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FINANCIALIZATION OF WATER, HUMAN RIGHTS & ENVIRONMENTAL PROTECTION

WHAT ARE THE ISSUES AT STAKE?

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Executive Summary

In December 2020, water joined gold, oil, grains, and other commodities traded on Wall Street making it now possible to trade water futures contracts in California's water market. Water futures contracts take place between a seller and purchaser who agree upon a certain amount of water being traded on a set date in the future at an agreed-upon price. In addition to the United States (US), Australia has also established water markets where consumers can buy additional water quotas or sell surplus. This report addresses the contexts of the US and Australia to identify the consequences and risks to human rights that may result from the financialization of water rights in water futures markets. The research aimed to answer the following questions: What is understood as the financialization of water? Does the financialization of water increase water management efficiency? Does it threaten human rights, and if so which ones? And how can the potential threats be mitigated to safeguard the human right to water and ensure environmental sustainability?

The methodology was based on gathering and analysing qualitative data through three different means: literature review of relevant reports, academic papers, newspapers' articles and other key documents; interviews conducted with different stakeholders from various sectors involved in the issue of water financialization; and a Safe Space roundtable discussion featuring other key stakeholders to help formulate policy recommendations.

This report found that speculation on water markets, i.e. buying and selling the resource with the intention of profiting from an "intervening price change",[1] poses threats to the human right to water due to speculation's tendency to create extreme price volatility and overpricing of water rights. The research also discovered that even though water markets can create incentives for more efficient uses of water, they cannot address the underlying issues of water scarcity and cannot alone safeguard the human right to water or a healthy environment. In addition to a healthy environment, other rights that are impacted include the right to food and sanitation. Both are undermined in concurrence with increasing water prices in speculative markets. Water scarcity leads to food insecurity and disruption of sovereignty if external investors create water rights contracts over water resources in areas where local populations cannot afford them. This report focuses on the trading of water rights and futures, which are likely to harm the right to sanitation due to uncontrolled price surges.

[1] Miguel Robles, Maximo Torero, and Joachim von Braun. "When Speculation Matters." *International Food Policy Research Institute,* Issue Brief 57, (2009): 2

Based on its findings, this report gives recommendations to mitigate the above outlined risks. For the governments of Australia and the US, the report recommends the development of a water bank or subnational entity governed by a range of entities representing the state, the private sector and the civil society. The goal of this water bank would be to oversee and regulate water rights allocations based on legislations that support the right to water and the right to a healthy environment. The water bank should oversee the allocation of water rights to domestic and public uses, and allocate quotas for the environment and water extraction to ensure environmental protection. The governments should also set a legal distinction between water rights for domestic and public-interest uses, and on the other hand, water rights for productive and recreational uses. The allocation of water rights for the former category should be excluded from markets and the scope of the financialization of water. Only water rights for the latter should be traded, and speculative behaviour should be limited by adopting transaction fees and expiration dates for water rights. The water bank should also have the power to intervene in water futures markets to suspend licenses and remove water rights from actors whose proven speculative behaviour represents a threat for water price stability.

For governments considering water financialization, the report recommends that they should recognize and introduce the human right to safe drinking water and sanitation in their constitution. They should also establish a legal framework for the regulations, in line with the outlined regulations for the US and Australia. These governments could also adopt economic policies, such as the adoption of a universal basic income (UBI) to offset the consequences of potential water price increases on the affordability of the resource

The report concludes that there remains a pressing need for water to remain a public resource and within the confines of democracy. To do so would be to ensure the continued affordability of water and thus the continued safeguarding of the human right to water.

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List of Acronyms

Acronym	**Full description**
AQUAFED	International Federation of Private Water Operators
CA	California
CME	Chicago Mercantile Exchange
GVA	Gross value added
IFI	International financial institution
IMF	International Monetary Fund
IO	International organisation
MDB	Murray-Darling Basin
NGO	Non-governmental organisation
NQH2O	The Nasdaq Veles California Water Index
OTC	Over-the-counter
SAP	Structural adjustment program
SDG	Sustainable development goal
UBI	Universal basic income
UDHR	Universal Declaration of Human Rights
UK	United Kingdom
UN	United Nations
UNEP	United Nations Environment Program
US	United States
WASH	Water, sanitation and hygiene

1. Introduction

Freshwater is a scarce natural resource as it only represents 2.5% of all Earth's water.[2] But because most freshwater reserves are either inaccessible or in the form of ice, the share of freshwater available for human and non-human consumption as well as for agricultural and industrial activities drops to 0.3% of all Earth's water.[3] Global scarcity of freshwater is expected to worsen due to several factors, such as anthropogenic climate change and population growth.[4] In addition to increased scarcity, the quality of freshwater is equally of concern as water reserves are increasingly polluted by human, agricultural, and industrial activities. Today, it is estimated that more than 2.2 billion people around the world do not have access to safe drinking water.[5] These are alarming statistics when you consider that unsafe drinking water contributes to 72% of all diarrheal deaths.[6] According to the 2018 United Nations World Water Development Report, this lack of access to potable water could triple by 2050.[7]

In this context of increased water insecurity, access to water and sanitation was recognized as a human right in July 2010 by the United Nations General Assembly. Resolution 64/292 emphasizes the central role of states and international organizations (IOs) in safeguarding and promoting this right.[8] It also acknowledges the interlinked nature of the human right to water and sanitation with the realization of other human rights. More recently, sustainable water management to ensure long-term availability of water has been included as a goal in the 2030 Agenda for Sustainable Development (SDG 6).[9]

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[2] Igor A. Shiklomanov. *A New Appraisal and Assessment for the 21st Century- A summary of the monograph World Water Resources*. UNESCO: (1998)

[3] Shiklomanov. *A New Appraisal and Assessment for the 21st Century.* UNESCO: (1998)

[4] Jacob Schewe, Jens Heinke, Dieter Gerten, Ingjerd Haddeland, Nigel W. Arnell, Douglas B. Clark, Rutger Dankers, Stephanie Eisner, Balázs M. Fekete, Felipe J. Colón-González, Simon N. Gosling, Hyungjun Kim, Xingcai Liu, Yoshimitsu Masaki, Felix T. Portmann, Yusuke Satoh, Tobias Stacke, Qiuhong Tang, Yoshihide Wada, Dominik Wisser, Torsten Albrecht, Katja Frieler, Franziska Piontek, Lila Warszawski, and Pavel Kabat. "Multimodel Assessment of Water Scarcity under Climate Change." *Proceedings of the National Academy of Sciences of the United States of America* 111, no. 9, (2014): 3245-250

[5] CDC. "Global WASH Fast Facts." Centers for Disease Control and Prevention. Centers for Disease Control and Prevention, April 1, 2021. https://www.cdc.gov/healthywater/global/wash_statistics.html.

[6] CDC. "Global WASH Fast Facts." Centers for Disease Control and Prevention. CDC, 2021.

[7] United Nations Water. *The United Nations World Water Development Report 2018: Nature-Based Solutions for Water.* WWDR: (19 March 2018)

[8] UN General Assembly. *The human right to water and sanitation*. United Nations: (28 July 2010). A/RES/64/292-E

[9] UN General Assembly. *Transforming our world: the 2030 Agenda for Sustainable Development* (21 October 2015). A/RES/70/1

Freshwater scarcity issues have led governments to globally tackle the question of how to better manage water resources in a more efficient way. A relatively recent emerging trend in water management has been the financialization of water. This trend is born in part from previous privatizations of water management. In the 1980s, the World Bank and the International Monetary Fund (IMF) globally promoted the idea that water infrastructures (and therefore the distribution of water) could be improved through increased involvement of private companies in water management. For example, under Margaret Thatcher, the UK privatized its water supply services attracting many private investors. While privatization of water services is an important process and raises many issues, the focus of this project will be on the financialization of water.

Although the exact definition of the financialization of water is debated, it is commonly understood as the expansion and the increasing influence of financial actors, whether institutional (e.g., pension funds) or private (e.g., banks) in the water sector. This increased influence is reflected in two different ways: on water, sanitation and hygiene (WASH) infrastructures on the one side, and on water ownership, on the other. The financialization of water infrastructures results from the large investments made by financial actors to develop these infrastructures[10] and the underlying process through which the shares of these privately-owned water provision companies are being traded on the stock exchange. The financialization of water ownership is used to express the process through which water rights are being traded in water markets. Water rights are traded in the form of water futures contracts - or simply named water futures - in which the parties - the seller and the buyer - agree on the transaction (sale/purchase) of a certain amount of water at a predetermined date in the future at an agreed-upon price. Therefore, whether or not water price changes between the signature of the contract and the date of the transaction does not matter since the price of the transaction has already been fixed.

Therefore, through its financialization, water becomes a commodity and a financial asset, whose value fluctuates according to supply and demand that is manifested in water markets. In the United States (US), in early December 2020, water joined gold, oil, grains, and other commodities traded on Wall Street. It is now possible to trade water futures contracts related to

[10] United Nations Human Rights Office of the High Commissioner. *Risks and impacts of the commodification and financialization of water on the human rights to safe drinking water and sanitation.* OHCHR: (16 July 2021). A/76/159

California's water market. The Nasdaq Veles California Water Index tracks the price of these contracts, revealing how financially important freshwater is as a commodified asset.[11] For example, during its first day on the stock exchange (7 December 2020), water was worth 486.53 USD per acre-foot, which corresponds to slightly more than 325,000 gallons (approximately 1,225,000 liters).[12] The financialization of water is not only a US phenomenon though. In Australia, the 2007 Water Act set quotas of water use distributed among a wide set of consumers: cities, firms, farmers, etc.[13] It also established water markets where consumers can buy additional water quotas or sell their surplus. Today, these transactions can be done through a simple mobile phone app.

Proponents of the financialization of water argue that water will only be treated with respect as a scarce natural resource when its true fiscal value is felt by people. Additionally, proponents of its financialization recognize that as an indispensable finite resource, it is ultimately a relatively safe investment opportunity.[14] While proponents of the financialization of water see it as a significant and innovative step towards a more efficient and sustainable management of water resources, many others raise concerns about it. Opponents to the financialization of water fear speculation by financiers who are disconnected from "real-world" realities. Water speculation is thought to potentially lead to increased barriers of access to water for vulnerable populations, exacerbating thus both international[15] and intranational[16] inequalities and further threatening the survival and livelihood of populations living in areas that are already suffering from water stress.[17] Opponents to the financialization of water see it first and foremost as a threat to human rights, as it treats freshwater as a commodity instead of as a commons essential for sustaining life on Earth.

[11] CME Group. "Nasdaq Veles California Water Index (NQH2O) Futures." CME Group, (2021). https://www.cmegroup.com/trading/equity-index/us-index/nasdaq-veles-california-water-futures.html

[12] Paula Sanchez Almendros, "The Future of Water Is Traded in the Stock Exchange," Smart Water Magazine, (December 11, 2020). https://smartwatermagazine.com/news/smart-water-magazine/future-water-traded-stock-exchange

[13] Australian Government. *Water Act 2007*. Parliament of Australia, (3 September 2007)

[14] Almendros, "The Future of Water Is Traded in the Stock Exchange," Smart Water Magazine, (2020).

[15] Between countries

[16] Between different socio-economic groups within a state

[17] Pedro Arrojo-Agudo, "Water: Futures Market Invites Speculators, Challenges Basic Human Rights - UN Expert," OHCHR, (December 11, 2020), https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=26595&%3BLan

2. Research & objectives

The overall objective of this project is to present a normative analysis of the issues that are at stake as a result of the financialization of water. Through the project, we intend to explore questions related to the *risks* to human rights as a result of the financialization of water. The research questions are the following:

1. What is understood as the financialization of water?
2. Does the financialization of water increase water management efficiency?
3. Does the financialization of water threaten human rights? If so, which human rights are being threatened?
4. How can these threats, if they are present, be mitigated in order to safeguard the human right to water and a healthy environment?

The project aims to be a part of the debate on the financialization of water by looking at the process of financialization through the lens of human rights and environmental protection issues. It will particularly assess the risks - mostly borned by the most impoverished - stemming from unregulated financialization, and from there, suggest recommendations for future regulations. This project will mostly focus on countries at the forefront of processes of financialization of water, Australia and the US. Through the two case studies, the project aims to more concretely answer the guiding research questions. While answering these questions, the project will seek to center its goal of incorporating intersectional perspectives from a variety of actors involved in and affected by the financialization of water. This process is one that is not inherently good or bad, but rather may pave the way for new risks to human rights and protection of water and ecosystems to emerge. By including the voices of a multitude of actors, the project hopes to inform policy recommendations from a normative rather than positive perspective. Policy recommendations focus on the elements to consider in regulating the financialization of water and the kind of regulations that should be implemented to prevent potential threats to human rights.

3. Literature review

3.1. Tracing the history of water management: from privatization to financialization

What is the best way to govern freshwater supplies to ensure water security and fair access to water in the present and in the future? Over the past centuries, public and private sectors have assumed varying roles of importance in answering this question of water governance and management. Both sides have supplied alternating perspectives on the benefits of water either as a public good vs. private good, and thus shaped the "ownership of infrastructural [water] networks" as well as their financing.[18] Loftus et al. outline four phases of water management that have paved the way for water financialization - although they are mainly focused on the Global North.[19] In the early 19th century, "atomized" private water suppliers in cities started supplying water as part of urban services for wealthy citizens in Europe and North America.[20] The role of the private sector in the early investment of water infrastructure has been documented particularly in France, Britain, and the US, where water was treated as a private good and the costs of the water supply system was covered by the consumers who could afford it.[21] Therefore, private suppliers induced a social stratification of water service provision, which limited access to the privileged few.

