

# 15<sup>th</sup> ANNIVERSARY REPORT

## 2002 - 2016

The background of the cover is a dynamic composition of overlapping geometric shapes in shades of blue and white, creating a sense of movement. On the left side, there is a black and white photograph of a weather station with various sensors and a wind vane. A bright, jagged lightning bolt strikes down from a dark, stormy sky in the center-right portion of the image.

The logo for the Foundation for Environment, Climate and Technology (FECT) is centered. It consists of a black circle containing a white silhouette of a person standing with arms raised. To the right of the circle, the word "FECT" is written in large, bold, black capital letters. Below "FECT", the full name "Foundation for Environment, Climate and Technology" is written in a smaller, black, sans-serif font.

Foundation for Environment, Climate and Technology

பார்வரிக டேஷருணிக ஸத நாக்ஷணிக படிதம

சூழல் காலநிலை தொழில்நுட்ப நிலையம்

உலர்ச்சுத ஸ்டீர்ஸ்ட்ரீட் ஸ்டீர்ஸ்ட்ரீட் ஸ்டீர்ஸ்ட்ரீட் ஸ்டீர்ஸ்ட்ரீட் ஸ்டீர்ஸ்ட்ரீட்

Fondation pour l'Environnement, le Climat et la Technologie



பாரீசரீக டேஷூனீக சத நாக்ஸனீக படுதல்  
சுழல் காலநிலை தொழில்நுட்ப நிலையம்  
உயிரினங்கள், மனிதன், விலங்குகள், தாவரங்கள், நீர் உயிர்கள்  
Fondation pour l'Environnement, le Climat et la Technologie

பாரிசரீக டேஸுலூனிக ஸத நாக்ஷனிக பதநத்  
சூழல் காலநிலை தொழில்நுட்ப நிலையம்

உயிர்த் துறையில் உயர்ந்த அளவுக்குரிய உயிர் வளம் உருவாகும்.

Fondation pour l'Environnement, le Climat et la Technologie



2000-2016

**Foundation for Environment, Climate and Technology**

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சூழல் காலநிலை தொழில்நுட்ப நிலையம்

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**Fondation pour l'Environnement, le Climat et la Technologie**

*Digana Village, Rajawella & Akurana, Sri Lanka.*

*Male, Maldives*

*Moroni, Comoros*

*New York, USA*

**Telephones**

+94 81 237 6746

+94081 230 0415

**Emails**

fectsl@gmail.com

info@tropicalclimte.org

**Websites**

www.climate.lk

www.tropicalclimate.org



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# INSTITUTIONAL PROFILE

## Vision

Our vision is to sustain FECT as a center of excellence in climate, environmental, information technologies and related areas where state of the art research is pursued; technological capability is advanced and disseminated and where all of this is combined to execute socially valued projects

## Mission

To sustain a think tank and center of excellence in climate, environment and information technologies with quality research to address societal concerns and ecological protection.

## Origin & Contributions

We instituted the Foundation for Environment, Climate and Technology (FECT) as a non-profit company in 2003. FECT contributes to climate, hydrology, adaptation, information technology, social sciences and engineering for sustainable development. Our charter requires us to work towards societal welfare without private profit.

- Developed infrastructure for research
- Implemented climate adaptation projects
- Undertook climate & environmental research
- Trained over three score of personnel since 1997

## Registration Details

<b>Company Name:</b>	Foundation for Environment, Climate and Technology
<b>Company Registration No:</b>	NA 1148 (from 2003) GA 556 (from 2008)
<b>Voluntary Service Org Reg No:</b>	KDS/AKU/5/2/සංඥ/83
<b>Date of Incorporation:</b>	31 <sup>st</sup> December, 2003
<b>Company Secretary:</b>	Ralapanawe Associates
<b>Auditor:</b>	Anzari & Company
<b>Bankers:</b>	Peoples Bank, Commercial Bank & Hatton National Bank

## Web and Social Media

<b>Websites :</b>	<a href="http://www.climate.lk">www.climate.lk</a>		<b>Facebook :</b>	<a href="http://www.facebook.com/FECTSL">www.facebook.com/FECTSL</a>
	<a href="http://www.tropicalclimate.org">www.tropicalclimate.org</a>		<b>Twitter :</b>	@fectlk

## Contact info

Foundation for Environment Climate & Technology  
Digana Village, Rajawella, 20180, Sri Lanka.  
76/2 Matale Road, Akurana, 20850, Sri Lanka  
Phone: +94-81-2376746, +94-81-2300415  
Email: [fectsl@gmail.com](mailto:fectsl@gmail.com)

# OVERVIEW

Foundation for Environment, Climate and Technology originated at the Natural Resources Management Services (NRMS) of the Mahaweli Authority with a project to study seasonal climate information for the Mahaweli river basin in 2000. It was built on the work of the computational mathematics group at the Institute of Fundamental Studies in Kandy from 1997 to 1999. Here, we summarize the events, projects, programs, partnerships, personnel, and outputs for the last decade and a half.

**Institutional History:** We had been working on a project to use climate information for water management from 2000 under the Natural Resources Management Services (NRMS) which is a company under the umbrella of the Environment and Forest Conservation Division of the Mahaweli Authority. To ensure continuity of our operations, and to sustain capacity through new grants a new organization was essential. The formal registration of the non-profit company the Foundation for Environment, Climate and Technology (FECT) took place by the Registrar of Companies on the 31st December, 2003.

We're located at the Mahaweli Authority premises in Digana in August 2005. We have settled well with the support of the Directors and the staff of the Headwork Division of the Mahaweli Authority. Since then, we have been executing grants, collaborating on proposals, contributing to scientific and technical meetings and conferences, and publishing extensively.

**Project Work:** We have demonstrated the use of hydro-climatic information with projects for water resources management, human-elephant conflict, plantation and food crop agriculture, malaria and dengue risk assessment and disaster risk management.

**Climate Work:** We have undertaken climatic diagnostics, climate prediction, hydro-climatic analysis, modeling, prediction, and climate change assessments. We continue to build a state of the art hydro-meteorological monitoring and prediction system.

**Information Technology:** We have undertaken IT infrastructure development, website development, interactive map servers and software development for scientific computation. We are developing high-performance computing and web services.

**Publishing:** We have published in newspapers, scientific journals, magazines, Internet, posters, newsletters and books.

**Education:** Fifty persons have been employed full-time and seven have been employed part-time since 2000. Employees have been researchers, provided IT services, administrative services, GIS, writing and accounting services. Twelve of them have obtained post-graduate degrees and five have obtained undergraduate degrees while being employed at FECT. A similar number are currently pursuing higher education (from Bachelors to Doctoral degrees) after leaving FECT. Further we partnered with the University of Peradeniya to launch a Masters in Sustainable Development Practice.

**Training:** Our staff has obtained on the job training. They have also received training at local and international workshops, and they have attended training programs at the International Research Institute for Climate and Society, New York, International Centre for Theoretical Physics, Italy, Post-Graduate Institute of Agriculture, University of Colombo, Kasetstart University, Thailand, and the Bangladesh Centre for Advanced Study, Dhaka, Asia Pacific Climate Centre, Centre in Busan, South Korea, and the China Meteorological Administration, International Crop Research Institute for Semi-

Arid Tropics (ICRISAT), Hyderabad, India, Agricultural systems modeling , Dubai, and Acharya N. G. Ranga Agricultural University (ANGRAU), Hyderabad, India.

Internship opportunities were provided to students from the Faculty of Agriculture and Science at the University of Peradeniya, and technical tertiary institutes such as National Institute of Business Management (NIBM), the Sri Lanka Institute of Information Technology (SLIIT) and the Sri Lanka Institute for Technical Education.

We have conducted workshops for the Mahaweli Authority, the Central Engineering Consultancy Bureau, the Department of Meteorology. the University of Peradeniya, the Post-Graduate Institute of Science, the Department of Geography, the American Corner in Kandy, the Akurana Pradeshia Sabhawa, the Plantation Human Development Trust, the Maldives National University, the Maldives Meteorological Service, the Hairu Fisheries Company in Comoros and the Botswana Meteorological Service. We have provided lectures and supported thesis research in water resources management, meteorology, oceanography, environmental science, geographic information systems and disaster management at the Post-Graduate Institute of Sciences, Post-Graduate Institute of Humanities and Social Sciences, University of Moratuwa, University of Peradeniya, University of Colombo, University of Ruhuna, South-Eastern University, the Eastern University and the Open University of Sri Lanka.

**Funding:** Our work has been funded through grants from International Research Institute for Climate and Society, The Earth Institute at Columbia University, System for Analysis Research and Training (START), Global Environmental Facility (GEF) and the Office of Global Programs at US National Oceanic and Atmospheric Agency (NOAA), National Science Foundation, Sri Lanka, the Provention Consortium, USA, WHO SEARO project office in Thailand, Food and Agricultural Organization (FAO), International Foundation for Science, Sweden, UNESCO-IHE Institute for Water Education, MacArthur Foundation, Chicago, USA, Agriculture Model Inter-comparison and Improvement Program (AgMIP), US Office of Naval Research, US National Academy of Sciences (NAS), United States Agency for International Development (USAID) and the University of Colorado. We hope to sustain our work through new partnerships and projects.

In later sections, we provide details on our climate adaptation projects, work on climate, hydrology and environment, science, environment and society, our partnerships, and staff, and list our outputs.

# ACKNOWLEDGEMENT

**Staff:** Our ability to maintain competent and dedicated staff has been instrumental in our sustenance amidst various difficulties. The dedication of the staff members to build up FECT is acknowledged. We thank our advisory staff for their key contributions.

**Partners:** We are grateful for the continuous support provided by the Mahaweli Authority of Sri Lanka including hosting us. We are grateful to our collaborators, particularly the Columbia University Water Center, International Research Institute for Climate and Society, Coconut Research Institute, Sugarcane Research Institute, University of Peradeniya, Department of Meteorology, Tea Research Institute, Anti-Malaria Campaign, Department of Agriculture, International Water Management Institute, the Universities of Ruhuna, Moratuwa, Colombo, Rajarata, Sabaragamuwa and The Open University.

In the Maldives, we thank the Maldives Meteorological Service (MMS), Maldives National University (MNU), Renewable Energy Maldives, Land and Marine Environmental Resources Group (Pvt) Ltd (LaMer), Ministry of Health, Ministry of Environment and Energy, Malé Water and Sewerage Company, and Dinemore.

We thank our sponsors and collaborators at the System for Analysis, Research and Training (START), Provention Consortium, International Foundation for Science, National Oceanic and Atmospheric Administration (NOAA), Food and Agricultural Organization (FAO), World Health Organization South - East Asia Region (WHO SEARO), Ministry of Science and Technology, National Science Foundation (NSF), Mahaweli Authority of Sri Lanka (MASL), MacArthur Foundation, University of Notre Dame, US Office of Naval Research, Agriculture Model Intercomparison and Improvement Project (AgMIP), United States Agency for International Development (USAID) and the US National Academy of Sciences, and the University of Colorado.

**Administration:** The administration of the company has proceeded smoothly through the cooperation among the management and staff. The Annual reports were submitted via our Company Secretary, Ralapanawe Associates, to the Registrar of Companies.

