

Four Questions About Water

ISSUES THAT WILL SHAPE THE 22ND CENTURY
(and beyond)



Four Challenges

in Water Resources

- 1. What, exactly, is Water in Society?**
2. How will Water Get to Growing Urban Areas?
3. Can We Stop Despoiling Surface Water Systems?
4. Who Controls Water?

Immediate Disclaimer

Expert predictions of future societal changes are often wrong. As stated in a 2023 UCLA study:

The experts were no more adept at forecasting than the inexpert predictions from regular people—and often did worse.

Research Brief

Experts Struggle to Accurately Forecast Societal Change



Immediate Disclaimer

In the field of environmental science, long term (20 plus years out) predictions are even less accurate. After accounting for factors such as specificity, timing and social acceptability, a recent study published in the Journal of Technological Forecasting concluded that a “correct” prediction occurred between 7% and 45% of the time.

*All these psychics and these doctors,
they're all right, and they're all wrong
It's like trying to make out every word
when they should simply hum along*

“A Little Bit of Everything”,
By Taylor Goldsmith (2011)

Immediate Disclaimer

But positive change may be in the offing. The use of AI in predictions may improve accuracy, particularly in the field of climate science. At a 2025 competition held in London, over 500 futurists were provided a series of questions* requiring predictive outcomes.

As detailed in a February 2026 *The Atlantic* article, the AI bot placed 8th in the competition (a new high score).



"Shouldn't we hold off on artificial intelligence until we figure out actual intelligence?"

General Comments on Water

Over the next 25 years, our water resources will be stressed in unprecedented ways.

The stressors include known dynamics (e.g., consumption rates) that have grown and emerging stressors (e.g., geopolitics).

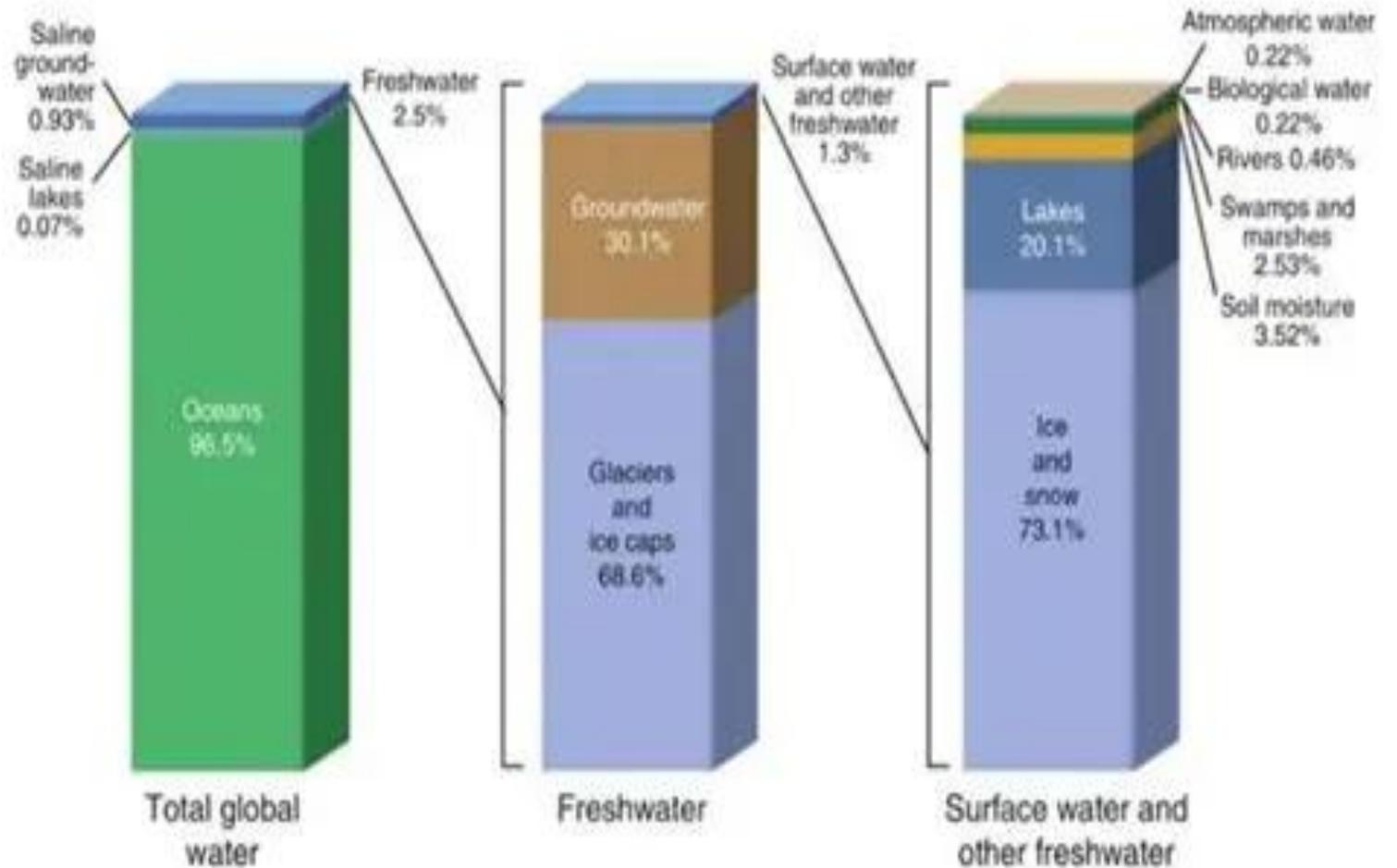
MAY YOU LIVE IN INTERESTING TIMES...



General Comments on Water

The planet contains enough water for every person currently on the planet.

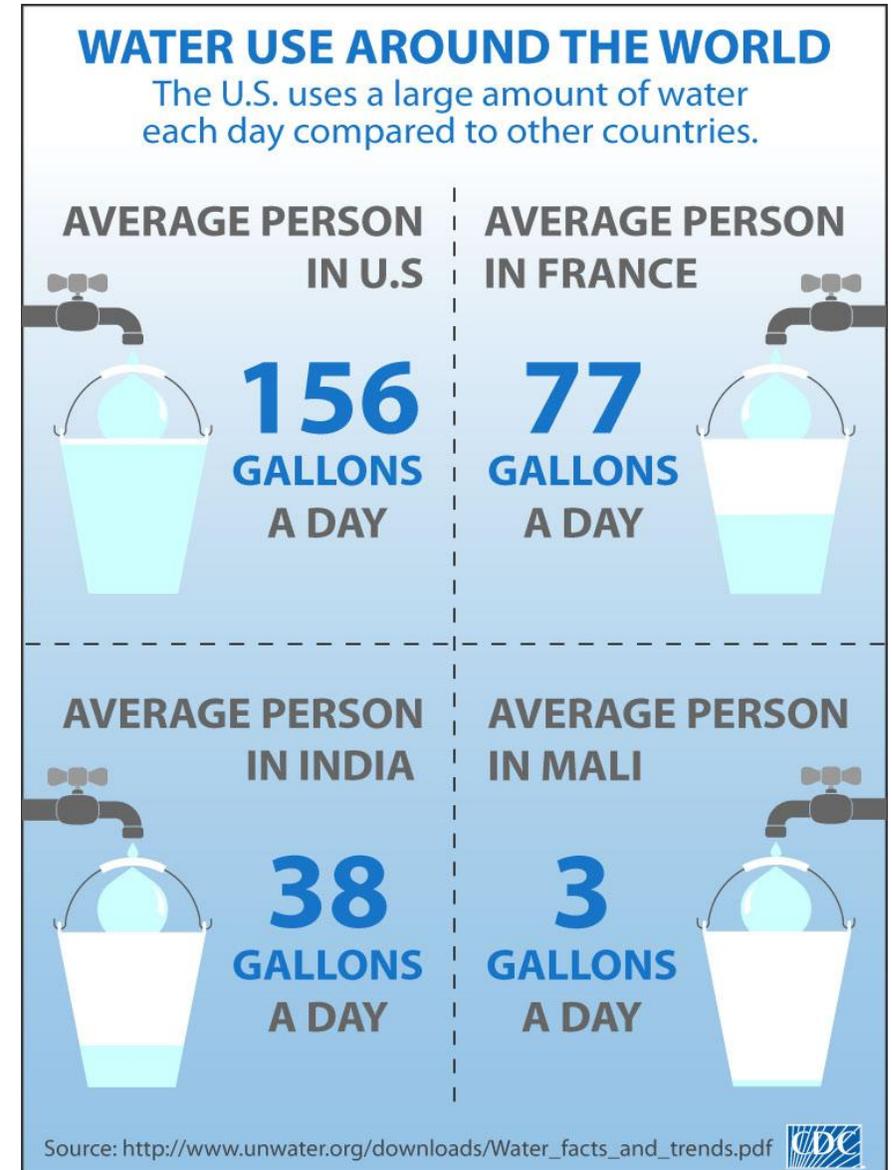
And enough for every new person arriving in the foreseeable future.



