

CURRICULUM VITAE

- Name :** ARUN KUMAR
- Born :** On June 13, 1959 at Meerut, UP, India, Married, 2 Children
- Education :** B.E.(Civil) Roorkee, ME (Civil) Bangalore, Dip in Hydro Power Development Trondheim (Norway) and PhD from IIT, Roorkee
- Employment :** Head (formerly Director) Alternate Hydro Energy Centre and Chief Scientific Officer since May 1998, Scientist 'C' 1985 - 1998, Scientist 'B' 1981-1985.
- Membership :** Life Fellow IE (India) , Life Fellow IWRS, Life Fellow IWWA, LM –IHA, Life Fellow - IHS, LM-SESI, Member- AWWA, Member- ASCE
- Awards :** CBIP "Cash your ideas Award - 1991" for innovative and indigenous solution for Weirs in hills, Surya Award (III) by Indian Institute of Rural Development and Social Services, Delhi(2001), National Scholarship (1973-79), UGC fellowship (1979-81)and NORAD fellowship (1988-89).
- Projects/ :
Field Work** Small Hydro Power Development related projects (involved in over total 800 MW capacity)
Detailed Project Reports 80 projects, Technical Specifications - 25 projects, Detailed Engg. Designs and construction drawings - 31 projects, pre-feasibility report - 70, planning and execution - 7 projects, techno-economic appraisal reports - 50 and R&D projects - 17 projects. Environment Mitigation and Eco-restoration - Dal & Nagin lake in J&K, Nainital lakes, Brindavan Lake, Jodhpur and Jaisalmer Lakes. India's first Cumulative Impact Assessment of Hydropower projects on rivers Bhagirathi and Alaknanda for MoEF
- National :
Committees** Ministry of New and Renewable Energy, constituted committee Chairman on Cost estimation for Village hydro project Member (Alternate) – Bureau of India Standards subcommittee (1984-95), Member (Convener) – subcommittee, MNES - New Technology, Member - Project Implementation Committee, Project Purchase Committee, Project Executive committee - MNES - HHP Govt. of India, IREDA's Board nominee, Member – UP Renewable Energy Cell, Uttaranchal Rural Electrification Cell, Member CII – GBC Godrej Renewable Energy Committee, Uttarakhand Electricity Regulatory Commission- member of advisory committee, Uttarakhand state govt committee for CDM project- member, Member secretary of Initiative for water for welfare, Ministry of Environment and Forests, Ministry of Science of Technology, Planning Commission, Ministry of New and Renewable Energy constituted steering committee member on Ladakh Renewable Energy Initiative. Member of executive committee of UREDA since 2006, Expert member on the committee constituted by Uttarakhand state government for Impact assessment of Hydro electric projects in hilly area. School management committee of Roorkee school for the Dean since Aug 10, 2010 for 3 years as Director's nominee, Servicing on governing body as faculty member for Technology Incubation and Entrepreneurship Activity (TIEDA) since Dec 2010, Member- 12th Plan proposal for small hydro sub group of MNRE
- International:** Contributed as Coordinating lead author for the chapter 5 on Hydropower of Special Report on Renewable Energy (SRREN) for Intergovernmental Panel For Climate Change report (IPCC) during 2009-11 released in June 2011; Member of Science Planning Group (SPG) in the area of Sustainable Energy by International Council for Science Regional Office for Asia and the Pacific Kuala Lumpur (Malaysia) 2008, development of a comprehensive report on Capacity Building on small hydropower development in Cambodia (UNIDO), Comprehensive report for implementing Renewable Energy Projects Systems in General and Small Hydro Power in particular in rural off grid areas of Sudan (UNIDO), UNDP-GEF Hilly Hydro project, REFRESHA with IH of UK, WB: New Small Hydro Options, R&M DPR with Canada, WIDP-WECS-HMG of Nepal for GIS database in SHP, Centre for Ecology & Hydrology : Training and Drainage Study for lean flow, CIDA – SHP Technology Transfer. Assessment of biological parameters of rivers in Himalayan regions with 10 institutions of 8 countries (funded by EC). Prepared a document for a shp development for Nias island in Indonesia (UNIDO), Prepared a document for privatisation of SHP in IRAN for Iran water and power co, Ministry of Energy, Prepared sector report on hydropower development in India for Norwegian embassy, Prepared sector Overview Report On Small Hydropower Development In India
- Professional:
Travel** *International:* Austria (2005, 2011), USA (1983,1997 &2010), Canada (1997), Nepal (2008, 2007,2003, 2000,1999, 1998, 1997, 1996 and 1994), Norway (1988-89, 1995 and 2000, 2009), Belgium (1985), Czech (2005), The Netherlands (1985), UK (1985, 2000, 2002 & 2010), China (1986 and 1998), Thailand (1998), Bangladesh 1999, 2003), France (1998, 2006), Germany (2009, 2011), Switzerland (2000, 2004, 2006), Sudan (2004) and Sri Lanka (1999, 2004, 2006, 2007 & 2010), Mexico (2010), Iran (2005), Rwanda(2007), Brazil (2008, 2009), Nigeria (2008) and Equatorial Guinea (2008), Cambodia (2010), Abu Dhabi (2011).
- National:* To the states of Arunachal Pradesh, Mizoram, Nagaland, WB, A&N Islands, Orissa, Bihar, Assam, Tripura, Meghalaya, Sikkim, MP, Gujarat, Karnataka, Maharashtra, Ar.P., Kerala, Tamil Nadu, J&K including Ladakh, HP, Uttarakhand, Jharkhand, Punjab, Gujarat, Chhattisgarh and Rajasthan.
- Collaboration :** Instrumental in Arranging MOU with International Organisations: Voith Hydro Germany, University of Itijuba (Brazil), ICIMOD, WEC-HMG (Nepal), IN-SHP (China), REMC-AIT (Thailand), SCP Gestion Conceil (Canada), IH (UK), ITECO (Nepal) Kathmandu, HTA Switzerland National : MNRE, Uttarakhand Govt., Bihar State. Hydro Corporation, HimUrja (HP Govt.), J&K PDC, .

