Dr. Subhendu Adhikari

Principal Scientist

Mob -

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Department	Aquaculture Production & Environment Division
Institute/University	Central Institute of Freshwater Aquaculture (*Indian Council of Agricultural Research*)
Address (Office)	Soil Science Section Aquaculture Production & Environment Division Central Institute of Freshwater Aquaculture P.O.- Kausalyaganga, Bhubaneswar-751 002 Orissa, India
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Tel	
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Date of Birth	January 1, 1966
Sex	Male

Educational Qualification

Degree/ Diploma	Year	Major field	University/ Institution	Distinction
M. Sc.	1988	Agricultural Chemistry & Soil Science	Calcutta University	1st class
Ph. D.	1995	Agricultural Chemistry & Soil Science	Calcutta University	-

Title of M. Sc. Thesis	• Assessment of Chemical characteristics of Calcutta sewage-sludge with reference to heavy metals
Title of Ph. D. Thesis	• Post irrigation effect of sewage application on soil properties and vegetation in the north-eastern fringe of Calcutta, India

Additional training in India and abroad

Training	Institution/ Country	Sponsored by	Duration	Subject
Training on Organochlorine pesticides residue analysis in fish and fishery products	Central Institute of Fisheries Technology, Cochin	CIFA	13-18 July 1998	Pesticide residue analysis
Training on Computer Application	ET & T Computer Education and Training Centre, Bhubaneswar	CIFA	1-24 December 1998	Computer Application
Summer School on Environmental Impact Assessment of Inland Waters for Sustainable Fisheries Management and Conservation of Biodiversity	Central Inland Capture Fisheries Research Institute, Barrackpore	CIFA	25 July to 14 August 2000	Sustainable Fisheries Management and Conservation of Biodiversity

Training on Climate Change/ Carbon Sequestration/ trading (Fisheries)	Carbon Management & Sequestration Centre, School of Environment & Natural Resources, Ohio State University, Columbus, Ohio, USA	NAIP	16th April to 17th July 2011	Carbon Sequestration in Aquatic Systems

Professionals experience (only for last 10 years)

Designation	Pay scale (Rs.)	Nature of work	Institute (Organization)	Period (From - To)
ARS Scientist	2200- 4000/-	Research	Central Institute of Freshwater Aquaculture (ICAR), Bhubaneswar	1992-1998
Scientist (Sr. Scale)	10,000/- 15,200/-	Research	Central Institute of Freshwater Aquaculture (ICAR), Bhubaneswar	1998-2001
Senior Scientist	12,000/- 18,300/-	Research	Central Institute of Freshwater Aquaculture (ICAR), Bhubaneswar	2001 onwards

Academic achievements (Awards /Special recognitions)

In-service awards

Name of the Award	Awarding Organization (Place/ Country)	Year	National/ International Institutional/ Professional Society.	Additional Information
ICAR award for outstanding team research for the Biennium 2001 - 2002	ICAR, New Delhi	2004	National	As Team member (Joint award)
Dr. B.C.Deb Memorial Award for Soil/ Physical Chemistry for 2004-2005	Indian Science Congress	2005	National	Individual Award

Fellowship of International Society for Environmental Protection (ISEP)	International Society for Environmental Protection, Gorakhpur	2005	0rganisational	Individual Award
The XII International Congress Commemoration Award for 2007	Indian Society of Soil Science, New Delhi	2007	Professional Society	Individual Award
Best Young Scientist Award of CIFA for the year 2002.	CIFA (ICAR), Bhubaneswar	2003	Institutional	Individual Award

Area of research: Specialization and experience (years) in research	• Management of Pond Environment (Soil and water quality management) and Nutrient Recycling in Pond Ecosystem, Assessment of heavy metals and pesticides in aquatic systems, carbon sequestration in aquaculture ponds.
Salient Research achievements	• Development of protocol for enhancement of pond productivity through efficient use of macronutrients for sustainable aquaculture production. • Quantified role of micronutrient for higher production • Development of nutrient budget (C, N and P) for carp culture practices • Assessment of fish quality produced by organic inputs • Evaluated feasibility of heavy metals and pesticides contaminated water for aquaculture purposes • Evaluated water quality management for optimum fish/ shellfish production

List of Publications

Peer-reviewed Research papers

National

1. **Adhikari, S.**, Gupta, S.K. and Banerjee, S.K. (1993). Heavy Metals Content of City Sewage and Sludge. *J. Indian Soc. Soil Sci.* **41(1)**: 170-172.

