

Child Labour as an Obstacles in the Development of India

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Available online at: www.xournals.com

Received 12th September 2018 | Revised 5th October 2018 | Accepted 4th December 2018

Abstract:

The change in climate is a major concern for the society because it gives an adverse effects on the environment as well on living beings. The climate change can be explained as the change in the factors of the climate like change in the temperature. Now these days, the temperature of environment is increasing rapidly. The main cause of increasing temperature is human activities. According to the report, the temperature of the climate will be increased up to 4°C by 2100. It will be a huge adverse effect in the climate. Because of the increased temperature, the rainfall, stream flow and drought which are opposite to each other occur. High temperature have many effects: it melts the ice rocks due to which the level of the ocean and sea has been increased that cause flood, the evapotranspiration is also increased cause the drought because the decreasing the surface and groundwater level. In this paper, the impact of climate change on the water resources has been discussed and also their observation by the modeling system.

Keywords: Climate, Rainfall, Streamflow, Drought, Evapotranspiration, Modeling System

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Introduction

In twenty-first century, Climate change is identified as a major globally predominant scientific, economic, political and moral issue that affects both natural and human systems. Intergovernmental Panel explain the climate change, the temperature will increase up to 4°C by 2100 that will majorly hamper the water resources and the demand of water all over the world. The effects of both supply and demand of water is considering as the gap between supply and demand will increase that would be a current challenge of water management. The alteration in the statistical distribution of weather patterns over a duration of time is known as climate change.

Climate change in the term of increased temperature has a significant influence on the hydrological cycle of water resources. The change in the climate affect the ground and surface water resources on both quality and quantity because of the precipitation and evapotranspiration of the water. High rates of surface runoff is seen due to the increased intensities of precipitation that cause the increment in the risk of flood and decrement in the rate of groundwater recharge resulting in the drought condition. Increasing population, ever growing urbanization, new agricultural and livelihood patterns, etc. generate multiple challenges for Indian water sectors. Inter-state issues are also the cause of over extraction and degradation of the existing resources.

In India, during southwest monsoon, freshwater resources are generated that fulfill the water requirements for many purposes such as agriculture, industries, domestic purposes, energy sectors and ecosystem that depends upon the monsoonal system. In India, more than 80% rainfall happens at the time of monsoon between 'June to September' this affects agriculture, Already agricultural field is under stress because of the high population and other problems like water resources management (Kumar *et al*, 2017; Madhusoodhanan, Shreej and Eldho, 2016; Qatarnah *et al* 2018).

Water Resources

Today, climatic change is imposing threat to the available water sources. The loss in water supply as well as climate change enhance the competition for the use of water for the economic, social and environmental applications in arid and semi-arid areas of India. In future, water would be a scarce resource.

Surface Water Resources

In India, river are connected with each other, in which most of the rivers are the part of Himalayan drainage system. India is the second wettest place after South America due to the presence of numerous water bodies present in the subcontinent by which it makes wettest place in the world after South America. Snowfall is the main source of water in the India recorded as 4000 km³. Ganga-Brahmaputra-Meghna system is the most important river system. It shares about 60% of total water among various rivers (Mall, Bhatle and Pandey, 2007).

Groundwater Resources

The formation of rock from ancient to recent, control the occurrence and movement of groundwater. In the same way, are the variations of landforms, from the rugged mountainous terrains of the Himalayas, Eastern and Western Ghats to the flat alluvial plains of the river valleys and coastal tracts, and the deserts of Rajasthan. The water runoff and groundwater recharge are controlled by the topography and rainfall (Mall, Bhatle and Pandey, 2007).

Detection of Climate Changes

There are many atmospheric variable such as temperature, rainfall and evapotranspiration that are analyzed for the determination of climate change. According to the study, the condition like droughts, floods and cyclone are the indicators of changing climates. The increasing of greenhouse emission is also one of the evidence. There are following section that are undertaken for the climate change.

