Road to the 2021 Nanjing Peace Forum

Capacity Building Trainings, Nov 4, 2021

WATER & PEACE

Transforming Conflict to Peace

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About Me…

AKADEMI SAINS MALAYSIA

MIT Visiting Scholar

USAID FROM THE AMERICAN PEOPLE

2016-2017 ASEAN-U.S. Science and Technology Fellowship

UTM IPASA IWA

UN Consultant

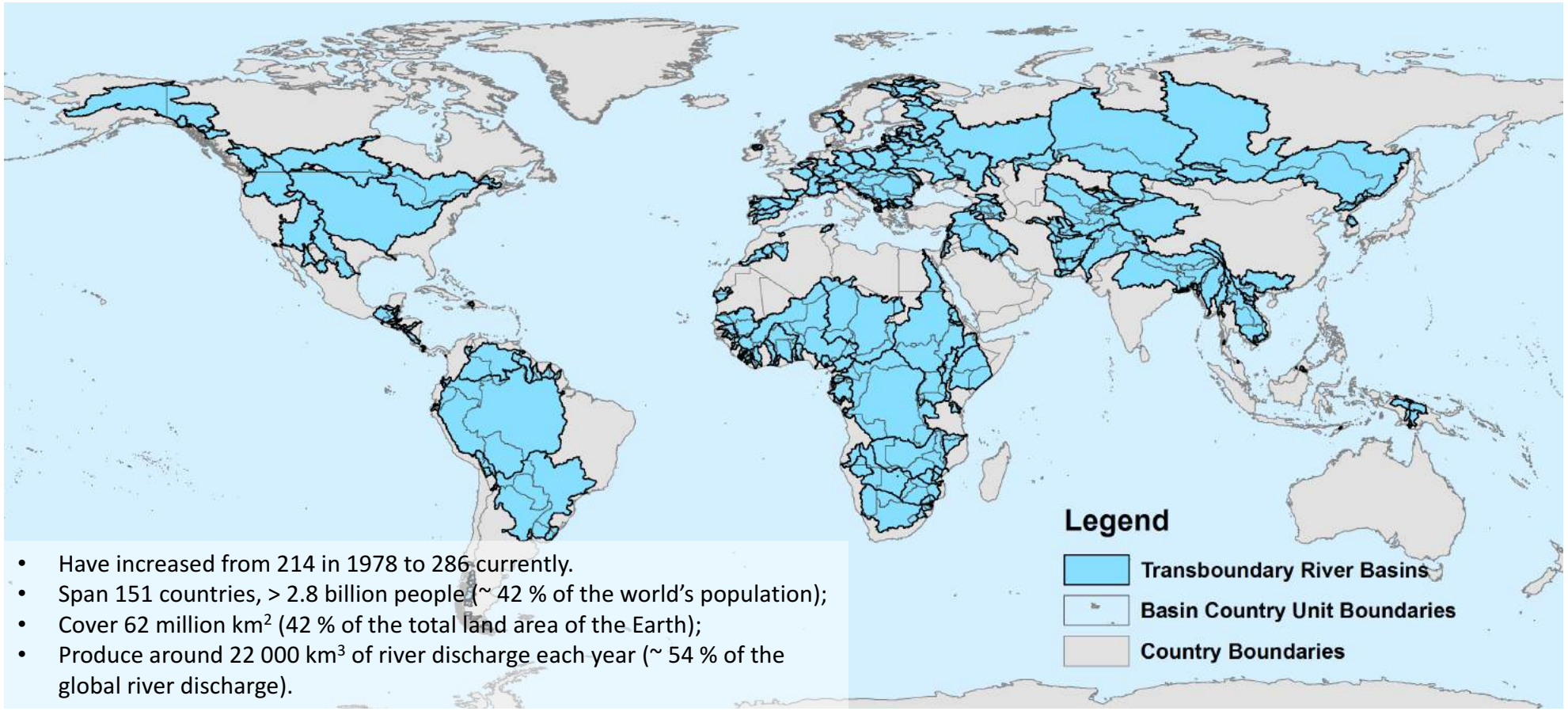
Newton Fund Recipient

Global Water Crisis

*Nowadays, water-related conflicts are on the rise in many parts of the world. Peace can't be achieved without solving the conflicts. So first, we **MUST** understand what causes these conflicts.*


