PROVIDING CLIMATE SERVICES FOR WATER MANAGEMENT IN SRI LANKA

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INTRODUCTION

Sri Lanka has widespread effects of climate including climate variability and change directly affecting the overall abundance and security of the natural resources of Sri Lanka. Extreme weather events such as high intensity rainfall, flash floods and landslides, and extended dry periods resulting in water scarcity are becoming more common (Climate Change Secretariat, 2013) Any adverse changes in weather patterns are likely to impact adversely on people, communities and economy.

Climate information can play a crucial role in national development planning, for managing risks and for mitigation and adaptation to climate variability and change. Timely communication of climate information helps to mitigate adverse impacts.

Climate services are the dissemination of climate information to the public or a specific user. They involve strong partnerships among providers for the purpose of interpreting and applying climate information for decision making, sustainable development, and improving climate information products, predictions, and outlooks.

The Foundation for Environment, Climate and Technology (FECT) has produced weekly climate advisories for Sri Lanka for the Water Management Secretariat (WMS) of the Mahaweli Authority of Sri Lanka (MASL) since 2008 based on a decade of research. This hydro-climatic advisory has been developed as the outcome of a collaborative research project on producing useable climate information for water resources management in a decade-long collaboration between MASL and the International Research Institute for Climate and Society (Zubair, et al., 2003).

The WMS convenes a multi-institutional panel (Department of Irrigation, Ceylon Electricity Board, Mahaweli Authority, National Water Supply and Drainage Board, etc) for water management and this advisory is provided a weekly bulletin for its review. This weekly report incorporates inputs from Sri Lanka Department of Meteorology, India Meteorological Department (IMD), the

International Research Institute for Climate and Society (IRI), the National Center for Environment Prediction (NCEP) of National Oceanic and Atmospheric Administration (NOAA) and after reviewing analysis from Bureau of Meteorology, Asia Pacific Climate Center. The bulletin provides daily, dekadal (10-day) and monthly satellite derived rainfall estimates, weekly average wind and temperature observations and weekly average Sea Surface Temperature anomalies.

Local and International Collaborators for the Weekly Hydro-Meteorological Advisories

This hydro-meteorological advisory contains outputs of Sri Lanka Department of Meteorology, India Meteorological Department (IMD), International Research Institute for Climate and Society (IRI), U.S.A. and National Center for Environment Prediction (NCEP), U.S.A., which are analyzed and interpreted by scientists at FECT.

Monitoring of Rainfall, Temperature, Wind and Sea Surface Temperature

The monitoring section of the report comprises daily satellite derived rainfall estimates (Figure 1-Left), monthly rainfall estimates (Figure 1-Middle), dekadal (10 day) satellite derived rainfall estimates (Figure 1-Right), and weekly average Sea Surface Temperature anomalies (Figure 2).

