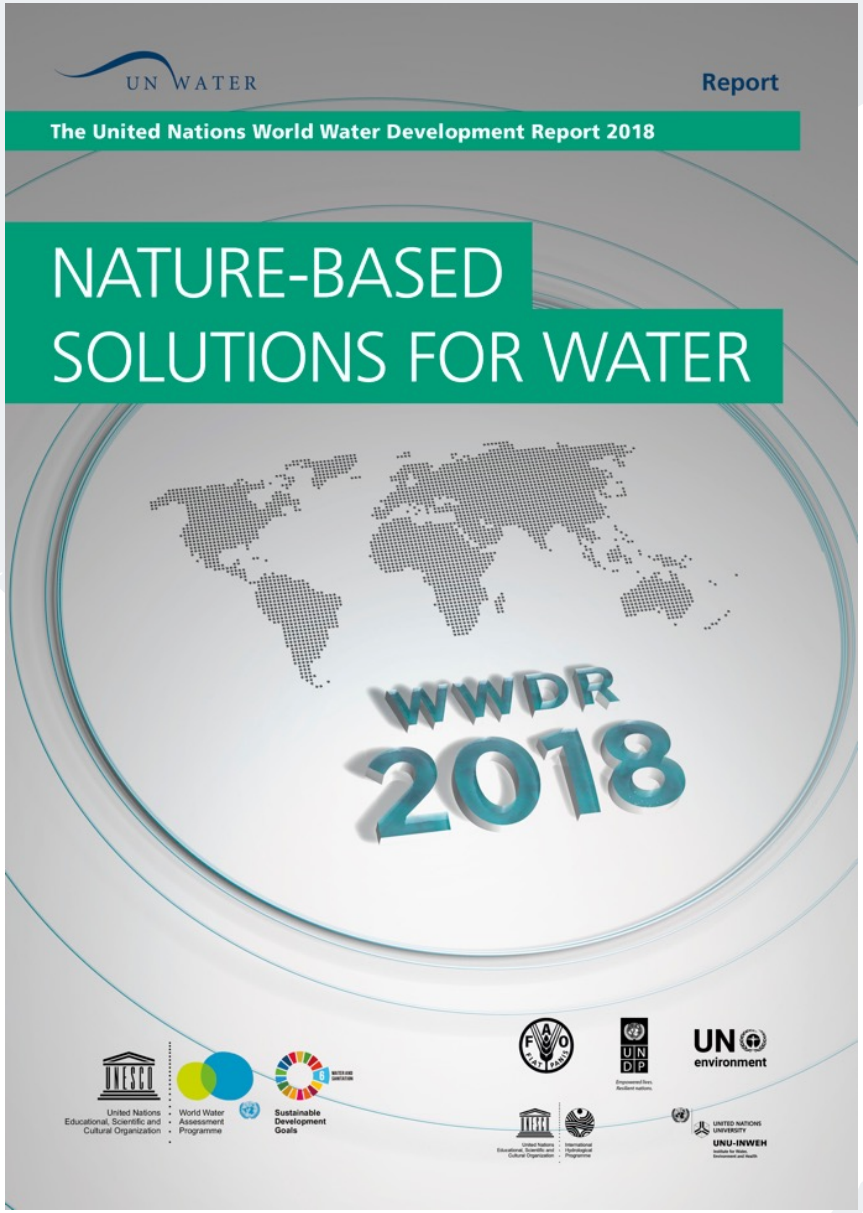
United Nations Educational, Scientific and Cultural Organization

World Water Assessment Programme

UN World Water Development Report 2018

Nature-based Solutions for Water



Stefan Uhlenbrook

UNESCO World Water Assessment Programme (WWAP), Perugia, Italy

United Nations Educational, Scientific and Cultural Organization

World Water Assessment Programme

UN WORLD WATER ASSESSMENT PROGRAMME

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

Policy-Science Dialogues

Knowledge Sharing, Advocacy, Outreach, Capacity Development

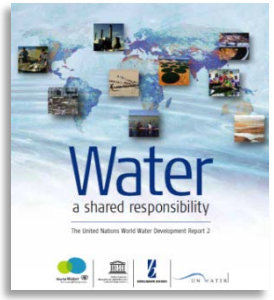
Evidence-based Knowledge Products

UN World Water Development Reports, SDG 6 Synthesis Reports

Complementary Projects

Water Assessment, Water and Gender, Emerging Fields

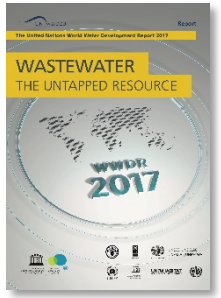
WWAP main product:
UN World Water Development Report (WWDR)



