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Best is Water, Pindarus

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United Nations
Educational, Scientific and
Cultural Organization



International
Hydrological
Programme

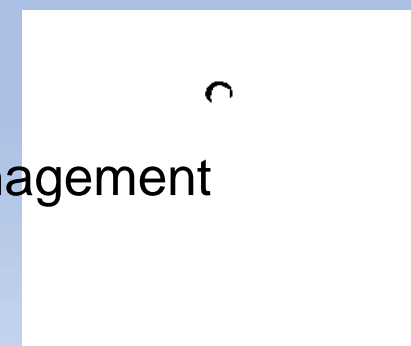


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“Αριστον μιν ύδωρ” :
Best is Water, Pindar 518 – 438 BC

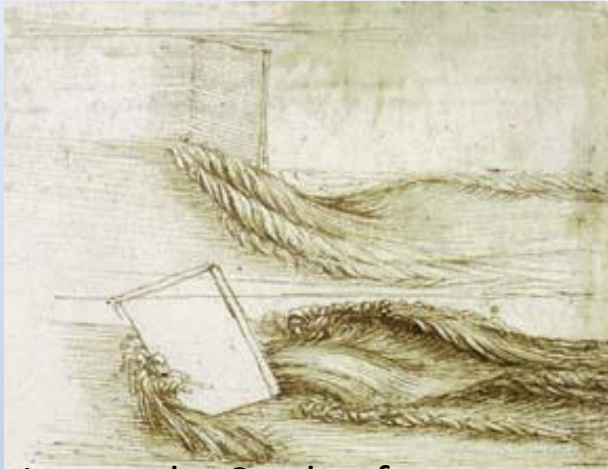
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ARISTOTLE UNIVERSITY OF THESSALONIKI, GREECE



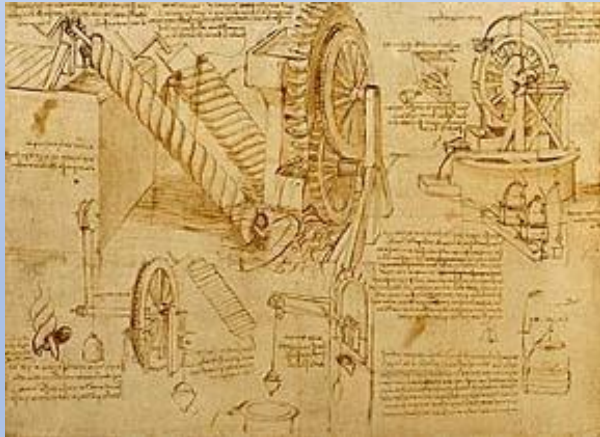


Greek writing on the Grand Pump Room in Bath England

Water "the vehicle of nature"
("vetturale di natura"), *Leonardo da Vinci 1452- 1519*

