GROUNDWATER

MAKING THE INVISIBLE VISIBLE

BALKANS JOINT CONFERENCE AND EXHIBITION

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SHUKOS | SHUKALB

Seeing the Unseen: the Value of Water

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OECD

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The “Unseen”

“Seeing the Unseen: the value of water”, theme of the 2022 SWWW

Groundwater

The ‘unseen’ refers to **groundwater**, which provides not only almost half of the world’s drinking water, but also about 40% of the water used for irrigation and about a third of the supply needed for industry (UN, 2022).

Yet this precious water source lacks explicit consideration from the water community, and it is poorly assessed and regulated.

➡ *Focus of the Conference and today’s presentation*

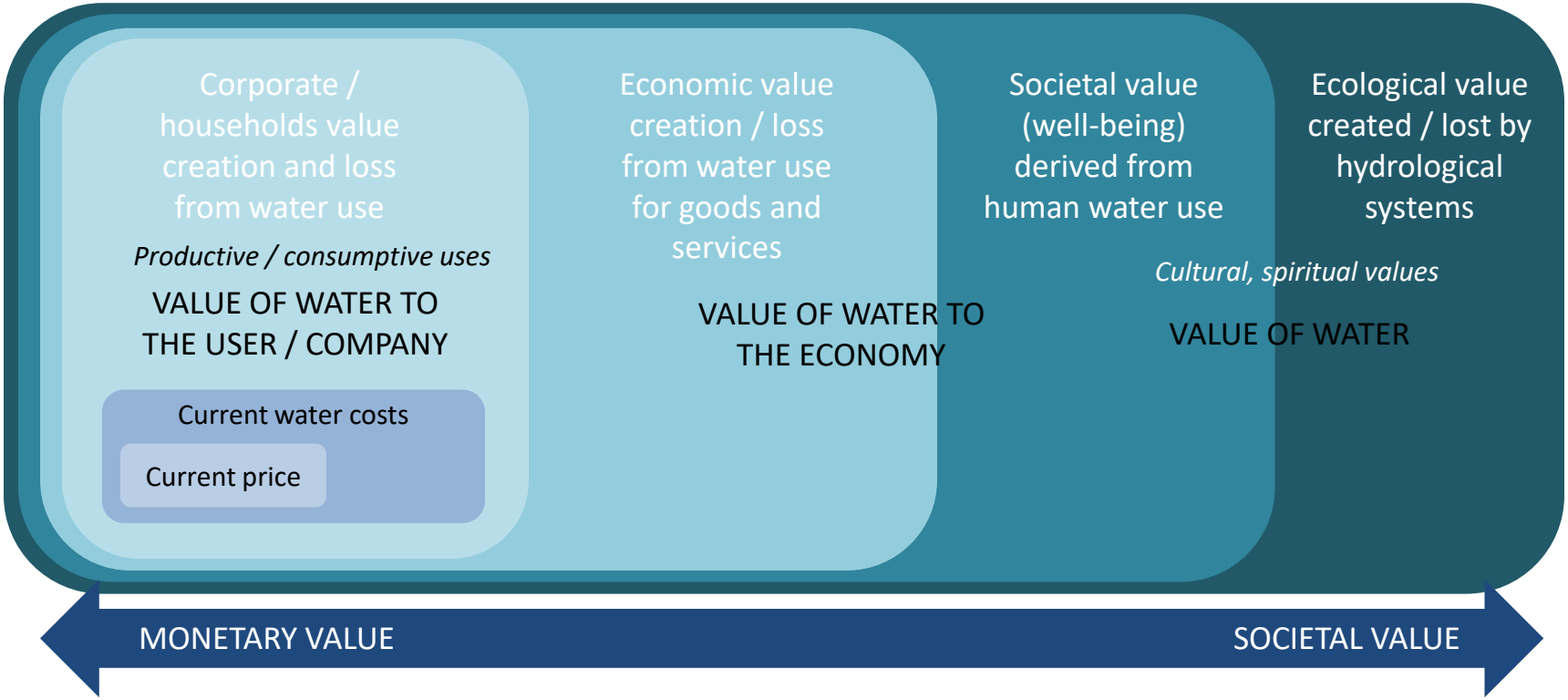
Green water

The ‘unseen’ can also refer to ‘**green water**’, such as vapour and humidity in the air, soil moisture, which is much less visible than rivers and lakes.

Green water is an important condition for livelihoods and determines crop yields, yet the ‘green water planetary boundary’ was recently reported as already being surpassed by the Nature Reviews Earth & Environment.

