Survey on Analysis of Water Scarcity in Chennai using Datamining Techniques

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ABSTRACT:

Water is one of the most important elements responsible for life on earth. But now water scarcity has become a major constraint to socio-economic development and threat lively hood in increasing parts of the world. The main reason for water scarcity is based on water management issues. This paper mainly deals with water supply and water demand, climate change (major impacts or threat to growing water scarcity), water security includes low quality and poor services which leads to water born diseases and affects human health. These issues can be achieved by proper policy making, maintaining water resource, and thereby it reduces the cause of water scarcity. A questionnaire is designed to determine the various factors of water scarcity that have impacts on publics.

KEYWORDS: *Water Security, climate change, adaptation, urban policy change, water resource management.*

I. INTRODUCTION:

Water has become a challenge of global dimensions. Poor policy management, increasing demands, migration and overexploitation are the major cause of water security concerns in urban communication. Climate change may affect both the long term availability and the short-term variability of water resources in many regions. Successful water management require both supply and demand related conservation practices.

Estimates of response to polices for managing water demand it deals with prices and water demand: Prices set by public officials are one potential lever for managing water demand when resources are scarce or highly variable. Good estimates of the price elasticity of water demand are critical to any such effort water managers must understand how demand will respond to changes in price. Thus, much of the economics literature on water demand has focused on the econometric estimation of demand parameters, including price elasticity.

The "supply curves" for water management policies are poorly understood. But the development of new models of municipal "water policy supply" under various climate conditions with water resources model. All of these would be useful starting points for a more comprehensive effort. So, this paper discusses about the water demand and supply, adaptation to climate change and water security.

II. LITERATURE REVIEW

1. "Water Management issues in Chennai, India" by Sethuram [1] discusses about the water security, climate change. The aim of this paper is to describe supply demand initiatives, to analyze policies and adaptation strategies and to provide recommendations. In order

to secure sources, policy must find solutions for pollution, increased population, climate change and poorly-governed system. Demand management is lacking as the major project focus of policies is on supply improvement. While rainwater harvesting does exist, the current demand management programs are insufficient to support Chennai's population growth, management through conservation and efficiency needs further enhancement and dynamic action. The key problem analyzed is the poor supply security and scarcity issues and the possible solution to this problem within policy planning and focus on demand related conservation practices.

2. "Water security: Debating an emerging paradigm" by Christina Cook, Karen Bakker [2] tells about comprehensive review of the concepts of water security, including both academic and policy literatures. The author speaks about framing of water security across the physical, social sciences, and also across disciplines. One of the key reasons to favora broad, integrative framing of water security is because it brings governance issues to the fore, whereas narrow and discipline specific approaches fail to board governance issues. Of course, governance is critical to the effective implementation of water security. The author concluded that the good governance brings a new approach to water management.

3. "Emerging solutions to the water challenges of an urbanizing world" by Tove Larsen, Sabine Hoffman, Christoph Luthi, Bernhard Truffer, Max Maurer [3] discusses about the urban water sustainability include the provision of safe drinking water, waste water handling, protection against flooding. Innovative approaches in urban water management are provided with many alternative solutions like new concepts of storm water drainage, increased water productivity, distributed on site treatment of wastewater, source separation of human waste, and institutions and organizational reforms. The possible solution is to put efforts in research, policy, and practices to develop alternatives with implications for cities aquatic ecosystem alike.

4. "Climate change adaptation and water resource management" by Sheila M. Olmstead [4] tells about the water supply, demand, and adaptation to climate change. The paper also describes about the responses of water users to water prices, non-price water conservation policies, water trading, investment in and operations of storage and conveyance infrastructure and trans-boundary water allocation mechanisms. Water resource adaptation have been developed for specific river basins, and large scale efforts have been also undertaken regarding the potential impacts on climate change(adaptation) on demand and supply of municipal water storage infrastructure.