Publications : Technical/Research Papers : 105 (including 39 **invited**), Engg. design and project reports - 60 National, Publications/Resources Papers/Reports - 20, BIS guidelines for Small Hydro Stations (draft)-1.

Courses : Participated in teaching of 50 short term courses, Course Coordinator - 9 courses, Course Director – 36. Formulated two M.Tech. Programme "Alternate Hydro Energy Systems" and M. Tech. Programme in "Conservation of Rivers and Lakes at AHEC". Also designed 3 optional subjects for UG students, Chairman APC (Since 1997) and BOS (Since 1998) CFB (2002 onwards).

Organised : 18 - International/National Conferences/workshops

Extra Activities: Deputy Director - STEP (1990-1998), Residential Warden (Ganga Bhawan (1982-85), Represented University Volley Ball team (1975-79), Convenor - Photography section at II Sc., Bangalore, 'B' certificate NCC.

Contact Number: Arun Kumar, Head, Alternate Hydro Energy Centre, Indian Institute Of Technology Roorkee, Roorkee-247 667 (Uttarakhand), INDIA, 91-1332-274254 and 285213 (Off.), 273270 and 285051(Res.), 273517 and 273560 (Fax), e-mail: akumafah@iitr.ernet.in or akumarb@gmail.com

Honours

- (i) Member (Alternate) of Bureau of Indian Standard (BIS) RVD Committee 15.4 on Small Hydro (1984-92).
- (iii) Member (convener) of Civil Engg. Aspects - New Technology Committee of Ministry of Non-Conventional Energy Sources, Govt. of India (1997 onwards).
- (iv) Member of 'Project Executive Committee' for UNDP-GEF Hilly Hydro Project, MNES, Govt. of India (1995-1999)
- (v) Member of High level "Project Implementation Committee" for UNDP GEF Hilly Hydro Project of Ministry of Non-conventional Energy Sources, Government of India (1998 -2000).
- (vi) Member of "Purchase Committee" for UNDP GEF Hilly Hydro Project of Ministry of Non-conventional Energy Sources, Government of India (1998 -2000).
- (vii) Member of "Renewable Energy Cell" of UP State Government since Aug. 2000
- (viii) Nominee Director of IREDA for its funded project (July, 2000- 2003).
- (ix) Member of "Rural Electrification Committee" of Uttaranchal – since Aug. 2001.
- (x) Member of Project Evaluation Committee of Uttaranchal Jal Vidyut Nigam, since July 2002.
- (xi) Member CII – GBC Godrej Renewable Energy Committee,(2003 till date).
- (xii) Chairman of the committee constituted by MNES for village hydro cost estimation, 2004.
- (xiii) Member of Uttaranchal state committee for CDM projects 2005
- (xiv) Member, Advisory Committee, Uttarakhand Electricity Regulatory Commission (2006 till date).
- (xv) Chairman, Hydropower seminar, ASSOCHAM and Royal Norwegian Embassy, 2006
- (xvi) Member of Planning Commission Sub-Committee on rivers, lakes and aquifer for 11th plan , 2006
- (xvii) Member of Planning Commission Sub-Committee on R&D Research, Design and Development in renewable energy, 2006
- (xviii) Member of International Scientific Committee constituted by MoEF for World Lake Congress, 2007
- (xix) Member, Expert member of committee for State S+T Intervention Projects, DST, Govt. of India, 2007
- (xx) Member, Expert member of committee for selection of site for IIT Patna from hydrology aspects.
- (xxi) Member of Standing Committee for Border area Illumination, Govt. of India, MNRE 2008.
- (xxii) Member of FICCI Renewable Energy Committee 2009
- (xxiii) Coordinating lead author on intergovernmental panel for climate change report on renewable energy – Hydro chapter (2009-2011)
- (xxiv) Member of Science Planning Group (SPG) in the area of Sustainable Energy by International Council for Science Regional Office for Asia and the Pacific Kuala Lumpur (Malaysia) 2008
- (xxv) Member of examination of small hydropower site offers constituted by Uttarakhand government 2008 till date
- (xxvi) Member of Uttarakhand state environment impact of hydropower project committee constituted by Uttarakhand government 2008 till date
- (xxvii) Member of Consultative committee for mid-term evaluation of MoEF constituted by Planning Commission 2009.
- (xxviii) Member of expert committee for examining the special issues related to Varanasi sewage on river Ganga constituted by MoEF 2010.
- (xxix) Member of expert committee for examining the issues of Loharinag Pala hydro project constituted by MoEF 2010.
- (xxx) Member of governing body as faculty member for Technology Incubation and Entrepreneurship Activity (TIEDA) of IIT Roorkee since Dec 2010,
- (xxx1) Member- 12th Plan proposals preparation for small hydro sub group of MNRE (2011)

