



Water, Society And Economics (With special focusing on Medieval India)

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Abstract: *Why we have to think about water? Why water is so important? Why we are so worried, we have abundant water stock? Around 71%, isn't it enough?*

These are some questions which encourage you to not to think the other side of the coin.

Have you ever wonder that besides we have a lot of water all over, some cities are facing a huge water crisis? Why did this happen?

You are traveling somewhere by train or bus and you are thirsty you would have to buy the drinking water despite this we have a lot of water to drink! Why do we need to buy? It is a free resource given by nature? Who is the owner? If it is a free resource, why someone is selling it? Who gives them that authority?

It is impossible to imagine life without a sufficient amount of water. From basic needs to modern industrial development, water has been a key factor. It also plays an important role in socio-cultural and religious activities around the globe.

The theme propounded by this abstract is to answer-unanswered questions, to solve daily reasonable problems, and illustrate some contemporary outcry on dams. But if you talking about dams be prepared that former prime minister of India Pt. Jawahar Lal Nehru once said that in his speech when he was laying the foundation of Nagarjun Sagar Dam, 10th of December, 1955, "When I lay the

foundation stone here of this Nagarjun Sagar, to me it is a sacred ceremony. This is the foundation of the temple of the humanity of India, a symbol of new temples that we are building all over India."

The dam could be considered as a water management project, as the hydro-social project or as hydrological development.

The basic aim to recapitulate about Socio-Hydrology and the work of interdisciplinary fields of this abstract. We will further consider the debacle of some previous approach, and some other which one is successful.

Basically the need for the consortium, who will help to seek

success.

What is water? The first question arises in every body's mind before talking about water.

A transparent and nearly colourless chemical substance that is the main constituent of Earth's streams, lakes, ocean and the fluid of most living organisms. But in this anthropogenic era what water's mean? Does it a compound of elements known as Hydrogen and Oxygen? In Mid 18th century the father of modern chemistry and a man who discovered water Antoine Lavoisier, who founded Compound of water H₂O. Are the compound of element Hydrogen and Oxygen in given ratio the only definition of water for the living organism?

So, basically, when we go deep inside our research, we find that NO! Water is not all about H₂O but It is an Emotion. Water as a "resources" to be 'managed' 'controlled' and hence 'quantified'.

Another question could be answered here that, Is there any difference between modern water and water?

Modern water is the dominant and hegemonic way of knowing water and relating to water. Which reduces water to a single substance and which render water as commensurable. Thus the difference between the thought of different genres scientists depends on their different schools of thought, ie. for a natural scientist it could be H₂O but for Social Scientists the thought would be different. Basically, we are talking

about the interdisciplinary way of study for water as a human need. Aristotle the legendary Greek philosopher said, "Man is by nature a social animal; an individual who is unsocial naturally and not accidentally is either beneath our notice or more than human. Society is something that precedes the individual." So rather than only consider natural scientists, humankind needs a social scientist as well who can think about their social liberty. And for water, it is a basic human need which nature provides and we have to equally distribute it as a responsibility. The one who can do it well is the one who understands the social needs very well.

Then another question arises in our mind is, What is Economics? (these basic concepts need us before talking about water as a resource)

So basically, the easiest example or definition of economics is "Allocation and Distribution of scarce resources."

People generally scare to read about Economics because they create prejudice about it that "Absolutely. Most. Mind-numbingly. Boring Subject On. Earth!. You'd have to be a math genius to even begin to understand what the subject is all about. I'm not."

Nevertheless, you just need one line definition to understand water Economics for this abstract has been depicted above.

So the third one to be considered before going through the subject is

Sustainability". What is Sustainability? For sustainability, the most popular definition is by the Brundtland Report. It defined sustainability as "meeting the needs of the present generation without compromising the needs of future generations."

So far we go, we come to the conclusion that these three aspects of water management are the emergence of needs of the selfish genes. Consequently, we have to add the more important discipline for the fair distribution among every individual and also with other fellow living organism and that is also because we have established the welfare policy of everything. We are not only entitled to natural resources but others are also.

So this school of thought gives rise to include Environmental scientists in this interdisciplinary topic. To make balance, to create equilibrium in our habitat.