2006

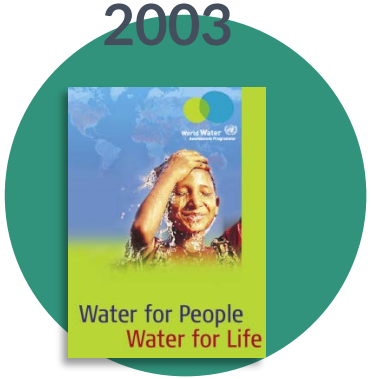
2012

2015



2017

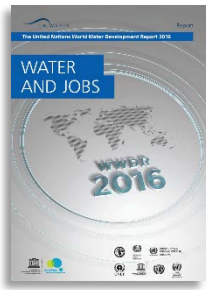
2003



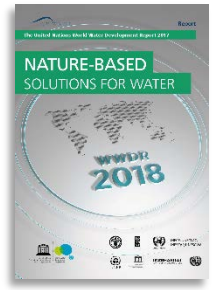
2009

2014

2016



2018



UN World Water Development Report (WWDR)

Nature Based Solutions for Water

2018 – 8th WWF, Brasilia, Brazil

Wastewater: The Untapped Resource

UN environment

UNDP
Empowered lives. Resilient nations.

UNESCO
United Nations Educational, Scientific and Cultural Organization

International Hydrological Programme

UNITED NATIONS UNIVERSITY
UNU-INWEH
Institute for Water, Environment and Health

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

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.

