hilsa, Tenualosa ilisha” held at RRC-Rahara, Kalyani Field Station, ICAR-CIFA, WB during 13-17 March, 2018. Training manual no. 70</i>: 37-41. 7. Chattopadhyay, D.N. 2018. Larval rearing and fry production of hilsa, <i>Tenualosa ilisha</i>. In: <i>Training manual on “Breeding and Seed Production of Hilsa, Tenualosa ilisha” held at RRC-Rahara, Kalyani Field Station, ICAR-CIFA, WB during 13-17 March, 2018. Training manual no. 70</i>: 42-44. 8. Chattopadhyay, D.N. 2019. Breeding and larval rearing of Hilsa

(*Tenualosa ilisha*). In the training programme on „Fish nutrition and feeding of fish” held at RRC, ICAR-CIFA, Rahara, WB during **17-21 June, 2019**. **Training manual no. 65**: 91-93.

9. **Chattopadhyay, D.N. 2019**. Techniques of induced breeding and spawn production of carps. In: *Training manual on “Induced breeding and seed production of Indian Major Carps” held at RRC, ICAR-CIFA, Rahara, Kolkata, W.B., India during 16-20 July, 2019*. **Training manual no. 75**: 1-6.
10. **Chattopadhyay, D.N. 2019**. Strategies of brood stock management. In: *Training manual on “Induced breeding and seed production of Indian Major Carps” held at RRC, ICAR-CIFA, Rahara, Kolkata, W.B., India during 16-20 July, 2019*. **Training manual no. 75**: 12-17.
11. **Chattopadhyay, D.N. 2019**. Nursery pond management. In: *Training manual on “Induced breeding and seed production of Indian Major Carps” held at RRC, ICAR-CIFA, Rahara, Kolkata, W.B., India during 16-20 July, 2019*. **Training manual no. 75**: 56-64.
12. **Chattopadhyay, D.N. 2019**. Production of some zooplankton for larval rearing of catfish. In: *Training manual on “Captive breeding and seed production of indigenous catfishes with emphasis on Ompok and Mystus species” held at RRC, ICAR-CIFA, Rahara, Kolkata, W.B., India during 30 July-03 Aug., 2019*. **Training manual no. 62**: 61-64.
13. **Chattopadhyay, D.N. 2019**. Nursery pond management. In: *Training manual on “Aquaculture pond production and productivity management with special reference to climate change” (sponsored by NFDB) held at RRC, Rahara during 26-30 August, 2019*. **Training manual no. 97**: 23-31.
14. Mandal, R.N. and **Chattopadhyay, D.N. 2019**. Role of natural fish food organisms in aquaculture. In: *Training manual on “Aquaculture pond production and productivity management with special reference to climate change” (sponsored by NFDB) held at RRC, Rahara during 26-30 August, 2019*. **Training manual no. 97**: 68-71.
15. **Chattopadhyay, D.N. 2019**. Composite carp culture. In: *Training manual on “Advanced aquaculture technologies for doubling farm income” (sponsored by NFDB) held at Kalyani Field station of RRC, ICAR-CIFA, Rahara during 11-13 September, 2019*. **Training manual**: 36-40.
16. **Chattopadhyay, D.N. 2019**. Composite carp culture. In: *Training manual on “Advanced aquaculture technologies for doubling farm income” (sponsored by NFDB) held at SS KVK, Sonarpur, South 24 Parganas, West Bengal during 27-29 November, 2019*. **Training manual no. 92**: 26-