Water: A Finite, Shared Resource

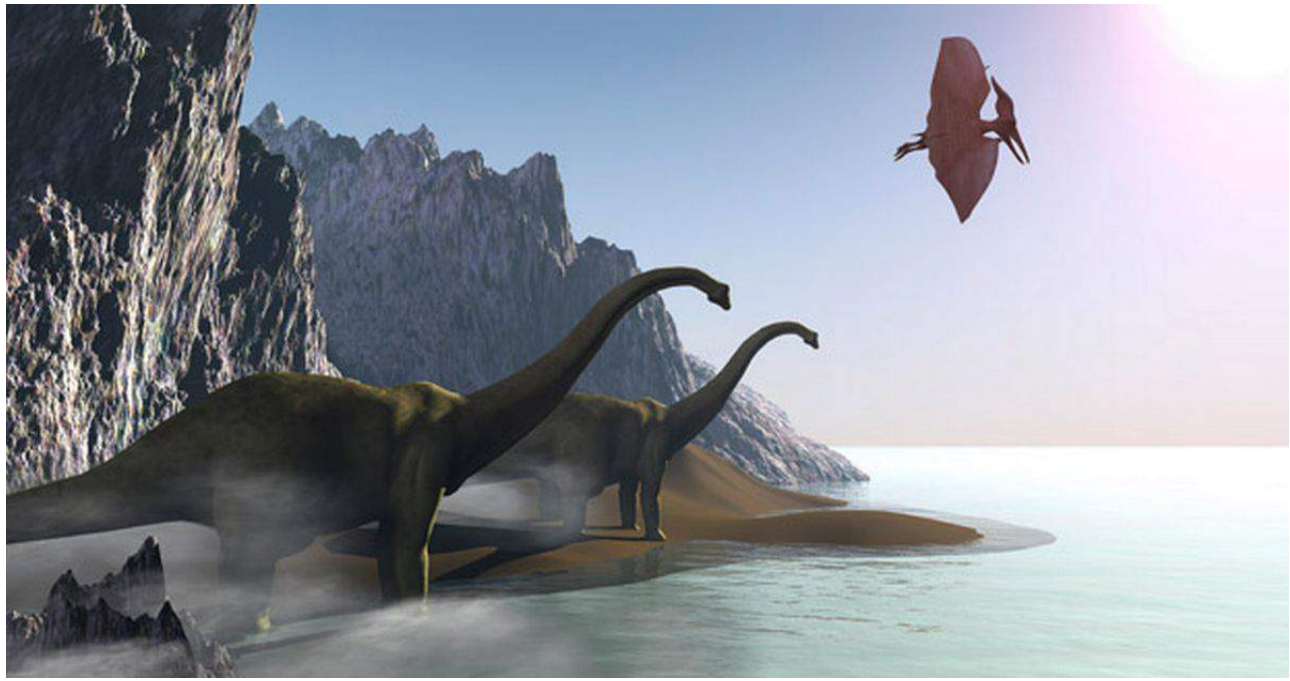
The World's Transboundary River Basin



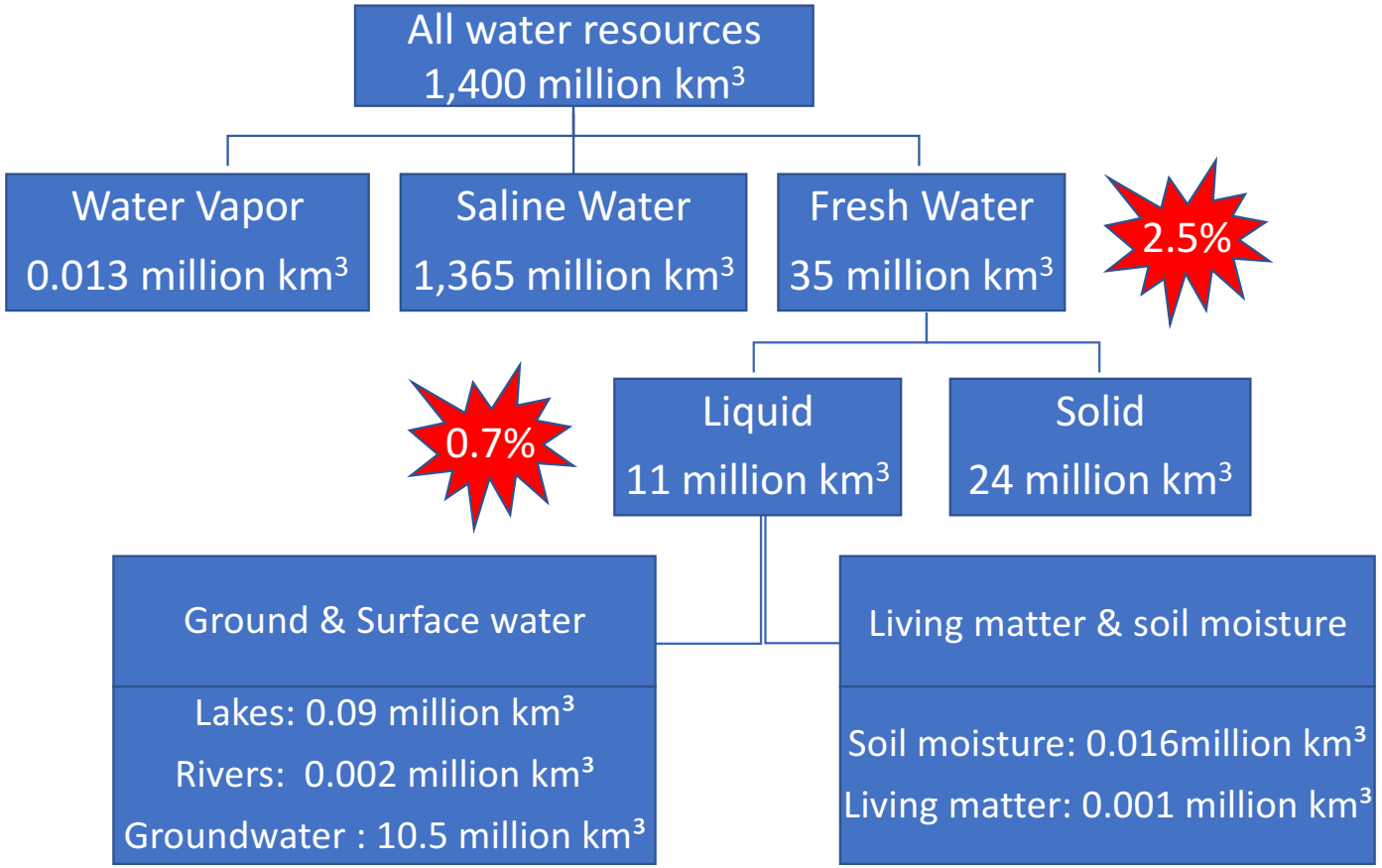
- Have increased from 214 in 1978 to 286 currently.
- Span 151 countries, > 2.8 billion people (~ 42 % of the world's population);
- Cover 62 million km^2 (42 % of the total land area of the Earth);
- Produce around 22 000 km^3 of river discharge each year (~ 54 % of the global river discharge).

Global Water Crisis

Water is a renewable, but finite resource. There is the same amount on earth today as there was when the dinosaurs roamed.



Global Water Crisis

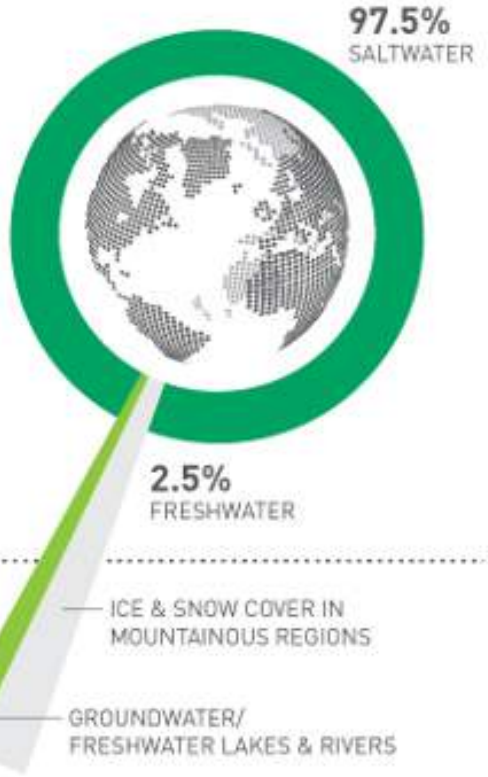


Source: Shiklomanov and Rodda (2003) ISBN: 0 521 82085 5

ABUNDANT WATER YES; BUT VERY LIMITED FRESHWATER

Approximately **70%** of the **EARTH'S SURFACE** is water

But **ACCESSIBLE AND USEABLE FRESHWATER** represents just a tiny sliver...