SOIL MOISTURE RETENTION, GROUNDWATER RECHARGE

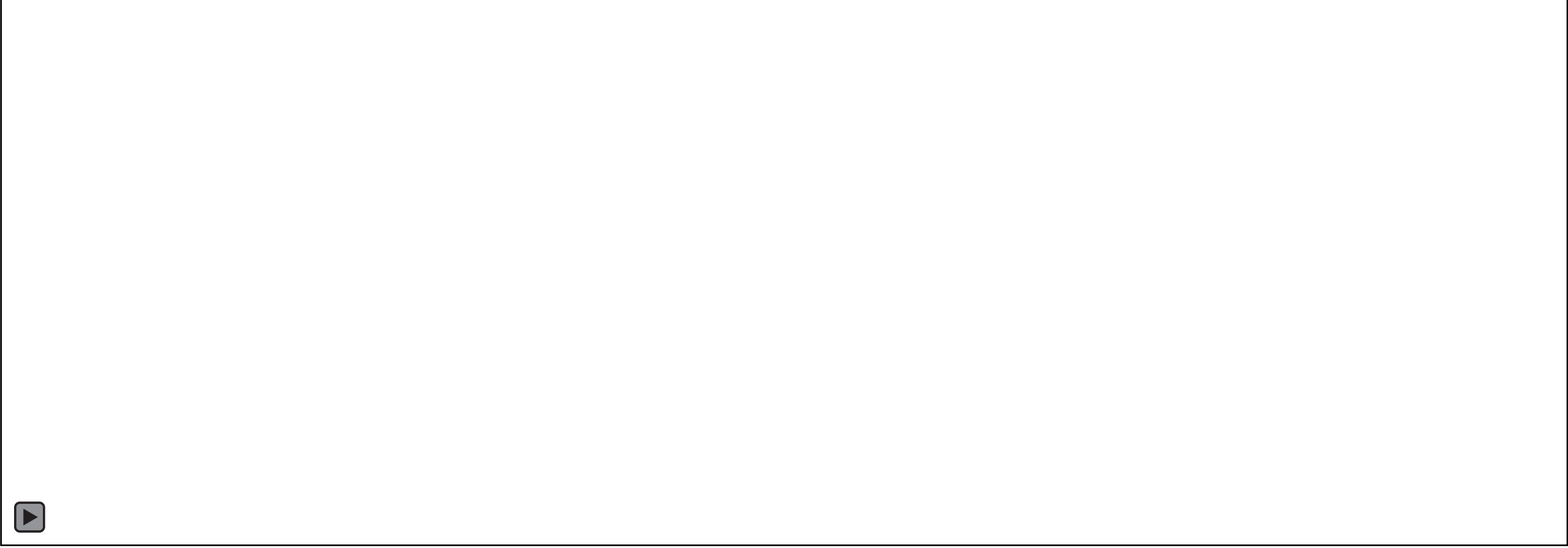
NATURAL AND CONSTRUCTED WETLANDS

REFORESTATION

RIPARIAN BUFFER STRIPS

URBAN GREEN SPACES AND GREEN BUILDINGS

DRY TOILET



PART ONE

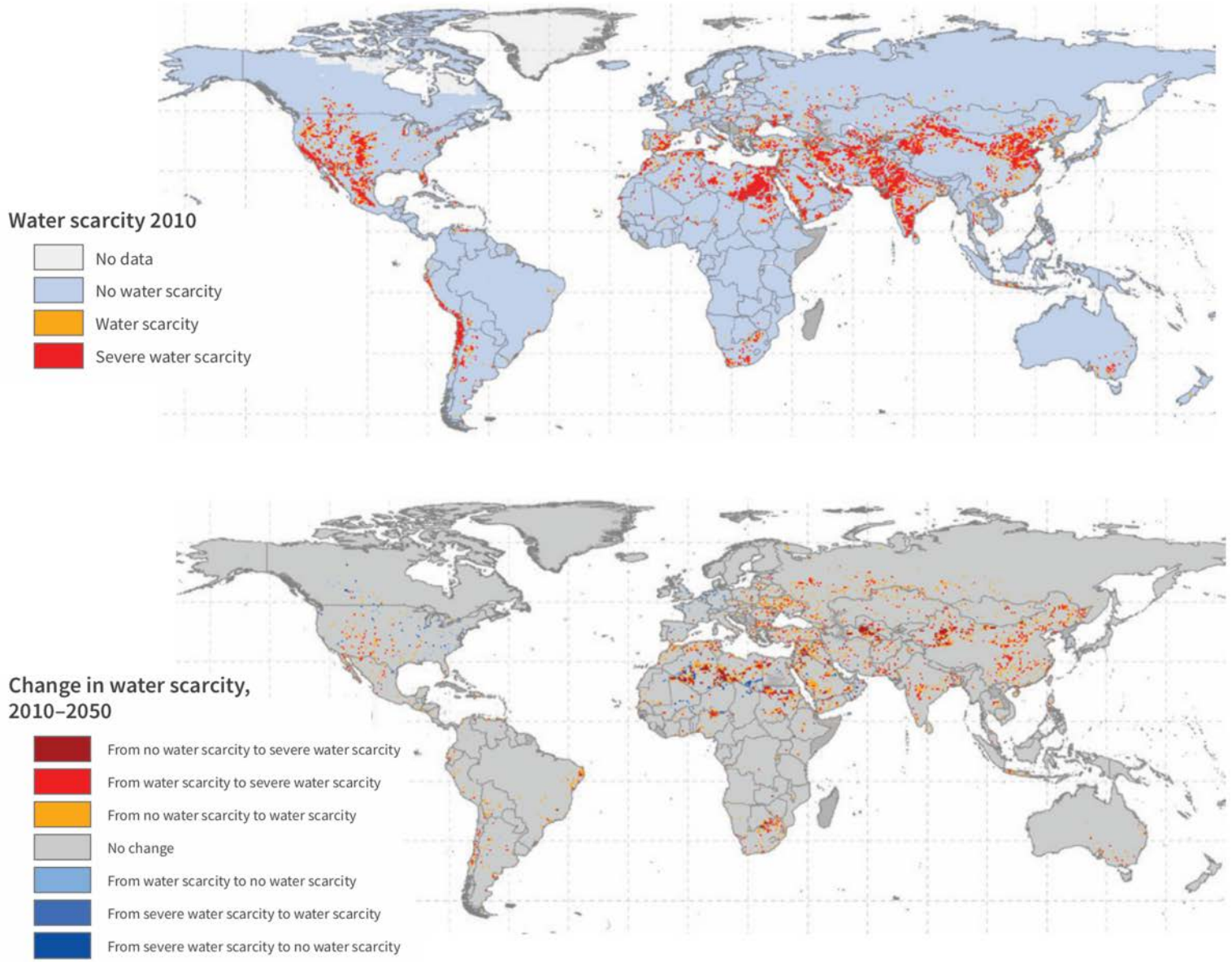
The world's water: Rising demand, increasing scarcity, degrading quality and increasing risks

Rising demand for water

The demand for water has been increasing and will continue to increase significantly over the coming decades

