

6. Foundation for Environment, Climate and Technology

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FECT Background

Introduction

FECT commenced at the Natural Resources Management Services (NRMS) with a project to study seasonal climate information for the Mahaweli river basin in 2000. It builds on the work of the computational mathematics group at the Institute of Fundamental Studies in Kandy from 1997 to 1999. FECT was registered as a non-profit company in 2003. The FECT group addressed three more projects on human-elephant conflict, disaster risk identification and climate change adaptation in plantations. In August 2005, we established a separate office at the Digana premises of the Mahaweli Authority. We now have groups for Information Technology, Publishing, Engineering and Disaster Risk Management in addition to our Climate group. Our staff numbers six and we are supported by several advisors.

FECT Office Administration

Office Manager – Zeenas Yahiya
Projects Manager – Zeenas Yahiya
System Administrator – Siraj Razick
Librarian – Manjula Siriwardena

Time Line

2000

Jan.11 : Scoping for IRI-MASL project
May 12 : Pilot Project Proposal
Jul. 24 : Proposal accepted by DG, MASL and IRI and funded
Aug. 10 : Research Assistant position offered to two candidates

2001

Sep. 1 : Heli Bulathsinhala commences work as Research Assistant
Oct. 8 : Chanaka Wickremasinghe commences as Data Entry Operator

2002

Jan. 1 : Upamala Tennakoon commences work as GIS operator
Feb. 1 : Zeenas Yahiya commences work as Documentation Specialist.
Jul. 1 : Siraj Razick joins as Web Designer.
Jul. 17 : Kusalika Ariyaratne joins as a Junior Research Engineer

2002 (continued)

Oct. 31 : Heli Bulathsinhala leaves
Dec. 13 : Irugal Bandara joins as a Junior Research Engineer

2003

Jan. 1: Janaki Chandimala commences work as Junior Research Engineers
Jan. 20 : Chanaka Wickremasinghe leaves
Jun. 20 : Kusalika Ariyaratne leaves

2004

May 16 : Irugal Bandara leaves
Jun. 1 : Manjula Siriwardena joins as Junior Research Engineer

2005

Feb. 7 : Saman Ratnayake joins as Research Assistant
May 31 : Saman Ratnayake leaves.
Jul. 15 : Yoosuf Ashraj joins as Junior Research Assistant
Sep. 1 : Staff move to Digana Office

2006

Jan. 4 : FECT office formally opened in Digana by Director / HAO&M and MASL

FECT Institutional Profile

INTRODUCTION

The Foundation for Environment, Climate and Technology is registered as a non-profit organization with the Registrar of Companies of Sri Lanka.

PROFILE

DATE OF INCORPORATION: 31st of December 2003

COMPANY REGISTRATION NUMBER: N(A) 1148.

COMPANY SECRETARY: Ralapanawe Associate, 194, Sri Jayawardenapura
Mawatha, Welikada, Rajagiriya.

COMPANY AUDITORS: Thiyagarajan & Co. Chartered Accountants Kandy.

BANKERS: Peoples Bank, Akurana Branch, Sri Lanka

PRIMARY OBJECTIVES

(From The FECT Memorandum Of Understanding)

1. To map, analyze, monitor, predict and describe environmental parameters along with social and economic information
2. To conduct research on environmental data, diagnostics, prediction
3. To use environmental information, geographic information systems, global positioning systems, remote sensing, ground surveys and studies of socio-economic conditions
4. To advise, plan, train, educate, recommend and provide technical guidance
5. To develop environmental diagnosis, modelling, impact assessment and adaptation technologies
6. To undertake scientific, educational and other publishing
7. To undertake research, education and advocacy work regarding scientific, technological and socio-economic issues affecting tropical regions.