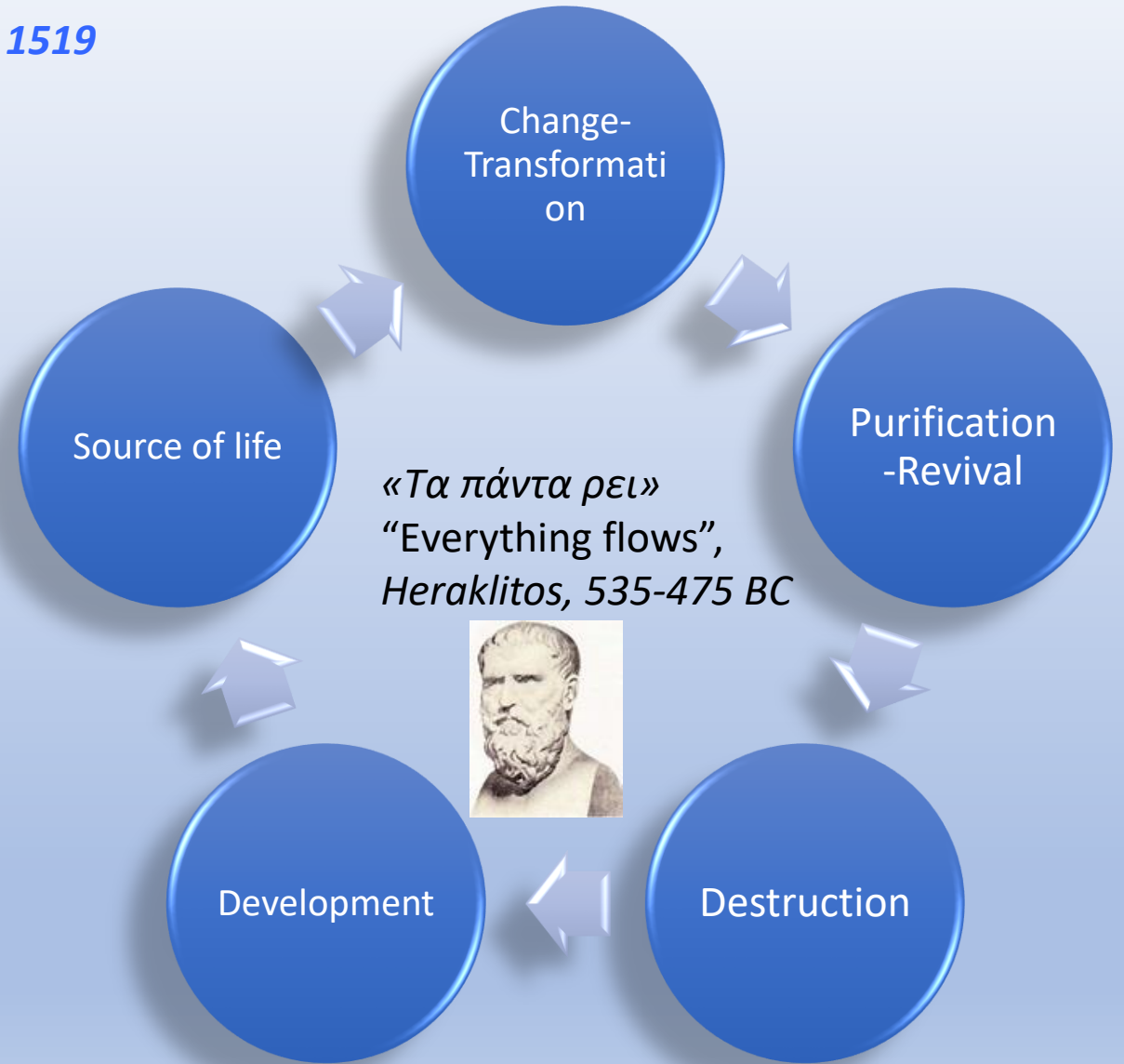


Leonardo, Study of water passing obstacles, c. 1508-9



Leonardo, Machine for raising water
(Codex Atlanticus, f. 26v)

Leonardo, "a benchmark in the science of hydrology"



Why water is different?

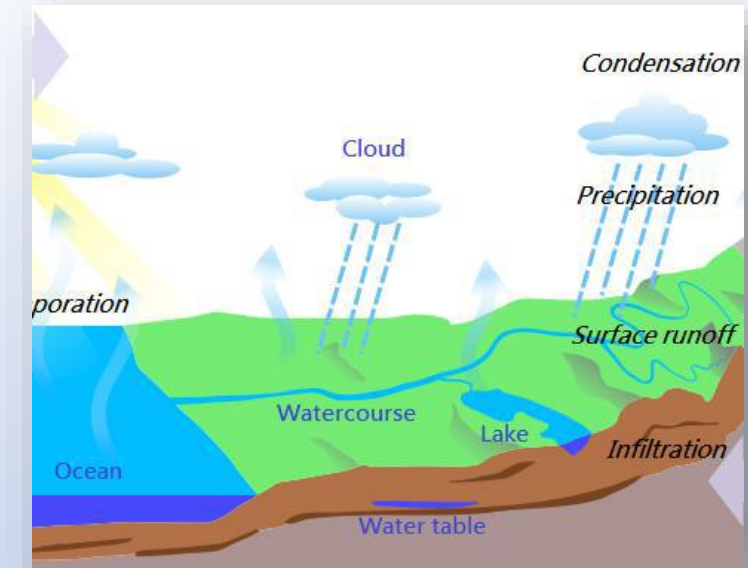
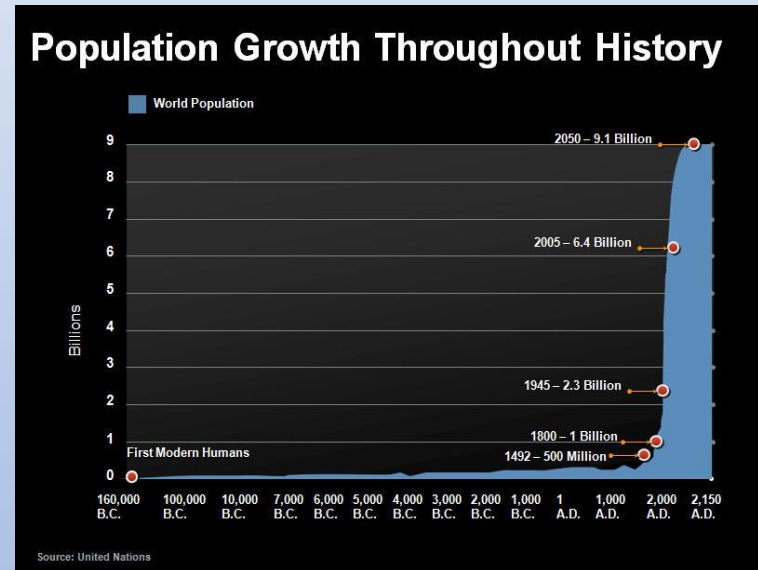
The UN General Assembly in Resolution 64/292, (2010) recognizes... *the right to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of life and all human rights.*

