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**WATER TRADING MECHANISM  
TO PROMOTE REUSE OF TREATED  
WASTEWATER**

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## **WATER TRADING MECHANISM TO PROMOTE REUSE OF TREATED WASTEWATER**

History of trading dates back to 3000 BC in the ancient civilizations and has evolved over time starting from barter system to coins, currencies and today's digital payments. It is often a sign of formalization and systemization of an activity, and has helped in the growth of human kind. In the modern world, there is hardly any commodity that stands out of scope for trading. Water, one of the essential natural resources for life sustenance, is probably among the last entrants to the trading spectrum. Even the sale of water, which is quite distinct from trading of water, has only about 300 years of history. In India, the sale of bottled water has begun in 1965 when the first drinking water bottling plant was set-up in Thane, Maharashtra by Bisleri to sell 'mineral water'.

The concept of trading of water is different from that of sale of value-added water like mineral water or packaged drinking water. The primary requirement of any item to be traded is that it should be a 'commodity' having 'economic value'. In India, water is neither considered as commodity nor possess any significant economic value. This is mainly because of the due consideration to the essentiality of water as a fundamental human right and to ensure that access to water is not hindered on the basis economic barriers of an individual or community. Moreover, the notion of having abundant water to the tune of 4000 billion cubic meter has made the scope of a water market appear dubious. The idea of keeping water as a public good and free resource is still relevant and crucial, and hence need not be rethought. It is important than ever to ensure universal access to clean and safe water to every citizen of the country. However, on the other hand, we must address the pertinent issues of inefficient use of water, inequitable distribution and extremely low productivity. There is no effective ecosystem that promotes or encourages efficient use of water or a system that disincentivizes the avoidable losses of water.

In many countries water trading has been successful in achieving water-use efficiency and improving water productivity. Water Trading is a water market mechanism that considers water as a commodity and can be traded amongst users according to their needs. The water company rather than creating their own water source, buy the water from a third party and sell it to the locals. Water rights are allocated to each sector and they use it according to their needs, buy when they need more water; and sell when they require less of it. **Though it may not be advisable to introduce a full-fledged water trading in India for various socio-economic reasons, trading of treated wastewater among industrial users could be tried. This paper examines the scope of formalizing the reuse of treated wastewater and potential of**

**exchanging treated wastewater rights and entitlements through a transparent platform.**

The entities involved will be water consuming industries irrespective of the volume of water consumed, agriculturists, municipal/residential users, the suppliers of treated wastewater, and a government regulatory agency.

As the pace of urbanisation increases, more and more wastewater gets generated. Only about 40% of this quantity is treated, and even that is not being reused. Even where it is reused, it is not used productively. So, there is an imminent need to encourage productive use of treated used water. There should be a mechanism to encourage and incentivise the treatment of wastewater and its reuse. The proposal does not intend to penalise or disincentivize water use by farmers in excess of what is considered as optimum. However, it is planned to incentivize and encourage efficient use of water. The quantity of water saved, that is the difference between actual consumption and water allocation, could be traded with industries or other farmers in lieu of credit points.

**Enabling elements of trading**

It is important to have an enabling environment of trading of water in open market. This primarily includes indisputable ownership and fair allocations. Then this should be systemized through an implementable trading mechanism.

Ownership of water

To make the trading of any commodity possible, the ownership should be indisputable. The extant provisions consider the common water resources as the property of Government and the private water sources and groundwater extracted from a private land as that of the property owner. Moreover, under the federal system, the State Governments are responsible to manage their water resources. Also, there are interstate water agreements and interstate disputes in sharing of water across boundaries. This makes it a bit complex and difficult to ascertain the quantum of water having indisputable ownership available for trading. Fortunately, this complexity is not present in the case of treated wastewater. In general, there are clear provisions on the right of treated wastewater between Governments and the agency (private/public/PPP) responsible for treating wastewater.

Water entitlements

The buyers in the trading system will be entitled for a specified allocation or entitlement fixed based on various considerations. This is the allotment of certain shares of water to various

water users and groups of users, considering number of factors and rules laid down by an appropriate authority. This entitlement could be transferred to other users in lieu of water credits which could be redeemed for any incentives fixed by the regulatory authorities.

As a pre-requisite to this, there should be a defined entitlement of water use for the industries in every basin. Industries must be restricted from un-regulated extraction of freshwater. They should in fact recycle the water to the maximum extent possible, and must use the treated wastewater. The quantity of extractable fresh water will be limited to such quantity which is essential to meet the water demand beyond recycling and use of treated wastewater. Whichever industrial unit can save water can trade it with other industrial units or for peri-urban agriculture or for municipal/residential uses. Trading between industrial units could be on monetary terms. However, water given for agriculture will earn water-points to industries.