TEAM LEADERS

Climate – Lareef Zubair

Information Technology – Vidhura Ralapanawe

Publishing – Zeenas Yahiya

Engineering – Janaki Chandimala

Disaster Risk Management – Vidhura Ralapanawe

Principal Scientist – Lareef Zubair

NON-PROFIT STATUS

(From The FECT Memorandum Of Understanding)

The income and property of the company when so ever derived, shall be applied solely towards the promotion of the objects of the company as set forth in this Memorandum of Association, and no portion thereof shall be paid to or transferred directly or indirectly, by way of dividend, bonus or otherwise howsoever by way of profit, to the members of the company.

Grants and Proposals

Grants Awarded

- April 1999: Bibliography on climate funded by National Science Foundation of Sri Lanka, Work completed in 2003.
- July 2000: Seasonal Climate for Water Resources Management in the Mahaweli River Basin.
- September-February 2002: Climate Impacts on Wildlife was developed in collaboration with CEISIN and CERC. Work completed.
- September-February 2002: Adaptation and Climate Change in Sri Lanka. Work completed.
- November 2002 to March 2003: A case study on Sri Lanka for the Global Hotspots project, Work completed.
- March 2003: Early Warning Systems for Malaria risk with the Anti-Malaria Campaign, the International Water Management Institute and several partners. Work on-going.

Proposals in Development

- Integrated River Basin Management for Mahaweli and Walawe.
- Disaster Risk Identification for Sri Lanka
- Disaster Information Dissemination
- Disaster Early Warning for Sri Lanka.
- Climate and Rural Energy
- Climate and Water Resources Management
- Regional Climate Model for Sri Lanka
- Land Surface Model for Sri Lanka
- Hydro-Meteorological Monitoring System for Sri Lanka
- Disaster Mitigation & Management – Rainwater harvesting

Publication Projects

- Climate Atlas for Sri Lanka
- Climate Atlas for Renewable Energy
- Disaster Management in Sri Lanka
- Facets of Climate in Sri Lanka
- Science and Technology Policy in Sri Lanka
- Energy Conservation in Sri Lanka

Projects Timeline

2000

- Scoping for River Basin Management Project in Sri Lanka by IRI and MASL
- Formulation of proposal with Mahaweli Authority and IRI Directors
- Seed-funding, formal start of project and site visit
- Start of Climate Assessment, Prediction and Adaptation Group (CAPAG)

2001

- Visit by Director/Environment, Mahaweli to International Research Institute for Climate Prediction (IRI)
- Visit to Ministry of Science and Technology by Principal Investigator, conducting training at Dept of Meteorology and post-graduate lectures (University of Colombo, Moratuwa)
- Proposal on Climate and Human-Elephant Conflict funded by IRI.
- Climate and Plantations proposal was funded by Global Environmental Facility (GEF) through the System for Analysis, Research and Training (START).

2002

- Recruitment of GIS Programmer and Documentation Specialist
- Principal Scientist (PS) engages in collaborative research at Frontier Research System for Global Change (FRSGC), Yokohama, Japan for three months and visits Sri Lanka in July
- Recruitment of second Research Assistant
- Chairman, National Water Resources Authority (Interim) of Sri Lanka attends IRI's water forum
- IRI Projects Portal and Book of Posters Developed
- Proposal for multi hazards case study in disasters funded by the Global Disaster Hotspots project at The Earth Institute at Columbia University.

2003

- Visit by Prof. Jeff Sachs to Sri Lanka, meeting with several cabinet ministers and prime minister with PS.
- Visit by Dr. Nirupam Bajpai of the Earth Institute's Centre for Globalization and Sustainable Development to CAPAG
- Presentations to senior water resource managers at the invitation of Minister of Irrigation and Water Resources on our work
- Minister of Irrigation and Water Resources and Science and Technology and Director of Meteorology visit CAPAG.

2003

- Dr. Neil Ward visits Sri Lanka and tours projects sites, CAPAG/NRMS and International Water Management Institute (IWMI), University of Peradeniya, Department of Meteorology, National Water Resources Authority (Interim) and Mahaweli Authority and meets with Minister for Science and Technology.
- Case study for disaster hotspots project completed.
- Scientists from the Coconut Research Institute visit IRI for collaboration supported by the AIACC Plantations project.
- Climate Variability and Human Health grant awarded to IRI and collaborators to develop prediction system for malaria using climate in Sri Lanka. PI visits Sri Lanka for Project Inception Workshop.