- ✓ A natural monopoly
- ✓ Highly variable in time and space
- ✓ Common pool resource
- ✓ Characterized by high level of interdependencies among the different users

Water has no substitute

Why water is different?

- Water is the “driving engine” for economy
- Water sustains the ecosystem
- Water is finite renewable resource
- Water is directly related to population growth



Water cycle http://commons.wikimedia.org/wiki/File:Water_Cycle-en.png

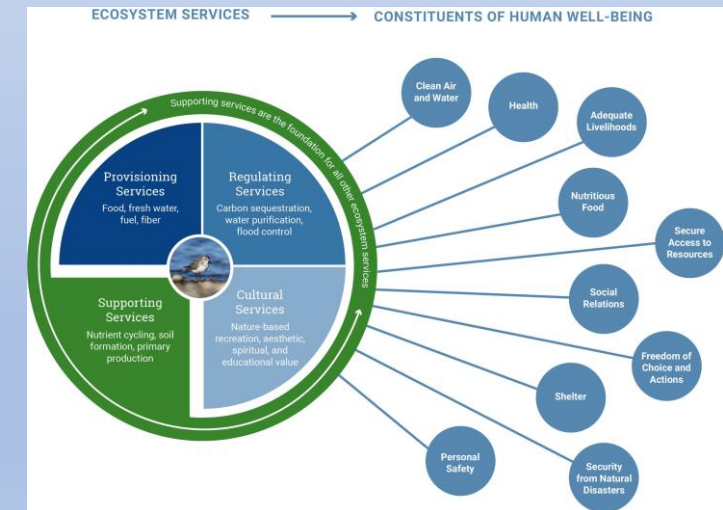


Diagram: WHSRN Executive Office

Why water is vulnerable?