**Financial Management:** Auditors, Anzari and Co., has reported a healthy state of financial management in each of our annual audits since inception.

## **Acknowledgements:**

### **OUR AFFILIATE SCIENTISTS:**

Dr. S. Mahanama  
Neil Devadasan,  
Eng. A.K Weerasinghe  
Ajith Gunaratne  
Vidhura Ralapanawe

### **SRI LANKA:**

#### ***Mahaweli Authority***

Eng. S.R.K Aruppola  
Eng. G.S.S Jayaweera  
Eng. K.N Wickramaratna  
Eng. J.A.S.A Jayasinghe  
Eng. H. Herath Banda  
Eng. B.S. Liyanagama  
Mr. Dhammika Bandara



Eng. Thilaka Samaratunga

S.B. Rajakaruna

A. Amerasekera

K.B. Jayasundera

Mr. Anver Batcha

Mr. R. Seneviratna

Mrs. J. Senanayake

Eng. Mrs. Thameema Hilal

**University of Peradeniya:**

Prof. C.M. Madduma Bandara

Dr. Uditha Ratnayake

Prof. Lakshman Dissanayake

Dr. Champika Bandara

Dr. Rupika Rajakaruna

Dr. D.H.S. Maithripala

Dr. Nalani Hennayake

Dr. Dileni Gunewardena

Dr. Wasantha Athukorala

Dr. Ananda Jayawickrama

Dr. O.G Dayaratne Banda

Dr. S.P Nissanka

Mr. Sampath Deegalla

Dr. Chamila Walgampaya

Dr. Kanthi Perera

Dr. Sachith Abeyesundara

Prof. W.B. Daundesekera

Dr. L. Galagedera

Dr. Shamala Kumar

Dr. Lalitha Dissanayake

Dr. Gemunu Herath

Dr. Hemali Ampitiya

Dr. M.T.M. Mahees (**University of Colombo**)

**University of Ruhuna:**

Prof. K.D.N. Weerasinghe

Dr. Champa M. Nawarathna

Mr. Janaka Gunaratna

Dr. Nalin Wikramanayake

**Sri Lanka Open University:**

Dr. S. Aluvihare

Dr. P. Amerasinghe

Mr. Farook Nawas (**South-Eastern University**)

Dr. M. Manobavan (**University of Jaffna**)

**IWMI:**

Dr. H. Manthirithilake

**Coconut Research Institute**

Dr. Sarath Peiris

Dr. Neil Fernando

**Anti Malaria Campaign:**

H.M. Faizal

G.N.L. Galappaththy

Dr. P.H.D. Kusumawathie

**Irrigation Department:**

Eng. H.M. Jayatillake

**Institute of Fundamental Studies:**

Dr. M.C.M. Iqbal

Prof. Gamini Seneviratne

Prof. C.B. Dissanayake

**Department of Agriculture:**

Dr. R. Punyawardene

Dr. W.M.W. Weerakoon

Mr. Chamila Perera

**Sugarcane Research Institute:**

Dr. A.P. Keerithipala

Mr. K. Sanmuganathan

Mr. A.L.C. De Silva

Ms. Sandya Ariyawansa

Ms. Tanuja Ariyananda (**SLRHF**)

Eng. M.J.M.N. Marikkar (**LTL Holdings**)

Dr. Ananda Mallawathantri (**UNDP**)

Dr. Gamini Batuwitige (**Gemidiriya**)

Eng J.M. Samoon (**Independent Engineer**)

**Akurana Pradeshiya Sabaha:**

Mr. A.M.M Simsan

Ms. Rupika Ekanayake

Mr. Rajapakse (**Akurana AGA**)

**MALDIVES:**

Dr. Zahid (**Maldives Meteorological Services**)

**Maldives National University:**

Dr. Shazla Mohamaed

Dr. Mizna Mohamed

Ms. Hudha Ahmed (**Renewable Energy**)

Mr. Nishan Ahmed (**Ministry of Health**)

**Malé Water and Sewerage Company:**

Mr. Mohamed Rasheed

Ms. Majeeda Mohamed (*Ministry of Environment*)

**LaMER:**

Mr. M. Aslam

Mr. Hussain

**National Disaster Management Centre:**

Mr. Hisan Hassan

**COMOROS:**

Mr. Messers Rukshan Malewena

Mr. Chamsoudine

Mr. A.M. Goulam

**INTERNATIONAL PARTNERS:**

**FAO, Rome**

Dr. David Dawe

Dr. Gil C. Saguiguit

**University of Philippines:**

Dr. Mercedita

A. Sombilla

**UNESCO-IHE:**

Prof. Roshanka Ranasinghe

**University of Notre Dame:**

Prof. Harindra J. Fernando

Mr. Udaya Jinadasa (*NARA*)

Dr. Randall Koster (*NASA*)

**Andalas University, Indonesia:**

Prof. Rudi Febriamansyah

Dr. Michael Glantz (*CCB/University of Colorado*)

**IRI:**

S.J. Connor

James Hansen

Amor Ines

Kevin Coffey

Michael Bell

Dr. Carolyn Z Mutter

Remi Cousins

Shaky Sherpa

**Columbia University:**

Adam Sobel

Upmanu Lall

Vijay Modi

Cynthia Rosenzweig

Andrew Thibodeau

Alex Ruane

Sonali McDermid

**University of Florida:**

Prof. Jim Jones

Prof. Cheryl Porter

Prof. Ken Boote

**Oregon State University:**

Dr. John Antle

Dr. Roberto Valdivia

Dr. Daniel Wallach (*INRA*)

Dr. Peter Thorburn (*QDPI, Australia*)

Dr. John Hargreaves (*CSIRO*)

Dr. Balwinder Singh (*IRRI*)

**National Academy of Sciences:**

Kelly Robbins

Al Mattei

Daniel Placht

Dr. Dalal Najib

**USAID, Sri Lanka & Maldives:**

Ms. Jeanette Normand

Ms Nihani Riza

Mr. Paul Richardson

Ms. Mary Ackley

Ms. Margot Welk

Mr. Andrew Sisson

# PARTNERS

## Primary Partners



MASL



NRMS



IRI



UoP



EL

Mahaweli Authority of Sri Lanka (MASL)  
Natural Resources Management Services (NRMS)  
International Research Institute for Climate and Society (IRS)  
University of Peradeniya (UoP)  
Earth Institute at Columbia University (EI)

## Sri Lanka Government Institutions



DEPARTMENT OF METEOROLOGY  
SRI LANKA

DoM



NRM



CRI



TRI



AMC



CEB



Irrigation Department



NIFS



DWLC

Department of Meteorology (DoM)  
Natural Resources Management Centre, Department of Agriculture (NRM)  
Coconut Research Institute (CRI)  
Anti-Malaria Campaign (AMC)  
Tea Research Institute (TRI)  
Uva Province Health Ministry  
Central Province Health Ministry  
Department of Wildlife (DWLC)  
Ceylon Electricity Board (CEB)  
Department of Irrigation  
National Institute of Fundamental Studies (NIFS)

## Sri Lankan Universities



UoP



UoR



UoM



UoC



SUSL



OUSL



EUS



UoK



UoSJ



SEUSL

University of Peradeniya (UoP)  
 Open University of Sri Lanka (OUSL)  
 University of Moratuwa (UoM)  
 University of Colombo (UoC)  
 Sabaragamuwa University of Sri Lanka (SUSL)  
 University of Ruhuna (UoR)  
 Eastern University of Sri Lanka (EUSL)  
 University of Kelaniya (UoK)  
 University of Sri Jayawardhenapura (UoSJ)  
 South Eastern University (SEUSL)

## Regional Universities



TNAU



IISc



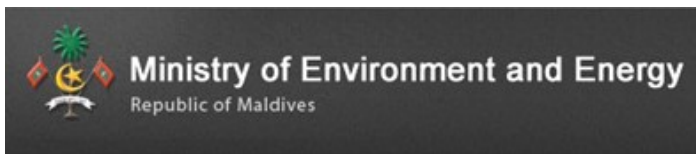
UoK



Cochin University

Tamil Nadu Agricultural University (TNAU)  
 Indian Institute of Science (IISc)  
 University of Karachi (UoK)  
 Cochin University of Science & Technology

## Maldivian Partners



Maldives Meteorological Service  
Republic of Maldives



Ministry of Environment & Energy  
Marine Research Centre  
Ministry of Tourism Arts and Culture  
Disaster Management Centre  
Maldives National University  
Renewable Energy Maldives  
UNDP Maldives  
Lamer (Pvt) Ltd  
Maldives Meteorological Service

## International Collaborators



IITM



NASA



FRSGC



IWMI



UMBC



LDEO



MacArthur  
Foundation

## CIESIN

Indian Institute of Tropical Meteorology, India (MFIITM)  
 National Aeronautical and Space Agency, USA (NASA)  
 Frontier Research System for Global Change, JAMSTEC, Japan (FRSGC)  
 International Water Management Institute (IWMI)  
 University of Maryland, Baltimore County (UMBC)  
 Lamont -Doherty Earth Observatory (LDEO)  
 Columbia University (CU)  
 Center for Environmental Research and Conservation (CERC)  
 Center for International Earth Science Information Network (CIESIN)  
 MacArthur Foundation, Chicago, USA

## Sources of Financial Support



START



NOAA



UNDP



ICTP



NSF



Provention



NSFIDRC



IDRC



IFS





**APCC**



**CGIR**



**USAID**

Global change System for Analysis Research and Training, USA. (START)  
National Oceanic and Atmospheric Administration, USA. (NOAA)  
United Nations Development Programme (UNDP)  
International Centre for Theoretical Physics, Trieste, Italy (ICTP)  
Ministry of Science and Technology, Sri Lanka. (MOST)  
International Foundation for Science, Sweden. (IFS)  
National Science Foundation, Sri Lanka. (NSF)  
International Development Research Centre, Canada. (IDRC)  
UNESCO-IHE  
US National Academy of Sciences  
Agricultural Model Intercomparison and Improvement Project  
APCC- APEC Climate Center  
Climate Change, Agriculture and Food Security program ([www.ccafs.cgiar.org](http://www.ccafs.cgiar.org))  
USAID

# CLIMATE ADAPTATION PROJECTS

## **River Basin Management in the Mahaweli**

We collaborated with the Mahaweli Authority of Sri Lanka (MASL) and the International Research Institute for climate and society (IRI) to explore the use of climate information for river basin management. We also worked with the Irrigation Department, the Ministry of Water Resources and the NASA Global Modeling and Assimilation Office. We have studied climatic tele-connections with rainfall and stream flow, investigated drought and flood indices, and the applicability of climate information for agricultural, water resources, environmental and disaster management at basin level. We provided weekly updates on hydro-meteorological monitoring and predictions to the MASL.

## **Climate Variability and Rice Production in Sri Lanka**

Our research has indicated a significant relationship between rice production in Sri Lanka and ENSO. These findings are useful to construct the use of seasonal climate predictions for agricultural management and policy-making. We collaborated with colleagues at the Institute of Fundamental Studies and Department of Agriculture.

