

**INDO-EU WORKSHOP
ON
CLIMATE CHANGE &
NATURAL DISASTERS**

September 06- 10, 2004, Hyderabad, India

PREAMBLE

As the 21st century unfolds, it accompanies a range of long-term environmental problems forecasting immense consequences for the economic well being of world. Climate is the average warming and cooling of weather for millions of years. The average surface temperature of the earth has increased by about $0.6^{\circ} \pm 0.2^{\circ}\text{C}$. The outcome affects all interconnected sections; the Atmosphere; the Hydrosphere (the earth's oceans and water); the Cryosphere (the areas of the planet covered by snow and ice); and the Biosphere (the living organisms inhabiting all these domains). The enormous complexity of the earth's dynamic climate system such as interacting air masses, winds, ocean currents, and patterns of evaporation and precipitation makes long-term climate prediction extremely problematic. Aerosols, suspended liquid and solid particles, fire soot, volcanic eruptions, sea salt, bacteria, and viruses are another key component of the earth's atmosphere affecting the climatic behavioral pattern by governing the albedo.

The El Nino Southern Oscillation (ENSO) is the most prominent global climate system associated with year-to-year weather variability. The global implications of the climate change are further temperatures amplification, sea levels rise, violent rainstorms, floods, droughts and tropical cyclones. The magnitude of global warming, the representatives of green house gases activate an increase in precipitation and to balance, enhanced evaporation. Tsunamis, generated in the water body by impulsive disturbances (earthquakes, landslides, volcanic eruptions, explosions, and even the impact of cosmic bodies, such as meteorites) also result in changes in the nature's cycle generating erosional floods, hurricanes, landslides, change in sea surface temperatures, atmospheric variation and submergence. Correlating the quantification of flood, droughts, El Nino, tsunamis put forth the global consequences of natural disasters leading to extreme weather. Deforestation, forest fires and changes in land use pattern are inevitable factors adversely altering rainfall patterns, soil fertility and finally causing biodiversity loss.

Natural disasters, whether due to natural variability or as a result of human activity trigger detrimental effects like climate change, global warming, variation in rainfall pattern, temperature fluctuation and ecosystem imbalance. Another effected zone is world's polar ice, sea ice, glaciers, and permanent snow cover. Natural disasters have become a common periodic affair in recent years. The fragile islands ecosystems react sensitively to climatic variations as frequent heavy rainfall and severe winds in Fiji's largest island, caused deadly landslides and widespread flooding. Evidence suggests that sea levels have risen by 10 to 15 cm over in past hundred years. Continued rises would have devastating effects on islands whose entire living space lies only a few meters or less above sea level. The Indian Ocean's Maldives Islands having a mean height of 1 m above sea level, even small increases in sea levels would be disastrous. The El-nino phenomenon is also strongly responsible for prolonged dryness in tropical islands causing extensive forest fires, flash floods and devastating droughts.

The mitigation of natural disasters of such great magnitude needs a strong synergy between conservation agencies and non-government organizations. Ironically, if not given immediate priority we can see more pronounce effects involving a significant contribution from human domain. The global climatic issues are multifaceted but the scientific uncertainty in predicting environmental dynamics is the lid reason to hold off on addressing the problem of potential irreversibility in climate impacts. Modeling and simulation for understanding the climatic changes and for predicting the weather changes is still naïve. There is the other aspect of management and preparedness for the

natural disasters. A shift of commitment from economy to environment for sustainable development is the need of the hour to avert the catastrophes of natural disasters. Measurement of climatic changes and a global climatic network for monitoring environmental parameters on a worldwide scale is urgently needed. In India Natural Disaster Management Program was framed in 1993 to focus on disaster preparedness with emphasis on mitigation measures.

Advancements in spatial technology for disaster mitigation and global climate monitoring have open new vistas to understand the fundamentals of global climate research and the complex interrelations between human activity and natural forces.

THEMES

This workshop provides a forum for the experts from the European Union and India to discuss threadbare both current and far sighted issues related to natural disaster and climate change. The following are the possible areas of major themes of discussion during the workshop.

Climate Change

- Global warming and climate change.
- Atmospheric pollutant and climate forcing, Albedo reduction
- Climate modeling: micro and meso scale
- Ocean – Atmosphere coupling – El nino.
- Middle atmosphere coupling process: stratospheric ozone and climate interaction
- Tropical monsoon dynamics.
- Satellite climatology.
- Medium range weather forecasting.
- Ocean mechanisms and climate change.