2004

- Proposal for Bridge Funding to IRI accepted. Disaster analysis extended to higher resolution
- Statistical Downscaling of Seasonal Predictions implemented
- Regional Climate Model (RegCM3) for Sri Lanka undertaken by Joshua Qian
- Joshua Qian visit project site, CAPAG/NRMS and Department of Meteorology
- Janaki Chandimala visits IRI for four months for work on climate and malaria project
- PI and staff visit Anti-Malaria Campaign (AMC), Department of Meteorology station in Badulla in Uva Province

2005

- Lareef Zubair visits project site, IWMI and AMC in January, August and December.
- Staff moves to Digana Offices at Headworks Division of Mahaweli Authority.
- Land Surface Modelling for Sri Lanka implemented and Lareef Zubair visits National Aeronautical and Space Agency (NASA)/GMAO for collaboration on Land Surface Modelling.
- Final reports on Human Elephant Conflict, Adaptation and Impact Assessment to Climate Change of Plantations, Disaster Management and Plantations submitted.

2006

- Digana Offices inaugurated by Mahaweli Authority's Director of Headworks
- Visit to Uva Province Health Ministry and training of Regional Malaria Office staff on GIS.
- FECT reorganized into four groups.
- High-Resolution Climate Analysis published by World Bank
- PS visits project site, IWMI and AMC in January and April
- Malaria-Climate analysis undertaken

Climate Group

The Climate Assessment, Prediction and Adaptation Group (CAPAG) was developed at the Natural Resources Management Services starting in 2000. This group relocated to FECT's own office at the Headworks, Operations, Administration and Maintenance Division of the Mahaweli Authority in Digana, in August 2005.

We work towards understanding climate in Sri Lanka, the equatorial Indian Ocean and surrounding regions, in developing useable climatic information that can be applied by users in diverse sectors.

Officers

Zeenas Yahiya - (Projects Manager)

Sociology, Media, Documentation

Upamala Tennakoon - GIS

Janaki Chandimala - Water Resources,
Climate

Manjula Siriwardena - Climate Change,
Energy

Yoosuf Ashraj - Data Management

M.R.A. Siraj - System Administrator,
Web designer

Lareef Zubair (Lead) – and
Climate Applications Assesment

On-going Projects

- Climatological Database Development
- Mesoscale Wind Modelling
- Orographic Rainfall Modelling
- Regional Climate Modelling

Completed Projects

- Climate Change Assessments for Sri Lanka
- El Niño/Southern Oscillation Impacts on Sri Lanka climate, hydrology, and agriculture
- Indian Ocean Dipole Impacts on Sri Lankan climate
- Characteristics of cyclones affecting Sri Lanka

Current Proposals (Under Development)

- Hydro-meteorological Information Systems
- Climatological Atlas

Information Technology Group

Our capability in Information Technology grew out of IT experience in local and international settings. These skills were brought to bear in support of projects through establishing computer infrastructure, GIS systems, databases, multimedia presentations and websites. We now have a strong team with the requisite infrastructure. This team has worked together in producing useful websites and databases apart from supporting projects.

We shall be developing the infrastructure for web servers, software development particularly open source, knowledge management and high-performance scientific computing. We offer our IT services for website development, GIS, presentation and the development of software packages and tools for work related to sustainable development.