2. Swarup, A**., Adhikari, S**. and Biswas, A.K. (1994). Effect of Gypsum on the behaviour of Soil phosphorus during reclamation of a sodic soil. *J. Indian Soc. Soil Sci.* **42(4)**: 543-547.

3. **Adhikari, S**., Mitra, A., Gupta, S.K. and Benerjee, S.K. (1994). Possibilities of using Calcutta sewage effluents and sludges for irrigation and manorial purposes. Part 1. Physico-chemical characteristics and impact of heavy metal contents on soil and water. *Proc. Indian Natn. Sci. Acad.* **B60 (6)**: 541-552.

4. Saha, P.K., **Adhikari, S**. and Chatterjee, D.K. (1996). Available iron, copper, zinc and manganese in some freshwater pond soils of Orissa in relation to soil characteristics. *J. Indian Soc. Soil Sci.* **44(4)**: 681-684.

5. **Adhikari, S**., Gupta, S.K. and Benerjee, S.K. (1997). Long term effect of raw-sewage application on the chemical composition of ground water. *J. Indian Soc. Soil Sci.* **45(2)**: 392-394.

6. **Adhikari, S**., Saha, P.K. and Chaterjee, D.K. (1997). Available boron, cobalt and molybdenum status in some freshwater fish pond soils of Orissa in relation to soil. Characteristics. *J. Indian Soc. Soil Sci.* **45(3)**: 583-584.

7. Chatterjee, D.K., Saha, P.K., **Adhikari, S**. and Mandal, A.K. (1997). Exploitation efficiency of added nitrogen and its effect on pond environment in freshwater aquaculture. *J. Aquacult. In Trop.* **12**: 123-131.

8. **Adhikari, S**., Mitra, A., Gupta, S.K. and Banerjee, S.K. (1998). Pollutant metals content of vegetables irrigated with sewage sludge. *J. Indian Soc. Soil Sci.* **6(1)**: 153-155.

9. Paul, B.N., Saha, C., Ghosh, A.S. and **Adhikari, S**. (1999). Effect of feed pellet diameter on the growth of rohu juveniles in flow-through aquaculture system. *Indian J. Animal Nutr.* **16(1)** : 34-37.

10. **Adhikari, S**. and Gupta, S.K. (1998). Effect of raw sewage water on mustard and soil properties. *J. of the IPHE, India.* **1998(2)**: 5-9.

11. **Adhikari, S**. and Saha, P.K. (1999). Desorption of adsorbed copper in freshwater pond soil in relation to soil properties. *J. Indian Soc. Soil Sci.* **47(2)**: 254-258.

12. Paul, B.N., **Adhikari, S**. and Ayyappan, S. (2000). Effect of feeding frequency on the growth performance of Labeo rohita juveniles and water quality in flow through system. *J. Animal Nutrition*. **17(1)**: 64-66.

13. Saha, C., Paul, B.N., **Adhikari, S.,** Mohapatra, B.C., Pattamajhi, P. and Ayyappan, S. (2000). *J. Aquacult.* **8**: 49-54.

14. **Adhikari, S**., Saha, R. and Gupta, S.K., (2001). Heavy metals contamination of sewage-fed fish, Labeo rohita in Eastern Calcutta. *Science and Culture.* **67(3-4**): 117-118.

15. **Adhikari, S**. and Gupta, S.K. (2002). Assessment of the quality of sewage effluents from dry weather Flow channel, Calcutta. *Indian J. Environ. Health*. **44(3)**: 197-202.

16. Chatterjee, A., **S. Adhikari**, S.P. Adhikary and S. Ayyappan, 2004. Fish as bioindicators for waiting periods of pesticides. *Indian Journal of Fisheries*, **51(3)**:271-276.

17. Sahoo, P. K., Tripathy, S., Mishra, B. K., **Adhikari, S.,** Das, B.K., Nandi, S., Hari Babu, P., Sarangi, N., Ayyappan, S., 2005. Is appendage deformity syndrome caused by Macrobrachium rosenbergii nodavirus? *Current Science*, **88(9)**:1374-1375.