Now in this question rising era, the next question would have emerged that How Water, Economics, Environment, and sustainability interconnected?

This interconnection gives birth to the interdisciplinary approach to understanding the human cycle depends on these four.

The Journey- An ordinary animals to a wise Man "It is not the strongest of the species that survives, nor the most intelligent; it is the one

most adaptable to change." What makes us different from other animals? This is one of the most fascinating questions of all the time. The incredible journey from ordinary animal to a Homo Sapience (Homo - Man and Sapience - wise). The journey was not as easy as it looks. The journey from unknown to know, a journey from the last predator to first. In my point of view, every animal comes with some unmatched and unique efficiency, like a Chimpanzees born with muscular and strong forearms. He or she can crush a human in minutes or can rip off us into two parts. But thanks to nature for our giant brain. With the help of this, we the homo sapience ruling the animal kingdom. But somewhere by this giant brain and omnipotent of thinking makes us destroy as well. The uniqueness to hold the nature was making us the pestilent. Pestilent of the nature. The jumbo brain is the jumbo drain on the body. It was not easy to carry around, especially when encased inside a massive skull. It's even harder to fuel, and that how distortion started to fuel it. But Homo- Sapiens were valianting to be the leader of the animal kingdom. Apparently, another question arises in mind that how it is relatable to today's water need? So the answer would be we are the followers of our ancestor's way of ideology. Again we should thank the language we had invented. The way of communication which gave us the mode to share our knowledge, experience and

believes. But we were not aware of resources at that time but we were exploring how to use it? Some evidence founded of water need was from the emergence of civilisation. An era when we homo sapience had understood what Society means? But the need for water gave an idea to our ancestors' predators to live beside the bank of rivers and this would have been our first management towards the water as a precious resource.

Historical evidence of water management (Indian Point of View) We human beings were conscious about water in our era of civilisation and most historians and archaeologists are found much evidence regarding this. We will discuss some of the famous evidence of them.

"A society which tries to move ahead without keeping itself firmly rooted in its tradition tends to fall." So it is an important step before ensuring the sustainability in the Anthropocene era, we should consider our past, our root.

So enthusiastically, I am going to review one of the best water harvesting systems of our ancestors. Our ancestors developed the range of techniques to harvest every possible form of water - from rainwater to groundwater, stream to river water and floodwater. And this is not a myth but "the Indians have historically been the world's greatest water harvester." Water was public good in ancient India and people were not using it as commercial good in India, and

you can see this type of transformation of behavior regarding water as a public good in modern India too. For instance; "Pyaun" a free water distribution by people in clay pots in India, this is a kind of system which gives light to the thought of our ancestors that water is a public good from yesterday to today and tomorrow will be too.

The Indus Valley Civilisation-

To go inside the study, Indus Valley Civilisation is the one of the oldest civilisation of India. So, to start our study regarding water management we should go through this civilisation. When archaeologists excavating the site of Harappan Heritage sites they found some great systematic evidence of water harvesting or water management system which was fascinating for them. The efficient irrigation system in the outer areas. Till now in Harappan sites, seven hundred well have been counted.

Archeologists had never found these type of irrigation system elsewhere, digging wells for water might be a Harappan invention. So, in the conclusion, we can say that Harappan was the one who invented well irrigation.

Dholavira- In Dholavira a sloping terrain between two stormwater channels and surrounded by series of water reservoirs has been found and also a stormwater drainage system found. This historical evidence shows us the awareness of water in ancient societies of India.

In the East States of India- Bihar is a state in East India, It is divided by the River Ganges, which floods its fertile plains. The Bihar state of India adopted the water management system during the ancient time. With the help of archeological surveys and pieces of evidence in Bihar we found, people had adopted many traditional and cultural ways; for instance, Ahar and Pyne system.

Ahar-Pyne system is an indigenous irrigation technology, which continues to irrigate substantial areas even today in South Bihar plains of India. This system has evolved from an understanding of the particular agro-climatic conditions of the region.

Ahars are reservoirs and consist of a major embankment across the line of the drainage with two side embankments running back up to the line of the drainage gradually losing their heights because of the gradient of the surface. Thus, an Ahar resembles a rectangular catchment basin with only three embankments, and the fourth side left open for the drainage water to enter the catchment basin following the natural gradient of the country.