### **Trading model: Water Reuse Certificates (WRCs)**

The WRCs is a market-based mechanism with tradable economic instrument which was conceptualized by 2030 Water Resources Group (2030 WRG). This encourages bulk users to meet their regulatory requirements by overcoming the geographical constraints of reclaimed water market. Under the WRC trading system, an independent implementation agency shall register water users across sectors including municipal/residential, industrial and agricultural sectors, and set individual targets for water reuse. These targets shall be user-specific and shall depend on the respective current water withdrawal from the environment and industrial best practices. Each WRC is equivalent to a certain quantity reused, say for example 1 WRC = 1000 cum with a specified quality grade. Users that treat water to a higher quality will receive higher credit and WRCs in proportion to their quality grade of treated wastewater. The water users having WRCs may sell them in the open market allowing other water users to bridge the gap between their wastewater reuse target and achievement. Each trading phase of WRCs may continue for a specified period, say for 3 years. The first year involves establishing the baseline for the respective user followed by target year where the users adopt measures to achieve their targets, and the final year is when the performance is assessed to issue WRCs and allow trading among the users. (2030 WRG, 2022)

### **Example of Murray Darling Basin, Australia**

Murray Darling Basin in Australia is working on the same principle and has proved that water trading is one of the best methods to use water in an efficient manner. The Murray Darling Basin

drains one seventh of the total Australian continent and constitutes one third of Australia's total agricultural production. Home to 2 million people and 16 Ramsar wetlands, it is stretched over 2500 kms. Australia is one of the driest continents of the world which makes the Murray Darling Basin water sharing plan one of the most important and decisive policy issues.

Its main aim is to redress the over allocation of water licenses and basically to return 2750 ggalitres of water from irrigated agricultural land to the river system. Since it has been working on the concept of water trading, farmers get a certain amount of water for their properties which is called water license. There are two main sorts- high security, which means that a property has permanent right to some water & low security, which means that the rights will depend upon the water availability. Sectors which have excess water at a particular period may then sell their rights to the ones who need extra water and this is actually water trading. Even at times water licenses are sold permanently. This is a very common practice amongst the industrial sector and the agricultural sector. In-fact the government also buys licenses to use water for environmental purposes such as reviving the dying trees in red gum forest areas.

### **Water Trading in Spain**

Since 2005, Water Markets (WMs) have become more frequent in Spain, although traded volumes represented less than 1% of all annual consumptive uses. During the 2005–2008 drought, WM exchanges alleviated the conditions of those basins where water scarcity was most severe. Water trading takes place in many different ways. First, there are informal exchanges at the local level in many southern and eastern regions, taking place even before the 1999 Reformed Water Law was enacted. Second, there is trading of private groundwater pumping rights. Third, there are formal lease contracts and trading of public concessions under the 1999 Reformed Water Law. Some of these exchanges take the form of purchases of land upstream to transfer the water to other downstream areas of the same basin. Fourth, during the 2005–2008 drought the government allowed, under Royal Decree 15/2005 and subsequent Decrees, inter-basin temporary trading. Last, water exchange centres have been used to make purchases by Water Agencies (Offers of Public Purchase of Rights) for environmental or urban uses. These different types of water exchanges are not necessarily exclusive but complementary, as they satisfy different users' supply needs. (Garrido et. al., 2013)

## Challenges

In the Indian context, there are some immediate challenges to deal with upfront, as discussed below.

- **Fixing price:** The freshwater supply is available at a substantially low or sometimes even at no cost. But the treating the wastewater and supplying it to the farm fields or to the industrial units will involve certain costs which may not be competitive with the cost of fresh water.
- **Storage:** Since the process of wastewater generation is continuous, the treatment process also should be continuous. However, the demand may not remain constant throughout the year. For example, the crops may not require irrigation for certain period; demands in industrial unit may also vary. This would require either storage of treated wastewater or discharging the treated water to other freshwater sources.
- **Identification/creation of demand:** To make the water/treated wastewater a tradable commodity, it is necessary to have a demand. This would require site specific analysis to identify/create demand for the treated wastewater through productive uses. GIS tools could be made use for initial planning, and social mobilisation through NGOs would be required to overcome the stigma of use of treated wastewater.
- **Assured supply:** It is important to make sure that the supply of treated wastewater is reliable and dependable. Supply could be interrupted due to a number of reasons including maintenance of plant, disruption in sewage network, quality problems in inlet sewage or treated sewage, disruption in distribution network etc. There should be alternate mechanisms in place to overcome such situations so that the trading system is unaffected by the externalities.

There should be an independent authority with statutory power to deal with such challenges judiciously.

## Water Regulatory Authority (WRA)

There have been revolutionary changes in the water sector throughout the world in policy, administrative and legal spheres. This paradigm will have a long-term effect on the sector and focuses on moving from the old state centre model of policy making to market centre model. This paradigm focuses more on institutional restructure, demand responsive approach and

community participation rather than only government participation in the management of the water resources. The establishment of Independent Regulatory Authority (IRA) and decentralized system of water allocation and government acting as a facilitator is one such change that has been made during the reforms.

