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On

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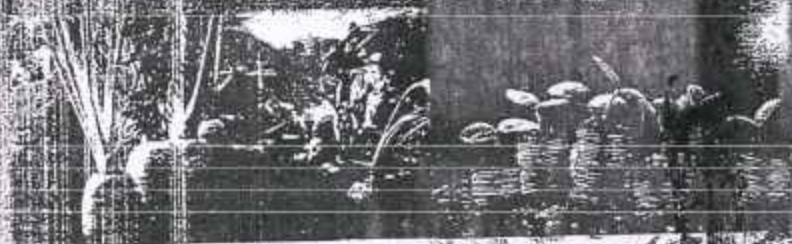
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Water Resources of India: A Review

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Abstract:

Water resources of a country constitute one of its vital assets. India receives annual precipitation of about 4000 km. The rainfall India shows very high spatial and temporal variability and paradox of the situation is that Mousinarm near Cherrapunji, which receives the highest rainfall in the world, also suffers from a shortage of water during the non-rainy season, almost every year. The total average annual flow per year for the Indian rivers is estimated as 1953 km. The total annual replenish able groundwater resources are assessed as 432 km. The annual utilizable surface water and groundwater resources of India are estimated as 690 km. and 396 km per year, respectively. With rapid growing population and improving living standards the pressure on our water resources is increasing and per capita availability of water resources is reducing day. Due to spatial and temporal variability in precipitation the country faces the problem of flood and draught syndrome. Overexploitation of groundwater is leading to reduction of low flows in the rivers, and salt water intrusion in aquifers of the coastal areas. Over canal-irrigation in some of the command areas has resulted in water logging and salinity. The quality of surface and groundwater resources is also deteriorating because of increasing pollutant loads from point and non-point sources. The climate change is expected to affect precipitation and water availability. The paper presents availability and demands of water resources in India as well as describe the various issues and strategies for developing a holistic approach for sustainable development and management of the water resources of the country.

Keywords: Water resources, drought, surface water, ground water, precipitation, population, sustainable development, etc.

Introduction

abiotic. It is used for drinking, cleaning, agriculture, transportation, industry, creation, and animal husbandry, producing electricity for domestic, industrial and commercial use. Due to its multiple benefits and the problems created by its excesses, shortages and quality deterioration, water as a resource requires special attention. Table 1 gives land and water resources of India. On a global scale, total quantity of water available is about 1600 million cubic km. The hydrologic cycle moves enormous quantity of water around the globe. However, much of the world's water has little potential for human use because 7.5% of all water on earth is saline water. Out of the remaining 2.5% freshwater, most of which lies deep and frozen in Antarctica and Greenland, only about 0.26% fish in rivers, lakes and in the soils and shallow aquifers which are readily for mankind.

TABLE 1: LAND AND WATER RESOURCES OF INDIA

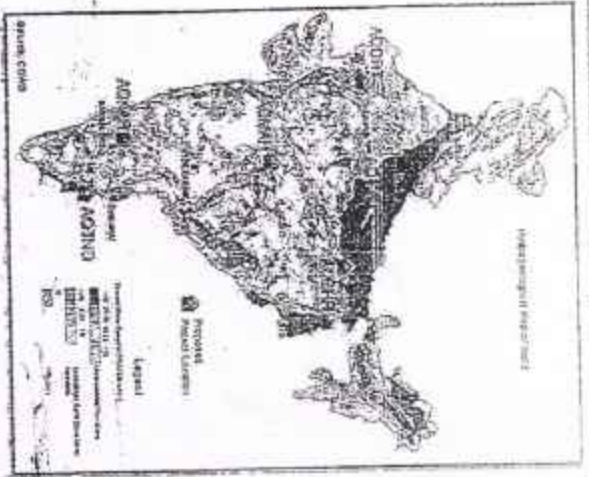
PARTICULARS	QUANTITY
Geographical Area	329 million ha.
Flood-Prone Area	40 million ha.
Ultimate irrigation Potential	140 million ha.
Total Cultivable Land Area	184 million ha.
Net Irrigated Area	50 million ha.
Natural Runoff (Surface water and Ground water)	1869 Cubic km.
Estimated Utilizable Surface Water Potential	690 Cubic km.
Groundwater Resources	432 Cubic km.
Available Groundwater resource for irrigation	361 Cubic km.
Net Utilizable Groundwater source for irrigation	325 Cubic km.

(Water Resources of India, National Institute of Hydrology.)

Water Resources

Water resources are sources of water that are useful or potentially useful humans. Uses of water include agricultural, Industrial, household, traditional and environmental activities.

Shelby



Water Surface

Surface water is water in a river, lake or fresh water wetland. Surface water is naturally replenished by precipitation and naturally lost through discharge to the oceans, evaporation, and sub-surface.

India's average annual surface run-off generated by rainfall and snowmelt is estimated to be about 1869 billion cubic meter (BCM). However, it is estimated that only about 690 BCM or 37 per cent of the surface water resources are actually mobilized. This is because (i) over 90 per cent of the annual flow Himalayas rivers occur over a four month period and (ii) potential to capture such resources is complicated by limited suitable storage reservoir sites.

Rainfall

The average annual rainfall in India is about 1170 mm. This is considerable variation in rain both temporarily and spatially. Most rain falls in the monsoon season (June-September), necessitating the creation of large storages for maximum utilization of the surface run-off. Within any given year, it is possible to have both situations of drought and of floods in the same region. Regional varieties are also extreme, ranging from a low value of 100 mm in Western Rajasthan to over 11,000 mm in Meghalaya in North-Eastern India.

