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Historical Way of Water Management in India

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ABSTRACT

The paper examines the water scarcity in India through historical prospective and references. We know that world is facing shortage of pure drinkable water. In this paper we mentioned the water law and policies in ancient to modern time and later, current policies and law are discussed.

Water is base of our life; our existence is depending on water. Water is essential for the survival of all forms of life on the earth. If we are not focusing on this sector, our next generation facing too much challenges for water. So, the proper management of water is required. For good management we read ancient, medieval and British policies and analyzing them and compare with current scenario.

In this paper we discuss about the methods of water conservation in ancient, medieval and during colonial period and check that current methods and what differences between them.

Keywords: Water management, Irrigation, water scarcity, ground water, Baolis

INTRODUCTION

Water is life; we all know that water is essential for all phase for all lives. All humans' animals need it. Water is basic element of industries and factories also, all over water is fundamental need for all. water is natural resources we should pay a concern to conservation and good management of water. Human population increasing day by day and the unsustainable use of natural resources and exploitation are problem for our planet earth. There is a need to reexamine water policies and law applied on people during ancient, medieval and colonial time.

India is country with many geographical diversities with it. Many areas of country facing shortage of water, decreasing ground water highly from the standard meter of measurement. People of that areas are struggling for drinking water and daily need of water. They totally depend on rain water for irrigation. Deforestation and urbanization also pay their contribution in shortage of water. We all should concern about this global issue like water crisis. We learn some methodology of water conservation and apply them.

WATER MANAGEMENT IN ANCIENT INDIA

The Harappan civilization (3000-1500 BCE) one of the most advanced systems in development of the ancient time. The Harappans also aware about importance of water. They prayed to rivers every day and rivers have divine status at that time. They also worship **Varuna** and **Indira**; Varuna was the god of water and Indira was the god of rain and thunder. Ost civilization in ancient time grown on the bank of river like Indus Valley Civilization, so we can say they know the role of water of human life and survive. Harappan farmers frequently used **Gabarbands** and **Canals** for water management for irrigation agricultural lands during dry seasons.

Dholavira and **Mohenjo-Daro**, the two major cities are best example of water management in Harappans civilization. In Dholavira the artificial ponds are best example for water conservation. The people of Dholavira take water from two seasonal rivers name Mansar and Manhar. For use of extra water level in rivers during rainy seasons the citizen make a dam and divert this water in walls and ponds through canals and make an artificial pond, this is very needful action for their existence and prosperity. A pond with dimensions 263-foot Lenth, 39-foot width and 24-foot depth find from Dholavira. A drinkable wall also finds with 4–25-meter round.

(Images: Dholavira pond for water conservation)

Wall are also found in Harappan civilization in **Mohenjo-Daro** the almost 700 walls there.
Lothal is also popular for its water management. The water management of Lothal known as **"terrakkal culture**". They have canals for irrigation and water purifying plants for drinking water. In Lothal we have to see the modern version of water management like water conservation, water harvesting or ground water existence.
Harappans are well aware of the seasonal rainfall and flooding and drainage system. We can say they have a good knowledge and understanding about water management and conservation of natural resources.
The Mauryan empire (~322-185BCE) is credited as the first who constructed dams, they also had an understanding of water balance measurement of rainfall, water pricing system and various water management system. In Mauryan time there was a separate department for supervision, construction and maintenance of a well-developed irrigation system with wells, canals, lakes and tanks. AT that time punishment and fines also imposed on the offenders. It's mentioned in the **Arthashashtra**. Water pricing was also an important element of the water management during Mauryan time period. Kautirya's method of classification of rainfall in relation to the annual average quantity is indeed appreciable because the methodology given in Arthashashtra is the same as we have today. The **Ahar-pyne** system is an excellent example of rainwater harvesting in the Mauryan era. A canal 45feet broad 10feet deep and 450 Lenth was found in Kumhrar, which is possibly from Mauryan era conducted by Archaeological survey of India during 1951-1955. A Mauryan empire Chandragupta Maurya constructed **Sudarsana dam** in Girnar, Gujrat. Many dams and canals constructed during Mauryan empire for drinking purpose and irrigation.
During time period of Atharvaveda people also familiar about the concept of water evaporation, condensation, river flow, storage rainfall. Water movement, storage concept of infiltration as part of Vedic society in ancient India.

In Brihatsanhita (550AD) consideration about ground water development and improving water quality.
In Rigveda mentions construction of artificial canals and it's known as word **Kulya.**
In many inscriptions and survey, we got that evidence about water management so we can say they have knowledge an awareness about it.
Rajtarngini of kalhan's also introduced of irrigation system in Kashmir.
Bhoj, the king of Bhopal built a large artificial lake.