Officers

Vidhura Ralapanawe (Lead) – Database, Multimedia Technologies
Neil Devadasan - Databases, GIS
Upamala Tennakoon - GIS, Cartography

M.R.A. Siraj – Web, System Administration, Software Development

M.R.A. Sabry - Scientific Computation
Zeenas Yahiya - Documentation, Content Management

L. Zubair - Content Management, Scientific computation

Ongoing Projects

- Tsunami Relief, Recovery and Rehabilitation Websites (<http://www.recoverlanka.net> and <http://www.geolanka.net/>)
- Computing Services for FECT

Completed Projects

- Website Development for FECT <http://www.climate.lk/>
- Website Development for SLMOHN <http://www.columbia.edu/~lz144/simon/>
- Website Portal Development for IRI Sri Lanka <http://iri.columbia.edu/~mahaweli>
- Interactive Map-server for Sri Lanka <http://149.166.110.235/website/srilanka/viewer.htm>
- Climate and Hydrological Database using the IRI Data Library for Internal Use

Publishing Group

Introduction

We undertake content development and publishing on sustainable development related topics in energy, environment, disaster risk management, climate and water resources through newspapers, poster demonstrations, lithographic printing and also through new media such as Internet and desktop publishing.

We have published one book, 6 technical reports and 18 issues of the Sri Lanka Meteorology, Oceanography and Hydrology Network. We have also supported the publications of Mahaweli journal articles and conference proceedings. We have established the infrastructure and computing resources for some of these tasks and shall work to develop our capabilities in consultation with others.

Officers

Zeenas Yahiya (Lead) -
Editing, Typesetting, Publishing
Vidhura Ralapanawe - Presentation,
Upamala Tennakoon - GIS,
Cartography
M.R.A. Siraj - Image Processing
Lareef Zubair - Content Development

On-going Projects

- Climate Atlas for Sri Lanka
- Facets of the Climate of Sri Lanka
- History of Technology in Sri Lanka
- Energy Conservation in Sri Lanka
- Environmental Management in Sri Lanka
- South Asia Climate News in web, electronic and printed version.

Completed Projects

- A Reference Guide for Weather and Climate in Sri Lanka and its Impacts
- FECT Climate Calendar
- Book of Posters
- Newspaper Articles – 15
- Magazine Articles – 4
- Six year archive of SLMOHN newsletters

Proposed Projects

- Tsunami in Sri Lanka
- Disaster Management in Sri Lanka
- Climate Information for Renewable Energy

Engineering

Our work at FECT serves engineering in many ways even if not in a traditional sense. We work to integrate climate and engineering particularly in water resources management, irrigation, environment, public health, disaster risk and energy domains. Our staff are qualified in all fields of engineering and bring this expertise to bear on problems in a multidisciplinary setting.

We train engineers through postgraduate courses at the University of Moratuwa and University of Peradeniya. We have conducted workshops for engineers at the Mahaweli Authority, the National Water Resources Authority (Interim) and the Central Engineering Consultancy Bureau.

As our expertise and capacity are particularly in the climate and environmental arena, we shall bring these to bear increasingly in Engineering for Sustainable Development.

Officers - ESD

Janaki Chandimala (Lead),
Water and Environmental Engineering

Neil Devadasan - Production
Engineering.

Sarith Mahanama – Hydrological
Modelling

Ruvini Perera - Hydrological Modelling

Vidhura Ralapanawe - Disaster Risk

Manjula Siriwardena - Chemical and
Mechanical Engineering, Energy
Analysis

Lareef Zubair - Chemical, Mechanical
and Environmental Engineering, Energy,
EIA

On-going Projects

- Hydro-meteorological Information System
- Hydrological Modelling
- Wind Resource Estimation
- Solar Energy Estimation

Completed Projects

- Low-Cost Water Treatment Unit
- Energy Audit
- Environmental Impact Analysis
- Disaster Hazard Assessment

Proposed Projects

- Wind Energy Potential Estimation
- Rain Water Harvesting Potential Estimation
- Updating Rainfall Reliability Estimation for Irrigation Designs
- Design Standards for Disaster Resistant Buildings and Infrastructure
- Flood and Inundation Zoning
- Disaster Mitigation & Management – Rainwater harvesting

Disaster Risk Management

We have conducted projects to identify disaster hazard risk in Sri Lanka over the last three years. Methodologies for injection of climate data into hazard risk assessment have been developed and the ground work for the future use of climate monitoring and predictions for dynamic hazard predictions is laid. High-resolution seasonal climate prediction techniques have also been developed in a related study. The results of these point the way to using historical, current and predictive climate information to inform disaster risk management policy and early warning systems. We have proposed early warning systems and disaster management systems over the last three years to government officials and professionals in Sri Lanka.