General Comments on Water

Consumption of water is correlated with societal development: members of more economically developed societies consume water at higher rates than those of less developed societies.

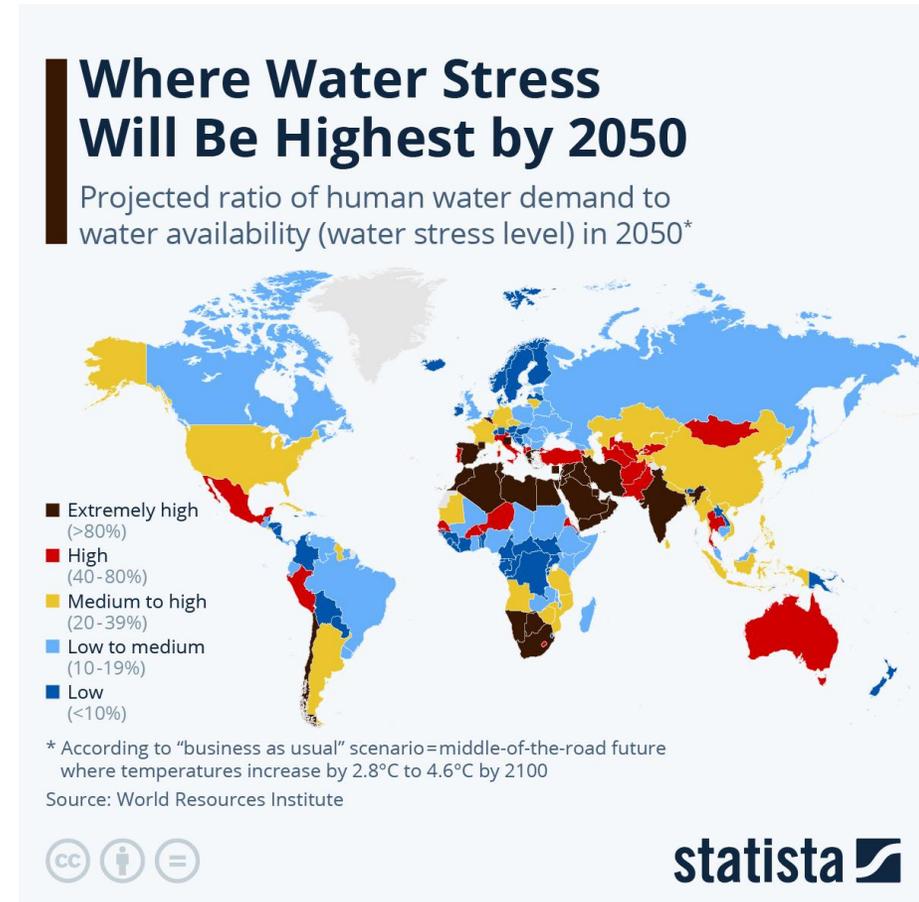
Even within developed societies, water consumption varies relative to income.



General Comments on Water

We also recognize that shortages of potable water are increasing as a result of a decrease in available potable water and an increase in demand for such water.

In short, more people are in need of the very substance that we are (on a daily basis) rendering unusable.

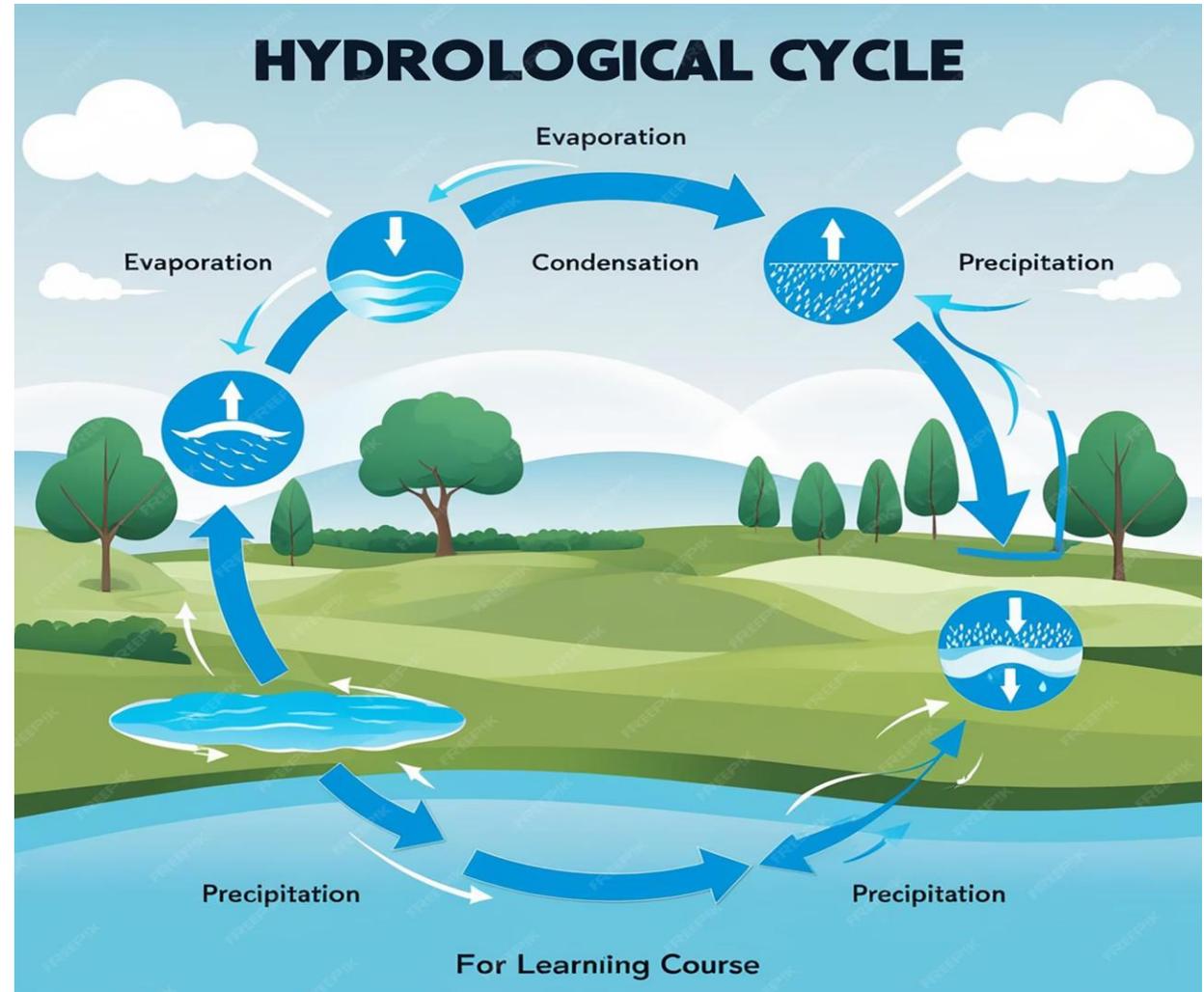


General Comments on Water

Water is a dynamic system, influenced by temperature and pressure gradients resulting in changes to water's physical form (vapor, solid, or liquid) and spatial distribution.

