

PREFACE

Based on analysis of data and a large number of studies, there is a near unanimity among scientists that the climate of earth is rapidly changing due to anthropogenic activities. Projections show that impact of this change is going to be significant and adverse at many places. These changes will alter the temporal and spatial pattern of rainfall with consequences for runoff, surface and ground water storage, water quality and destructive potential. Therefore, it would be necessary to initiate actions in time so that the adverse impacts are mitigated and the damage to the infrastructure and population is minimized.

Among the countries of the world, India is highly vulnerable to the adverse impacts of climate change due to a number of reasons. Himalayas are the largest storehouse of snow and glaciers outside Polar Regions and are the source of three major Indian Rivers, namely, Indus, Ganga and Brahmaputra. More than 60 crore people of India depend on waters of these rivers and their tributaries. Hydrological response of Himalayan rivers is likely to be significantly impacted due to climate, land use and other changes. India also has 7500 km long coastline and about 171 million people are residing in the coastal zones. Besides, many key infrastructure projects including sea-ports are located in the coastal districts. All these are also likely to be impacted by changes induced by global warming and climate. In addition, climate change will likely to have adverse impacts on other areas in the country especially the areas having frequent floods and drought.

The main objective behind the present report is to compile the likely impacts of climate change on various processes and components of hydrological cycle. Its focus is on the impacts of climate change on water resources in India. After introducing the subject, the topic of downscaling has been discussed which is an essential feature of impact assessment studies in water sector. This is followed by individual chapters to discuss impacts of climate change on temperature, precipitation, evapotranspiration, snow and glaciers, river flows and ground water. As a result of global warming, quality of water in rivers and aquifers is also likely to be impacted. Climate change would also impact the occurrence of extreme events as floods and droughts as well as soil erosion and transport. These aspects have also been dealt in separate chapters. Since the focus here is on future events, uncertainties naturally come into picture. A chapter describes the uncertainty that are expected and how to handle them. In the end, suggestions for adaptation and research in the water sector have been given.

It is hoped that the report would be useful for academicians, planners and decisions makers in the water sector in India and elsewhere. A number of NIH scientists have contributed to the various chapters of the report. I compliment the NIH team for bringing out a useful and timely report. I also thank the reviewers for their useful suggestions which helped in improving the report.

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