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CLIMATE SMART

FECT NEWSLETTER

Residents walk through floodwaters in the Colombo suburb of Kaduwela on May 20, 2016/AFP

FOUNDATION FOR ENVIRONMENT, CLIMATE & TECHNOLOGY

This Foundation was established in 2003, to promote environmental and climate technology and its applications. FECT builds on the work of the officers in Sri Lanka and internationally. Our work is oriented towards developing usable scientific and technological information that can be applied by users in diverse sectors. We work actively with partners in Government institutions, Research Institutes, Universities and Civil Society.

FECT
Foundation for Environment, Climate & Technology

FOR THE APPLICATION OF SCIENCE FOR SOCIETAL WELFARE AND ENVIRONMENTAL SUSTAINABILITY

IN THIS ISSUE

EDITORS' DESK P.2

PRINCIPAL SCIENTIST'S MESSAGE - P.3

CREATING A CULTURE OF RESEARCH - P.4

HIGHLIGHTS FROM THE LAST FEW MONTHS - P.5

ONGOING PROJECTS- P.6

A LOOK BACK AT LAST YEAR - P.7-8

EDITORS' DESK

Dear Readers,

Welcome to the first edition of Climate Smart, our new quarterly supplement designed for climate enthusiasts, academics researchers and especially for people who normally wouldn't consider picking up a climate Newsletter. It is with great happiness that we invite you to share in the journey of FECT for the past quarter. In this first edition we have chosen to showcase our organization's achievements and milestones. In the future editions we hope to be entertaining, informative and above all useful. The FECT team had completed a very busy year with much work taking place in different areas. This edition has been able to capture some of these attempts.

** There are several snapshots of the work ethic of the Organization, objectives and the social role it has fulfilled.*

** We are indeed privileged to hear from Dr Lareef his journey into climate sciences and advocacy.*

** The research initiatives have been depicted in the presentations of three of our budding scientists, ongoing researches and the visit to Maldives to establish a link.*

** We also hear the stories of our past colleagues and their accounts.*

** There is also a bird's eye view of the climate prevailing over Sri Lanka and the Maldives over the past quarter.*

The climate is a gift which we are blessed with and the survival of all species depends upon it. While human action and ignorance may threaten to harm it, it is also our duty as concerned and informed individuals and communities to work proactively and mitigate the harm done. We hope that the Foundation's initiative in this regard will be recognized and appreciated by joining in this climate movement.

We will be delighted to receive contributions for our next issue from students, scientists, climate enthusiasts, scholars and academicians. We welcome comments and suggestions that would advance the objectives of this publication.

Editors: Rasika Abeysinghe & Shifna Rameez

OUR CONTRIBUTION

Since the beginning of FECT we have, undertaken Climate & Environmental research implemented climate adaptation projects developed infra-structure for research trained over a score of personnel. To sustain these advances we instituted the Foundation for Environment, Climate and Technology. FECT contributes to climate, hydrology, adaptation, information technology, social sciences and engineering for sustainable development. As a non profit organization we work towards social welfare without private profit. Our Goal is to contribute towards:-

- *Disaster Risk Identification for Sri Lanka*
- *Disaster Information Dissemination*
- *Climate and Rural Energy*
- *Hydro meteorological Monitoring*
- *Regional Climate Modeling*
- *Dynamic Disaster Hazard Identification*
- *Early Warning Systems for Natural Hazards*
- *Early Warning System for Dengue Risk*

OUR VISION

"To sustain a center of excellence in climate, environmental and information technologies and related areas where quality research is to support sustainable development and advance of technological capacity for societal welfare."