Pyne is the local name for the diversion channels. These channels may be of various sizes. The small ones are those found originating in Ahars and carrying the water of the Ahars to cultivable plots. The large ones have their origins in rivers from which water is

diverted through these artificial channels by erecting embankment in the river beds. They are led some way upstream above the level of the land they are intended to irrigate. It is often 3 to 5 km before the water of the Pynes reaches the level of cultivation. Some of the biggest pynes are 16 to 32 km. In length, and some of them known as Dasian Pynes (Pynes with 10 branches) irrigate many thousand acres of lands of hundreds of villages.

It takes a very important role in Paddy cultivation in Bihar. In a book like, Kautilya's Arthashastra and Magasthenes' Indica has also mentioned these forms of water management.

Bengal and Orissa also share equal pieces of evidence of the water management system in ancient India, for instance, in Bengal Inundation canals are founded. These are long canals taken off from large rivers. They receive water when the river is high enough and especially when in flood.

Sir William Willcock (1930) described the Bhagirathi, the Jalangi, and the Mathabhanga as the 'overflow irrigation systems' in ancient Bengal, built up by great engineer Bhagirathi.

In Orissa, there was a dependent agrarian regime.

North East- In the northeast, Nagaland, Meghalaya, Assam, and Manipur were the state which were indulged in water management way of agrarian life. For Instance, Dongs by the

Bad tribes in Assam, in Manipur, Hills cut into traces and water brought to them from hill streams through irrigation channels, Zambo or the Ruza system in Nagaland and bamboo, drip irrigation in Meghalaya.

Western- In the west, Rajasthan was one of the developed states in water harvesting and water management. Due to a lack of water resource this state was much aware than others. In Rajasthan, for irrigation, for drinking water, and rainwater harvesting separate system adopted.

The arid region of Rajasthan consists of the districts of Hanumangarh, Jaisalmer, Barmer, Ganganagar, Churu, Jhunjhunu, Sikar, Nagaur, Jodhpur, Pali and Jalore covering an area of nearly 1,43,842 sq.km. A nearly rainless desert and lack of water resource it was a more difficult water harvesting environment for people living there. Following methods adopted by the people of Rajasthan were,

Jhalaras- The water of Jhalaras was used religious ceremonies, a community bath, and such other functions. Jhalaras in Man Mandir at Jodhpur are well known. The water reservoirs receive water for the soakage of tanks situated at a higher level.

Tank irrigation; 35 tanks in jodhpur

Tanka- It is a circular or rectangular shape pond with a life span of 3-4 years, normally on bare ground to which surface runoff can be diverted. The

area around it is a clean catchment. The traditional tanka is constructed with lime plaster and thatched with bushes. Ranier and Padamsar tanks of Jodhpur, forest tanks of Ranthambore, Sukhsagar tank and Kalasagra tank and Padmini tank are few famous ones. Many examples could find in Rajasthan like, Dams on the Luni river and the chuniya river. Formation of artificial lakes Jaswantsagar and Sardar samand lake.

For rainwater harvesting, they made Kunds and Toba. The elaborated system found in forts also.

In Gujarat, step well known as Vav or Vavadi found.

In Madhya Pradesh, Haveli- Based on water harvesting and runoff farming. In Sanchi Hill, we will find ancient tanks there. One of the most famous systems is the Pat system, in this system Walter climbing up hills slopes to irrigate fields.

In Maharashtra, the famous water irrigation system was a Phad irrigation system; It was a series of "bandharas" the rivers to divert water for agriculture use. Khazana in Goa, it was a unique coastal, estuarine agroecosystems. Sluice Gates; it was to protect fields from saltwater, regulation of fishing.

Bunds- an eco-friendly material like mud, straw, bamboo, twigs, etc.

North- In northern states like, Delhi, Uttar Pradesh, Punjab Haryana had there owned equal legacy in water management.

In Delhi, not only ancient but also

the medieval history of water management had a great legacy. Tanks, Baolis (stepwell) in ancient and in sultanate period Hauz-i-samshi, Hauj-i-Alai, Hauj-i-Khas, and Daryacha or small sea was founded. In the Mughals Period, we found much evidence related to water management in Ain-i-Akbari written by Abulfazal.