Visits to Foreign Countries for Training/Education tour/Workshops/Seminars

- a) Invited by Intergovernmental Panel on Climate Change (IPCC), a scientific intergovernmental body setup by World Meteorological organization (WMO) and United Nations Environment Programme (UNEP), working group III as "Coordinating Lead Author" for preparing special report on Renewable Energy Sources and Climate Change Mitigation preparing – chapter 5 on Hydropower. The global report is released on June 14, 2011. (**Invited**). Attended first meeting at São José dos Campos, SP, Brazil, During Jan 26-29, 2009, second meeting at Oslo Norway during Aug 31 – Sept 04, 2009, Expert meeting At Washington DC, USA during Feb 1-2, 2010) and Third meeting at Oxford UK during Feb 28- March 05, 2010., fourth meeting at Mexico city Sept 17-24, 2010,

fifth meeting and fifth meeting at Potsdam Jan 17 – 20, 2011 and Final concluding meeting at Abu Dhabi May 3-8, 2011 **(Invited)**

- b) Invited by UNIDO, Vienna to prepare a Strategy Document for small hydropower development (2011) **(Invited)**
- c) Invited by UNIDO, Vienna to prepare a report on Capacity Building on small hydropower development in Cambodia and visited April 01-07, 2010. **(Invited)**
- d) Invited by UNIDO, to organize two training programmes in July and Sept 2010 on SHP capacity building at Cambodia **(Invited)**
- e) Invited by DFCC bank, Sri Lanka for Low Head Hydropower Development under World Bank funded RERRED project Feb 18-20, 2010 **(Invited)**
- f) Invited and visited leading hydro turbine manufacturer Voith Hydro, Heidenheim, Germany on Aug 28, 2009. **(Invited)**
- g) Invited by Koran International Turkey, to visit Turkey as shp expert to discuss with turkey Minister of Energy, govt agencies, Istanbul IU technical University and Tamsan for small hydro development during March 01 – 04, 2009 **(Invited)**
- h) Invited by to be member of Science Planning Group (SPG) in the area of Sustainable Energy by International Council for Science Regional Office for Asia and the Pacific Kuala Lumpur (Malaysia) and to contribute an article on Hydro Energy. Attended its meeting held at Kuala Lumpur (Malaysia) during Nov 14 – 15, 2008. **(Invited)**.
- i) Invited by AIL to visit Equatorial Guinea for water supply project design work Sept 30 – Oct 2, 2008**(Invited)**.
- j) Invited by Minister of Mining and Energy of Brazil and the Director-General of the United Nations Industrial Development Organization (UNIDO) to participate as a speaker in the **Global Renewable Energy Forum**, being held in Foz do Iguaçu, Brazil, from 18 to 21 May 2008 **(Invited)**.
- k) Invited to South Asia Regional Workshop on Developing Regional Standards for Micro-Hydro Sector, Colombo, Sri Lanka, March 25-27, 2006 for presenting on National micro hydro standards and quality programmes in India **(Invited)**.
- l) Invited and visited as international specialist for small hydropower development in Indonesia (Nias Island) by UNIDO Feb 4-12, 2006 **(Invited)**
- m) Participated in The first meeting of EU funded 10 institutions of 8 countries, research project review meeting at Brno, Czech Republic June 12-19, 2005. Also was invited by UNIDO, Vienna for discussion with them on small hydropower programme and related training activities on June 17, 2005
- n) Invited By Iran and Water Development corporation, Govt of Iran to visit and advise on small hydropower during may 13-21, 2005 **(Invited)**
- o) Invited to South Asia Regional Workshop on Developing Standards for Micro-Hydro Sector, Colombo, Sri Lanka, Sept. 5-7, 2004 for presenting on Existing micro hydro standards and quality programmes in India **(Invited)**
- p) Invited and participated in International Conference on Innovation in Hydraulics Efficiency Measurements at Lucern, Switzerland and visited other reputed international laboratories during July 13-21, 2004. **(Invited)**
- q) Invited and visited as international specialist for small hydropower development in Sudan by UNIDO, June 23-July 4, 2004.
- r) Invited and delivered specialist lecture – International Seminar and Training Course on Small Hydropower at Colombo, Sri Lanka, June 9-12, 2004.
- s) Invited and Delivered specialist lecture – International Training Programme on Power Generation, Dhaka, July 18-20, 2003. **(Invited)**
- t) Invited and Participated – UNESCO/DFID Sponsored, HKH – Friend Workshop at Kathmandu, May 7-9, 2003. **(Invited)**
- u) Visited Centre for Ecology & Hydrology, UK, Wallingford Hydraulic Research Institute, Dulas Engg, UK in Dec. 02-07, 2002. **(Invited)**
- v) Member of Delegation of Ministry of Non-conventional Energy Sources, Government of India and visited Small hydropower related government institutions, manufacturers and sites in Norway, Switzerland and UK during Nov. 12-Dec. 02, 2000. **(Invited)**
- w) Participated in UNESCO sponsored Hindu Kush Friend Workshop at ICIMOD Kathmandu, April 12-14, 2000. **(Invited)**
- x) Organised International short-term course on SHP at Kathmandu during April 17-22, 2000.
- y) Participated in the Energy Network Exchange visit to SHP sites in Sri Lanka by Intermediate Technology Development group, Sri Lanka during June 7-11, 1999. **(Invited)**
- z) Organised jointly an International Course on SHP at Dhaka/Bangladesh during May 6-9, 1999.
- aa) Participated in UNESCO Workshop on lean flows by ICIMOD, Kathmandu during April 23-25, 1999. **(Invited)**
- bb) Visited Water & Energy Commission Secretariat, HMG Nepal, Kathmandu for Nepal district SHP - GIS database project during March 6-8, 1999.
- cc) Participated in the Small Scale Hydro Resource and Technology IEA sponsored Workshop at NICE, France, Oct. 13-14, 1998. **(Invited)**