From Left Standing - Ms. S. Zubair, Ms. N. Najimuddin, Ms. A. Nijamdeen, Ms. A. Abeywardane, Mr. J. Visvanathan, Dr. L. Zubair, Dr. J. Porter, Mr. H. Ariyaratne, Mr. R. Lokuhetti, Mr. T. Hadgie - From Left Seated - Ms. R. Zacky, Dr. P.H.D. Kusumawathie, Dr. D. Najib, Prof. P. Wickramagamage

20 YEARS AFTER A TURN TO CLIMATE STUDIES: MAKING IT COUNT

In 1997, I left postings as a Senior Lecturer in Civil, Environment, and Mechanical Engineering at the University of Peradeniya to join the Institute of Fundamental Studies (IFS) in Kandy. The Director of the IFS had courted me after I gave a talk on fluid turbulence there - after 3 hectic years, I was getting burnt out at Peradeniya. For the Director, I was an instrument to promote the fundamental sciences at the IFS. I chose to work on atmospheric sciences and climate - my doctoral studies were on the fundamental sciences underpinning these fields. Although, this was good in theory, I had missed out on centuries of meteorological and climate thought. Previously, a score of engineering undergraduates had research projects at Peradeniya with me - through their projects, my ignorance about the atmosphere, weather or climate became clear. My turn to IFS and to climate was in retrospect an imprudent choice at that point in an academic career. The University was a more fabled and stable place than the IFS - usually folks go the other way.

1997 had the strongest El Nino on record. There were foreboding media headlines – Time Magazine splashed "Droughts and Floods to come" across its cover. Alarming but garbled stories on global warming and other environmental problems were a constant refrain. The Minister of Science and Technology, Bernard Soysa convened all the important agencies, officials and scientists to advise for mitigation plans – they reported back that they could not be sure of El Nino's impact and needed further research to sort things out.

However, the scientists in peripheral fields such as agriculture were not as guarded. They advised that farmers should be prepared for dry conditions and fire risk – adaptation steps such as not harvesting tea, covering the soil with mulch and growing chilies instead of rice. In the end, there were floods across Sri Lanka in the wet season. The contemporary scientific literature had been right although not communicated. After following the advice of the agriculturalists, farmers were badly affected and some may have committed suicide.

I thought we could address the societal needs by starting a research group at IFS with state of the art science, empirical evidence and rigour. We focused on analyzing the atmosphere, oceanography, climate, weather and hydrology in Sri Lanka. Our first projects capitalized on the hourly wind measurements from the Ceylon Electricity Board to determe the viability of wind power. We tried to build a regional climate model for Sri Lanka (MM5) and eventually settled on a national wind model to suit computing resources. We identified the impact of climate on rice and sought relations of climate with sunspot activities. Two graduates from Peradeniya and Ruhuna, three students who were on their way to University, and my former students at Peradeniya joined our group. We built up infrastructure for research with computers and networks, internet access, websites, library books and journal articles. We engaged other scientists through a research network we called Sri Lanka Meteorology, Oceanography and Hydrology Network. We obtained a small research grant from the National Science Foundation.

The team members all went on to scale academic heights (e.g. obtaining doctorates from Iowa, Indiana and Yale) and later identified their two years at IFS as pivotal and formative.

At the end of 1999, I left to work at the University Consortium for Atmospheric Research (UCAR-Colorado) and the International Research Institute for Climate Prediction (IRI – New York). The IRI had been just set up by the US Atmospheric Agency (NOAA) to help tropical countries adapt. The IRI's findings were already being consulted by Sri Lanka's Director of Meteorology and in the Time Magazine story. The IRI offered me an opportunity to undertake a demonstration and I picked Sri Lanka joining demonstrations in Greater Horn of Africa, Southern Africa, North-East Brazil and Philippines.

In consultation with Dr. H. Manthrithillake, the Director of the Environment and Forest Conservation Department of the Mahaweli Authority (MASL), we started a formal collaboration in 2000 with a small grant from the IRI. I was able to resurrect the IFS research group physically at the Natural Resources Management Services (NRMS) of the MASL at Polgolla. After the initial 18 month project, we kept going as we were granted additional projects on human-elephant conflict, disaster risk and plantations to form a program.