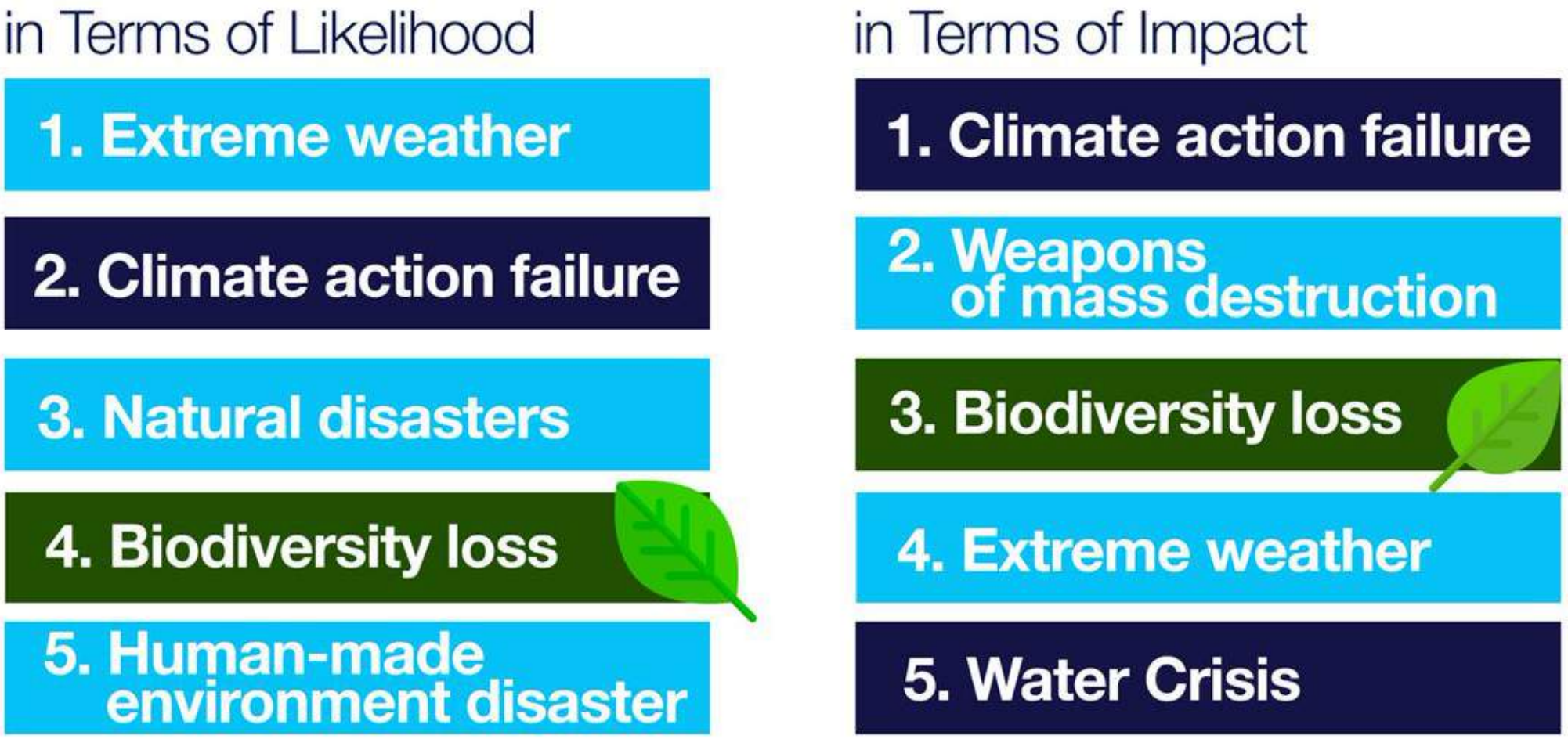


...LESS THAN 1%

of all water resources

Source: United Nations Environment Programme (UNEP) with Clean Edge analysis

2020 WEF Top 5 Global Risks

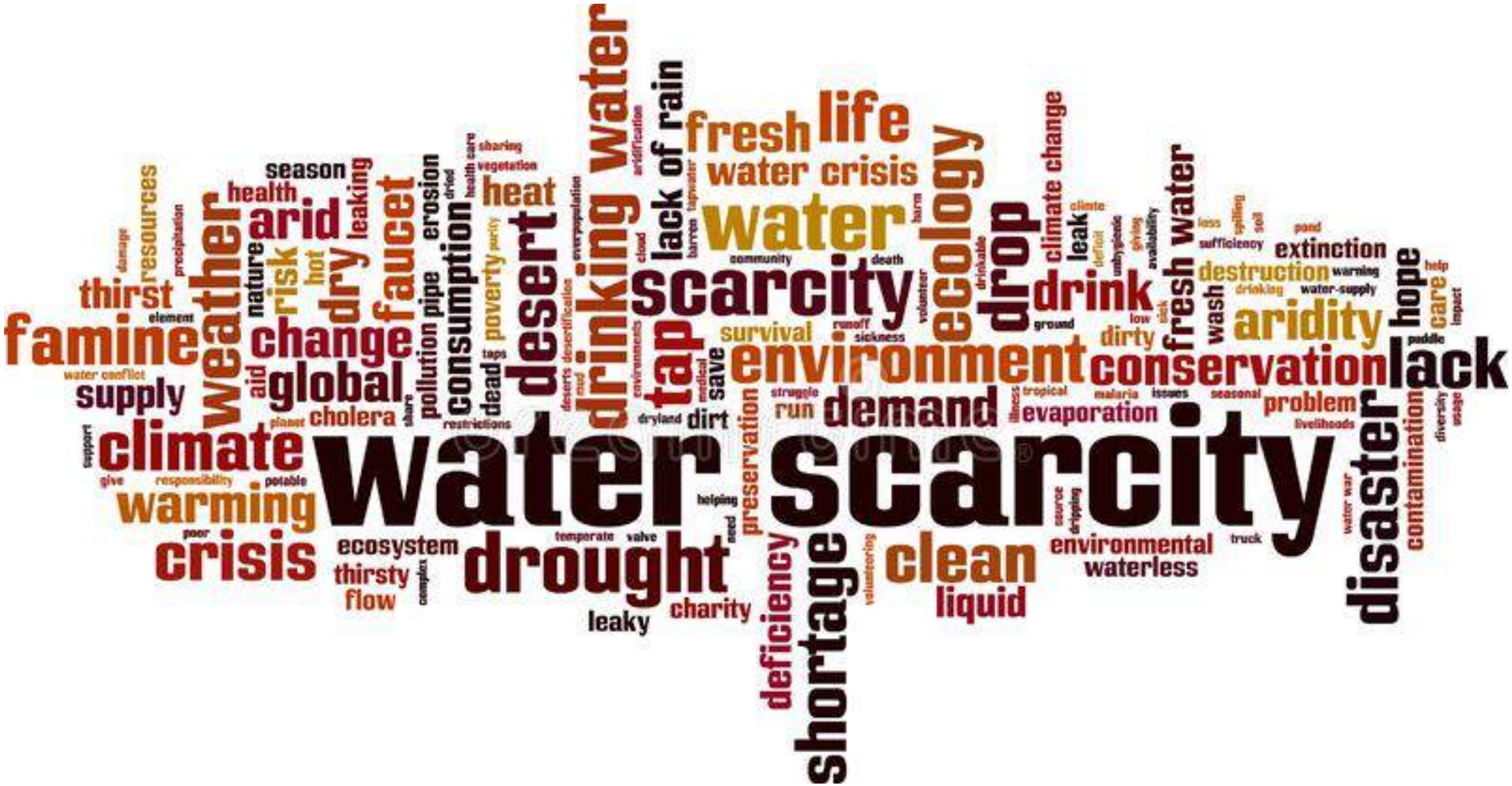


Global Water Crisis

As **population** grows, pressure in our limited available water supply is mounting. This is exacerbated by **pollution** and **climate change**. In many places.

Freshwater consumption is forecast to increase globally **by 25% by 2030**.

Thus, by 2025, **1.8 billion** people will be living in countries or regions with absolute water scarcity, and **2/3** of the world's population could be living under **water stressed conditions**.


water scarcity
drought
famine
climate
crisis
warming
weather
thirst
supply
change
global
arid
dry
faucet
desert
drinking water
lack of rain
fresh
life
water crisis
water
scarcity
ecology
drop
drink
environment
conservation
lack
aridity
demand
shortage
deficiency
clean
liquid
disaster
contamination
extinction
destruction
hope
fresh water
climate change
evaporation
environmental
waterless
ecosystem
thirsty
flow
leaky
charity
preservation
tap
heat
season
health
leaking
erosion
consumption
pollution
pipe
poverty
cholera
risk
hot
nature
resources
survival
problem
dirty
wash
care
leak
dirt
run
save
dead
aid

Cape Town South Africa – Almost DAY ZERO!

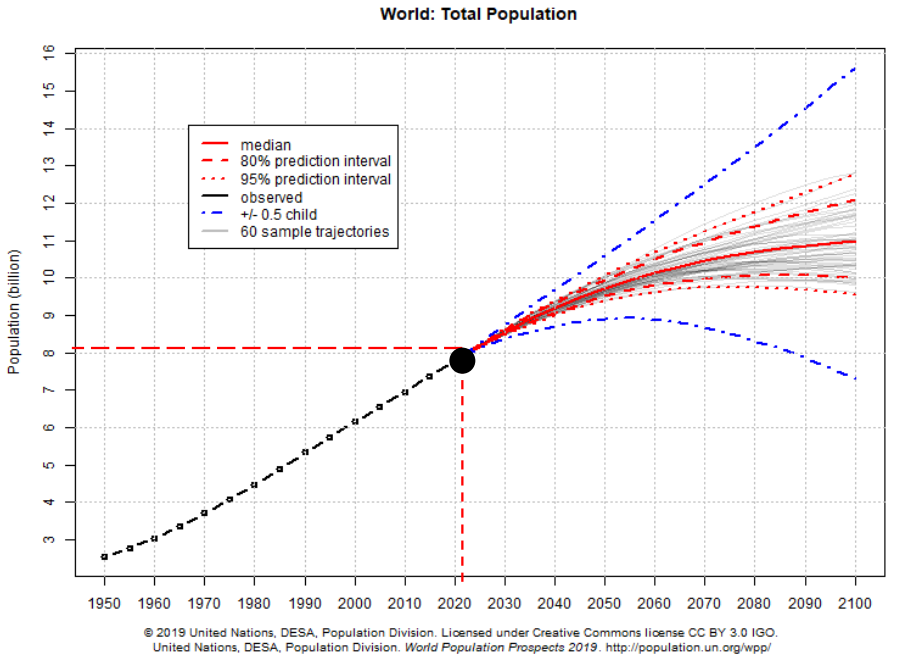
Multiple Causes of Water Scarcity

- Growth in population
- Environmental degradation
  - Modification in land use pattern
  - Global climatic change
  - Pollution of water resources
- Water governance issues
- Lack of data – what we don't know can hurt us

Causes of Water Scarcity: Population Growth

- The estimate of Earth's maximum supportable population is 13.4 billion (currently around 9 billions).
- Looking at the population statistics, where are we headed?

Water Scarcity and Food Availability Will Limit Our Growth!