However, as Loftus et al. contend, municipalization trends in the early 20th century shifted water management to the public sector where infrastructure was mainly financed by local taxation.[22] Industrialization increased the demand for water resources and water-borne epidemics, like cholera, aroused public debate around the right to sanitation and the need to generalize water supply to all populations. As a result of these debates, ownership and management of water supplies came under states' control "to provide universal access and to support agricultural and industrial production".[23]

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[18] Alex Loftus, Hug March, and Thomas F. Purcell. "The Political Economy Of Water Infrastructure: An Introduction To Financialization." *Wiley Interdisciplinary Reviews: Water* 6, no. 1 (2018): 2

[19] Loftus, March, and Purcell. "The Political Economy of Water Infrastructure." *Wiley Interdisciplinary Reviews: Water,* (2018): 1-7

[20] Loftus et al. "The Political Economy...." (2018): 1-7

[21] Michel Kerf, David R. Gray, Timothy Irwin, Celine Levesque, Robert R. Taylor, and Michael Klein. *Concessions for infrastructure: A guide to their design and award*. World Bank Technical paper, no. WTP 399. Finance, Private Sector, and Infrastructure Network Washington, D.C.: World Bank Group, (1998)

[22] Loftus et al. "The Political Economy...." (2018): 1-7

[23] Kate Bayliss. "The Financialization of Water." *Review of Radical Political Economies,* 46, no. 3, (2014): 293

By the 1970s, the effectiveness of state management came under public scrutiny as a result of economic shocks and rising oil prices. Notions of "market failure" were replaced by notions of "state failure".[24] Social perceptions of water changed along with increasingly popularised privatization efforts and neoliberal policies, which were praised to be more effective in reducing water poverty.[25] Water became once again valued as a private commodity with an economic value. As neoliberal ideas gained traction in international development debates, water privatization became central to policies developed by International Financial Institutions (IFIs) in the form of Structural Adjustment Programs (SAPs) throughout the 1980s and 90s.[26]

A diverging configuration of remunicipalisation began to appear after the turn of the century.[27] Expected profit rates from water privatization failed to be met and movements against the policies of IFIs gained global recognition, so that by the 2010s, remunicipalisation had started to outpace privatization.[28] However, in parallel, an opposite configuration also started to appear in the form of financialization. By opening up the water sector to private ownership, markets and investment, the wave of privatization paved the way for new stakeholders to influence the water sector. They embroiled the "network of services and infrastructures involved in [water] delivery" within the "contemporary financial environment" dominated by private equity investments seeking value extraction through speculative trading.[29] The new financial mechanisms of private investment and trading of water rights now enable a system of rent extraction through water infrastructure, which ties the sector to the fortunes of "sovereign wealth funds, pension schemes, and institutional investors".[30] Bayliss argues that privatization laid the foundations for financialization by transforming a public service into an asset that can be speculatively traded.[31]

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[24] Bayliss. "The Financialization of Water." *Review of Radical Political Economies,* (2014): 294

[25] José Esteban Castro. "Poverty and citizenship: Sociological perspectives on water services and public–private participation." *Geoforum,* 38, no. 5, (2007): 756-771

[26] Loftus et al. "The Political Economy…." (2018): 1-7

[27] Loftus et al. "The Political Economy…." (2018): 1-7

[28] Loftus et al. "The Political Economy…." (2018): 1-7

[29] Hug March, and Thomas Purcell. "The muddy waters of financialisation and new accumulation strategies in the global water industry: The case of AGBAR." *Geoforum,* 53, (2014): 11

[30] Loftus et al. "The Political Economy…." (2018): 6

[31] Bayliss. "The Financialization of Water." (2014): 295

3.2. Understanding water financialization: definitions and practises

Financialization of water might be perceived as an extension of privatization. It reflects a capitalist framework, which promotes investments and trading to dominate the management of various strands of the economy. Epstein broadly characterizes financialization as an "increasing importance of financial markets, financial motives, financial institutions, and financial elites in the operations of the economy and its governing institutions".[32] Loftus et al. suggest that financialization can also be understood as a "process in which the locus of profit-making has shifted from the "real" economy to the "financial economy" as profits accumulate through financial means rather than through commodity production.[33]

The initial privatization of water infrastructure to small-scale shareholders in the 1970s and 80s gave way for an eventual take-over by global private equity firms, which are turning ownership into financial assets and investment.[34] Rather than being ensured by public service, water supply providers (e.g., water transportation and treatment) are being ensured by private companies. Financialization is then achieved when shares of the private companies are being traded on financial markets. As shareholders trade investments, the ownership of water rights and infrastructure changes hands according to financial incentives without any connection to 'real' production or employment.[35]

Although the definition of financialization of water is highly debated, in this report it is understood as the process through which water rights are transformed into a commodity and a financial asset, whose value fluctuates according to supply and demand in water markets. Therefore, the financialization of water steers the management of the resource in accordance with the ebbs and flows of liberated markets and investment opportunities. These liberated financial markets also warrant speculation. Robles et al. define speculation as:

> [T]he assumption of the risk of loss in return for the uncertain possibility of a reward. It is ordinarily understood to mean the purchase of a good for later resale rather than for use,

[32] Gerald Epstein. "Financialization, Rentier Interests, and Central Bank Policy." For *Financialization of the World Economy*. Conference paper. University of Massachusetts, Amherst: Political Research Institute, (2002): 3
[33] Loftus et al. "The Political Economy...." (2018): 2
[34] Bayliss. "The Financialization of Water." (2014): 292-307
[35] Bayliss. "The Financialization of Water." (2014): 294

> or the temporary sale of a good with the intention of later repurchase in the hope of profiting from an intervening price change.[36]

Without any external intervention or regulation in a liberated market, the speculation of a natural resource may have adverse effects.[37] According to Robles et al., speculation could "result in unreasonable or unwanted price fluctuations" and harm those who cannot afford the resource.[38] As a necessity for life, the possible harms caused by a speculation of water can threaten the human right to water and prove an obstacle to achieving the SDG 6.[39] Speculative investment in water is likely to increase in regions with growing water insecurity, such as California and Australia, where speculation may prompt a price surge for the scarce resource. Speculators, such as private equity funds, institutional investors or even farmers, turn water into an interest-bearing capital by anticipating future demands for supply, buying water rights in regions at a given price and expecting bigger returns when a drought hits.[40] Therefore, speculation of water involves a trading of water futures, which is not concerned with access to the resource itself, but rather future profits. Nicknamed the "new oil" or "blue gold," according to Buiter, water will eventually become "the single most important physical-commodity based asset class, dwarfing oil, copper, agricultural commodities and precious metals."[41]

Furthermore, Ahlers and Merme argue that the primary objective of the private financial shareholders in the water sector is "to seek steady growth opportunities and high returns, with little interest in, or any mandate for, socio-environmental sustainability".[42] Private investors who finance water infrastructure development remain disconnected from water governance, as they may lack expertise in the sector and understanding of its complexity, such as competing demands for water or ecosystem integrity.[43]

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[36] Miguel Robles, Maximo Torero, and Joachim von Braun. "When Speculation Matters." *International Food Policy Research Institute,* Issue Brief 57, (2009): 2

[37] Robles, Torero, and von Braun. "When Speculation Matters." *International Food Policy Research Institute*, (2009): 7

[38] Robles, et al. "When Speculation Matters." (2009): 7

[39] Sustainable Development Goal 6: "Ensure access to water and sanitation for all."

[40] Rhodante Ahlers, and Vincent Merme. "Financialization, water governance, and uneven development." *Wires Water* 3, no. 6, (2016): 766-774

[41] Willem Buiter. "Essay: Water as Seen by an Economist." *Global Themes Strategy, Thirsty Cities - Urbanisation to Drive Water Demand,* Citi Global Thematic Investing Research, (2011): 24

[42] Ahlers, and Merme, "Financialization, Water Governance....." (2016): 768

[43] Ahlers, and Merme, "Financialization, Water Governance....." (2016): 768

However, for Castree and Christophers, finance provides a critical resource to develop 'green' infrastructure that can sustainably adapt to a changing biophysical world and "remake the arteries through which capital flows [as] the lifeblood of the biological and social reproduction of most of contemporary humanity".[44] Furthermore, financialization of water may also be used and viewed by some as an extension of a development agenda to increase the efficiency of water management and provide solutions to water scarcity in low-income countries. Lack of access to water is perceived in terms of a "financing gap,"[45] which represents the amount of money needed to build sufficient infrastructure to produce and share water supplies with all citizens equally. To fill this gap, development policies have been shaped to support the role of the private and financial sector. Yet Bayliss argues that while the problem of water access in low-income countries is a complex issue dependent on a myriad of factors ranging from social institutions, history, to geography, and other situational determinants, it has become reduced to a financial one.[46] Can financialization alone provide the solution to a complex systemic issue?

The financialization of water is a contested issue with varying degrees of threat and opportunity. The literature on financialization suggests that the threat to human right to water and sanitation must be accounted for, especially in the case of surging prices due to speculation. But literature also suggests that water markets may be used in beneficial ways to support development projects and build environmentally sustainable infrastructure. The key to safeguarding human rights within water financialization may involve the introduction of market regulations and a closer cooperation between private and public sectors to account for the socio-economic and environmental realities tied to the water sector.

3.3. Water markets & financialization of water resources in Australia

Population growth, economic growth and anthropogenic climate change are some of the main factors that have triggered the current global water crisis. Increased water scarcity has forced the international community to shift its approach to water management from a supply-side

[44] Noel Castree, and Brett Christophers. "Banking Spatially on the Future: Capital Switching, Infrastructure, and the Ecological Fix." *Annals of the Association of American Geographers* 105, no. 2, (2015): 385
[45] Bayliss. "The Financialization of Water." (2014): 296
[46] Bayliss. "The Financialization of Water." (2014): 296

approach, i.e., meeting new demand through increased supply to a demand-side approach, i.e., meeting new demand through more eco-efficient use of existing supply[47]. For a long time, governments have sought to increase available supply of water resources through large-scale infrastructures (e.g., dams) but both issues of overexploitation and ever-increasing costs to provide additional supply have pushed governments to seek to meet demand of new users by promoting the adoption of more efficient water uses by existent users. The demand- side approach has been formally acknowledged in the Rio Declaration and in the Agenda 21.[48] One of the main tools of this approach is the creation of water markets. Even though only a small share of Earth's total freshwater resources is currently being managed through water markets,[49] they are gradually emerging across the world. Most water markets are situated in Australia and in the US, but others exist in Chile, South Africa, China and Spain. While all water markets are intended to better manage water resources, they greatly differ from one another due to a wide range of factors, such as the institutional setting and hydrological context in which they are implemented.[50] In this regard, analyses and assessments of water markets are most relevant when done on a case-by-case basis.[51]

Australia has been the first country in the world to introduce water markets. Issues of water scarcity in Australia partly stem from the adoption of water-intensive modes of agricultural production that are non-adapted to the dry climatic conditions of the country.[52] Consequences of anthropogenic climate change are expected to worsen this situation of water stress. It is in this context that the Australian government decided to create water markets in the middle of the 1980s. Due to the hydrological landscape of Australia, water markets are concentrated in few regions of the country. In the south-eastern part of the country, the Murray-Darling Basin (MDB) is

[47] Henning, Bjornlund. "Water Markets And Their Environmental, Social And Economic Impacts In Australia". In *Expo Zaragoza*, (2008): 1-16

[48] R. Quentin Grafton, James Horne, and Sarah Ann Wheeler. "On the Marketisation of Water: Evidence from the Murray-Darling Basin, Australia," *Water Resources Management* 30, no. 3, (2016): 913-926

[49] Ereney Hadjigeorgalis. "A Place for Water Markets: Performance and Challenges," *Review of Agricultural Economics* 31, no. 1, (2009): 50-67

[50] R. Quentin Grafton and al. "An Integrated Assessment of Water Markets: A Cross-Country Comparison," *Review of Environmental Economics and Policy* 5, no. 2, (January 2011): 219-239

[51] Grafton and al. "An Integrated Assessment of Water Markets: A Cross-Country Comparison," *Review of Environmental Economics and Policy,* (2011): 219-239

[52] Lin Crase, Phil Pagan, and Brian Dollery. "Water Markets as a Vehicle for Reforming Water Resource Allocation in the Murray-Darling Basin of Australia," *Water Resources Research* 40, no. 8, (2004): 1-10

the main source of freshwater. It covers four states (Australian Capital Territory, New South Wales, South Australia and Victoria), accounts for almost three quarters of Australia's irrigated lands and is the most productive agricultural area of the country.[53] There are several water markets linked to the Murray-Darling Basin. The most important one is the southern Murray-Darling Basin (sMDB) water market. In terms of number of transactions concluded and volumes of water traded annually, it is Australia's largest water market[54] and one of the biggest in the world.[55] Due to their dominant importance in the Australian water trading sector, the rest of this section focuses on the MDB water markets, and especially on the sMDB water market.

Water markets in the Murray-Darling Basin have been established as a reaction to issues of overexploitation of water throughout the 1970s and early 1980s.[56] Overexploitation was mostly induced by states governments' overallocation of water entitlements.[57] Irrigators could extract more water than what was sustainable, leading to serious environmental problems in the Basin. To address these problems, states' governments introduced both allocations and entitlements markets; in 1984 in South Australia; in 1989 in Victoria; while in New South Wales the former was introduced in 1984 and the latter in 1989.[58] Water entitlements (or permanent water) refer to rights to "long-term access to share of the total consumptive pool of water resources",[59] while water allocations (or temporary water) refer to "the volume of water entitlement holders receive during a given water year, dependent on the available water in storages, expected inflows, system losses, demand expectations, delivery capacity and other factors".[60] To put it simply, water entitlements can be considered as property rights of access to water and water allocations as the quantity of water received each season from these property rights. At the Basin level, all four

[53] Anthony S. Kiem. "Drought and Water Policy in Australia: Challenges for the Future Illustrated by the Issues Associated with Water Trading and Climate Change Adaptation in the Murray–Darling Basin," *Global Environmental Change* 23, no. 6, (2013): 1615-1626

[54] Adam Loch et al., "Markets, Mis-Direction and Motives: A Factual Analysis of Hoarding and Speculation in Southern Murray–Darling Basin Water Markets," *Australian Journal of Agricultural and Resource Economics* 65, no. 2, (2021): 291-317

[55] S. Wheeler et al., "Reviewing the Adoption and Impact of Water Markets in the Murray–Darling Basin, Australia," *Journal of Hydrology* 518, (2014): 28-41

[56] Crase, Pagan, and Dollery. "Water Markets as a Vehicle for Reforming Water Resource Allocation in the Murray-Darling Basin of Australia," *Water Resources Research,* (2004): 1-10

[57] Bjornlund. "Water Markets And Their Environmental, Social And Economic Impacts In Australia", (2008): 1-16

[58] Grafton, Horne and Wheeler. "On the Marketisation of Water: Evidence from the Murray-Darling Basin, Australia." *Water Resources Management,* (2016): 913-26

[59] Wheeler et al., "Reviewing the Adoption and Impact of Water Markets," *Journal of Hydrology,* (2014): 30

[60] Wheeler et al., "Reviewing the Adoption and Impact of Water Markets," *Journal of Hydrology,* (2014): 31

states agreed in 1996 to set up a "cap", i.e., a maximum level of annual water extractions in order to limit overexploitation.[61] This decision coupled with the creation of water markets paved the way for water trading. Indeed, these processes have entailed the transformation of water into a commodity that can be exchanged on a market and whose price fluctuates according to a demand-supply logic. While participation in the markets was very limited in the first years (especially in the entitlements market), the participation rate has gradually increased since the middle of the 2000s, especially in the allocations market.[62] This trend has entailed another one: the increasing volume of water traded on the market.[63] There are now many different stakeholders active in water markets including: farmers (for irrigation of their land), cities (for provision of drinking water), industries (for production) and even financial institutions (for investment diversification).[64] Today in Australia, water markets are the main mechanisms through which water resources are distributed and constitute essential elements of irrigators' risk-management strategies.