International

1. **Adhikari, S**. (2002). Distribution of different forms of copper in freshwater pond soils of Orissa, India. *The Israel Journal of Aqculture- Bamidgeh*, 54**(3)**: 104-109.

2. **Adhikari,S.** and S.Ayyappan (2002).Fertilization of freshwater fish ponds with cobalt and its adsorption and desorption in the pond sediment. *The Israel Journal of Aqculture- Bamidgeh*, 54**(3)**: 110-115.

3. **Adhikari, S**. and Ayyappan, S. (2004). Behavioral role of zinc on primary productivity, plankton and growth of a freshwater teleost, *Labeo rohita* (Hamilton). *Aquaculture*. **231 (1-4)**: 327-336.

4. **Adhikari, S**., B. Sarkar, A. Chatterjee, C.T. Mohapatra and S. Ayyappan, (2004). Effect of Cypermethrin and Carbofuran on certain hematological parameters and prediction of their recovery in a freshwater teleost, *Labeo rohita* (Hamilton). *Ecotoxicology and Environmental Safety*, **58**:220-226.

5. **Adhikari, S**. (2004). Interference of Magnesium on Zinc adsorption by pond sediment and on Zinc accumulation in a freshwater teleost, *Labeo rohita* (Hamilton). *Ecotoxicology and Environmental Safety*, **59**: 228-231.

6. Sarkar, S., A. Chatterjee, **S. Adhikari,** and S. Ayyappan, (2005). Carbofuran and Cypermethrin induced histopathological alterations

in the liver of *Labeo rohita* (Hamilton) and its recovery. *Journal of Applied Ichthyology*, **21**:131-135.

7. Reddy, R., Pillai, B.R. and **Adhikari, S.**, (2006). Bioaccumulation of copper in post-larvae and juveniles of freshwater prawn *Macrobrachium rosenbergii* (de Man) exposed to sub-lethal levels of copper sulfate *Aquaculture*, **252**:356-360.

8. **Adhikari, S**., Sarkar, B., Chattopadhyay, A., Chattopadhyay, D. N., Sarkar, S. K. and Ayyappan, S, (2006). Effect of cypermethrin on breeding performances of a freshwater fish, *Labeo rohita* (Hamilton). *Chemistry and Ecology*, **22(3)**: 181-188.

9. Ghosh, L.,**Adhikari,S.** and Ayyappan,S. (2006). Distribution of lead, cadmium and chromium in sediment and their availability to various organs of a freshwater teleost, *Labeo rohita* (Hamilton). *Journal of Fisheries and Aquatic Science*, **1**: 200-208

10. **Adhikari,S**., Naqvi,A.A. and Sarangi,N. (2006). Effect of Fluoride on growth and feed intake of juvenile giant freshwater prawn *Macro brachium rosenbergii* (De-Man). *Fluoride*, **39**: 290-294

11. Ghosh,L. and **Adhikari,S**. (2006). Accumulation of Heavy Metals in Freshwater Fish – An Assessment of Toxic Interactions with Calcium. *American Journal of Food Technology*, **1**: 139-148

12. **Adhikari,S**. , Ghosh,L. and Ayyappan, S. (2006). Combined effects of water pH and alkalinity on the accumulation of lead, cadmium and chromium to ***Labeo rohita*** (Hamilton). *Int. J. Environ. Sci. Tech.*, **3 (3)**: 289-296.

13. Chattopadhyay, A., **Adhikari, S**., Adhikary, S.P. and Ayyappan, S. (2006). Evaluation of butachlor for control of submerged macrophytes alongwith its impact on biotic components of freshwater system. *Iran J. Environ. Health. Sci. Eng.*, **3(2)**: 103-108.

14. Ghosh, L.,**Adhikari,S**. and Ayyappan,S. (2007) . Assessment of Toxic Interactions of Heavy Metals and Their Effects on Accumulation in Tissues of Freshwater Fish. *Research Journal of Environmental Toxicology*, **1**: 37-44

15. **Adhikari, S**.,Naqvi, A. A., Pani, K.C., Pillai, B.R., Jena, J.K. and Sarangi, N. (2007). Effect of manganese and iron on growth and feeding of juvenile giant river prawn, *Macrobrachium rosenbergii* (De- Man). *Journal of the World Aquaculture Society*, **38(1)**: 161-168.

