



The Global Water Resource Management - An Analytical View

KEYWORDS

U N General Assembly open working group on sustainable development goals (S D's), The International Renewable Energy Agency (IREA), The 14th Delhi Sustainable Development Summit

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ABSTRACT *Water Crises is now a serious human issue that exists when supply of water is less than demand. The increase in population at geometrical rate and over use of water for industrial purpose are considered to be the major reasons for decreasing the water resources in the world. Many studies show that our finite source of fresh water are polluting and depleting by bad weather phenomenon. In view of the present status of water resources and greater increasing demands of water for meeting the requirements of the rapidly growing population of country as well as the problems are likely to arise in future long term strategy is needed for sustainable water resources management in India. So the water resources management practices may be adopted on increasing the water supply and managing the water demand under stressed water availability conditions. Also knowledge sharing people participation, public policy and pricing practices, mass communication and capacity building are essential for effective water resources management.*

Introduction:

Natural resources are generally defined all those things available in man's physical environment on which he depends for the satisfaction of some want or the other. Natural resources include land, water and forest resources, fisheries, mineral, marine resources, climate, rainfall and topography. William.J. Baumol states that natural resources have a dominant role in economic growth. Now-a-days, water is a prime natural resources. It is required for satisfying one of the basic needs of humans. Thus, water has become a precious national asset. Water is essential for agriculture and country's overall development. Therefore optimum development and efficient utilisation of water is of great significance. There is stress on integrated and multidisciplinary approach to planning, formulation and implementation of projects. Presently, the highest priority has been accorded to drinking water followed by irrigation, hydro- power and industrial uses. However, in terms of utilisation, irrigation and livestock account for 93 percent of the water utilisation and domestic and industrial uses account for the remaining 7 percent.

Extent of Water Resources:

At present, India is one of the wettest countries in the world, with average annual rainfall of 1100 m.m. However, there is no accurate information about India's water resources. Narottam shah of the Bombay- based centre for Monitoring Indian Economy, stated till now we have no arrangements in this country to compile and publish on an annual basis, comprehensive data regarding various aspects of water which are important for policy analysis and programme formulation and for monitoring the efficiency of use of our scarce water resources.

B.S. Nag and G.N Kathapalia made an estimation of water resources of India National Commission on agriculture. The estimation is summarized in Table-1.

Table - 1 Annual Water Resources of India, 1974 and 2025.

	1974	2025
Total Precipitation	400	400
a) Immediate Evaporation	70	70
b) Run of to surface water bodies	115	115
c) Percolation into the soil	215	215

Water Utilization	38	105
Belonging to Which ground water	13	35
Contribution surface flows	25	70

Source: The State of India's Environment (1984-85), The Second Citizens's Report , Centre for Science and Environment.

The total rainfall for 1974 and 2025 is estimated at 400 million hectare metres and this is expected to be in 2025. In distributed three important ways : 70 million hectare metres evaporation immediately : 215 million hectare metres percolate into the soil and help soil moisture and recharge ground water and finally, 115 million hectare metres run-off into surface water bodies like rivers. Water actually utilised was 38 million hectares in 1974 which is expected to rise to 105 million hectares metres by the 2025.

Objectives of the Study:

- To encourage action for sustainable and integrated development and management of water resources at global, national state and local levels.
- to highlight the crucial role of water for future survival of human beings and draw attention to its increasing scarcity and resulting implication for pricing practices and projects.
- To support the role of water for economic and social welfare as a basic human right .
- To render assistance in promoting role of youth, women and in water resources.
- To generate an environment for formation of water partnerships at national levels.

Extent of Global Water Resources:

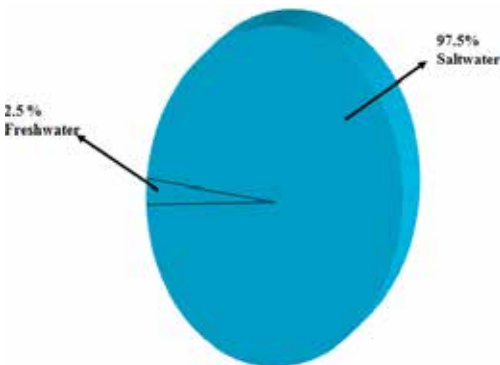
It is believed that there is an infinite supply of water on the planet. In Fact the available fresh water represents less than half of 1 per cent, of the world's total water stock. The rest is sea water, or in accessible in ice caps, ground water and soil. We are polluting diverting and depleting that finite source of fresh water at an astonishing rate. United Nations argue 31 countries are falling the water stress and scarcity and over one billion people lack adequate access to clean drinking water . By the years 2025, as much as two thirds of the world's population estimated to have expanded by an additional 2.6 billion people will be living in conditions of drinking of seri-

ous water shortage and one third will be living in conditions of absolute water scarcity.