However, the significant role of water trading in Australia to manage water resources does not mean that water markets are not contested and criticized. On the contrary, water markets are subject to heated debates among scholars and practitioners. At the two extremes, some consider water markets as the panacea to water scarcity issues, while others argue that they only benefit the wealthiest and the most powerful at the expense of more vulnerable individuals as well as the environment.[65] For example, Kiem argues that benefits stemming from water markets are limited to the largest and most well-informed irrigator, while the others (e.g., small family-farms) are hit hard by the negative impacts of water trading.[66] In between these two extremes of the spectrum, many scholars agree that water markets have the potential to both provide many benefits but also to present some limitations.

In order to better grasp this debate, it is essential to understand the underlying drivers to water markets creation as well as the concerns related to them. The main economic rationale

[61] Bjornlund. "Water Markets And Their Environmental, Social And Economic Impacts In Australia", (2008): 1-16
[62] Bjornlund. "Water Markets And Their Environmental, Social And Economic Impacts In Australia", (2008): 1-16
[63] Wheeler et al., "Reviewing the Adoption and Impact of Water Markets," *Journal of Hydrology,* (2014): 28-41
[64] Wheeler et al., "Reviewing the Adoption and Impact of Water Markets," *Journal of Hydrology,* (2014): 28-41
[65] Grafton, Horne, and Wheeler. "On the Marketization of Water". *Water Resources Management,* (2016): 913-26
[66] Kiem, "Drought and Water Policy in Australia," *Global Environmental Change*, (2013): 1615-1626

behind the introduction of water markets is that markets create incentives to move water from low-value uses to higher-value uses, especially during water-scarce periods.[67] This means moving from low-value uses, i.e., agricultural activities that take place on unproductive soils or that require low investments in water-dependent assets (such as annual croppings) to higher-value uses, i.e., agricultural activities that take place on fertile, more suitable soils or with significant investments in water dependent assets (such as horticulture or livestock breeding).[68] Because water markets make the price of water explicit, they induce irrigators to adopt water-saving technologies (e.g., more efficient irrigation systems) and strategies, such as retiring from degraded lands which require more water to grow the same agricultural output as compared to healthier lands.[69] In doing so, water markets lead to a "win-win" scenario. On the one hand, inefficient water uses are reduced while, on the other hand, low-value users are compensated for giving up their water through income flows. While this economic argument is appealing, Crase, Pagan and Dollery argue that, because most water trades occur in the allocations market, water trading is not likely to lead to the structural changes necessary to produce significant water efficiency gains.[70] Inefficient irrigators are likely to sell part (or all) of their seasonally allocated water, but they tend to keep their water entitlements and, as a consequence, manage to remain in the agricultural sector for the long-term.

Water markets have also raised many concerns about their potential negative economic, social and environmental consequences. Kiem argues that water markets are likely to remove water from agriculture to high-emission industries, such as mining or manufacturing, because agriculture is considered as a relatively low value user of water compared to the latter.[71] In this regard, he concludes that the reallocation of water to high value users may have many negative impacts. Looking at water transactions in the MDB water markets, Grafton, Horne and Wheeler[72] do not find any evidence of significant volumes of water sold by irrigators to non-farming industries for so-called high value producing activities. Therefore, they argue that Kiem's concern

[67] Bjornlund. "Water Markets And Their Environmental, Social And Economic Impacts In Australia", (2008): 1-16
[68] Bjornlund. "Water Markets And Their Environmental, Social And Economic Impacts In Australia", (2008): 1-16
[69] Crase, Pagan, and Dollery. "Water Markets as a Vehicle for Reforming Water Resource Allocation". *Water Resources Research,* (2004): 1-10
[70] Crase, Pagan, and Dollery. "Water Markets as a Vehicle for Reforming Water Resource Allocation". *Water Resources Research,* (2004): 1-10
[71] Kiem, "Drought and Water Policy in Australia," *Global Environmental Change*, (2013): 1615-1626
[72] Grafton, Horne, and Wheeler. "On the Marketization of Water". *Water Resources Management,* (2016): 913-26

or argument is not empirically supported. Other concerns have been expressed about the cultural and social changes induced by the water market in rural communities. Rural communities fear that if too many irrigators decide to sell their water entitlements, it may lead to decrease of land value, loss of both on-farm and off-farm jobs (as a consequence of farm production decline), outmigration and reduction of public services provision (e.g., healthcare, child education, etc.).[73] To put it simply, the main argument is that the introduction of water markets may greatly disrupt the socio-economic organisation of rural communities, and in the worst-case scenario, may ultimately lead to the gradual erosion of social life in such communities (mainly through outmigration because of the lack of economic opportunities in the area). While it is difficult to quantify these social impacts and few articles try to do so, Wheeler and Cheesman found, after having conducted one of the largest surveys of water entitlement sellers in the MDB, that most of them (approximately 60%) stayed in their local area after having sold their entitlements[74]. This evidence tends to demonstrate that this snowball effect of negative socio-economic impacts is not likely to occur in most cases. However, as mentioned previously, further studies (both quantitative and qualitative) are needed to better assess the socio-economic impacts of water markets.

In the current context of global issues of environmental sustainability, a lot of discussions have emerged about the relationship between water markets and environmental protection. Indeed, beside the economic rationale introduced above, there also lies an environmental rationale for the creation of water markets. The two are closely interrelated. The markets induce irrigators to adopt water-saving technologies and practices, ultimately creating a synergy between environmental goals and irrigators' rational behaviour.[75] On a purely theoretical ground, this argument can be contested. Indeed, it is based on the assumption that irrigators will not use the surplus of water saved from the adoption of more efficient technologies and would allow the surplus to return to the environment. However, it is equally likely that irrigators decide to use this

[73] Henning Bjornlund, Sarah Wheeler, and Jeremy Cheesman, "Irrigators, Water Trading, The Environment And Debt: Buying Water Entitlements For The Environment," in *Basin Futures: Water Reform In The Murray-Darling Basin*, ed. Daniel Connell and R. Quentin Grafton, (Canberra: ANU E Press, 2011): 291-302

[74] Sarah Ann Wheeler and Jeremy Cheesman, "Key Findings from a Survey of Sellers to TheRestoring the BalanceProgramme," *Economic Papers: A Journal of Applied Economics and Policy* 32, no. 3, (2013): 340-352

[75] Crase, Pagan, and Dollery. "Water Markets as a Vehicle for Reforming Water Resource Allocation". *Water Resources Research,* (2004): 1-10

surplus to increase their surface of irrigated lands, for example. In this context, the absolute quantity of water flows returning to the environment may decrease, threatening ecosystems' survival.[76]

In the Murray-Darling Basin, both states and federal governments have taken actions to keep sufficient levels of water for ensuring ecosystems' sustainability. Since the late 2000s and early 2010s, their strategy has focused on purchasing water entitlements and allocations from irrigators willing to sell them; these transactions are known as "environmental water buybacks".[77] Loch et al. identify three main obstacles for this strategy to truly become efficient and beneficial.[78] First, by limiting the overall supply of water resources available for consumptive use (such as irrigation in agriculture), environmental water buybacks may reduce irrigators' ability to deal with water issues during prolonged periods of droughts. Equally, this decrease of available supply may increase both water entitlements and seasonal allocations' prices, impeding the poorest irrigators to buy water they need for their crop production. Finally, if irrigators are unwilling to sell their water entitlements or allocations, governments may not be able to achieve their environmental goals. Evidence tends to show that prices have indeed increased since governments have started to purchase entitlements and allocations.[79] However, further empirical studies to confirm this causal relation are needed. Equally, Bjornlund, Wheeler and Cheesman[80] have found, after having conducted interviews with irrigators in the MDB, that irrigators' acceptance of environmental needs as a reason for governments to purchase entitlements and allocations has decreased over time. Their interviews demonstrate that irrigators are becoming less and less willing to sell their entitlements and allocations to governments for promoting environmental sustainability. This evidence shows that the theoretical environmental rationale for the introduction of water markets is not so straightforward in reality. Rather, it appears that MDB water markets, as they currently

[76] Bjornlund. "Water Markets And Their Environmental, Social And Economic Impacts In Australia", (2008): 1-16

[77] Bjornlund, Wheeler, and Cheesman, "Irrigators, Water Trading, The Environment And Debt: Buying Water Entitlements For The Environment," (Canberra: ANU E Press, 2011): 291-302

[78] Adam Loch et al., "Allocation Trade in Australia: a Qualitative Understanding of Irrigator Motives and Behaviour*," *Australian Journal of Agricultural and Resource Economics* 56, no. 1, (July 2011): 42-60

[79] Adam Loch et al., "Markets, Mis-Direction and Motives," *Australian Journal of Agricultural and Resource Economics*, (2021): 291-317

[80] Bjornlund, Wheeler, and Cheesman, "Irrigators, Water Trading, The Environment And Debt: Buying Water Entitlements For The Environment," (Canberra: ANU E Press, 2011): 291-302

stand, inherently lead to a clash (or trade-off) between environmental objectives and irrigators' socio-economic welfare.[81] This point is quite widely acknowledged within the literature.

Over the last few years, another concern has emerged among some rural communities in the MDB: water speculation. Water speculation occurs when some stakeholders buy water entitlements or allocations at a certain price to sell them later at a higher price in order to generate profits. This speculative activity can be very profitable, especially in the MDB due to the high variability of its climatic and hydrological conditions, as it has been estimated that during droughts the returns on investments can be as high as 159%.[82] There are thus high incentives for speculative behaviour in MDB's water markets. Adam et al. identify three main drivers of speculative price increases in the Murray-Darling Basin.[83] First, contrary to widespread "preconceptions" that water speculation is mostly driven by non-landholders (such as superannuation or sovereign funds looking for significant profits), they argue that high water allocations price in the MDB are greatly induced by landholders' demand for water, especially from irrigators involved in perennial crops. Indeed, this form of agricultural production is capital-intensive insofar as it requires high levels of initial investments. As a consequence, perennial growers are more likely, than irrigators involved in annual crops, to pay very high prices for water in order to protect their capital investments (e.g., fruit trees) during droughts. Secondly, expected drier conditions in Australia induced by climate change are expected to gradually increase water allocations prices. As prices increase, so do potential benefits stemming from speculative trade, ultimately encouraging more and more people to get involved in speculative activities. Finally, the third main driver of speculative behaviour identified is the reduction of the total supply of water available for consumptive uses, caused by governmental interventions in the markets to reallocate water entitlements and allocations to environmental users (i.e., for environmental purposes).

To conclude, water markets have been introduced in Australia, and especially in the Murray-Darling Basin, in the late 1980s following the assumption that they would solve water

[81] Kiem, "Drought and Water Policy in Australia," *Global Environmental Change*, (2013): 1615-1626

[82] Adam Loch et al., "Markets, Mis-Direction and Motives," *Australian Journal of Agricultural and Resource Economics*, (2021): 291-317

[83] Adam Loch et al., "Markets, Mis-Direction and Motives," *Australian Journal of Agricultural and Resource Economics*, (2021): 291-317

scarcity issues without affecting farming communities and while protecting the environment from overexploitation at the same time. More than thirty years later, assessments of the social, economic and environmental performances of water markets outline mixed results. Some scholars highlight their rather negative consequences while others point out the many benefits they have induced. However, except scholars who are firmly opposed to processes of commodification and financialization of water, there is a relatively wide recognition within the literature that water markets can generate beneficial outcomes if set up in a fair institutional framework that takes into account both socio-economic and environmental realities and dynamics in which water resources are embedded.

3.4. Water financialization in the United States

In the United States, the commodification of water is not a new phenomenon, particularly in the Western states[84] where large arid and semi-arid expanses are common. Water market activity in the Western United States has been documented as far back as the early 1900s when neighboring farmers rented and traded water amongst themselves to adapt to supply and demand fluctuations throughout the year.[85] Within the Western states, most water rights operate on a principle of prioritized seniority, which means that whoever has used a source of water for the longest has the greatest entitlement or seniority to it with junior, or newer, users having less priority. During times of drought or reduced precipitation, junior rights holders can lose their access to water as priority reverts those with more seniority.[86] Informal tradings of water entitlements between farmers is a strategy used to mitigate this lack of access. The recent formalized financialization of water in the United States though promises to change this through the creation of a system that allows for the purchasing of future water rights.

Within the United States, particularly the relatively arid Western states, new challenges regarding use and access to water are arising annually for a number of factors. Increased

[84] Western states refers to the following: Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Texas, Utah, Washington, Wyoming

[85] Matthew T. Payne and Skye Root. "Water Markets in the USA." *American Water Association*, 13, no. 5, (September 2011): 6

[86] Payne and Root. "Water Markets in the USA." *American Water Association*, (2011): 6

evapotranspiration from a warmer climate and decreased precipitation in the form of snow will contribute to increased temporal distribution of water resources, which deviate from what the United States' water infrastructure is designed to handle.[87] Decreased snowfall is particularly alarming as it significantly changes the temporal availability of water by not providing a reserve in the mountains that melts later in the summer during months when precipitation is particularly low. This results in increased water scarcity during a time of year when water demand is at its highest. Furthermore, the lack of replenishment of snow banks contributes to slower groundwater recharging, which is alarming in the face of the fact that the United States is currently depleting its groundwater reserves more quickly than it is allowing them to recharge.[88] The implications of these changes in precipitation are monumental for both natural wildlife as well as humans, particularly those engaged in water intensive industries.