With politicians replacing the professionals on the NRMS board, we set up a non-profit called Foundation for Environment, Climate and Technology in 2003. FECT has sustained itself for 15 years now. Our projects had been oriented towards helping the relevant government organization. Although we kept receiving international grants, support of excellent collaborators and kept executing projects well and shared our results with the relevant central government organization, it did not result in the anticipated development outcomes or help the vulnerable adequately.

The societal needs that prompted my turn to climate and managing its impacts have only become direr. In a modest way in relation to the need, we have built up the research infrastructure, built a track record of research contributions, set 60 young researchers and professionals on track for excellence, and built up a network of international and local collaborators and supporters. FECT as an institution has proven its capacity and resilience to meet the constant challenges and has catalyzed action, supported other researchers, community activists, and local government. In the face of global environmental threats, maybe we have to think of alternative institutional and operational model for effective capitalization of research by those most at risk. Perhaps there is a role for a non-profit researcher driven organization outside the centers of power. It may be that the freedom, rigour, satisfaction, ethical commitment that FECT can nurture is needed – and that derives fundamentally from its staff, collaborators, history, institutional character, and nimbleness that only such a charitable non-profit can provide.

By: Dr. Lareef Zubair, Principal Scientist, FECT

CREATING A CULTURE OF RESEARCH

In December, the South Eastern University of Sri Lanka, the National Science and Technology Commission (NASTEC) and the Centre for Science and Technology for Non-Aligned and other Developing Countries (NAMS&T) Prevention organized a conference on the Impact of Extreme Natural Events: Science and Technology for Mitigation. FECT staff members presented 3 research papers.

Seasonal Impact of Climate on Tea Production in Sri Lanka

Nijamdeen, A., Zubair, L., Dharmadasa, M., Najimuddin, N., P. and Malge, C.

We investigated the impacts of climate (rainfall, minimum and maximum temperature) on tea production in Sri Lanka initially by looking at seasonality and seasonal variability. There is clear statistical evidence for the substantial influence of rainfall, maximum and minimum temperature on tea production – higher rainfall enhances February to May production while higher temperatures can suppress production – in the colder months from October to December, higher temperatures enhanced production.There is also a strong seasonality of production in different regions of the hills where the climate influence differs.These relationships shall enable us to develop climate based statistical models for yield predictions.

Drought Monitoring for Sri Lanka: Spatial Extent and Temporal Evolution during the 2016-17 Drought

Lokuhetti, R., Zubair, L., Visvanathan, J., M., Nijamdeen, A.

Drought is the most common disaster in Sri Lanka with the largest number of impacted persons. While the present response is substantially on post-disaster relief provision, prior disaster risk management and adaptation to mitigate the impacts of hazards is better all around. Such risk management and adaptation needs anticipation of the spatial and temporal variation of drought through the use of meteorological and hydrological data. However, meteorological data is not freely available and exorbitantly priced. As an alternative, we see to demonstrate the use of satellite derived data which is free and accessible in time. We found that (a) the satellite based data quality is adequate for most droughts monitoring in Sri Lanka,(b) the 2016/2017 drought in Polonnaruwa is of medium-intensity drought, (c) drought in Sri Lanka was built up over 2016. Drought can be punctuated by floods in some places – it is only by considering monthly or finer scale data that we could narrow down the impact of these high rainfall events.

Cyclonic Storm Roanu and the Orographic Mechanism triggered the May 2018 Landslide in Aranayaka

Lokuhetti, R., Zubair, L., Visvanathan, J., M., Nijamdeen, A.

Various studies of the landslide in Aranayaka and neighbouring regions on the days after 14 May 2016, have not reported on its meteorological drivers. Our work analyzes, the topography, the rainfall, the cyclone track, wind fields, satellite imageries of the clouds and show that the precise dates and the locations of the heavy rainfall are consistent with what is expected from the orographic rainfall mechanism. The wind in the eye-wall was dramatically increased from the North-Westerly direction on the 15th of May. The peak rainfall on the 17th was on western mountain slopes located on slopes that give unimpeded channels for westerlies. Our findings have implications for more precise risk assessment for landslide elsewhere.