The multidimensional Values of Water

Value ≠ Price ≠ Cost



Source: WWF, 2022 SWWW

Valuing water: the example of Oceans

« A living ocean is a source of sustainable wealth and presents a new class of assets »
Ralph Chami, IMF

What science tells us

Oceans are the lungs of the planet

- The ocean comprises 71% of the Earth's surface area, with an average depth of 3,800 meters, playing a defining role in the global carbon cycle
- Over the past 200 years, the oceans have taken up to 500 GtCO2 from the atmosphere out of 1300 GtCO2 total anthropogenic emissions (*IPCC Special Report on Carbon Dioxide Capture and Storage*)

What economy tells us

A living ocean is valuable

- The value of oceans in terms of carbon sequestration is over $30 trillion, at today's carbon price.
- Seagrass is worth over a trillion dollars in terms of carbon sequestration services, another trillion in terms of flood control, and more in terms of food security.

Towards an ocean positive economy: Shift from an extractive to a regenerative approach of natural resources

- Recognise the ocean as a *living system, connected to the land and the atmosphere*
- Learn from Indigenous Peoples about active holistic guardianship of the lands, seas, air, water, plants, animals, spirits and ancestors
- Align markets to value this living system

Source: Dr Ralph Chami, Assistant Director at the IMF (at the Welcome Session of the 2022 SWWW)

Valuing water: the example of French rivers

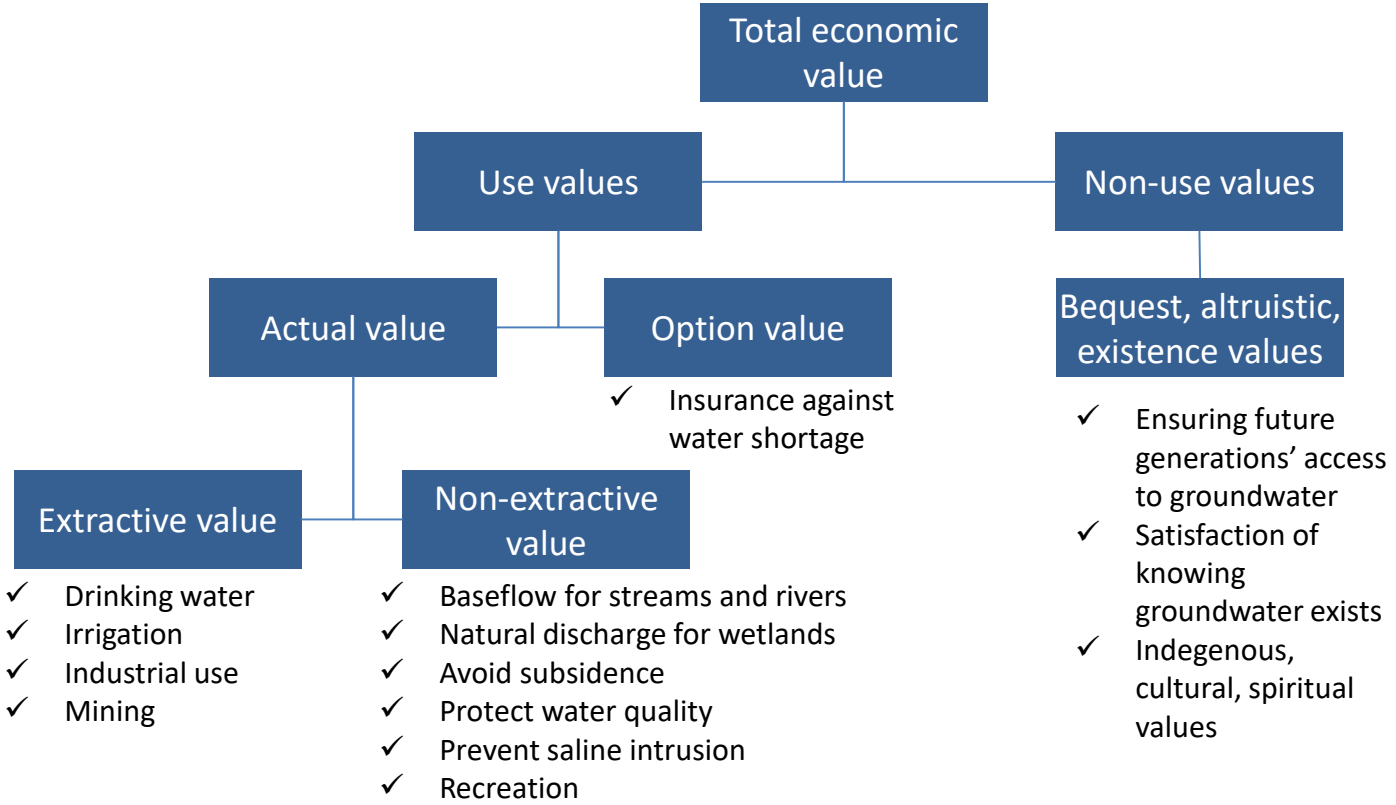
- France has launched a national programme to support the quantification and monetisation of the value of ecosystems and ecosystem services in 2012.