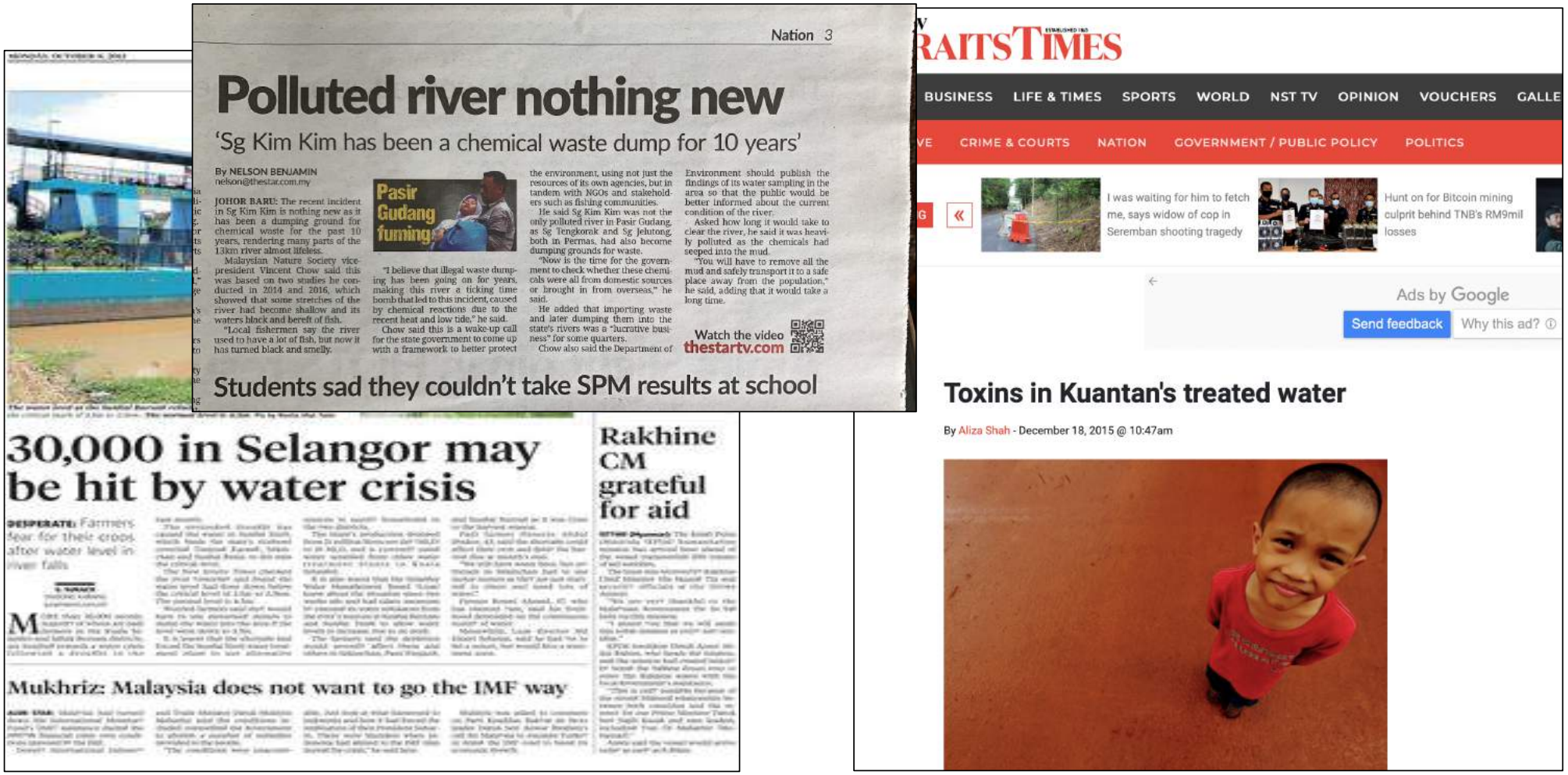
- Classical Malthusian Discourse vs. Virtual Water Discourse
- Demographic Race between Countries

Causes of Water Scarcity: Environmental Degradation

- Modification in Land Use Pattern
  - Land use pattern may reduce the amount of surface water
  - People are forced to use marginal lands
  - Forests are cleared so that land can be used as agricultural purposes
  - Reduction in dams' storage capacity
  - Poverty feeds back to environmental problems

- Global Climatic Change
  - Permanent increase of CO_2
  - Increase of CO2 in the atmosphere lead to significant changes in climate e.g. prolong drought, intense rain, typhoon, etc.

Causes of Water Scarcity: Water Resources Pollution



Nation 3

Polluted river nothing new

'Sg Kim Kim has been a chemical waste dump for 10 years'

By NELSON BENJAMIN
nelson@thestar.com.my

JOHOR BARU: The recent incident in Sg Kim Kim is nothing new as it has been a dumping ground for chemical waste for the past 10 years, rendering many parts of the 13km river almost lifeless.

Malaysian Nature Society vice-president Vincent Chow said this was based on two studies he conducted in 2014 and 2016, which showed that some stretches of the river had become shallow and its waters black and bereft of fish.

"Local fishermen say the river used to have a lot of fish, but now it has turned black and smelly.

Pasir Gudang fuming

"I believe that illegal waste dumping has been going on for years, making this river a ticking time bomb that led to this incident, caused by chemical reactions due to the recent heat and low tide," he said.

Chow said this is a wake-up call for the state government to come up with a framework to better protect the environment, using not just the resources of its own agencies, but in tandem with NGOs and stakeholders such as fishing communities.

He said Sg Kim Kim was not the only polluted river in Pasir Gudang, as Sg Tengkorak and Sg Jelutong, both in Permas, had also become dumping grounds for waste.

"Now is the time for the government to check whether these chemicals were all from domestic sources or brought in from overseas," he said.

He added that importing waste and later dumping them into the state's rivers was a "lucrative business" for some quarters.

Chow also said the Department of Environment should publish the findings of its water sampling in the area so that the public would be better informed about the current condition of the river.

Asked how long it would take to clear the river, he said it was heavily polluted as the chemicals had seeped into the mud.

"You will have to remove all the mud and safely transport it to a safe place away from the population," he said, adding that it would take a long time.

Watch the video thestartv.com

Students sad they couldn't take SPM results at school

30,000 in Selangor may be hit by water crisis

DESPERATE: Farmers fear for their crops after water level in river falls

Rakhine CM grateful for aid

Mukhriz: Malaysia does not want to go the IMF way

RAITS TIMES

BUSINESS LIFE & TIMES SPORTS WORLD NST TV OPINION VOUCHERS GALLE

VE CRIME & COURTS NATION GOVERNMENT / PUBLIC POLICY POLITICS

I was waiting for him to fetch me, says widow of cop in Seremban shooting tragedy

Hunt on for Bitcoin mining culprit behind TNB's RM9mil losses

Ads by Google

Send feedback Why this ad?

Toxins in Kuantan's treated water

By Aliza Shah - December 18, 2015 @ 10:47am

Causes of Water Scarcity: Lack of Data

We don’t know enough – what we don’t know can hurt us

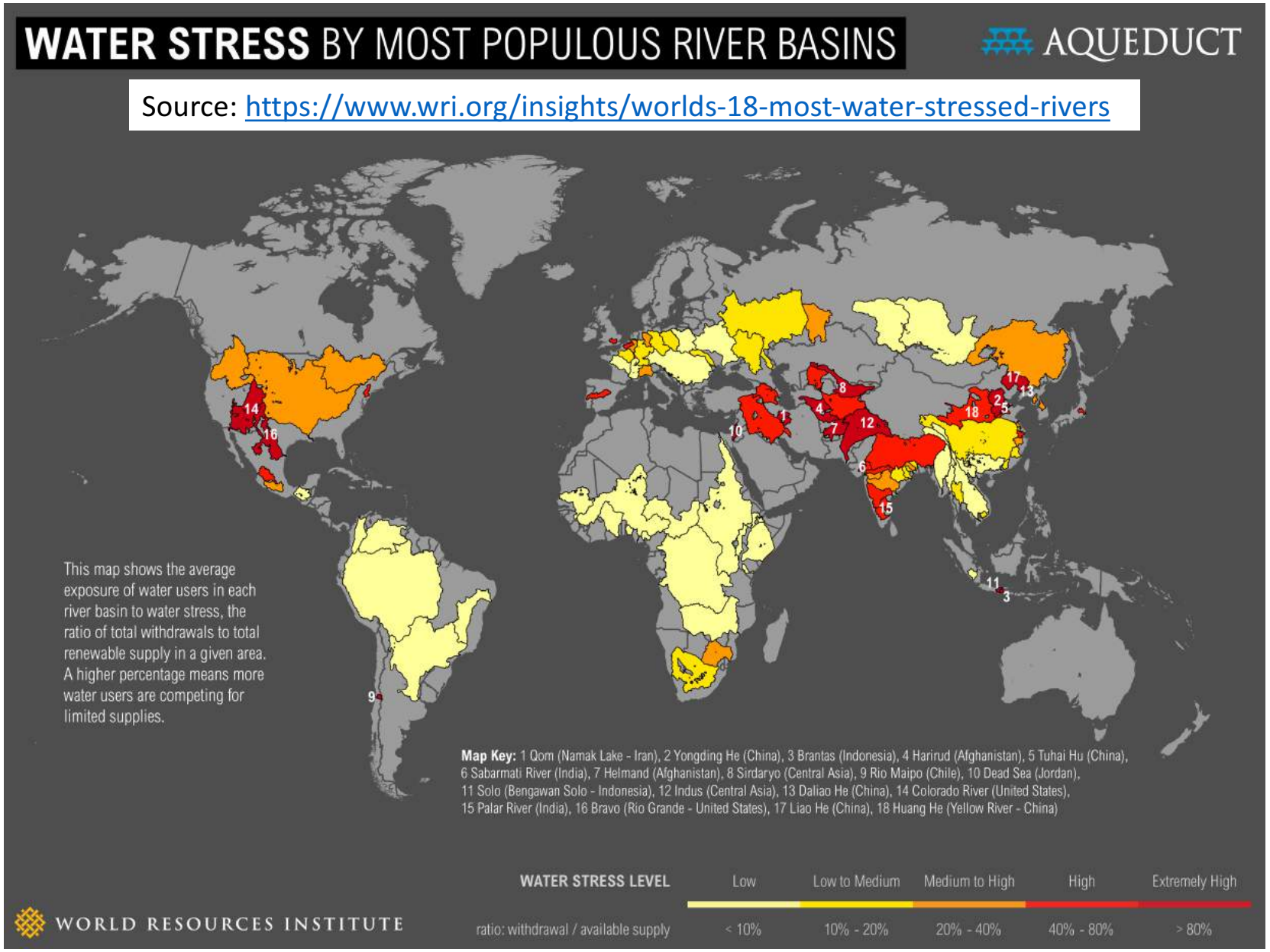
- Quantity, quality and distribution of the resource
- How agriculture, cities and industries use it
- How it is managed
- How much is invested