III. PROBLEM DEFINITION:

In today's world Water Scarcity becomes a major thread to every being. Due to poor quality of water people are suffering from many water born diseases like stomach infection, head ache, etc. This is because of

1. Lack of government policy and practices.
2. Improper Maintenance of water resources.
3. Water supply and water demand are not balanced equally.

IV. OBJECTIVE AND HYPOTHESIS:

The main objective of this research is to identify whether the water scarcity is rising due to lack of government policy and practices. Insufficient practices of water supply and demand due to improper water management systems and also not adapting to climate changes. All these

factors lead to water security, safe drinking water, etc.

A. PRIMARY OBJECTIVE:

IMPACTS OF SAFE DRINKING WATER ON WATER SECURITY

Water security mainly deals with quantity and availability of water it follows two water assessment tools. First to measure the water stress and water shortages and water stress says about the ratio of water availability and water shortages estimates the number of people so that water demand can be reduced. It also deals with the sufficient quantity of water at a high quality, at affordable price lead to safe and clean water, healthy, productive life, and it also meets both long-term and short-term needs like health, safety, welfare, households, communities, etc. Water security framing system should have securing the food supply, protecting ecosystem, sharing water resources, managing risk and governing water wisely.

B. SECONDARY OBJECTIVE:

IMPORTANCE OF WATER SUPPLY, DEMAND AND POLICY ADAPTATION

Water management deals with various factors like water administration and utility management, water supply and demand side management.

ADMINISTRATION AND UTILITY MANAGEMENT SYSTEM

Administration programs includes utility measures, reducing water loss, practical approaches, and goal setting for future management, enhancing education, creating awareness among schools and colleges, improving local participation, and managing grievances and feedbacks. Ground water extraction, pricing, fines within the regulatory system clearance of rivers, maintain drainage system all these policy comes under utility management system.

WATER SUPPLY AND DEMAND SIDE MANAGEMENT

Water supply side policy includes supply infrastructure maintenance of quality, source maintenance, quality control etc. Water distribution follows adaptation strategies like renovate pipelines, maintain valves and sumps (including dams and canals), and also supply through desalination plants. Demand side management includes policies and programs, to improve demand related practices by conservation pricing, pipelines and metering etc. Adapting to climate change is also a major factor on water scarcity. According to the climate report water supply and demand has to beeventually maintained to reduce the risk of water shortage in any circumstances. So, supply and demand management gives a great success on adaptation policy. The following are the major changes to supply system in Chennai:

1. The process of acquiring water from poondi, Tamaraipakkam and neyveli.
2. The Chennai metro water supply board is dogging 100 wells to expand the existing well fields and develop water facilities for semi urban region.
3. Increased Amma water production and supply to all regions. This policy is yet to show results as it is relatively new.
4. There are 9000 or more lorries for meeting domestic supply.
5. The process for repair and restore existing tanks and Oorains.

C. RESEARCH HYPOTHESIS:

Hypothesis (H1): The term water scarcity is still being into practices and due to lack of government policies and practices.

Hypothesis (H2): The cause of water supply and water demand occurs due to improper water management system.

V. RESEARCH METHODOLOGY

The methodology of this paper is based on quantitative data collection and analysis include questionnaire with closed ended questions. The second source of data in this paper is secondary data. All secondary data are collected from various books, magazines, newspaper, journals, internet sites etc given in the reference section. To predict how the water scarcity is concerned by the public, checking about the adequate amount of water supply in Chennai and also finding the reasons for water demand.

A. METHODS AND MATRIALS

This method is used to collect the data about safe drinking water, water security which includes both quantity and quality of the water. Causes of water born diseases due to poor quality of water service, estimating the cost of water, analysis of water shortages in monthly basis, etc.

This is a questionnaire based study on the awareness of safe drinking water on water security. The participants who undertook the survey are heterogeneous people (i.e. student, employee, etc). A total of 30 questions were asked to 100 people and age group was between 16-45yrs. Individuality was assured when the subjects filled the survey. The questionnaire is filled in paper and pen method and also filled through Google forms. After the data collection, statistical measurements are done. The questions included are:

VI. DATA ANALYTICS:

The access of water in Chennai is mainly by direct in-house, outside tap, storage tanks, metro water tank, independent wells, community wells, etc. But many streets have no proper piping and have no supply because water is not allocated evenly hence careful planning can be enhanced.