Increasing water scarcity

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



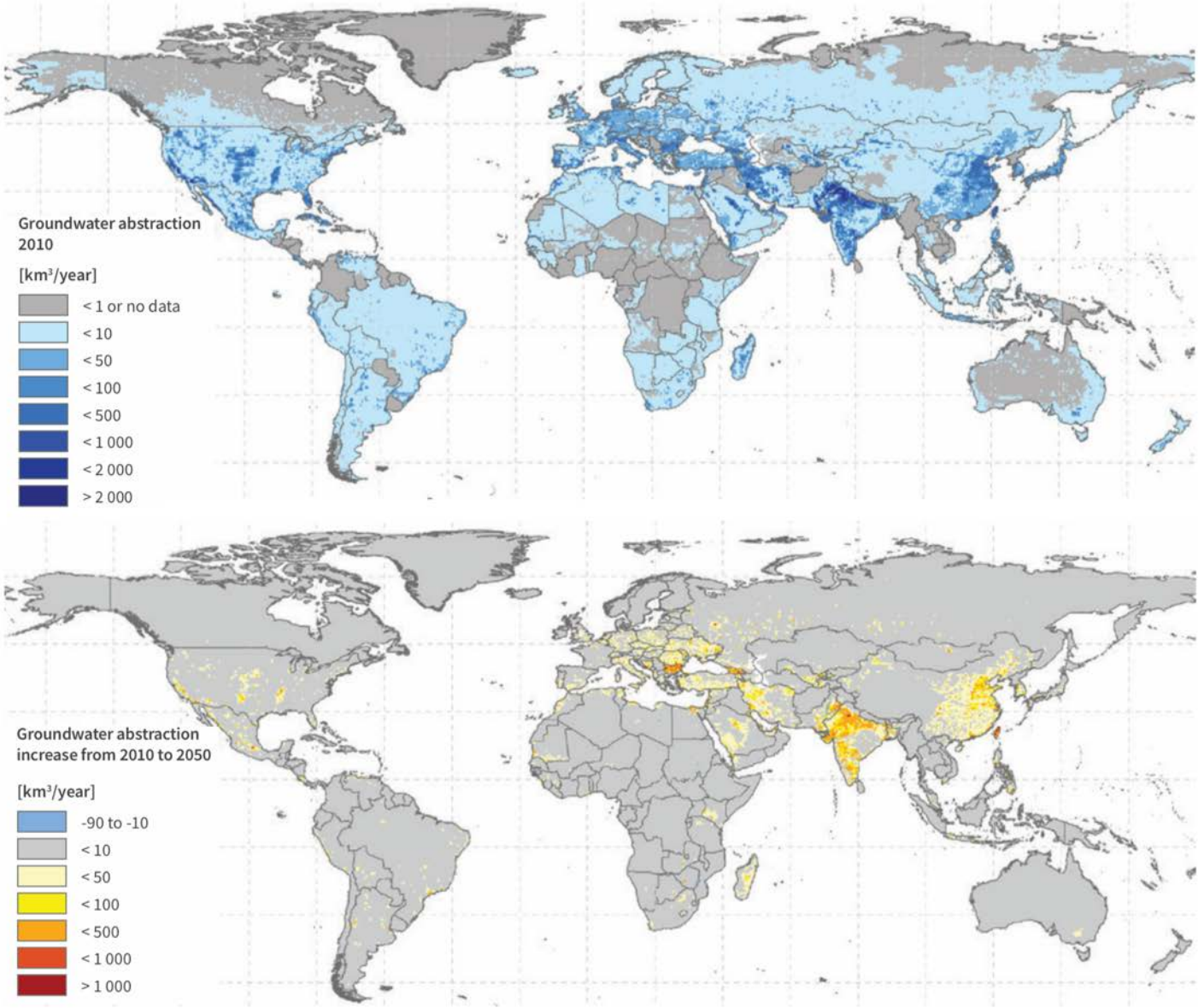
Physical water scarcity in 2010 (upper figure) and projected change in water scarcity* by 2050 (lower figure) based on the *middle-of-the-road* scenario