Further exacerbating this problem, outside of climatic changes, are socioeconomic changes that are increasing demand even as supply becomes ever scarcer. Seasonal fluctuations in water supply are driven by economic processes. Fresh water demand is growing faster than demand for any other resource.[89] In the US, the Southwestern states are faced with higher population growth, higher average temperatures and lower precipitation compared to the rest of the United States.[90] Three states that are most impacted by these changes in recent years are Arizona, California, and Texas. Arizona is a state with some of the most advanced water infrastructure in the US, a necessity born of the fact that the state's annual precipitation ranges from 40 inches in some parts of the eastern-central mountains, to 3 inches in the southwestern region of the state.[91] Since 2009, Arizona has had an active water trading market which approximately represents 4% of overall consumed water used annually.[92] 92% of all traded water in Arizona has historically been in the form of leases.[93]

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[87] Kurt Schwabe, Mehdi Nemati, Clay Landry, and Grant Zimmerman. "Water Markets in the Western United States: Trends and Opportunities." *Water* 12, (14 January 2020): 1

[88] USGS. Groundwater Decline and Depletion. U.S Department of the Interior. (2021)

[89] D. N. Savinskaya, E.V. Popova, Kondratev V.U., and M.I. Popova. "Mathematical modeling of technical and economic systems in agriculture." IOP Conf. Series: Earth and Environmental Science, (2021): 1

[90] Schwabe, Nemati,Landry, and Zimmerman. "Water Markets in the Western United States." *Water*, (2020): 2

[91] Schwabe, et al. "Water Markets...." (2020): 3

[92] Schwabe, et al. "Water Markets...." (2020): 5

[93] Schwabe, et al. "Water Markets...." (2020): 5

9% of total daily water used in the US is consumed in California, the third most populated state in the country and a major grower of US agricultural products.[94] While the bulk of California's water demand comes from the semi-arid southern part of the state where on average less than 5 inches of precipitation are received annually, more than ⅓ of its consumed water originates from the northern mountains which receive more than 100 inches of precipitation in some parts.[95] Approximately 89% of California's water goes to environmental and agricultural uses with the remainder being allocated to the urban sector.[96] California is the most important agricultural producer in the United States, leading production for more than 77 different products and producing twice as much as Texas, its leading competitor.[97] California markets consisted of transferring rights either in the short term or long term with the majority of rights held by the farming sector.[98] Compared to Arizona and California, groundwater trading is most prominent in Texas. Oil, cattle, and agriculture, all water intensive industries, are the main drivers of the Texan economy and contribute to water stress experienced in the state.[99]

Water trades are typically confined to being within a state's boundaries. The water markets of the past have helped informally facilitate trades between farmers and municipalities as is relevant to their laws and guidelines. Increased efficiency of water management contributes to demand hardening as increased efficiency makes it more difficult for farmers/households to further reduce their demand during a shortage or drought.[100] A consequence of demand hardening is that the perceived potential benefits of water markets increase. Since 2009, water markets in all three states have been functioning to help address the intensification of water scarcity that has been taking place since then.[101] As the issues related to water scarcity continue to harden, new instruments for addressing this concern have emerged in the form of financialization of water,

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[94] Ivor Altaras Penda. "Water Share Trading: Business Risk Solution Or Social Hazard Inauguration?" *Pregledni Rad Scientific Review*, 7, no. 1 (2021): 4

[95] Schwabe, et al. "Water Markets...." (2020): 6

[96] Schwabe, et al. "Water Markets...." (2020): 6

[97] The Governor's Office of Planning and Research, Vital Communities Institute, and California Rural Policy Task Force. "California Agriculture: Feeding the Future." Governor's Office of Planning and Research, (2003).

[98] Schwabe, et al. "Water Markets...." (2020): 6

[99] Schwabe, et al. "Water Markets...." (2020): 7

[100] Schwabe, et al. "Water Markets...." (2020): 9

[101] Schwabe, et al. "Water Markets...." (2020): 10

which allows for major water users, such as farmers and municipalities, as well as investors, to speculate on the price of water by purchasing usage rights in advance.

The Nasdaq Veles California Water Index (NQH2O) was formalized in December 2020 as a way for such purchases to occur. Since 2013, the so-called "OTC market--over the counter market," has received increasing attention for how it manages water scarcity.[102] The formalization of the Nasdaq Veles Water Index signals a transition in the US from the end of decades of different informal water markets to a future where there is a singular regulated water market. According to David Lerman, a managing director and asset manager of the Chicago Mercantile Exchange (CME) Group company, the NQH2O indexus is a "completely different and innovative" way to invest in a new financial approach for generating profit.[103] Moving from the OTC type markets to the regulated market represents standardization of contracts, increased liquidity, increasing transparency, and reduced trading risks, which represents a more beneficial position of the NQH2O to its users.[104] In addition to supposedly improving the stance of its investors, the index has been hailed as a mechanism through which environmental interests can be secured.

The Nasdaq Veles California Water Index and water futures trading does not affect total water availability but rather changes who can access water depending upon best guesses regarding water futures and who has more power to enter the water future market. That supplies do not change, but access has, incentivizes speculation in the form of investors purchasing the right to water in advance with the hope they can sell it to users at a higher price in the future. Economists argue this will lead to a more efficient use of water as well as it will provide an incentive for those who hold the rights to improve their own water efficiency.

A common economic argument in favor of financialization of water in the United States is that the value of the water spent in the agricultural sector is undervalued while the water consumed by urban centers is overpriced, therefore the ability to facilitate water transfers would provide maximum economic benefits to both parties.[105] For example, the price paid per acre foot of

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[102] Penda. "Water Share Trading" *Pregledni Rad Scientific Review,* (2021): 24

[103] According to David Lerman, managing director and asset manager of the ECM Group company, while presenting NQH2O as a new financial product. https://www.youtube.com/watch?v=M_3KBrDV9OI

[104] Penda. "Water Share Trading" (2021): 24-25

[105] Jedidiah Brewer, Robert Glennon, Alan Ker, and Gary D. Libecap. "Water Market In the West: Prices, Trading, and Contractual Forms." National Bureau of Economic Research, (March 2007): 2

water in urban areas is anywhere from 9 to 70 times higher than the price paid per acre foot of water for agricultural use.[106] Across the Western states, on average, 73% of total sourced water volume goes to the agriculture sector and 23% to the municipal sector with the remaining roughly 4% going to industrial uses.[107] Purchases of permanent water or leases by industrial users do happen but the overall volume compared to the entire market is relatively small.[108] Economists see these geographically determined price disparities and usages as a sign of market failure and pro-water financializers claim that this failure can be corrected through systems that allow farmers to sell their water to municipalities, thereby driving down the price of water for urban areas while providing the farmers with returns from their water sales that would surpass their returns from using the same water to grow a crop. In addition to the economic argument, water financialization is pushed under the narrative of allowing for increased ecosystem protection. NGOs and other organizations working in the field of conservation are increasingly acquiring water entitlements to protect fish and wildlife habitats.[109] Water demand comes from uneven distribution and scarcity of it. Tools of water financialization are perceived as correctors of these uneven distributions across multiple sectors of life and interests.

3.5. Human rights concerns

Financialization of water is causing new dilemmas to arise in multidimensional areas, such as sociology, economics, law, semantics, politics and geopolitics, as well as ethics. Within the realm of law, there is a special emphasis on the topic of fundamental human rights and liberties, which connects directly to the realm of ethics that is concerned with the moral questions that arise in regards to the usage and distribution of water as a limited resource.[110] Penda notes that the few recognitions that exist regarding the human right to water are limited and insufficient for tackling the challenges posed by the emerging financialization of water. In critiquing these limitations, Penda notes that the right to water does not mean the right to unlimited amounts of water or the

[106] Brewer, Glennon, Ker, Libecap. "Water Market In the Wes.." National Bureau of Economic Research, (March 2007): 1
[107] Schwabe, et al. "Water Markets...." (2020): 12
[108] Schwabe, et al. "Water Markets...." (2020): 12
[109] Payne and Root. "Water Markets in the USA." *American Water Association,* (2011): 6
[110] Penda. "Water Share Trading" (2021): 5-6

right to free water nor does it provide guidelines on what quantity of water is sufficient for securing human dignity.[111] The difference between the universal right to water vs. the right to limited access is a significant distinction which has implications for the amount that people are able to access. Water access is directly tied to many other human rights, such as the right to food, the right to sanitation and health, and even the right to parenthood. Without access to this essential resource many other fundamental human rights are threatened given that water is the foundation to life and all other rights.

Affordability of water is at the core of it as a human right. The financialization of water potentially threatens this as it could drive the price of water past the point of affordability. Pricing is the main instrument for treating water as an economic resource. Cullet notes that this is potentially problematic as "it is not the neutral mechanism that it is made out to be."[112] He further notes that the economization of water process is linked to the partial or complete withdrawal of the state from its provisions.[113] In, *Privatising Human Rights: What Happens to the State's Human Rights Duties when Services are Privatised,* Adam McBeth argues that states at the very least are obligated to progressively adopt policies and measures for the realization of social rights, such as the right to water. Human rights treaties are state-focused because only states are expected to enforce them.[114]

This raises questions though about who is obligated to enforce certain rights when certain services become privatized. The financialization of water further calls the enforcement of the right to water into question as it further dislocates control of water resources from the state to non-state actors. We can look to past privatization of water for examples of the human rights concerns we might anticipate emerging under financialization of water given that privatization paved the way for financialization by allowing non-state actors access to the resource as something for them to control. Considering who is charged with enforcing human rights- states -

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[111] Penda. "Water Share Trading" (2021): 6

[112] Philippe Cullet. "FOSTERING THE REALISATION OF THE RIGHT TO WATER: NEED TO ENSURE UNIVERSAL FREE PROVISION AND TO RECOGNISE WATER AS A COMMON HERITAGE." *National Law School of India Review* 31, no. 1 (2019): 117

[113] Cullet. "FOSTERING THE REALISATION OF THE RIGHT TO WATER" *National Law School of India Review* 31, no. 1 (2019): 117

[114] Adam McBeth. "Privatising Human Rights: What Happens to the State's Human Rights Duties when Services are Privatised." *Melbourne Journal of International Law* 5, no. 1, (2004)

this is problematic and raises the need for there to be controls imposed on these non-state actors so that human rights are preserved and not lost to the interests of investors in water. Khulekani Moyo says there is a need for holistic water delivery systems that must be scrutinized to ensure they are meeting standards that align with the right to water.[115] Philip Alston notes though that in the absence of uniform international standards, it is difficult to impose high levels of control and regulation on non-state actors.[116] Though the preamble of the Universal Declaration of Human Rights (UDHR) states that the UDHR is a standard for "every organ of society,"[117] it is under debate whether this encompasses corporations or not.[118] Therefore ambiguity in who is in charge of enforcing the right to water in the face of financialization raises concerns regarding how this right will be safeguarded. From this ambiguity arises a multitude of opportunities for the right to water to be ignorantly shunted aside at best and outright maliciously ignored for the sake of profits at worst.

From the position of the water market though, the question about whether or not water is a fundamental human right is outside the scope of the market and instead falls under the realm of the law.[119] The responsibility of providing water to satisfy human rights needs falls on the utility providers of a country, not the index, and so it is an irrelevant question to the market.[120] The primary goal and function of these trading financial instruments is to facilitate risk reduction for those who depend on water and to have speculators provide the capital that keeps the market liquid.[121] Paradoxically, as financialization of water reduces risk for investors and business, it simultaneously increases social hazards given that the state is increasingly dislocating water management responsibility to the private sector and that the private sector dislocates human rights responsibilities back onto the state.

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[115] Khulekani Moyo. "Privatisation of the Commons: water as a right; water as a commodity." *Stellenbosch Law Review* 22, no 3, (2011): 804-822

[116] Philip Alston. "The Not-a-Cat Syndrome: can the international human rights regime accommodate non-state actors?" in *Non-State Actors and Human Rights,* Philip Alston (ed.), Oxford (2005): 3-36

[117] The United Nations. *Universal Declaration of Human Rights*. (1948)

[118] Moyo, Khulekani, and Sandra Liebenberg. "The Privatization of Water Services: The Quest for Enhanced Human Rights Accountability." *Human Rights Quarterly* 37, no. 3, (2015): 706

[119] Penda. "Water Share Trading" (2021): 25

[120] Penda. "Water Share Trading" (2021): 27

[121] Penda. "Water Share Trading" (2021): 32

3.6. Gaps in the literature

While many gaps exist in the literature related to water financialization, largely in part due to how new this concept is, we have identified several major gaps in the literature that scholars should seek to fill. Water speculation is strongly associated with water financialization yet this phenomenon has largely been ignored in the literature so far. It is a disservice to all actors involved in and affected by water financialization to overlook this significant driver of water prices. This report aims to fill that gap and propose policy recommendations that are tailored towards guarding human rights in the face of water speculation.

Another gap in the literature is that of the connection between the right to water, how this right informs all other rights, and the impact of water financialization on these rights. One important example is the impact of water financialization on the rights of indigenous communities for self-determination. As outlined in the Resolution adopted by the UN General Assembly in 2007, UN Declaration on the Rights of Indigenous Peoples, Article 3: "Indigenous peoples have the right to self-determination. By virtue of that right they freely determine their political status and freely pursue their economic, social and cultural development".[122] Does financialization hinder this right if communities have to rely on water markets to access the indispensable resource? Some of the current literature does discuss how the market itself does not feel responsible for securing the human right to water as it is a responsibility that has been bestowed upon the state by international treaties. The literature fails to note though what the ethical responsibilities should be of those involved in water financialization as well as what their legal obligations should be for securing the right to water.

Information about water financialization in the United States is largely missing, which is unsurprising given how new the Nasdaq Veles Water Index is. Scholars should seek to study this new market as it continues to evolve and be particularly attuned to the human rights implications associated with this new market. Furthermore, there should be recognition in the literature regarding how, as a hegemonic power, the United States' new water market has the potential to

[122] United Nations General Assembly. *United Nations Declaration on the Rights of Indigenous Peoples.* United Nations (13 September 2007). A/RES/61/295

influence water markets around the world and what are the implications of such a system being exported.

In the case of Australia, the socio-economic impacts of water markets are acknowledged and assessed but again, there is no connection made between them and human rights. Like in the US, within Australia, the impacts of water financialization should be studied through a human rights approach so that subsequent policy recommendations can be made situated within a human rights framework.

4. Methodology

The methodology of the research project mostly relies on gathering and analysing qualitative data through three different means: literature review of relevant reports, academic papers, newspapers' articles and other key documents; interviews conducted with different stakeholders from various sectors, all involved - more or less directly - in the issue of water financialization; and a Safe Space roundtable discussion featuring other key stakeholders who have not been interviewed.

As noted above, the literature review has introduced a comprehensive understanding and definition of water financialization, and has reviewed the risks associated with it, noting especially concerns for human rights and environmental protection. The review has also concisely traced the history of water management, which helps to better contextualize some of the current regimes of water management. The review has focused on current - rather than past - challenges and risks related to the financialization of water, mostly in two different geographical areas: the United States and Australia. While the literature review has introduced some elements related to the privatization of water - as an essential preliminary step towards financialization - the rest of the project reviews the impact of water *financialization* on access to water.

Following the literature review, individual interviews have been conducted with people involved in the water sector. In an effort to best represent the diversity of actors involved in the issue of water financialization, we have interviewed academic experts, private sector actors, and representatives of international organizations (IOs), non government organizations (NGOs) and UN

institutions. Please see Appendix A for a list of all the people interviewed over the course of the research. These interviews have been opportunities to gather first-hand knowledge, experience, and opinions from opposing parties, such as:

1. Those encouraging water financialization as a solution to water scarcity;
2. Those who are vehemently opposed to the financialization of water due to concerns related to human rights;
3. Those who see both opportunities and risks with the financialization of water and call for more regulations of this new phenomenon.

Conducting interviews was the most suitable approach to gather further data and answer the project's research questions as it provided the possibility to grasp different actors' experiences on a personal level and in their own words. It also ensured that the information gathered is timely and up to date with current challenges. Please see Appendix B for an overview of the interview format and questions that were posed to the interviewees. Thematic coding techniques were used to analyse interviews based on their transcripts. The coding strategy used keywords from the interviews' questions in order to classify the content along key thematic issues, such as: speculation, human right to water, water management efficiency, human right to food, environmental protection and sustainability.