- dd) Visited 11 Small hydro stations in China (IN-SHP and ICIMOD), Aug. 30-Sept. 04, 1889. **(Invited)**
- ee) Technical discussion with REMC, AIT Bangkok, Sept. 1998. **(Invited)**
- ff) Participated in the "Experts' consultation on Private MMHP Development in the Hindu Kush Himalayan Region - A review of inputs and Methodologies, ICIMOD, Kathmandu, Nepal (Feb. 9-13, 1998). **(Invited)**
- gg) Visited Canada, attended different meetings with SCP Gestion Conceil (Sherbrooke), EDC, CIDA, CANMET, financial institutions and visited 11 shp power stations with auto operations (Aug. 9-22'97). **(Invited)**
- hh) Attended Indo-US Hydro Forum Meeting on Aug. 08'97 at Atlanta and delegated/participated in the Water Power' 97 International Conference (Aug. 3-8'97 at Atlanta, USA). **(Invited)**
- ii) Represented AHEC at India Trade Exhibition during May 17-20'97 in Kathmandu, Nepal.
- jj) Attended International Meeting on Renewable Energy-Enet work at Bhutwal, Nepal during March 9-11'96. **(Invited)**
- kk) Visited 8 Norwegian organisations for possible cooperation during April 23-29' 95 in Norway under NORAD support. **(Invited)**
- ll) Invited and participated in Expert Consultative Committee meeting at ICIMOD, Kathmandu, Nepal during Jan 11-16'94. **(Invited)**
- mm) P.G. Diploma cum Research Project in Hydro Power Development at Norwegian Institute of Technology, Trondheim, Norway, Aug. 1988-June, 1989.
- nn) Hangzhou Research Centre, China for SHP projects Aug. 18-29, 1986. Travelled across the country to visit 12 hydropower stations.
- oo) Invited by Twenty Technical Univ., Enschede, Netherlands June 1985 to study energy systems.
- pp) Delegate and presented a research paper in V World Congress on Water Resources, Brussels, June 1985.
- qq) Turlock irrigation district in California to see SHP installations, 1983.
- rr) Colorado State University, USA & Boston University for Indo-US collaborative research project 1983-84.

Details of Papers Published/Research Work

A. RESEARCH

I. Congress/Conference/Journal

1. **Kumar, A.**, T. Schei, A. Ahenkorah, R. Caceres Rodriguez, J.-M. Devernay, M. Freitas, D. Hall, Å. Killingtveit, Z. Liu, 2011: Hydropower. In IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation [O. Edenhofer, R. Pichs-Madruga, Y. Sokona, K. Seyboth, P. Matschoss, S. Kadner, T. Zwickel, P. Eickemeier, G. Hansen, S. Schlömer, C. von Stechow (eds)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. (Invited)
2. Arvizu, D.,, **A. Kumar**, et al 2011: Technical Summary. In IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. (Invited)
3. IPCC, 2011: Summary for Policymakers. In: IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation, Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA. Part of team of authors (Invited)
4. **Kumar Arun**, Small Hydropower: Social and Environment service , presented at Second World Renewable Energy Technology Congress-2011, New Delhi Apr 21-23, 2011 (Invited)
5. **Kumar Arun**, “ Challenges in Implementing Hydropower in India and Relevant Technology Development”, International Symposium on Energy Materials: Opportunities and Challenges, Kolkata, March 1-2, 2011(Invited)
6. Swati KM, Sharma MP and Kumar A, “Green-House Gas From Hydropower Reservoirs”, In proceedings of International Conference on Sustainable Water Resources Management and Climate Change Adaptation, organized by National Institute of Technology Durgapur, Durgapur (West Bengal), pp 405-420, Feb.17-19, 2011.
7. Saxena P, and **Kumar A**, “Government of India Policy on Hydro Power Development”, International Conference on Hydraulic Efficiency Measurement (IGHM-2010), Alternate Hydro Energy Centre, IIT Roorkee, Roorkee (India), pp.1-6, Oct. (21-23) 2010
8. Patil SS, Verma HK and **Kumar A**, Efficiency Measurement of Hydro Machine by Thermodynamic Method, International Conference on Hydraulic Efficiency Measurement (IGHM-2010), Alternate Hydro Energy Centre, IIT Roorkee, Roorkee (India), pp.181-189, Oct. (21-23) 2010.