*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**

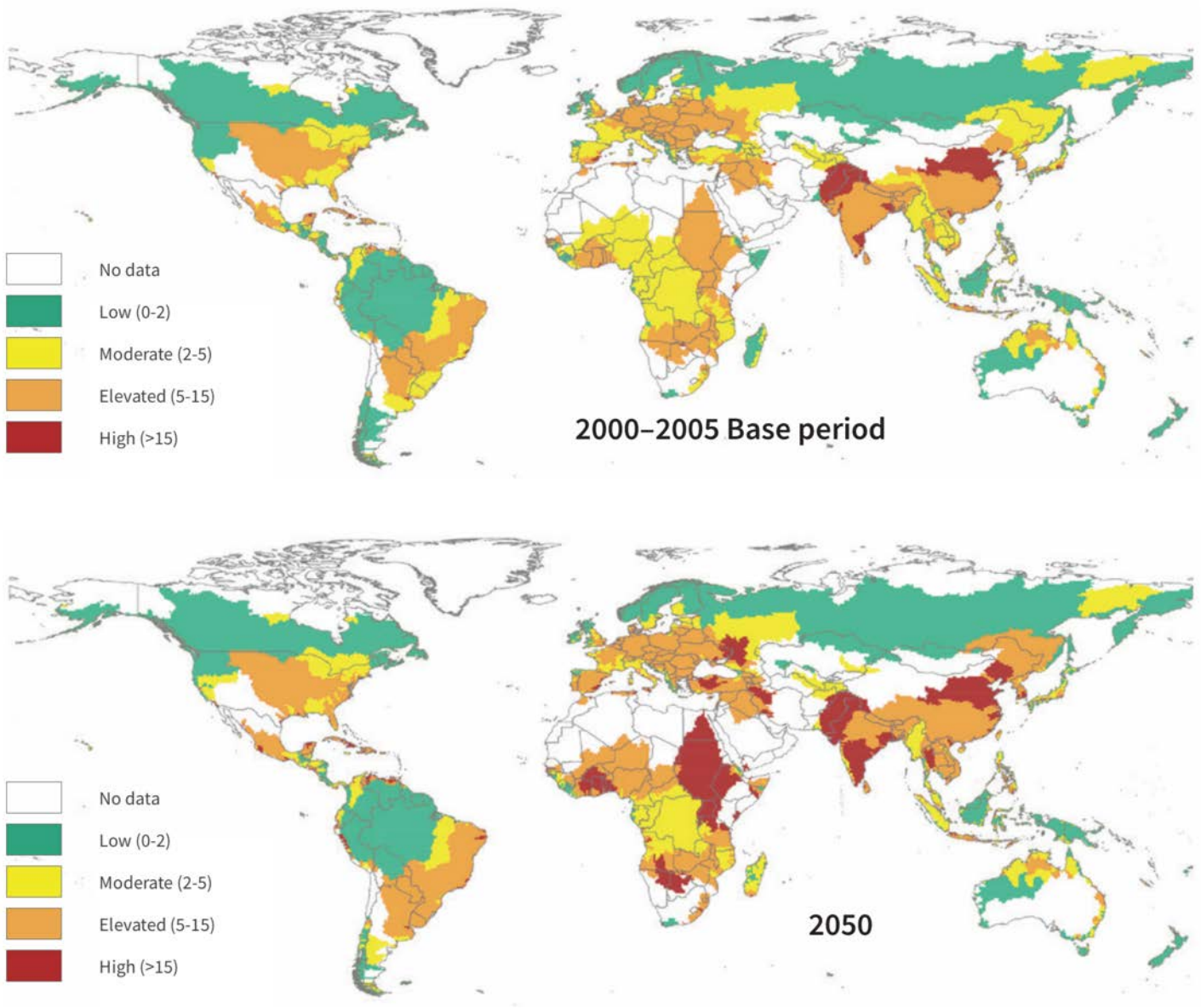


Groundwater abstractions in 2010 (upper figure) and increases in groundwater abstraction by 2050 above 2010 levels (lower figure) based on the *middle-of-the-road* scenario

Source: Burek et al. (2016)