Natural Disasters

- Floods and flash floods
- Earthquake
- Landslides
- Forest fires
- Desertification/ Drought

Policy Research and Policy options

The outcome of Thematic Workshop is the following

- To gain first hand knowledge of state of art in a given thematic research area in Europe and India
- To provide a platform for networking, match making and to establish contacts between Indian and European researchers drawn from academia, public research laboratories and industries with complementary interests;
- To evolve international research cooperation projects and actions with European and Indian partners to be submitted under the EC Sixth Framework Programme (EC FP6) Thematic priorities e.g. EC FP6 Global change and Ecosystems; Human Resources and Mobility Initiatives; International Cooperation with developing countries (INCO-DEV) related call for proposals.

MODUS OPERANDI

This workshop will have active participation of Department of Space, Department of Science and Technology, Indian Meteorological Department, Ministry of Agriculture, Department of Ocean Development, CSIR, Geological Survey of India.

The workshop will start with a few Keynotes presentations and will be followed by the presentations on the thematic topics related to Global/Climate change and to Natural Disasters till the third day. Each scientific topic will be addressed both by the European group and the Indian group. The fourth day (Sept 09) will be devoted for group-wise discussion to arrive at joint ideas for future collaboration or possible projects development. The last day will be for summarization, recommendation and follow up actions.

Besides this programme, arrangement can be made for visits of EU experts to specific institutions of nearby cities during the days preceding the workshop or for an excursion.

It is expected that each presenter will give a 4/5 pages note on the respective presentation. We propose to bring out a post conference publication consisting of these notes, the summary of discussions and on possible common areas of collaboration.

PROGRAMME SCHEDULE

I. Inauguration/opening and keynote addresses

There will be parallel Sessions on A & B. The list of Indian Participants is tentative.

A. Climate

1. Topics : Global warming and Climate change/climate modeling/El Nino/Medium range weather forecasting

EU contributions : Prof David Griggs, Metoffice (UK)
India contribution : Dr S K Srivastava, Director General, India Meteorological Department
: Dr B N Goswami, Center for Atmospheric Science

2. Topic : Atmospheric pollutant and climate forcing, Albedo reduction

EU contribution : Prof Millan Millan, CEAM (SP) ; Prof. F. Prodi, IASC (IT)
India contribution : Prof J Srinivasan, Indian Institute of Science
: Prof A Jayaraman, Physical Research Laboratory (PRL)

3. Topic : Middle atmosphere coupling process

EU contribution : Prof Petteri Taalas, Metoffice (SF)
India contribution : Dr R Sridharan, Vikram Sarabhai Space Centre (VSSC)
: Dr D Narayana Rao, Director, National MST RADAR Facility

4. Topic : Tropical monsoon dynamics

EU contribution : Dr. L. Eymard, Univ. P. Marie Curie, Paris, (FR)
India contribution : Prof U C Mohanty, Indian Institute of Technology, New Delhi
: Prof P Goswami, C-MMACS

**5. Topics : Satellite climatology
Ocean mechanisms and climate change**

EU contribution : Prof O Johannessen, (N)
India contribution : Dr Satish Sethya, Director, National Institute of Oceanography
: Dr M S Narayan, Head, Space Application Centre (SAC)

6. Topic : Palaeoclimate

EU contribution : Dr Crucifix, University of Louvain La Neuve, (B)
India contribution : Dr R Ramesh, Physical Research Laboratory (PRL)

7. Topic : Nitrogen cycle

EU contribution : Dr K. Butterbach-Bahl, Inst. for Meteorology and Climate, Garmisch, (DE)
India contribution : Dr A P Mitra, Distinguished Professor, National Physical Laboratory
: Dr Shyam Lal, Physical Research Laboratory (PRL)

B. Natural Disasters

1. Topic : Forest Fires

EU contribution : Prof X Viegas, University of Coimbra, (PT)
India contribution : Dr A Saxena, Joint Director Forest Survey of India
: Dr K V S Badrinath, Head, ISRO GBP, (NRSA)