Mismanagement Of Water Resources:

Now water crises are a serious human issue that exists when supply of water is less than the demand. Environmental economists argue that the demand for water is increasing due to rapid growth of population in all over the world. Demand for the water among the urban people is very high as compared to the rural people. There has been increasing migration of rural people to urban areas for jobs and business opportunities. This leads for growing water demand in urban areas of many countries. It is estimated by an Amsterdam based ecological management foundation that the rainfall is over only renewable source of fresh water. It creates a constant global supply of 40000 to 50000 cubic km water per year. But the world population increases roughly by 85 million per year.

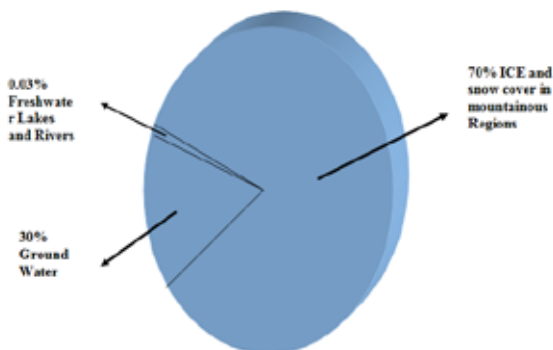
ANNEXURE-I Total World Water



Source: : U N Water.

Annexure I - depicts that at present the total world water consists of 97.5%, Salt Water and 2.5% Fresh Water.

ANNEXURE II Breakdown of Freshwater Resources



Annexure: I-Total World Water
Source: U.N Water

It is revealed from annexure II that the availability of fresh water per head is decreasing rapidly. The growing population at geometrical rate and subsequent fall in water supply disturbs the demand and supply curve of water.

The ground water researchers find that our fresh water source has been declining in many countries, since, last so many years. The scientific studies conducted in major rivers of Asia and Pacific shows the over all decline in the water amount flowing to world's ocean. The climate changes strongly influence the reduction of water amount and quality because the large level of increase in the carbon emission by the effects of global warming pollutes the drinking water resources

dangerously. At the some time we are loosing the supply of quality water due to the poor land management and the deforestation. Therefore, the sustainable and equitable water management is necessary for saving the water from human and economic tragedy. Recently the liberal attitude of government are exploited by the big corporate sector in industrialist countries for misusing water resources for their industrial purposes. Thus the industrialists are building their merchant power plant in rural areas where plenty of natural water can be acquired. Experts opine that industrialists use 84 million gallons of water (15% of total use) a day in southwest Louisiana.

Some important aspects of such strategies are studied as follows:

Surface Water Conservation Management :

Water Conservation implies improving the available water through augmentation by means of storage of water in surface reservoirs, streams tanks, soil and ground water zone. It emphasizes the need to modify the space and time availability of water to meet the demands. This concept also focuses the need for judicious use of water. There is a scope for better conservation and management of water resources in different uses. On the demand side, a variety of economic, administrative commentary based resources to help conserve water. It is an urgent a need to control the rapid growth of population. This growing population is putting excessive stress on all material resources so there is need of the hour is balanced development of surface water as well as ground water.

Water Harvesting:

This is the traditional technique first used by the Greek and Island people to save the water. It can be the first solution for the water scarcity. Harvesting water means harvesting, river. In other words, rain water harvesting is the process to capture and store rainfall for its efficient utilization and conservation to control its run off, evaporation and seepage. Some of its advantages of rain water harvesting are: It reduces the declining the water level, it also in creases available water. It is considered as environment friendly. No doubt rainwater harvesting enhances the quality of grand water through dilution, particularly of fluoride nitrate and salinity and also prevents soil erosion. Consequently, We can manage the supply and demand curves of the water. Government should promote harvesters in India, Delhi Government announces the award for the "Best rain harvesters" which provides 2lack rupees for group and one lack rupee for individual.