9. Jain Sanjay, Saini R.P. and **Kumar Arun**, “CFD approach for prediction of efficiency of Francis Turbine”, International Conference on Hydraulic Efficiency Measurement (IGHM-2010), Alternate Hydro Energy Centre, IIT Roorkee, Roorkee (India), pp.257-263, Oct. (21-23) 2010.
10. Shekhawat Kuldeep Singh, Saini R.P. and Kumar Arun, “Finite Element Method (FEM) Analysis of Silt Erosion in Small Hydro Turbine” National Seminar on Advancement of Renewable Energy, presented at Arya College of Engineering, Jaipur
11. **Kumar Arun**, “Hydropower : Sustainable Energy Hydropower”, World Renewable Energy Technology Congress-2010, 18– 20 March 2010, New Delhi (Invited)
12. Kumar Arun, “Introduction to Low Head Hydropower Technology and its' Potential”, Workshop on Low-Head Hydropower Development, Colombo Feb 18-20, 2010, **(Invited)**
13. Sharma M.P., Kumar Arun and Rajvanshi Shalini, “Assessment of Trophic State of Lakes: A Case of Mansi Ganga Lake in India”, J. of Hydro Nepal –Journal of Water, Energy and Environment, Issue No. 6, January 2010, 65-72
14. HK Verma & Arun Kumar; “Performance Testing of SHP Stations: A Guide for Developers, Manufacturers and Consultants”, Dec 2009.
15. Arun Kumar presented as Anon ((2009): Status Paper on Ganga, National River Conservation Directorate, Ministry of Environment and Forest, Govt of India 31p. Aug 2009
16. Arun Kumar, “Status of SHP Development In India”, National Seminar Hydro Power Stations- Advancement In Harnessing & Up-Keeping July 2 – 3, 2009, Dehradun **(Invited)**
17. Arun Kumar & Vinay Shankar, “SHP Development In India”, 5th Hydro Power for Today Forum, May 11-12 2009, Hangzhou, China
18. Arun Kumar, “Small Hydropower Development: Recent Indian Initiatives”, International Conference Water India-V at Hotel Hyatt Regency New Delhi (India) on 3-4 November, 2008, **(Invited)**
19. Arun Kumar and Vinay Shankar, “Preparation Of A Plan Of Interventions For Conservation Of Vembanad Lake, Kerala, India”, International workshop on Sustainability of Lake Remediation and Interventions Hyderabad, India
20. Arun Kumar and Vinay Shankar, “Human Resource Development For Sustainable Remediation and Interventions”, International workshop on Sustainability of Lake Remediation and Interventions Hyderabad, India
21. Maity D, Sinvhal H and Kumar A, “Comprehensive Management Plan of Rabindra Sarovar, Kolkata” presented in International workshop on "Sustainability of Lake Remediation and Interventions", July 22-25, 2008, Hyderabad.
22. M.P.Sharma, Vivek Goel and A. Kumar “Water quality mapping of Kosi River using benthic macroinvertebrate” presented at “International conference on “Rivers in Hindu Kush-Himalaya: Ecology and Environmental assessment” held at Kathmandu, Nepal on March 03-07, 2008. **(Invited)**
23. M.P.Sharma & Arun Kumar “Water Resources Management Strategies in India”, presented at “International conference on “Rivers in Hindu Kush-Himalaya: Ecology and Environmental assessment” held at Kathmandu, Nepal on March 03-07, 2008
24. Saxena P, A. Kumar, “Small Hydro Development In India”, Ministry of New and Renewable Energy, Special Publication on 25 years of Renewable Energy in India, Nov. 2007. **(Invited)**
25. Arun Kumar, “Hypolimnic Withdrawal For Lake Conservation”, World Lake Conference (Taal 2007) at Jaipur Oct 28-30, 2007 (**Key Note Address- Invited**)
26. A. Kumar, H. K. Verma, Indian initiative to develop standards, guidelines and manuals for small Hydropower, International Conference on Small Hydropower Kandy, Sri Lanka, 22-24 October 2007
27. J. D. Sharma, A. Kumar, M. K. Singhal, Real time digital simulator for small hydropower plants, International Conference on Small Hydropower Kandy, Sri Lanka, 22-24 October 2007
28. H. K. Verma, A. Kumar Performance testing and evaluation of small hydropower plants International Conference on Small Hydropower Kandy, Sri Lanka, 22-24 October 2007

29. R. P. Saini, A. Kumar, Water mills for multipurpose applications, International Conference on Small Hydropower Kandy, Sri Lanka, 22-24 October 2007
30. S. K. Singal, Arun Kumar, D. K. Agarwal, O. D. Thapar, and Manoj Arya, "Implementation Of Dam Based Small Hydro Power Plant - A Case Study", IEEMA Journal, XXVII (9), 58- 63 (Sept 2007) **(invited)**
31. Arun Kumar, SMALL HYDROPOWER DEVELOPMENT: Non-Fossil Energy for Sustainable development, 7th renewable energy, summit, Sept 12, 2007, New Delhi **(invited)**
32. Arun Kumar & Mk Singhal, Small Hydropower Development National Seminar On Recent Advances In Wind And Hydro Energy Generation September 20, 2007 Jammu **(invited)**
33. Arun Kumar, "Small Hydro Power: Growth, Prospects, Barriers And Mitigations", Capacity Building Initiative Workshop For Financial Institutions In India To Address Risks And Barriers Associated With Re Projects, May 18-19, 2007, Mumbai (Invited)
34. Arun Kumar, "Training and Education in Small Hydropower and other Renewable Energy", Strategy for Quality focused training in Renewable Energy and Distributed Generation in India, Feb 21, 2007, New Delhi. (Invited)
35. M.P. Sharma: Shailendra Sharma, Vivek Goel, Praveen Sharma & Arun Kumar, "Water Quality Assessment of Behta River using Benthic Macroinvertebrates" Life Science Journal, 3 (4), 2006, 67-74.
36. Arun Kumar, "Small Hydropower: Potential And Developmnet", National Seminar On Hydropower: Harnessing The Untapped Potential, January 04, 2007, New Delhi (Invited)
37. Arun Kumar, "Small Hydro Power – Resource Assessment & Technology Development", Workshop On India-Asean Cooperation In Renewable Energy 18-19 December 2006, New Delhi (Invited)
38. Arun Kumar & Verma HK, "Standards And Guidelines For Small Hydropower Development: The Indian Initiative", International Himalayan Small Hydropower Summit, October 12-13, 2006, Dehradun
39. Saraf AK & Arun Kumar, "Spatial Technologies In Himalayan Small Hydropower Development", International Himalayan Small Hydropower Summit, October 12-13, 2006, Dehradun
40. Arun Kumar, "Some Specific Aspects Of Small Hydropower Projects For Consideration By Regulators", International Himalayan Small Hydropower Summit, October 12-13, 2006, Dehradun
41. Saini RP & Arun Kumar, "Development Of Standard Water Mills In Uttaranchal", International Himalayan Small Hydropower Summit, October 12-13, 2006, Dehradun
42. Kumar, Arun, "Standards and Performance Testing of Small Hydropower" Workshop on "Development of Small, Mini & Micro Hydropower Plants – Challenges & Related Issues" 16th June, 2006, CBIP, New Delhi, **(Invited)**
43. Kumar, Arun, "Sustainable Conservation of Lakes" National Consultation on Water Management in Fisheries and Aquaculture, June 23-24, 2006, Pussa, New Delhi. **(Invited)**
44. Kumar, Arun, M.K. Singhal, Sejal Kunchwar Small Hydro Power Projects – Issues, Constraints and Suggested Measures during Aug. 23-25, 2005, Shimla, Himachal Pradesh. (Invited), **(Invited)**
45. Kumar, Arun, "DDG Technologies – Potential, Constraints, Application and Relevance to Uttaranchal" workshop on Renewable Based DDG From Commissioning to Viability, March 18, 2006, Dehradun. (Invited)
47. Kumar, Arun, Small Hydropower - Untapped Potential, 5th ASSOCHAM Renewable Energy Summit on Commercialization of Renewable Energy Technologies, Aug. 25-26, 2005. (Invited)
48. Kumar Arun, Saini, R.P., Gandhi B.K., and Verma, H.K., "Performance Testing of Hydropower Stations: Need, Scope and Recommendations", Conference on Development of Hydropower Projects – A Prospective Challenge, April 20-22, 2005, Shimla. **(Invited)**
49. Kumar, Arun "Small Hydropower: Option for Electricity Generation", International Seminar on Non-conventional Energy, Renewables Energy Efficiency and Conservation", Feb. 20-21, 2005, Thiruvananthapuram. **(Invited)**
50. Kumar, Arun and Verma H.K., "Standards and Testing of Small Hydropower Stations", International Congress on Renewable Energy, Jan. 20-22, 2005, Pune. **(Invited)**
51. Kumar, Arun, "Existing Micro Hydro Standards and Quality Programmes in India", South Asia Regional Workshop on Developing Standards for Micro-Hydro Sector, Colombo, Sri Lanka, Sept. 5-7, 2004. **(Invited)**