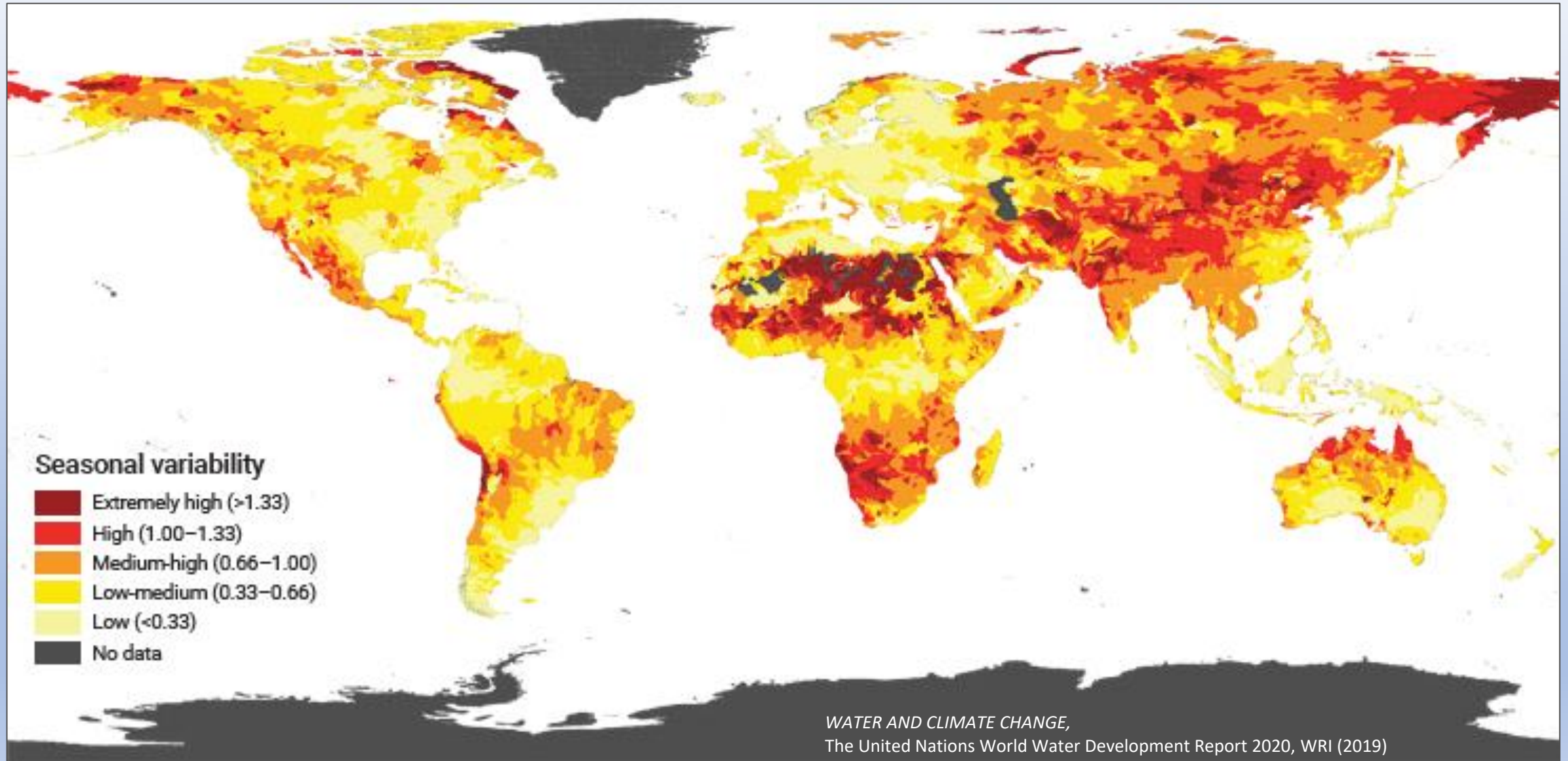
- Supply vs demand
- Water scarcity
- Climate change/wet and dry shocks
- Highly variable and not equitably distributed in time and space
- Transboundary issues