The organization has provided technical services in water treatment and climate, and flood risk analysis to assist victims of the recent tsunami and the last floods in Ratnapura.

Responding rapidly to the Tsunami we have created two Internet Resource Centers for bringing scientific information to the Relief, rehabilitation and reconstruction efforts. We have published about 40 papers on topics related to disasters bearing on climate, environment and technology with a focus on Sri Lanka and made scores of presentation. Now we seek to leverage out past and present work into an expanded program to develop disaster preparedness.

Officers

Vidhura Ralapanawe (Lead) - Disaster Risk Management, IT

Janaki Chandimala, Modelling, Engineering

Neil Devadasan – IT solutions

Manjula Siriwardena - Diagnostics, Engineering

Siraj Razick - IT

Upamala Tennakoon - GIS

Zeenas Yahiya – Vulnerability and Societal Analysis.

Lareef Zubair – Climate, Disaster Risk Management

On-going Projects

- Hydro-meteorological Information System
- Hydrological Modelling
- Tsunami Relief, Recovery and Rehabilitation Websites (<http://www.recoverlanka.net> and <http://www.geolanka.net/>)

Completed Projects

- Contributions to Hazard Estimation for Sri Lanka National Atlas, 2nd edition
- Disaster Analysis for Sri Lanka, Global Disaster Hotspots Project Report.

Proposed Projects

- Disaster Information Dissemination
- Disaster Risk Identification for Sri Lanka
- Disaster Research in Sri Lanka

FECT Project Staff

Upamala Tennakoon: GIS Operator



Upamala has been trained in GIS work through the Environment and Development project in Ordnance Survey, UK in Resource Survey and Mapping, Cartography and GIS. She counts ten years of experience in drafting, cartography, architectural work, mapping and GIS work. Upamala provides GIS, graphics and presentation support for the project work. She is developing an Atlas of Climatology for Sri Lanka.

Zeenas Yahiya: Projects Manager



Zeenas trained in languages (French/English/Sinhala/Tamil). She has four years of experience in scientific documentation at the Institute of Fundamental Studies, Kandy. She helps prepare papers, articles and reports for publication, coordinates project management and the PI at IRI regarding administrative work and accounting. She has brought "Bibliography of Climate in Sri Lanka" to publication. She is reading for a degree in the social sciences at the Open University of Sri Lanka.

Siraj Razick: IT Engineer



Siraj obtained a BIT from Curtin University of Technology of Australia. He works with all project staff to construct and update the website for all projects. He is responsible for system administration and equipment maintenance. He undertakes software projects in C, C++ and Java, GUI programming in QT/KDE , GTK+ and Xlib and graphical design and editing with GIMP/InkScape.

Janaki Chandimala: Intermediate Research Engineer



Janaki Chandimala obtained a B.Sc in Civil Engineering at the University of Peradeniya, Sri Lanka in 1999 and an M.Sc in Hydrology and Environmental Engineering from Hohai University, Nanjing, China in 2002. She modelled riverbed evolution in the lower reaches of the Yangtze River. Since January 2003, she has been working on climatic, hydro-meteorological and hydrological analysis in support of the river basin, plantations, human-elephant conflict and malaria projects.

Manjula Siriwardhana – Junior Research Engineer



Manjula Siriwardhana obtained a B.Sc. in Chemical and Process Engineering at the University of Peradeniya Sri Lanka in December 2003. She took the ‘Assessment of Impact of and Adaptation to Climate Change in the Plantation sector in Sri Lanka’ project work to completion. Since January 2005, she has been working on the river basin and malaria projects.

