WATER RESOURCES AND CLIMATE CHANGE

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Water is the essential part of human life and ecology on earth. Fresh water is the natural resource on which human activities, food security and the sustainability of ecosystems depend. The quantity and quality of water pose a serious problem today in many regions. The urbanization, changes in landuse pattern, increase in pollution levels and depletion of aquifers excerbate the problem of water scarcity.

India, a tropical monsoon country, is rich in renewable fresh water resources in the form of rainfall, snowfall and glaciers contributing to rivers, lakes and groundwater. Sea (saline) water resource is also abundant through a coastline of about 7000 km long covered by Bay of Bengal on eastern side and Arabian sea on the west. Total annual precipitation in India is about 4000 km^3. There are total 113 river basins out of which 14 are major as well as perennial rivers, 44 are medium and 55 are minor river basins. Due to spatial and temporal variations in rainfall and highly uneven distribution, some river basins suffer absolute water scarcity and some basins fall in the category of water stress and scarcity. Groundwater resource contribute to 70-80% of agricultural produce in India, about four-fifths of the domestic water supply in rural areas and about 50% of urban and industrial uses. From the estimated utilizable fresh water resources of about 1130 km^3, less than 600 km^3 only has been put to use at present (surface and groundwater). Within this total utilization more than 90% is for only irrigation purpose and less than 10% for community water supply and industrial uses.

The global warming and climate change due to increasing concentrations of green house gases and sulphate aerosols in the atmosphere is expected to cause significant impacts on hydrological cycle at regional as well as global scales. The studies related to impacts on water resources revealed that climate change will account for 20% increase in water scarcity and balance 80% is due to population increase, economic developments resulting in water pollution problems. Indian water resources are also expected to be under the influence of climatic change, through intensification of water cycle (floods and droughts), faster retreation of Himalayan glaciers and sea level rise.

There are acute problems of water scarcity and water pollution existing in some parts of India, while the future projections are still severe at the prevailing rates of population growth leading to increased fresh water demand and increase in pollution loads in surface and groundwater resources.

The United Nations programmes and the national action plans addressing to water resources development and management issues have been briefly reviewed including the impacts due to climatic changes, population growth and economic development. Finally the importance of comprehensive water cycle studies at watershed/river basin level and regional scale has been emphasised including multi-sector aspects needed for sustainable development.