The last form of collecting qualitative data was through a Safe Space, an online roundtable discussion organized in collaboration with the Geneva Water Hub and held on November 11, 2021. Participants included: the Special Rapporteur on the human rights to safe drinking water and sanitation, university professors (University of Geneva, Zhejiang University) and representatives of NGOs (Earthjustice, Global Institute for Water, Environment and Health), think tanks (Geneva Water Hub), and the private sector (Pictet Asset Management, AQUAFED). Information gathered from the roundtable discussion has been used to help shape and inform the project's findings, analyses and recommendations. Please see Appendices C and D for the Safe Space concept note and agenda.

5. Findings

Based on the insights gathered through the interviews conducted with experts in the issue of water financialization as well as through key reports and other relevant documents, this part aims to answer the research questions formulated at the beginning of this report and address some of the gaps outlined at the end of the literature review. Our findings are articulated around three main arguments. The first focuses on the risks speculation on water markets may pose to the human right to water. The second further investigates the assumption that financialization of water increases water management efficiency. The last argument develops more thoroughly the interrelation between the human right to water and the realization of other human rights, such as the right to food, right to sanitation, and right to a healthy environment.

5.1. Speculation & the human right to water

As briefly introduced earlier in this report, speculation is commonly understood as "the purchase of a good for later resale rather than for use, or the temporary sale of a good with the intention of later repurchase in the hope of profiting from an intervening price change".[123] In the case of water, a distinction has to be drawn between speculating on WASH infrastructures and speculating on water in itself, i.e., on the resource. The former form of speculation stems from the buying and selling of shares of private companies involved in water supplying or treatment services; whereas the latter form of speculation results from buying water rights and trading them in water futures markets, such as the Chicago Mercantile Exchange.[124] Investors, whether they be superannuation funds, banks, large-scale irrigators or small-scale farmers, bet on the future price evolution of water. If they expect water prices to increase in the near future, they buy water rights in order to sell them later at a higher price and thus generate profits. Whether speculation in water markets is "good" or "bad" – in relation to water management efficiency - is highly debated. This part aims to further explore the arguments around the issue of speculation on water. Given the

[123] Miguel Robles, Maximo Torero, and Joachim von Braun. "When Speculation Matters." *International Food Policy Research Institute,* Issue Brief 57, (2009): 2

[124] Maude Barlow (member of the Board of Directors of Food & Water Watch). Interview with the authors. 10 August 2021

data gathered and used for this part, note that the focus is on the speculation over water ownership, i.e., water rights, rather than over water infrastructures.

One of the key underlying (economic) rationales to the creation of water markets is the right pricing of water. It is based on the assumption that, without (water) markets, water is under-priced, leading to overexploitation of water resources and inefficient and excessive uses of water.[125] By setting the "real" price of water – through the logic of demand and supply – water markets incentivize consumers to adopt more efficient uses of water, ultimately leading to a better management system of water scarcity. However, this argument is contested by many, especially since the advent of water futures markets. It is argued that water futures markets are dominated by speculative logics of profit maximisation.[126] As a consequence, rather than setting the "real" price of water and stabilizing it, these markets may tend to overprice water, making it ultimately unaffordable to the most vulnerable people.

This is what happened in Australia in the early 1990s when the Australian government allowed farmers to sell surplus water. The lack of regulations in the water markets – combined with the dry climatic conditions of that time – entailed a significant speculation-driven increase in water prices, which made water the most valuable "crop" to be harvested on land.[127] Mining companies and cotton industries, both owning very large supplies of water, made a lot of money by selling parts of their water rights.[128] While this example shows how the financialization of water and its potential underlying speculative logic may hinder the realization of the human rights to safe drinking water and sanitation, empirical data on the consequences of speculation on water are lacking and are thus very much needed to better assess this phenomenon. The lack of empirical evidence is certainly due to the recent nature of this phenomenon.

Due to the lack of evidence from water futures markets, opponents to financialization of water often draw parallels with what happened and is happening in food futures markets to predict what will occur in water futures markets. Both markets share three main similarities. Firstly,

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[125] Willem Buiter (professor of International and Public Affairs at Columbia University). Interview with the authors. 28 Junes 2021

[126] United Nations Human Rights Office of the High Commissioner. *Risks and impacts of the commodification and financialization of water on the human rights to safe drinking water and sanitation.* OHCHR: (16 July 2021). A/76/159

[127] Barlow Maude (member of the Board of Directors of Food & Water Watch). Interview with the authors. 10 August 2021

[128] Barlow. Interview. 10 August 2021

both water and food futures, as financial products, are being traded through automated processes in opaque spaces where investors' accountability cannot be easily determined.[129] Secondly, both water and food are the most basic needs which underpin human life and are thus very closely intertwined with the realization of all other human rights.[130] What happens in both markets should therefore be scrutinized with very careful attention. Finally, both markets are driven by the same speculative logics.[131] The burst of the speculative bubble in food futures markets in 2008, which led to a global increase in food prices and food riots in many countries around the world, exemplify the risks and threats that speculation on such sensitive and essential "products" can entail. It also reveals the unequal power relations that exist within these markets, between those who can afford to bet on future water or food prices to make profits and those whose survival depends on such prices.

Now, whether or not these power imbalances are inherent to water markets is also debated. Some argue that water markets are the wrong instrument to deal with water scarcity because such asymmetry in power relations are unavoidable in water markets. In the words of the UN Special Rapporteur on the human rights to safe drinking water and sanitation, Prof. Pedro Arrojo-Agudo: "[the] market is not able to identify the problems of the most vulnerable because *they are not in the market*".[132] By contrast, others argue that these power imbalances and their resulting distributional consequences in terms of access to sufficient and affordable water supply stem from an issue of information access, rather than from the very nature of markets. It is argued that, in order to have good functioning markets, information has to be transparent and made equally available to all stakeholders involved in water trading.[133]

Beyond the adverse consequences of speculation on the affordability of water, opponents to the financialization of water also often denounce the very ethics of speculation. They see the

[129] United Nations Human Rights Office of the High Commissioner. *Risks and impacts of the commodification and financialization of water.* 16 July 2021

[130] United Nations Human Rights Office of the High Commissioner. *Risks and impacts of the commodification and financialization of water.* 16 July 2021

[131] United Nations Human Rights Office of the High Commissioner. *Risks and impacts of the commodification and financialization of water.* 16 July 2021

[132] Pedro Arrojo-Agudo (UN Special Rapporteur on the human rights to safe drinking water and sanitation). Interview with the authors. 23 June 2021

[133] Michael Young (economist and professor of Water and Environmental Policy at the University of Adelaide). Interview with the authors. 28 June 2021

behaviour of investors hoping for drier climatic conditions - in regions already marked by severe water scarcity - to bet on higher water prices and thus reap significant profits as deeply immoral.

Proponents of the financialization of water argue that speculation can be good. In the words of Willem Buiter, former Chief Economist at Citigroup and Visiting Professor of International and Public Affairs at Columbia University, "speculation [...] can be a force for good in the water market as in many other markets if managed properly".[134] Through the financialization of water ownership, water rights are transformed into financial assets that contribute to diversifying owners' sources of income. In addition, speculative strategies give the opportunity to water rights owners – like farmers – to sell water at high prices and make significant profits.[135] In this sense, water rights are a valuable asset, which can be especially beneficial for farmers who know they are going bankrupt; they go bankrupt but at least they can earn money by selling their water rights (more than if they would have sold their land).[136] Also, due to the physical constraints of water transportation, water often remains in the same district even after the trading of water rights. This means that, at the district level, while irrigators can earn money through speculation, the overall amount of water does not change - or only slightly - limiting thus the potential negative socio-economic consequences, such as decrease in agricultural production outputs. In this sense, water speculation "does not harm local communities" but rather "brings money into them".[137]

However, it could be argued that such analysis is only partial insofar as it only focuses on the sellers. Yet, speculation is a two-side process. If some farmers sell their water at high price, it necessarily means that some potential buyers cannot afford to pay, and therefore cannot fully meet their water needs.

While proponents of financialization of water point out the potential positive outcomes of speculation, they acknowledge the necessity to "manage it properly". Both Willem Buiter and Michael Young, Australian economist, water policy expert and Executive Director of the Environment Institute of the University of Adelaide, outline that ensuring a sufficient level of

[134] Buiter (professor of International and Public Affairs at Columbia University). Interview with the authors. 28 Junes 2021
[135] Young (economist and professor of Water and Environmental Policy at the University of Adelaide). Interview with the authors. 28 June 2021
[136] Young. Interview. 28 June 2021
[137] Young. Interview. 28 June 2021

income or wealth (so that everyone can afford to buy water to meet basic demands) is one potential way to mitigate the consequences of price instability induced by speculation. This could be achieved by either implementing a separate process of wealth redistribution through taxes and other fiscal means,[138] or adopting a universal basic income (UBI) which takes account of water price fluctuations.[139] In addition to these options, Willem Buiter suggests another mechanism in the form of a market of last resort that could intervene – by buying and selling water rights – when there is excessive volatility in the water markets in order to avoid unnecessary and inefficient speculation that could make water unaffordable to many people.[140]

Assessments of whether speculative logics in water markets reinforce or hinder the realization of the human right to safe drinking water and sanitation, therefore, tend to depend on the angle through which this right is framed. If the realization of this right is framed as a purely financial issue, speculation may have mixed consequences depending on the context and market structure in which it takes place. If speculation takes place in a sound redistributive fiscal environment and is regulated to avoid excessive volatility, speculation can be beneficial insofar as it may represent an additional source of income while not threatening the human right to water. In this context, the introduction of water futures markets, rather than leading to future price uncertainty, may entail greater transparency of expectations of future water prices[141]. In turn, this greater price certainty may help water markets' consumers to adopt the best water supply management strategies (for example, save water supply if price is expected to increase in the coming weeks or months). However, if speculation is unregulated, it may lead to excessive water prices, making the resource non-affordable for the most impoverished people. But - according to this view - because the realization of the right to water is foremost a financial issue, these potential adverse consequences of speculation on prices can be mitigated through financial means in order to safeguard the human right to water. This is well exemplified by Willem Buiter's

[138] Young. Interview. 28 June 2021
[139] Buiter. Interview. 28 June 2021
[140] Buiter. Interview. 28 June 2021
[141] Anna Tobin, "Could trading water on the stock market actually be good for the environment?", *euronews.green, (*18 May 2005)
https://www.euronews.com/green/2021/05/17/could-trading-water-on-the-stock-market-actually-be-good-for-the-environment

statement: "The main solution to water as a human right is to recognise that a decent income, sufficient wealth is a basic human right".[142]

By contrast, if the realization of the human right to water is framed as a multidimensional issue involving a set of social, political and economic factors, then speculation is seen as inherently adverse to the safeguarding of this right because it tends to reinforce pre-existing power imbalances. The most vulnerable people, not being able to compete on the market due to either lack of access, or lack of information, or lack of economic resources – or the three combined -, have no power of influence and are thus completely dependent on the behaviour, decisions and actions of more powerful markets' stakeholders, whether they be richer and larger irrigators, superannuation funds or banks.

What comes out from this argument is that if there is speculation, it has to be regulated. Any government willing to financialize water ownership through the creation of a water futures market should make sure that this transition is accompanied by the implementation of regulations that limit speculative behaviours within these markets. The last part of this report provides policy recommendations on that issue.

5.2. Water management efficiency in financialization

A strong argument put forth by proponents of water financialization is that such a process may increase water efficiency. We will examine this claim by considering what increased water efficiency would look like and its connection to the human right to water. To do so we must first define and contextualize what is meant by water efficiency and how it can support the human right to water.

Defining Water Efficiency

According to the United Nations Environment Programme, "water efficiency is a multifaceted concept. It means 'doing more and better with less' by obtaining more value with the available resources, by reducing the resource consumption and reducing the pollution and environmental impact of water use for the production of goods and services at every stage of the

[142] Buiter. Interview. 28 June 2021

value chain and water service provision."[143] In her acclaimed work, *Water Use and Conservation*, Amy Vickers defines water efficiency as the reduction of water wastage by measuring the amount of water required for a particular purpose and the amount of water used or delivered.[144] It differs from water conservation in that it is preoccupied with reducing waste rather than restricting total usage. Water efficiency can be understood as an important tool in the realization of water conservation, "the preservation, control and development of water resources, both surface and groundwater, and prevention of pollution"[145] and water security, "the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water."[146] Given the role it plays in securing other water related objectives, it is important to understand how incentivizing increased water efficiency may be perceived by governments and market actors as a desirable thing to achieve.

Strong consideration for the market is clearly given by both the United States and Australia in their respective definitions of water efficiency. The United States Environmental Protection Agency's Water Senese program states "water efficiency is the smart use of water resources through water saving technologies and simple steps we can all take around the house" and then connects these savings first and foremost to households saving money.[147] Australia's Department of Industry, Science, Energy, and Resources provides an even more market focused definition of water efficiency by never speaking of a direct definition of water efficiency but rather focusing on speaking of "water-efficient appliances and fixtures, combined with sensible water use" to "save money and keep resources at sustainable levels."[148] Thus, for both the United States and Australia, ideas about water efficiency are less closely tied to human well being than in the UN's definition and are more closely related to the monetization of water.

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[143] United Nations Environment Programme. "Water and Energy Efficiency- Information Brief." UN, (2014): 1

[144] Amy Vickers. *Handbook of Water Use and Conservation: Homes, Landscapes, Businesses, Industries, Farms*. Amherst, MA: Waterplow Press, (2001): 434

[145] Glossary of Environment Statistics, Studies in Methods, Series F, No. 67, United Nations, New York, (1997)

[146] UN Water. "What Is Water Security? Infographic: UN-Water." United Nations, (May 8 2013) https://www.unwater.org/publications/water-security-infographic/

[147] United States Environmental Protection Agency. "Why Water Efficiency ." *Environmental Protection Agency*, (January 19 2017) https://19january2017snapshot.epa.gov/www3/watersense/our_water/why_water_efficiency.html

[148] Australian Government- Department of Industry, Science, Energy and Resources. "Water efficiency", (2021) https://www.energy.gov.au/households/water-efficiency

Incentivizing Efficiency

Unequal access to water and sanitation services between the poorest and richest members of a country is a common trend around the world. For example, in 2017, 80% of the richest rural Haitians had access to basic drinking water while only 22% of the poorest had such access.[149] In that same year, in Cambodia, 99% of the richest urban residents had access to basic sanitation while only 60% of the poorest had access.[150] While these are just two examples of the sharp inequalities that exist within many more countries, they are representative of a wider global trend where 4.2 billion people lack access to safely managed drinking water services and 3 billion lack access to basic sanitation services.[151] The global need to expand water services and to increase water efficiency creates space for new mechanisms of water management, such as financialization of water, to arise and be implemented.