Yoosuf Ashraj - Data Management



Yoosuf has completed his GCE (A/L) examination and is due to enter University to read for a degree in Engineering. He helps manage data resources and acquires data as needed. He is also undertaking climate impact analysis for dengue in Sri Lanka

FECT Advisors

Lareef Zubair: Principal Scientist



Lareef Zubair is an Associate Research Scientist at the International Research Institute for Climate and Society (IRI) and advises FECT as its principal scientist. He received a B.Sc from the University of Peradeniya, Sri Lanka in 1987 and a M.S and a Ph.D. from Yale University, U.S.A. in 1989 and 1993 respectively. Prior to joining the IRI, he was a Post-Doctoral Associate in Mathematics and Engineering at Yale University, a Senior Lecturer in Engineering at the University of Peradeniya, Sri Lanka and a Research Fellow at the Institute of Fundamental Studies, Sri Lanka. He is interested in tropical climate, climate impacts and adaptation, and in the application of climate information.

Vidura Ralapanawe: IT



Vidhura Ralapanawe received a B.Sc (Eng) from the University of Moratuwa, Sri Lanka in 1996 and a M.Sc in Responsibility & Business Practice from the University of Bath, U.K. in 2000. He has worked for IBM in New York and later as a consultant on social and environmental risk management & business strategy to the corporate sector in Sri Lanka. He is interested in sustainable development, technology and application of climate information. He handled the Sri Lanka case study of the Natural Disaster Hotspots Project. He also works with the IRI Data Library.

Badra Nawaratne: Engineer



Badra, a Civil Engineer attached to the Mahaweli Authority of Sri Lanka has obtained a National Diploma in Technology in Civil Engineering from the University of Moratuwa in 1988. She is an Associate Member of the Institution of Engineers Sri Lanka and is reading for her Charter. Her basic training in down stream development includes project and micro level water management. At present she is engaged in a study on climatology impact on the yield of Mahaweli Water Shed.

FECT Collaborators

Ruvini Perera: Hydrologist



Ruvini Perera received a B.Sc from the University of Peradeniya, Sri Lank in 1995 in Civil Engineering and a M.Sc in Environmental Engineering from the New Jersey Institute of Technology in 1999. She has been employed at the Coast Conservation Department and Road Development Authority in Sri Lanka. Since, 1999 she has been employed as a Civil and Environmental Engineer at TAMS Consultants, New York and Dewberry, New Jersey. She undertakes hydrological modelling, water resources management and environmental assessments. She functioned as an IRI Senior Research Staff Associate for the Human-Elephant-Conflict in Sri Lanka project

Neil Devadasan –Systems Engineer



Neil obtained his B.Sc in Production Engineering from the University of Peradeniya and has trained in Systems Engineering and GIS at the Indiana University Purdue University at Indianapolis (IUPUI). He is a Director of the Polis Center which addresses common community problems and issues through innovating approaches in IT, GIS and other advanced technology. Neil collaborates with FECT in producing an interactive map server for Sri Lanka and in establishing the Tsunami assistance portal <http://www.geolanka.net/>.

Sarith Mahanama – Hydro-meteorologist



Sarith Mahanama completed his B.Sc in Civil Engineering at the University of Peradeniya in 1993 and his Ph.D in Water Resources and Environmental Engineering at the University of Hong Kong in Civil and Environmental Engineering. He has been attached to NASA – Goddard Space Flight Center as an Assistant Research Scientist as a Contractor through the University of Maryland at Baltimore County since 2000. Sarith is developing a Land Surface Model for Sri Lanka which incorporates global climate model and assimilated data.

Sabry Razick – Scientific Computation



Sabry obtained his B.S in Microbiology from the University of Kelaniya and after serving there as an Assistant Lecturer is now reading for his M.Sc in Bioinformatics at Chalmers University of Technology in Sweden. He has been supporting FECT since its inception with the computing infrastructure and scientific computation.

