AN EXPLORATORY STUDY ON WATER CRISES IN DELHI: AN ANALYSIS OF CAUSES AND REMEDIES

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ABSTRACT

It is good news to the world that Scientists have detected water on moon while bad news is also there that human-beings are crying for a drop of water on the earth. When we think of water, a picture of long queue of people with empty bucket in their hands comes in our mind, especially in summer. This long queue of people for water refers to acute shortage of water and problems being faced by them on this count. The water scarcity hit drastically in the summer because its consumption increases in many folds as due to hot summer season human-being and animals drinks more water and use more water for bath and washing purposes. The water requirement is increasing day by day while the availability of water resources is reducing day by day. It is beyond doubt that Water Scarcity is very serious challenge not only for India but for the whole world.

Like every summer, Delhi is facing alarming water scarcity this summer also. Residents are facing acute shortage of water, which results into lot of resentment, agitations, dharnas, slogan shouting, amounting to sheer misuse of all kind of resources. Though as per data, large water resources are available but fact remains that water level in Delhi NCR is getting down every year. There are about 4000 tube wells being operated by Delhi Jal Board but about 25-30 per cent of these tube wells are yielding non-potable water. This paper is an attempt to understand and analyze the reasons of the water scarcity in Delhi. It also explores the possible ways to manage the water crises in city.

Keywords : Water Resources, Water Crises, Potable Water, Irrigation Water, Ground water

INTRODUCTION:

It is beyond doubt that water is one of the most precious natural resource for human life. Without water the human life cannot be imagined as we need water at every step of our life i.e. for drinking, washing, bathing, etc.etc. Though three fourth part of earth is covered by the Oceans but water usable for human being is far less. As per UN Estimates, Earth is having about 1400 million cubic kilometer, which is enough to cover it with a layer of 3000 meters depth. But fact remains that fresh water constitutes a very small proportion of this enormous quantity. About 75.2 per cent of fresh water lies frozen in Polar Regions and another 22.6 per cent is present as ground water. The rest is available in lakes, rivers, atmosphere, moisture, soil etc.

India is a wonderful land of many rivers and mountains, divided into 28 states and 7 Union Territories. Majority of the population (1, 027,015, 247 as per 2001 census) are living in villages and dependents on rivers for water requirements. The water requirement is increasing while the availability of water resources is reducing day by day. It is a matter of very serious concern that in India search for water is a matter of life and death for people. In some part of the India like Amravati, Akola, Yavatmal villages in Jharkhand, almost every human being spent approximately five to six hours a day in the morning for collecting or searching the water. It is indeed a matter of serious concern when other countries are looking forward for conquering the moon and other planets; India is only struggling with severe water crises. On one hand, one sixth part of the country is drought prone and while on other hand, around 7.5 million hectare is floods affected area per year (Source : National Water Policy 2002).

India's groundwater is not in a very good state. The annual recharge of water is far less than what is consumed. The situation is more alarming in urban areas due to population pressure and industrial growth, which in turn have led to increased water consumption.The total groundwater sources, which are annually recharged, provide around 43 million cubic metres (mcm) of water, out of which only 7 mcm is reserved for drinking and industrial purposes; 36 mcm is reserved for irrigation. The total need is assessed at 64 mcm at the end of the Eighth Five-Year Plan.

OBJECTIVES:

i) To study and understand the reasons of water crises in Delhi NCR Areas.
ii) To explore the effective management strategies to minimize the water crises.

SCOPE:

This paper will create awareness among people and consumers about the scarcity of water resources, its effective use. It will also share sense of educating people and professionals for development of more water resources in Delhi. This study will also convey alertness to government machinery and other concerned departments to plan and implement remedial measures to avoid future water crises. This paper can also be base to find out a gap and scope for further study.

LITERATURE SURVEY:

A. Maria her paper titled **"Urban Water crises in Delhi, Stakeholders responses and potential scenarios of Evolution"** has focused on inadequate piped water supply, unreliability, and uncontrolled ground water abstraction. In this paper, the author has discussed the scenario of convergence towards universal access to potable water supply through a centralized public network, is not only long term scenario that can take place in developing cities similar to Delhi. It also emphasize on alternative scenario in which private copying systems play a role in shaping the long term technical trajectory of the urban

water management system, allow the highlighting of certain important policy tools in achieving the sustainability of water management in developing cities.