## **Climate Change and Variability and Tea and Coconut**

This project was a three-year collaborative undertaking between five Sri Lankan organizations: the Department of Meteorology (DoM), Tea Research Institute (TRI), Coconut Research Institute (CRI) and University of Peradeniya and IRI, funded by the global change system for Training, Analysis and Research (START). We engaged in climatic analysis, impact assessment, development of adaptation strategies and capacity building. We have developed climate change assessments and contributed to an operational prediction scheme for coconut production.

## **Climate and Human-Elephant Conflict**

This project was in collaboration with the IRI, Center for Environmental Research and Conservation (CERC), Environment and Forest Conservation Division of the MASL and the Department of Wildlife Conservation in Sri Lanka. We established precipitation and NDVI climatologies, undertook downscaling of climate predictions and identified a link between drought in the first half of the year and elephant deaths.



## **Climate and Natural Disaster Hotspots**

We identified disaster hazard risk spatially and seasonally for Sri Lanka at fine scales along with the impacts of combination of these risks. We also studied vulnerability to disaster. This work resulted in a proposal for disaster risk management. Our partners were the Center for Hazards and Risk Research (CHRR), Center for International Earth Science Information Network (CIESIN), and The Earth Institute at Columbia University. This project was funded by The Earth Institute at Columbia University with a grant from the World Bank. This work was published by the World Bank.

## **Climate Variability and Malaria and Dengue**

We studied the interaction of dengue and malaria with climate in Sri Lanka. We collaborated with the International Water Management Institute (IWMI), the Anti-Malaria Campaign (AMC), NASA/GSFC land surface group, University of Kelaniya, and the IRI. The project was funded by NOAA/NSF/EPRI/NASA Climate Variability and Human Health program. Scientists attached to the University of North Carolina and University of Victoria, Canada collaborated with us on research on climate impacts on Dengue Fever.

## **Assessing Drought and Enabling Adaptation through Rainwater Harvesting**

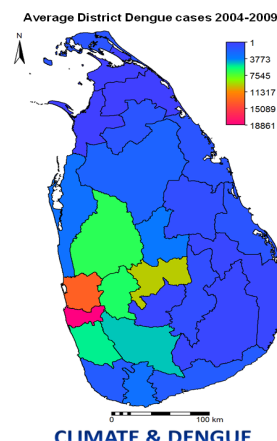
In collaboration with the University of Peradeniya we developed a systematic basis to assess drought and design a Rain Water Harvesting (RWH) system based on climate data, and developed a proposal for the installation of a RWH unit in Idamelanda, Hanguranketa. Using regional, seasonal and long term indicators we developed a computer program to generate estimates for the collector and storage sizes to a given reliability. We focused on RWH unit for domestic, home gardening purposes and developed a draft proposal for implementation of an RWH unit with the participation of the community. This effort was funded by the ProVention Consortium.

## **Assessing Predictability of Seasonal Rainfall in the Kelani River Basin in Sri Lanka**

We investigated the improvement in skill obtained in predicting the stream flow in the Kelani River by using factors other than ENSO such as sea surface temperature indices, Himalayan snow cover, Quasi-Biennial Oscillation and the influence of volcanic eruptions. This effort was funded by the International Foundation for Science, Sweden.

# Regional and Seasonal Variation of Dengue Risk in Sri Lanka and its Relationship to Climate

This project characterized the spatio-temporal character of Dengue risk in Sri Lanka, to evaluate its relationship with climate and environmental precursors for the peak incidence seasons and test a model for predicting Dengue risk in Kandy District. Through this work, we were able to evaluate the potential for a Dengue early warning system that relates climate and environmental variables with dengue risk. This project was supported by WHO SEARO project office in Thailand.



## Climate Change Impacts on Seasonally Intermittently Open Tidal Inlets

This project was funded by UNESCO – IHE Institute for water management. We developed a comprehensive description of the production process of stream flow fluxes to Maha Oya and Negombo lagoons in Sri Lanka, and Songkhala Lagoon in Thailand for the Climate Change Impact on Seasonally and Intermittently Open Tidal inlets project.

## ENSO Impacts on Cereals in Sri Lanka

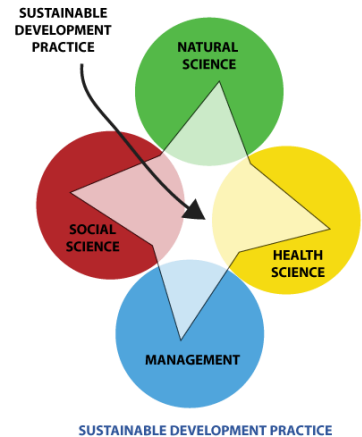
We assessed the relationship of Sri Lankan rice production; area harvested and yields with rainfall and El Nino – Southern Oscillation (ENSO) to characterize the climate impact better and to help develop seasonal predictions. This project was collaboratively funded by FAO and Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) through the University of Philippines. The project was conducted in 11 countries including Bangladesh, Cambodia, China, India, Indonesia, Malaysia, Pakistan, Philippines, Sri Lanka, Thailand, and Vietnam simultaneously.

## South Asia Strategy Development for CCAFS and Toolkit for crop yield

This project is a component of the South Asia program of the Climate Change, Agriculture and Food Security (CAAFS) programme. The goal was to develop a toolkit based on a crop simulation model and apply this for Sri Lanka. The toolkit integrates spatial data of weather, soil, crop management practices, crop distribution and crop parameters to provide qualitative and quantitative crop status spatially. The Sri Lanka team was led by the Director of the Natural Resources Management Centre of the Department of Agriculture and the collaborators included staff from the Rice Research Development and Training Institute, and the University of Peradeniya, The Foundation for Environment, Climate and Technology (FECT) played a supporting role by providing the weekly hydro meteorological advisories to the Mahaweli Authority (MASL). This was sponsored by IRI, Mahaweli Authority and IFS (Sweden).

## **Masters in Development Practice (MDP) at the University of Peradeniya**

The Masters in Development Practice was launched by the University of Peradeniya in collaboration with FECT, Columbia University, Open University and other educational institutions. FECT was engaged in curriculum development, teaching, research and field placements for the MDP programme. We also undertook research projects and capacity development in Sri Lanka and Maldives. This project was funded by MacArthur Foundation, USA as a node in a global network of 22 universities that are offering MDP.



## **Intra-Seasonal Climate Predictions for Sri-Lanka and Maldives for Water Resources Management**

The overall goal of the project promoted better understanding of intra-seasonal variability of rainfall around Sri Lanka and Maldives, refine prediction schemes, translate this information to support water management, and upgrade local capacity for climate science and climate services. This project was done in collaboration with the University of Peradeniya, Mahaweli Authority of Sri Lanka (MASL), Malé Water and Sewerage Company (MWSC) and Maldives Meteorological Service (MMS). It was sponsored under the PEER program of the US National Academy of Sciences and USAID program in Sri Lanka and Maldives.

## **Modeling the Impacts of a Variable and Changing Climate on Rice and Sugarcane Agricultural Systems in Sri Lanka.**

The Agricultural Model Inter-comparison and Improvement Project (AgMIP) is a major international effort linking the climate, crop, and economic modeling communities with cutting-edge information technology to produce improved crop and economic models and the next generation of climate impact projections for the agricultural sector. The objective of the project was to substantially improve the characterization of world food security due to climate change and to enhance adaptation capacity in both developing and developed countries. The project was done in direct collaboration with University of Peradeniya, University of Ruhuna, and Sugarcane Research Institute.

# **CURRENT PROJECTS**

## **Can Drought and Flood Hazards be Skillfully and Robustly Assessed at Fine Spatial Resolution in Maldives and Sri Lanka?**

Through this project we hope to implement a hazard analysis framework for combining multiple terrestrial indicators from satellite observations and climate/hydrological model simulations to assess hazard risks and impacts of climate variability. These assessments shall be evaluated for utility in decision support for disaster management. The project is partnered by Goddard Space Flight Center-NASA (NASA-GFSC) and the Maldives National University (MNU). It is sponsored under the PEER program of the US National Academy of Sciences and USAID program in Sri Lanka and Maldives.

## **Monitoring Drought and Assessing Climate Change in Next Decades in Sri-Lanka and Maldives**

Scientists from the Foundation for Environment, Climate and Technology, Maldives National University, Maldives Meteorological Services, Columbia University are working to develop monitoring and predictive tools for drought risk and to address a riddle in climate change projections which predict a wetter climate although what has been experienced is sustained drying. This project is sponsored under the PEER program of the US National Academy of Sciences and USAID program in Sri Lanka and Maldives.

## **Remote Sensing of Atmospheric Waves and Instabilities (RAWI)**

The Remote Sensing of Atmospheric Waves and Instabilities project over the Equatorial Indian Ocean is being undertaken by the University of Notre Dame in partnership with Massachusetts Institute of Technology, and National University of Singapore to capture and study intra seasonal phenomena by observing across the equator with measurement stations at eastern atolls of Seychelles, Sri Lanka and Singapore; spanning time scales from minutes to months. For this project FECT contributes through analysis of data on atmospheric waves around Sri Lanka including the MJO phenomenon, and also support post-graduate education.

## **El Niño Ready Nations**

FECT is contributing to the International Project on El Nino Ready Nations conducted by Dr. Mickey Glantz of the Center for Capacity Building at the University of Colorado, Boulder, USA. We have contributed an evaluation of climate, impacts, communication and outcomes on Sri Lanka and Maldives during the 2015/2016 El Nino. This International project which has contributors from 16 countries is sponsored by the USAID Office of Foreign Disaster Assistance of grant to Dr. Glantz.

# CLIMATE, HYDROLOGY & ENVIRONMENT

We have undertaken hydro-climate data management, climatic diagnostics, climate change assessments, hydro climatic analysis, climate modeling and climate prediction.

**Data Management:** We acquired and organized data and undertook quality assessment.

**Climate Assessment and Research:** We have characterized climatologies of all meteorological variables over Sri Lanka. We developed a climate calendar which is a representation of the seasonality of climate.

**Climate Diagnosis:** We diagnosed seasonal, inter-annual, decadal, multi-decadal and long-term trends. In particular, we investigated the impact of two of the principal modes of regional inter-annual variability, the El Niño-Southern Oscillation and the Indian Ocean Dipole.

**Climate Modeling:** We developed a meso scale model for capturing topographically induced rainfall. We also developed a high-resolution wind climate model ignoring the rainfall mechanisms. We collaborated on Regional Climate Modeling focused on Sri Lanka with the IRI and the International Center for Theoretical Physics (ICTP).

**Seasonal and Intra-Seasonal Climate Prediction:** We have investigated the skill of seasonal predictions from global climate models. We have collaborated to implement a statistical methodology to correct the biases for predictions of global models for rainfall over Sri Lanka and to make it available at high resolution. We have collaborated with SUNY-Albany to predict daily rainfall estimates from satellite cloud images over the Indian Ocean for up to 30 days.

**Climate Change Assessments:** We have investigated the trends in climate from observations over Sri Lanka. We have contributed to downscaling exercises for climate change using statistical methods and land surface models.

**Hydro-climatic Diagnosis:** We have published studies on the Pacific and Indian Ocean influences on the Kelani and Mahaweli stream flow.