A common argument related to how to increase water efficiency is to create market incentives which reward decreased total water usage and the elimination of loss. Non-revenue water, also referred to as water loss, is water that is intended to reach consumers but never does as a result of leakages. It is estimated that every year more than 48 billion meters cubed water is lost.[152] In a market where water is financialized, and thus the price of water is higher, water distributors have increased incentives to minimize water loss in order to maximize their profits, which can then be invested in expanding water infrastructure and services to a greater number of individuals.

Increased efficiency though does not solely benefit water suppliers and consumers but extends beyond the individual level to also impact the environment. If increased water efficiency allows for us, as humans, to draw less total water due to prevention of loss, that in theory would allow for more water to be left for the environment. However, this benefit only occurs if people do not increase their water consumption as a result of improved efficiency. In this sense, improved water efficiency, while being a potential important means towards greater environmental

[149] UNICEF and WHO. *Progress on household drinking water, sanitation and hygiene: 2000-2017: Special Focus on Inequalities.* New York: UN, (2019): 45

[150] UNICEF and WHO. *Progress on household drinking water, sanitation and hygiene..* (2019): 45

[151] UNICEF and WHO. *Progress on household drinking water, sanitation and hygiene..* (2019): 139

[152] Ociepa, Ewa, Maciej Mrowiec, and Iwona Deska. "Analysis of Water Losses and Assessment of Initiatives Aimed at Their Reduction in Selected Water Supply Systems" *Water* 11, no. 5, (2019): 1037. doi.org/10.3390/w11051037

sustainability, cannot be the sole solution to these environmental issues as it does not address the underlying causes of water scarcity (e.g., climate change, water pollution, etc.). In the same vein, it cannot be the sole strategy to safeguard the human right to water because the realization of this right is not only about the technical dimension of improving water efficiency but also the more political dimension of addressing issues of inequalities. The next subsection focuses on one kind of inequality that may arise as a consequence of the financialization of water and how this may ultimately lead to an inefficient water management regime.

Monopolies

Another inefficiency to consider when evaluating how financialization of water processes may contribute to improved water management is that of the natural monopoly. Water management can be considered to be a natural monopoly given its high barrier costs of entry. Monopolies are inherently inefficient given that, compared to an equivalent, non-monopolistic market, under the monopoly, a product's price is higher and output lower. When applying this to water, such conditions may contribute to more expensive, less accessible water of potentially a lower quality for personal and domestic consumption. The present absence of market regulations in Australia and the United States to prevent the arisal of a water monopoly as a result of financialization processes suggest that financializing water resources may in fact become inefficient.

The financialization of water raises issues of (unequal) representation and accountability. Thanks to private ownership of the resource entitled by water rights, owners of such rights enjoy a decisional monopoly over how to use and manage their own resources. Problems may arise when decisions taken by some owners, especially large-supply owners, affect other users or consumers who are themselves not owners of water rights. These people who also need water find themselves in a situation where they do not have a say in how the resource should be managed. So, the risk with the financialization of water is that while everyone needs water and has a stake in its management, some voices (especially those of the most vulnerable) may be excluded from

decision-making processes[153]. In other words, the risk is that decisions over the management of water resources may ultimately become concentrated in the hands of a few large and powerful water rights owners. The problem is that to make sound and informed water management decisions, the greatest number of stakeholders - rather than "a single voice" - should be involved in decision-making processes[154].

Consumers are often at a disadvantage where monopolistic conditions exist. In avoiding a slippery slope argument, we must however note that just because new monopolies may arise does not mean it will necessarily threaten the human right to water. But it is worth being critical against a process, which creates worse conditions for some consumers, especially when the product in question is so essential to maintaining life. In places where water financialization is taking place, it is important for governments to develop a human rights based approach to water efficiency so personal consumers do not lose out to private entities. A first step would be to ensure that the greatest number of stakeholders in water management issues are involved in decision-making processes through public and democratic participation; what the UN Special Rapporteur calls a "democratic water governance"[155].

5.3. Related rights: food, sanitation & healthy environment

In addition to posing a threat to the human right to water, financialization processes may also pose a threat to other related human rights, such as the right to food, the right to sanitation, and the right to a healthy environment. Other aspects to consider could also include the right to health and the right to adequate living conditions, but this report focuses on the aforementioned rights on food, sanitation and environment, as they somewhat cover similar topics. The effects on food systems, individual and public sanitation, and the environment are inextricably linked to overall human well-being and health. It is hence important to assess how they are impacted by financialization and safeguard them as an addition to the basic right of water access.

[153]Richard Connor (Editor-in-Chief of the United Nations World Water Development Report at UNESCO). Interview with the authors. 22 July 2021
[154]Connor. Interview. 22 July 2021
[155]United Nations Human Rights Office of the High Commissioner. *Risks and impacts of the commodification and financialization of water.* 16 July 2021

Right to food

Food production and consumption are directly linked to water security. In the case of surging prices for water in speculative markets, those who cannot afford the increased prices, such as smallholder farmers, become at risk to lose access to the indispensable resource. Maude Barlow gives an example of Australia's initiation of water markets, which at first aimed to help farmers conserve water by selling excesses on the market.[156] Instead of achieving the original intent, the introduction of water markets brought in external brokers who were not associated with the land and were able to make large-scale profits by selling water to corporations for mining, development or the cotton industry, and hence driving up the water prices so that smaller scale actors and farmers could no longer afford them.[157] Hence the right to food can be threatened by the processes of water financialization, which may result in profit accumulation to the detriment of producers and consumers. As smallholder farmers play an important role in providing healthy and nutritious food, the lack of water access will hinder not only their personal livelihoods but also food production for local communities.

Clapp and Isakson argue that financialization advances the division of power and wealth in a manner that exacerbates existing lines of social stratification and inequalities in food systems, as the main beneficiaries are actors with money, big agribusiness firms and financial investors, while the majority of farmers, consumers and the planet bear "the bulk of the costs."[158] The costs increase "economic and ecological vulnerabilities within agrifood systems" which undermine the sector's resilience and demonstrate a challenge to the ability to provide livelihoods and food security long-term.

Food sovereignty, "broadly the right of peoples [...] to control their own food systems", could be promoted as part of the solution to empower local modes of food production that benefit the environment and communities.[159] Fair local markets play an important role in establishing food sovereignty. In an unregulated market, speculation of water rights undermines the right to food

[156] Barlow. Interview. 10 August 2021
[157] Barlow. Interview. 10 August 2021
[158] Jennifer Clapp and S. Ryan Isakson. "Risky Returns: The Implications of Financialization in the Food System." *Development and Change* 49, no. 2, (Forum 2018): 437-460
[159] Martha Jane Robbins. "Exploring the 'localisation' dimension of food sovereignty." *Third World Quarterly* 36, no. 3, (2015): 449-468

and sovereignty, however, if the market is regulated according to caps on quantity or price and limited to local actors, trading of water could be made more fair and respectful of the human right to food.

Right to sanitation

In 2010, the United Nations General Assembly recognized the right to water and sanitation in a Resolution, which acknowledged that "clean drinking water and sanitation are essential to the realisation of all human rights".[160] However, speculative trading of water futures poses a similar threat to sanitation as it does to questions of water access. Vulnerable communities that face water insecurity, in the face of surging water prices, may also be forced to sacrifice the quality of sanitation due to a lack of better options or funds to invest in better infrastructure. Barlow brings up an example of girls' access to toilet facilities at schools: if a school lacks sanitary indoor bathrooms, girls may not want to attend due to fear of violence if they have to use the woods or fields as a bathroom.[161] The financialization of water and its consequential issues on sanitation are, therefore, issues that also interact with other development areas, such as girls' access to education.

However, Willem Buiter suggests that when financializing water, it would be necessary to first integrate physical water supply infrastructures to the furthest possible extent to avoid discrepancy in availability.[162] After this, speculation could help resources reach the areas with the highest scarcity value. Private investment and financial markets could contribute to the 'financing gap' to build better infrastructure for sanitation purposes where funding from governments or international organisations fail to do so. Although financialization of water may exacerbate social issues related to sanitation, it could, on the other hand, help direct funding for critical infrastructure needed to ensure proper sanitation.

Castree and Christophers also acknowledge that even though capital is "centrally bound up with capitalism's most exploitative and ecologically harmful circuits," there are "signs of hope,

[160] UN General Assembly. *The human right to water and sanitation*. United Nations (28 July 2010). A/RES/64/292-E
[161] Barlow. Interview. 10 August 2021
[162] Buiter. Interview. 28 June 2021

not least in historical (and contemporary) examples of finance being put to extraeconomic ends".[163] Therefore, finance could surpass a mere profit-seeking rationale and instead be used to fund extraeconomic motives, such as the right to sanitation, through investment in infrastructure. This report focuses on the trading of water rights and futures, which are more likely to harm the right to sanitation due to uncontrolled price surges, but a trading of investment in water infrastructure could be further studied to determine its possibilities to support the right to sanitation.

Right to a healthy environment

The right to a healthy environment was recognized as a human right by the United Nations Human Rights Council in resolution 48/13 on 8 October 2021.[164] As a landmark resolution, this calls for a recognition of the interlinked nature of environmental protection and human rights - "neither goal can be achieved without the other".[165] As an environmental resource, the way water and its rights are traded and allocated play an immense role in ensuring wider ecological sustainability. As outlined in the findings on water efficiency, there are arguments to claim that water markets increase the efficiency of water allocation, enhance ecological sustainability, and help avoid droughts. However, as charted, the creation of water markets and the trading of water futures do not address the underlying causes of water scarcity and cannot fully foster ecological sustainability. Ahlers and Merme question the basis of water financialization on interest-bearing profits: "To what extent are high returns a reflection of the externalization of costs?"[166]

If the speculation of water rights causes price surges that threaten farmers' access to water, the externalization of costs is laid on both the farmer and the environment under their control. In cases of drought, the over extraction of water aquifers leads to drastic environmental harm - soil and land erosion, increased sinkhole hazards and associated risks.[167] Droughts also reduce the fertility of soil, demanding an increased need for pesticides and inorganic fertilizers in

[163] Castree, Noel, and Brett Christophers. "Banking Spatially on the Future: Capital Switching, Infrastructure, and the Ecological Fix." *Annals of the Association of American Geographers* 105, no. 2, (2015): 385
[164] UN News. "Access to a Healthy Environment, Declared a Human Right by UN Rights Council." October 8 2021
[165] UN News. "Access to a Healthy Environment, Declared a Human Right by UN Rights Council." October 8 2021
[166] Ahlers, and Merme, "Financialization, Water Governance....." (2016): 769
[167] Rogelio Rinales, Carles Roqué, Francisco Gutiérrez, Mario Zarroca, Domingo Carbonel, Joan Bach, and Ivan Fabregat. "The impact of droughts and climate change on sinkhole occurrence. A case study from the evaporite karst of the Fluvia Valley, NE Spain." *Science of the Total Environment* 579, (1 February 2017): 345-358

farming, reducing soil's potential for carbon sequestration as well as releasing any carbon that was already stored back into the atmosphere. Other consequences of droughts also include the death of pollinators, and consequential harms on ecosystems services, including food security.[168] Overall, droughts have severe consequences on nature, animals, and local communities, and due to climate change and weather variability, droughts are increasing in frequency and duration in certain regions, such as Australia and California.[169] If unregulated speculation of water rights forces water prices too high and inaccessible in regions with current or future danger of drought, the costs on the environment and ecosystems will multiply.

Ouma, Johnson and Bigger outline two sets of interventions that can be taken to resist the socio-environmental consequences that stem from the financialized trading of natural resources: politics of information and politics of legitimation.[170] Sharing of information is key to generate systemic solutions to socio-ecological crises rather than relying on purely financial modes. However, Ouma, Johnson and Bigger call into question a challenge:

> But how can we practically produce knowledge about the grounded operations of finance when many of its key players – the investment banks, hedge funds, private equity managers, family offices, endowments and pension funds that ought to be the objects of public scrutiny – keep their profiles low and doors closed?[171]

Financial institutions may attribute themselves with "higher common principles" to cultivate a social legitimacy that renders their motives for environmental protection, social impact or the greater national good.[172] However, the legitimacy of such claims should be critiqued to identify where the costs of financialization processes become externalized. Legal frameworks can help identify moments of so-called false legitimacy and shape the regulations on natural resource

[168] Ahmad M. Alqudah, Nezar H. Samarah, and Russel E. Muller. "Drought Stress Effect on Crop Pollination, Seed Set, Yield and Quality." *Alternative Farming Systems, Biotechnology, Drought Stress and Ecological Fertilisation,* (ed.) Eric Lichtfouse, Springer, (2011): 193-213

[169] Oleg Smirnov, Minghua Zhang, Tingyin Xiao, John Orbell, Amy Lobben, and Josef Gordon. "The relative importance of climate change and population growth for exposure to future extreme droughts." *Climatic Change* 138, (2016): 41-53

[170] Stefan Ouma, Leigh Johnson, and Patrik Bigger. "Rethinking the financialization of 'nature'." *Environment and Planning A: Economy Space* 50, no. 3, (2018): 506

[171] Ouma, Johnson, and Bigger. "Rethinking the financialization of 'nature'." *Environment and Planning A: Economy Space,* (2018): 506

[172] Ouma, Johnson, and Bigger. "Rethinking the financialization of 'nature'. (2018): 506

financialization to avoid the costs to ecological sustainability and human rights. More proposed regulations will be outlined in the policy recommendations.

Food, sanitation, and environment are all impacted by threats posed by speculation in water markets. These additional consequences do influence the overall wellbeing of individuals and are not extractable from the consequence of water financialization. All three related rights should be taken into consideration when assessing the overall impact of water trading.

6. Policy recommendations

Financialization of water is not yet a global trend, rather it is a phenomenon that is currently unfolding upon a limited scale.[173] Given how few nations have financialized their water, this report has separated our government policy recommendations[174] based on the current status of water financialization in a country.

6.1. For governments of the United States & Australia

As the two countries that have currently financialized water resources, this report includes recommendations tailored for the United States and Australia. To safeguard the right of their citizens to access sufficient and affordable supplies of potable water, we highly recommend these governments to take the following measures:

1. **Establish a water bank or subnational entity governed by a range of entities representing the state, the private sector and the civil society.** The goal of this subnational entity would be to oversee and regulate water rights allocations based on legislations that support the right to water. Also, in a matter of fostering environmental sustainability, a minimum threshold of water to preserve ecosystems should be kept in the environment. In this sense, the overall amount of water allocated through water rights should be equal to the overall supply of water available minus the amount of water - i.e., the determined minimum threshold - to be kept in the environment.

[173] Connor. Interview. 22 July 2021

[174] Policy recommendations are informed by the interviews conducted during the research (see Appendix A) and by the roundtable discussions of the Safe Space, an online event co-organised by the Capstone team and the Geneva Water Hub which took place on Thursday, 11 November 2021, from 2pm to 4.30pm CET time (see Appendix C and Appendix D for more details).

