UN World Water Development Report 2018
Nature-based Solutions for Water

Stefan Uhlenbrook
UNESCO World Water Assessment Programme (WWAP), Perugia, Italy
UN WORLD WATER ASSESSMENT PROGRAMME
Monitor – Assess – Report the State, Use and Management of Water Resources

Evidence-based Knowledge Products
UN World Water Development Reports, SDG 6 Synthesis Reports

Complementary Projects
Water Assessment, Water and Gender, Emerging Fields

Policy-Science Dialogues
Knowledge Sharing, Advocacy, Outreach, Capacity Development
WWAP main product:
UN World Water Development Report (WWDR)
UN World Water Development Report (WWDR)

Nature Based Solutions for Water

Wastewater: The Untapped Resource

2018 – 8th WWF, Brasilia, Brazil
Nature-based solutions (NBS) are inspired and supported by nature and use, or mimic, natural processes to cost effectively contribute to the improved management of water. The defining feature is not whether an ecosystem being used is “natural” but whether natural processes are being proactively managed to achieve a water-related objective. A NBS uses ecosystem services to contribute to a water management outcome. A NBS can involve conserving or rehabilitating natural ecosystems and/or the enhancement or creation of natural processes in modified or artificial ecosystems.

What do we mean by nature-based solutions (NBS) for water?
PART ONE

The world’s water: Rising demand, increasing scarcity, degrading quality and increasing risks
Rising demand for water

The demand for water has been increasing and will continue to increase significantly over the coming decades.
At present, an estimated 3.6 billion people (nearly half the global population) live in areas that are potentially water-scarce at least one month per year, and this population could increase to some 4.8 to 5.7 billion by 2050.

Physical water scarcity in 2010 (upper figure) and projected change in water scarcity* by 2050 (lower figure) based on the middle-of-the-road scenario.

*Regions are considered water scarce when total annual withdrawals for human use are between 20 and 40% of the total available renewable surface water resources, and severely water scarce when withdrawals exceed 40%.

Source: Burek et al. (2016)
Increasing water scarcity - groundwater

A third of the world biggest groundwater systems are already in distress

Groundwater abstractions in 2010 (upper figure) and increases in groundwater abstraction by 2050 above 2010 levels (lower figure) based on the middle-of-the-road scenario

Source: Burek et al. (2016)
The greatest increases in exposure to pollutants are expected to occur in low- and lower-middle income countries, primarily because of higher population and economic growth, and the lack of wastewater management systems.

Water quality risk indices for major river basins during the base period (2000–2005) compared to 2050 (nitrogen index under the CSIRO-medium-scenario)

Source: Veolia/IFPRI (2015)
Floods have accounted for 47% of all weather-related disasters since 1995, affecting a total of 2.3 billion people.

Internationally reported global disaster mortality for events with fewer than 100 deaths (UNISDR 2015, based on EM-DAT)
PART TWO

Ecosystems and the water cycle
Ecological processes driven by climate, vegetation and soils in forests, grasslands, wetlands, as well as in agricultural and urban landscapes, play a major role in the movement, storage and transformation of water.
Evaporation from the vegetation and soils from terrestrial ecosystems can be a very important source of precipitation for other areas.
The world’s ecosystems: Increasing degradation

Since the year 1900, an estimated 64–71% of the natural wetland area worldwide has been lost due to human activity.

Although about 30% of the global land remains forested, at least two thirds of this area are in a degraded state.
NBS offer significant potential to address contemporary water management challenges across all sectors, particularly regarding sustainable agriculture and sustainable cities.

NBS for water: Working with nature

- Soil moisture retention, groundwater recharge
- Natural and constructed wetlands
- Reforestation
- Riparian buffer strips
- Urban green spaces and green buildings
- Dry toilet
PART THREE

NBS for meeting water management objectives
NBS for improving water availability

NBS mainly address water supply through managing precipitation, humidity and storage, including soil infiltration and groundwater recharge.
NBS for improving water availability for agriculture

It has been estimated that global crop production could be increased by nearly 20% as a result of on-farm soil and water management practices in rain-fed agriculture alone (e.g., improved water harvesting through modifying tillage regimes or mulching).
NBS for improving water availability in urban settlements

Urban green infrastructure, including green buildings, is an emerging phenomenon that is establishing new benchmarks and technical standards that embrace many NBS.
NBS for improving water quality

Non-point (diffuse) source pollution from agriculture, notably nutrients, remains a critical problem worldwide, including in developed countries. It is also the one most amenable to NBS.
NBS for improving water quality - LIMITS

NBS, like grey infrastructure, have limits: They are not a panacea and must be evaluated and deployed based on locally specific conditions.
In 2009 the Netherlands initiated their ‘Room for the River’ programme. With a budget of €2.5 billion, the programme was designed to restore the natural floodplains of rivers (an NBS) along certain non-vulnerable stretches, diverting rivers and creating water storage areas, in order to protect the most developed riparian areas. The restored wetlands both provide additional storage and safeguarded biodiversity, while enhancing aesthetic and recreational opportunities.

**NBS for reducing risks to water-related extreme events (floods and droughts)**
Effect of different NBS interventions on flood peak reduction (left) and combined effect of basin-wide interventions with flood magnitude (right).
PART FOUR
The untapped potential for NBS
Current trends in investing in NBS

Evidence suggests that, worldwide, green infrastructure only accounts for less than 5% of the total investment in water-related infrastructure and even less when compared to the overall expenditure in water resources management.
The ‘Green’ vs. ‘Grey’ debate

The goal is to find the most appropriate blend of green and grey infrastructure to maximize benefits and system efficiency while minimizing costs and trade-offs.

