Chapter 12
Statistical Analysis of Major Flood Events During 1980–2015 in Middle Ganga Plain, Ganga River Basin, India

Aman Arora
https://orcid.org/0000-0001-9396-8720
Department of Geography, Faculty of Natural Sciences, Jamia Millia Islamia, New Delhi, India

Masood Ahsan Siddiqui
Department of Geography, Faculty of Natural Sciences, Jamia Millia Islamia, New Delhi, India

Manish Pandey
https://orcid.org/0000-0001-8291-2043
University Center for Research and Development (UCRD), Chandigarh University, Mohali, India

ABSTRACT

To understand the vicious nature of extreme flood events for the most flood prone region of Ganga River Basin, this study uses 36 years (1980-2015) of flood records from Dartmouth Flood Observatory (DFO) and the Centre for Research on the Epidemiology of Disasters (CRED) Emergency Events Database (EM-DAT). Further, the Water Level (WL) data collected from Central Water Commission (CWC) for same period are utilized to compare with the data of DFO and EM-DAT to identify the major flood events recorded in the Middle Ganga Plain (MGP). The final dataset comprises of 15 attributes (parameters) and is prepared of identified 99 flood

DOI: 10.4018/978-1-7998-5027-4.ch012

instances for statistical analysis. The descriptive statistical analysis is performed for the following parameters: severity class, flood duration in days, affected flood area, flood magnitude, total number of deaths, and total count of displaced people. The graphical representation of all selected parameters provides an insight of common flood events, which lie between ±95% confidence level and exclude the major events as outliers.

1. INTRODUCTION

There is a long list of disasters, particularly natural disasters which impact society and economy significantly. The disasters are on rise. The Special Reports on Extreme Events and Disasters (SREX) of Intergovernmental Panel on Climate Change (IPCC) predicted further increase of disasters i.e. floods, cyclones, droughts, heatwaves, etc. The report further quoted that the magnitude and frequency of extreme temperature are liable to increase in the 21st century while the cold days will decrease significantly. With the extreme temperature, the heavy precipitation is also expected to increase in the coming years (IPCC 2012). Floods being among the most pervasive phenomena, they are being further monitored and assessed by international institutions like United Nations, World Bank, etc. (UNDP Emergency Analyst 2008). They (floods) alone have caused property damage at the scale of > $50 million in 2018 only (EMDAT 2018, 2019; World Bank – World Development Indicators 2019). As reported by EM-DAT, 2019 (Centre for Research on the Epidemiology of Disasters (CRED) EM-DAT Team n.d.), there have been 4960 reported flood events worldwide. There has been reported loss of 23037130 people due to all types of natural disasters; out of which 30% (6960299 persons) have lost their lives due to floods only (Arora et al. 2019). Since 1953 to 2016, there has been estimated loss of life and property (including damage to the structure, agricultural loss, and cattle) has been reported to be huge (₹ 3475812.01 million) (CWC 2018). The year 2015 has brought the most severe loss to the country with a total loss estimated to be ₹ 572910.98 million. Flood has a special significance as major part of India is affected frequently. Impacts of floods include direct mortality and indisposition and indirect displacement and widespread damage of crops, infrastructure and property. The analysis of precipitation data during 1950-2000 reveals that the rainfall intensity will increase in coming decades, so the flood events (Vittal et al. 2016). As per report of National Disaster Management Authority (NDMA) about 15% area of India is prone to floods. Majority of such areas occur in a linear form along the major rivers of the rivers like Ghaghara, Ganga, and Gandak in Uttar Pradesh and almost entire Bihar.

GIS-based Multi-Criteria Analysis for Delineation of Groundwater Potential Zones: A Case Study from Jodhpur District, Rajasthan, India

Raghib Raza, Gajendra Kumar Chawlaand Chandra Shekhar Dwivedi (2020). *Spatial Information Science for Natural Resource Management (pp. 24-43).*
www.irma-international.org/chapter/gis-based-multi-criteria-analysis-for-delineation-of-groundwater-potential-zones/257695