Past Project Staff

Heli Bulathsinhala: Junior Research Engineer



Heli holds a B.Sc degree in the Second Class (Upper) in Civil Engineering from the University of Moratuwa. He joined the projects in 2001 and collected climate data, carried out data analysis, quality control, climate impacts assessments and hydro-meteorological work. He worked on both the water resources and climate change components of our work. While engaged in the project, Heli undertook an M.Sc in Water Resources at the University of Moratuwa on climate change impacts on water resources in Sri Lanka.



Chanaka Wickremasinghe :: Data Entry Operator

Chanaka completed his General Certificate of Education (Advance Level) Education. and has training in desktop publishing. He undertook data acquisition, entry, scanning and checking for a year ending February 2003.



Kusalika Ariyaratne : Junior Research Engineer

Kusalika holds a B.Sc (Eng.) degree in the First Class from the University of Peradeniya. She was attached to the project from 2003. She collected climate, maritime and plantation data, carried out data analysis and quality control and climate impacts assessments. She completed her M.Sc in Oceanography while concurrently being attached to the project and now is a Fulbright scholar reading for a Ph.D at Texas A&M University.

Irugal Bandara: Junior Research Engineer



Irugal Bandara obtained a B.Sc in Agricultural Engineering from the University of Peradeniya in 1999. Thereafter, he followed a year-long post-graduate diploma course at the Indian Institute of Remote Sensing, Deharadun, India. He joined the project in 2003 and was in service until 2004. Bandara assisted with the projects on Human-Elephant Conflict, Tea and Coconut Plantations and Disasters.

Acknowledgements

Much of the work reported here have been done by the officers of the FECT and NRMS. Heli Bulathsinhala, Chanaka Wickremasinghe, Upamala Tennakoon, Zeenas Yahiya, M.R.A. Siraj, Kusalika Ariyaratne, Irugal Bandara, Janaki Chandimala, Manjula Siriwardena, Yoosuf Ashraj and Badra Nawaratne have contributed enormously in many different ways. Similarly our advisors, Ruvini Perera, Vidhura Ralapanawe and Neil Devadasan have supported in important ways over the years with new contributions from Sabry Razick and Sarith Mahanama.

Our work on Sri Lankan climate commenced in 1997 in the computational mathematics group at the Institute of Fundamental Studies, Kandy, Sri Lanka; that was led by Lareef Zubair. The staff members of the computational mathematics group until 1999, A. Gunaratne, R. Aloysius, S. Ramanayake, S. Somasundera, J. Ratnayake and A. Somasundera, contributed in many ways. R.B. Weerakoon, C. Jayasinghe and S. Sakalasooriya of the computer and administrative units directly supported the work here.

The subsequent program of work was facilitated by the management and staff at the Mahaweli Authority of Sri Lanka. Drs. H.M. Manthrihillake and Ranjith Wanigaratne were instrumental in initiating the formal engagement. Dr. Manthrihillake's support in organizing administrative and financial arrangements and in recruiting the first staff members was critical. The Director-Generals of the Mahaweli Authority, M. Samarasekera, P.T. Senaratne and M.U.A Tennakoon have also supported the project. After the project was initiated it was located at the Environment and Forest Conservation Division of the Mahaweli Authority and there the following staff members have helped us in addition to Dr. Manthrihillake: R. Attygalle, K. Samarakoon, A.S. Hewaratne, R.B. Herath, H.A. Rajapakse, A. Karunarathne, A.M.K. Adhikari and S. Jayasinghe.

From 2000-2005, our work was supported by the Board of the Natural Resources Management Services. Here, we are particularly grateful to H.M. Manthrihillake and C.M. Madduma Bandara. The staff of the NRMS has been supportive of our work particularly on a day to day basis. We thank A. Amarasekera, K.B. Jayasundera, Renuka P. and S.B. Rajakaruna for professional management and numerous acts of assistance.