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17. **Chattopadhyay, D.N. 2019.** Small indigenous fish species (SIFS)-role in improving nutritional security for rural poor and strategy for conservation. *In: Training manual on “Integrated farming system involving fish, livestock and agri-horticulture crops” (sponsored by NFDB) held at Kalyani Field station of RRC, ICAR-CIFA, Rahara during 6-10 Jan., 2020. Training manual no. 69: 43-55.*
18. **Chattopadhyay, D.N. 2018.** Strategies of brood stock management. *In: Training manual on “Induced breeding and seed production of Indian Major Carps” held at RRC, ICAR-CIFA, Rahara, Kolkata, W.B., India during 23-28 July, 2018. Training manual no. 75: 9-14.*
19. **Chattopadhyay, D.N. 2018.** Techniques of induced breeding and spawn production of carps. *In: Training manual on “Induced breeding and seed production of Indian Major Carps” held at RRC, ICAR-CIFA, Rahara, Kolkata, W.B., India during 23-28 July, 2018. Training manual no. 75: 15-20.*
20. **Chattopadhyay, D.N. 2018.** Nursery pond management. *In: Training manual on “Induced breeding and seed production of Indian Major Carps” held at RRC, ICAR-CIFA, Rahara, Kolkata, W.B., India during 23-28 July, 2018. Training manual no. 75: 24-32.*
21. **Chattopadhyay, D.N. 2018.** Nursery pond management. *In: Training manual on “Management of soil, water, nutrient and live fish food organisms for sustainable freshwater aquaculture” held at RRC, ICAR-CIFA, Rahara, Kolkata, W.B., India during 27-31 August, 2018. Training manual no. 80: 19-26.*
22. **Mandal, R.N. and D.N. Chattopadhyay. 2018.** Role of natural fish food organisms in aquaculture. *In: Training manual on “Management of soil, water, nutrient and live fish food organisms for sustainable freshwater aquaculture” held at RRC, ICAR-CIFA, Rahara, Kolkata, W.B., India during 27-31 August, 2018. Training manual no. 80: 58-67.*
23. **Chattopadhyay, D.N. 2018.** Composite carp culture. *In: Training manual on “Advanced aquaculture technologies for doubling farm income” held at Ramkrishna Ashram KVK, Nimpith, South 24 Parganas, West Bengal during 27-29 November, 2018 (sponsored by NFDB). Training manual no. 92: 36-40.*
24. **Chattopadhyay, D.N. and R.N. Mandal. 2018.** Breeding and rearing of hilsa. *In: Training manual on “Application of farm made feed for sustainable aquaculture production” held at RRC, ICAR-CIFA, Rahara,*

	Kolkata, W.B., India <i>during</i> 3-7 December, 2018. Training manual no. 65: 94-96.
IX. Audio Cassette	Prepared 3 nos of audio cassettes (Matsya Lahar, Matsya Dhara and Matsya Taranga) in 3 different languages Viz. Hindi, Oriya and Bengali in association with others for rural fish farmers. These were published by CIFA .
X. Preparation of CD for rural fish farmers	Chattopadhyay D.N., J.P.Verma and G.S.Saha. 2007. CD on „Common Carp Breeding“ in Oriya language for rural fish farmers. The CD was published by Director, CIFA and released by Dr. A.E.Eknath of ICLARM & Chairman, Scientific Advisory Committee of CIFA on 11.04.07.
Patent	Patent of Feed “ CIFABROOD ” registered on 18-03-2011 as a team member.
Awards/ recognition	<ul style="list-style-type: none"> • „R & D in Aquaculture in the country“ given by Convener, Fifth Indian Fisheries Forum, 2000. • „Best Technical Staff Award“, Institutional, CIFA (ICAR), 2004. • Bishes Praman Patra for “Involvement in Extension of Rajbhasa” on celebration of Rajbhasa Hindi Golden Jubilee year, Institutional, CIFA (ICAR), 2000. • “Best Section Award” of CIFA in the Silver Jubilee Year of CIFA 2010-2011 as a team member of RRC of CIFA, Rahara • “Best Poster Award” of the paper authored by H.K.De, D.N.Chattopadhyay, Radheyshyam, G.S.Saha, A.K.Dash, P.P.Mondal and S.Pal presented in the 9th Indian Fisheries Forum held at Chennai during 19-23 Dec. 2011