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Strategies for Sustainable Water Management

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ABSTRACT
An inorganic chemical substance having no colour, no taste, transparent and odorless, is one of the main constituent of the earth's hydrosphere called water. It is the vital fluid for all forms of life, even though provides no calories and organic nutrients. According to World Health Organization Report (WHO) 2017, safe drinking water is "water that does not represent any significant risk to health, over life-time consumption including different sensitivities that may occur between life time stages". Chemically it is Contains one oxygen and two hydrogen atoms, connected by a covalent bond, represents sharing of electron pairs which implies the stable balance of alternative and repulsive forces between atoms. Globally, 96.5% water is in oceans, 0.9% other saline water and only 2.5 % water is fresh water (drinking water).Water that is used in drink or for food preparation is known as drinking water . It's intake for a healthy person per day depends upon the intensity of physical activities carried out by man per day as well as the environmental conditions of any area. Moreover, developed countries have been very efficiently managed for quality standard of tap water needs of its people. However third world countries are the chronicle victim of acute shortage of water, flood. Consequently, 80% of illness in these countries is directly caused by inadequate water and sanitation. So here in this paper our primary concern is to evolve an area specific and need-based strategic blueprint for sustainable water resources management which may be helpful to address the basic human rights of food and water.

Keywords: *Ultimate irrigation potential, Zone specific strategies, resource management technique, usage.*

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On the day 28th July, 2010, United Nation General Assembly "RESOLUTION" explicitly recognized the human right to water and sanitation and acknowledged that clean drinking water and sanitation are very essential for realization of all other human rights. Hence, it provides a mandatory draft to pull all the state and organizations to think upon and make financial, technology transfer and help capacity building towards the developing countries, to make arrangements for safe, clean, accessible and affordable drinking water, sanitation for all.

WHO further has specified the bare basic quantum of sufficient, safe drinking water and affordable drinking water to mitigate the personal and domestic need of human uses. The Committee on Economic, Social and Cultural Rights adopted under general Comment No.15, Article1.1 that" the human right to water is indispensable for leading a life in human dignity. It is a prerequisite for the realization of other human rights". Moreover it has a strong bearing on the realization of Millennium Development Goals (MDGs).

A deep insight into the water distribution on the earth reveals that only 2.5% fresh water is available to cater the needs of survival. A major chunk of this fresh water is locked up in forms of ice and under- ground water, only a very tiny share is available in the form of surface water to serve directly the urgent human lives needs. Further surface water is segregated into lakes, amounting for about 20.9% while rivers make up for just 0.49% and rest of water is locked in glacier form.

The quest is to peep into the matter that how to manage the depleting water resources in proportion to ever increasing human resources and their watery needs in present scenario. Especially, in context of third world countries, where food-feed and drinking water concerns have became bone of contention for sustainability.

Thus, the present study is focused on, to suggest and evolve workable strategies to maintain the bare basic human rights of safe drinking water and irrigation usages to their population. The study has been carried out on the line of paramount parameters namely sufficient, safe, acceptable and physically accessible continuous drinking water for everyone .Suffice watery needs are 50 to 100 liters per person per day to ensure the most basic

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ones(WHO) .Safety implies for, water that is free from micro-organism, chemical substances along with radiological hazards. The World Health Organization guidelines laid provisions for the development of national and local standard of water quality. Acceptability it must be of acceptable colour, odor and taste for each personal and domestic use. It all facilitation must be acceptable irrespective of culture, gender, life cycle and privacy requirements. Lastly, it is physical accessibility. It is in righteous manner that everyone must have water and sanitation services within or in the immediate vicinity of household, educational institution, workplace or health institution. Water source must be within 1,000 meters.

According to The United Nations World Water development Report 2021, water availability (supply) has hit over two billion people of countries suffering from water stress. About 4 billion people are residing in severe physical water scarcity for at least one month per year, round the year. More over 1.6 billion people face 'Economic' water scarcity that implies that irrespective of physical availability of water they lack necessary infrastructure to access that water.(Comprehensive Assessment of water Management in Agriculture,2007).

Another issue of concern is the global built reservoir capacity is decreasing in proportion the population increase. Globally, fresh water use (demand) has increased by about 1% per year since 1980's .These trends have been mainly attributed to a blend of rapid population growth, economic development and shifting consumption pattern. About 69 % of global water withdrawals are mostly meant for agriculture (irrigation) along- side aquaculture and livestock uses. Alarmingly, this ratio can reach up to 95% in some developing countries.(Food and Agriculture Organization, 2011a).

INDIAN CONCERNS

About 2,00,000 lives are yearly claimed by inadequate access to safe water and 21 major cities are vulnerable to run out of ground water as by 2020, going to affect about 100 million people directly in near future. The present scenario is providing enough food for the thought, to Think, Plan and Act.(TPA).

