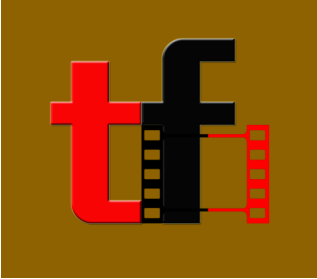


जीवनं – The Water & Its Management



Abstract:

Water is the lifeline of the environment. It is the symbol of civilization. It is also the source of energy which serves the purpose of industrial requirement such as water treatment, power generation, as a mode of transportation etc. Beyond these water resource is a symbol Hence water management is consolidation of creating awareness about water resources, its judicial use, scientific, technical & operational planning - to develop, operate & maintain the present resource & also to enhance it for the future generation.

Keywords: आपः (water), सूक्तिः (Vedic hymns), Fresh water, Water Management, Irrigation, Natural Vegetation.

Introduction

Protection of freshwater ecosystem, sustainable measures for utilization of water - are foremost responsibilities of human beings.

In the Vedic texts such as - Yajurveda, a hymn says “आपो व इदं सर्वं विश्वभूतान्यापः...” meaning, everything is & out of water.

In Rigveda वरुणसूक्तं 1.25 sage शुनःशेपः (shunah shepaha) prays lord Varuna (the god of water) as “इमं मे वरुण श्रुधी हवमद्या च मृळ्य त्वामस्युरा चके” (1.25.19)*¹ – meaning oh! lord Varuna! listen to my prayer, bless us with happiness, I am praying in front of you to get protection.

In the Amarakosha (thesaurus) of Sanskrit -

“आपः स्त्री भूमि वारि सलिलं कमलं जलम्, पयः कीलालम् अमृतं जीवनं भुवनं वनम्” the word जीवनं meaning the life & the word अमृतं meaning - nectar are listed as the synonyms of water.

There are many such pieces of evidence from which we can understand that the importance of water was known from ancient times. But today in contrast to this, creating awareness about conservation of water has become essential.

Present Scenario & Concerns

Even though 2/3rd of the earth is covered by water, only 3% of this is fresh water. Out of this 3%, ~70% is in the form of glaciers, 29% underground water & 1% in the form of lakes & other water bodies. The groundwater level is also tapering down.

Global warming which is a natural phenomenon has accelerated due to human intervention.

With this changing climate, it is required to study the nature of water availability (*1.25.19 means 1st mandala, 25th sukta & 19th hymn)

& steps required for water harvesting.

India accounts for ~4% of global fresh water. In India, we find many rivers across the country majorly classified as Himalayan rivers & peninsular rivers. The penin

Ramachandra Sharma

sular rivers are mostly monsoonal which flow as floods during monsoonal downpour & dry in summer. Northeastern states, coastal areas are often hit by floods whereas we observe low rainfall in the northwest, few parts of Deccan plateau & Central India.

~17.5% of global population is in India. Out of this more than 45% of the people depend upon agriculture sector. Approximately 2/3rd of the water resource is used for irrigation alone in our country which implies that it is not water efficient.

According to economic survey of India, there is a huge gap between irrigation potential created (I.P.C) & irrigation potential used (I.P.U).

Plan Period	I.P.C Mha	I.P.U Mha
7	11.31	9.77
8	5.17	4.36
9	7.69	3.79
10	8.82	6.23
11	9.50	2.71

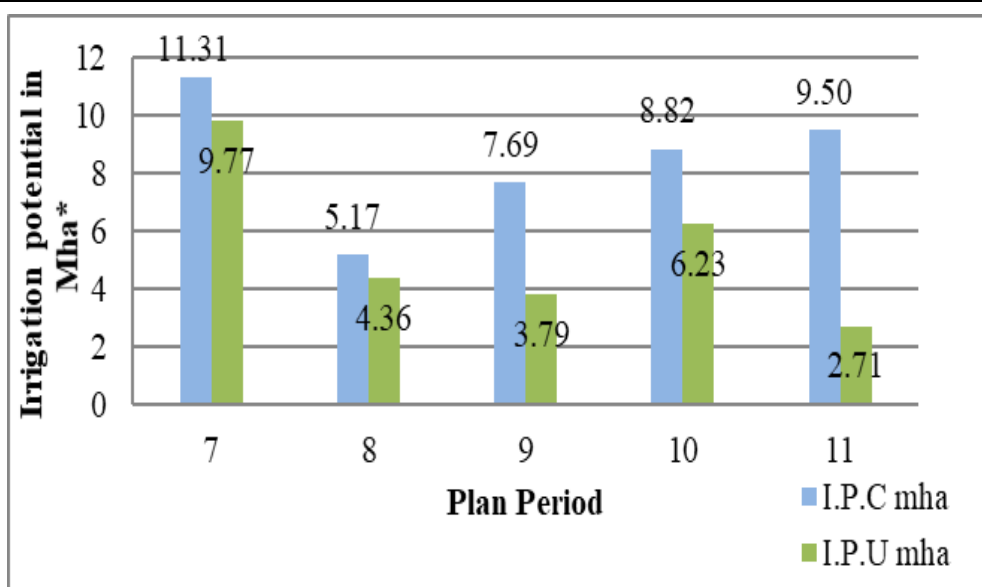


Chart 1 *Mha – Million hectares

Deviation from natural vegetation, disposal of sewage & industrial wastes into water bodies, inappropriate techniques of irrigation-water intensive crops in dry (arid) regions, increasing desertification, domestic wastage of water etc. have created water scarcity.