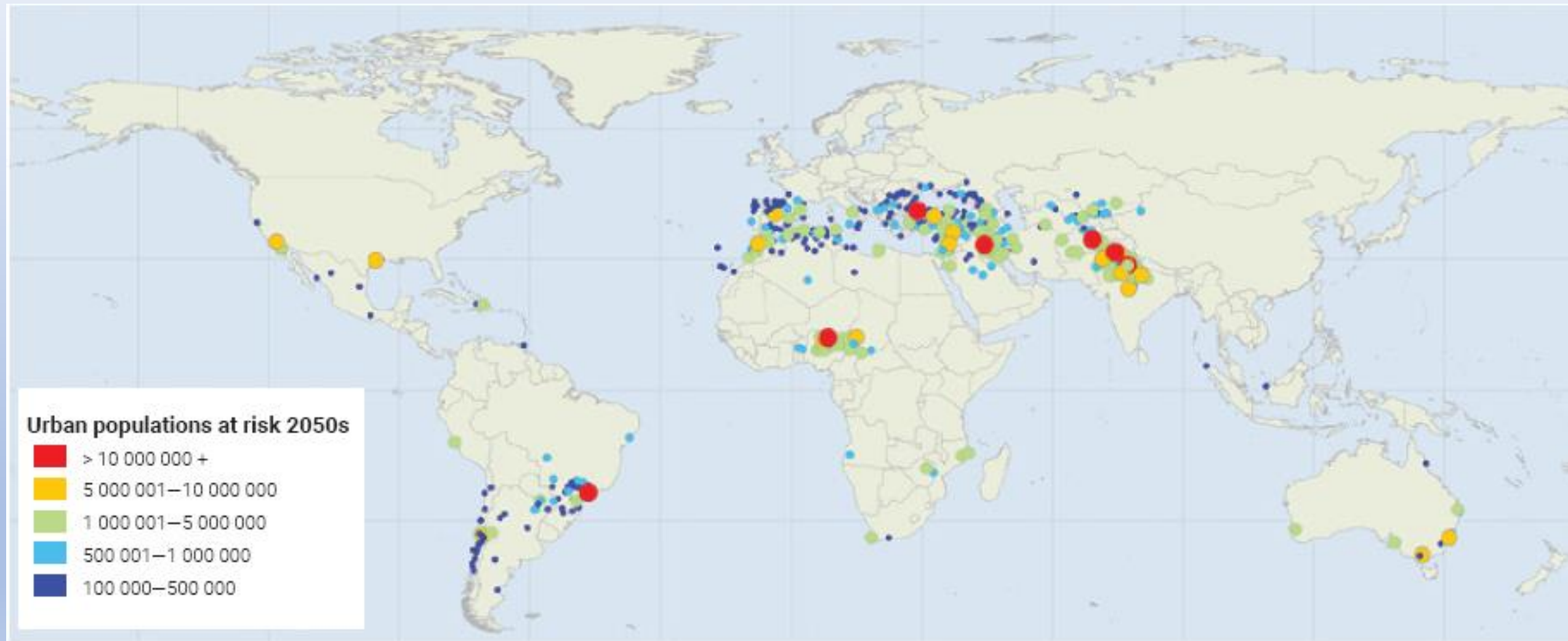
The water challenge

- The high variance of water /dramatic fluctuations exacerbated by periodic droughts or floods still reshape societies
- Rapid population growth and significant consumptive demands as dramatic shifts from rural to urban areas
- Intensive agricultural uses and intensive irrigation developments and extreme droughts are misery in slow motion with impacts that are deeper and longer lasting
- Deterioration of water quality, from agricultural practices and urban and industrial uses
- Decreasing groundwater availability coupled with contamination of a large number of aquifers
- Transboundary water dependencies, overlapping and shifting political and administrative boundaries affecting shared water bodies, challenging global water security.

Seasonal variability of water per year

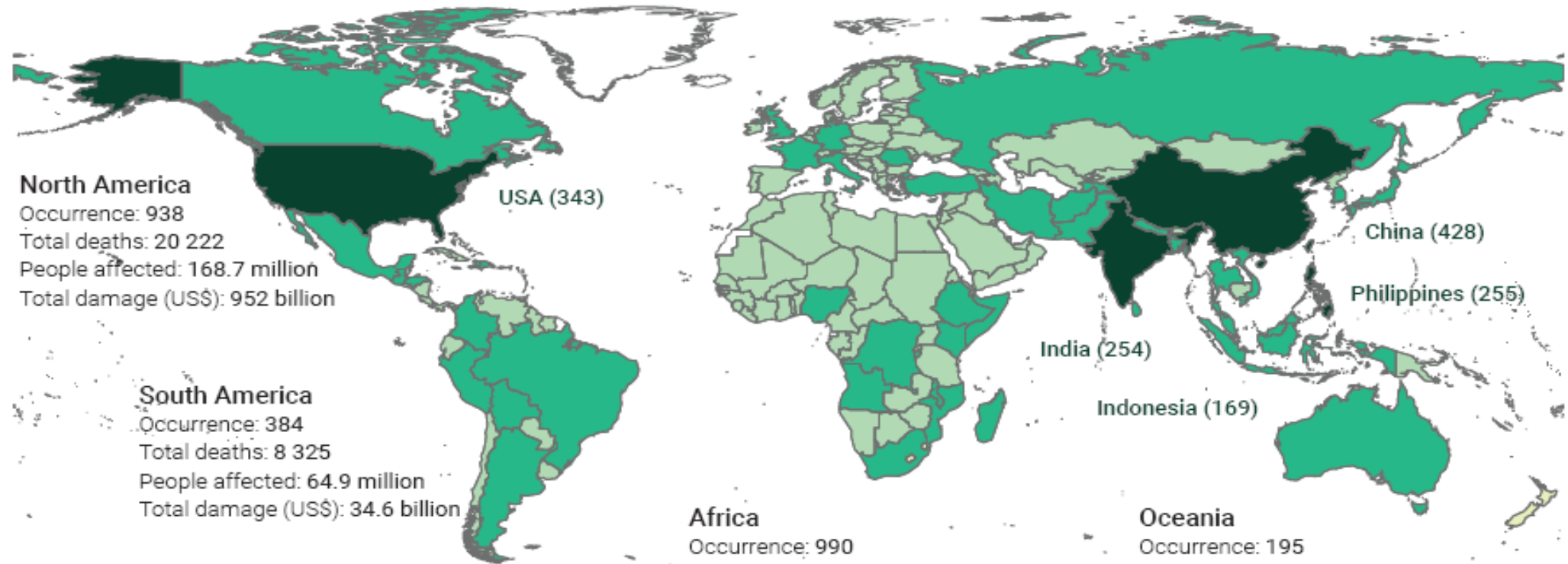
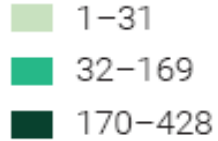