Water quality degradation

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

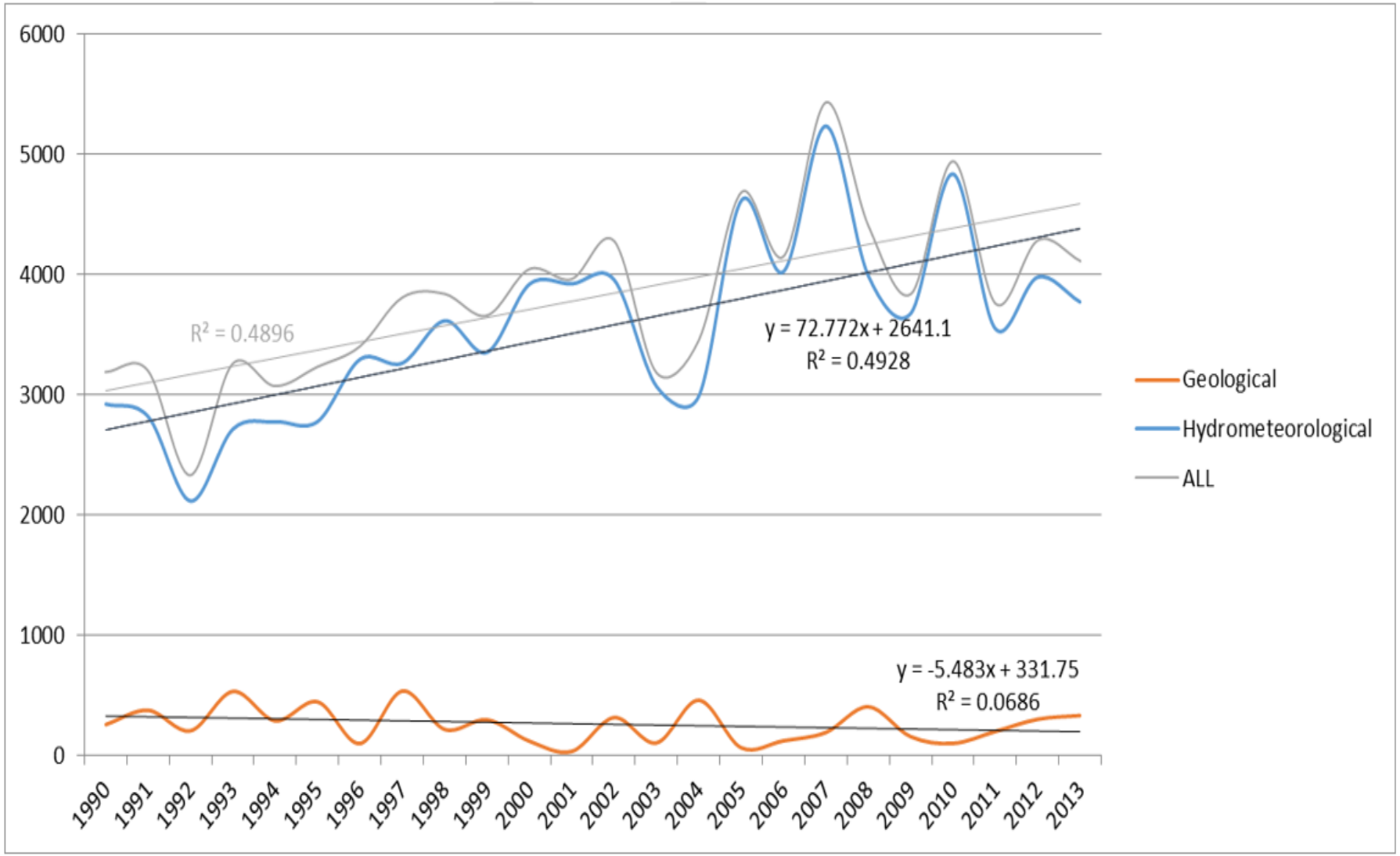


Water quality risk indices for major river basins during the base period (2000–2005) compared to 2050 (**nitrogen index** under the CSIRO-medium-scenario)

Source: Veolia/IFPRI (2015)