2. **Set a legal distinction between, on the one hand, water rights for domestic and public-interest uses, and on the other hand, water rights for productive and recreational uses.** More concretely, water rights allocations would be based upon the guiding principle of division of water rights into two categories: 1) water rights for domestic and public-interest uses; 2) water rights for productive and recreational uses. The former category includes households' water needs to meet their requirements for drinking needs, sanitation and personal health of each member. It also includes the water resources required for the proper functioning of public institutions such as schools, administration services, etc. The latter category includes all water resources that are used by for-profit companies for production purposes in the agricultural, industrial and service sectors and for recreational purposes in the service sector (e.g., water theme park, swimming pools, etc.).

3. **Establish a minimum credit system for water rights for domestic and public-interest uses.** The water bank or subnational entity would allocate a determined minimum amount of litres of water per household. This amount would be determined by a series of factors, including: the number of people living in the household, their health condition, and the overall availability of water supply in the water district or basin at the time of allocation. As mentioned above, the amount of water allocated should be sufficient to meet households' minimum requirements for drinking needs, sanitation and personal health.

4. **Prohibit the financialization of water rights for domestic and public-interest uses**. Governments should pass laws to prohibit the trading of this category of water rights in water futures markets. In other words, this category of water rights should be excluded from the scope of the financialization of water.

5. **Limit speculation over water rights for productive and recreational uses.** In order to avoid (excessive) price volatility of water, governments should take two main measures. First, they should introduce a transaction tax that would apply to each water rights transaction in the productive and recreational use category. In this context, rapid buying and selling of water rights - which is often the main driver of price volatility - would entail high fees. In this regard, the tax deters speculative behaviour from taking place, leading ultimately to more stable prices. Secondly, governments should introduce expiration dates on water rights of this category. Passing this date, water rights would expire and would have to be surrendered to the water bank or subnational entity that is regulating water allocations. The implementation of this mechanism would limit risks of long(er)-term speculation. It would prevent water rights owners from simply holding on to water rights for the purpose of selling them and generating profits in anticipation of a future increase in water price (e.g. due to a drought). In addition to the introduction of these mechanisms, the water bank or subnational entity should have the power to intervene in water futures markets to suspend licenses and remove water rights from actors whose proven speculative behaviour represents a threat for water price stability.

6.2. For governments considering financialization

Governments that seriously consider creating water futures markets to manage their water resources should undertake a series of steps beforehand. First, if not already done, they should recognize and introduce the human right to safe drinking water and sanitation in their constitution. In doing so, the right to water should constitute the cornerstone of the legal framework regulating the financialization of water. Then, within this framework, legislations should be passed right from the beginning to implement the key elements discussed in the previous section, namely:

1. The creation of a water bank or subnational entity for overseeing and regulating water rights allocations;
2. The implementation of a minimum threshold of water to be kept in the environment;
3. The division of water rights into two categories: one for both domestic and public-interest uses and the other for both productive and recreational uses;
4. The creation of a minimum credit system within the water bank or subnational entity which allocates a determined minimum amount of water to households to meet their requirements for drinking needs, sanitation and health;
5. The prohibition of trading water rights for domestic and public-interest uses in water futures markets;
6. The introduction of a transaction tax and an expiration date on water rights for productive and recreational uses.

Finally, these governments should also adopt economic policies such as the adoption of a universal basic income (UBI) to offset the consequences of potential water price increases on the affordability of the resource. They should also include legally-binding provisions on environmental protection and human rights in (bilateral) investment treaties related to WASH infrastructures in order to make foreign investors accountable for their activities. In this sense, any investment

treaties related to WASH infrastructures should be embedded in the broader framework of the human right to water.[175]

6.3. For NGOs

Non-governmental organizations can play an important role in securing the human right to water through monitoring and advocacy programs. NGOs that are interested in protecting the human right to water in financial markets should consider adopting the following policies:

1. Quarterly monitoring of the price of water and the needs of localized individuals;
2. Creating opportunities to financially support individuals who may be unable to afford water;
3. Advocating for increased consideration of the human right to water;
4. Creating and facilitating educational programs for community members;
5. Lobbying governments to pass legislation which safeguards the human right to water.

7. Conclusion

The issue of water financialization is a recent occurrence with a limited scope in the United States and Australia. However, these countries hold powerful positions on the global political stage and can act as examples to other countries that have already privatized water services, such as the United Kingdom and Chile. Due to the short time span of water financialization so far, the literature on the topic is limited with gaps in research regarding the role of speculation and the impact on other rights and local communities and indigenous peoples. This report has delved into the human rights threats posed by speculation's tendency to create price volatility and overpricing of water rights in water futures markets. Consideration has been given to related rights that

[175] Having been brought to us very late in our research process during the Safe Space, issues related to investment treaties (especially those related to WASH infrastructures) have not been included in the main body of the report due to lack of time. Yet we consider that these issues are sufficiently important to be considered and included in our policy recommendations.

impact overall human well-being, but further study would still need to be done to better grasp the implications on indigenous peoples rights to self-determination.

Since there is little to no existing data on the consequences of water speculation, the situation can be analyzed in reference to the burst of the speculative bubble in food futures markets in 2008, which led to drastic increases in food prices and riots around the world. It exemplifies the risks that speculation can have on essential resources, as well as the unequal power relations that exist within financial markets. The report, therefore, concludes that speculation must be limited and regulated through different means, such as: the prohibition of trading of some water rights (i.e, those used for domestic and public-interest purposes); the introduction of transaction taxes and expiration dates on water rights used for productive and recreational purposes; and the interventions of a subnational entity in water futures markets when there is excessive price volatility.

Furthermore, this report explores the possibility for water financialization to enhance water efficiency, but discovers that even though it creates incentives for more efficient uses of water, it fails to address the underlying causes of water scarcity, such as climate change and water pollution. In this regard, the financialization of water, as a reactive rather than proactive strategy to deal with water scarcity issues, cannot fully safeguard ecosystems' sustainability. It also fails to address some of the pressing issues of inequalities - especially in terms of representation in decision-making processes - that would be necessary to build a more equitable and efficient water management regime.

In addition to environmental sustainability and the right to a healthy environment, other rights that are impacted by water financialization, and which impact humans' well-being, include the right to food and sanitation. Both are undermined in concurrence with increasing water prices in speculative markets. Water scarcity leads to food insecurity and disruption of sovereignty if external investors create water rights contracts over water resources in areas where local populations cannot afford them. On the other hand, finance could be used for 'extraeconomic' purposes to invest in critical infrastructure needed for sanitation, but the speculation of water rights does little to advance this agenda.

The financialization of water does not in itself equate to a violation of the human right to water given there remains a sufficient supply for households. The right to water is only threatened when affordable and sufficient access to supply is denied. So long as these conditions are met, in theory, who owns and controls water supplies would not be important.[176] In reality, past water management schemes show that without regulation, water supplies do eventually become unaffordable and as a result, households lack sufficient access. There remains a pressing need for water to remain a public resource and within the confines of democracy. To do so would be to ensure the continued affordability of water and thus the continued safeguarding of the human right to water.

[176]Connor. Interview. 22 July 2021

Appendices

Appendix A: List of interviewees

Name	Title	Date of interview
Pedro Arrojo-Agudo	UN Special Rapporteur on the human rights to safe drinking water and sanitation	23.06.2021
Michael Young	Research Chair in Energy, Water and Environmental Policy, University of Adelaide; known for his contribution to the development of water and environmental policies in the Murray Darling Basin (Australia) and in the western USA.	28.06.2021
Willem Buiter	Visiting Professor of International and Public Affairs, Columbia University; Former Chief Economist, Citigroup	28.06.2021
Richard Connor	Editor in Chief of World Water Development Report, UNESCO	22.07.2021
Maude Barlow	Co-founder, Blue Planet Project; Founding member, Council of Canadians; Senior Advisor on Water to the 63rd President of the United Nations General Assembly	10.08.2021
Jorge E. Viñuales	Harold Samuel Professor of Law and Environmental Policy at the University of Cambridge; Adjunct Professor of International Law at the Graduate Institute of Geneva	29.10.2021

Appendix B: Interview format

Briefing:

1. Introduce ourselves
2. Thank them for being here and taking the time to discuss with us
3. Request permission to record the session for the purpose of transcribing
4. Would they like to remain anonymous? Or would they like to get a copy of statements to review if quoted directly in the report?
5. Let them know they can change their mind at any moment
6. What this will be used for: *The interview is used for the purposes of a capstone research project conducted by the three of us at the Graduate Institute, in partnership with Geneva Water Hub*
7. Introduce the capstone project: *Our research is particularly interested in articulating the risks, if any, financialization of water and water speculation may pose to human rights, and how to avoid such risks. We are not passing judgement on whether financialization of water is good or bad, but rather we seek to draw neutral conclusions about this process. Given that the United States and Australia are at the forefront of this process of financialization, our research focuses on these two countries as case-studies.*

Questions: *(note that these are the general questions that were asked, but there were some differences based on the people's expertise)*

1. In your opinion, does water financialization strengthen or undermine the right to water?
2. Do you see water financialization as helping or hindering environmental protections?
3. Do you see the financialization of water as posing a threat to any other human rights? If so, what specific rights? If not, why do you believe that no rights are threatened?
4. How best can we mitigate the risks associated with the financialization of water?
5. (Question directed at their specific work in an organization)
6. Do you see any benefits or opportunities related to the financialization of water?

Debriefing:

1. Thank you for their time
2. Do they want a copy of the final report?
3. Is there anything they'd like to add - final questions or comments?

Appendix C: Safe Space concept note

Freshwater scarcity issues have led governments to tackle the question of how to better (i.e., in a more efficient way) manage water resources. A relatively recent emerging trend in water management has been the financialization of water. The UN Special Rapporteur on the Human Rights to Safe Drinking Water and Sanitation, Mr. Pedro Arrojo-Agudo, has recently presented his report on the commodification and financialization of water.

Although the definition of financialization of water is highly debated, especially within academic circles, it is generally understood as the process through which water management is transformed into a commodity and a financial asset, whose value fluctuates according to supply and demand in water markets. On 7 December 2020, water joined grains and other natural resources traded on the Chicago Stock Exchange. It is now possible to trade future water rights leases related to California's water market. The Nasdaq Veles California Water Index tracks the price of these leases, revealing how financially important freshwater is as a commodified asset. The financialization of water is not a purely US phenomenon though. In Australia, the 2007 Water Act set quotas of water use distributed among a wide set of consumers: cities, firms, farmers, etc. It also established water markets where consumers can buy additional water quotas or sell their surplus.

As part of their Capstone project, a group of students of the Graduate Institute is collaborating with the Geneva Water Hub, a global centre of the University of Geneva, on conducting research on the topic of water financialization. The research is particularly interested in looking at the issues resulting from water financialization from an environmental and human rights-based approach.

The upcoming safe space is part of the Capstone project and aims to feed the debate on the financialization of water by addressing its risks and opportunities. Some guiding questions to be discussed during the workshop are:

1) How can the concept of financialization of water be articulated? What are its implications for human rights and environmental protection?
2) Does financialization of water increase water management efficiency?
3) What are the current examples of water markets? And how do they work?
4) What are the risks of water speculation? How can water speculation be avoided in water markets?

The safe space aims to discuss current practices in countries at the forefront of processes of water financialization such as Australia and Western United States. Using these water markets as case studies, the safe space also aims to assess the risks stemming from speculative strategies on water rights. In this regard, the safe space will first feature a short presentation by the Capstone group of the Graduate Institute on their ongoing research. Afterwards, a discussion between leading actors and experts will take place in order to provide greater insight into the opportunities and challenges posed by the financialization of water. Following the safe space, the outputs of these discussions will be anonymously used by the Capstone group in their final report to inform

policy recommendations for international and national actors interested in safeguarding human rights and aquatic ecosystems.

Appendix D: Safe Space agenda

11 November 2021

Time	Description
14:00 CET	The safe space will commence with introductions by the Capstone group and an invitation for participants to introduce themselves and their areas of expertise
14:10 CET	Video-message from the UN Special Rapporteur on the human rights to safe drinking water and sanitation, Prof. Pedro Arrojo-Agudo
14:15 CET	Presentation of the ongoing Capstone research project
14:30 CET	Discussion and feedback on the Capstone research project
15:00 CET	Break
15:10 CET	Thematic discussions on: - *Speculation*: Discussion on the opportunities and risks related to speculation in water futures markets as well as on existing or potential mechanisms to limit price volatility. - *Legal perspective*: Overview of legal guidelines, which regulate water markets and water rights. - *Policy recommendations*: How to safeguard the human right to drinking water and sanitation in countries that have financialized and are considering financializing their water?
16:15 CET	Concluding remarks
16:30 CET	End of the Safe Space

Bibliography

Ahlers, Rhodante, and Vincent Merme. "Financialization, Water Governance, and Uneven Development." *Wires Water* 3, no. 6 (2016): 766-774. doi:10.1002/wat2.1166.

Allen, John, and Michael Pryke. "Financialising household water: Thames Water, MEIF, and 'ring-fenced' politics." *Cambridge Journal of Regions, Economy and Society* 6, no. 3 (2013): 419-439. doi:10.1093/cjres/rst010.

Alliance for Water Efficiency. *Water Efficiency and Conservation State Scorecard: An Assessment of Laws and Policies* (2017). https://www.allianceforwaterefficiency.org/sites/www.allianceforwaterefficiency.org/files/highlight_documents/AWE-2017-State-Scorecard.pdf (accessed 23 October 2021).

Almendros, Paula Sanchez. "The Future of Water Is Traded in the Stock Exchange." *Smart Water Magazine* (December 11, 2020). https://smartwatermagazine.com/news/smart-water-magazine/future-water-traded-stock-exchange.

Alqudah, Ahmad M., Nezar H. Samarah, and Russel E. Muller. "Drought Stress Effect on Crop Pollination, Seed Set, Yield and Quality." *Alternative Farming Systems, Biotechnology, Drought Stress and Ecological Fertilisation,* (ed.) Eric Lichtfouse, Springer, (2011): 193-213. https://doi.org/10.1007/978-94-007-0186-1.

Alston, Philip. "The Not-a-Cat Syndrome: can the international human rights regime accommodate non-state actors?" in *Non-State Actors and Human Rights,* Philip Alston (ed.), Oxford (2005): 3-36.

Arrojo-Agudo, Pedro (UN Special Rapporteur on the human rights to safe drinking water and sanitation). Interview with the authors. 23 June 2021.

Arrojo-Agudo, Pedro. "Water: Futures Market Invites Speculators, Challenges Basic Human Rights - UN Expert." OHCHR (December 11, 2020). https://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=26595&%3BLan.

Australian Government. *Water Act 2007*. Parliament of Australia (3 September 2007).

Australian Government, Department of Industry, Science, Energy and Resources. "Water efficiency" (2021). https://www.energy.gov.au/households/water-efficiency (accessed: 25 October 2021).

Barlow, Maude (Member of the Board of Directors of Food & Water Watch). Interview with the authors. 10 August 2021.