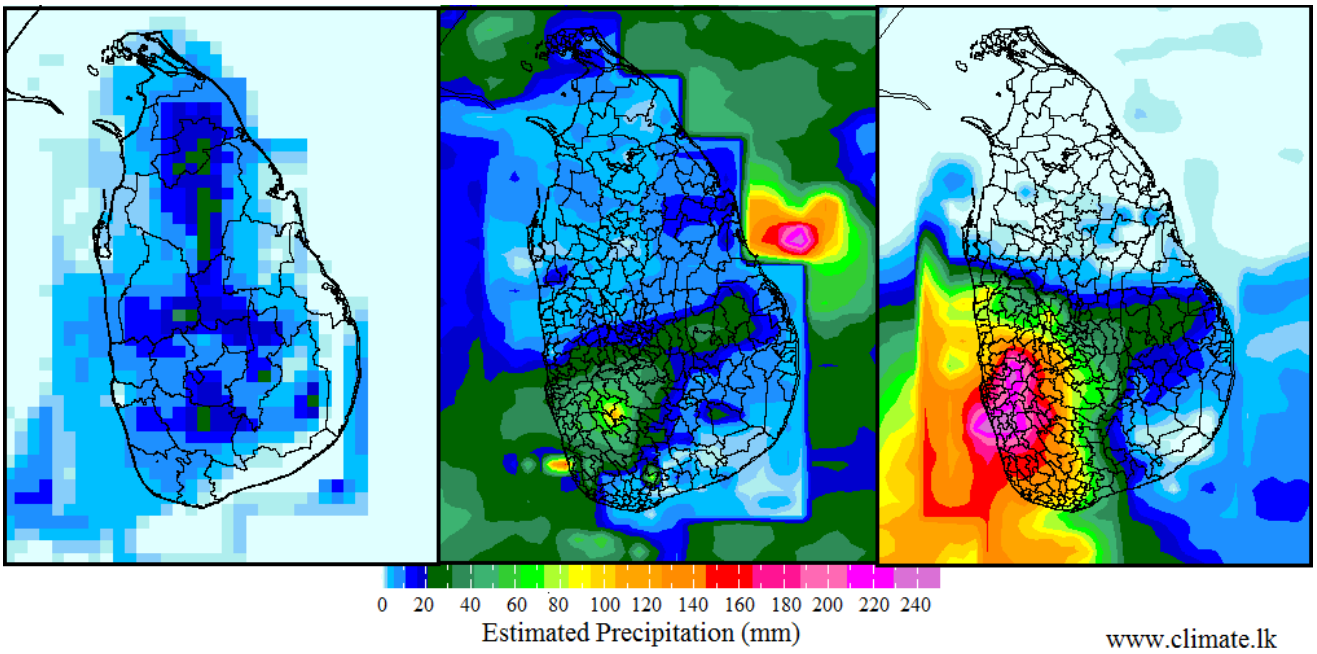

Figure 1: Daily satellite derived rainfall estimate for 4th March 2015 (left), Monthly rainfall estimate for September 2016 (middle) and dekadal (10 day) satellite derived rainfall estimate for the period of 21-30 May 2016 (right) (Image Source: FECT)

Daily satellite derived rainfall estimates for previous week (i.e. last 7 days) are presented in this advisory in a gridded map format that helps the reader identify where rainfall occurred in the previous week. Monthly rainfall estimates the total rainfall in the previous month in the country as

well as the rainfall anomaly (whether rainfall in each region is above or below average). Dekadal (10 day) satellite derived rainfall estimates elaborates the cumulative rainfall received approximately for previous 10 days in Sri Lanka. Using these figures, an overall picture of the rainfall conditions in the previous month is given to the reader.

The average minimum and maximum temperature conditions, wind direction and speed in the previous week are also given in this advisory. Weekly average sea surface temperature (SST) anomaly map is also provided which is useful when predicting rainfall, temperature and wind based on El Niño/ La Niña conditions and Indian Ocean dynamics.

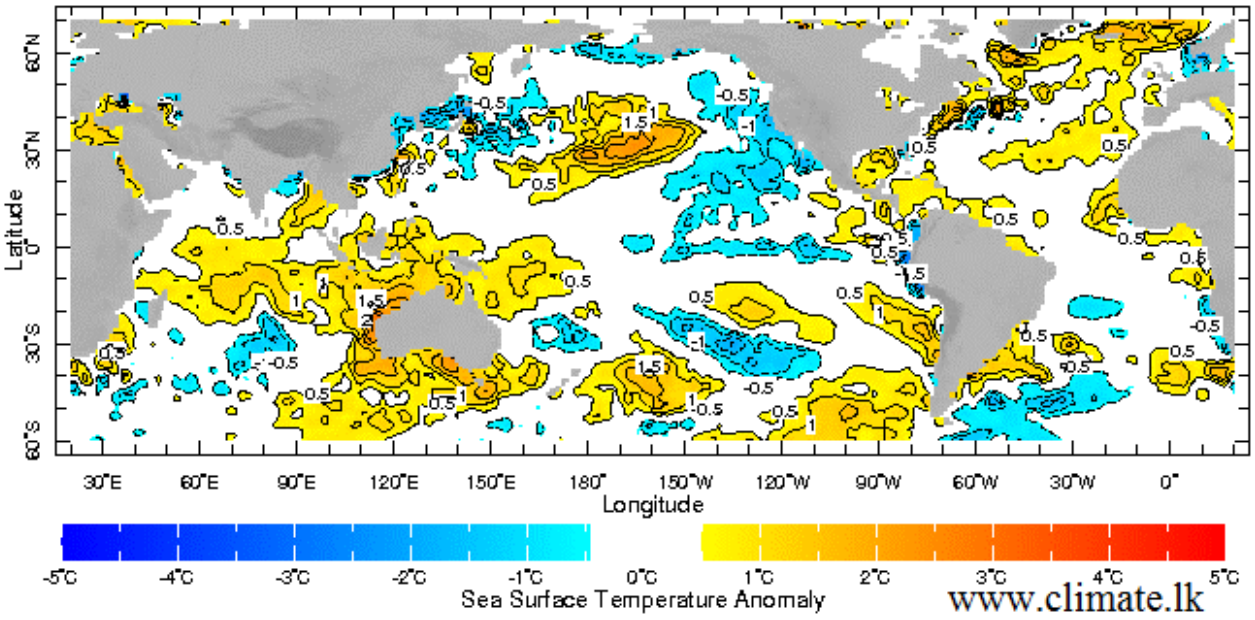

Figure 2: Weekly average Sea Surface Temperature anomalies for 17th-23rd February 2013

This section includes what conditions are likely in the coming week using weekly predictions from Indian Meteorological Department (IMD), National Oceanic and Atmospheric Administration (NOAA) and seasonal predictions from International Research Institute for Climate and Society (IRI), European Center for Medium Range Weather Forecast (ECMWF) and APEC Center. These predictions are up to 3 days to 3 months ahead from various agencies and climate models. A 30-day prediction by Paul Roundy of the State University of New York, Albany and Lareef Zubair (Zubair, et al., 2015) is an important prediction in this hydro-meteorological advisory (Figure 3). This prediction is based on observed cloud cover and atmospheric waves. Prediction is for the entire country including separate figures for 6 regionals (i.e. Northern, Southern, Eastern coast, Eastern slopes, Western coast and the Western slopes).