Temperature

The change in the hydrological cycle is due to the increase in temperature, which increase evaporation and hence rainfall. Remote sensing devices are used to derive and observe the rainfall as a factor of climate changes.

Modeling for Observing the effects of Climate Change

For understanding the climate dynamics, General Circulation Models (GCMs) are used and project about the future climatic uncertainty. They also give the input data for the of climate change on coarse horizontal scales.

A hydrological modeling is required to understand the climate changes and their effects. One such

hydrological modeling is Soil and Water Assessment Tool (SWAT) that is used in this study. The basic principle of SWAT modeling is the division of watershed into many sub-units. This model follow two steps:

1. Watershed is divided into various sub-catchments based on DEM>
2. The information for sub-units is grouped and organized into 5 classes:
 - a. climate
 - b. hydrological response units (HRUs)
 - c. ponds/wetlands
 - d. groundwater
 - e. main channel or reach draining the sub-basin.

SWAT has multi-objective applications like analysis of impacts of climate change. It is a versatile, flexible model for integrating the environmental processes and observation and handling the watershed management practices.

Protection of Water Quality

Due to change in the precipitation, flow and temperature water quality gets altered. Instream summer base flows is reduced by the longer dry seasons and loss of snowpack that results in the increased concentration of pollutants. The capacity of sewer systems and wastewater treatment is not enough to bear and carry the increased frequency and intensity of rainfall events that eventually cause combined sewer overflow and storm water runoff. This storm water runoff and sewer overflow increase the pollution level. The below given steps would be helpful in protecting the water quality and water supplies and will help in providing security to wildlife from flood atrocities

- The protection and restoration of the streamside vegetation buffers, wetlands and headwaters are helpful in decreasing the toxicity of pollutants and also in reducing the inflow of urban and agricultural runoff.
- Environmental and public health monitoring and surveillance systems should be restored and improved for the evaluation of climate-health baseline relationships.

- Adopting minimum stream flow water quality standards for the protection aquatic flora and fauna.
- Sewage systems should be upgraded and investigation should be done for the opportunities that give beneficial reuse of stormwater and wastewater (www.nrdc.org/policy).

Review of Literature

According to Mall, Bhatla and Pandey (2007) they gave a review that the hydrological cycle has been modified extensively in most of the agro-climatic regions and river basins due to human activities such as non-ecofriendly cropping pattern, land use pattern, overexploitation of water storage, irrigation and drainage.

Kusangaya et al (2013) in their paper, they focused on three conditions in which first one is to improve the use of downscaled climatic change information. Second is earth observation's refining use and data to increase understanding and improving the prediction of climate change. Last one is available model output's utility should be improved by acknowledging and quantifying compounded predictive uncertainty.

Madhusoodhanan and Sreeja and Eldho (2016) Water sector of India is highly dynamic, spatially heterogeneous. Climate change put a pressure on the nexus. There is a need to formulate climate change policies.

Kumar et al., (2017) in this paper, researcher divided the paper into section. In first section, they gave their conclusion on the effect of climate change on the water balance and said rainfall pattern of the climate has a dominating impact on water balance components. Increasing the rainfall increase the risk of floods of low. According to researcher, a broad gap is seen between availability of detailed research performed on the impact of climate change on water resources and urgent need for the adaption of water management strategies in time.

Qatarneh et al., (2018) proposed that the impact of climate change is very irrelevant to rainfall and stream flow. The falling temperature affects the activities of human life and agriculture both rain fed and irrigated area. Hence, there should a need of more attention in designing and analysis for both agriculture and urban planning projects. And also the temperature and rainfall observations should be

taken in account for providing the resources of complete and reliable data.

Conclusion

Climate change is increasing rapidly due to which the rainfall and stream flow has been uncontrolled. In India, the main season of rainfall is June to September, if any change occur in the climate during this period cause the insignificant effect on the

agriculture on which more than 80% people depends. There are many models for observing the climate changes. In these model, SWAT is a model that has been accepted universally because of the application handle the watershed management practices. In spite of the many models, there is a need of awareness among the people to reduce their activities that affect the climate.



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