Urbanization



Spatial distribution of water related disasters 2001–2018

Number of water-related disasters



North America

Occurrence: 938
 Total deaths: 20 222
 People affected: 168.7 million
 Total damage (US\$): 952 billion

USA (343)

South America

Occurrence: 384
 Total deaths: 8 325
 People affected: 64.9 million
 Total damage (US\$): 34.6 billion

Europe

Occurrence: 655
 Total deaths: 2 910
 People affected: 9.3 million
 Total damage (US\$): 147.4 billion

Asia

Occurrence: 2 206
 Total deaths: 255 438
 People affected: 2.9 billion
 Total damage (US\$): 557.5 billion

China (428)

Philippines (255)

India (254)

Indonesia (169)

Africa

Occurrence: 990
 Total deaths: 38 880
 People affected: 276.8 million
 Total damage (US\$): 12.6 billion

Oceania

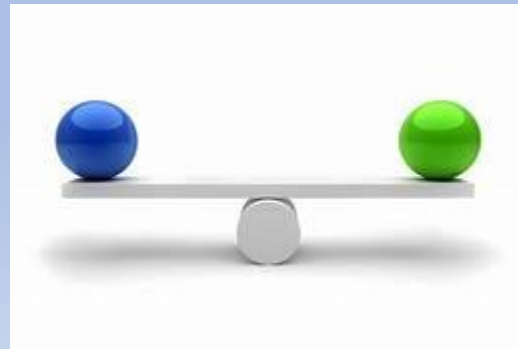
Occurrence: 195
 Total deaths: 739
 People affected: 5 million
 Total damage (US\$): 35.2 billion

WATER AND CLIMATE CHANGE,
 The United Nations World Water Development Report 2020
 ,Developed by UNU-INWEH, based on EM-DAT data.

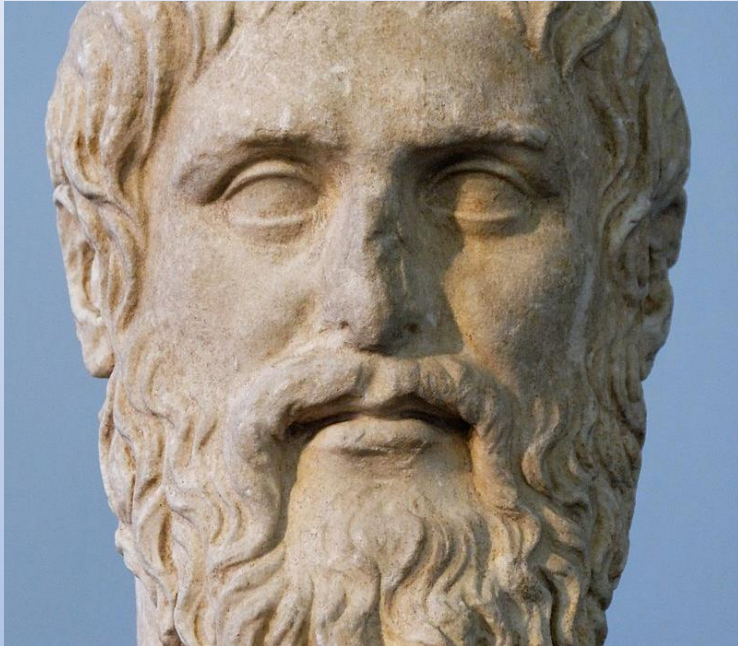
Supply vs demand



- The global population increased by three-fold in the 20th century but water use increased by six-fold.
- There will be a 40% gap between the demand for water and the availability of water by the year 2030.
- In the future 30% of the total demand will be delivered by alternative sources.



History makers...