The water sector reform is the part of major infrastructure reforms and they put more emphasis on market-oriented systems, increasing the roles of private players and state acting only as a facilitator rather than having full-fledged control over the sector. There are some important principles of the reforms:

- It is proposed to consider **Water as a commodity** rather than as a public good due to the fact that market mechanisms would work best when it is considered as a commodity which can be purchased or sold. Defining property rights and allowing water trading would help in the emergence of a water market which in turn would set the price according to market supply & demand and would increase the water conservation and reduce the water conflict amongst the various sectors.
- It is observed that free or subsidized water would lead to its wastage and inefficient usage and also true beneficiaries of subsidized water are big farmers rather than the ones who actually are in need of it, they often end up buying water at higher costs. So, considering the situation it is better to **recover the full cost of water from those consumers for whom it is affordable** including the operation and transportation costs as well as capital cost of the water resource project.
- Restructuring the role of the state is being suggested which include divesting the role of state and establishing IRAs and increasing the role of private players to promote active involvement of beneficiaries and people's participation.
- Decentralization of Government which includes more transparent government policies, involvement of the general public in the water governance and making government authority accountable for their actions and decisions.

All of the above aspects could be well addressed in case of treated wastewater since due to controlled distribution, quality control, and certainty in available quantity and operational areas. As the reforms flourishes there increases the need for setting up an IRAs in each state and Maharashtra was the first one to establish an IRA in the water sector followed by Arunachal



Pradesh. Today there are 12 states in India which have enacted Acts to form IRA, as depicted in Table 1. Out of the 12 states Haryana, Jammu & Kashmir, Jharkhand, Maharashtra, UP, Punjab & Rajasthan have constituted the Authority as per the Act and the remaining states are still undergoing the process.

Table 1: List of States enacted for Water Resources Regulatory Authority/Commission

<u>S.N.</u>	<u>States</u>	<u>Water Resources Regulatory Authority</u>	<u>Remarks/Details</u>
1	Andhra Pradesh		THE ANDHRA PRADESH WATER RESOURCES REGULATORY COMMISSION ACT, 2009 is enacted.
2	Arunachal Pradesh		Arunachal Pradesh Water Resources Regulatory Authority Act 2006 is enacted.
3	Haryana	Haryana Water Resources (Conservation, Regulation and Management) Authority Website: <a href="https://hwra.org.in/">https://hwra.org.in/</a>	Constituted under The Haryana Water Resources (Conservation, Management and Regulation) Act 2020.
4	Himachal Pradesh		
5	Jammu and Kashmir	Jammu and Kashmir Water Resources Regulatory Authority Website: <a href="http://www.jkswrra.nic.in/index.html">http://www.jkswrra.nic.in/index.html</a>	Established as per the Jammu and Kashmir Water Resources (Regulation & Management) Act, 2010
6	Jharkhand	Jharkhand Water Resources Regulatory Authority	Constituted under Jharkhand Water Resources Regulatory Authority Act 2014
7	Maharashtra	MAHARASHTRA WATER RESOURCES REGULATORY AUTHORITY (MWRRA) Website: <a href="https://mwrra.org/">https://mwrra.org/</a>	Formed as per MWRRRA Act 2005.
8	Punjab	Punjab Water Regulation and Development Authority (PWRDA) Website: <a href="https://pwrda.org/">https://pwrda.org/</a>	Constituted under the Punjab Water Resources (Regulation and Management) Act, 2020
9	Rajasthan	Rajasthan River Basin and Water Resources Planning Authority Website: <a href="http://www.water.rajasthan.gov.in/content/water/en/rrbwrpa_department.html#">http://www.water.rajasthan.gov.in/content/water/en/rrbwrpa_department.html#</a>	As per Rajasthan River Basin and Water Resources Planning Act, 2015. Positions of Chairman and Members are vacant as on July/2022.
10	Telangana		Enacted Telangana Water Resources Regulatory Commission Act, 2009
11	Uttar Pradesh	Uttar Pradesh Water Management and Regulatory Commission.	Constituted under Uttar Pradesh Water Management and Regulatory Commission Act 2014. <b>But has not started functioning actively.</b>
12	Uttarakhand		Enacted Uttarakhand Water Management and Regulatory Act 2013.

But even the IRA in Maharashtra does not comply with the actions and the standards of the Water Regulatory Authority in a sense that it only has the power to regulate water tariff in the irrigation sector and does not have any control over the industrial sector and domestic sector. Despite having the power to resolve disputes, regulate quality of water services and build healthy competition in the water sector, the regulatory board is not concerned about any of its responsibilities.

### **Way forward**

1. Formation of Independent Regulatory Authority (IRAs) with statutory powers to determine water allocation and pricing of treated wastewater.
2. Creation of a trading platform and induction of all stakeholders into it.
3. Identification of Industrial Clusters, Municipal/Residential units, Agriculture lands and Environmental needs where the treated wastewater could be reused.
4. Preparation of site-specific plans for reuse, with the help of GIS tools and validation by ground truthing.
5. Fixing of target of reuse and finalizing the norms of treated wastewater quality along with credits and value of Water Reuse Certificates (WRCs)
6. Establishment of regular monitoring mechanisms under the supervision of IRAs.
7. Social impact assessment at the end of 3<sup>rd</sup> year.

### **References**

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