The particular location where water evaporates is often miles away from where the water precipitates. This can occur across political boundaries.

Which means that, in part, water shortages are a distributional problem.



General Comments on Water

Water is also a resource that can be stored, used, and/or managed (and denied access to, restricted, or despoiled).

Collected water that can serve as a resource for society includes lakes (both natural and human-produced) and groundwater.

Finally, as an energy source, water can further industrial and social development.



General Comments on Water

Societies (throughout time and presently across the globe) have considered (and continue to consider) water differently from philosophical, cultural and legal perspectives.

Any impact occurring from this “balkanized” conceptualization to water management has been absorbed by the immense absorptive capacity of the hydrologic system.

But that capacity to absorb systemic stress will be sorely tested in the future.



Question #1: What is the Ideal Relationship with Water?

Which makes the next 30 years a fascinating time in the field of water resources.

The questions discussed over the next four weeks are inter-related.

Question #1: What do we want our Human-Water relationship to be based on in the Future? Can Society Agree on a Common Definition of Water?

- Is it A Commodity?
- Is it A Public Good?
- Is it A Human Right?
- Is it a co-equal Participant on this Planet?

These are not mutually exclusive categories.

Question #1: What is the Ideal Relationship with Water?

This is not a theoretical question; more existential and certainly not limited to water.

An “ideal relationship” envisions balances between consumption and impacts/damages and systemic replenishment. This balance is predicated on an understanding of the needs of all Life Participants, the interconnection between all Life Participants, and the respect for each Participant’s right to exist.

Look at a tree, a flower, a plant. Let your awareness rest upon it. How still they are, how deeply rooted in Being. Allow nature to teach you stillness.

Eckhart Tolle (“Stillness Speaks”, 2010)

Challenge #1: Is Water A Commodity or a Common Good?

Business as usual for water must change, given the projected increase in the world's population of about 2.5 billion over the coming decades, cascading risks from climate change with its myriad of interactions with water, rising global water use, declining aquifers in large food-producing regions, degrading riparian environment due to overextraction, and water pollution.

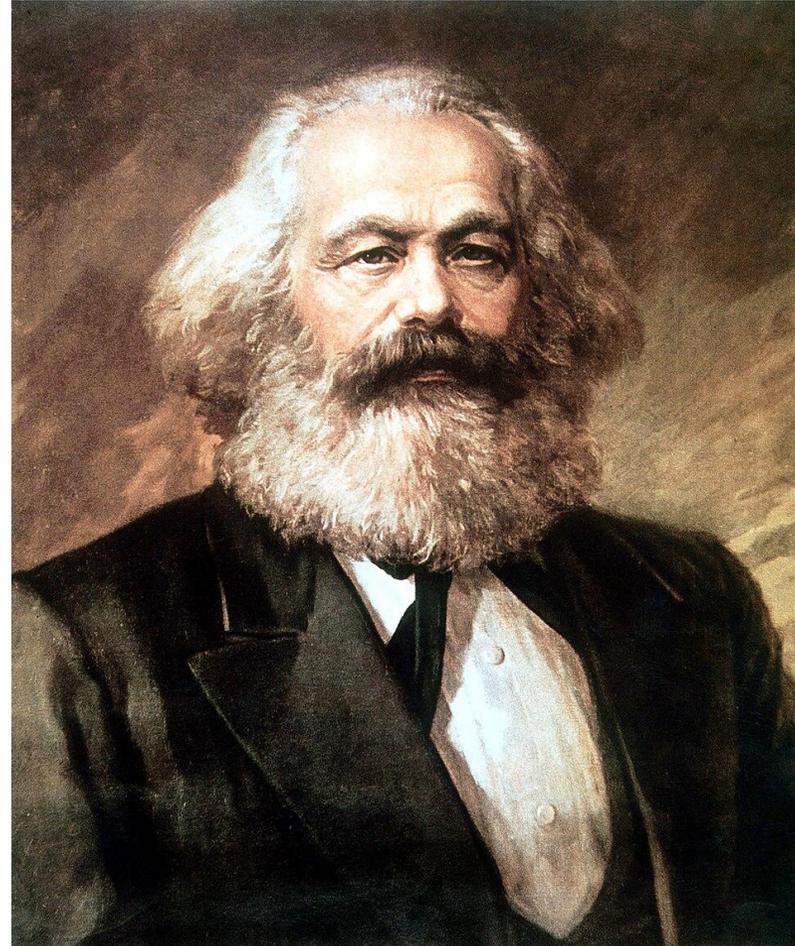
Challenge #1: Is Water A Commodity or a Common Good?

What is a commodity?

- Article of trade or commerce.
- Commodification is the process of transforming items or resources or services into marketable goods.

Inherent in this process is:

- a) The presumption that the commodity has utility and a market price; and
- b) There is (or can be) an assignment of ownership of that item/resource/service.

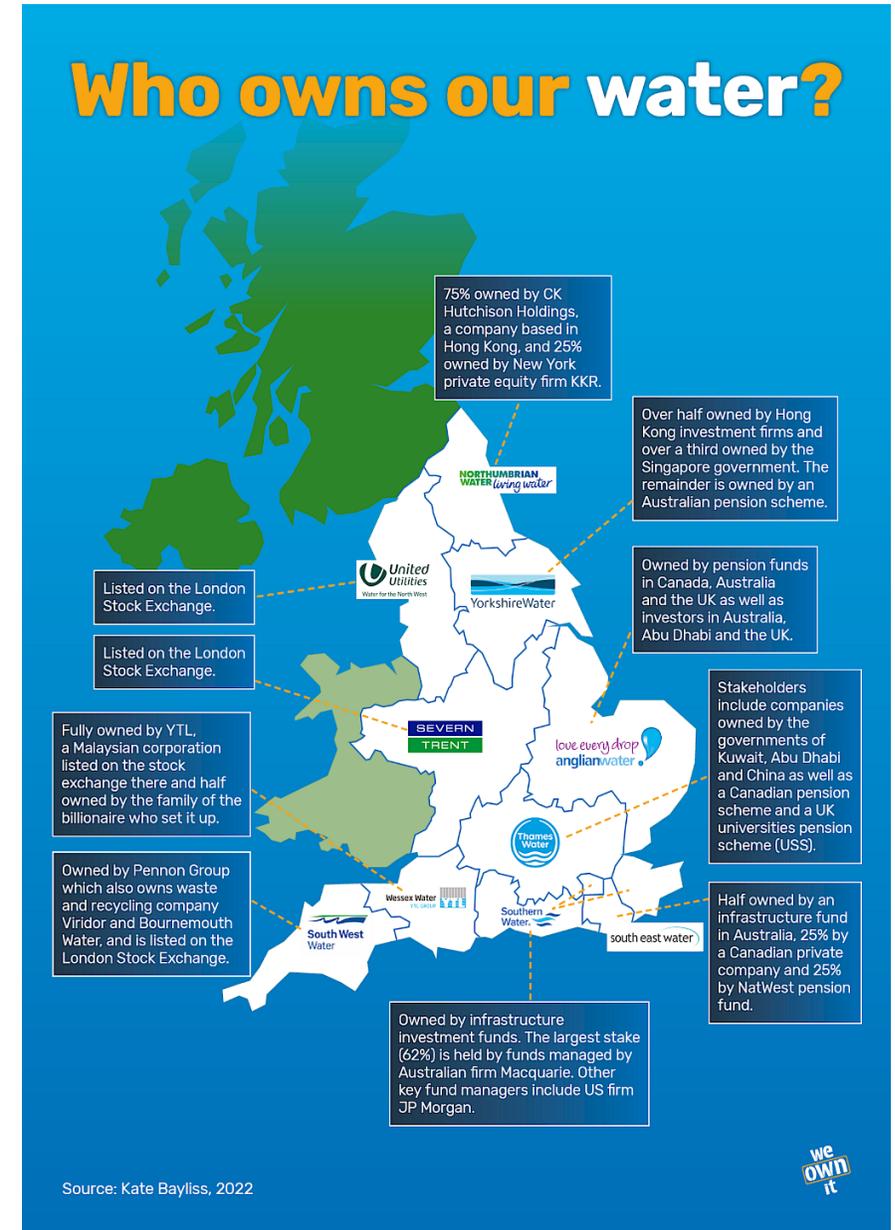


Challenge #1: Is Water A Commodity or a Common Good?