**Hydro-climatic Modeling:** We have developed a water resources system simulation model for the Walawe. We have calibrated a land surface model for small catchments and collaborated to produce an island-wide land surface model that mimics hydrological features at high resolution. We collaborated with NASA GMAO to simulate land surface features over Sri Lanka at high resolution based on climate reanalyzes data.

**Hydro-climatic Monitoring:** We are working towards a near real-time hydro-meteorological monitoring system which combines surface and satellite-based observations.

# SOCIETY, ENVIRONMENT AND TECHNOLOGY

Our science and technology contribution is complemented by research into the environmental, technological, historical and socio-economic setting. We have researched environmental hazards and policy on science and technology history, on energy conservation and renewable energy, and on climate and climate adaptation in Sri Lanka. Here, we report on some aspects of these works.

**Traditional Agriculture and Sustainability:** We have argued in a paper that appeared in *Science, Technology and Society*, that the indigenous irrigation systems in Sri Lanka offer a useful counterpoint of an irrigation system that has many favorable attributes.

**Environment Impact Analysis:** Our work on EIA has led to an understanding of environmental history, law and protection. A summary was reported in the *Journal of the Institution of Engineers in Sri Lanka* and in *Environmental Impact Analysis*.

**Technology and Communication:** There are often failures of communication between metropolitan climate forecasts centers and peripheral users. We have analyzed the reasons for miscommunication during the El Niño of 1997 and the successful communication during the El Niño of 2002 in Sri Lanka.

**Valuation of Climate Variability Impacts on Coconut Production:** We collaborated with Dr. Neil Fernando and others of the Coconut Research Institute on assessing the valuation of climate impacts on coconut production. This work was published as an AIACC technical report.

**Valuation of Climate Impacts on the Economy:** We worked with Peter Epilla formerly of the School of International and Policy Affairs, Columbia University to assess the impacts of climate on GDP in Sri Lanka.

**Economic valuation under AgMIP:** With the use of the “Tradeoff Analysis Model for Multi-Dimensional impact assessment (TOA\_MD)”, we analyzed and compared a reference scenario with climate change, socio-economic and rice in Sri Lanka using a common set of key drivers to assess plausible futures for agricultural markets and global food security.

**Socio-Economic Scenarios under CCAFS:** We provided weekly hydro-meteorological advisories to the Mahaweli Authority where they could use the scenarios to explore the feasibility of strategies, technologies and policies towards improved food security, environments and livelihoods under different socio-economic and governance conditions.

# CAPACITY BUILDING

**Capacity Building:** We have provided on-the-job training, and conducted workshops both formally and informally. We supported the National Steering Committee on Seasonal Climate Predictions. We have trained Mahaweli Engineers in climate analysis and predictions for water management. We have provided a series of lectures at the Department of Meteorology and training for meteorologists.

We have supported, lectured and provided resources for research to students in post-graduate courses in meteorology, oceanography, water resources and disaster management at the University of Peradeniya, University of Moratuwa, University of Colombo and The Open University. We have provided lectures and supported thesis research in water resources management, meteorology, oceanography, environmental science, geographic information systems and disaster management at the Post-Graduate Institute of Sciences, University of Moratuwa, University of Peradeniya, University of Colombo and the Open University. Our Principal Scientist serves as the External Examiner for the M.Sc. in Meteorology at the University of Colombo.

We support the Panel Meeting of Water Management Secretariat in Sri Lanka with decision making on water allocation by providing them with our weekly Experimental Climate Services for Water Management.

FECT contributed to the workshop on Mainstreaming Climate Information Application for Enhancement of Agro-ecosystem Services and Functions in the Nilwala Basin, organized by the Asian Disaster Preparedness Center and the Faculty of Agriculture of the University of Ruhuna to initiate a program on technology interventions to meet the challenges associated with climate change in paddy ecosystems in the downstream of Nilwala river.

FECT provided training for its staff on Climate, Crop (APSIM, DSSAT, STICS and SRI-CANE), and Economics (TOA-MD) modeling on Rice and Sugarcane Farming Systems in Sri Lanka, under the Agricultural Model Inter-comparison and Improvement Project.

In view of creating awareness on the impacts of environmental pollution, FECT organized an Environmental day program along with an exhibition in Akurana. This program was conducted with the support of the Akurana Pradeshiya Sabhawa. School children, employees from the government, private sector and community groups in the Pinga Oya catchment area participated and contributed to this program.

We conducted a workshop along with an exhibition of posters on “Climate and Water Security” in the Maldives at the Maldives National University with the aim of bringing together expertise on climate and water, to introduce the issues involved, to identify and address critical gaps in knowledge, and to identify research priorities to meet emerging societal needs. Undergraduates, faculty members, researchers from various organizations and teachers in secondary schools participated at this workshop.

**Reference Guide:** One thousand five hundred citations on climate related topics were organized into a Reference Guide. This effort was supported by the NSF Sri Lanka and the IRI.

**Training and Education:** Seasonal Climate Predictions (March 2003) - Neil Ward of IRI visited Sri Lanka. He met with all Directors at the Meteorological Department and had a presentation at the National Steering Committee on Seasonal Forecasting and Applications at BMICH Senate Room, and a talk at the University of Peradeniya that was arranged by Center for Environmental Studies.

# OUTREACH

**Outreach:** We created websites, distributed newsletters and provided feature articles for mass-media. We have produced the South Asian Climate News - a quarterly newsletter reaching 1500 scientists and policy makers by email and postal mail. We supported the distribution of the Asian Climate Digest in Sri Lanka until 2006. Since then we have produced a detailed annual climate summary for Sri Lanka which is available on our website.

**Website:** We maintain [www.climate.lk](http://www.climate.lk) as our flagship website.

**Posters:** We have prepared more than forty posters presenting facets of our work. We have a permanent poster exhibition in our office at Digana.

## Workshops

### **Dendrochronology (December 2004)**

We helped Dr. Brendan Buckley and Dr. Orawan Buckley of the Tree Ring Laboratory, Columbia University, USA visit Sri Lanka to scope out the prospects of carrying out dendrochronological studies to develop estimates of climatic and hydrological variability in the past centuries in Sri Lanka. He made presentations at the Arts Faculty Seminar Room, University of Peradeniya, on 'Tree Ring Reconstruction of Asian Monsoon Dynamics' and held a workshop at the Post Graduate Institute of Science.

### **Regional Modeling (September 2004)**

Jian-Hua (Joshua) Qian visited Sri Lanka. We arranged a presentation at the University of Peradeniya and at Sri Lanka Association for the Advancement of Science.

### **Malaria Workshops (September 2007)**

A workshop on Analysis of Impacts of Climate Variability on Malaria Transmission in Sri Lanka and Development of An Early Warning System was held at the International Water Management Institute, Colombo, which was organized by IWMI, AMC, IRI and FECT.

A One-Day Workshop on Malaria Risk Management using Climate Information was jointly organized with the Post Graduate Institute of Science, University of Peradeniya, Foundation for Environment, Climate and Technology, and the International Research Institute for Climate and Society, New York, USA.



## **Masters in Sustainable Development Practice (Jan 2009)**

We helped the University of Peradeniya launch a Masters Program in Sustainable Development Practice with assistance from the MacArthur Foundation. The Program commenced at the University of Peradeniya in 2010. FECT developed curricula for the course on Climate and Society; supported teaching; and worked with government, non-governmental, and private sector organizations in support of internship placement of students.

## **Symposium on Pinga-Oya (February 2013)**

Symposium on Pinga-Oya was organized by the Foundation for Environment, Climate & Technology and hosted at the Department of Geography, in the University of Peradeniya. The symposium was attended by scientists, researchers, teachers, undergraduates, school students, members of women's associations, and journalists. The papers presented at this symposium are published as a proceeding.

## **Ministry of Water Resources (2003)**

Two presentations were held at the Ministry of Water Resources and Mahaweli Development under the patronage of the Minister, Gamini Jayawickrama Perera. Heads of departments under the Ministry attended the presentations. The Minister also visited our office and had discussions with our staff.

## **Mahaweli Authority**

Two presentations were held on the use of climate information for river basin management at the Environment and Forest Conservation Division offices in Polgolla under the patronage of the then Directors, Dr. Herath Manthirithillake and Mr. Ranjith Herath. A presentation on the use of climate information was held in the Headworks Administration and Operations Maintenance Division of the Mahaweli Authority in Digana Village in 2004 and a poster exhibition was held in 2005. Two seminars were organized at the Head Office of the Mahaweli Authority in 2004 and 2014 and held under the patronage the Director-General. Dr. Herath Manthirithillake, Director of the MASL visited IRI in 2003 and Prof. C.M. Madduma Bandara, Chairman of Natural Resources Management Centre visited IRI In 2006.

## **Fisheries Training Program, Comoros (February 2014)**

Lareef Zubair was an Invited Expert to the Comoros Ministry of Fisheries and Hairu Fisheries Development Project (Comoros) and contributed lectures to the Fisheries Training program where 20 fishermen were being taught advanced techniques.

## **American Center (2004)**

At the Invitation of the US Embassy's Environment Officer, Lareef Zubair, provided a seminar for the World Water Day for invitees in Kandy branch of the American Center in 2004.

## **Ministry of Environment, Maldives (2009)**

Lareef Zubair presented a seminar on capacity building programs for the Maldives Ministry of Environment at the invitation of the Minister of Environment.

# CHARITABLE ACTIVITIES

## Tsunami Relief

After the Tsunami on the 26th December 2004, two websites were developed to find ways to contribute to the recovery effort. They provide topical information about Tsunami disaster, Sri Lanka, disaster management and health care, updates on the evolving situation on the ground, requests for assistance, offers of assistance, maps, information on regional weather and climate, networking tools and information on organizations that are involved in relief particularly small community based organizations, and contains links to related websites and efforts. It provided a GIS based interactive mapping tool that can help contextualize relief work spatially.

## Emergency Water Treatment System

In the aftermath of Tsunami a pressing problem for the affected was the lack of potable water. There was a request for water treatment equipment, from Prof. Raveendranath the Acting Vice-Chancellor at the Eastern University to Dr. M.C.M. Iqbal and Dr. Zubair. This request came after tests proved that almost all the wells, even those inland have been contaminated by the Tsunami and is unsuitable for human consumption. We fabricated and installed a prototype unit at the Eastern Universities Disaster Management Center with instructions on reproducing it.

## Air Pollution and Coal Power Plants

The need for climate expertise in evaluating the impact of air pollution due to coal and other industries encouraged us contribute to reports submitted to the Supreme Court on hearings on the Environmental Impact Assessment at Sampur, Trincomalee. Our Principal Scientist contributed to the Environment Committee of the Public Utilities Commission of Sri Lanka which is charged with regulating electric utilities. Further we undertook dissemination through the national newspapers, popular news websites and social media.

### **The following newspaper articles were published:**

- *Is the air pollution analysis for the Sampur Coal Plant credible?* (Financial Times) Clouded Sampur (Daily news)
- *Was Air Pollution Analysis for Sampur Coal Plant Botched?* (The Sunday Leader)
- Web article: *Is the Air Pollution Analysis for the Sampur Coal Plant Credible?* (Sri Lanka Guardian, Ground Views).