Causes of Water Scarcity: Lack of Data

Inefficient of Water Allocation, Utilization and Distribution

Water Stress Situation

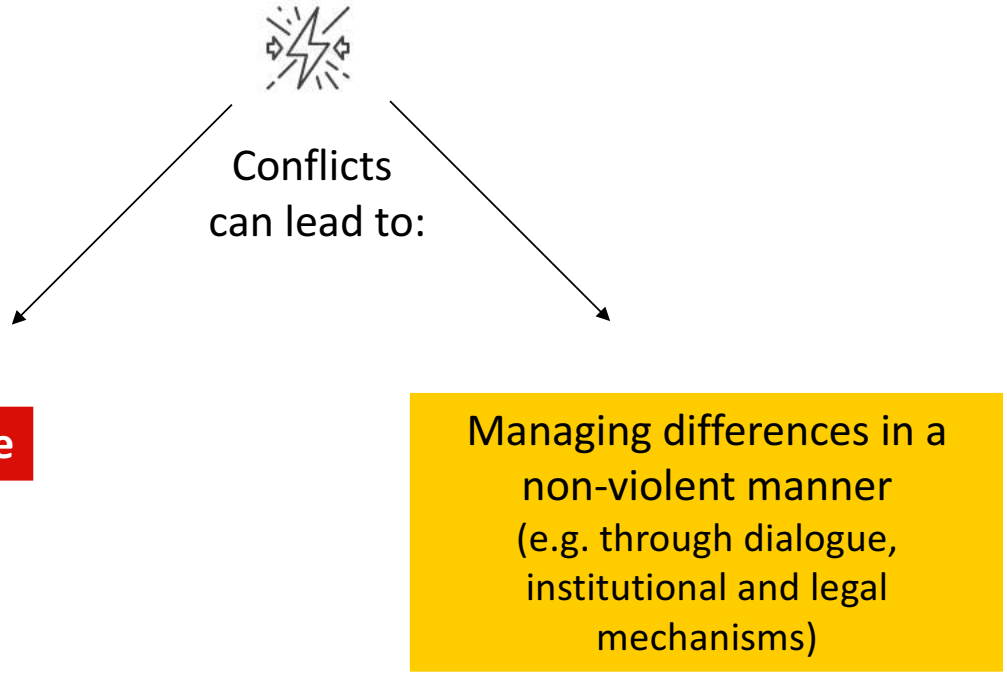
Economic Deficit


WATER STRESS BY MOST POPULOUS RIVER BASINS
AQUEDUCT
Source: https://www.wri.org/insights/worlds-18-most-water-stressed-rivers
This map shows the average exposure of water users in each river basin to water stress, the ratio of total withdrawals to total renewable supply in a given area. A higher percentage means more water users are competing for limited supplies.
Map Key: 1 Qom (Namak Lake - Iran), 2 Yongding He (China), 3 Brantas (Indonesia), 4 Harirud (Afghanistan), 5 Tuhai Hu (China), 6 Sabarmati River (India), 7 Helmand (Afghanistan), 8 Sirdaryo (Central Asia), 9 Rio Maipo (Chile), 10 Dead Sea (Jordan), 11 Solo (Bengawan Solo - Indonesia), 12 Indus (Central Asia), 13 Daliao He (China), 14 Colorado River (United States), 15 Palar River (India), 16 Bravo (Rio Grande - United States), 17 Liao He (China), 18 Huang He (Yellow River - China)
WATER STRESS LEVEL
Low
Low to Medium
Medium to High
High
Extremely High
ratio: withdrawal / available supply
< 10%
10% - 20%
20% - 40%
40% - 80%
> 80%
WORLD RESOURCES INSTITUTE

Types of Water Conflict

What are Conflicts?

Conflict = an incompatible interaction between two or more actors



Types of Water Conflict

- Water related conflicts have no single cause alone.
- Different types of water conflicts:
  - Conflicts over the control of water resources as a “cause”
  - Water as a military or political “tool”
  - Water as a military “target”

Types of Water Conflict

- **Control of Water Resources**: where water supplies or access to water is at the root of tensions.
- **Military Tool**: where water resources, or water systems themselves, are used by a nation or state as a weapon during a military action.
- **Political Tool**: where water resources, or water systems themselves, are used by a nation, state, or non-state actor as a tool to reach a political goal.

Types of Water Conflict

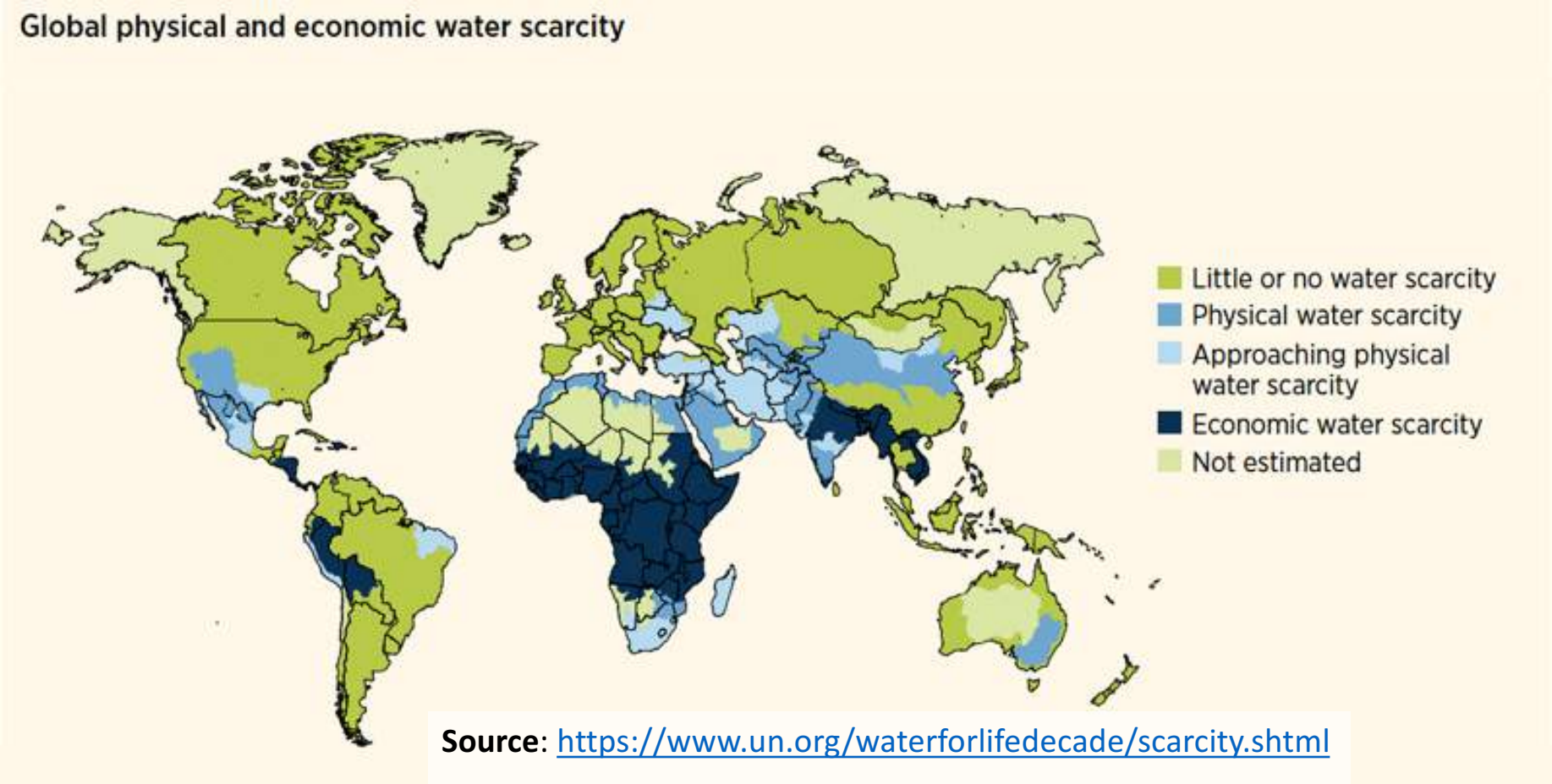
- **Terrorism**: where water resources, or water systems, are either targets or tools of violence or coercion by non-state actors.
- **Military Target**: where water resource systems as a vulnerability of the adversary system are targets of military actions by nations or states.
- **Development Disputes**: where water resources or water systems are a major source of contention and dispute in the context of economic and social development.