Integrated Water Resources Management(IWRM) has been defined by Technical Committee of the Global Water Partnership a process which promotes coordinated development and management of water land and related resources. Available water can be utilized at maximum level in order to achieve economic and social welfare in an equitable manner. IWRM approach is the best technique applying knowledge from various disciplines from diverse stake holders to devise and implement efficient, equitable and sustainable. solutions to water and development problem. This is a comprehensive participatory planning and implementation tool for managing and developing water resource equitable for future generation. India water partnership is a registered society under societies act in 1860. The IWP is supported by over 110 partners form NGO's govt, organizations, PSUs autonomous bodies and private sectors working from different parts of the Country.

Water Shed Management:

Water shed is the unit of management in IWRM where surface water and ground water linked and related to land use and management. The main aim of water shed management is to establish a workable and efficient use and development of land and water resource in water shed for socio-economic growth. Local communities play a pivotal role in planning, implementation funding activities within participatory water shed development programmes. There people can use their knowledge, skill, available resources and creativity to devel-

op water shed and implement community centered program.

Ground Water Management:

Now a days it is need to protect from overexploitation an effective ground water management policy oriented towards promotions of efficiency, equity and sustainability is required. In India agricultural holdings are extremely small and fragmented and excess population depended. The detrimental environmental consequences of over exploitation of ground water need to be effectively prevented by the central and state governments. There is promising solution by combining government admiration with active people participation in joint management approach.

Drought and Flood Management:

There is an uncertainty and randomness in defining start end of drought. Necessary steps may be taken at political, administrative and technical levels to encourage people participation in the drought management for optimum use of the available water supply to meet demands for this purpose. The drought prone area assessed in the Country is of the high order of strengthening of R and D the high and capacity building in terms of emerging information technologies.

Another natural disaster is floods that are the most frequent to be faced in India. Usually floods in the eastern part of India viz Orissa, Andhra Pradesh, Bihar, West Bengal and TamilNadu in the recent past are the best examples. It is the information published by different government agency, the tangible and intangible losses due to flood in India are increasing at alarming rate. After the disastrous floods of 1954 a national program of flood management was launched. Recently, the GOI has taken a number of steps for flood management called Community Participation. For this purpose, farmers, professional bodies, industries and voluntary organizations have to be aware about flood management. It is actually the peoples participations in flood fighting and disaster suspense is required. Media like TV, Radio and news papers can also play and important role in flood management.

Develop sea water desalination Technologies:

Desalination of Sea water is another big solution for water scarcity. Singapore and middle East Countries wholly depends this technology for increasing their water supply. Many technologies are using for desalination of sea water in different nations. More research and development on sea desalination technology will help us to major portion of water resources extremely using for the creation of energy. Unfortunately, Water desalination technologies are untouchable to poor nations due to its expensive nature.

Organize the training Workshop on water use and Recycle:

The water workshop help to society to be more vigilant on water preservation. The work shop water economies, water policy and ethics promotes the strong awareness on water scarcity and water use.

Water regulation and Strict water policies:

Safe drinking water policy is necessary for the smooth distribution of water and intervenes of private parties in the society. Strong environmental law can control over pumping and ground water exploitation.

Government of India Rural Water Supply Programme:

In recent years, there is the shift from "Supply driven approach to a demand driven approach". There is thrust towards grater decentralization particularly the rural water supply Programme. At the Central level GOI first introduced such reforms in rural drinking water in 67 pilots districts covering 26 states in 1999 via the sector reform programme. Similarly Accelerated Rural Water supply Programme (ARWSP) aims at achieving the drinking water needs of the rural population. The ARWSP was launched during 1972-73. It is presently being implements through the Rajiv Gandhi National Drinking

Water Mission (RGNDWS). The scheme aims at coverage of all rural people with population of hundred and above. As on 1st April 2005, 96.13% of the rural habitations have been fully covered with drinking water facilities. Drinking water supply is one of the 6 components of Bharat Nirman which has been envisaged to build strong rural infrastructure in 4 years (2005-06 to 2008-09).

An Initiative has been taken by Government of India in February 2006 by launching National Rural Drinking Water Quality Monitoring and surveillance programme. This programme envisages institutionalization of community participation for monitoring and shriveling of drinking water sources at the gross-root level by Gram panchayats and village water sanitation committees followed by checking the positively tested samples at the district and state level laboratories.

