

IMPACT OF CLIMATE CHANGE USING PRECIPITATION ON WATER RESOURCES IN INDIA

Abdul Rehman¹, Mohammad Sharif², Mohd Amir³

¹Research Scholar, Civil Engineering Department Jamia Millia Islamia, New Delhi (India)

²Professor, Civil Engineering Department Jamia Millia Islamia, New Delhi (India)

³Research Scholar, Civil Engineering Department Jamia Millia Islamia, New Delhi (India)

Abstract: Present paper analyze the impacts of climate change on hydrology and water resources such as generation technology for climate change scenario, hydrologic simulation and modelling. The Climate Change Knowledge Portal (CCKP) provides an online tool for access to regional, and country data based on climate change and development. Changes in temperature and precipitation patterns consequent to climate change are expected to affect the spatial and temporal distribution of water resource management. It is important to describe how climate has varied and changed in the past time. The monthly mean historical rainfall and temperature data can be mapped to show the baseline climate and seasonality by months, in specific years, and for rainfall and temperature. I will show the mean historical monthly rainfall and temperature for India during the time period 1990-2015 and the monthly mean precipitation and temperature data have been projected change to show the baseline climate with scenario RCP2.6, RCP4.5 in various models at Delhi for India during the period 2020-2059. Climate change is expected to exacerbate current focused on water resources resulting from population growth, economic parameters and land use changes, including urbanization.

Keywords: Climate change, modelling, rainfall, temperatures, water resource, simulation.

1. INTRODUCTION

The impacts of climate change on water availability and water quality will affect many sectors, such as energy production, infrastructure, human health, agriculture, and ecosystems. Water quality could suffer in areas experiencing increases in rainfall. The water cycle is a delicate balance of precipitation, evaporation, and all of the steps. The water resources and the hydrologic cycle is a very important link of climate change. The effect of climate change on water resources is because of the water and water quality changes that caused by climate factors

(Includes rainfall and temperature changes). And it is achieved by the changes of the various water cycle links. Climate change will change the world of the present situation of the hydrologic cycle, and cause the redistribution of water resources in time and space. The redistribution and changes of water resources in space will cause the human society and ecology change a lot.

2. MATERIALS AND METHODS

The CCKP provides an online tool for access to comprehensive global, regional, and country data related to climate change and development. This tool allows a user to investigate the historical variability of rainfall and temperature at various time scales near a user-selected location.

These are organized as follows:

- Historical data of Rainfall and temperature to understand the seasonal CYCLE
- Projected change Monthly mean data of Pricipitation and temperatures

2.1 Scenario RCP2.6

In this scenario analyze and draw the three models (ccsm4, fio_esm, miroc5) at Delhi for India during 2020-2059.

2.2 Scenario RCP4.5

Analyze and draw the three models (ccsm4, fio_esm, miroc5) at Delhi for India during 2020-2059.

3. RESULTS AND DISCUSSION

3.1 Monthly mean historical Rainfall and Temperature

The monthly mean historical rainfall and temperature data are represented to show the baseline climate and seasonality for rainfall and temperature. The results are in the form of various graphs to show the mean historical monthly rainfall and temperature for India during the time period 1991-2015.

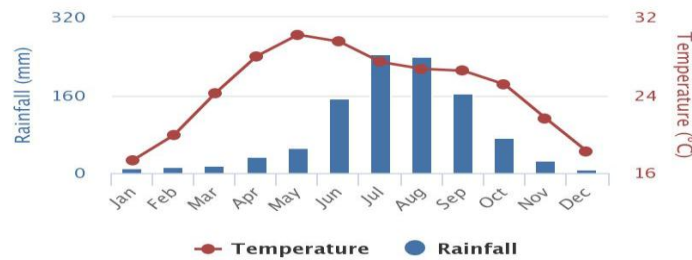


Fig. 1 Average Monthly Temperature and Rainfall for India at New Delhi during 1991-2015

3.2 Monthly mean Precipitation and Temperature

The projected change monthly mean precipitation and temperature data are represented to show the baseline climate and seasonality for precipitation and temperature. The result are in the form of various graphs to show the projected change for different scenario with various models mean monthly rainfall and temperature at Delhi for India during the time period 2020-2059.

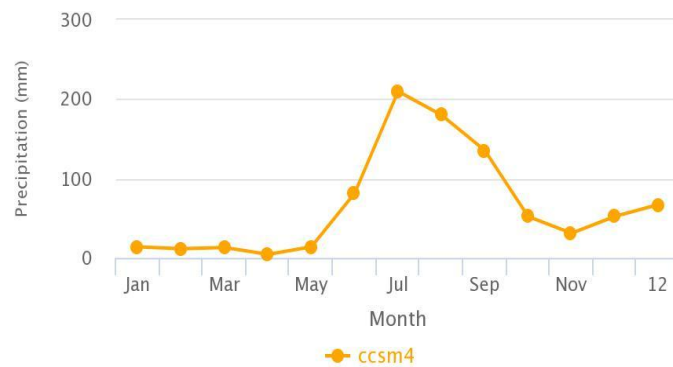


Fig.2 Mean Projected Monthly Precipitation RCP2.6 (model-ccsm4)

at New Delhi for 2020-2039



Fig.3 Mean Projected Monthly Precipitation RCP2.6 (model-fio_esm) at New Delhi for 2020-2039