52. Verma, H.K. and Kumar, Arun, "Instrument Networking for Efficiency Measurement in Small Hydro Power Stations", international conference on Advances in Hydraulic Efficiency Measurements at Lucern, Switzerland, July 14-16, 2004. **(Invited)**
53. Kumar, Arun, "Technical issues and design of structure for low head projects", International seminar on Renewable Energy, June 10-12, 2004 at Colombo, Sri Lanka. **(Invited)**
54. Kumar, Arun, "Small Hydropower in Hilly Regions" Presented at International Congress on "Renewable Energy for Sustainable Development", Jan. 21-23, 2004 at Bangalore. **(Invited)**
55. Kumar, Arun, "Small Hydropower Development - Potential and Rural Electrification", Presented at Regional Seminar on "Small Hydropower", Nov. 11-15, 2003 at Thiruvananthapuram, Kerala. **(Invited)** – also included in IREDA news (Jan. 2004).
56. Kumar, Arun, "Rural Electrification: Small Hydro", Presented at Round Table Meet on "US India Initiative for Hydropower Development", April 14, 2003, New Delhi. **(Invited)**
57. Kumar, Arun, "Distributed Generation : Technologies for Power Supply in Rural Areas" Presented at National Workshop on "Rural Electrification: Small Mini/Micro Hydel – Technology Overview" held on Jan. 24-25, 2003 at New Delhi **(Invited)**
58. Rees, G.H., Croker, M., Singhal, M.K., Saraf, A.K., Kumar, Arun & Others, "Flow Regime Estimation of Small Hydropower Development in Himachal Pradesh", J. Applied Hydrology, Vol. XV(2), 2002, 77-90.
59. Rees, G.H., Kumar, Arun, Saraf, A.K., Singhal, M.K., "Application of Regional Flow Estimation method in the Himalayas", 4th International Conference on FRIEND in Cape Town, South Africa, Mar. 18-22, 2002.
60. Kumar, Arun, "Small Hydro Potential and Prospects in India", International Conference "Green Power 2002", CII, Feb. 15-16, 2002, Chennai. **(Invited)**
61. Kumar, Arun, Rees, G., Raghuvanshi, T.K., "Small Hydropower assessment through HP Software", Annual International Conference Map India 2002, New Delhi, Feb. 6-8, 2002. **(Invited)**.
62. Kumar, Arun, "Small Hydropower Development Potential, Technology & Environment", Presented at National Conclave on "Small Hydropower" held on July 18-19, 2002 at New Delhi. **(Invited)** – also included in IREA news and SHP News (China).
63. "Selection of sites and low head turbines for Small hydro power development", business meet on Small Hydro Power Projects 2000-2001, Hyderabad Dec. 14, 2000. **(Invited)**
64. "GIS Based Assessment of Small Hydro Power Potential in Himachal Pradesh" National Seminar on small Hydro, Shimla, Dec. 09, 2000 **(Invited)**.
65. "Small Hydro Power Potential in Uttarakhand Region" Seminar on Harnessing of Uttarakhand Resources for Development of the Himalayas, Dehradun, September 10, 2000. **(Invited)**
66. "New technology for small hydropower projects", J. of Power and River Valley Develop Vol. XLVIX 1999 pp 134-141. **(Invited)**
67. Testing and certification of Small Hydro Equipment national Conference on renewable energy, Indore Dec. 20-22, 2000. **(Invited)**
68. 'Low Head small hydro power development', national workshop, Chandigarh Jan. 17, 2000. **(Invited)**
69. "Assessment of Small Hydro Scheme in India", IEA Workshop on Review of Assessment Methodologies and Possible Improvements, Nice, France, Oct. 13-14, 1998. **(Invited)**
70. "Small Hydro Power - Technology R&D Areas", IEA Workshop at Nice, France, Oct. 13-14, 1998. **(invited)**
71. "Small Hydro - A National Perspective", ANERT National Conference, Thiruvananthapuram, Feb. 10-11, 1999. **(Invited)**
72. "Private Sector Participation in SHP Development in India - An Introspection", ANERT National Conference, Thiruvananthapuram, Feb. 10-11, 1999.
73. "Reviving the Small Hydro Potential in Uttar Pradesh", National Seminar on Development Needs of Uttarakhand Region", Dehradun, Feb. 20-22, 1999. **(Invited)**