2. Topic : Desertification/drought

EU contribution : Prof J Hill, University of Trier, Geoscience, (DE)
India contribution : Prof K S Ramasastry, National Institute of Hydrology
: Dr C S Murthy, NRSA

3. Topic : Landslides –geohazards

EU contribution : Prof B Theilen-Willinge, Univ. of Berlin (DE) and VCE Holding GmbH
India contribution : Dr George Phillip, Deputy Director, Wadia Institute of Himalayan Geology
: Dr Vinod Kumar, NRSA, Hyderabad

4. Topic : Floods and flash floods

EU contributions : Prof. Z. Kundzewicz, Academy of Science, Poznan, (PL)
India contribution: : Dr M P Singh, Remote Sensing Directorate, Center Water Commission
: Dr Bhanumurthy, NRSA

5. Topic : Earthquakes/seismic Risks

EU contribution : Prof P Gasparini, University of Napoli, (IT)
India contribution : Dr Harsh K Gupta, Secretary, Dept. of Ocean Development
: Dr R P Arya, University of Roorkee

6. Other: Case Studies in relation to Natural Disasters

Integrated Disaster management: Prof Evans, , University of Glasgow (UK)
India contribution : Dr R R Navalgund, Director, NRSA

Programme

The tentative programme of the proposed workshop is the following.

	9.00 – 11.00		11.15 – 13.15		14.55 – 16.55		
Sept 06	Inauguration	Keynote Address I	Keynote Address II	Keynote Address III	Session A1 Global warming and Climate change/climate modeling/E1 Nino/Medium range weather forecasting		
					14.55 – 15.25 15.25 – 15.35	Prof David Griggs Discussions	
					15.35 – 16.05 16.05 – 16.15	Dr S K Srivastava Discussions	
					16.15 – 16.45 16.45 – 16.55	Dr B N Goswami Discussions	
Sept 07	Session A2 Atmospheric pollutant and climate forcing, Albedo reduction		Session A3 Middle atmosphere coupling process		Session A4 Tropical monsoon dynamics		
	9.00 – 9.30 9.30 – 9.40	Prof. Millan Millan ; Prof. Prodi Discussions	11.15 – 11.45 11.45 – 11.55	Prof. Petteri Taalas Discussions	14.55 – 15.25 15.25 – 15.35	Dr. Eymard Discussions	
	9.40 – 10.10 10.10 – 10.20	Prof J Srinivasan Discussions	11.55 – 12.25 12.25 – 12.35	Dr R Sridharan Discussions	15.35 – 16.05 16.05 – 16.15	Prof U C Mohanty Discussions	
	10.20 – 10.50 10.50 – 11.00	Prof A Jayaraman Discussions	12.35 – 13.05 13.05 – 13.15	Dr D Narayana Rao Discussions	16.15 – 16.45 16.45 – 16.55	Prof P Goswami Discussions	
	Session B1 Forest Fires		Session B2 Desertification/drought		Session B3 Landslides–geohazards		
	9.00 – 9.30 9.30 – 9.40	Prof.X.Viegas Discussions	11.15 – 11.45 11.45 – 11.55	Prof. J Hill Discussions	14.55 – 15.25 15.25 – 15.35	Prof. B. Theilen-Willinge Discussions	
	9.40 – 10.10 10.10 – 10.20	Dr A Saxsena Discussions	11.55 – 12.25 12.25 – 12.35	Prof K S Ramasastry Discussions	15.35 – 6.05 16.05 – 16.15	Dr George Phillip Discussions	
	10.20 – 10.50 10.50 – 11.00	Dr K V S Badrinath Discussions	12.35 – 13.05 13.05 – 13.15	Dr C S Murthy Discussions	16.15 – 6.45 16.45 – 16.55	Dr Vinod Kumar Discussions	
	Sept 08	Session A5 Satellite climatology Ocean mechanisms and climate change		Session A6 Palaeoclimate		Session A7 Nitrogene cycle	
		9.00 – 9.30 9.30 – 9.40	Prof. O Johannessen Discussions	11.15 – 11.45 11.45 – 11.55	Dr Crucifix Discussions	14.55 – 15.25 15.25 – 15.35	Dr K. Butterbach-Bahl Discussions
9.40 – 10.10 10.10 – 10.20		Dr Satish Sethya Discussions	11.55 – 12.25 12.25 – 12.35	Dr R Ramesh Discussions	15.35 – 16.05 16.05 – 16.15	Dr A P Mitra Discussions	
10.20 – 10.50 10.50 – 11.00		Dr M S Narayan Discussions			16.15 – 16.45 16.45 – 16.55	Dr Shyam Lal Discussions	
Session B4 Floods and flash floods		Session B5 Earthquakes/Seismic Risks		Session B6 Case Studies in relation to Natural Disasters			
9.00 – 9.30 9.30 – 9.40		Prof. Z. Kundzewicz Discussions	11.15 – 11.45 11.45 – 11.55	Prof. P. Gasparini Discussions	14.55 – 15.25 15.25 – 15.35	Prof. Evans Discussions	
9.40 – 10.10 10.10 – 10.20		Dr M P Singh Discussions	11.55 – 12.25 12.25 – 12.35	Dr Harsh K Gupta Discussions	15.35 – 16.05 16.05 – 16.15	Dr R R Navalgund Discussions	
10.20 – 10.50 10.50 – 11.00		Dr Bhanumurthy Discussions	12.35 – 13.05 13.05 – 13.15	Dr R P Arya Discussions			
Sept 09	Group discussion and projects identification				Visits		
Sept 10	Discussions and Conclusions						