- 75 % of households do not have drinking water at home.
- 84% rural household do not have access to piped water.
- 70% of India's water is contaminated
- India ranked 120th among 122nd in water quality index.

The Global Risk Report of the World Economic Forum ranked water crises as the third most important global risk in its impacts on humanity:

1st weapons of mass destruction
2nd Extreme weather events
3rd water crises

Above quoted facts have mandated to devise a more comprehensive and target oriented strategic plans to fulfill the pre-requisite conditions to cope up with water needs for drinking cum domestic uses and irrigation for agriculture needs as the major use. Here, Ultimate Irrigation Potential (UIP) gauged by Central water Commission (CWC) of the country has been used to make a catalogue. Therefore, 28 states and 8 Union Territories of Indian federation have been segregated to have a deep insight into the potential (UIP) of resources. Consequently, states and Union territories segregation would definitely provide a road map for potential harnessing feasibility.

Following are the proposed UIP Zones;

1. Potential Zone-1

Consisting of the states and Union territories those are having minimum Ultimate Irrigation Potential ranged up to 500 Thousand hectare. As per the periodic assessment of Central water commission Report are Arunachal Pradesh and Mizoram, Himachal Pradesh, Goa etc.

2. Potential Zone -2

The areas having Ultimate Irrigation Potential up to 1000 TH Ha (ranged between 500 to 5000 Thousand ha) are grouped under harvestable zone. It stretches from North to south and east to west.

3. Potential Zone-3

Those areas having Ultimate Irrigation Potential nearing simply to average national potential are grouped under this zone. It's the most viable and economic zone which needs area specific or localized need based planning.

4. Optimum Potential Zone-4

This Zone is consisting of areas having maximum UIP that can be harnessed optimally with manageable state's resources. Moreover areas falling under this zone have consisted maximum national Ultimate Irrigation Potential. The states viz. Uttar Pradesh, Bihar, Andhra Pradesh, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, West Bengal, Gujarat, Haryana, and Karnataka . Therefore, areas endowed with Ultimate Irrigation Potential nearing to the national average UIP and above are covered under this zone.

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ZONE-WISE DISTRIBUTION OF ULTIMATE IRRIGATION POTENTIAL
Major, Medium & Minor Irrigation Projects (Thousands hectares)

Zone-I	Zone-II	Zone-III	Zone-IV
Arunachal Pradesh, Goa, Himachal Pradesh, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura & Union Territories. Command over 1.04 % UIP. IPC 0.87 %	Uttrakhand, Manipur, Jammu & Kashmir Chhattisgarh, Assam, Haryana, Jharkhand, Kerala. Command Over UIP 12.20 % IPC 10.47%	West Bengal, Tamil Nadu, Rajasthan, Punjab, Orissa, Maharashtra, Karnataka, Gujarat. Command Over UIP 38.15 % IPC 38.44 %	Andhra Pradesh, Bihar, Madhya Pradesh, Uttar Pradesh. Command over UIP 48.55 % IPC 50.07 %

- Ultimate Irrigation Potential (UIP)
- Irrigation Potential Created (IPC)

This zone wise segregation of country's ultimate irrigation potential has been drawn on the basis of total irrigation potential available in the country. (Source: Annual water Report of Water Commission of India) The rationale behind this exercise is to evolve Zone Specific strategies (ZSS) to harness irrigation potential with more accuracy and be fitting Resource Management Techniques (RMT). Thus such RMT will definitely lead to overcome resources crunch at The National and states level.

Moreover it is known fact that Indian irrigation sector is facing major challenge of ever increasing gap between Irrigation Potential Created (IPC) and actual usages or Irrigation Potential Utilized which are hampering agricultural productivity as well leading to water crises and disputes in the country. These ZSS are expected to produce desirable outcome to lessen the gap between potential created and potential usages. This paper would also provide input for policy planner to chalk out need and potential based projects for specific zone and guidelines to intensify Irrigation projects in higher potential zones. This analysis would also be helpful to reduce the gap between irrigation potential created and usages which poses serious challenges to make both ends meet.

Jal Jeevan Mission flagship program was rolled out in August, 2019 to cater portable piped drinking water needs of about 17 per cent households and about 83 per cent are targeted to provide with drinking water at door step by 2024 through functional tap water connection (FTWC).In this line it is targeted to assure 55 liters per capita per day regularly on long run basis to every house hold.Agriculture is commanding 80 per cent of available current water and irrigating about 48.8 per cent of 140 million hectare (mha) of agriculture land of the country. The rain fed area is accounting for 51.2 per cent which reveals the plight of Indian agriculture. Despite the fact we are expecting sky rocketing growth of the sector as well as of the economy.

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