

DEVELOPPING A COMPOSITE MAP OF EXTREME RAINFALL ANOMALIES IN SRI LANKA

E. M. G. P. Hemachandra¹ N. D. K. Dayawansa¹ and R. P. De Silva¹

¹ Department of Agricultural Engineering, Faculty of Agriculture, University of Peradeniya, Sri Lanka:

gimhanipaboda@gmail.com

dammid@pdn.ac.lk

rpdesilva@uwu.ac.lk

1. INTRODUCTION

Climate change is a global phenomenon and Sri Lanka is also experiencing consequences of climate change and variabilities (Ministry of Mahaweli Development and Environment, 2016). Climate change studies have shown changes in rainfall characteristics in the country (Ministry of Environment, 2011). Though the average annual rainfalls in the country do not show considerable change, the seasonal and daily rainfall indicate climate change and variabilities (Punyawardena, 2002). Accordingly, the country can expect occurrence of extreme climatic events in the future (<http://sdwebx.worldbank.org>). Within this background, this study was undertaken to develop a composite map of extreme rainfall anomalies in Sri Lanka for a 30-year period (1986 – 2015).

2. METHODOLOGY

Daily rainfall data for 30-year period (1986 – 2015) was obtained in 103 locations representing the Dry, Wet and Intermediate climatic zones in Sri Lanka. Six different climate change indicative parameters of rainfall were developed to emphasize the changes in rainfall pattern which are more important in decision making. The parameters illustrate multiple viewpoints such as the highest number of dry and wet days in a year, highest number of consecutive dry and wet days in a year and the highest and the lowest ratios of dry and wet days in a year. Thereby many important changes of rainfall which cannot be derived using general statistical methods were evaluated. A composite map of extreme rainfall anomalies for thirty-year period was developed using Inverse Distance Weighted (IDW) interpolation method to reflect the extreme conditions and the vulnerability to rainfall extremes.

3. RESULTS AND DISCUSSION

The composite map (Figure 1) shows the situation of rainfall in Sri Lanka for any location. The map indicates the vulnerable areas for floods, droughts and landslides as well. According to the map, Jaffna, Mutative, Puttlam, Ampara and Hambanthota areas experience more dry extremes while Nuwara Eliya and Ratnapura area experience more wet extremes during past 30-year period. The developed map illustrates the spatial variability of rainfall extremes. The Wet zone is getting a positive trend of wet extremes while dry zone is getting a positive trend of dry extremes. According to the temporal variability of rainfall in Sri Lanka, most of the rainfall extremes have occurred during the recent ten-year period (2006 – 2015). The map can be used as a guide in decision making in agricultural planning and management and other water related development activities.

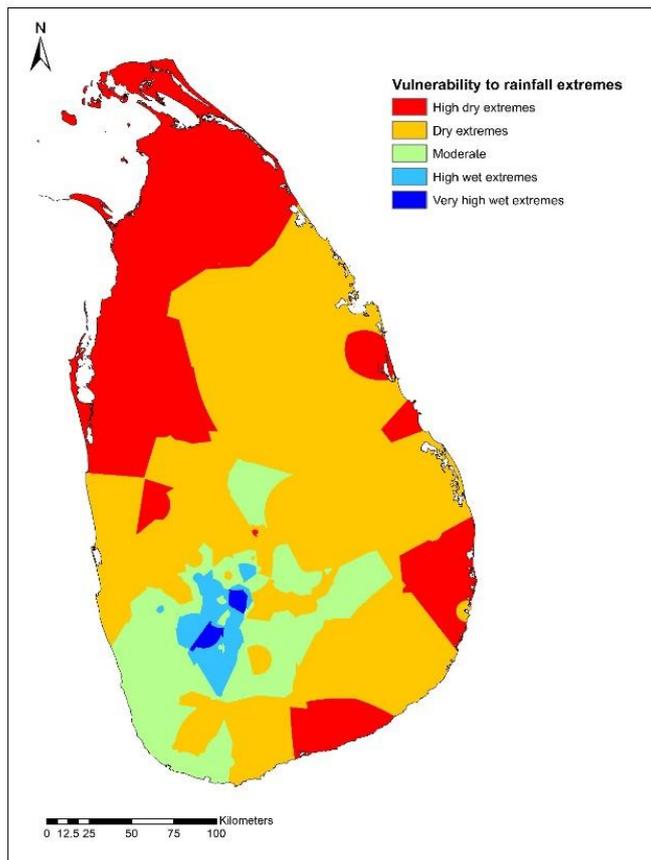


Figure 1: Vulnerability to rainfall extremes

4. CONCLUSION

The analysis identifies that the wet zone of Sri Lanka is experiencing wet extremes. Hence, some areas in the wet zone are highly vulnerable for floods, landslides, etc.. Dry zone of Sri Lanka is more susceptible to dry extremes. Hence, dry zone of Sri Lanka experiences risks of droughts, lack of water, etc.. The spatial diversity of these parameters provides information for the farmers and decision makers to identify the suitable crops and management practices according to the climatic conditions of their localities and this information will be useful in disaster preparedness and management aspects.

5. REFERENCES

http://sdwebx.worldbank.org/climateportal/countryprofile/doc/GFDRRCountryProfiles/wb_gfdr-climate_change_country_profile_for_LKA.pdf Vulnerability, Risk Reduction, and Adaptation to Climate Change Sri Lanka Retrieved from on 10.25.2018.

Ministry of Environment, (2011). Sri Lanka's second national communication on climate change.

Ministry of Mahaweli Development and Environment, (2016). National adaptation plan for climate change impacts in Sri Lanka. 2016 to 2025.

Punyawardana, B. V. R. (2002). Climate change: Challenges and opportunities in Sri Lanka. Natural Resource Management Centre, Sri Lanka.