PARTICIPANTS

INDIA Workshop, Hyderabad, 6-10 September 2004 List of EU Participants

1. **Dr. BUTTERBACH-BAHL, Klaus**
IMK - IFU
Forschungszentrum Karlsruhe
Kreuzeckbahnstr. 19
82467 Garmisch Partenkirchen
Germany
2. **Dr. CRUCIFIX, Michel**
Met Office
London Road
RG12 2SZ Bracknell
United Kingdom
3. **Dr. EYMARD, Laurence**
Università Pierre et Marie Curie
UMR7617 CNRS
Place Jussieu 4
75252 Paris Cedex 05
France
4. **Prof. EVANS, Edward**
Univ. of Glasgow,
Bevis, Great Somerford
Chippenham, Wiltshire SN15 5JA
United Kingdom
5. **Prof. GASPARINI, Paolo**
Università di Napoli Federico II
Corso Umberto I, 40
80125 Napoli
Italy
6. **Dr. GHAZI, Anver** **Coordinator**
European Commission
RTD
Rue du Luxembourg, 46 2/114
1049 Brussels
Belgium
7. **Dr. GRIGGS, David**
Head, Hadley Centre
Met Office
London Road

RG12 2SZ Bracknell
United Kingdom

8. **Prof. HILL, Joachim**
University of Trier
Remote Sensing Department
Behringstrasse 15
54286 Trier
Germany
9. **Prof. JOHANNESSEN, Ola**
Director
Nansen Environmental and Remote Sensing Center
Edvard Griegsvei 3
5059 Bergen
Norway
10. **Dr. KUNDZEWICZ, Zbigniew**
1/42 Os. Raczynskiego
62-020 Swarzedz
Poland
11. **Dr. MILLAN, M. Millan**
Fundacion CEAM
Parque Tecnológico
C/Charles R. Darwin, 14
46980 (Paterna) Valencia
Spain
12. **PETER, Denis**
European Commission
RTD
Rue du Luxembourg, 46 2/97
1049 Brussels
Belgium
13. **Dr. TAALAS, Petteri**
Director-General,
Finnish Meteorological Institute
Pl 5000101 Helsinki
Finland
14. **Dr. THEILEN-WILLIGE, Barbara**
Büro für Angewandte Geowissenschaftliche Fernerkennung
Birkenweg 2
78333 Stockach
Germany
15. **Prof. VIEGAS, Xavier**

University of Coimbra
ADAI Apartado 10131
3031-601 Coimbra
Portugal

16. **Prof. Prodi, Franco**
Director, IASC, CNR
Via Godetti 101
40129 Bologna,
Italy

List of Indian Participants

1. **Dr. V. S. Ramamurthy**
Secretary, DST
Technology Bhavan
New Mehrauli Road
New Delhi
2. **Dr. A. P. Mitra**
Distinguished Professor
National Physical Laboratory (NPL)
Pusa
New Delhi-110012
Website: www.npl-cgc.ernet.in
3. **Dr. Harsh K Gupta**
Secretary,
Dept. of Ocean Development,
Mahasagar,
C. G. O complex,
New Delhi -1100 03
4. **Dr. Rajendra K. Pachauri**
Chairman of the IPCC
Director,
Tata Energy Resources Institute (TERI)
Habitat Place, Lodhi Road
New Delhi 110 003
5. **Dr. S K Srivastava,**
Director General,
India Meteorological Department,