- The programme's 2018 report estimates that **the value of the capacity of French rivers to retain nitrogen exceeds EUR 2 billion annually** (*OECD, 2022, Financing a Water Secure Future*).

- However, no monetary value could be attributed to nearly half of the ecosystem services analysed due to a **lack of available data or appropriate methodologies** (*EFESE, 2018, Les milieux humides et aquatiques continentaux*).

- As damages to ecosystems (and related environmental and resource costs) can be hardly valued, they can consequently hardly be charged for and compensated.

Valuing water: Total Economic Value of groundwater



Not an exhaustive view of all of the benefits of groundwater:

- limitations in understanding all benefits of groundwater, particularly environmental benefits ;
- methodological challenges related to the economic valuation of these benefits.

Source: OECD (2017), adapted from Qureshi et al. (2012); Johns and Ozdemiroglu (2007)

Valuing water: Groundwater as natural capital

Consumptive groundwater use in Australia: A valuable contribution to the economy

- ≈ 3 500 GL of groundwater providing a direct use value of between AUD 1.8 to 7.2 billion per year.
- Groundwater's contribution to Australia's GDP: from AUD 3 to 11 billion per year.
- Only partial view of the total economic value of groundwater, as non-extractive uses and options values have not been quantified.

Source: OECD (2017) adapted from Deloitte Access Economics

Groundwater as natural capital: The Kansas High Plains Aquifer

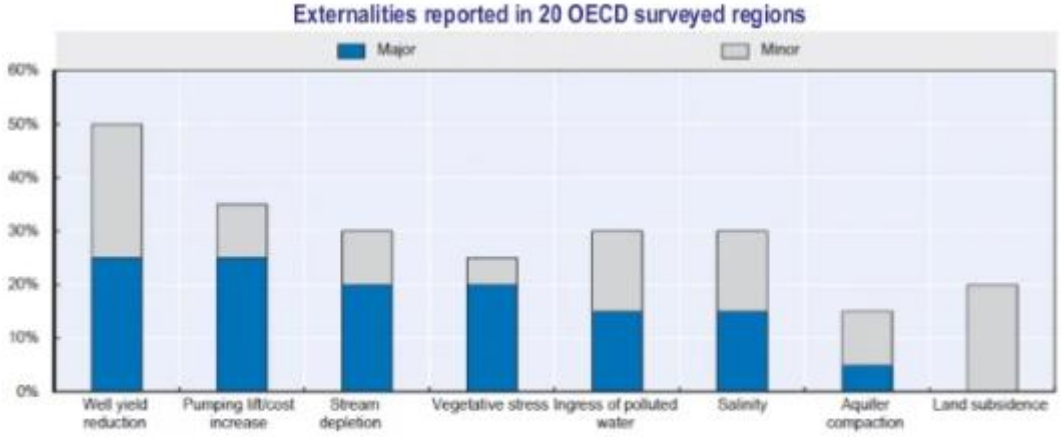
- Supports significant food production in the U.S., but is rapidly depleting.
- Between 1996 and 2005, profits attributable to the Kansas portion of the aquifer dropped from USD 2.3 billion to USD 1.2 billion. Amounted to a loss of ≈ USD 110 million per year of capital value due to groundwater withdrawal and changes in aquifer management.
- Yearly decline in wealth: twice as large as the state's investment in school infrastructure over the period.

Source: Fenichel et al., 2016

Groundwater is increasingly used and intensive groundwater use leads to major challenges

Intensive groundwater pumping can lead to:

- **Long-term depletion of aquifers**
- **Significant negative environmental externalities**, including:
  - Stream depletion
  - Salinity and infiltration of polluted water
  - Aquifer compaction and land subsidience



Source: OECD (2015)

A multiplicity of economic & policy instruments to respond to these challenges

Reduce use

DEMAND SIDE

	Instruments	Advantages/ drawbacks	Conditions for success
Regulatory	Entitlements (rights, permits), quotas, zoning	(+) Control use (-) Costs and allocation	Design, expertise, flexbility
Economic	Taxes, subsidies, markets, transfers, retirements	(+) Cost-effective & flexible (-) Acceptance (tax), results, costs (subsidies)	Expertise, transaction costs
Collective action	Voluntary programs	(+) Local adapted and lower costs (-) Adoption issues	Supported by regulations