Water is considered a commodity in the US as well as in most of the “developed” world.

There are 230 private water districts in New York State, serving 830,000 residents (roughly 4% of the population). Nationally, private water systems service over 33,000,000 (10%).

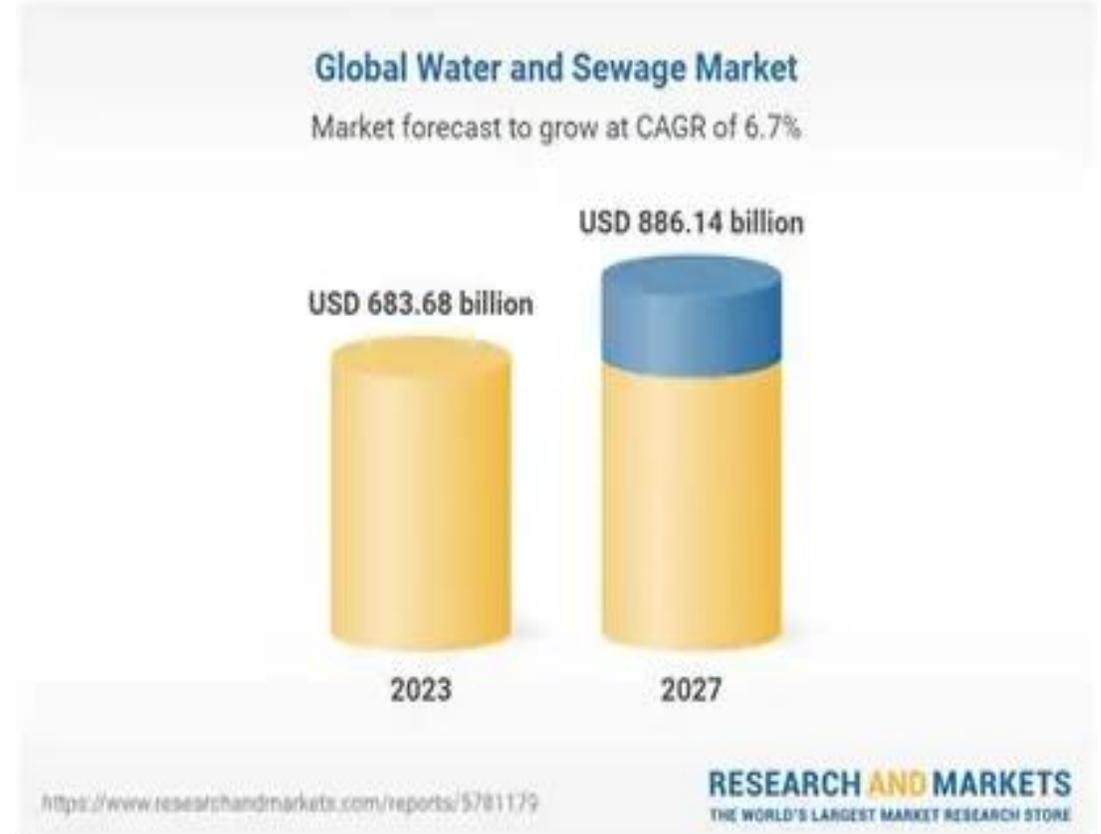
In England, virtually all water provided is from privately controlled systems.



Challenge #1: Is Water A Commodity or a Common Good?

Water is big business.

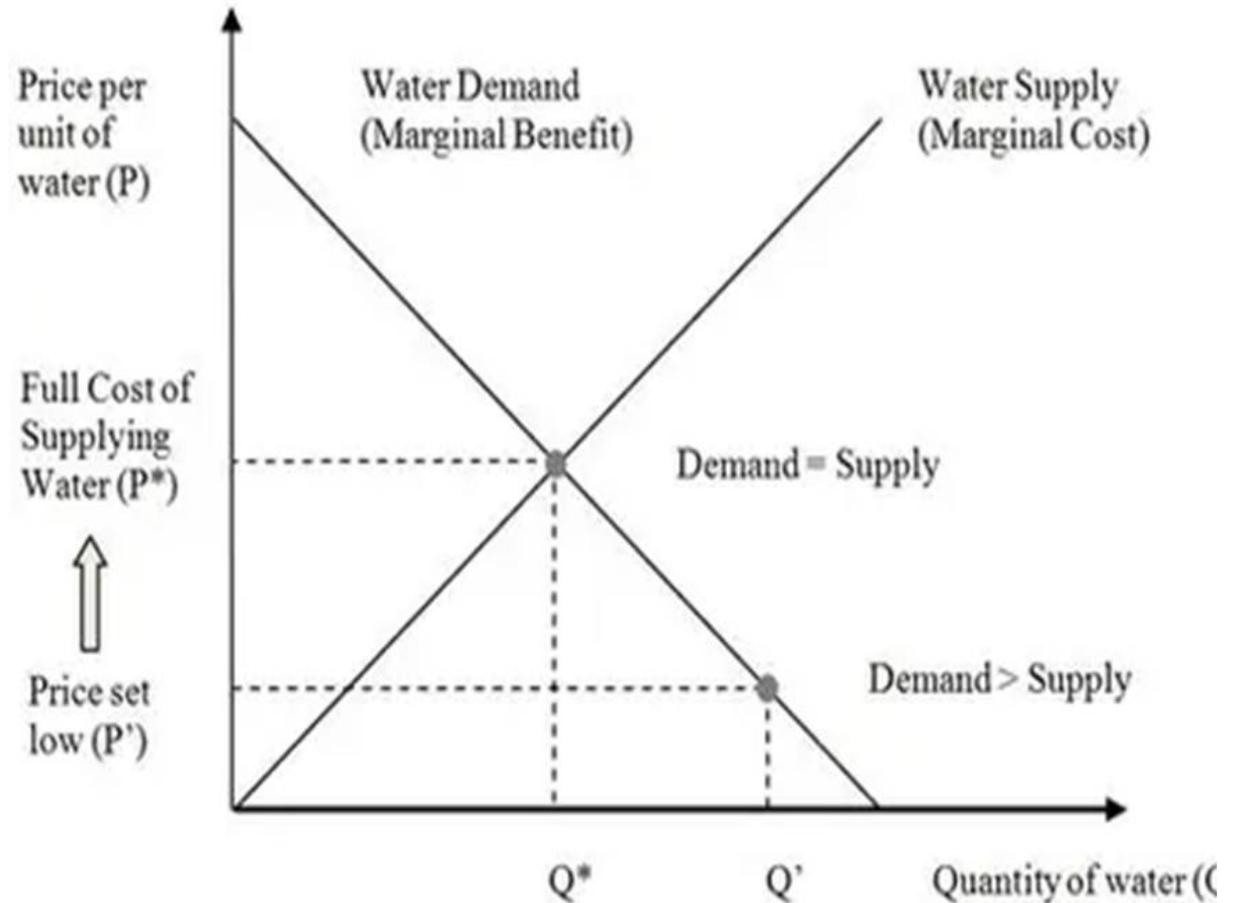
- Total infrastructure investment in water projects amounted to almost \$200B (World Bank, 2024).
- User fees across the globe total as much as \$30B annually. In the US, water rates are rising at almost double the CPI.
- Infrastructure needs are estimated at over \$1.5 trillion over the next ten years.
- Bottled water is estimated at \$500B today (worldwide), rising to over \$600B by 2033.



Challenge #1: Is Water A Commodity or a Common Good?

A commodity has a market price, dependent on the dynamics of the local market.

Traditionally, the factors often included in the price of water are the costs involved in procuring, treating and delivering water of the appropriate quality to its point of use. Factors frequently **excluded from the price of water** are costs or benefits to the environment, to future generations, and other intangibles such as contributions to health and well-being.