Physical and Economic Scarcity

Physical versus economic water scarcity:

- **Physical scarcity**: limit of the annually renewable water for different uses (human and ecosystem uses) has been surpassed and backstopping options such as groundwater mining from non-renewable resources are not available or already exhausted.
- **Economic water scarcity**: sufficient amounts of water are available, but economic, human and institutional capacities for allocating it are severely limited.

Physical and Economic Scarcity



Source: https://www.un.org/waterforlifedecade/scarcity.shtml

Physical and Economic Scarcity

Economic water scarcity is caused by:

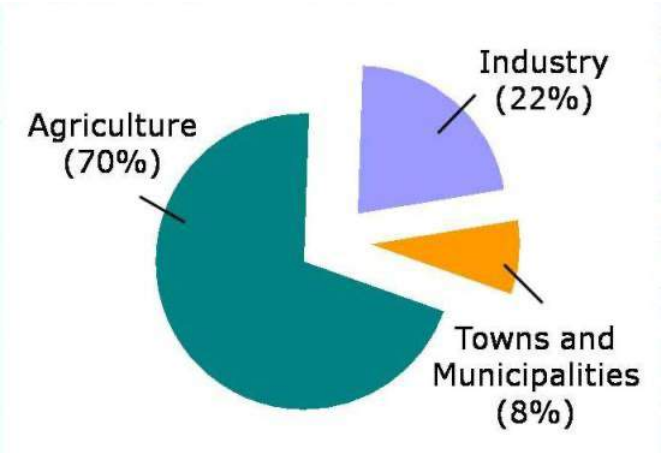
- Lack of water infrastructure in general or to the poor management of water resources where infrastructure is in place
- Unregulated water use for agriculture or industry, often at the expense of the general population.
- Major inefficiencies in water use, usually due to the economic undervaluing of water as a finite natural resource, can contribute to water scarcity

Factors that Impacting Water

- Environmental security policies
- Food policies
- Energy policies
- Demographics
- Climate change adaptation
- Land use policies
- International trade, subsidies and incentives
    - Among others

Different Uses of Water

- Agriculture (approx. 70% of global withdrawal)
- Industry (20%)
- Domestic uses (approx. 10%)



→ Quality and quantity aspects: while the quality of water is vital for drinking water, the quantity aspect is predominant in the agricultural sector.

Water Conflicts on Different Levels

Water related conflicts can occur on different levels:

- Local
- National
- Regional
- Global

Water Conflicts on Different Levels

Local Level

- Tensions over the use of a water well
- Or between pastoralists and modern irrigated agriculture
- Where traditional conflict management systems have been eroded and new ones not firmly established, local water related conflicts can turn violent.

Water Conflicts on Different Levels

National Level

- Question of land use and water rights, as well as infrastructure development, may lead to conflicts
- Both local and national water related conflicts are more likely in economically water scarce countries, as it is more a challenge of infrastructure and management, rather than about water quantity per se.
- E.g. Darfur conflict: increasingly limited water and land resources, possibly also due to climate change, were factors that escalated tensions.

LUZI (2008); MASON et al. (2009)

Water Conflicts on Different Levels

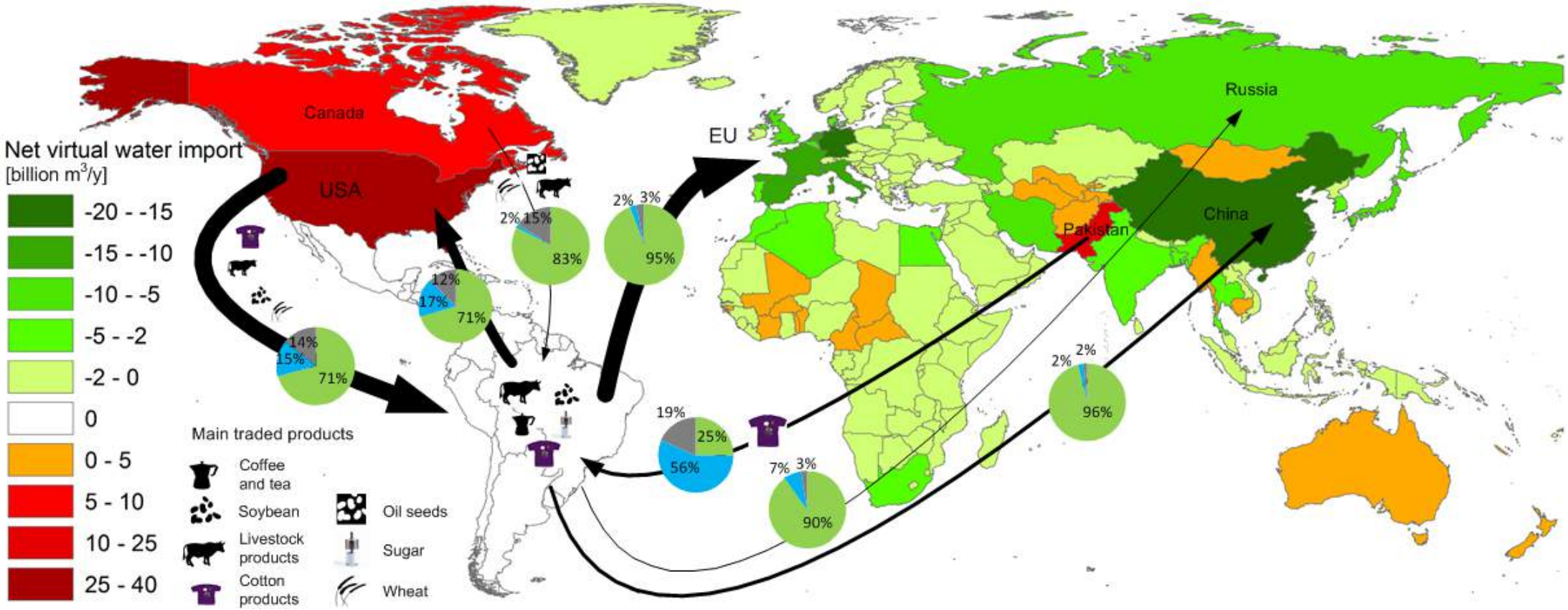
Regional Level

- Conflicts often arise over shared river basins or trans-boundary groundwater
- More diplomatic and economic tensions than violent
- E.g. Nile Basin, Mekong, Jordan, Euphrates-Tigris, Syr Darya and Amu Darya

East Africa and the Nile basin. Source: http://en.wikipedia.org/wiki/Water_politics_in_the_Nile_Basin [Accessed: 05.02.2013]

Global Level

Water in the form of food ("virtual water") links the world availability of water with the global food trade.

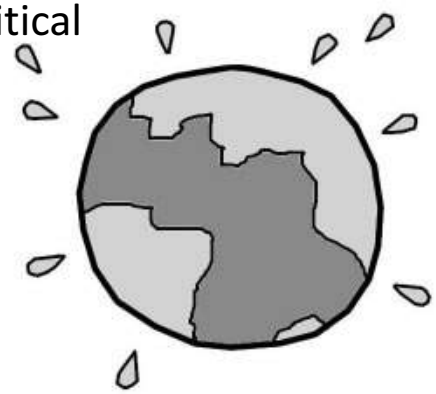


Virtual water imports into Europe. Source: Mekonnen, M.M. and Hoekstra, A.Y. (2011) National water footprint accounts: the green, blue and grey water footprint of production and consumption, Value of Water Research Report Series No.50, UNESCO-IHE, Delft, Netherlands.