Water-related risks

Floods have accounted for 47% of all weather-related disasters since 1995, affecting a total of **2.3 billion people**



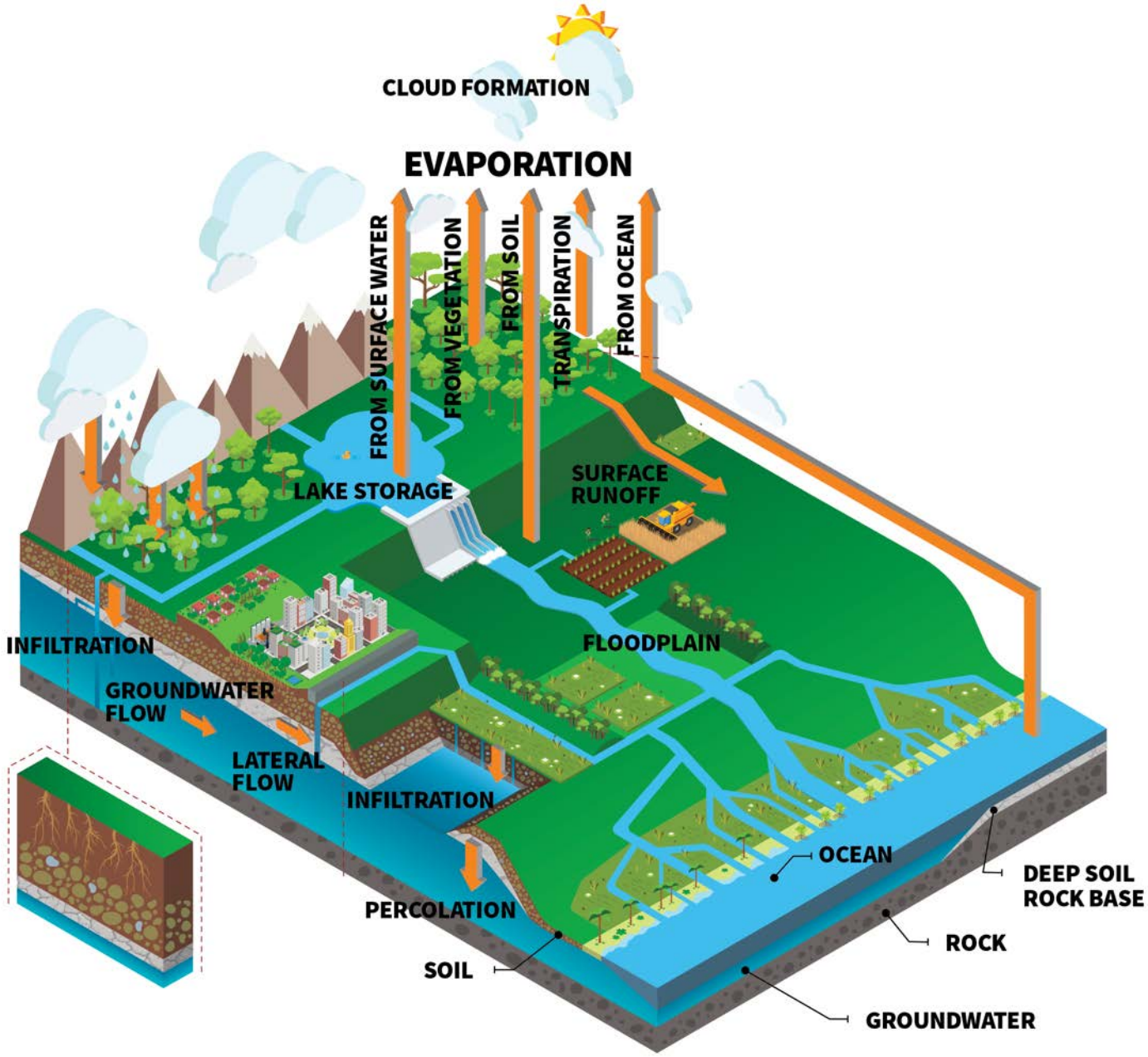
Internationally reported global disaster mortality for events with fewer than 100 deaths (UNISDR 2015, based on EM-DAT)