## **Environment Day for Schools in the Pinga Oya Catchment**

An Environmental day program along with an exhibition was organized for the school children in and around Akurana. The program was conducted with the assistance of the Akurana Pradeshiya Sabhawa. Children from seven schools in the area, employees from the government and private sector, and community groups participated and contributed to this program. The aim of this event is to raise an awareness to take positive environmental action to protect nature and the planet Earth. This was an enriching event which included environmental speeches by the participating organizations, students' programs and exhibition in reference to the environment day.

## **Sethusamudram**

The project Sethusamudram was proposed by the Defense Minister of India in 1999, George Fernandez includes a canal that is to be excavated through the Palk Straits. This had raised many questions in Sri Lanka about the impact of the project on Sri Lanka. The aim of this project is to reduce the travel time of Indian ships that have to circumnavigate Sri Lanka. But this project earns the consideration of the people of Sri Lanka and Tamil Nadu as it may be accompanied with grave environmental damage. In this regard Dr. Lareef took an immense effort to prove the social and environmental impacts on Tamil Nadu and Sri Lanka to the relevant authorities through articles published in the newspapers.

Published articles: <http://www.climate.lk/sethu/>

## **Preserving the Colombo Meteorological Observatory**

Systematic meteorological data collection in Sri Lanka was started by Colonel Fyers of the Royal Engineers in 1852, at Colombo. Data since 1853 is available at the headquarters of the Department of Meteorology where the most careful meteorological measurements have been conducted in Sri Lanka. It is also the only site from which radiosonde measurements are carried out. However in 2004 the British High Commission wanted to acquire a part of the land from the east end of the Department of Meteorology, which was adjoining the residence of the British High Commissioner. The Department had been resisting this move initially, but when the order came from the highest authority, the government protocol prevented the Department officials from making any objection. In accordance to this issue on behalf of the scientific community in Sri Lanka an extensive attempt was made by Dr. Lareef Zubair by appealing to stop the takeover of this land by the British High Commission, through letters addressed to relevant authorities and newspaper articles.

For Published articles: <http://www.climate.lk/cot/>

# COMOROS

FECT undertook climate and adaptation related work in Comoros at the invitation of the Hairu Group, and the Ministry of Fisheries in Comoros. Consequently we focused on setting up available weather predictions, development of customized predictions and the translation of these for cyclone, high wind speed, heavy rain and inundation forecasting, to provide Hydro Meteorological monitoring and prediction for Comoros, and Weather and Hazard outlooks for fishing operations. The work has been supported by personnel in departments in charge of meteorology, agriculture, fisheries, environment, surveys, census, water resources, energy, disaster management and the University of Comoros.



*Left: L. Zubair is seen with local partners on a visit to a farm in Grand Comoros*

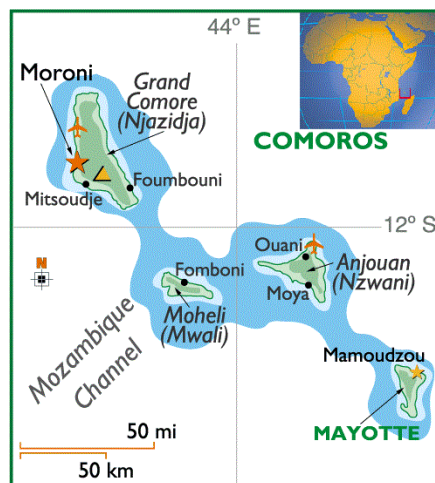
*Right: Fisheries Training Workshop where Dr. L. Zubair contributed at a meeting hosted by the Hairu Group in Moroni, Comoros.*

## Projects

- Climatological analysis
- Climate Predictions for Comoros
- Weather and hazard outlooks for fishing operations
- Fisheries outputs

## Partners and Affiliated institutions

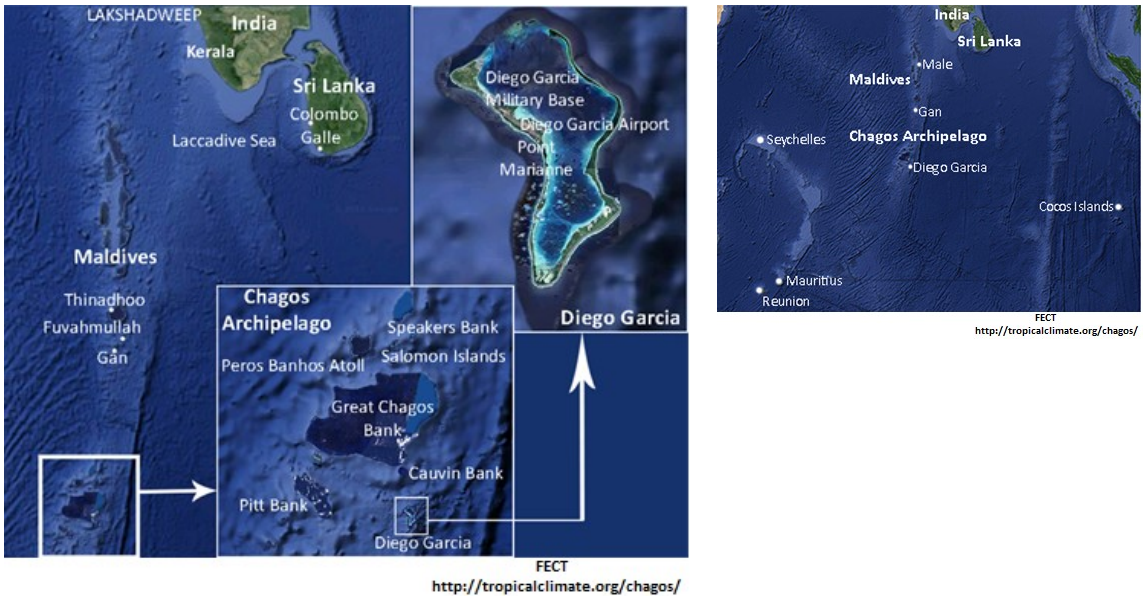
- ANACAM
- I'INRAPE
- Service Topographique - Comoros
- DERE - Comoros
- University of Comoros
- Hairu Fisheries Management



*Topography of the Comoros archipelago*

# CHAGOS

FECT Chagos was initiated as part of the program on climate of Indian Ocean Islands at the Columbia University. Currently Satellite based rainfall monitoring; Climatological analysis from ground and satellite observations and studies of the influences of ENSO and MJO are being carried out in Chagos by FECT.



*Satellite Images of the Central Equatorial Indian Ocean Region  
inset left: Diego Garcia Atoll, from Google Earth and inset right: The Chagos Archipelago,*

## Projects

- Decadal Sea Level Rise Projections (2016 onwards): We are planning on making observations using Tidal, Satellite and Coral based methods to measure Sea Level Rise in the next 20 years if our proposal on this topic is granted.
- Satellite Rainfall Monitoring Tool (2016)
- Climatological Analysis (2016)

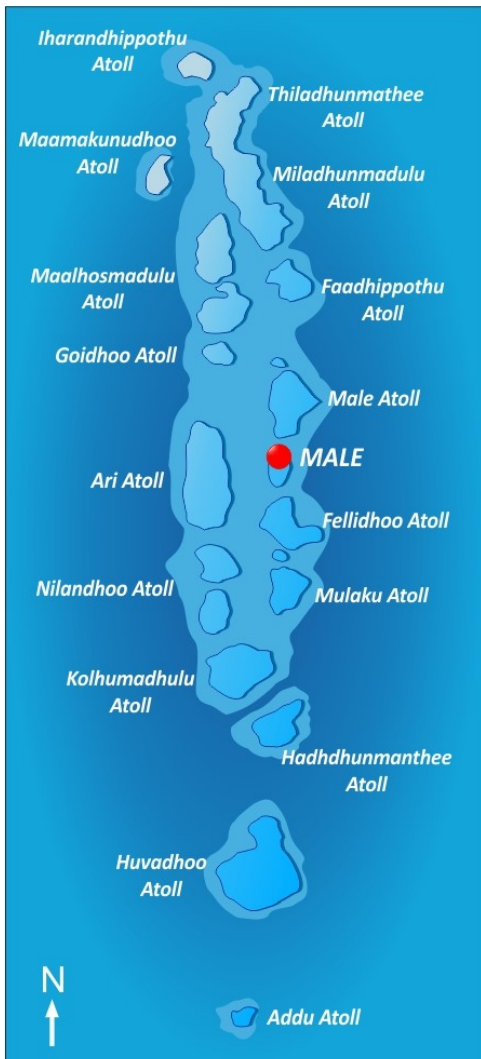
For further info regarding our work in Chagos visit: <http://tropicalclimate.org/chagos/>

# THE MALDIVES

## Workshop on Climate & Water Security in the Maldives (2015)

FECT and MNU (Maldives National University) organized a workshop in Male' on the 13<sup>th</sup> of September 2015 at the Auditorium of MNU on climate and water security in the Maldives. The goals of this workshop include expertise on climate and water, review the state of knowledge, and identify research priorities and educational needs.

The presentations focused on sustainability of water resource management, climate and water resources linkages, climate monitoring and predictions for water management, the Climate Advisory for Maldives, and lessons learned from ongoing programmes and projects. And there was a poster session alongside the workshop.



Atolls of Maldives



Audience in the Workshop on Climate and Water Security



Dr. L. Zubair explaining about a Poster- El Niño & La Niña influences on the Climate of the Maldives to a member of the audience

## Projects

- Can drought and flood hazard be skillfully assessed at fine spatial resolution from combining constrained streams of observed, remotely sensed and model predicted data in Sri Lanka and the Maldives? (August 2015 – July 2018)
- Developing Monitoring Tools for Managing Drought Risk and addressing the riddle of Increased Drought Tendency amidst the Wetter Climate Change Projections in Sri Lanka and Maldives
- Intra-seasonal climate predictions for Sri Lanka and Maldives for water resources management
- Assessing Water Scarcity and Alternative Mitigation options for the Maldives
- Masters in Development Practice (MDP)
- Climate and Dengue in the Maldives - 2014 Onwards
- Climate Predictions for Maldives (2011 onwards)
- Planning for Capacity and Science Development in Climate in Maldives (2009-2011)
- Climatological Analysis (2010-2011)
- Launching a Masters in Sustainable Development Practice at the University of Peradeniya (2010-onwards)
- Satellite Rainfall Monitoring Tool (2009-2010)
- Columbia Dynamo Project
- Columbia Marine Biology Project in the Arabian Sea

## Partners and Affiliated institutions

- |                                   |   |
|-----------------------------------|---|
| • Ministry of Environment         | • Health Protection Agency              |
| • Maldivian National University   | • UNDP Maldives                         |
| • Marine Research Centre          | • LaMer Pvt. Ltd                        |
| • Disaster Management Centre      | • Ministry of Tourism, Arts and Culture |
| • Male Water and Sewerage Company | • Ministry of Fisheries and Agriculture |
| • Renewable Energy Maldives       |   |

# TIMELINE

## 2000

- Scoping for River Basin Management Project in Sri Lanka by IRI and MASL
- Formulation of proposal with Directors of the MASL (Dr. H. Manthrithillake and Dr. R.D. Wanigaratne) and the Director of the IRI (Dr. Antonio Divino Moura)
- Seed-funding, formal start of project through Natural Resources Management Services (NRMS) affiliated with MASL.