Groundwater and Climate Change Pressures

Groundwater and Climate Change - Two Special Challenges for Peaceful Dispute Resolutions

- The largely unseen nature of groundwater often make conflicts over access and control of these resources more diffuse as compared to the case of surface water.
- In the case of groundwater irrigation for agriculture, the resources provide important means to buffer against climate variability and are thus key income-smoothing assets.
- If it is not managed adequately, this may result in social and political unrest or even conflict.



Groundwater and Climate Change Pressures

E.g. Depleting River Flows in Middle East

- All the countries in the Middle East already face serious water shortage and additional climate-induced resource scarcity could escalate conflicts and political turmoil.
- The river flows in Turkey, Syria, Iraq, Lebanon and Jordan have depleted by 50 to 90% from 1960 to 2010.
- See some examples in the video (next slide)

Are Future Water Wars Inevitable?

Water Scarcity Exercise
(10 mins)

- Scan the QR Code. It should bring you to a ***Padlet*** page.
- Follow the instruction given on the ***Padlet*** page:-
  - *Pick (pin in the map), a water stress area in any part of the world and suggest (note down) a few best solutions that you can think of to mitigate the issue of water scarcity in that particular area.*

Way Forward: Water Cooperation

Water Conflict or Cooperation?

Water War Hypothesis

- "I believe water will be the defining crisis of our century, the main vehicle through which climate change will be felt—from droughts, storms, and floods to degrading water quality. We'll see major conflicts over water; water refugees." - Alexandra Cousteau, Social Environmental Advocate WATERPOLITICS (2013)
- It seems intuitive: 'the less water there is, the more likely it is that people will fight over it'.

But is this true?

Well, actually, NO…

or

6. Water Conflict or Cooperation?

Water Cooperation

- Researchers have found that arid climates are no more conflict-prone than humid ones.
- It also transpires that conflicts over water erupt in equal measure in rich and poor countries, democracies and autocracies.

UNESCO (2013)

Water Conflict or Cooperation?

Water Cooperation

- At the international level water appears to provide reasons for trans-boundary cooperation rather than war.
- While there has been conflict related to water in a handful of international basins...
- ... in the rest of the world's approximately 300 shared basins the record has been largely positive.
- Places that generally cooperated with each other, usually also cooperated over water.
- In places where there were conflicts, such as the Middle East, there were often other causes for disagreement. In other words, the water situation didn't't help but it was not the main cause of war.

Water Conflict or Cooperation?

Water Cooperation

- This is perhaps exemplified by the hundreds of treaties in place guiding equitable water use between nations sharing water resources.
- The institutions created by these agreements can, in fact, be one of the most important factors in ensuring cooperation rather than conflict.

Water more often unites than divides people and societies.

UN (2013)

Water Conflict or Cooperation?

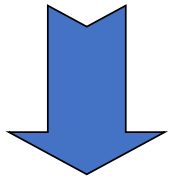
Defining a common interest:

- Improving water efficiency,
  - New technology
- Implementing integrated water resources management,
  - Strengthening institutions
  - Capacity-building
- Sharing the benefits
  - Virtual Water

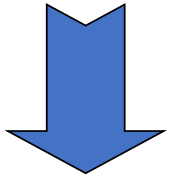
Water Conflict or Cooperation?

The Dynamics of Cooperation

Coordination: Sharing of information, communication, assessments



Cooperation: Joint projects, active planning, adaptation of national plans to factor in regional costs and benefits



Collaboration: Formalized agreements, Integrated Basin Management, joint institutions

WATER SECURITY & SUSTAINABLE DEVELOPMENT HUB

OUR EFFORT TOWARDS SOLVING THE ISSUE

UK Research and Innovation GCRF

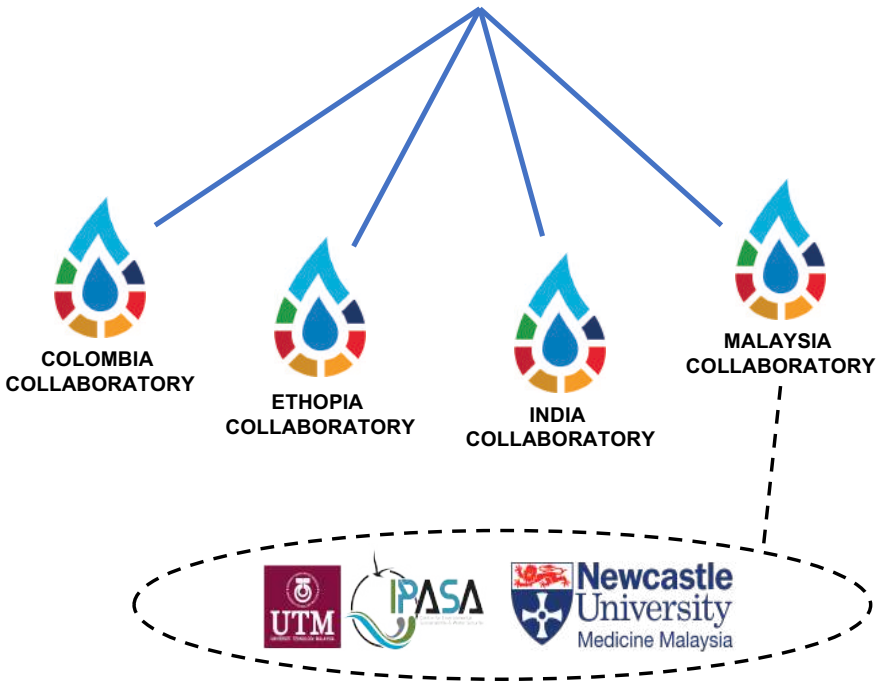
GCRF Water Security and Sustainable Development Hub (2019 - 2024)

Funders:

GCRF UK Research and Innovation

WATER SECURITY & SUSTAINABLE DEVELOPMENT HUB

(UNITED KINGDOM)



Vision:

To **enable sustainable water security through transformative system approach** that better understands water systems, values all water aspects and strengthens water governance to enable integrated water management.

Aim:

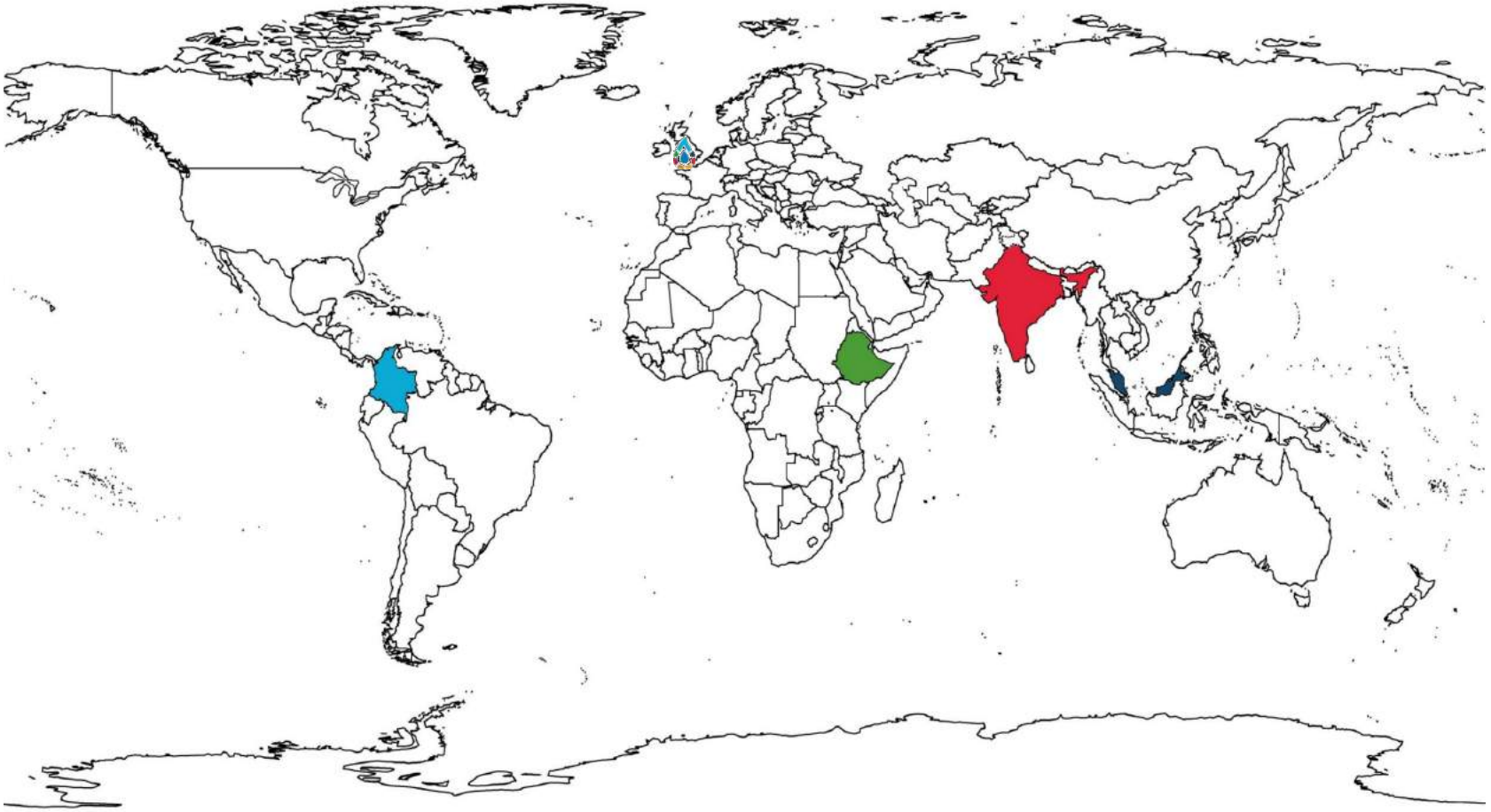
To **build and enhance understanding across water security systems**, in order to address five (5) systemic barriers to water security:-