The role of price in distribution of range and water resources:

The price of both range and water resources has constituted a stimulant to general economic growth, a means of inducing private investment in resources development a device for allocating the resources over time among uses and users.

Range:

Price plays two important, related roles in the development and use of range. The first of these is to foster general development of regional economies based on livestock production. This is done by facilitating private use of public range as a compliment to base ranch properties, many of which are inadequate size to support livestock enterprises in arid areas. Widespread trespass and illegal use of federal range during early 1900's amounted to a zero-price for such public range. Since of the Taylor grazing Act in 1934, private livestock producers have been charged for the use of public range but a fee generally held to be lower than rental fees for privately owned range of similar quality.

The second role of price pertains the resources of a capital good capable of producing forage. As a limiting case, forage may be considered a stock resource and a public agency is faced with the problem of its year allocation. Under these circumstances the traditional, micro static value of marginal product criterion for different pricing alone is adequate.

Fixation of Water price:

The role of price in public water development and use differs in general respects from its role in range development. Water development is linked more closely to price through agency practice, price exerts a strong influence on local organizations which participate in public development and undertake local programmes of water management.

Investment in water development by federal agencies must satisfy two basic criteria or tests: Economic justification and financial feasibility. Price is related to both tests. As an important source of revenue, it is relevant to financial feasibility constituting a basic condition for private use of project water. price has direct bearing upon the type and extent of activities, such benefits are related to costs in tests economic justification.

Price also affects the organisational arrangement through which water development, management, allocation and use occur. Many publics usually are entailed in water development. Physically tracing water from the point of initial impoundment to eventual consumptive use often involves a chain of organizations through which water rights and service commitments are transferred. Federal agencies, countries and local water districts are common links in this chain. The present discuss is concerned with the economic consequences of pricing the dominant developing agency which is assumed to be initial link. These consequences, however, devolve upon the functions of the entire organizational sequence and the eventual allocation of water among uses and users.

Managing water Resources and policy challenges in the Twelfth plan:

India's available supply of fresh water is the same as it was 5000 years ago, and the population has grown and so host the GDP. These will be a commitant increase in demand for water. Until recently ,official estimate showed the available supply of water to be well above total demand. More recent studies indicate that there is near balance at a national level hides wide regional variations with acute shortages in many parts. Since growth in GDP implies expanded water use, the water situation can be expected to worsen rapidly. Already there is evidence of excessive draws of groundwater in many parts of the country. This leads to lowering of the water table and increasing salinity and harmful for health.

The Twelfth plan must signal the need for a radically new approach. Since water is rarely a state government. They need to act on both the supply once the demand side.

On the supply side, action is necessary on several fronts including building storage of dams, investing in watershed management to improve surface water retention and ground water recharge, and forcing industry to treat waste for reuse. We need alternative investment keeping relative costs in mind. In terms of prioritization we need to do much more on watershed management projects, which involve one-tenth of cost per hectare as compared to large irrigation projects.

On the demand side, efforts will have to be accompanied by efforts to improve efficiency of water use. It calls for complementary investments in land levelling, drip irrigation, additional costs have to be allowed to pass through into the system in the form of higher food prices. The first step in evolving a rational water policy is to make scientific assessment of the available water resources in each basin in the country.

Conclusion:

The United Nations reports that two third of world population will face serious problems from the shortage of drinking water by 2025. A strong environment law is necessary to save the world from pollution and water scarcity.

State governments would therefore be well advised to combine price rationalization with establishment of statutory water regulates to determine water allocations for different uses such as household needs, agriculture and industrial use.

A Controversial issue that needs to be faced is whether a system of rational management of the country's water resources can be achieved without bringing in legislation that would empower the Central Government can to act in this area. The constitution provides that the Central Government can determine rational use of water interstate rivers, provided parliament passes a law for this purpose.

Price is a powerful tool in the process of allocating public resources or their product of allocating public resources or their product. It is desirable, therefore, that the price policies be maintained which admit future price change and that the administration on of a particular price policy not preclude future organizational mutations. If it does, the latitude for reallocation these important resources is limited and thus their potential contribution to regional and national developments.

Humanity can now stop digging of the earth and look up harvesting free photons from our sun as green planets do providing our food. Let us now green our desert areas growing salt – loving crops using abundant land, salt waters and sun light. Let us accelerate the global transition to the more equitable knowledge – rich, cleaner, greener economics now within our grasp.

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