74. "Small Hydro Schemes in Hilly Areas with Limited Hydrological Data", International Symposium on "Hydrology of ungauged streams in Hilly Region for SHP Development, March 9-10, 1998, New Delhi.
75. "Regional Flow Duration for Himalayan Region of the Indian State of Uttar Pradesh", 5th International Conference "Hydroenergia 97", Dublin, Ireland, Sept. 29-Oct.1, 1997.
76. "Regional Flow Duration Model for Planning Small Hydro Power Projects in Himalayan Catchments of a North India State", 3rd International Conference of Hydro Power, 1997, Trondheim, Norway, June 30-July 2, 1997.
77. "GIS in Small Hydro Planning and Resource Management", Issue Sept - Oct.' 1997, GIS Development, New Delhi PP 30-37.
78. "Small Hydro Status" CII organised International Conference on Investment Opportunities in Renewable Energy, Mumbai, Sept. 11-12, 1997. **(Invited)**
79. "Small Hydro Power Scenario in Uttar Pradesh", All India Seminar on Development of Hydro Power Potential in India, April 22, 1997, Lucknow. **(Invited)**
80. "Survey and Assessment of Small Hydro Potential" International Conference on Small Hydro Power System, Mar 13-14, 1997, New Delhi. **(Invited)**
81. "Technology Selection Challenges for Small Hydro Power" International Conference on Small Hydro Power System, Mar 13-14, 1997, New Delhi.
82. "Remote Sensing and GIS Application in Small Hydro Projects Planning & Development. International Conference on Small Hydro Power System, Mar 13-14, 1997, New Delhi.
83. "Small Hydro Power Technology", All India Peoples' Technology Congress, Calcutta, Feb. 21-23' 97. **(Invited)**
84. "Selection of member and size of unit of Small Hydro Plant"; First International Conference on Renewable Energy and Small Hydro, Feb. 3-7 1997, Hyderabad.
85. "Resource Assessment-Resource assessment", International workshop for NAM and developing countries on Renewable Energy Application, Photovoltaic, Wind & Small Hydro, New Delhi, Dec. 3-7, 1996. **(Invited)**
86. "Small Hydro Power Status, Technology and R&D Areas, Seminar on S&T Inputs to Renewable Energy, Proceeding and Legislation, IIT, New Delhi, Nov. 22, 1995. **(Invited)**
87. "Small Hydro Potential of India', National Symposium on Renewable Energy, Bangalore Mar 6-7, 1995. **(Invited)**
88. "Small Hydro Power -Issues and Constraints" National Seminar on Small Scale Hydro Power, New Delhi, Jan 20-21, 1995. **(Invited)**
89. "Small Hydro Power and Role of consultant", National Seminar, Tripathi, Sept. 02,1994.
90. "Sadani Small Hydro Electric Project - a case Study", National Seminar, Ranchi, Mar 1994. **(Invited)**
91. "Ganga - Small Hydro Development", Seminar on Ganga in the Service of Nation", Roorkee, Sept, 1993.
92. "Economic & Financial Analysis of Small Hydro Power Projects", Urja bharti, Journal of Ministry of Non-Conventional Energy Sources, Vol. 3, No.2, Aug. 1992.
93. "Cost Effective Civil works as Applicable to Small Hydro Power" RN-SHP, Hangzhou Newsletter for Small Hydropower (Published in issue No. 1,1991).
94. "Potential of Entrepreneurship in Small Hydro Generation", International Conference on "Science Park Movement, Tiruchirapalli, Dec. 1990.
95. "Entrepreneur, Science Parks and Communication Through Video Media", International Conference on Science Park Movement, Tiruchirapalli, Dec. 1990.
96. "Civil Engineer as Manger of Hydraulic Project" 5th National Convention of Civil Engineers, Institution of Engineers, Calcutta Jan. 1990.
97. "Design Aid on Desilting Tanks for Micro Hydro Stations", Seminar on Potential & Development of Small/Micro Hydel Energy Systems in the Himalayan regions at Roorkee, Dec. 1987. **(Invited)**

98. "Steel Fibre Reinforced Concrete Penstock for Small Hydro Projects", Seminar on Potential & Development of Small/Micro Hydel Energy Systems in the Himalayan Regions at Roorkee, Dec. 1987.
99. "Design and Construction of Gates for Small Scale Hydropower III International Symposium on Wave, Tidal, Otec & Small Scale Hydro Energy by British Hydraulic Research Association at Brighton, England, May 1986.
100. "Environmental Impacts on Small Scale Hydropower Stations" International Seminar on Environmental Impacts Assessments of Water Resources Projects of WRDTC at Roorkee, Dec. 1985.
101. "Inexpensive Renewable Energy System for Rural Areas" International Water Resource Association V World Congress on Water for Development at Brussels, Belgium, June 1985.
102. "Integrated Small Hydro Energy Development" Speciality Conference on Water for Resource development by American society of civil Engineers at Idaho, USA, Aug. 1984.
103. "Small Hydro Power System Technology and Rural Development", Seminar on Small Hydro Power by Central Board of Irrigation & Power", at Delhi, India, Jan. 1983. **(Invited)**
104. "Manali Mini Hydro Power Project : A Case Study, World Conference on Water Power-1985, by American Society of Civil Engineers and US Army Corps of Engineers at Las Vegas, USA, Sept. 1985.
105. "Kakroi Fall Ultra Low Head Hybrid Hydro Energy Development" an international conference Energex-82, by Ministry of Energy, Canada, Aug. 1982. **(Invited)**

II. THESIS/DISSERTATION

1. "Optimal Hydro Generation Scheduling", Ph. D. Thesis at IIT Roorkee, 2008.
2. "Flood Wave Subsidence in Prismatic Open Channel", ME Dissertation thesis submitted at Indian Institute of Science Bangalore, 1981 (Unpublished).