Source: Acreman, 2011
The substantial value of social, economic and environmental co-benefits can tip investment decisions in favour of NBS.
Supporting the 2030 Agenda for Sustainable Development

NBS for water have high potential to contribute to the achievement of other SDGs and targets of the 2030 Agenda.
PART FIVE

Making it happen: accelerating the uptake of NBS
NBS do not necessarily require additional financial resources but usually involve redirecting and making more effective use of existing financing.
Investments in watershed protection have ended up saving New York City more than **US$300 million per year** on water treatment operation and maintenance costs alone.
Enabling the regulatory and legal environment

Peru’s Compensation Mechanisms for Ecosystem Services Law of 2014 is the first national-level regulatory framework specific for green infrastructure investment in the drinking water supply and sanitation sector in Latin America.
NBS can require greater levels of cross-sectoral and institutional collaboration than grey-infrastructure approaches. This can bring groups of stakeholders together under a common agenda.
Improving the knowledge base

Traditional or local-community knowledge of ecosystem functioning and the nature–society interaction can be a significant asset.
Sustainable water security will **not** be achieved through **business-as-usual**.

NBS offer a vital means to move beyond **business-as-usual**.

**Closing statement**

**EVERY ACTION WE TAKE TO PROTECT THE ENVIRONMENT, NO MATTER HOW SMALL, DIRECTLY HELPS CREATE A BETTER, HEALTHIER WATER WORLD**
Thank you

Working with nature to improve the management of water resources, achieve water security for all, and contribute to core aspects of sustainable development

More info at:  
www.unesco.org/water/wwap

Download the report at:  
www.unesco.org/water/wwap/wwdr
Improved wastewater management generates social, environmental and economic benefits essential to achieving sustainable development. Launched in Durban, South Africa and over 30 locations worldwide.
Over 80% of the world’s wastewater is released to the environment without treatment.
WASTEWATER: Not a BURDEN but a VALUABLE RESOURCE

REDUCING
REMOVING
REUSING
RECOVERING
Not a BURDEN but a VALUABLE RESOURCE

Source: Ostara, 2016
Wastewater increasing worldwide

Vast majority released without treatment

Affordable ('low-cost') treatment options are available

Reliable and sustainable source of water

Sustainable source of energy, nutrients and other recoverable by-products

Take home messages

In a circular economy, wastewater use and by-product recovery can generate new business opportunities while helping finance sanitation services

The costs of improved wastewater management are outweighed by benefits in terms of human health, socioeconomic development and environmental sustainability

Essential for achieving the 2030 Agenda for Sustainable Development
IMPORTANT RAISING PUBLIC ACCEPTANCE and SOCIAL AWARENESS

Extensive information campaigns and participation by the public are required to build trust and overcome the so-called 'yuck' factor
UN WORLD WATER ASSESSMENT PROGRAMME (WWAP)
Monitor, Assess and Report on the State, Use and Management of Water Resources

2 TRANSDISCIPLINARY PROJECTS
   WATER AND GENDER, WATER DIAGNOSTICS, WATER AND MIGRATION

1 EVIDENCE-BASED KNOWLEDGE PRODUCTS
   UN WORLD WATER DEVELOPMENT REPORTS, SDG 6 SYMPOSIUM SERIES

3 POLICY-SCIENCE DIALOGUES
   KNOWLEDGE SHARING, CAPACITY DEVELOPMENT, VALORISATION, ADVOCACY

Arrows connect the steps, indicating a flow of information or actions.
UN WORLD WATER ASSESSMENT PROGRAMME
Evidence-based Knowledge Products
UN World Water Development Reports, SDG 6 Synthesis Reports
Complementary Projects Water Assessments, Water and Gender, Emerging Fields
Policy-Science Dialogues
Knowledge Sharing, Advocacy, Outreach, Capacity Development

Monitor – Assess – Report the State, Use and Management of Water Resources

WWDR 2018
EU Parliament in Brussels, May 2018
UN WORLD WATER ASSESSMENT PROGRAMME

Evidence-based Knowledge Products
UN World Water Development Reports, SDG 6 Synthesis Reports
Complementary Projects Water Assessments, Water and Gender, Emerging Fields

Policy-Science Dialogues
Knowledge Sharing, Advocacy, Outreach, Capacity Development

Monitor – Assess – Report the State, Use and Management of Water Resources

HQ of UN, New York
UN WORLD WATER ASSESSMENT PROGRAMME
Evidence-based Knowledge Products
UN World Water Development Reports, SDG 6 Synthesis Reports
Complementary Projects Water Assessments, Water and Gender, Emerging Fields
Policy-Science Dialogues Knowledge Sharing, Advocacy, Outreach, Capacity Development

Monitor – Assess – Report the State, Use and Management of Water Resources
Evidence-based Knowledge Products

UN World Water Development Reports, SDG 6 Synthesis Reports

Complementary Projects
Water Assessments, Water and Gender, Emerging Fields

Policy-Science Dialogues
Knowledge Sharing, Advocacy, Outreach, Capacity Development

Monitor – Assess – Report the State, Use and Management of Water Resources