A. DATA ANALYSIS AND DISCUSSION

The access of water in Chennai is mainly by direct in-house, outside tap, storage tanks, metro water tank, independent wells, community wells, etc. But many streets have no proper piping and have no supply because water is not allocated evenly hence careful planning can be enhanced.

CONCERNING ABOUT WATER SCARCITY AND QUALITY ISSUES

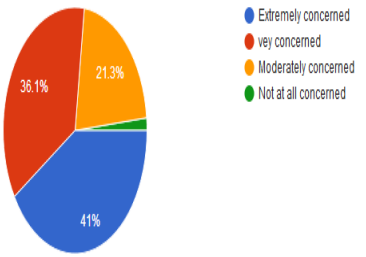

Figure1: concerning about water scarcity issues in Chennai: Data collection, 2018

Survey indicates that 41% are extremely concerning about water scarcity and their quality issues problems and 80% feel the need for improvement, respectively. This proves that Chennai has serious water quality issues in certain areas.

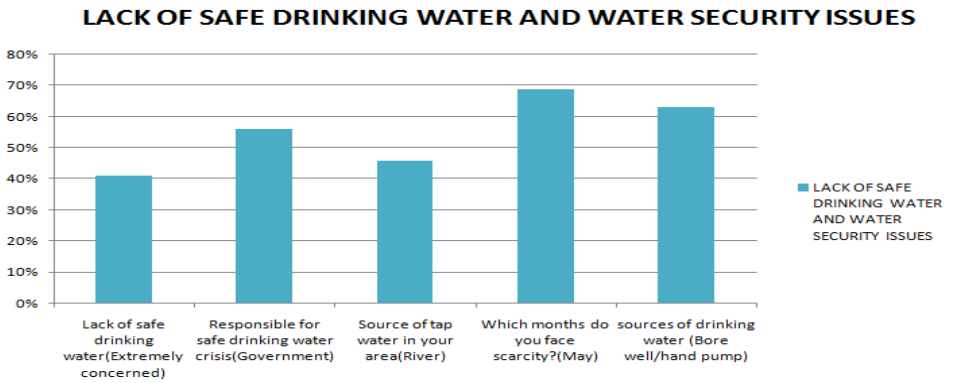

Figure2: Indicates the lack of safe drinking water, Source: Data Collection, 2018

The data analysis of figure2 indicates the lack of safe drinking water and water security issues, nearly 58% of the people are saying that the Government should be more responsible for water crisis problem, 46% are getting water from tap water which comes from river, since more people are using river has their source it should be properly cleaned and maintain by water management policy. 69% of the population facing water scarcity on the month of April and May this has to be notified. 64% of drinking water comes from the source of bore well and hand pump, so ground water extraction should be maintained.

There are large numbers of illegal ground water pumping stations have sprung up where, every day, about 30-35 tankers load are filled and sold in the city for money. Ground water sources are fast depleting and Chennai's retention is very low hence ground water table has reduced in Chennai. It also deals with water price that is rapidly increasing due to water demand. Due to bad quality of water supply poor people are mostly getting affected and caused by many water diseases. 91% of the people were interested in being informed and using rules about saving water at home

Nearly 30 percent were giving bribe to make complaint and to take immediate action over the issues. Thus, this issue needs more survey and dynamic action from all stakeholders and policy makers in Chennai.

VII. CONCLUSIONS:

The analytical review of this paper indicates poor water security. Even though government had many good policy and practices there are still irregular water supply in certain areas. All the rivers, lakes, canals should be properly maintained with good water management system so, that the term water scarcity can be reduced. Quality of the water should be increased to reduce the health issues. All these should be embedded within good governance process necessary for achieving secure water for all.

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