## 2001

- Proposal on Climate and Human-Elephant Conflict funded by IRI
- Proposal by SLAAS with our input on Adaptation and Impact Assessment to Climate Change (AIACC) was funded through the System for Analysis, Research and Training (START).
- Climate Assessment, Prediction and Adaptation Group (CAPAG) established at NRMS

## 2002

- Sri Lanka Portal (<http://www.tropicalclimate.org/~mahaweli/>) 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
- Poster presentation at the Inaugural Ceremony of the Workshop on Impact Assessment and Adaptation Methods of Climate Change for Plantations, organized for officials of the Ministry of Plantations and Department of Meteorology, Colombo.

## 2003

- Visit by Dr. Nirupam Bajpai of the Earth Institute's Centre for Globalization and Sustainable Development to CAPAG
- Minister of Irrigation and Water Resources, Directors of Science and Technology and Director of Meteorology visit CAPAG
- Dr. Neil Ward of IRI visits CAPAG/NRMS, and Mahaweli Authority
- Climate Variability and Human Health grant awarded to develop prediction system for malaria using climate in Sri Lanka.
- Transformation of CAPAG as the Foundation for Environment, Climate and Technology

## 2004

- Proposal for Bridge Funding on Disaster Risk to IRI is accepted
- A Bibliography on Weather and Climate of Sri Lanka and Impacts and Adaptation: A reference Guide was published
- 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
- Brendan Buckley and Orawan Buckley of the Tree Ring Laboratory, Columbia University, visit CAPAG/NRMS.



## **2005**

- Land Surface Modelling for Sri Lanka implemented with NASA/GMAO.
- Staff moves to Digana Office at Headworks Division of Mahaweli Authority.

## **2006**

- Digana Offices inaugurated by Mahaweli Authority's Director of Headworks.
- High-Resolution Climate Analysis published by World Bank.

## **2007**

- Project conclusion workshop on the NOAA grant was held at the International Water Management Institute
- Janaki Chandimala attends International training workshop on Scientific Methodology, conducted by International Foundation for Science, in Dhaka Bangladesh.
- Proposal submitted to the Provention Consortium Research and Action Grants for Disaster Risk Reduction Round 3 was funded
- Proposal to International Foundation for Science (IFS, Sweden) on stream flow predictions and hydrological assessment submitted was funded

## **2008**

- Dr. L. Zubair attends Eco Health Workshop in Merida, Mexico.

## **2009**

- Poster Exhibition held at FECT office for MASL staff on January 1st 2009.
- Susanthi Liyanarachchi obtained training at ICTP, Italy.

## **2010**

- Proposal on Regional and Seasonal variation of Dengue Risk in Sri Lanka and its relationship to Climate was funded by SEARO (South-East Asia Regional Office) – WHO
- "The Impacts of El Niño Southern Oscillation (ENSO) Events on Cereal Production Area and Yield" was funded by SEARCA-FAO
- Climate change impacts on seasonally and intermittently open tidal inlets project was funded by UNESCO-IHE Institute for Water Education.
- Launched a Masters in Sustainable Development Practice at the University of Peradeniya, MacArthur Foundation, FECT developed curricula for the course on Climate and Society; support teaching; and work with government, non-governmental, development, and private sector organizations in support of placement of students and graduates
- Lareef Zubair attended the Eco health conference in August 2010 at the London School of Hygiene

and Tropical Medicine, UK

- Lareef Zubair, attended the Indo-Gangetic Plains regional meeting of the Climate Change Adaption to Agriculture and Food Security (CCAFS) program, in New Delhi
- Lareef Zubair, International Graduate Conference on Climate Change and People in Kathmandu, for mentoring and presentation on Rates of Ecosystem Change in Southern Asia.

## **2011**

- Lareef Zubair and Madhura Weerasekera attended the workshop on “Indian Northeast Monsoon” at the Regional Meteorological Centre, Chennai.
- Madura Weerasekera attended the Eighth International Seminar on Climate System and Climate Change (ISCS) held from 18 to 29 July 2011 in Beijing, China.
- Madura Weerasekera attended the "Summer School on Climate Impacts Modeling for Developing Countries: Water, Agriculture and Health" from 5 - 16 September 2011, in Trieste, Italy.

## **2012**

- Sewwandhi Chandrasekara, and Sanjaya Ratnayake, participated in the training programme of central Young Scientist Support Program and participated in the training programme at the Asia Pacific Climate Centre in Busan, South Korea.
- Lareef Zubair, Prabodha Agalawatte, Dumindu Herath, Yasas Harischandra, and Erandika Wijekoon participated at the AgMIP South Asia Regional Projects Kickoff Workshop, Colombo, Sri Lanka
- “Development, evaluation and application of a toolkit for regional crop yield forecasting and climate change impact assessment for Sri Lanka”, was funded by CCAFS (Climate Change, Agriculture and Food Security) project
- Project on “Modeling the impacts of a variable and changing climate on rice and sugarcane Development (DFID), UK and the United States Department of Agriculture –Agricultural Research Service (USDA-ARS)
- Project on “Intra-seasonal climate predictions for Sri Lanka and Maldives for water resources management” was awarded by the US National Academy of Sciences

## **2013**

- Sewwandhi Chandrasekara and Yasas Harischandra, participated at the AgMIP Multiple Crop Model Training Program (DSSAT and APSIM crop models). From 25th -29th March 2013, at the International Crop Research Institute for Semi-Arid Tropics (ICRISAT), Hyderabad, India.
- Dumindu Herath and Erandika Wijekoon, participated at the AgMIP workshop for regional teams on TOA-MD modeling held in Dubai from 29 April to 3 May 2013.

- Lareef Zubair, Prabodha Agalawatte, Dumindu Herath, Erandika Wijekoon, Sanjaya Ratnayake and P. Wickramagamage participated at the AgMIP South Asia regional research and coordination team midterm review workshop held from 22nd to 26th July 2013, Kathmandu, Nepal.
- Lareef Zubair, Prabodha Agalawatte participated at the AgMIP Climate Training workshop at Acharya N. G. Ranga Agricultural University (ANGRAU), Hyderabad, India.
- Symposium on Pinga-Oya was held on 19th Tuesday February 2013, Organized by Foundation for Environment , Climate & Technology and Department of Geography, Faculty of Arts, University of Peradeniya.
- A retreat for FECT staff members was held at the Old Trinitians' Sports Club, Kandy

## **2014**

- Lareef Zubair, Prabodha Agalawatte, and Dumindu Herath participated at the Finish line workshop in Arusha, Tanzania, from 28 January – 4 February, 2014.
- Lareef Zubair, and Prabodha Agalawatte participated at the 2nd ANCST Workshop on “Atmosphere-ocean interactions in the Indo-Pacific basin and their impact on Asian climate” organized by the Indian Institute of Science, Bengaluru, India, on 23-24th November, 2014.
- “Remote Sensing of Atmospheric Waves and Instabilities (RAWI)” project was funded by the University of Notre Dame.
- “Drought Monitoring and Climate Change Assessment for Sri Lanka and Maldives” project was funded by the US National Academy of Sciences.
- Lareef Zubair had discussions with Hairu Fisheries/ Ministry of Fisheries, at Moroni, Comoros.

## **2015**

- FECT conducted the Workshop on Climate and Water Scarcity in the Maldives, at the Maldivian National University, Malé. Lareef Zubair, Prabodha Agalawatte, and Janan Viswanathan participated at the workshop
- Lareef Zubair participated at the 2015 International Conference on Green Development in Tropical Regions, organized by Andalas University, Indonesia held in West Sumatra, Indonesia.
- “Can drought, flood and landslide hazard be skillfully assessed at fine spatial resolution from combining constrained streams of observed, remotely sensed and model predicted data in Sri Lanka and Maldives?” project funded by the US National Academy of Sciences.

## 2016

- *Review Meeting for FECT staff and Collaborators* was held at the Digana Resort in Rajawella to Brainstorm on past and on going projects, common issues, review work to fix problems and improve work and working conditions, to identify priorities and to draft a strategic plan for FECT 2016, on 1<sup>st</sup> January, 2016.
- Prabodha Agalawatte , Udara Ratnayake, Janan Viswanathan, Akram Kamiss and Prof. P. Wickramagamage participated at the short course conducted by the Eighth International Perspective on Water Resources and the Environment (IPWE) organized by the American Society of Civil Engineers (ASCE) and the Environmental and Water Resources Institute (EWRI), at Cinnamon Grand Colombo, Sri Lanka. 3<sup>rd</sup> January 2016.
- Lareef Zubair and Prabodha Agalawatte participated at the workshop on Eighth International Perspective on Water Resources and the Environment (IPWE) organized by the American Society of Civil Engineers (ASCE) and the Environmental and Water Resources Institute (EWRI), at Cinnamon Grand Colombo, Sri Lanka. 4-6 January 2016.
- *Review Meeting for FECT staff and Collaborators* was held at the Digana Resort in Rajawella to update on-going project activities, review work, fix problems and improve working conditions, to identify priorities, on 29<sup>th</sup> April, 2016.
- L. Zubair & P. Wickremagamage Undertook the student workshop on GIS and Climate at the Maldives National University, Maldives.
- Rimza Zacky participated at the *PEER financial training* workshop held in Bangkok Thailand from August 8-9, 2016.
- Lareef Zubair participated at the workshop on Research topics and plans for the Bachelor of Environment Management held at the Maldives National University, Male', Maldives on 29th August, 2016.
- Zubair, L., participated at the Symposium on Outlook on CKDu held at the National Institute of Fundamental Studies (NIFS), Kandy on 15th August, 2016.
- Lareef Zubair and Prabodha Agalawatte participated at the FOSID 2016 – (Faculty of Science Industry Day) held at the Faculty of Science, University of Peradeniya, on September 3, 2016.
- Lareef Zubair participated at the "Science and Technology for Society Forum Sri Lanka 2016", held from 8th to 10th Sep 2016 at the Water's Edge, Colombo, Sri Lanka organized by COSTI/Ministry of Science Technology and Research, Sri Lanka.
- Prabodha Agalawatte participated at the 5th Asia Pacific Climate Change Adaptation Forum - Blue Green Era Conference held at BMICH from the 17 – 19 October, 2016.
- Manusha Lakmali, Ruchira Lokuhetti and Ashara Nijamdeen participated at the APAN Youth Forum at the BMICH from the 17 – 19 October, 2016.
- Zubair, L., participated and delivered the keynote speech at the Fifth Annual Science Research Sessions – 2016 “Enriching the Novel Scientific Research for the Development of the Nation” held at the Faculty of Applied Sciences, South Eastern University of Sri Lanka, Sammanthurai, on December 29, 2016.

# SELECTED PUBLICATIONS

## 2016

**Zubair, L. and P. Wickramagamage** (Editors), *Proceedings of the Pinga Oya Symposium*, Foundation for Environment, Climate and Technology, Kandy, Sri Lanka.