In a Joint paper by Vijay Kumar and Sharad K Jain, National Institute of Hydrology, Roorkee on **"Status of Virtual Water Trade from India"** has discussed about virtual water i.e. water required in the production of a commodity or service. Paper has also discussed about rapidly growing ploopulation and improving living standards in India, the water requirement of the country is increasing land per capital availability of water resources is reducing day by day. The Authors have emphasized that there is a need for proper planning of water resource utilization for the country so that the gap between the water availability and requirement may be minimized.

Ministry of Water Resources, Government of India, in the National Water Policy, April 2002 (Available on Internet) has emphasize on the importance of water for human and animal life, its increasing scarcity and need for the planning and management of this resources. It has clearly indicated about the need for a National water policy, Water resources Planning, Water allocation priorities, Ground water and Drinking water development, Water quality, Conservation of Water. It has also discussed about Land Erosion by sea or river, drought prone area development, Water Sharing Distribution amongst the states. To achieve the objectives State Water Policy backed with an operational action plan shall be formulated in a time bound manner. National Water Policy may be revised periodically as and when need arises.

Water crises in Delhi:

It is evident that India is facing grave and challenging situation of water crises and Delhi is not left aloof from this serious problem. It is a well known fact that Delhi is not having enough clean drinking water. There have always been head lines in newspaper about dirty and unclean water in water tapes in one area or the other. As per data available, Delhi needs 800-mega gallons per day (mgd) of water while it gets only 600 mgd. There is no other alternative except to depend on the neighboring states for the extra 200 mgd. in Delhi. In Delhi potable water is made available to the people through around 1.33 million domestic connections and around 11.5 thousand public stand posts. Different modes of water supply to the public in Delhi are given in Table-1 as under:-

Table: 1 Mode of Water Supply in Delhi

Type of Supply	Supply Mode	Volume supplied in Million Liter per day
Domestic Connection	1331820 connections	1124
Commercial and Institutional Connection	52623 connections	34
Industrial Connections	10876 Connections	13
Bulk Supply to DCB and NDMC	Bulk Supply	158
Public Standposts	11533 standposts	223
Water Tankers	493 Vehicles	10

Sources: Estimations – PWC, GHV, TCE (2004), "Project preparation study – Delhi Water Supply and Sewerage Project" Report prepared for Delhi Jal Board.

In spite of above modes of water supply, still there is hue and cry among the people due to inadequate and inferiority quality of potable water supply. It is strongly felt that it is necessary for the People, Government and other private bodies to seriously start working on planning for developing water resource including Ground, drinking and irrigation water. On the study of various facts and figures, following are the important reasons for water shortage in Delhi:-

Reasons:

- Increase in Population:
  As per the information available, Delhi, occupies an area of 1,483 sq km and has a population of nearly 14 million. According to Census 2001, Delhi is considered to be the second largest metropolitan city next to Mumbai with approximately 1,38,50,507 people lodging in New Delhi. Since long, Delhi has been a place of opportunities for the people from all parts of India. Every year large number of people shifted to Delhi in search of better livelihood and fulfills their dreams in the city. The population affected by Water Shortage has increased from 7% to 35% in the period from 1995 to 2004 according to Planning Commission data. (Mint, July 29, 2010). Hence this increase in population is one of the key reasons for water scarcity in Delhi.
- Summer Season and high temperature results in evaporation of water resources
  Another important reason of water shortage is high temperature due to which the water from sea, rivers, lakes etc. evaporates. One of the challenge of water management in arid regions is to reduce the huge amount of water loss through evaporation from water surfaces of dam reservoirs and lakes due to extremely high evaporation rates (Gokbulak and Ozhan, 2006; Craig, 2008). The extremely high rate of evaporation from water surfaces in arid and semi-arid regions greatly reduces optimal utilization of water reservoirs.
- Decrease in Water level :
  It is clear from the data available that records that water level declines in major parts of Delhi. Though in most parts of Delhi, the water table decline has been less than 4m, significantly greater declines (4m to more than 8m) have been recorded in areas in central Najafgarh block, both sides of the ridges in southern city block and in the Chattarpur basin of Mehrauli block. Enhanced water pumps for domestic purposes in residential areas and farm houses have resulted in this significantly greater decline during this period (Source: http://www.rainwaterharvesting.org/index_files/about_delhi.htm)
- Daily water consumption increased many folds.
  Presently Delhi requires 3324 million liters of water a day (MLD) while it is getting only 2034 MLD. Daily average water consumption in Delhi is 240 liters per capita per day (lpcd), which is highest in India. Though it is already having acute shortage of consumable water and again large scale of extraction of ground water will result in widening gap between demand and supply of water. Delhi is experiencing increasing pressure to meet demand for its water resources. Growing urbanization, improvements in living standards, exploding population are just some of the contributing factors.
- Misuse of Water
  It revealed from Water Awareness campaign that there was misuse of water in cities where as rural area faces the problem of inadequate water of poor quality. Increase industrial and urban water use has resulted in reduction in the water available for agriculture in drought prone area. Also there is inequitable distribution of rainfall and majority of area is rain fed. India is a developing country having 2 % of land, 4 % of water and 16 % of population of the world and hence ensuring water security and providing sanitation is a problem in rural area. In cities, there is a problem of sanitation in slums. Pollution of fresh water resource due to domestic, industrial and agriculture effluent is a serious problem.

  Water is being sold at the commercial rates because of its shortage and non-availability. Water mafia is flourishing in huge numbers. When there is hue and cry in the Media then only political leaders will start talking water. A blame game starts between political parties and leaders.

METHODOLOGY:

This study is a descriptive and analytical in nature. Primary as well as secondary data has been used in this study. Primary data was collected through a questionnaire that was administered to the general public. The questionnaire was distributed among 100 different people in different part of Delhi. Out of 100 people only 80 respondents have responded to the questionnaire. Information related to the study has also been obtained by conducting interviews of Professionals working with Delhi Jal Board, people and consumers etc. The data collected was processed; analyzed and presented in an analytical way with the help of statistical tools i.e. percentage, average etc.

Data Analysis:

S.No.	Statement	SA	A	U	D	SD
1	There is shortage of water in Delhi due to hot Summer	60%	30%	10%	-	-
2.	Shortage of Water is due to misuse of water	30%	50%	10%	10%	-
3.	People are misusing water in Delhi	10%	50%	20%	10%	-
4.	Sufficient work has been done by Govt. to avoid water crises	-	10%	20%	70%	-
5.	Water crises can be overcome by effective Management strategies	20%	70%	10%	-	-
6.	Water Resource Planning, implementation and monitoring can greatly useful in resolving water crises.	80%	10%	10%		

(SA= Strongly agree, A=Agree, U=No Idea, D=Disagree, SD= Strongly Disagree)

INFERENCES:

1. Majority of respondents i.e. 90% have agreed that there is shortage of water in Delhi due to hot summer. While 10 percent of respondents were uncertain to comment in this regard.
2. Only 30 per cent respondents strongly agreed and 50% agreed that water of shortage is due to misuse of water by the people. While 10% were uncertain and 10% were strongly disagreed that shortage of water is due to its misuse.
3. Again majority of Delhi residents agreed that water misuse is not been handled properly by the people.
4. Small number of respondents only 10% have viewed that sufficient work has not been done by government of India to handle water crises. 70% of the respondents were disagreeing that Govt. of India has not done sufficient work to handle water crises.
5. Majority of respondents i.e. 90% have opined that water crises can be handled by effective management strategies and practices.
6. Again Majority of respondents 90% have viewed that Water Resource Planning, implementation and monitoring can greatly useful in resolving water crises.