Landslide in Samsara Kanda, Aranayake, May 2016, Pix - AP

IRENE Conference Held in Colombo: Dec 2017

QUARTERLY HIGHLIGHTS

Field Visit to Queensberry

FECT visited Sri Lanka's first dedicated Climate Change Research Station and participated in Dilmah's observatory opening ceremony. Seen hiking up to the hill top are Zubair, Dharmadasa, Lokuhetti, Nijamdeen, Janan, Shakira with Asansa, and Tuan ahead of this lot. The center is established by Dilmah Conservation to build alliances among the scientists, environmentalists, farmers, and individuals who respect Earth and strive to restore the equilibrium that is critical for life on earth to continue. This center will research, evaluate, and share suggestions for building climate resilience in agriculture and food production, with an emphasis on the tea sector. Separate teams visited I October (Prof. P. Wickramagamage) for the launch and before that to install instruments (Tuan Hadgie, Ruchira Lokuhetti and Janan Vishwanathan).

Environment Day Program in Rambuk-Ela School

An Environmental Day program for the Rambuk-Ela school was organized by the environmental officer at Akurana Pradeshiya Sabhawa in October 2017– Ms. Nasliya. Ashara Nijamdeen, Asansa Abeywardene and Tuan Hadgie attended and spoke to the students about Dengue Prevention and Solid Waste management.

From Left: Mr. Hussain Waheed, Mr. Ibrahim Humaid, Dr. Zahid, Dr. D. Najib, Ms. A. Nijamdeen & Dr. L. Zubair at the Maldives Meteorological Service (MMS) HQ

Collaborative Visit to Maldives

Dr. Dalal Najib (US National Academy of Sciences), Dr. Zubair Principal Scientist and Ms. Ashara (FECT) Visited the Maldives in November to interact with partners (Maldives National University, Health Protection Agency, Marine Research Centre, Ministry of Environment), and private sector participants (Land and Environmental Research Ltd, Renewable Energy Maldives Ltd, Small Island Research Centre).

Release of Publications about, for and by FECT

- 15th Anniversary Summary of FECT, 75 pages
- Charitable Activities of FECT, 20 pages
- Staff Handbook, 9 pages
- Proceedings of the Pinga Oya
- The Maldives Climate and Water Symposium

CURRENT PROJECTS AT FECT

PEER Drought Project

Scientists from the Foundation for Environment, Climate and Technology (FECT), Maldives National University, Columbia University are working with others in Universities, Water Supply and Meteorological Services 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 Program for Enhanced Engagement in Research (PEER) program of the US National Academy of Sciences which is also supported by USAID in Sri Lanka and Maldives.

Under this project FECT scientist are involved in a sub project that monitors drought and assesses climate change in the next decade in Maldives and Sri Lanka. These assessments shall be evaluated for utility in decision support for drought disaster management.

A man walks through an alley that flooded following heavy rains in Colombo, May 2016, Pic: AP

PEER Hazards Project

This project also hopes to develop operational drought, flood and landslide hazard assessments using climate, terrestrial and societal information and to assess drought, flood and landslide risk more reliably in Sri Lanka and the Maldives. Current drought, flood and landslide hazard estimations do not combine separate indicators from models, observations, and remote sensing into an overall assessment or provide a way to cope with shortfalls in data in real time; this project implements 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.

La Nina Ready Nations

This International project which has contributors from 16 countries and is sponsored by the USAID Office of Foreign Disaster Assistance. FECT and its Principal Scientist was invited by Dr. Mickey Glantz, pre-eminent expert on El Nino impacts to contribute case studies on what happened with the El Nino event in 2015/2016 in Sri Lanka and Maldives. With the help of our collaborators, we have compiled a detailed analysis which documents profound influence in terms of disasters, food and water shortfalls seasonally, and coral bleaching.