Challenge #1: Is Water A Commodity or a Common Good?

From an economist's perspective, much of the impending water crisis (shortages, ecosystem degradation, etc.) are manageable through pricing mechanisms, conscious of incorporating negative externalities such as pollution into the market price.

The Price of H₂O

Current prices merely cover costs. Instead prices should be aimed at reducing demand.



Source: Los Angeles Department of Water and Power.

Challenge #1: Is Water A Commodity or a Common Good?

Commodification promotes:

- Efficiencies in product management, including storage and distribution.
- Efficiencies in product usage by the customer.
- Innovations for all participants in the marketplace.

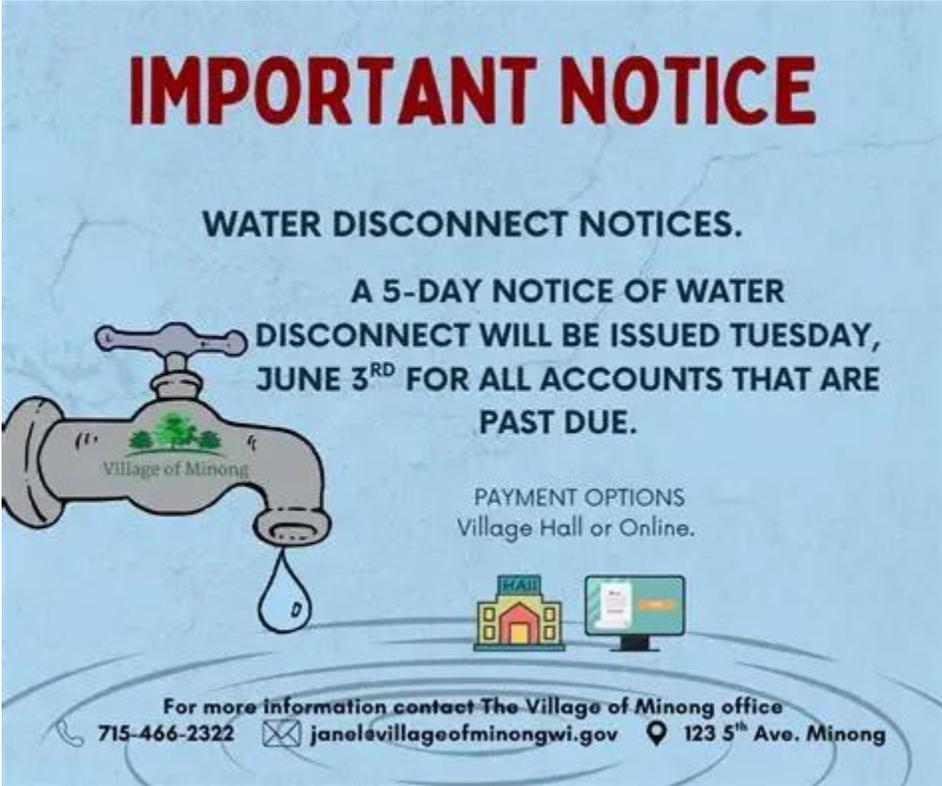


Challenge #1: Is Water A Commodity or a Common Good?

But considering Water to be solely a commodity ignores (or at least minimizes) a basic reality:

Water is a necessity for life.

Privatized water allows for this necessity to be turned off for financial reasons (e.g., inability to pay your bill). A 2018 study by MIT documented over 500,000 households in the US were disconnected from public water systems for nonpayment.



IMPORTANT NOTICE

WATER DISCONNECT NOTICES.

A 5-DAY NOTICE OF WATER DISCONNECT WILL BE ISSUED TUESDAY, JUNE 3RD FOR ALL ACCOUNTS THAT ARE PAST DUE.

PAYMENT OPTIONS
Village Hall or Online.

For more information contact The Village of Minong office
715-466-2322 ✉ janel@villageofminongwi.gov 📍 123 5th Ave. Minong

The notice is set against a light blue background with a cracked texture. On the left, there is a cartoon illustration of a grey water faucet with a single drop of water falling from it. The faucet has a small green logo and the text 'Village of Minong' on its side. To the right of the faucet, there are icons for a village hall and a computer monitor. The text is in various colors: red for the main title, black for the notice details, and blue for the payment options and contact information.

Challenge #1: Is Water A Commodity or a Common Good?

An alternate approach is for Society to consider water to be a Common Good.

“Common Goods” are entities and/or services that have the potential to benefit all members of society equally.

- Common Goods are non-excludable
- There is an absence of private ownership, with the use of the Good controlled by the State



Challenge #1: Is Water A Commodity or a Common Good?

In its purest sense, resources such as solar energy and wind and air can clearly be demonstrated to be “Common Goods”.

These goods can not be restricted or apportioned and are available to all members of a society.



Challenge #1: Is Water A Commodity or a Common Good?

But Common Goods are associated with two fundamental problems:

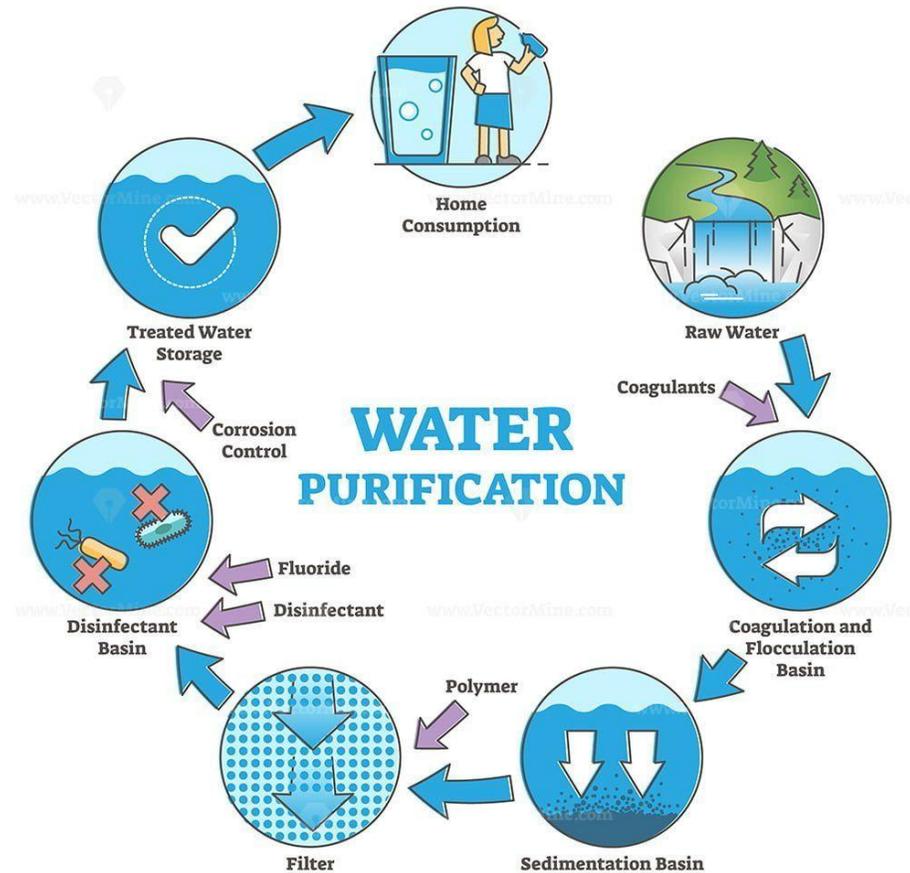
- “Free Riders”. A “Free Rider” is a user of services who does not contribute to the upkeep or protection of the Good.
- “Tragedy of the Commons”. This concept, first introduced by Garrett Hardin, contends that Common Goods become overused (to the point of destruction) without some level of oversight or control.



Challenge #1: Is Water A Commodity or a Common Good?

The argument for water as a Common Good is less clear.

- Water can be controlled and that control generates power (both dynamic and political).
- Access to water can be restricted and that restriction promotes efficiency and social stratification.
- Enhancements to water (e.g., purification) can be charged for but those improvements extend the usefulness of that resource.
- Water (and entire water bodies) can be owned and have been defined in many modern societies as legal property.