16. **Adhikari, S**., Chaurasia, V.S., Naqvi, A.A. and Pillai, B.R. (2007). Survival and growth of *Macrobrachium rosenbergii* (de Man) juvenile in relation to calcium hardness and bicarbonate alkalinity.

Turkish Journal of Fisheries and Aquatic Sciences, **7**:23-26.

17. Naqvi, A.A., **Adhikari, S**., Pillai, B.R. and Sarangi, N. (2007). Effect of ammonia-N on growth and feeding of juvenile *Macrobrachium rosenbergii* (De Man) Aquaculture Research, **38**:847-851.

18. Chattopadhyay, Amita**.,** **Adhikari, S.,** Adhikary, S.P. and Ayyappan, S. (2007). Influences of environmental factors and antidote addition on glyphosate toxicity to freshwater fish, *Labeo rohita* (Hamilton). *Chemistry and Ecology*, **23**: 279-287.

19. **Adhikari, S.**, Ghosh, L. and Ayyappan,S. (2007). Effect of calcium hardness on toxicity and accumulation of water-borne lead,cadmium and chromium to *Labeo rohita* (Hamilton). *Asian Journal of Water, Environment and Pollution*, **4**: 103-106

20. **Adhikari, S**., Sarkar, B., Chattopadhyay, A., Chattopadhyay, D. N., Sarkar, S. K. and Ayyappan, S, (2008). Carbofuran induces changes in breeding performances of a freshwater fish, *Labeo rohita* (Hamilton). *Toxicological and Environmental Chemistry*, **90**: 457-465.

21. **Adhikari, S.,** Ghosh, L., Rai, S.P. and Ayyappan, S. (2009). Metal concentrations in water, sediment and fish from sewage-fed aquaculture ponds of Kolkata, India. *Environmental Monitoring and Assessment*, **159**: 217-230.

22. **Adhikari, S.,** Ghosh, L., Giri, B. S. and Ayyappan, S. (2009). Distributions of metals in the food web of fishponds of Kolleru Lake, India. *Ecotoxicology and Environmental Safety*, **72:** 1242-1248**.**

23. Mohanty, M., **Adhikari, S.,** Mohanty, P. and Sarangi, N. (2009). Effect of waterborne zinc on survival, growth, and feed intake of Indian major carp, *Cirrhinus mrigala* (Hamilton) *Water, Air and Soil Pollution*, **201**: 3-7.

24. Mohanty, M., **Adhikari, S.,** Mohanty, P. and Sarangi, N. (2009). Role of waterborne copper on survival, growth, and feed intake of Indian major carp, *Cirrhinus mrigala* Hamilton. *Bulletin of Environmental Contamination and Toxicology*, **82**: 559-563.

25. Rout, G., **Adhikari, S**. and Mohanty, P. (2010). Effect of calcium and magnesium on copper, cadmium, and some essential elements of Indian major carps *Labeo rohita* (Hamilton) and *Catla catla* (Hamilton) treated with copper and cadmium. *Toxicological & Environmental Chemistry*, **92**: 1319-1330.