Software

1. Hydra-HP – Flow regimes Estimation for Small Hydropower Estimation alongwith Centre for Ecology and Hydrology, UK (sold 42copies).

B. OTHERS (NATIONAL PUBLICATIONS/RESOURCE PAPERS/REPORTS)

- 1 Prepared the first quality standard for micro hydropower, Sept 2005
- 2 Prepared the draft and final version of the guidelines for Bureau of Indian Standard on the "Preliminary dimensions of small, mini & micro hydro power station and selection of turbines"(draft) as an alternate member of committee on hydropower stations. (Published IS 12800 (part 3):1991).
- 3 Special Issue on Small Hydro- Urja Bharati, Journal of Ministry of Non-Conventional Energy Sources as Convener of Publication Advisory Committee (Aug. 1992).
- 4 Prepared the Special Publication on Small Hydropower Development – Initiatives and Private Sector Participation, Issue 3, May 2003.
- 5 Team member of National team on MMHP for writing the country report for ICIMOD Nepal's Regional Training Programme on Mini and Micro hydropower.
- 6 Presented Resource paper on Small Hydro-Technology, Potential and Economics in business Meet on Renewable Energy use in Plantation Industry, Guwahati March 1994. **(Invited)**
- 7 Presented Resource Paper on Small Hydro-Technology, Potential and Economics in Business meet on Renewable Energy Use in Darjeeling Hills, Darjeeling June 6-7, 1994. **(Invited)**
- 8 Team Member "SHP - Private Sector Participation" Nov., 1996 and Nov., 1999 and April 2003.
- 9 Presented Resource Paper on Small Hydro-Technology, Potential and Economics in Ladakh Region in workshop at Leh Aug. 06,1994. **(Invited)**
10. Presented Resource Paper on "Potential for Hydro Energy" Seminar on International Prospectives in Water Resources Planning for students of University of Iowa (USA), Jan. 13, 1998, Roorkee. **(Invited)**
11. GIS based Identification of sites for Small Hydro Power Development, Workshop for Hilly states, Jan. 30-31, 1998 at Roorkee and Feb. 20-21, 1998 at Guwahati. **(Invited)**
12. Prepared Country resources paper on Small Hydro Power and presented at "Experts' Consultation on Private MMHP Development in the Hindu Kush Himalayan Region - A Review of Inputs and Methodologies", Kathmandu, Nepal, Feb. 9-13, 1998. **(Invited)**
13. Prepared as Team Coordinator Pre - Investment Report for New Options in Small Hydro Power, for IREDA, Jan, 198 for their submission to World Bank for 2nd line of credit.
14. Prepared as Team leader the Report "Identification of sources for irrigation, drinking water and Small Hydro Power in Tea Estates of Darjeeling Hills", for Darjeeling Planters' Association, March, 1998.
- 15 Presented Resource Paper on "Civil Engg. consideration for Design of Diversion and Desilting works" at "Workshop on SHP - State of Art", IIT Delhi, Dec. 10-12, 1998. **(Invited)**

16. Prepared as Team Leader the Report “GIS based data base of Small Hydro Power sites in Himachal Pradesh)” April 2002.
17. Prepared as Team Leader the Report “GIS based district inventory of SHP sites in Nepal”, Dec. 2001.
18. Prepared as Team Leader the Report” Zonal Plan covering 13 Hilly states of India for SHP Development” UNDP-GEF Hilly Hydro Project April 2002.
19. Presented Resource Paper for distributed generation through SHP in Ministry of Power National Workshop in Jan 2003. **(Invited)**
20. Presented Resource Papers for remote village electrification through SHP for State Nodal Agency Officers at Guwahati & Delhi in National Training Programme during June & Aug. 2004. **(Invited)**
21. Presented resource paper on Feasibility, planning, designs and procurement lowest coast with high quality in Workshop at Colombo, Sri Lanka in June 2004. **(Invited)**.
22. Prepared as Team Leader the Report on “Conservation of River Kshipra at Ujjain” Municipal Corporation, Ujjain, Govt of Madhya Pradesh, April 2009.
23. Prepared as Team Leader the Report on “Review of Water Quality Monitoring”, Ministry of Environment & Forests, National River Conservation Directorate, Govt of India, Feb 2010.
24. Master plan on “State Level Identification Plan of Small Hydropower Potential Sites in Punjab”, Punjab Energy Development Agency, Chandigarh, April 2006
25. Master plan on “Assessment of Cumulative Impact of Hydropower Projects in Alaknanda and Bhagirathi Basins up to Devprayag”, Ministry of Environment & Forests, National River Conservation Directorate, Govt. of India, March 2011
26. Master Plan on “Small Hydropower for Ladakh Region of Jammu Kashmir”, Ministry of New and Renewable Energy, Govt. of India, Dec 2009
27. Guidelines for Preparation of Project Reports under NRCP and NGRBA, Ministry of Environment & Forests, National River Conservation Directorate, Govt. of India, Dec 2010