Challenge #1: Is Water A Commodity or a Common Good?

The previous discussion reflects historical representations of water as a binary choice: Water as a marketable commodity or Water as a publicly-held Good.

But both options are predicated on an acceptance of Water as having instrumental value.

Diamond-Water Paradox of Value



Water is more useful and is necessary for human life, yet diamonds are valued more highly.

Challenge #1: Is Water A Commodity or a Common Good?

Historically, water has been considered by varying societies as either a commodity or a public good. But this binary choice is predicated on the fundamental premise of Water as a resource with instrumental value for humans.

In the past 50 years, a third option has been presented:

Consider the access to and the utility of water to be a human right

Water and Human Rights

What is a Human Right?

A right granted to any human without regard or consideration for characteristics of that person.

Rights rely on governments to define, modify over time, and protect them. Basic rights are codified in a society's most important documents.



Water Quality and Human Rights

“Water” is mentioned once in the US Constitution (relating to enemy warships) and while 27 Amendments have been approved (out of 33 circulated to the States), none formally or by inference address Water as a fundamental right of the citizenry.

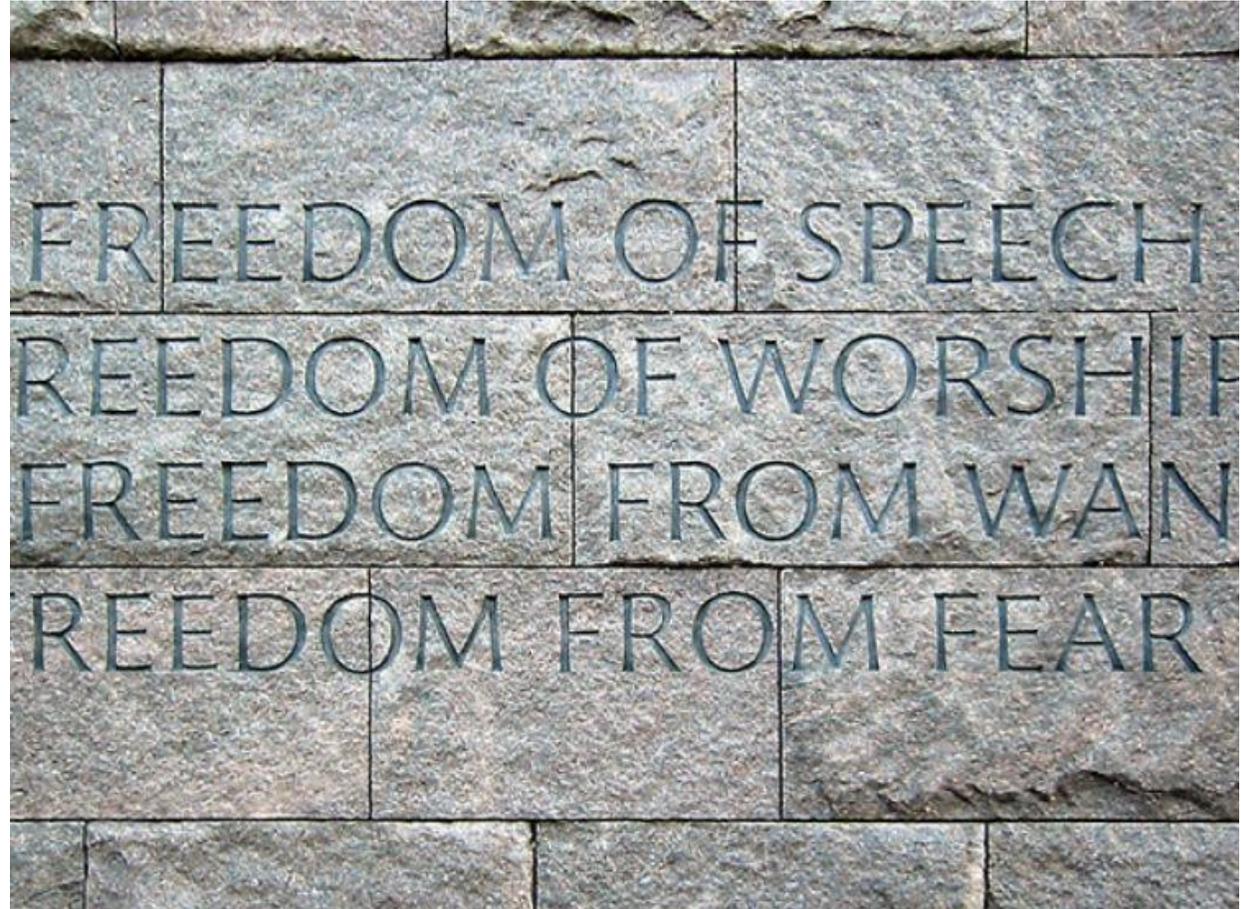
Water is mentioned as a resource warranting governmental protection in nine State Constitutions, but only in California does the following statement exist: **“every human being has the right to safe, clean, affordable, and accessible water.”**



Water Quality and Human Rights

Maybe the closest the US has come to articulating an individual's right to water is in Franklin Delano Roosevelt's famous "Four Freedoms" speech, which he gave in January of 1941. FDR promotes a "freedom from want" which can be interpreted as an individual's right to the basic needs for life.

But aspirational language is not codification of a right, not the assignation of that right to citizens, and not protection of that right.

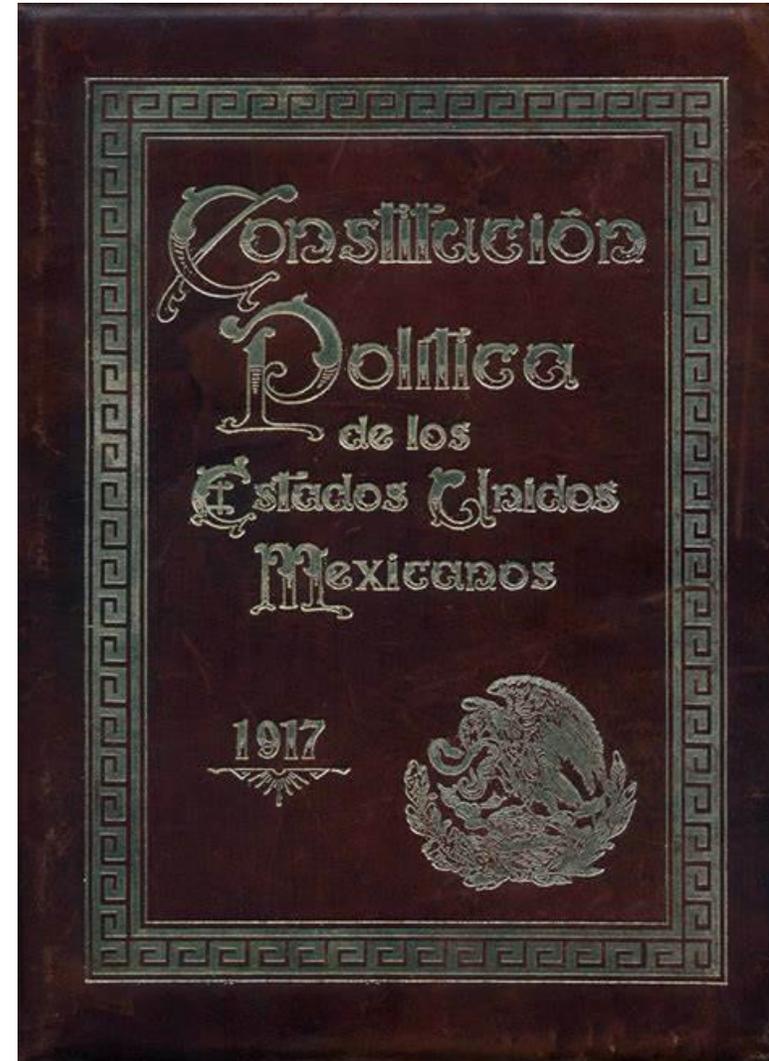


Water Quality and Human Rights

Other nations address the issue of water rights differently.