Expanding concrete buildings, industries without proper plans have not decreased the greenery in the urban areas but also have increased the use of groundwater & deprived rainwater recharge. Most of the rainwater will flow in the form of urban floods with no use to anyone but creating more problems to manage drainage system.

Statistics about Few Rivers

River Ganga

For the people of India, Ganga is not just a river but it's a symbol of civilization & faith etc. River Ganga is described in *Bala Kanda of Valmiki Ramayana*. Ganga Bharati (adoration) is practiced as a mark of respect developing a psychological bondage, considering this river as *Mother – Maa Gange*. In the year 2008, this was declared as a National River. It runs approximately for a length of 2525 km draining about 8,61,404 sq km area. It is also home to National Water animal Gangetic Dolphin.

Water depletion of this river has crossed 40%, seasonal variability is very high. Now Ganga is listed under one of the most endangered rivers in the world, according to WWF. As per studies for the causes of Ganga-pollution, it is found that - Industrial waste adds to 15%, Municipal sewage 80% & disposal of other wastes 5%.

Narmada

It is the largest of west flowing rivers, a major source of hydroelectric power for the states of Gujarat & Madhya Pradesh. It flows approximately for 1310km draining 98,796 square km area.

Water depletion of this river is above 50% & most of its tributaries flow for less than 200km. This has led to flow of saline water from the sea (near estuaries) & degradation of soil.

Cauvery

It is one of the most utilized rivers. ~90% is used for irrigation purpose & this river is also a major source of power generation. Its length is around 800km & area drained is about 88000 sqkm. This river is shared among Karnataka, Tamilnadu, Kerala, Goa. It is the major source for paddy & sugarcane crops. The source of this river is Tala Cauvery of Western Ghats still in the previous river (2016) rainfall fell down beyond 40%. There was a drought situation & shortage of power. During reversal of Monsoon in the months of November & December Tamilnadu was prone to worst floods recently.

Kerala is the state situated in western ghats where receiving more rainfall. Ironically Kerala was hit by the worst drought conditions in 115 years as per the meteorological report.

Thus there are growing tendency apparent flood & drought conditions in our country.

The above statistics clearly indicate that we have failed miserably in water management.

Possible Solutions

Recharging of groundwater

Construction of small check dams, planting trees near river banks to ensure perennial rivers.

In addition to this, the organic degradation of the plant debris will make the soil porous & increases its water holding capacity. Due to this after precipitation horizontal percolation of water is possible which will increase the volume of underground water.

Irrigation

~48% of cultivable land has irrigation facility in India. As per economic survey net irrigated area as a percentage of total cropped area is 33.9%, The declining trend inefficient utilization of irrigation potential created (refer chart 1) should be addressed.

Irrigation systems such as-

- Canal irrigation – maintenance cost is low, carries sediments which add to the fertilizers & caters to other water needs.
- Drip irrigation for Horticulture crops – High efficiency of ~ 90%, checks soil erosion & uniform distribution of water.
- Sprinklers (for dry crops) – >70 % efficient.

etc should be adopted based on the crop suitability/requirement.

Government initiatives - Pilot projects

- The government of India has taken up Namami Gange as a prestigious project to clean river Ganga.
 1. Nirmala Dhara under this project aims for managing of municipal, rural sewage & industrial discharge.

2. Aviral Dhara to regulate agriculture on the river banks, to restore & conserve wetlands.

- Interlinking of water bodies.

1. At micro levels government with the consensus of public & rational analysis should try to interlink the water bodies which can increase the catchment, drainage area thereby catering the needs of the population residing.

- Periodic desilting of water bodies/ Dams so that water storing capacity will increase. The government should also take strong steps against illegal mining of sand which is a threat to natural percolation of water.

If the pilot projects succeed then same it can be extended to other rivers/water bodies.

Natural Vegetation

The effect of regional vegetation on climate & water is an adaptive tool for sustainable development. Access to clean water is one among Sustainable Developments Goals (SDG6). Natural vegetation must be nurtured considering the land, type of soil & emphasizing on local climate. Without trees, soil runoff will be high. Intermediate tree cover will allow the water to percolate into the ground. Soil depending on the organic matter & porous nature can absorb more water. Plants of shrubs, allowing grass to grow, planting small trees can serve the purpose of soil conservation & water recharge.

Regulation in Waste Disposal

It is evident that due to sewage & untreated waste disposal water bodies are polluted. As a good practice multiple sewage/waste treatment plants should be built. Disposal without treatment should be completely avoided.

Use of Saline Water

In many countries such as Israel, USA saline water is converted into the useful water after diluting it with a scientific approach. There is a scope for us to adopt this technique in the states such as Rajasthan, Gujarat utilizing the saline groundwater.

Global Response on SDG in 2017

More than 2 billion people globally are living in countries with excess water stress, defined as the ratio of total freshwater withdrawn to total renewable freshwater resources above a threshold of 25 percent. Northern Africa and Western Asia experience water stress levels above 60 percent, which indicates the strong probability of future water scarcity.

In 2012, 65 percent of the 130 countries that responded to a survey on integrated water resources management reported that management plans were in place at the national level.

Conclusion:

Thus water conservation & its management is the responsibility of every human being. There is a need for adoption of locale-specific water harvesting techniques, nurture natural vegetation and lead life in harmony with nature. Political will to prioritize the issue & public participation is vital. The watershed management should be guided by integrated & common perspective.

Promotion of water storage & water recycling, water footprints/mapping (usage at different stages), periodic check & strategic planning, scientific approach in saving water, local governing & moreover initiative from everyone for judicious use can make us conserve water, provide scope for sustainable development & protect the natural heritage.

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