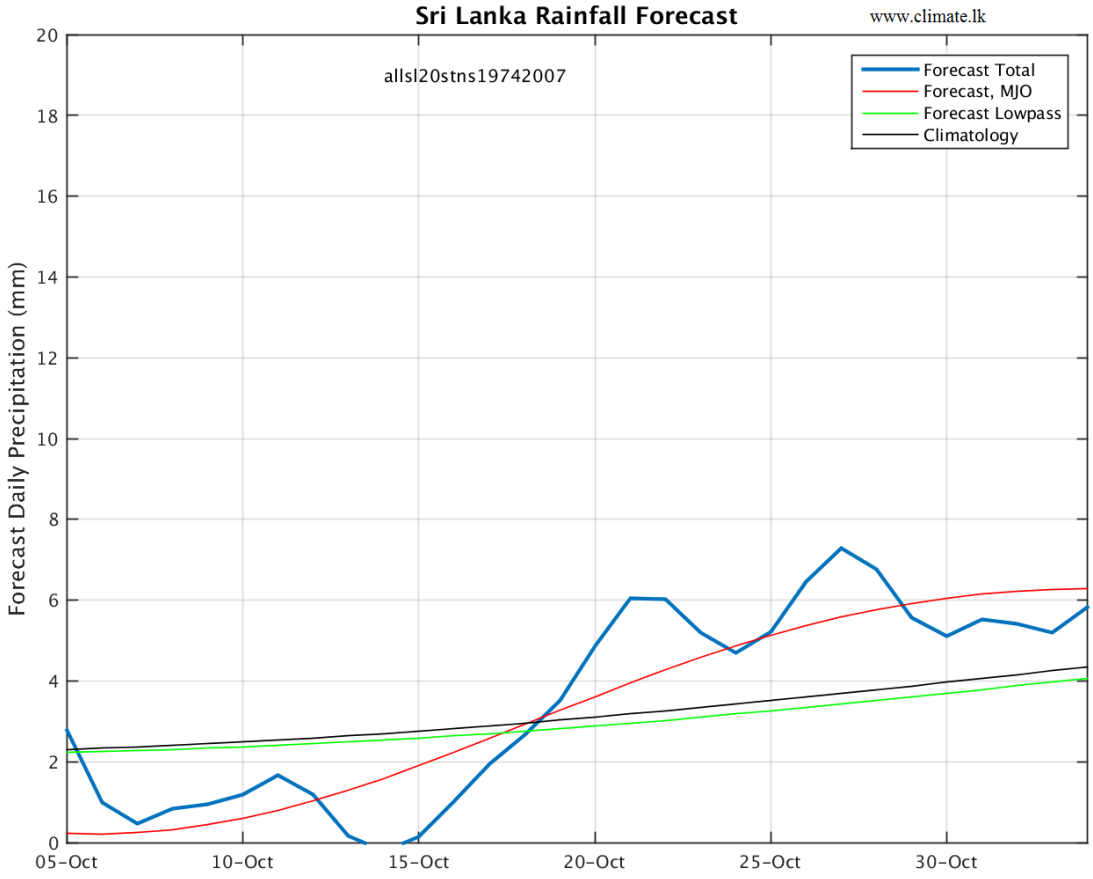

Figure 3: Forecasted daily rainfall for entire Sri Lanka on the 6th October 2016 for the following 30 days based on cloud cover and atmospheric waves.

Future Development of the Hydro-Meteorological Advisories & its Availability

This product is available at http://fectsl.blogspot.com. The advisory is also disseminated as a newsletter which is emailed to subscribers every week (http://www.climate.lk/subscribe.html). The advisory is also publicized on social media such as Facebook (http://www.facebook.com/fectsl and Twitter (@fectlk or http://www.twitter.com/fectlk).

Future Development of the Hydro-Meteorological Advisories & its Availability

Further enhancements of this advisory is underway. FECT scientists are on the lookout for new developments in the field of climate prediction so they can be incorporated into this advisory. In addition, we seek to improve validation of the predictions against ground observations.

REFERENCES

Climate change secretariat. 2013. The national climate change policy of Sri Lanka. [Online] Available at: http://www.climatechange.lk/Documents/Climate_Change_Policy/Climate_Change_Policy_English.pdf [Accessed 04 March 2013].

Zubair, L., Perera, R. and Mathrithillake, H. 2003. Using Climate Information for Mahaweli river basin management, Proc. World Water and Environmental Resources Congress 2003, American Society of Civil Engineers, Philadelphia.

Zubair, L., Agalawatte, P., Yahiya, Z., Roundy, P., Sobel, A., 2015, Intra Seasonal Climate Predictions for Sri Lanka for Water Resources Managers. Poster Presented at the Workshop on Climate and Water Security in the Maldives, Maldives National University, Male

Zubair, L., Agalawatte, (2012) Skill Assessment of Intra-Seasonal Rainfall Predictions for Sri Lanka , Oceanography Proceedings of ngalthe Bay of Be of The first Conference on h and National Aquatic hOffice of Naval Researc a Research olomband Development Agency, Co