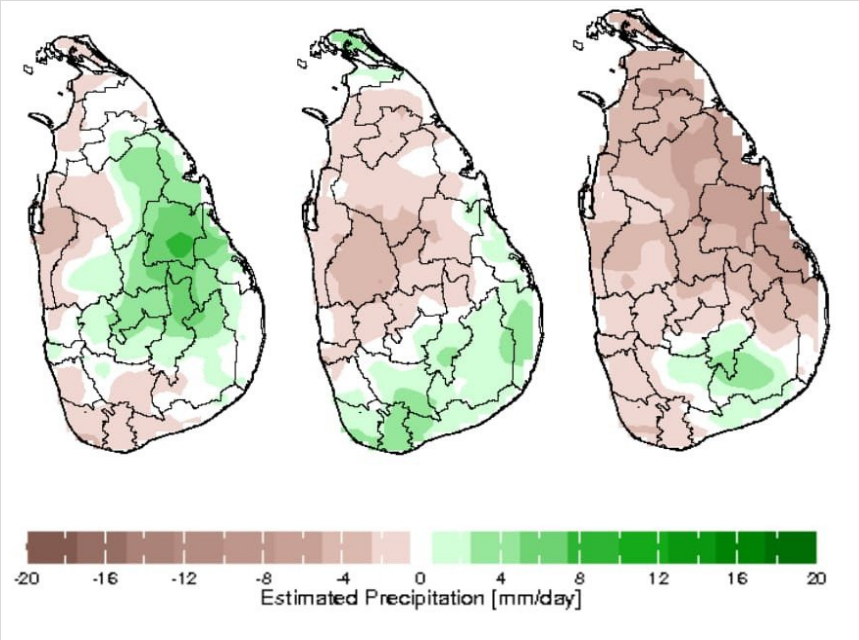
Climate, Environment and Tea Agricultural Systems in Sri Lanka

Dilmah Conservation has sponsored FECT to assess the impacts of climate on Tea Plantation Systems in Sri Lanka with a primary focus on impacts on tea production, yield and quality and with a secondary focus on the impacts on Water Resources, Renewable Energy Supply, Health, Land Management, Logistics, Wildlife and Disaster Risk of the Plantation System. We shall focus on the hill country Tea Plantation and on representative estates representing the variety in climate and production. In undertaking this project, we draw on about 30 related projects including our 2002-2006 study on adaptation and Impact Assessment to Climate Change in the Plantation Sector in Sri Lanka.

Mr. J. Visvanathan, Ms. A. Abeywardane, Ms. S Zubair & Dr. M. Dharmadasa at the Dilmah Obsevatory, Queensberry Estate

