WATER & PEACE
Transforming Conflict to Peace

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In a world where water matters could lead many water-stressed nations towards political instability and conflict, women’s involvement in the water sector is imperative not only for gender equality but for ensuring peace and security. Growing evidence indicates that water projects have higher chances to be more effective when women participate.

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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 km² (42 % of the total land area of the Earth);
- Produce around 22 000 km³ 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

All water resources
1,400 million km³

Water Vapor
0.013 million km³

Saline Water
1,365 million km³

Fresh Water
35 million km³

2.5%

Liquid
11 million km³

Solid
24 million km³

0.7%

Ground & Surface water

Lakes: 0.09 million km³
Rivers: 0.002 million km³
Groundwater: 10.5 million km³

Living matter & soil moisture

Soil moisture: 0.016 million km³
Living matter: 0.001 million km³

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...

97.5% SALTWATER

2.5% FRESHWATER

ICE & SNOW COVER IN MOUNTAINOUS REGIONS

GROUNDWATER/ FRESHWATER LAKES & RIVERS

...LESS THAN 1% of all water resources

Source: United Nations Environment Programme (UNEP) with Clean Edge analysis
2020 WEF Top 5 Global Risks

in Terms of Likelihood
1. Extreme weather
2. Climate action failure
3. Natural disasters
4. Biodiversity loss
5. Human-made environment disaster

in Terms of Impact
1. Climate action failure
2. Weapons of mass destruction
3. Biodiversity loss
4. Extreme weather
5. Water Crisis
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.
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 CO₂
  - 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
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
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.


WATER STRESS LEVEL

Ratio: withdrawal / available supply

- **Low**: < 10%
- **Low to Medium**: 10% - 20%
- **Medium to High**: 20% - 40%
- **High**: 40% - 80%
- **Extremely High**: > 80%
Types of Water Conflict

What are Conflicts?

Conflict = an incompatible interaction between two or more actors

Conflicts can lead to:

- **Violence**
- Managing differences in a non-violent manner (e.g. through dialogue, institutional and legal mechanisms)
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

Global Level

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

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:-
  o 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 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
OUR EFFORT TOWARDS SOLVING THE ISSUE
GCRF Water Security and Sustainable Development Hub (2019 - 2024)

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.

Funders:
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
- 61% people lack safe sanitation
- 10% global abstraction for energy
- 1.4bn jobs directly water-dependent
- Clean water is vital to 81% businesses
- 892 million people defecate in the open
- Women often responsible for water collection
- 61% people lack safe sanitation
- $7.5tn water infrastructure by 2030
- 1.4bn jobs directly water-dependent
- 45 billion litres leaks every day
- 153 nations share transboundary resources
- 45 billion litres leaks every day
- 10% global abstraction for energy
- 80% wastewater returned to environment untreated
- 80% wastewater returned to environment untreated
- Women often responsible for water collection

- 62% natural hazard deaths from water
- Fragmented, non-inclusive governance
- 28% world’s population lack safe drinking water
- 30% primary schools lack safe water supply or sanitation
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Common Threats to Water Security

- Broken infrastructure
- Inequities & Inequalities
- Pollution
- Loss of wildlife
- Poor sanitation
- Flooding
- Drought
- Water black market
The Hub’s Approach

**Institutions**

*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.

**Social**

**Natural**

**Engineering**
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
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:

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

Centre for Environmental Sustainability and Water Security (IPASA)