Add or store water

SUPPLY SIDE

	Instruments	Advantages/ drawbacks	Conditions for success
Alternative supplies	Rainwater harvesting, reservoirs, desalination	(+) Relieve water constraints (-) Costs, results, damages	Long-term investments
Storage	Infiltration, aquifer storage and recovery, banking	(+) Relieve constraints (-) Uncertain results	Expertise and financing

Source: OECD, 2015

Limits of economic instruments

Technical issues: data availability, challenges to assess environmental and resource benefits and costs…

Political and societal issues: affordability, social equity…

Legal Rights of Nature (incl. water) is Gaining Ground

Countries	Rights
Chile	• **Article 8 (draft): individuals and people are intertwined with Nature.**
New Zealand	• **Whanganui River** and **Forests** recognized as a legal entity, an « indivisible and living whole » with **legal personhood**.
Ecuador	• **Rights of nature in constitution**. Ruling to protect Los Cedros cloud **forest** against mining concessions sucessful (November 2021).
Costa Rica	• Conferred personhood on bees.
Peru	• Kukama Indigenous women in Peru filled lawsuit to demand government recognize legal rights of nature for Marañon River « to live free from contamination » (Sept 2021).

Source: Dr Ralph Chami (at the Welcome Session of the 2022 SWWW)

The gaps between intention and action: the role of social norms

- The gaps between intention and action, and the drivers for moving from individual to collective action, may help to explain why we are continually lagging behind on SDG 6 to deliver “clean water and sanitation for all”.

- **Social norms can explain the difficulty of aligning thoughts and actions**, and the limitation of some economic instruments in providing incentives for water saving (*Juan Velasquez, researcher at Linnaeus University*)

- The role of **adequate incentives** and **motivation** in driving behaviour and social change is essential. The tricky thing, from a policy perspective, is that we know social norms change and can change fast. Several drivers contribute to such changes, which are difficult for institutions to control.

Avoid building future liabilities: the financial materiality of water risks

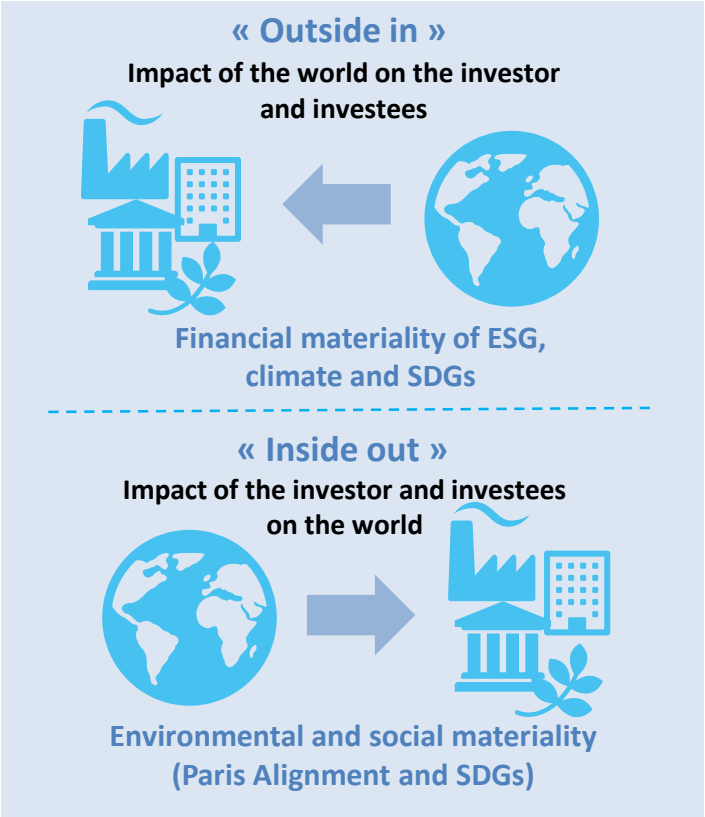
- Right now, **99% of financing is going in the wrong direction** (IPCC Climate Change 2022, Mitigation of Climate Change, Summary for Policymakers).

- Water-related risks are not fully captured in risk assessment approaches of central banks and financial institutions and when they are incorporated, these risks are usually not fully priced.

- Bridging data gaps and improving assessments to better inform investors on water-related risks can lead to a better allocation of capital.

➡ Network for Greening the Financial System (NGFS)
Task Force on Nature-related risks
Toward a Framework for Assessing Financial Risks stemming from Water-related Losses?

The "double materiality"



Source: DWS based on European Commission June 2019