CONCLUSIONS:

It is universal fact that water is precious national resource which is reducing day by day all over the world. Delhi, capital of India has also faced the consequences of water scarcity. The most important reasons of water scarcity in Delhi are increase in population many fold, decrease of ground water level, evaporation of water resources due to heat, mismanagement of water resources etc. As on day the total population of city is 1, 37,82, 976 million and people from all other parts of India are migrating to Delhi in large number. Hence water consumption automatically exploded due to high increase in people in Delhi. A considerable

part of water losses because of evaporation due to heat. It is constant development over the last decade that every year water level is declining. These are few significant reasons of water shortage in Delhi. It is alarming indications for all of us to preserve ground, drink and irrigation water in the larger interest. Despite worrying signals for the water crisis in future, it appears that concerned authorities are in no hurry to take serious measure to save water and avoid its crises.

RECOMMENDATIONS:

The problem will become more acute in the near future because fresh water sources will decrease and the city will be surrounded by brackish and saline water. If the groundwater is exploited without being recharged, then it will also affect the fresh water. Even fresh water tube wells are now yielding brackish water. This means that the fresh water has been polluted. It is moral responsibility of people and government that water resources should be planned, developed, managed and sustained to avoid its scarcity in future. It is felt that necessary efforts are not put for planning and developing water resources so that common scarcity of water can be resolved. In view of above study, it is suggested that following measures may be taken to avoid water crises in future:-

Rain water harvesting

Rain Water Harvesting means capturing rain water for future use taking measures to keep that water clean so that it is not polluted Water harvesting can be undertaken by capturing run off water from rooftops, capturing run off water from local catchments, capturing seasonal flood waters from local steams and conserving water through watershed management. The water captured can be utilize for drinking, irrigation purposes and will be useful increasing ground water recharge.

It is pertinent to mention here that Roof-top water harvesting structures have already been implemented at the Indian Institute of Technology, New Delhi. Around 50 mc of water can be kept in reserve by storing the excess water during rainy season. We need to maintain a constant water level. We have already taken initiatives to make residents aware about the grim scenario and the possible solutions. Tamilnadu is one among the top list of the states doing Rain Water Harvesting. In Chennai City, annual rainfall of 120 cm, over an area of 174 sq. kms, is capable of yielding 125 liters per day with Rain Water Harvesting, making them self sufficient. At the micro-level, this amount of rainfall is capable of yielding more than 700 liters of water per day this will not only take care of the daily needs of a family with 5 members. Tamilnadu could do it successfully because it made Rain Water Harvesting mandatory for Individual Houses, Multi Storied Building, Cluster of Office Building, Individual Office Building etc.

Rivers can be combined:

It is proved by the records that Floods and droughts affect vast areas very badly in India. One-sixth area of the country is drought-prone. Out of 40 million hectare of the flood prone area in the country, on an average, floods affect an area of around 7.5 million hectare per year. As per Tamil Nadu chief Minister his state had initiated projects for linking rivers within the state (Mint, July 29, 2010). It is recommended that droughts and floods have to be resolved at national level that it can be done by combining different rivers.

Implementation of Government Policies on Water resources:

In view of the present water crises it is strongly recommended that there should be effective water management and there is an urgent need of paradigm shift in management of water resources. People are facing serious water shortage it is necessary to give greater emphasis on the improvement of water resources. This can be done when suitable allocation of fund is made to the respective Departments with proper follow up and compliance report from them. Most of the States demanded more fund in a recent Meeting of the National Development Council (NDC) for

strengthening water resources. In case of failure, responsibility should be fixed and further corrective action be taken.

Separation of drinking water line and non-drinking water line:

It is generally found that majority of people are using potable water for all purposes. This results that access to safe water and sanitation remains a major challenge in both urban and rural areas. At present 40 to 60 per cent of water used is lost to leakage, theft and poor accounting. Health risks will continue to be a major concern, especially in rapidly growing urban areas where population growth and the rise of megacities will further constrain the availability of water. In 1950, there were less than 100 cities with a population in excess of 1 million; by 2025, that number is expected to rise to 650. As urban populations grow, water use will need to shift from agriculture to municipal and industrial uses, making decisions about allocating between different sectors difficult.

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