	26. **Adhikari, S**. and Mohanty, M. (2012). Effect of waterborne boron and molybdenum on survival, growth and feed intake of Indian major carp,*Cirrhinus mrigala* Hamilton*). Chemistry and Ecology*, **28**: 113–121.
Book Chapters	1. Sarkar, B., **Adhikari**, **S.,** Bandyopadhyay, P., Patra B. C. and Ayyappan, S (2004). Pesticides and fish: a workhouse for the detection, evaluation and abatement of water pollution. In: Water Pollution: Assessment and Management, Kumar Arvind and Tripathi, G.(eds.). *Daya publishing House*, New Delhi, India, 520 p. 2. Amita Chattopadhyay, **Adhikari, S.** and Adhikary, S. P. (2005). "Aquatic weeds and their management". In: Plant diseases Bio-control Management, Nehra, Sampth (ed). *Aavishkar Publishers, Distributors*, Jaipur, India, pp.127-142. 3. Sarkar, B., Mukherjee, D., **Adhikari, S.** and Ayyappan, S. (2005). Application of Environmental Biotechnological Tools in water Resource Development. In: Advances in Biochemistry and Biotechnology Volume 1, Chiranjib Chakraborty (Ed.*). Daya Publishing House*, New Delhi, India, pp.195-213. 4. **Adhikari, S**. (2007)**.** Role of water quality parameters in fish health and diseases. In. "Disease Management in freshwater pisciculture". Agrotech Publishing Academy, Udaipur (ISBN: 81-8321-059-7). 5. **Adhikari, S.** (2006). Soil and water quality management in Aquaculture. In: Handbook of Fisheries and Aquacutlure. *Indian Council of Agricultural Research*, New Delhi (ISBN: 81-7164-061-3). 6. **Adhikari, S.** and Mishra, B**.** (2008). Computer Based Advanced Tools for Soil-Water Management, p.217—231. In: Applied Bioinformatics Statistics and Economics in Fisheries Research. Eds. A.K.Roy and N. Sarangi. New India Publishing Agency, Pitam Pura, New Delhi. 7. **Adhikari, S.**, Chattopadhyay, A. and Sarkar, B. (2011). Application of some herbal extracts and calcium as an antidote to counteract the toxic effects of cypermethrin and carbofuran in Indian major carps, p. 281-288. In: Pesticides in the Modern World- Risks and Benefits. Ed. Margarita Stoytcheva, Intech- Open Access Publishers, Croatia (ISBN: 978-953-307-458-0) 8. **Adhikari, S.**, Pani, K.C., Jena, J.K., and Eknath, A.E. (2011). Utilization of carbon, nitrogen and phosphorus in carp culture ponds,

	pp. 163-173. In: Carp: Habitat, Management and Diseases. Ed. Jennifer D. Sanders and Sam B. Peterson, Nova Science Publishers, New York, USA (ISBN: 978-1-61324-525-5). 9. Dash, S., **Adhikari, S.**, Patra, A.K., and Panda, U.C. (2012). Heavy metals accumulation in water, sediment, fish and prawn in Kharasrota River, India, pp.1-14. In: Advances in Environmental Research, Volume 26. Ed. Justin A. Daniels, Nova Science Publishers, New York, USA (ISBN: 978-1-62081-469-7).

Teaching/ Training/ Extension

Teaching/ Extension

Teaching

Item	Details	Year	Additional Information
Faculty of CIFE, Mumbai and CIFA, Bhubaneswar	• Course of study for "Nutrient Management in Aquaculture" for M.F. Sc (Freshwater Aquaculture) students of CIFE,Deemed University, Mumbai	1999 to 2007	Faculty In-charge (2000 - 2007)
	• Course study for "Ecotoxicology and Pollution Management" for M.F. Sc (Freshwater Aquaculture) students of CIFE, Deemed University, Mumbai	2000 to 2004	Faculty member
	• Taught the courses and conducted the examinations for last 6 batches of M.F.Sc students of CIFE Deemed University, Mumbai		
Manuals or Bulletins	1. Training manual on "Nutrient management on freshwater Aquaculture".	1999	Co author
	2. Training manual on "Aquatic Environmental Management in Freshwater Aquaculture"	2000 2001 2003	Co author
	3. Training manual on "Nutrient and Environment Management in Aquaculture"	2005 2006	Co author

Guidance of students for University Degree	1. Ms. Lopa Ghosh was awarded **Ph.D Degree** in Chemistry on her thesis "Effects of lead, cadmium and chromium on Aquatic biota of freshwater fish ponds" from Utkal University, Vanivihar, Bhubaneswar.	2004	Guide
	2. Mr. K. C. Pani was awarded **Ph.D. Degree** in Chemistry on his thesis "Transformation and availability of Phosphorus from different sources in fish ponds and its effect upon addition of organic matter" from Utkal University, Vanivihar, Bhubaneswar.	2004	Guide
	3. Mr. Biplab Sarkar was awarded **Ph. D. Degree** in Zoology on his thesis "Evaluation of the effect of Cypermethrin and carbofuran on Indian Major Carp, *Labeo rohita* (H.) alongwith their impact on aquatic environment" from Utkal University, Vanivihar, Bhubaneswar.	2004	Joint Guide
	4. Mrs. Supriya Dash was awarded **Ph.D. Degree** in Zoology on her thesis "Studies on limnological aspects of the marginal water of river Kharasrota in Jajpur district, Orissa with special reference to heavy metals" from Utkal University, Vanivihar, Bhubaneswar.	2012	Joint Guide
	5. Mr. Sumanta Mukherjee was awarded **M.F.Sc. Degree** for his thesis "Evaluation of Potentialities of some chemicals in reduction of cadmium and chromium accumulation in *Heteropneustes fossilis* (Bloch)" from Barkatualah University, Bhopal, and Madhya Pradesh.	2000	Guide
	6. Ms. Shilpi Sharma was awarded **M.Sc. Degree** in Applied Limnology and Fisheries Technology for her thesis "Zinc and Copper induced hematological variations and bio-accumulation in freshwater teleosts,*Anabas testudineus* (Bloch) and *Channa punctatus* (Bloch)	2001	Joint Guide