Bayliss, Kate. "The Financialization of Water." *Review of Radical Political Economies* 46, no. 3 (2014): 292-307. https://doi:10.1177/0486613413506076.

Bjornlund, Henning. "Water Markets And Their Environmental, Social And Economic Impacts In Australia". In *Expo Zaragoza* (2008): 1-16.

Bjornlund, Henning, Sarah Wheeler, and Jeremy Cheesman. "Irrigators, Water Trading, The Environment And Debt: Buying Water Entitlements For The Environment." Essay. In *Basin Futures: Water Reform In The Murray-Darling Basin*, edited by Daniel Connell and R. Quentin Grafton, 291–302. Canberra: ANU E Press (2011).

Brewer, Jedidiah, Robert Glennon, Alan Ker, and Gary D. Libecap. "Water Market In the West: Prices, Trading, and Contractual Forms." *National Bureau of Economic Research* (March 2007): 1-45

Buiter, Willem (Professor of International and Public Affairs at Columbia University). Interview with the authors. 28 June 2021.

Buiter, Willem. "Essay: Water as Seen by an Economist." *Global Themes Strategy, Thirsty Cities - Urbanisation to Drive Water Demand,* Citi Global Thematic Investing Research (2011).

Castree, Noel, and Brett Christophers. "Banking Spatially on the Future: Capital Switching, Infrastructure, and the Ecological Fix." *Annals of the Association of American Geographers* 105, no. 2 (2015): 378-386. https://doi:10.1080/00045608.2014.985622.

Castro, José Esteban. "Poverty and citizenship: Sociological perspectives on water services and public–private participation." *Geoforum* 38, no. 5 (2007): 756-771. https://doi:10.1016/j.geoforum.2005.12.006.

Centers for Disease Control and Prevention. "Global WASH Fast Facts." *Centers for Disease Control and Prevention* (April 1, 2021). https://www.cdc.gov/healthywater/global/wash_statistics.html.

Clapp, Jennifer, and S. Ryan Isakson. "Risky Returns: The Implications of Financialization in the Food System." *Development and Change* 49, no. 2, (Forum 2018): 437-460. https://doi.org/10.1111/dech.12376.

CME Group. "Nasdaq Veles California Water Index (NQH2O) Futures." *CME Group* (2021). https://www.cmegroup.com/trading/equity-index/us-index/nasdaq-veles-california-water-futures.html.

Connor, Richard (Editor-in-Chief of the United Nations World Water Development Report at UNESCO). Interviews with the author. 22 July 2021.

Cullet, Philippe. "FOSTERING THE REALISATION OF THE RIGHT TO WATER: NEED TO ENSURE UNIVERSAL FREE PROVISION AND TO RECOGNISE WATER AS A COMMON HERITAGE." *National Law School of India Review* 31, no. 1 (2019): 111-24. https://www.jstor.org/stable/26918424 (accessed: 20 June, 2021).

Crase, Lin, Phil Pagan, and Brian Dollery. "Water Markets as a Vehicle for Reforming Water Resource Allocation in the Murray-Darling Basin of Australia." *Water Resources Research* 40, no. 8 (2004): 1-10. https://doi.org/10.1029/2003wr002786.

Dyballa, Cindy, and H.W. (Bill) Hoffman. "The Role of Water Efficiency in Future Water Supply." *Journal (American Water Works Association)* 107, no. 6 (2015): 35–44. https://www.jstor.org/stable/jamewatworass.107.6.35 (accessed: 23 October 2021).

Epstein, Gerald. "Financialization, Rentier Interests, and Central Bank Policy." For *Financialization of the World Economy*. Conference paper. University of Massachusetts, Amherst: Political Research Institute (2002).

Food and Agriculture Organization of the United Nations, and United Nations Water. "Progress on Change in Water-Use Efficiency: Global Status and Acceleration Needs For SDG Indicator 6.4.1." Rome: United Nations (August 23 2021).

Glossary of Environment Statistics, Studies in Methods, Series F, No. 67. New York: United Nations (1997).

Grafton, R. Quentin, Gary Libecap, Samuel McGlennon, Clay Landry, and Bob O'Brien. "An Integrated Assessment of Water Markets: A Cross-Country Comparison." *Review of Environmental Economics and Policy* 5, no. 2 (2011): 219–39. https://doi.org/10.1093/reep/rer002.

The Governor's Office of Planning and Research, Vital Communities Institute, and California Rural Policy Task Force. "California Agriculture: Feeding the Future." Governor's Office of Planning and Research (2003).

Grafton, R. Quentin, James Horne, and Sarah Ann Wheeler. "On the Marketisation of Water: Evidence from the Murray-Darling Basin, Australia." *Water Resources Management* 30, no. 3 (2016): 913–26. https://doi.org/10.1007/s11269-015-1199-0.

Hadjigeorgalis, Ereney. "A Place for Water Markets: Performance and Challenges." *Review of Agricultural Economics* 31, no. 1 (2009): 50–67. https://doi.org/10.1111/j.1467-9353.2008.01425.x.

Hoffman, H.W. “Have We just Harvested the Low Hanging Fruit?” Proc.WaterSmart Innovations, Las Vegas, Nevada (2014).

Kerf, Michel, David Gray, R., Timothy Irwin, Celine Levesque, Robert R. Taylor, and Michael Klein. *Concessions for infrastructure: A guide to their design and award*.

Kiem, Anthony S. “Drought and Water Policy in Australia: Challenges for the Future Illustrated by the Issues Associated with Water Trading and Climate Change Adaptation in the Murray–Darling Basin.” *Global Environmental Change* 23, no. 6 (2013): 1615–26. https://doi.org/10.1016/j.gloenvcha.2013.09.006.

Loch, Adam, Christopher Auricht, David Adamson, and Luis Mateo. “Markets, Mis-Direction and Motives: A Factual Analysis of Hoarding and Speculation in Southern Murray–Darling Basin Water Markets.” *Australian Journal of Agricultural and Resource Economics* 65, no. 2 (2021): 291–317. https://doi.org/10.1111/1467-8489.12419.

Loch, Adam, Henning Bjornlund, Sarah Wheeler, and Jeff Connor. “Allocation Trade in Australia: a Qualitative Understanding of Irrigator Motives and Behaviour*.” *Australian Journal of Agricultural and Resource Economics* 56, no. 1 (2011): 42–60. https://doi.org/10.1111/j.1467-8489.2011.00575.x.

Loftus, Alex, Hug March, and Thomas F. Purcell. "The Political Economy Of Water Infrastructure: An Introduction To Financialization". *Wiley Interdisciplinary Reviews: Water* 6, no. 1 (2018): 1-7. https://doi:10.1002/wat2.1326.

Lopes, Paula Duarte, Alexandre Tavares, and Ana Cordeiro Santos. “Report to the 48th session of the Human Rights Council (2021) on planning and vision Report to the 76th session of the UN General Assembly (2021) on water commodification.” University of Coimbra (2021).

March, Hug, and Thomas Purcell. “The muddy waters of financialisation and new accumulation strategies in the global water industry: The case of AGBAR.” *Geoforum* 53 (2014): 11-20. https://doi:10.1016/j.geoforum.2014.01.011.

Moyo, Khulekani. “Privatisation of the Commons: water as a right; water as a commodity.” *Stellenbosch Law Review* 22, no 3 (2011): 804-822.

Moyo, Khulekani, and Sandra Liebenberg. "The Privatization of Water Services: The Quest for Enhanced Human Rights Accountability." *Human Rights Quarterly* 37, no. 3 (2015): 691-727. http://www.jstor.org/stable/24518344.

McBeth, Adam. “Privatising Human Rights: What Happens to the State’s Human Rights Duties when Services are Privatised.” *Melbourne Journal of International Law*, 5, no. 1 (2004).

Nasdaq Veles California Water Index Futures (NQH2O). YouTube. YouTube, 2020. https://www.youtube.com/watch?v=M_3KBrDV90I.

Ociepa, Ewa, Maciej Mrowiec, and Iwona Deska. "Analysis of Water Losses and Assessment of Initiatives Aimed at Their Reduction in Selected Water Supply Systems" *Water* 11, no. 5 (2019): 1037. https://doi.org/10.3390/w11051037.

Ouma, Stefan, Leigh Johnson, and Patrik Bigger. "Rethinking the financialization of 'nature'." *Environment and Planning A: Economy Space* 50, no. 3 (2018): 500-511. https://doi.org/10.1177/0308518X18755748.

Payne, Matthew T. and Skye Root. "Water Markets in the USA." *American Water Association* 13, no. 5 (September 2011): 6-8.

Penda, Ivor Altaras. "Water Share Trading: Business Risk Solution Or Social Hazard Inauguration?" *Pregledni Rad Scientific Review* 7, no. 1 (2021).

Rinales, Rogelio, Carles Roqué, Francisco Gutiérrez, Mario Zarroca, Domingo Carbonel, Joan Bach, and Ivan Fabregat. "The impact of droughts and climate change on sinkhole occurrence. A case study from the evaporite karst of the Fluvia Valley, NE Spain." *Science of the Total Environment* 579 (1 February 2017): 345-358. https://doi.org/10.1016/j.scitotenv.2016.11.091.

Robbins, Martha Jane. "Exploring the 'localisation' dimension of food sovereignty." *Third World Quarterly* 36, no. 3 (2015): 449-468. https://doi.org/10.1080/01436597.2015.1024966.

Robles, Miguel, Maximo Torero, and Joachim von Braun. "When Speculation Matters." *International Food Policy Research Institute,* Issue Brief 57 (2009). https://www.ifpri.org/publication/when-speculation-matters (accessed 20 June, 2021).

Savinskaya, D. N., E.V. Popova, Kondratev V.U., and M.I. Popova. "Mathematical modeling of technical and economic systems in agriculture." IOP Conf. Series: Earth and Environmental Science (2021).

Schaible, G. and Aillery, M. *Water Conservation in Irrigated Agriculture: Trends and Challenges in the Face of Emerging Demands*. EIB-99, US Department of Agriculture, Economic Research Service, Washington (Sept 2012).

Schewe, Jacob, Jens Heinke, Dieter Gerten, Ingjerd Haddeland, Nigel W. Arnell, Douglas B. Clark, Rutger Dankers, Stephanie Eisner, Balázs M. Fekete, Felipe J. Colón-González, Simon N. Gosling, Hyungjun Kim, Xingcai Liu, Yoshimitsu Masaki, Felix T. Portmann, Yusuke Satoh, Tobias Stacke, Qiuhong Tang, Yoshihide Wada, Dominik Wisser, Torsten Albrecht, Katja Frieler, Franziska Piontek, Lila Warszawski, and Pavel Kabat. "Multimodel Assessment of

Water Scarcity under Climate Change." *Proceedings of the National Academy of Sciences of the United States of America* 111, no. 9 (2014): 3245-250. http://www.jstor.org/stable/23770677 (accessed June 17, 2021).

Schwabe, Kurt, Mehdi Nemati, Clay Landry, and Grant Zimmerman. "Water Markets in the Western United States: Trends and Opportunities." *Water* 12 (14 January 2020).

Shiklomanov, Igor A. *A New Appraisal and Assessment for the 21st Century- A summary of the monograph World Water Resources*. UNESCO (1998).

Smirnov, Oleg, Minghua Zhang, Tingyin Xiao, John Orbell, Amy Lobben, and Josef Gordon. "The relative importance of climate change and population growth for exposure to future extreme droughts." *Climatic Change* 138 (2016): 41-53. DOI:10.1007/s10584-016-1716-z.

Tobin, Anna. "Could trading water on the stock market actually be good for the environment?" *euronews.green (*18 May 2005). https://www.euronews.com/green/2021/05/17/could-trading-water-on-the-stock-market-actually-be-good-for-the-environment.

UN News. "Access to a Healthy Environment, Declared a Human Right by UN Rights Council." October 8 2021. https://news.un.org/en/story/2021/10/1102582 (accessed 20 November 2021).

United Nations Environment Programme. "Water and Energy Efficiency - Information Brief." United Nations (2014). *https://www.un.org/waterforlifedecade/pdf/01_2014_water_energy_efficiency.pdf* (accessed 24 October 2021).

United Nations General Assembly. *The human right to water and sanitation*. United Nations (28 July 2010). A/RES/64/292-E.

United Nations General Assembly. *Transforming our world: the 2030 Agenda for Sustainable Development.* United Nations (21 October 2015). A/RES/70/1.

United Nations General Assembly. *United Nations Declaration on the Rights of Indigenous Peoples.* United Nations (13 September 2007). A/RES/61/295.

United Nations Human Rights Office of the High Commissioner. *Risks and impacts of the commodification and financialization of water on the human rights to safe drinking water and sanitation.* OHCHR (16 July 2021). A/76/159

United Nations International Children's Emergency Fund, and World Health Organisation. *Progress on household drinking water, sanitation and hygiene: 2000-2017: Special Focus on Inequalities.* New York: United Nations (2019).

United Nations Water. *The United Nations World Water Development Report 2018: Nature-Based Solutions for Water.* WWDR (19 March 2018).

United Nations Water. "What is Water Security? Infographic: UN-Water." United Nations, May 8, 2013. https://www.unwater.org/publications/water-security-infographic/.

United States Geological Survey. "Groundwater Decline and Depletion." U.S Department of the Interior. https://www.usgs.gov/special-topic/water-science-school/science/groundwater-decline-and-depletion?qt-science_center_objects=0#qt-science_center_objects (accessed June 21, 2021).

United States Environmental Protection Agency. "Why Water Efficiency ." Environmental Protection Agency (January 19 2017). https://19january2017snapshot.epa.gov/www3/watersense/our_water/why_water_efficiency.html (accessed 20 October 2021).

Vickers, Amy. *Handbook of Water Use and Conservation: Homes, Landscapes, Businesses, Industries, Farms*. Amherst, MA: Waterplow Press (2001).

Wheeler, Sarah Ann, and Jeremy Cheesman. "Key Findings from a Survey of Sellers to TheRestoring the BalanceProgramme." *Economic Papers: A journal of applied economics and policy* 32, no. 3 (2013): 340–52. https://doi.org/10.1111/1759-3441.12038.

Wheeler, S., A. Loch, A. Zuo, and H. Bjornlund. "Reviewing the Adoption and Impact of Water Markets in the Murray–Darling Basin, Australia." *Journal of Hydrology* 518 (2014): 28–41. https://doi.org/10.1016/j.jhydrol.2013.09.019.

World Bank Technical paper, no. WTP 399. Finance, Private Sector, and Infrastructure Network Washington, D.C.: World Bank Group (1998). http://documents.worldbank.org/curated/en/413031468766780427/Concessions-for-infrastructure-a-guide-to-their-design-and-award (accessed: 18 June 2021).

Young, Mike (Economist and Professor of Water and Environmental Policy at the University of Adelaide). Interview with the authors. 28 June 2021.