**Zubair, L., Zahid, Agalawatte, P. and Lokuhetti, R.** (2016). The Maldives. In Michael H. Glantz (Ed.), *A STEPPING STONE TOWARD ENSO RELATED DRR LESSONS LEARNING: Lessons Learned Portal Project for ENRNs* (El Niño Ready Nations) (pp. 26 – 31). US: CCB/INSTAAR, University of Colorado.

**Zubair, L., Agalawatte, P. and Lokuhetti, R.** (2016). Sri Lanka. In Michael H. Glantz (Ed.), *A STEPPING STONE TOWARD ENSO RELATED DRR LESSONS LEARNING: Lessons Learned Portal Project for ENRNs* (El Niño Ready Nations) (pp. 26 – 31). US: CCB/INSTAAR, University of Colorado.

**Zubair, L., Agalawatte, P. and Lokuhetti, R.** (2016). *The El Nino event of 2015/16 in Sri Lanka: Predictions, Preparedness, Communication and Impacts.* In *Climate Change Secretariat* (Ed.), NEELAHARITHA-The Climate Change Magazine of Sri Lanka (pp.40-46). Sri Lanka: Ministry of Mahaweli Development and Environment.

**Agalawatte, P., Viswanathan, J., Zubair, L. and Bell, M.** (2016). Providing climate services for water management in Sri Lanka. In *Climate Change Secretariat* (Ed.), NEELAHARITHA-The Climate Change Magazine of Sri Lanka (pp.40-46). Sri Lanka: Ministry of Mahaweli Development and Environment.

**Agalawatte, P. and Zubair, L.** (2016). State of the art climate change assessments for Sri Lanka from CMIP5. In *Climate Change Secretariat* (Ed.), NEELAHARITHA-The Climate Change Magazine of Sri Lanka (pp.40-46). Sri Lanka: Ministry of Mahaweli Development and Environment.

## 2015

**Gunaratne, A., and Zubair, L.,** (2015). *Fine Scale Evaluation of Tropical Wind Climatologies using a Mass Consistent Model.* International Journal of Numerical Methods and Applications, 14 (2) 77-105, December 2015, [http://dx.doi.org/10.17654/IJNMADec2015\\_077\\_103](http://dx.doi.org/10.17654/IJNMADec2015_077_103)

**McDermid, S. P., Guntuku, D., Murthy, K. M. D., Nedumaran S., Piara S., Chukka S., Gangwar, B., Subash, N., Ashfaq A., Zubair, L., and Nissanka, S.P.,** (2015). *Integrated Assessments of the Impacts of Climate Change on Agriculture: An Overview of AgMIP Regional Research in South Asia.* In *Society of Agronomy, Crop Science Society of America, and Soil Science Society of America* (18).Imperial College Press.

**McDermid, S.P., Wijekoon, E., Agalawatte, P., Zubair, L., et al.** (2015). The AgMIP Coordinated Climate-Crop Modeling Project (C3MP): Methods and Protocols. (Chapter 8). In *Society of Agronomy, Crop Science Society of America, and Soil Science Society of America* (31). Imperial College Press.

**Rosenzweig, C., Jones, J.W., Hatfield, J. R., Antle, J. M., Ruane, A. C., Boote, K. J., Thorburn, P. J., Valdivia, R. O., Porter, C. H., Janssen, S., Wiebe, K., Mutter, C.Z., Lifson, S., Contreras, E. M., Athanasiadis, I., Baigorria, G., Cammarano, D., Descheemaeker, K., Hoogenboom, G., Lizaso, J., McDermid, S., Wallach, D., Adiku, S., Ahmad, A., Beletse, Y., Dileepkumar, G., Kihara, J., Masikati, P., Ponnusamy, P., Subash, N., Rao K.P.C., Zubair, L., and AgMIP Collaborators around the world.** (2015). AgMIP Technical Report USDA 59-3625-1-745.

**Zubair, L., Nissanka, S.P., Weerakoon, W.M.W., Herath, D.I., Karunaratne, A.S., Agalawatte, A.S.M.P.M.B., Rasnayaka M., Herath S., Punyawardhene, B.V.R., Vishwanathan, J., Punya, D. A., Wijekoon, E. N., Gunaratna, J., Chandrasekara S.S.K., Wickramagamage, P., Weerasinghe, K.D.N., Navaratne, C.M., Perera, R.S., Gunsekara, A.I., Pradeep Kumara, G.M., Daniel W., Roberto O. V., and McDermid, S., (2015). Climate Change Impacts on Rice Farming Systems in Northwestern Sri Lanka. (Chapter 10). In Society of Agronomy, Crop Science Society of America, and Soil Science Society of America (39). Imperial College Press.**

## 2013

**Chandrasekara S.S.K., (2013). *Institutional capacity to protect stream reservations in Sri Lanka: Case Study in Kalugamuwa Grama Niladari Division-GeliOya*. Sri Lanka Water Convention 2013. Conference Proceedings. National Water Supply & Drainage Board, Sri Lanka. ISBN 978-955-4731-00-4. P 118-121.**

**Chandrasekara, S.S.K., Agalawatte, P., Weerasekera, M., Zubair, L., Nawaratna, B. and Bell, M. (2013). *Experimental climate services for water management in Sri Lanka and Maldives*. Sri Lanka Water Convention 2013. Conference Proceedings. National Water Supply & Drainage Board, Sri Lanka. ISBN 978-955-4731-00-4. P 37-41.**

**Herath, D., De Alwis, A.E.N., Agalawatte, A.S.M.P.M.B., Harischandra, Y.G., Chandrasekara, S.S.K., Zubair, L. and Samaratunga, P.A. *Simulating SocioEconomic Impacts of Climate change on Rice Farming Systems: Trialing a Novel Integrated Methodology for Kadawaramulla, Kurunegala*. Peradeniya Economics Research Symposium (PERS) 2013 Proceedings. University of Peradeniya. 29 August, 2013 (pp 38 – 42).**

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**A.K. Srivastava, M. Rajeevan, L. Zubair and J. Revadekar, South Asia, in Blunden, Jessica, Derek S. Arndt, 2012: State of the climate in 2011. Bull. Amer. Meteor. Soc., 93, S1–S282.**  
<http://dx.doi.org/10.1175/2012BAMSStateoftheClimate.1>

**Rosenzweig, C., Jones, J.W., Hatfield, J.L., Muttter, C.Z., Adiku, S.G.K., Ahmad, A., Beletse, Y., Gangwar, B., Guntuku, D., Kihara, J., Masikati, P., Paramasivan, P., Rao, K.P.C. and Zubair, L., 2012: *The Agricultural Model Intercomparison and Improvement Project (AgMIP): Integrated regional assessment projects*. In *Handbook of Climate Change and Agro ecosystems: Global and Regional Aspects and Implications*. D. Hillel and C. Rosenzweig, Eds., ICP Series on Climate Change Impacts, Adaptation, and Mitigation Vol. 2. Imperial College Press, 263-280.**

## 2011

**Gadgil, S., Rajeevan, M., Zubair, L., and Yadav, P., 2011, *South Asian Monsoon: Inter Annual Variability*, In Eds, Ding et al., Global Monsoon System, Research and Forecast, World Scientific Publications and World Meteorological Organization.**

**Rajeevan, M., Zubair, L., *South Asian Climate, in State of the Climate in 2010*, J. Blunden, D. S. Arndt, M. O. Baringer, Bulletin of the American Meteorological Society, Volume 92, Issue 6 (June 2011) pp. S217-219.**

## 2010

**Adhikari, S., Liyanarachchi, S., Chandimala, J., Nawaratne, B.K., Bandara, R. and Zubair, L., *Rainfall prediction based on the relationship between rainfall and El Niño Southern Oscillation (ENSO)*. Journal of the National Science Foundation, December 2010, 38 (4): 249-255.**

**Gadgil, S., Rajeevan, M., Zubair, L., and Yadav, P., *South Asian Monsoon: Inter Annual Variability*, In Eds., Ding et al., Global Monsoon System, Research and Forecast, World Scientific Publications and World Meteorological Organization. Chapter 3, pages 25-42, 2011.**

## 2009

**Liyanaarachchi, S., Nawarathna, B., Bandara, R., Adhikari, S., Chandimala, J.C., and Zubair, L.,** *Sri Lankan rainfall climate and its modulation by El Niño and La Niña episodes*, submitted to Journal of the National Science Foundation.

**Lyon, B., Zubair, L. and Ralapanawe, V.,** *Fine scale evaluation of drought hazard for tropical climates*, *Journal of Applied Meteorology and Climatology*, 48 (1): 77-88.

**Qian, J.H., and Zubair, L.,** *The effects of grid-resolution and domain choice on the quality of simulations of the South Asian northeast monsoon rainfall*. *Monthly Weather Review*, 138(7): 2780-2802.

## 2008

**Mahanama, S., Koster, R., Riehl, and Zubair, L.,** *The role of soil moisture in seasonal streamflow predictability - case study in Sri Lanka*, *Advances in Water Resources* 31 (3): 1333-1343.

**Zubair, L., Galappaththy, G. N., Hyemin, Y., Janaki, C., Amerasinghe, P., Neil, W., and Stephen J. C.,** *Epochal changes in the association between malaria epidemics and El Nino in Sri Lanka*, *Malaria Journal*, 7:140. (2008).

**Zubair, L., Siriwardhana, M. and Chandimala, J.,** *Predictability of Sri Lankan Rainfall based on ENSO*, *International Journal of Climatology*. 28 (1): 91-101.

## 2007

**Chandimala, J., and Zubair, L.,** *Predictability of Streamflow and Rainfall for Water Resources Management in Sri Lanka*, *Journal of Hydrology*, 335 (3-4), 303-312.

**Fernando, N., Zubair, L., Peiris, T.S.G., Ranasinghe, C.S., and Ratnasiri, J.,** *Economic Value of Climate Variability Impacts on Coconut Production in Sri Lanka*, *AIACC Working Paper No. 45*, Washington, DC: START.

## 2006

**Zubair, L. and Chandimala, J.,** *Epochal Changes in ENSO-Streamflow relations in Sri Lanka*, *Journal of Hydrometeorology*, 7 (6):1237-1246.

**Zubair, L., Ralapanawe, V., Tennakone, U., and Perera, R.,** *Natural Disaster Risks in Sri Lanka: Mapping Hazards and Risk Hotspots, Chapter 4, in Natural Disaster Hotspots Case Studies*, Washington, DC: World Bank 2006.

**Zubair, L., and C.F. Ropelewski,** *The strengthening relationship of ENSO and the North-East Monsoon rainfall over Sri Lanka and Southern India*, *Journal of Climate*, 19 (8): 1567–1575.

## 2005

**Zubair, L., Perera, R., and Was the 2002/03 Maha bumper harvest due to El Nino?** *Journal of the Institute of Engineers, Sri Lanka*, (4): 63 – 70.

**Zubair, L.,** *Modernization of Sri Lanka's Traditional Irrigation System and Sustainability*, *Science, Technology and Society*, 10 (20): 161-195.

## 2004

Zubair, L., *May 2003 disaster in Sri Lanka and Cyclone 01-B in the Bay of Bengal*, *Natural Hazards*, 33: 303-318. (2004).