WATER MANAGEMENT IN MEDIVAL TIME PEROID

sMedieval period is between ancient and modern period. They have large scale of agriculture and new water resources.
Tughlaqs were first to introduce canal irrigation at that time. A book name Tarikh-i-Firoz Shahi written by Barani, tell that Ghiasuddin Tughalaq was first ruler to constructed canals. later, Firoz Tughlaq built canals on large numbers. For Hisar region he built Rajabwahi and Ulug Khani canals. Shah Jahan (1628-1653CE) is also built **Nahar-i-bihist**.
Mughals build complex system for water conservation. They built **Qanats** in various areas. Water flowed from tunnel to an open **tank.**
Baolis were also built for conservation of water in arid or semi-arid areas. Chand baoli in Jaipur, Rajasthan is a noticeable example. They built many baolis to recurring issue of droughts and famine like Red fort baoli, Hazrat Nizamuddin Baoli, Agrasen ki Baoli, Delhi raja ki Baoli, Gandhak ki Baoli. In later the king from cholas dynasty also constructed tanks on large scale for example Cholagangam was built by Rajendra chola (1014-1044CE) in his capital Gangaikonda cholpuram. A Portuguese traveler, Domingo Paes also mentioned a large tank of Vijayanagarm built by Krishnadeva Raya.
During Mughal period **Arhat** or **Rahat** (Persian wheel) use for lifting water, this is described by an historian Sujan Rai.
Dhenkli described by Fryer, it was used when water level is closed to the surface.
In the Dekkan, the small canals from rivers served towns and villages and benefited cultivation and probably managed according to **Phad** system.
In Multan canal superintendent **(Mir-i-ad)** was also appointed.
In medieval period drought and flood regularly faced by people so they have pond for rain water harvesting and extra water supply on rivers during heavy rain and flood and the store it later use this water during drought.
In medieval period a proper settlement of irrigation and drinkable water was present and we got many evidences about it.

WATER MANAGEMENT IN BRITISH PERIOD

British period in India is generally considered an environment turning point. An era of limitless exploitation of natural resources for industrial use. Vast number of trees rolled down for railway sleepers, ship, and other commercial use. In the age of discovery, the exploitation natural resources are common but British also pay attention about conservation, the idea of botanical garden was copied from middle east. In colonial time exploitation more important than conservation and the commercial production became more important than sustain.
The British ruler applied government control over surface water. The British deforestation large tracts in order to access coal and timber and to promote agriculture its result lack of water shortage, underground

water level decreasing. Under colonial legislation division of responsibilities between center and state was introduced regarding water.

In British India renovation, improvement and extension of existing works. They **built Upper Ganga Canal, Upper Bari Doab Canal, Betwa Canal, Nira Left Bank Canal, Gokak Canal and Rushkulya canal,** major projects for irrigation were started during colonial period**.**

CURRENT SCENARIO OF WATER SCARCITY AND MANAGEMENT IN INDIA

Water crisis in India is a complex issue with multiple factors like rapid urbanization, industrialization, unsustainable agricultural and increasing demand of water. Climate change and rainfall pattern change affecting sources of water, so the water management is very concerning issue for today's world. sustainable water management is solution for water crisis because lack of pure drinkable water affects communities' health especially in rural areas and its bad impact on human health.

Unchecked urbanization concrete and other infrastructure disrupting rainwater from absorbing into the ground. According to the Indian government s 2016 -17 ground water year book, Delhi uses 390 million cubic meters of groundwater a year its 25% more than the natural rate of 310 million cubic water.

"She sends me to fetch water very early in the morning oh grandfather it is very difficult for me. my pot never fills up fully. The water is so deep that my rope hardly reaches it. The sun rises and also sets by the time, I return unable to collect even one pot full of water"- a folk song of Rajasthan

This is the real story of most women and girls child in Rajasthan and other areas where water is not available easily. they travel by bare foot under the hot sun for search of water. It's also affected education of girls because they have burden of fetching water over long distance.

We people think that we have water limitless but reality is different. We all know water is essential for all living beings. We all need fresh drinkable water. Water is different story in different regions of India, it's not same for everyone. The condition of Rajasthan is very thinkable and concerning point for all of us. It's not struggle for water only it affects their health and education also.

This condition is also Madhya Pradesh also. I recently visit there and I found that people struggling too much for water. a boy name Sonu told me that we have 2 pumps system of water one is near my home and another one is alternative option, when one source gets drought, we use another one. the 80% economy of MP based on agriculture but they have too much struggle for water.

Since we took only some major cases for study but we get result that our country facing water crisis in different phases and different way. Decreasing ground water level is biggest issue on front of us. The heavy urbanization and lack of unplanned water networking structure is responsible for it. The current scenario of our country regarding water crisis is very poor.

CONCLUSION

The paper has explored the awareness and development in India regarding water. From Harrapan civilization to colonial time using references from ancient literatures and evidences. we found that in ancient India especially in Harappa civilization there was a good management for irrigation and water conservation. for agriculture they have canals they have ponds for storage. also, in Mauryan empire they strictly follow water rules and punished for breaking rules. In Vedic period peoples worship rivers. its show that they familiar with the importance of water and have a good management. water as a precious source of life in medieval. the projects which can use in that time of appreciated in today's world its fruitful for cure water crisis. We can say they were aware about water and know management. As a result, we can

say that the traditional water network is one way to save. we should learn water networking from ancient time and renewed it. The traditional water management methodology name **Kulyas** known in Himanchal Pradesh and **Kuhals** of Jammu & Kashmir, the **Kattas** of Karnataka**, Surgams** of Kerala, **Ahar -pyns** in Uttar Pradesh, Madhya Pradesh and Bihar are still use in today.

It is not totally unfair to assume that environmental conservation as a policy of colonialization. they were not serious attention to conservation of natural resources. But still they took step regarding water management and substantiable development of water. Large number of canals and dams constructed under British rule ,they still working today.

Policy makers, researches, government, scientist and environmentalists have been working on this topic for a long time. We should promote water saving campaign. its's problem of global level so the countries should be need to working together and share their ideas about waste water recycling and water management.

India's traditional way of water management have solution to modern India's water problems and crisis, India is a country with geographical diversity and early time in India mostly regions have their own system of water management accordingly their climate, we should revive ancient methodology of water saving in modern era with modern prospective.

We should have to change an infrastructure of cities and set it according like Harrapan civilization since we can set a water networking like that time. The busy and congested settlement of cities break the ancient water networking system.

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