	7. Mr. V. S. Chaurasia has been awarded **M.F.Sc. Degree** for his thesis on "Impact of inland saline water, water calcium and soil chemical composition on growth and survival of juvenile *Macrobrachium rosenbergii* (de Man) from CIFE (Deemed University), Mumbai.	2002	Guide
	8. Md. Ajaz Ahmad Naqvi was awarded **M.F.Sc Degree** on his thesis "Effect of iron, manganese and ammonia-N on survivability, growth and feeding of *M. rosenbergii* (de Man)" from CIFE (Deemed University), Mumbai.	2005	Guide
	9. Mr.Bishnu Charan Kisan was awarded **M.F.Sc.Degree** for his thesis "Effect of arsenic on growth and feeding of *M. malcolmsonii* (H. Milne Edward)" from CIFE (Deemed University), Mumbai.	2007	Guide
	10. Ms. Mausumi Mohanty was awarded **M. Phil. Degree** in Zoology for her thesis "Effect of copper and zinc on survival, growth and feeding of a freshwater fish, *Cirrhinus mrigala* (Hamilton)" from Raven Shaw University, Cuttack.	2007	Joint Guide
	11. Ms.Gomati Swain was awarded **M.Phil. Degree** in Zoology for her thesis "Phytoremediation of copper and cadmium using water hyacinth, *Eichhornia crassipes"* from Raven Shaw University, Cuttack.	2008	Joint Guide
	12. Mr. Gautam Rout was awarded **M.Phil. Degree** in Zoology for his thesis "Effect of calcium and magnesium on accumulation of copper and magnesium to Indian major carps, *Labeo rohita* (Hamilton) and *Catla catla* (Hamilton)*"* from Raven Shaw University, Cuttack.	2008	Joint Guide

Popular articles	**English** 1. **Adhikari, S.** & Saha, P. K. Ammonia toxicity in aquafarming, *Fishing Chimes*, **19(3**): 20-23. 2. **Adhikari, S.** Water and soil quality management in freshwater prawn farming, *Fishing Chimes*, **20(4):** 22-24. 3. Chaurasia V. S. and **Adhikari S.** Certain behavioural aspects of giant freshwater prawn. *Fishing Chimes*, **22(8):** 19-20. 4. **Adhikari, S**. Fertilization, Soil and Water quality management in small-scale ponds, Part-II: soil and water quality management, *Aquaculture Asia*, **VIII (1):** 11-13. 5. **Adhikari, S**. Fertilization, soil and water quality management in small-scale ponds Part-I. Fertilization. *Aquaculture Asia*, **VIII (4**): 6-8. 6. **Adhikari, S**. Fertilizer requirement of fishponds. *Aquatech*, **2(9**): 82-83. 7. **Adhikari,S.** and Pani, K.C. Soil and water quality management in fishponds. *Indian Farming*, **56(10**): 47-49. 8. **Radheyshyam, Saha, G**.S., Barik, N.K., Eknath, A.E., De, H.K., Safui, L., Adhikari, S. and Chandra, S. Constraints to fish production in community ponds in Orissa, India. *Aquaculture Asia*, **XVI (1**): 25-30.	1999 2000 2002 2003 2003 2003 2007 2011	Collaborative Individual Collaborative Individual Individual Individual Collaborative Collaborative
Extension bulletins/ pamphlets	• One pamphlet on **Soil and Water quality management for sustainable aquaculture.**	2003	Individual