Mausam Bhavan
Lodi Road
New Delhi – 110 003

6. **Dr. R R Navalgund,**
Director,
National Remote Sensing Agency (NRSA),
Balanagar,
Hyderabad – 500 037
7. **Dr Kota Harinarayana,**
Vice Chancellor,
University of Hyderabad,
Coordinator
Hyderabad- 500 046
8. **Dr. V P Dimri**
Director,
National Geophysical Research Institute (NGRI),
Uppal Road
Hyderabad-500 007
9. **Dr. K N Shankara,**
Director,
Space Application Centre (SAC),
Ambawadi Vistar P.O
Jodhpur Tekra
Ahmedabad – 380 015
10. **Dr. Alok Saxena**
Joint Director
Forest Survey of India
Kanlagarh Road
Dehradun-248004
11. **Dr. B M Reddy,**
National Geophysical Research Institute (NGRI),
Uppal Road,
Hyderabad – 500 007
12. **Dr. K V S Badrinath,**
Head,
ISRO GBP,
National Remote Sensing Agency (NRSA),
Balanagar,
Hyderabad – 500 037
13. **Prof. A. Jayaraman,**
Physical Research Laboratory (PRL),
Navragpura,

Coordinator

Ahmedabad – 380009
Gujarat

- 14. Dr. Sridharan,**
Space Physical Lab,
Vikram Sarabhai Space Centre (VSSC),
ISRO P.O,
Thiruvananthapuram – 695 022
Kerala
- 15. Dr. Bhanumurthy,**
Water resources Division,
National Remote Sensing Agency (NRSA),
Balanagar,
Hyderabad- 500 037
AP
- 16. Dr. Satish R Shethye,**
Director,
National Institute of Oceanography,
Dona Paula,
Goa – 403 008
- 17. Dr. V Jayaraman,**
Director,
Earth Observation Systems/NNRMS/RRSSC,
ISRO Headquarters,
Antariksh Bhavan,
New BEL Road,
Bangalore – 560 094
- 18. Prof. D Narayana Rao,**
Director,
National MST RADAR Facility,
Gadanki,
Pakaja mandal
Chittor Dist - – 517 112
- 19. Prof. J. Srinivasan**
Centre for atmospheric sciences
Indian Institute of Science,
Bangalore - 560012,
- 20. Dr. U. C. Mohanty,**
Centre for Atmospheric Sciences,
Indian Institute of Technology,
Hauz Khas,
New Delhi - 110016
Fax: 091-11-6862037

- 21. Dr. J. N. Goswami,**
Physical Research Lab (PRL),
Navrangpura,
Ahmedabad -380009,
Gujarat
Website: www.prl.ernet.in
- 22. Dr. Prashant Goswami,**
Center for Mathematical Modelling,
C-MMACS,
kodialhi , near airport
Bangalore,
- 23. Prof. B N Goswami,**
Center for Atmospheric Science
I. I. Science
Bangalore - 560 012,
Website: <http://caos.iisc.ernet.in/faculty/bng.html>
- 24. Dr. M. P. Singh**
Remote Sensing Directorate
Center Water Commission
315 (S), Sewa Bhavan,
R. K Puram
New Delhi- 110 066
- 25. Prof. R. P. Arya,**
Earth Quark Engineering Department
University of Roorkee
Roorkee
- 26. Dr. M. S. Narayan**
Head,
Metealogy groups,
Space Application Centre (SAC),
Ambawadi Vistar P. O,
Jodhpur Tekra,
Ahmedabad-380015
- 27. Dr. R. Ramesh,**
Paleo climate group,
Physical Research Laboratory (PRL),
Navrangpura,
Ahmeddabad-380009,
Gujarat
- 28. Dr. Shyam lal,**
Atmospheric chemistry division,
Physical Research Laboratory (PRL),
Navrangpura,