1) Insufficient data
2) Unfit service delivery models
3) Fragmented governance
4) Unsuitable solutions to localized problems; and,
5) Limited community involvement.

About the Water Security Hub

- **Funder:** UKRI Global Challenges Research Fund (GCRF)
  - Cost: £20m
- **Start:** 13 February 2019
- **End:** 12 February 2024
- **Current research team:** 119 (expected full capacity ~130)
- **No. Research Institutions:** 11
- **No. Research Partners:** 45
- **Countries:** Colombia, Ethiopia, India, Malaysia, UK
- **NU involvement:** Engineering, GPS, APL, Education, Medicine

International Hub Collaboration



- Colombia
- Ethiopia
- India
- Malaysia
- U.K.

“The world is not on track to achieve SDG6”

UN Water (28 June 2018)
Report on Water and Sanitation

70% global abstraction for agriculture

Women often responsible for water collection

61% people lack safe sanitation

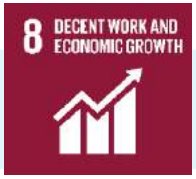
$7.5tn water infrastructure by 2030

62% natural hazard deaths from water

10% global abstraction for energy

153 nations share transboundary resources

Fragmented, non-inclusive governance



1.4bn jobs directly water-dependent

45 billion litres leaks every day

30% primary schools lack safe water supply or sanitation

Clean water is vital to 81% businesses

80% wastewater returned to environment untreated

28% world’s population lack safe drinking water

892 million people defecate in the open

Common Threats to Water Security


Broken infrastructure

Inequities & Inequalities

Pollution

Loss of wildlife

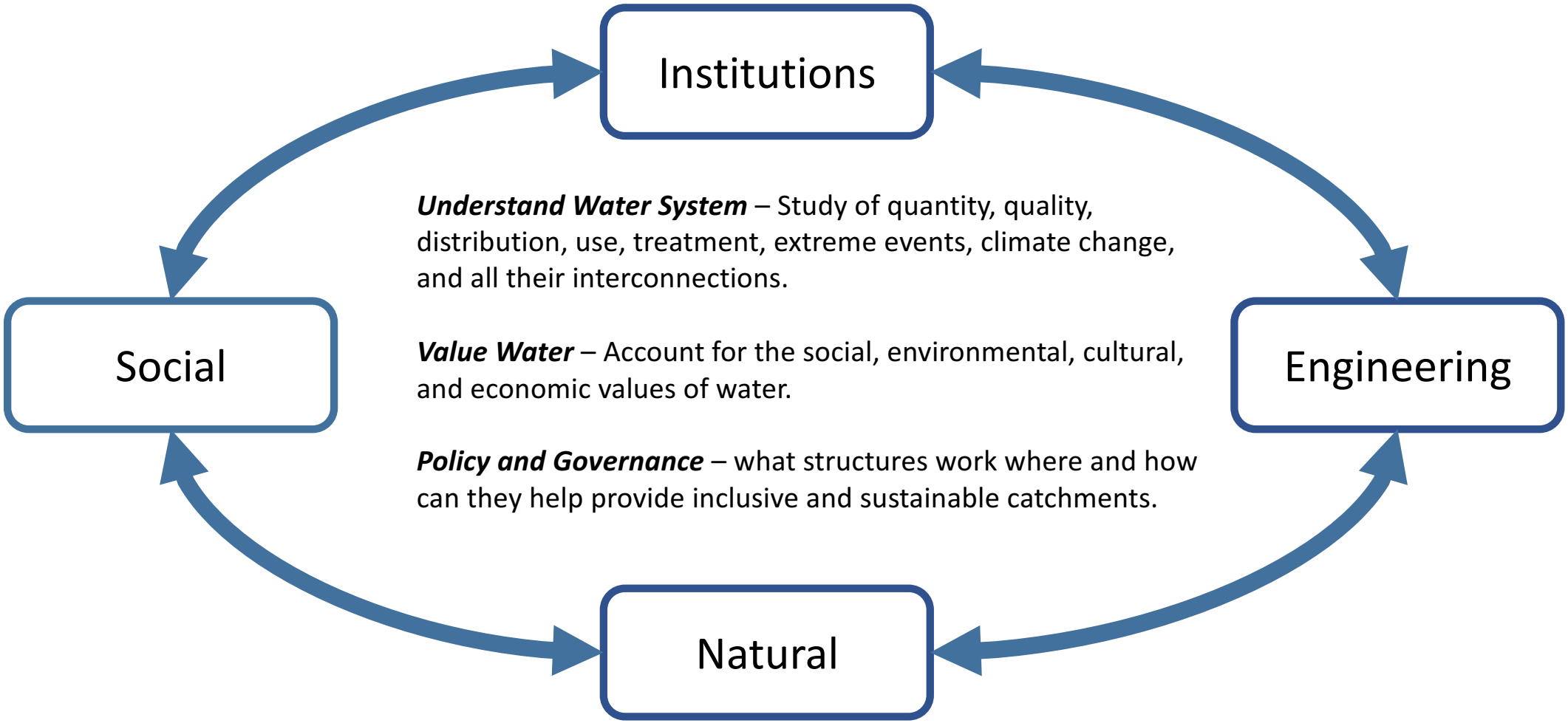
Poor sanitation

Flooding

Drought

Water black market

The Hub's Approach



Understand Water System – Study of quantity, quality, distribution, use, treatment, extreme events, climate change, and all their interconnections.

Value Water – Account for the social, environmental, cultural, and economic values of water.

Policy and Governance – what structures work where and how can they help provide inclusive and sustainable catchments.

The Hub's Research Programme

Work stream 1: Collaboratories

A global network of local water collaboratories

Work stream 2: Tools

Enabling and integrating tools for well-managed water systems

Work stream 3: Risks

Catalysing investment and improvement in water quality and hydrological resilience

Work stream 4: Values

Realise the full social, economic and environmental value of water services

Work stream 5: Governance

Policy and governance to enable long term water security across all scales

Work stream 6: MEL

Monitoring, Evaluation and Learning

The Hub's Guiding Principles

With the Hub, we intend to:

- Maximise the real-world impact of research
- Build capacity of institutions and researchers
- Promote transdisciplinary collaboration
- Embed equality, diversity and inclusion
- Act with transparency and accountability to all partners

@GCRFWATERHUB

www.watersecurityhub.org

Take Home Points

- Water has remained too low on the list of political priorities for too long.
- Neglecting the need for investments has caused development to lag, people to suffer and the environment to deteriorate.
- The resources needed to address the problems of water management are minuscule compared with the financial resources that have been pledged and secured to deal with carbon emissions or the recent financial crisis.
- As climate change evolves, governments will have to learn to operate under conditions of greater risk and uncertainty.
- Sharing information is key for better sharing of resources/benefits.
- More investment in data is essential, as well as in scenario tools that inform decision-making.

INACTION IS NOT AN OPTION!

Thank You!
Any Question?

Contact us at:

zainurazn@utm.my

https://www.utm.my/ipasa/

Centre for Environmental Sustainability and Water Security (IPASA)