Since 2005, we have been located at the Headworks Division of the Mahaweli Authority at Digana. The intervention and support of the Executive Director of the Mahaweli River Basin Division, J.A.S.A. Jayasinghe and the Director of the Headworks Division, Nimal Wickramaratne were indispensable to us since then. The staff of the Headworks Division particularly H. Herath Banda and A. Batcha and their staff have supported us enormously since then.

Many from the International Research Institute for Climate Prediction and the Earth Institute at Columbia University have contributed to work in Sri Lanka. Neil Ward, Steve Zebiak, Maxx Dille, Carolyn Mutter and Shiv Someshwar have guided the formulation of projects following the early guidance by Reid Basher, Chet Ropelewski, Upmanu Lall and Steve Rayner. Sandy Vitelli, Ann Binder, Tricia Ramsey, Brendon Hoch, Jeff Turmelle, Jia Fang, Leo Ostwald and Jussara Barone are gratefully acknowledged for

office and computer support for these projects. Jim Hansen and Jennifer Phillips helped with agriculture. Benno Blumenthal, Michael Bell and Emily Grover helped with data management. Tony Barnston, Lisa Goddard and Simon Mason helped with interpretation of forecasts. Neil Ward and Ousmane Ndiaye have guided the work on downscaling. Brad Lyon, Anji Seth, Michael Bell and Chet Ropelewski contributed in climate diagnostics. Jian-Hua Qian developed the regional climate model. Jia Fang facilitated the development of the website. Sankar Arumugam, Jian-Hua Qian, Steve Connor, Anji Seth, Lisa Goddard, and Tony Barnston lent their expertise and time to plan future programs. Maxx Dilley, Bob Chen, Kathy Boyer and Brad Lyon supported our work in disaster risk management. Neil Ward and Steve Connor are helping in launching the project on climate and malaria and in its implementation.

Columbia University students have participated in these projects with mutual benefit. Stacey Hirsh and Hyemin Yang have contributed usefully particularly with the data library during their internships at IRI.

The Earth Institute provides a conducive milieu for this work at the IRI. The introductions provided by the Director, Jeffrey Sachs, to decision makers in Sri Lanka and the support of various others in the Earth Institute have been valuable. Interaction with others in the Earth Institute such as Nirupam Bajpai, Brendan Buckley, Bob Chen, Art Lerner-Lam, Prithiviraj Fernando, Fred Koontz and Marc Levy is valued. The support and guidance of Roberto Lenton on numerous occasions has been pivotal. Jeffrey Shaman, Marc Stieglitz and Mark Cane helped launch the project on climate and malaria.

Our collaborators are numerous and not all named here but we thank them all for contributions to the work program.

Sri Lankan

Anti-Malaria Campaign – D.M. Gunawardena, Gawrie Galapaththy, H.M. Faizal
Coconut Research Institute: T.S.G. Peris, Neil Fernando, Sanathanie Ranasinghe
Department of Meteorology: S.B. Basnayake, G.H.P. Dharmarathna
Department of Wildlife Conservation: W. Hendawitharana
Irrigation Department – H.M. Jayatillake, K.S.R. de Silva, P.C. Senaratne
University of Peradeniya – T.D.M.A Samuel, S.B. Weerakoon, P. Wickramagamage

International

Frontier Research System for Global Change: Toshio Yamagata, Suryachandra Rao
National Aeronautical and Space Agency – Goddard Space Flight Centre (NASA – GSFC): Sarith Mahanama
Indian Institute of Science: Sulochana Gadgil, J. Srinivasan
Indian Institute of Tropical Meteorology: K. Rupa Kumar Kolli and K. Krishna Kumar.
International Centre for Theoretical Physics: K.R. Sreenivasan
International Water Management Institute: H. Manthrilake, N.R. Aloysius, Felix Amerasinghe, Priyanie Amerasinghe, Wim Van Der Hoek, Olivier Briet, D.M. Gunawardene.
University of North Carolina: Aravinda De Silva