“only what is rare is valuable”

however water
which is the best of all things
is the cheapest (*Plato*)

**the market price of an item
need not reflect its true value.**

Cost-Price-Value of Water

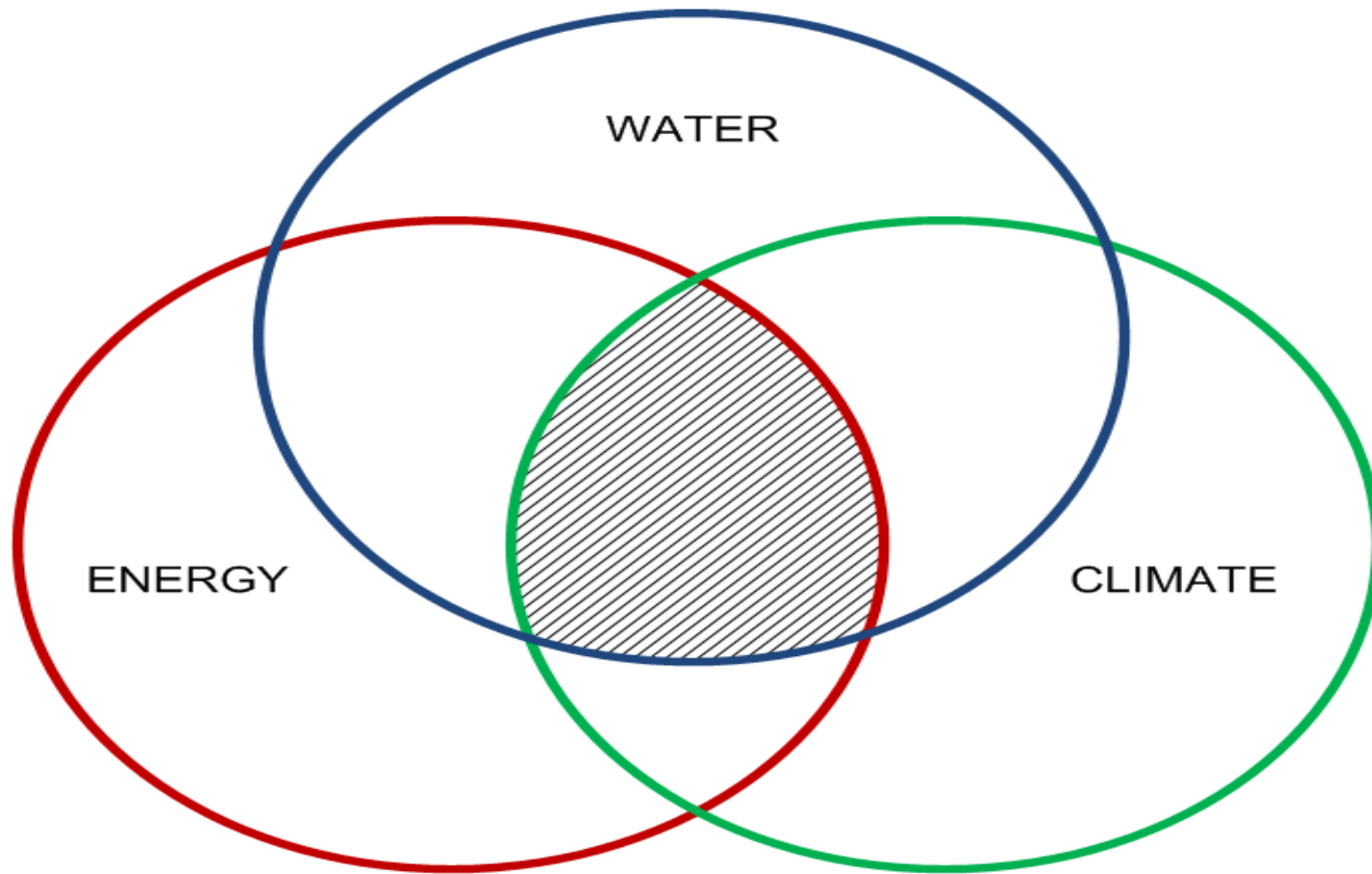
“The Diamond-Water Paradox”



Adam Smith (1776)



Public or private?
Social or economic?



NEXUS: Interactions of water resources with other resources:
energy, land, and human resources

SDG6



6 CLEAN WATER AND SANITATION

6.1.1	Safely managed drinking water services
6.2.1	Safely managed sanitation and hygiene services
6.3.1	Wastewater safely treated
6.3.2	Good water quality
6.4.1	Water use efficiency
6.4.2	Level of water stress
6.5.1	Integrated water resources management
6.5.2	Transboundary basin area with water cooperation
6.6.1	Water-related ecosystems
6.A	Enhance international water cooperation
6.B	Participation of local communities

SUMMARY PROGRESS 2021: SDG 6 INDICATORS

6.1.1 DRINKING WATER

2.2 billion people **29%** of the world's population lacked safely managed drinking water services in 2017

6.2.1a SANITATION

4.2 billion people **55%** of the world's population lacked safely managed sanitation services, and 673 million people practised open defecation, in 2017