Ahmeddabad,
Gujarat – 380009

29. Dr. Geoge Phillip,

Deputy Director,
Wadia Institute of Himalayan Geology,
Dehradun-248001

30. Dr. C.S Murthy

Disaster Management Systems Group,
National Remote Sensing Agency,
Balanagar,
Hyderabad – 500 037

31. Dr. K.S. Rama Sastry,

National Institute of Hydrology,
Jal Nigam Bhavan,
Roorkee,
Uttar Pradesh -247667

32. The Director General,

Geological Survey of India,
Dharitri Building,
GN-40, Sector - V, Salt Lake City,
Calcutta – 700091

33. Shri. R.K. Singh

Joint Secretary
National Disaster Management (NDM),
Ministry of Home Affairs,
Government of India,
New Delhi-110001

34. Dr. William D Dar

Director General,
International Crop Research Institute for Semi Arid Tropics (ICRISAT),
Patancheru – 502 324
Andhra Pradesh

35. Prof. P.B.Rao,

Chairman, ADCOS – 2
PPEG Building
National Remote Sensing Agency
Balanagar,
Hyderabad – 500 037

36. Dr. Y. S. Ramakrishna

Director
Central Research Institute for Dry land Agriculture (CRIDA),
Santoshnagar

Hyderabad – 500 059

37. Dr P C Pandey,

Director,
National Centre for Antarctic and Ocean Research
Headland Sada
Vasco da Gama
Goa – 403 804

38. Dr V S Hegde,

Dy Director (Appins),
Earth Observation System/ Ass.Prog.Dir,
ISRO Headquarters,
Antariksh Bhavan
New BEL Road
Bangalore – 560 094

39. Shri R. Jeyaseelan

Chairman,
Central Water Commission,
315 (S), Sewa Bhavan,
R. K Puram
New Delhi – 110 066

40. Dr. V. S. Prakash

Director
Drought Monitoring Cell (DMC),
9th Floor BWSSB Building
Cauvery Bhavan
K. G. Road
Bangalore – 560 094

41. Asutosh Mishra

Commissioner for Disaster Management & Ex-Officio,
Secretary to the Govt,
Revenue & Disaster Management Department,
Govt. of AP,
L block, Room no-705,
Andhra Pradesh Secretariat,
Hyderabad-500001

42. V C Thakur

Wadia Institute of
Himalayan Geology,
Dehradun 248 001,
URL: <http://www.ias.ac.in>

43. Prof. Sulochana Gadgil

Centre for Atmospheric Science,
Indian Institute of Science,

Bangalore-560 012.

44. Prof. V.K. Gaur

Honorary Emeritus Scientist,
Distinguished Professor, IIA, Bangalore
CSIR Centre for Mathematical Modelling &
Computer Simulation (C-MMACS)
NAL Belur Campus
Bangalore – 560 037

45. Harnam Singh

Joint Secretary
Flat No. 67,
IES Apartments, Plot No. 9, Sector-4,
Dwarka Phase-I,
New Delhi - 110075

46. Prof. V.K. Mathur

Director
Central Building Research Institute (CBRI)
IIT/Roorkee
Roorkee - 247 667
Uttaranchal

47. Maj. Gen. (Retd.) Pushendra Singh

Executive Director
Disaster Management Institute
Madhya Pradesh

48. Yashwant Rao Chavan

Academy of Development
Administration,
Raj Bhavan Complex,
Baner Road,
Ganeshkhind,
Pune
Maharashtra-411007

49. Joint Secretary

NDM Division,
Government of India,
Ministry of Agriculture (Department of Agriculture and Cooperation)
Krishi Bhavan
New Delhi

50. Director,

Gujarat State Disaster Management Authority,
Gandhinagar
Gujarat

51. Prof. B. K. Rao

I A S

Former Secretary

Dept. of Mines and Geology

Govt. of India

52. Disaster Monitoring Cell,

Andhra Pradesh,

Hyderabad.

53. Dr. R K Pande,

Director,

Disaster Mitigation and Management Center,

Dehradun

54. Prof. E Arumugam,

Director,

Centre for Disaster Mitigation and Management,

Chennai

55. Shri Arvind Behera,

Chief Executive / Director,

Orissa Disaster Management Authority (OSDMA),

Bhubaneswar

Orissa

56. Dr S K Dubey,

Director,

IIT/ Kharagpur,

West Bengal