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Zubair, L., Ratnayake, J., Somasundera, A., *Weather and Climate in Sri Lanka: A Reference Guide*, Natural Resources Management Services, Kandy, Sri Lanka ISBN 955-8968-00-5.

## 2003

Zubair, L., *Sensitivity of Kelani streamflow in Sri Lanka to ENSO*, *Hydrological Processes*, 17 (12) 2439-2448.

Zubair, L., Tennakoone, U., Chandimala, J., and Siraj, M.R.A., *What led to the May 2003 Floods?* *Journal of the Institute of Engineers, Sri Lanka*, (3): 51 – 56.

Zubair, L., Rao, S. C., and Toshio, Y., *The Influence of the Indian Ocean Dipole on the Sri Lankan Maha rainfall*, *with Geophysical Research Letters*, 10 (2): 1063-1066

Zubair, L., *ENSO influences on Mahaweli streamflow in Sri Lanka*, *International Journal of Climatology*, 23(1):91-102.

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Zubair, L., *Development of Meteorological Studies in Sri Lanka*, *Journal of the Institute of Engineers, Sri Lanka*, 35 (2): 14-18. (2002)

Zubair, L., *El Nino Influences on Rice Production in Sri Lanka*, *International Journal of Climatology*, 22 (2):249-260. (2002).



# CONFERENCE PROCEEDINGS AND ABSTRACTS

## 2016

**Sadeek, S.**, participated at the International Conference on Dengue and Dengue Hemorrhagic Fever 2016 “Dengue to Stem the Tide” at BMICH, Colombo, Sri Lanka. 24<sup>th</sup> and 26<sup>th</sup> January, 2016.

**Zubair, L., Wickramagamage, P., Visvanathan, J., Chandrasekera, S. and Agalawatte, P.** (2016). “Environmental Management Challenges under Rapid Urbanization: Lessons from Pinga Oya catchment of Sri Lanka's Mahaweli River”. IPWE 2016 8th International Perspective on Water Resources and the Environment, workshop of the American Society of Civil Engineers; 4-6 January 2016, IPWE conference paper no: 261.

**Agalawatte, P., Zubair, L. and Nawarathna, B.** (2016). “Intra-Seasonal Climate Predictions for Water Resources Management in Sri Lanka”. IPWE 2016 8th International Perspective on Water Resources and the Environment, workshop of the American Society of Civil Engineers; 4-6 January 2016, IPWE conference paper no: 266.

**Zubair, L., Agalawatte, P., Viswanathan, J., Wijeratne, K., Zahid, M., Mizna Mohamed, Majeeda Mohamed, and Rasheed, M.** (2016). “Operational Island-Scale Water Scarcity Assessment for the Maldives”. IPWE 2016 8th International Perspective on Water Resources and the Environment, workshop of the American Society of Civil Engineers; 4-6 January 2016, IPWE conference paper no: 264.

**Agalawatte, P., Zubair, L., Zahid, Viswanathan, J. & Bell, M.** (2016). “The Monthly Climate Advisory for Maldives – a resource for marine Scientists”. Maldives Marine Science Symposium; 27 October 2016, Maldives Marine Science Abstract Booklet, pp (39).

## 2015

**Agalawatte, P.**, Intra-Seasonal Climate Predictions for Water Resources Management in Sri Lanka.

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**Zubair, L.**, Climate Variability and Change in the Tropical Indian Ocean Islands: Implication for Water Security and Green Development. International Conference on Green Development in Tropical Regions, Andalas University, Indonesia. 28th – 31st October 2015.

## 2014

Roberto, O. V., John, M. A., Cynthia E. R., Alex, C. R., Joost, V., Muhammad, A., Ibrahima, H., Sabine, H. T., Richard, M., Nhemachena, C., Paramasivam, P., **Herath, D.**, and Harbir, S., Agricultural Pathways and Scenarios for Regional Integrated Assessment of Climate Change Impact, Vulnerability and Adaptation. **Zubair, L.**, Nissanka, S.P., Weerakoon, W.M.W., **Herath, D.I.**, Karunaratne, A., **Agalawatte, A.S.M.P.M.B.**, Herath, R.M., **Wijekoon, A. E. N.**, Punyawardhene, B.V.R.S. Delpitiya, P., **Chandrasekara, S.S.K.**, Gunaratna, J., **Vishwanathan, J.**, **Wickramagamage, P.**, Weerasinghe, K.D.N., Navaratne, C.M., Perera, T.M.R.S., Gunesekara, A.A.I., **Gajanayake, P.**, and Wallach. D. Climate Change Impacts on Rice Farming Systems in North-West Sri Lanka, ASA, CSSA, & SSSA International Annual Meeting. Long Beach, CA. 2-4 November, 2014.

**Zubair, L., and Agalawatte, P.**, Climate Change Projections for Sri Lanka for the mid-twentieth Century from CMIP5 Simulations under a High Emissions Scenario. AGU Fall Meeting, San Francisco 1, 15-19 December, 2014.

**Zubair, L. and Agalawatte, P.**(USA, Sri Lanka). ENSO, IOD, EQUINOO and MJO Influences over the Equatorial Indian Ocean Climate. 2nd ANCST Workshop on Atmosphere-ocean interactions in the Indo-Pacific basin and their impact on Asian climate, Indian Institute of Science, Bengaluru, India, 23-24 November, 2014.

## 2013

**Chandrasekara S.S.K.**, (2013). Institutional capacity to protect stream reservations in Sri Lanka: Case Study in Kalugamuwa Grama Niladari Division-Geli Oya.

**Chandrasekara, S.S.K., Agalawatte, P., Weerasekera, M., Zubair, L., Nawaratna, B. and Bell, M.** (2013). Experimental climate services for water management in Sri Lanka and Maldives.

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**Herath, D.**, De Alwis, A.E.N., **Agalawatte, A.S.M.P.M.B.**, Harischandra, **Chandrasekara S.S.K.**, **Zubair, L.**, and Samarasinghe P.A. Simulating Socio Economic Impacts of Climate change on Rice Farming Systems: Trialing a Novel Integrated Methodology for Kadawaramulla, Kurunegala. Peradeniya Economics Research Symposium (PERS) 2013 Proceedings. University of Peradeniya.

**Zubair, L.**, (2013). Building International Bridges and Taking on Global Challenges Through Science: Lessons Learned from PEER and related Projects in Sri Lanka and Maldives.

**Zubair, L.**, (2013). Intraseasonal Climate Prediction for Water Management in Sri Lanka and Maldives, PEER PI conference, Bangkok.

**Zubair, L.**, Characterizing Climate Variability and Climate Change over Sri Lanka for Adaptation. SLAAS – Theme Seminar “Adaptation and Mitigation Strategies for Climate Change, Ensuring Sustainable Socioeconomic Development”.

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**Chandrasekara S.S.K.**, Stream reservation encroachment in Sri Lanka: Can it be solved by improving the existing communication channels? International Conference on Climate, Water and Policy (ICCWP).

**Ranamalee, Bandara., Chandrasekara, S.S.K., and Zubair, L.**, Statistical downscaling global climate models to fine-scales over Sri Lanka for applications in the fisheries sector. Proceedings of the National Aquatic Resources Research and Development Agency (NARA) Scientific Sessions.

**Zubair, L., and Agalawatte, P.**, Skill Assessment of Intra-Seasonal Rainfall Prediction for Sri Lanka.

**Zubair, L., Agalawatte, P., and Herath, D.**, Meteorology and Predictability of Tropical Storm ARB-04 in the Equatorial Indian Ocean during November 2011. The First International conference on Oceanography in the Bay of Bengal.

## **2010**

**Weerasekara, M.**, 'A geographic information systems based technique to analyze dengue risk at district level. 2nd annual symposium on Disaster Risk and Climate Change Adaptation. Disaster Management Centre.

**Bandara, R.**, 'Assessment of Rain Water Harvesting Potential - A case study for Idamelanda', International Conference on Sustainable Built Environment.

**Zubair, L.**, Climate Justice in relation to Adaptation and Ecohealth in Southern South Asia. Ecohealth conference, London School of Hygiene and Tropical Medicine, UK.

**Zubair, L.**, Climate Adaptation for Integrated Water Resources Management: Learning from Practice in Sri Lanka, International Development Research Centre, Ottawa.

# TECHNICAL REPORTS

## 2016

**Agalawatte, P., Rathnayake, U. and Zubair, L. (2016).** “The Climate over Sri Lanka up to the Yala of 2015”. Technical Report. Foundation for Environment, Climate and Technology, Digana.

**Lokuhetti, R., Agalawatte, P., Rathnayake, U., Kamiss, A., Vishwanathan, J., and Zubair, L. (2016).** “The Rainfall Climate over Sri Lanka during 2015”. Technical Report. Foundation for Environment, Climate and Technology, Digana.

**Lokuhetti, R., Agalawatte, P., Viswanathan, J., Zubair, L., Zahid and Bell, M. (2016).** Monthly Reports on Experimental Climate Monitoring and Prediction for the Maldives – (from January - December 2016). Technical Report. Foundation for Environment, Climate and Technology, Digana.

**Afaaf, A., Janan Vishwanathan, Lareef Zubair, (2016).** Communication Strategy for FECT on Social Media”. Technical Report. Foundation for Environment, Climate and Technology, Digana.

**Lokuhetti, R., P. Agalawatte, N. Shobana, S. Rathnayake and U. Ratnayake.** FECT report on Aranayake landslide site visit. June 2016.

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**Ratnayake, R.** Modeling using Groundwater Vista (MODFLOW) software. IPWE Training Workshop, FECT Technical Report. February 2016.

**Vishwanathan, J.** Short course on Watershed Modeling using MIKE SHE/MIKE 11. IPWE Training Workshop, FECT Technical Report. February 2016

## 2015

**Zubair, L., Kusumawathie P., and Vishwanathan. J.,** Managing Emerging Infectious Diseases in Kandy with an Eco-Health Approach, Project Report to Master of Development Practice, University of Peradeniya, FECT Technical Report 2015-01: April 2015.

**Zubair, L., C. Gunaratne, J. Vishwanathan, P. Agalawatte and U. Rathnayake.** Climate and Water Resources Management: With Case Studies in Sri Lanka, Project Report to Master of Development Practice, University of Peradeniya, FECT Technical Report 2015-02: October 2015.

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Climate of Maldives and Its Impacts: Posters from FECT and Partners. FECT Technical Report 2015-04: November 2015.

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Foundation for Environment, Climate & Technology, Intra-Seasonal Climate Predictions for Sri Lanka and Maldives for Water Resources Management: Annual Technical Report: 2014. FECT Technical Report 2014-01: April 2014.

**Zubair, L., Nissanka, S., Weerakoon, W., Herath, D., Karunaratne, A., Agalawatte, P., Herath, R., Punyawardhene, B., Vishwanathan, J., Delpitiya, P., Wijekoon, E., Gunaratna, J., Chandrasekara, S., Wickramagamage, P., Weerasinghe, K., Navaratne, C., Perera, R., Gunesekara, S., Kumara, G., Wallach, D., Valdivia, R., and McDermid, S.** Modeling the impacts of a variable and changing climate on

rice agricultural systems in Sri Lanka for AgMIP. Final report to AgMIP, FECT Technical Report 2014-02: May 2014.

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