Fig.4 Mean Projected Monthly Precipitation RCP2.6 (model-miroc5) at New Delhi for 2020-2039



Fig.5 Mean Projected Monthly Precipitation RCP4.5 (model-ccsm4) at New Delhi for 2020-2039



Fig.6 Mean Projected Monthly Precipitation RCP4.5 (model-fio_esm) at New Delhi for 2020-2039

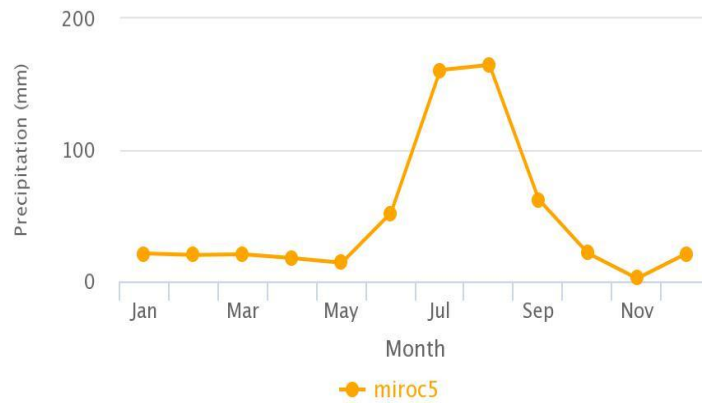


Fig.7 Mean Projected Monthly Precipitation RCP4.5 (model-miroc5) at New Delhi for 2020-2039



Fig.8 Mean Projected Monthly Precipitation RCP2.6 (model-ccsm4) at New Delhi for 2040-2059



Fig.9 Mean Projected Monthly Precipitation RCP2.6 (model-fio_esm) at New Delhi for 2040-2059



Fig.10 Mean Projected Monthly Precipitation RCP2.6 (model-miroc5) at New Delhi for 2040-2059



Fig.11 Mean Projected Monthly Precipitation RCP4.5 (model-ccsm4) at New Delhi for 2040-2059



Fig.12 Mean Projected Monthly Precipitation RCP4.5 (model-miroc5) at New Delhi for 2040-2059



Fig. 13 Mean Projected Monthly Temperature RCP2.6 (ccsm4) at New Delhi for 2020-2039



Fig. 14 Mean Projected Monthly Temperature RCP2.6 (ccsm4) at New Delhi for 2040-2059

4. REFERENCES

- 1) Annamalai, H. (2001). Role of the Indian Ocean in Regional Climate Variability. Analysis.
- 2) Bandyopadhyay, G. (n.d.). The Prediction of Indian Monsoon Rainfall : A Regression Approach Indian monsoon rainfall-brief literature review, 1–7.
- 3) Dutta, P., & Chorsiya, V. (2013). Scenario Of Climate Change And Human Health In India. International Journal of Innovative Research and Development || ISSN 2278 – 0211, 2(8), 157–160.
- 4) Goyal, M. K., & Surampalli, R. Y. (2018). Impact of Climate Change on Water Resources in India. Journal of Environmental Engineering, 144(7), 04018054.
- 5) Guhathakurta, P., & Rajeevan, M. (2008). Trends in the rainfall pattern over India. International Journal of Climatology, 28(11), 1453–1469. <https://doi.org/10.1002/joc.1640>
- 6) Kusangaya, et al. (2014). Impacts of climate change on water resources in southern Africa: A review. Physics and Chemistry of the Earth, 67–69(January), 47–54.
- 7) Liu, J. (2018). Book Review: Impact of Climate Change on Water Resources in Agriculture. Water Economics and Policy, (7), 1880001. <https://doi.org>
- 8) Ozor, N., Technology, A., & Studies, P. (2015). IMPACTS OF CLIMATE CHANGE ON WATER RESOURCES IN AFRICA : the Role of Adaptation Kevin Chika Urama and Nicholas Ozor, (January 2010).
- 9) Patz, J. A., Githeko, A. K., McCarty, J. P., Hussein, S., Confalonieri, U., & De Wet, N. (2003). Climate change and infectious diseases. Climate change and human health: risks and responses. World Health Organization, 103–137. <https://doi.org/10.2307/2137486>
- 10) Singh, P. K., & Dhiman, R. C. (2012). Climate change and human health : Indian context, (June), 55–60.
- 11) Song, Q., Vecchi, G. A., & Rosati, A. J. (2007). Indian Ocean variability in the GFDL coupled climate model. Journal of Climate, 20(13), 2895–2916. <https://doi.org/10.1175/JCLI4159.1>
- 12) Veiga, L., Cunha, D. A., Oliveira, R. P. D. E., & Ribeiro, L. (2005). Impacts of Climate Change on Water Resources: A Case Study on Portugal. The Fourth Inter-Celtic Colloquium on Hydrology and Managment of Water Resources, 1–18.