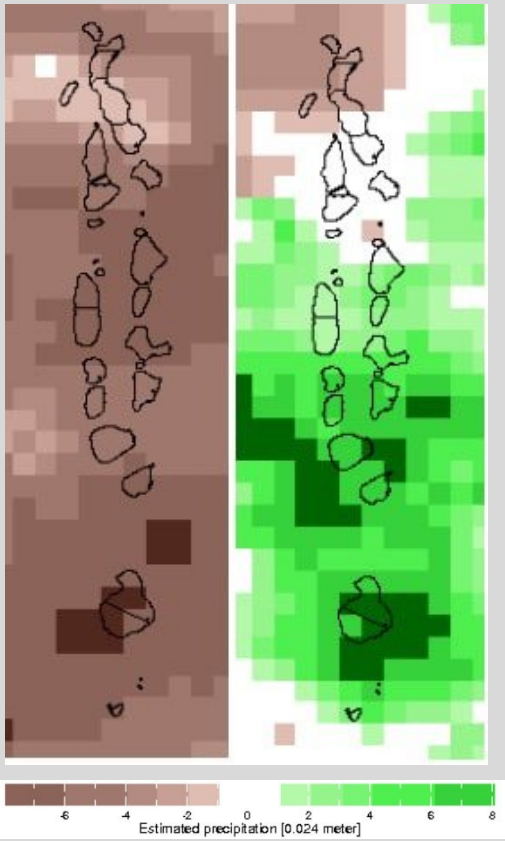
SRI LANKA AND MALDIVES CLIMATE FOR 2017 ESPECIALLY FROM OCT TO DEC

Sri Lanka Climate for 2017



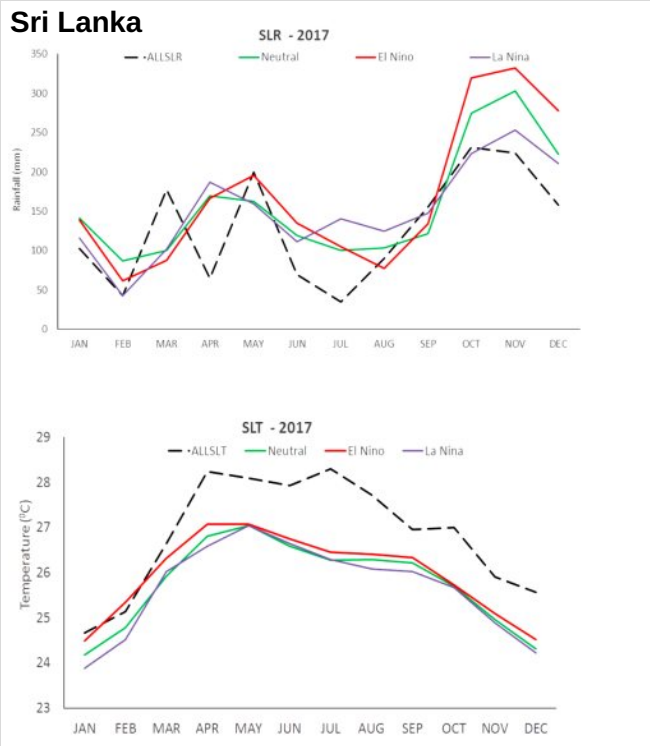
- **Maps show the rainfall anomalies (difference in the rainfall received with the historical monthly average) in October, November and December 2017.**
- The North and North-West have had a dry start to the Maha cultivation season from October. Since these are the wettest months in Sri Lanka, deficits shall have consequences that last for another year in the plains unless interrupted by rains in May.

Maldives Climate for 2017



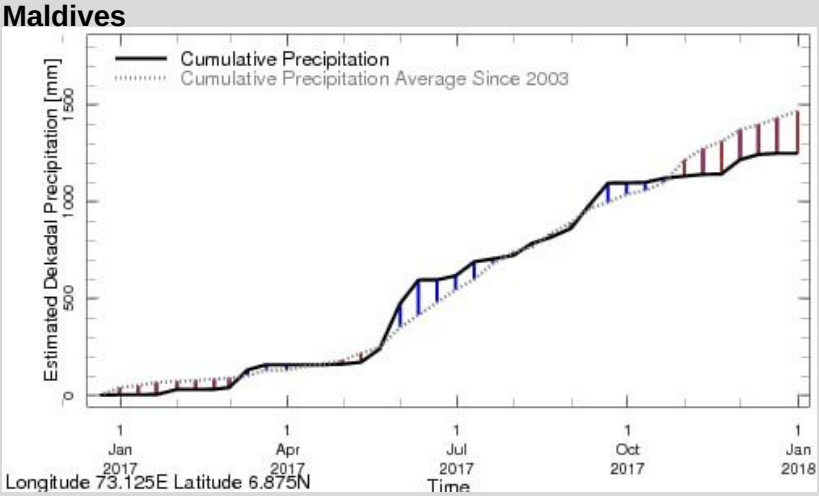
- **Maps show the rainfall in October (left) and November (Right) 2017.**