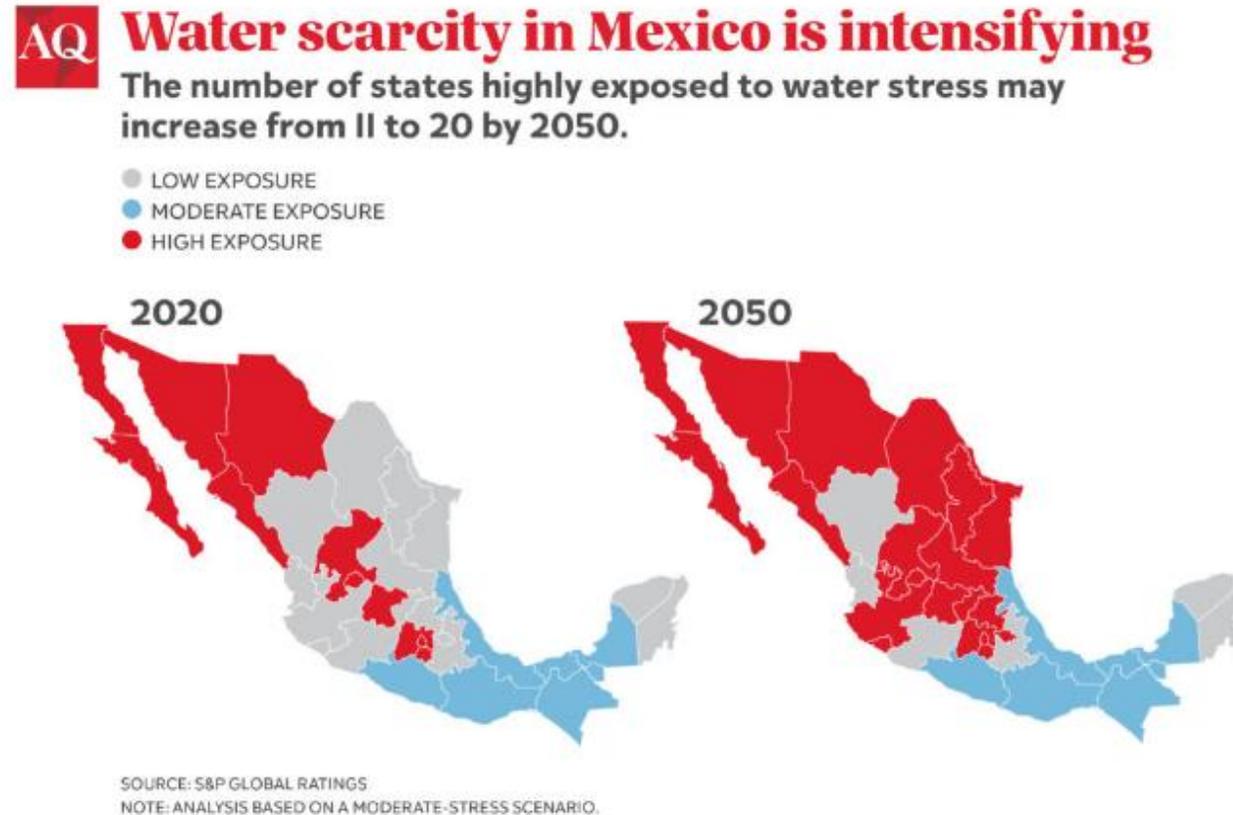
In Mexico, the Constitution was amended in 2012 to include the following language:

All persons have the right to the access, availability, and healthiness of water for personal and domestic consumption in a sufficient, healthy, acceptable, and equitable manner. The State guarantees this right and the law defines the foundations, supports, and modalities for the equitable and sustainable access and use of water resources, establishing the participation of the Federation, federal entities and municipalities, as well as the participation of the citizenry for the achievement of said objectives.



Water Quality and Human Rights

But Mexico has yet to have enforceable laws that protect this Constitutional right; as a result, access to sufficient water is becoming a greater public crisis in that country. Already, almost 80million Mexicans lack adequate water and sanitation. This number is expected to increase to over 100million in 10 years.



Water Quality and Human Rights

The articulated concept of water as a Human Right on the World Stage originated with the 1977 UN Water Conference held in Mar del Plata, Argentina. The consensus statement from this conference (attended by 104 nations including the US) stated:

All peoples...have the right to have access to drinking water in quantities and of a quality equal to their basic needs.”

In 1992, this statement is reinforced at the International Conference on Water and Environment in Dublin, Ireland. But the Dublin statement qualified this Right:

*It is vital to recognize first the basic right of all humans to have access to clean water and sanitation **at an affordable price.** (emphasis added)*

Water Quality and Human Rights

This linkage or providing water to price, the reinforcement of water as a commodity, undercut, for many, the intrinsic nature of a “Right”.

Maude Barlow:

“International institutions are advocating...the privatization and commodification of water. Price water, they say in chorus, put it up for sale and let the market determine its future....Water, according to the World Bank and the United Nations, is a human need, not a human right. A human need can be supplied in many ways, especially for those with money. But no one can sell a human right.”



Water Quality and Human Rights

What changes is the introduction of the concept of environmental justice; specifically, Water Justice.

In 2000, the privatized water system in Cochabamba, Bolivia was dissolved after an international consortium (headed by Bechtel) attempted to control all groundwater in the area. Within a few years, contracts for private water systems in La Paz and El Alto were similarly cancelled.



Water Quality and Human Rights

In 2002, the UN clarifies a previous (1966) declaration of human rights. In 1966, the UN had stated that all humans had the “right to an adequate standard of living”, which further specified that such a right was predicated on the right to “food, clothing, and housing”.

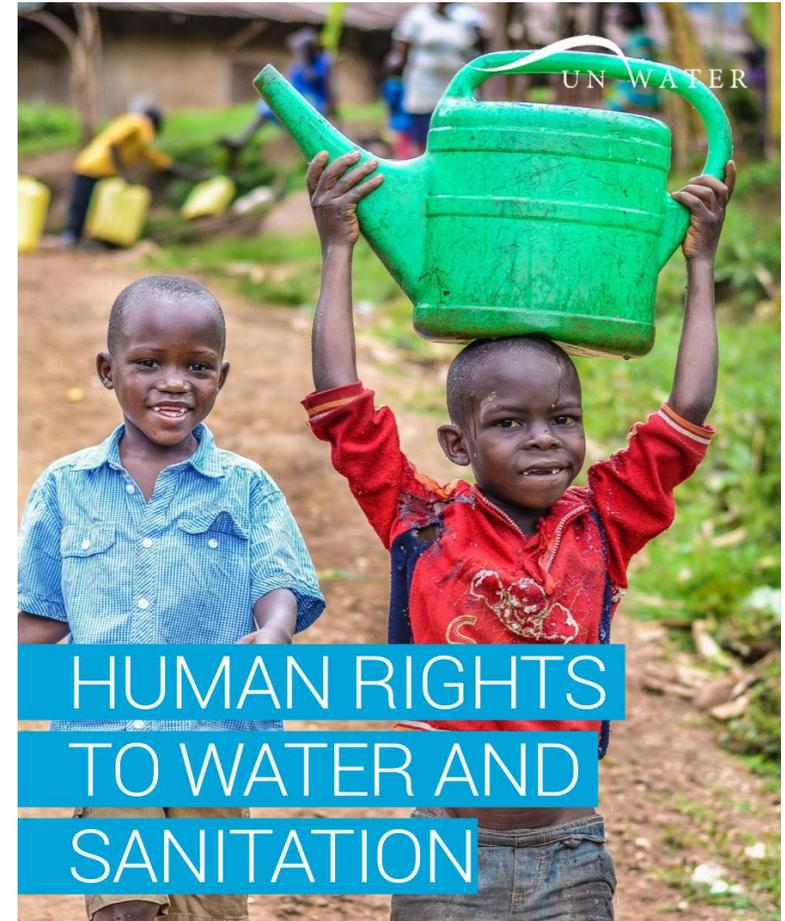
In 2002, the UN clarifies that “an adequate standard of living” is predicated on “the rights to food and clean water”. It further went on to state that a person’s entitlement extended to “sufficient, safe, acceptable, physically accessible, and affordable water for personal and domestic uses.”