6.2.1b HYGIENE

3 billion people **40%** of the world's population lacked a basic handwashing facility with soap and water at home in 2017

6.3.1 WASTEWATER

Less than **50%** of domestic wastewater is safely treated in 24 out of the 75 reporting countries (most of the 75 are high-income countries)

6.3.2 WATER QUALITY

Lack of water quality data means **over 3 billion people** are at risk because the health of their rivers, lakes and groundwater is unknown

6.4.1 WATER-USE EFFICIENCY

Since 2015 water-use efficiency has increased by **4%** globally

6.4.2 WATER STRESS

2.3 billion people live in water-stressed countries, of which **721 million** live in high and critically water-stressed countries

6.5.1 INTEGRATED WATER MANAGEMENT

129 countries are not on track to have sustainably managed water resources by 2030. Globally, the current rate of progress needs to be doubled

6.5.2 TRANSBOUNDARY COOPERATION

Only **22** countries reported that all the rivers, lakes and aquifers that they share with their neighbours are covered by operational arrangements for cooperation

6.6.1 ECOSYSTEMS

1/5 of the world's river basins are experiencing rapid changes in the area covered by surface waters

6.a.1 INTERNATIONAL COOPERATION

Official development assistance (ODA) commitments to the water sector increased **11%** from 2015 to 2019, but disbursements only rose by 3%

6.b.1 PARTICIPATION

Only **14** out of **109** countries report having high levels of participation by communities in water and sanitation decision-making

Integration?

From water supply and sanitation to agriculture, energy, and industry, seek the benefits of an improved integration of the values of water across the full water development or engineering cycle



There is light.....



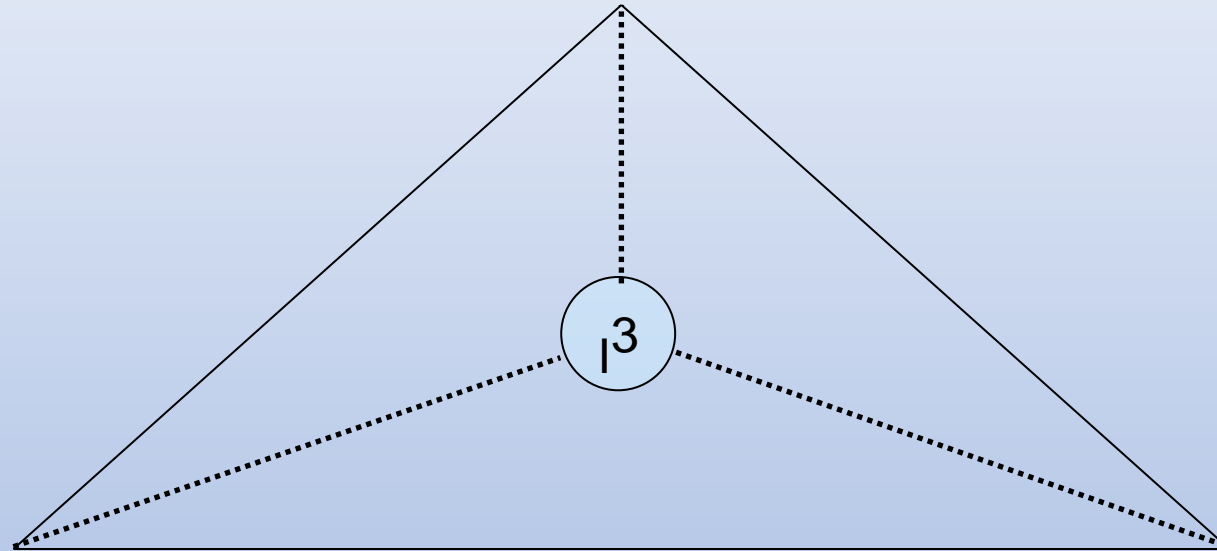
New «water culture»



A “water smart” society, *The right water for the right purpose to the right users”*

- Rediscover the true value of water for society, the environment and the economy
- Restore trust among people and the earth
- Reduce the pressure on planet by rethinking “all about water”
- Because **water is the best of all**

GNOSIS
[Intelligence]
[Knowledge]



DOXA
[Interpretation]
[Judgement]

PRAXIS
[Implementation]
[Action]



*Prof. E. Vlachos
(1935-2017)*

Water engineers will be in the forefront of expanding scientific and research capacity but also in a pragmatic respond to immediate needs of society expanding the field of water resources.

UNESCO WWR2021

<https://unesdoc.unesco.org/ark:/48223/pf0000375724>



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**Thank
you**



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