In Uttar Pradesh, Johads of Kandhala, Tanks, wells, minor streams founded. As well as in Punjab which has basically water management hidden in name, Punj- five and ab- water. i.e. Jhelum, Chenab, Ravi, Sutlej, and Beas. So irrigation was mainly around well irrigation and floodwaters. Abi-tank irrigation in Haryana.

Water in Literature- We can easily evaluate the importance of water when we see water mention in literature as an important resource. Indian literature always gave importance to the water as a precious resource. It means that our ancestors were more aware than us regarding water harvesting and water management. They were more conscious of water vulnerability.

What is literature? And why should we follow this? From the era of the cognitive revolution what we got was the way to depict our imagination with the help of literature. Literature helps us to learn from the past, understand the present and predict the future. Through the various forms of literature, we try to understand the versatile society. India is

the patron of literature from ancient times. Most probably Rig Veda was the first book composed in human history. So, we could say literature was the pillar of the cultural revolution. Importance of water in literature, For instance, The Hungry Tide, by Amitav Ghosh, Don't Cry Lake Tai, by Qiu Xiaolong, The Man with the Compound Eyes, by Wu Ming-Yi, Empires of the Indus, by Alice Albinia, Waters Close Over Us, by Hartosh Singh Bal, and Land of the Seven Rivers, by Sanjeev Sanyal.

Every student must have read the famous poem by Khazada Mirza Khan Abdul Rahim Khan-e-Khana, also known as Rahim.

"rahiman paanee raakhiye, bin paanee sab soon.
paanee gaye na oobare, motee, maanush, choon."

Meaning would be different but the scenario is exactly what we are talking all about. Water is so important for human beings and it is seeing in Indian literature as well. Why we were living near water? Exactly! Because we are homo sapiens (wise men) and we were very much aware of the importance of this precious material.

Drought and flood same time- Now the important question arises that what is the reason for drought and flood the same time? It is a worthy question mentioning here on the current scenario. Let us talk about Chennai. Chennai, on the Bay of Bengal in eastern India, is the

capital of the state of Tamil Nadu. The major problem faced by Chennai is A massive flood was reported in 2015 that affected the Coromandel Coast region of the Tamil Nadu and Andhra Pradesh, and the union territory of Puducherry, with Tamil Nadu and the city of Chennai particularly hard-hit. "The 2015 South Indian floods killed more than 500 people and over 18 lakh people were displaced. With estimates of damages and losses ranging from nearly Rs 200 billion to over Rs 1 trillion, the floods were the costliest to have occurred in 2015, and were among the costliest natural disasters of the year." The flood was caused due to heavy rainfall generated by the annual northeast monsoon in November-December 2015. In India, the reason behind drought and flood at the same time because of a lack of water management. An underdeveloped country like India people are busy in the growth and development sector but they are not concentrating on water management programs because of a lack of knowledge. We should consider and only consider it is true that water is a precious material. We can imagine life without technology or without anything but we can not think of life without water. A water management study should be one of the core courses in a country like India. According to the NITI Ayog report; "India is facing its 'worst' water crisis in history and that demand for potable water

will outstrip supply by 2030 if steps are not taken."

and the world- From 1660 to 1800, a new water industry became established in London. This new industry consisted of several supply companies that sold water, mostly for domestic consumption, to consumers through a large network of mains connected directly to houses. The emergence of this new industry in this period predates and overlaps with the period 1760-1830, the years traditionally assigned to the Industrial Revolution in Britain. Despite its emergence as a new industry at the time, as well as the size it eventually achieved, the water industry is hardly mentioned within the historiography of the "leading sectors" of the Industrial Revolution. These sectors are typically parts of the textile, transportation, iron and coal, and chemical industries. The water industry's emergence as

a new sector, however, offers an interesting perspective on some aspects of the Industrial Revolution. This paper how London's water industry in this period experienced an important technological change that sustained the industry's growth. Besides, the role of joint-stock financing and incorporation is explored. These two themes, technological changes, and business organisation, are also situated within the broader historiography of the Industrial Revolution. It is argued that although joint-stock financing was crucial,

incorporation itself, while common, was not indispensable. Regarding technology, the water industry shows the pan-European roots of technical change in the IR, while confirming the divergence of England from the Continent over time. The presence of a large and wealthy consumer market in London was very important in promoting the expansion in scale that motivated technological change. London's water industry in the 17th and 18th centuries consisted of several private water companies. Before they arrived on the scene, London's water supply included the pumps and wells that existed in European cities well into the nineteenth century, as well as small, low pressure, gravity flow aqueducts that drew water from springs, lakes, and rivers.