Water Quality and Human Rights

And in 2010, the UN General Assembly approved the following:

- The right of every human being to have access to enough water for personal and domestic uses (estimated at between 50 and 100 litres of water per person per day).
- The water must be safe, acceptable and affordable.
- The water costs should not exceed 3 per cent of household income.

This Resolution passed 122 to 0, but several countries (including the US) abstained. And in passing this Resolution, the UN offered no guidance on enforcement of this right.



Water as a Human Right

Comments Supportive of Establishing a “Water Right”:

- Access to clean water eases the global burden of water-borne infections. Diarrhea, alone, is responsible for 1.8 million potentially preventable deaths per year, mostly among children under the age of five.
- Establishment of a “right to water” quietly raises the quality of life in developing nations.
- Focusing attention on the absence of sufficient water in certain areas helps international organizations in setting priorities.
- Creation of a “right to water” draws attention to (and hopefully helps to resolve) international watershed disputes.

Comments Challenging the Need for this “Right”:

- How much water is “as of right”?
 - Enough to subsist?
 - Enough for economic independence?
- What obligation does a State have to defend the water rights of its citizenry?
 - Is wasting water a crime against the state?
 - How does this “right” impact international watershed disputes?
 - Is a water dispute a potential conflict warranting war?
 - Could the bombing of a water plant be considered a war crime?
- When is it acceptable for water to be privately owned?

Could Water Itself be Granted Rights?

Is it possible for water to achieve some level of self-determination?

That is, rather than water being a *human* right can water become its own rightful entity? Can simple existence be sufficient to validate one's access to rights (arguably, the sole criterion for a human right)? Rather than a system predicated on instrumental (utilitarian) values, can merely intrinsic value be invoked?

Is there a threshold requirement for establishing eligibility for rights?

What entities (other than humans) have rights?



Could Water Itself be Granted Rights?

There are limited examples of rights being extended to non-humans. Among other considerations is the concept of “standing” which has recently been expanded to entities other than humans.

Examples include:

- Animal cruelty laws
- Protections extended to unique ecological features including but not limited to “The Tree That Owns Itself” located in Athens Georgia



Could Water Itself be Granted Rights?

Extending Rights to other organic life forms:

In 1972, USC Law Professor Christopher Stone posed a hypothetical: Should Trees Have Standing? "Standing" is the threshold legal concept of connection to an injustice or a harm. The act of cutting a hole through another living entity would seem to be cruel and inhumane. If permission was requested, would it have been granted? And if the answer was NO, was there a legal mechanism to enforce that intention?

"You grok," Smith repeated firmly. "I am explain. I did not have the word. You grok. Anne groks. I grok. The grass under my feet groks in happy beauty."

Stranger in a Strange Land by Robert Heinlein



Could Water Itself be Granted Rights?

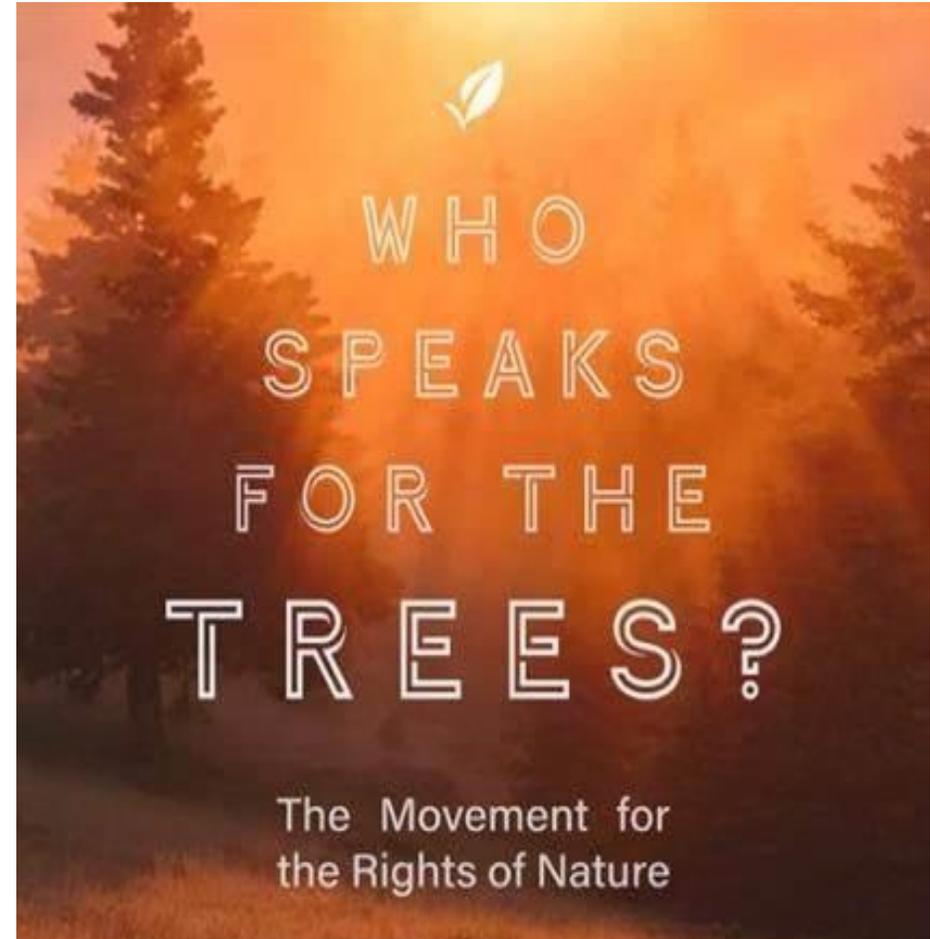
Examples of Rights being Extended to Nature:

- In 2008, Ecuador became the first country in the world to formally recognize and implement the Rights of Nature, which Ecuadorians refer to as the Rights of Pachamama (Mother Earth). The constitutional provisions regarding the Rights of Pachamama state: “Nature, or Pachamama, where life is reproduced and occurs, has the right to integral respect for its existence and for the maintenance and regeneration of its life cycles, structure, functions and evolutionary processes. All persons, communities, peoples, and nations can call upon public authorities to enforce the Rights of Nature.”
- In 2017, four rivers sought and in some instance won legal rights: the Whanganui River in New Zealand, the Rio Altrato in Colombia, and the Ganga and Yamuna rivers in India. The New Zealand case is fundamentally unique because the Parliament finalized The Te Awa Tupua Act, appointing two guardians of the river: one representative of the Maori Indigenous people and one representative of the government — the Crown — arguably reconciling two different worldviews.
- In 2022, Spain’s Mar Menor saltwater lagoon became the first ecosystem in Europe to be granted a limited legal status similar to a company.
- In 2019, the city of Toledo, Ohio adopted the Lake Erie Bill of Rights, a municipal law that gave the lake rights of its own. [Note: This ordinance has since been challenged by the State of Ohio and has been invalidated.]

Could Water Itself be Granted Rights?

Extending rights to Water is also justified by:

- Recognizing that our impact on Water and water bodies can have a profound and long-lasting impact on Humanity which means that extending rights to Water becomes a surrogate for extending rights to future residents;
- Fully appreciating that assaults on Water are disrespectful to Water's inherent right to self-preservation and self-determination (a restatement of Water's intrinsic value); and
- Considering Water as a "moral patient" shifts human thinking away from Anthropocentric structures.



Conclusions

The current social conceptualization of WATER as a resource and/or a commodity may be too open to exploitation and/or abuse.

There is an opportunity in the coming years to reimagine the “Human-Water Relationship” as one of codependent inhabitants on this planet.

Such a new relationship offers us a chance to redefine sustainability as a mutually beneficial concept, not based on anthropocentric calculations.

Any redefined Human-Water relationship requires international governmental and legal structure