Sri Lanka



- **The spatially averaged rainfall (top) and temperature (below) for Sri Lanka for 2017 (black line) when compared with historical values during El Nino phases (red, green and blue lines) shows that there was large rainfall deficits from June to August and October to December.**

Maldives



- **The cumulative rainfall anomalies (difference in the rainfall received with the historical monthly average) for 2017 for Northern Maldives.**

- The Maldives had close to average rainfall in aggregate for 2017. Seasonally, there were deficits in the Central Islands from May to September and in the Northern Islands (chart shown) from October to December. The temperature in the Maldives was warmer than was usual. The sea surface temperatures stayed warmer modestly compared to the usual.
- Further Information is at **http://fectmv.blogspot.com**

- This is consequential as most regions get 70% of the annual rainfall in these months. More alarming is that the temperature has far exceeded what is typical even for an El Nino year. There could be consequences on health (heat stress, improved conditions for disease transmission and CKDU) and water losses due to enhanced evaporation and evapotranspiration.
- Further Information is at **http://fectsl.blogspot.com and http://www.tropicalclimate.org/sri_lanka/drought/index.php**

Messages from Past Staff (2003 to 2014)

"I started off my career as a scientist at FECT, I worked as a Junior Research Scientist.During my tenure at FECT from 2010-2012, I was groomed to be a confident research fellow and trained to work on exciting new projects, field research projects and other useful areas which added value to my career aspirations. I sincerely appreciate Dr. Lareef Zubair, founder and the Principal Scientist of the FECT who gave me the opportunity to be a part in his research team and the FECT family."

Madhura Weerasekera, BSc. Environmental Sciences and Natural Resources Management, SAB, SL, Scientist at the National Aquatic Resources Research and Development Agency

"I joined the FECT in 2011 as a coordinator for the Masters in Development Practice Program, jointly conducted by FECT and University of Peradeniya, Sri Lanka. During my stay at FECT I have been transformed to climate change scientist, with the supervision of principal scientist, Dr.Lareef Zubair. FECT offered me the promotions to encourage my career performances. FECT is enriched with manual library, data library and the resource personals world wide, which enable the FECT scientists develop the research capacity. I truly believed that, FECT provided me great guidance to become where I am now. I am willing to offer my knowledge to the FECT in future".

Sewwandhi Chandrasekara, BSc.Agri, (Pera) SL, M.Phil (IWRM) (Pera)
Phd Research Fellow, Chonbuk National University, Republic of South Korea

"After my graduation at University of Peradeniya, I joined FECT as a junior research engineer in through FECT I was able to publish my research papers to an international audience. This recognition, skills and experience earned me a full scholarship in a very competitive foreign university and it opened up a whole new career path for me thereafter. FECT therefore, is an ideal place for the young and an ideal place to start your career because it will facilitate you an unchallenged research environment and supervision while you can work with own dignity and independence and learn a lot".

Manjula Sriwardane, BSc. Eng. Chemical & Process Engineering, (Pera) SL, Senior Research Engineer, National Engineering, Research and Development Center (NERD),

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Twitter: @fectlk @climatelk and @fectmv

FECT Photo Diary

Mr. T. Hadgie with Ms. A. Abeyawardane are examining the weather records maintained at the Agrarian Services Centre at Ussapitiya, Aranayaka with the Office in Charge.

FECT assisted Akurana Women's Welfare Association (AWWA) to open a website that will provide information and support on activities. AWWA caters to the welfare of its members. www.awwa.lk is developed and maintained as multilingual website providing information in Sinhala, Tamil and English.

L to R - Ms. A. Nijamdeen, Ms. N. Najimudeen, Ms. A. Abeywardane, Ms. S. Zubair - on their way from the Doteloya Plantation (close to Aranayaka) after collecting weather data from hill station.

L to R - Queensberry worker, Mr. J. Visvanathan & Mr. T. Hadgie setting up the weather station at the Dilmah Observatory,Queensberry Estate