Water and We- Society is the very reason taken for water, either in positive or negative directions. The cognitive revolution has given us the power of culture, and culture is the goodwill given by our forefathers. So, for sustainable development, we need to reconstruct or we should have to upgrade the culture of the anthropogenic era by adding water as part of the culture.

Indian literature was aware of the importance of the ancient era and that would have been the reason behind the presence of water in literature. Our literature is vehement towards culture. Actually, literature is a pavement of culture and vice versa. So, we should

consider water as part of our devotion.

Conclusion- At the end of our discussion, we can finally come to the point that water is not only H₂O but it is far more than this. It is impossible to imagine life without a sufficient amount of water. From basic needs to modern industrial development, water has been a key factor. It also plays an important role in socio-cultural and religious activities around the globe. For thousands of years, humans have consumed water as if it were an inexhaustible natural resource. Water resources are not evenly distributed. The concept of interlinking of rivers for optimum development and utilisation of water resources was mooted to overcome the scarcity of water in certain regions of India. It involves inter-basin and inter-basin water transfer diverting water from surplus river basins, which is basically surplus flood water, to water deficit areas. Because of topographical variation and uneven distribution of rainfall, India has what is called the flood drought-flood syndrome with some areas suffering from flood damages while others face acute water shortage or droughts. Inter-basin water transfer scheme (Interlinking of rivers) will be proved as a potent weapon to mitigate flood drought-flood syndrome with irrigation benefits and hydropower generation enhancement to the public at large in National interest. Optimal sustainable development, maintenance

of quality and efficient use of water resources to match with the growing needs of water is essential in the present scenario.

There are two scenarios of problems one its negative fact which encourages us to think beyond to find a better solution and the second one is the solution itself. In India, we consider both. When we see the Indian perspective, India has taken lots of major decisions towards water management and water distribution. For instance; The National Water Development Agency, The National Water Development Agency was set up in 1982 by the Government of India as a Society under Societies Registration Act 1860 under the then Ministry of Irrigation. National Water Development Agency (NWDA) publishes a report annually. The Report gives a comprehensive overview of the role of NWDA in the field of water resources development, particularly inter-basin transfer of water, commonly known as Interlinking of Rivers. The second and a major initiative was taken by the Government of India was the Ministry of Jal Shakti, It is a ministry under the Government of India which was formed in May 2019 under the second Narendra Modi ministry. This was formed by the merging of two ministries; Ministry of Water Resources, River Development & Ganga Rejuvenation and Ministry of Drinking Water and Sanitation. The formation of

this ministry reflects India's seriousness towards the mounting water challenges the country has been facing over the past few decades. The ministry was incorporated with an aim to clean the river Ganges. They would also encompass any international or national disputes between inter-state water bodies and the rivers which are shared by India along with other neighboring countries. A special project "Namami Gange" project has been launched to clean Ganga and its tributaries to provide safe drinking water to people of the country. The ministry has also launched its special campaigns on social so that citizens of the country become aware of water conservation. The Jal Shakti ministry was a greater step taken by the government of India towards water conservation. The aim is purely conscious that providing safe drinking water to every citizen of India and achieve an apex to provide every house with a water tank connection through the pipeline. But to achieve an extreme success we the citizen of India should stand together to make this dream a success. Neither a ministry nor an individual can alone achieve this target but with the power of togetherness, we can achieve the impossible. One Theodore Roosevelt Said that "I am a strong individualist by personal habit, inheritance, and conviction; but it is a mere matter of common sense to recognise that the State, the community,

the citizens acting together, can do a number of things better than if they were left to individual action."

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