PART TWO

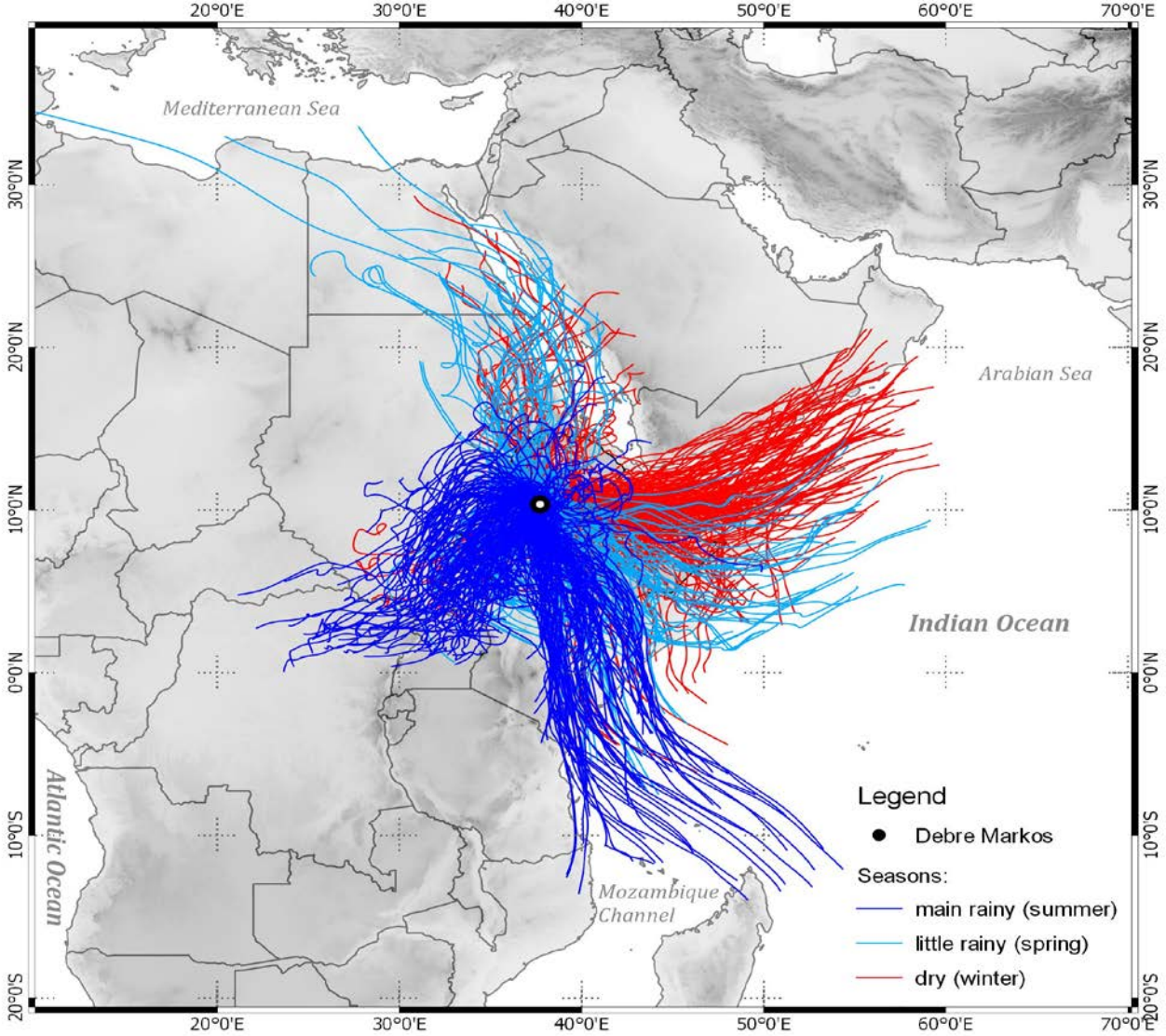
Ecosystems and the water cycle

The relationship between 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**

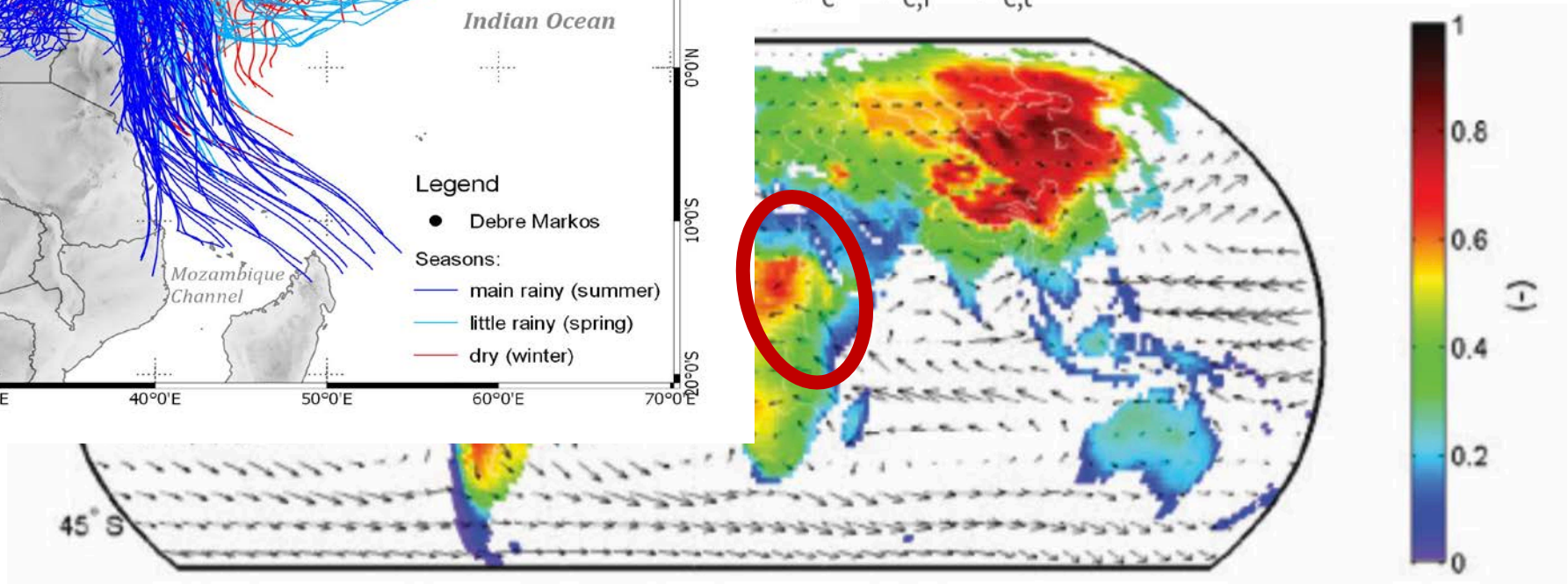


Tekleab et al. 2015



…vaporation from the vegetation and …ils from **terrestrial ecosystems** can …e a very important source of …ecipitation for other areas

$\rho_c = \rho_{c,i} + \rho_{c,t}$



Source: Van der Ent et al., 2014

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 for water: Working with nature

NBS offer significant potential to address contemporary water management challenges **across all sectors**, particularly regarding sustainable agriculture and sustainable cities

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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.

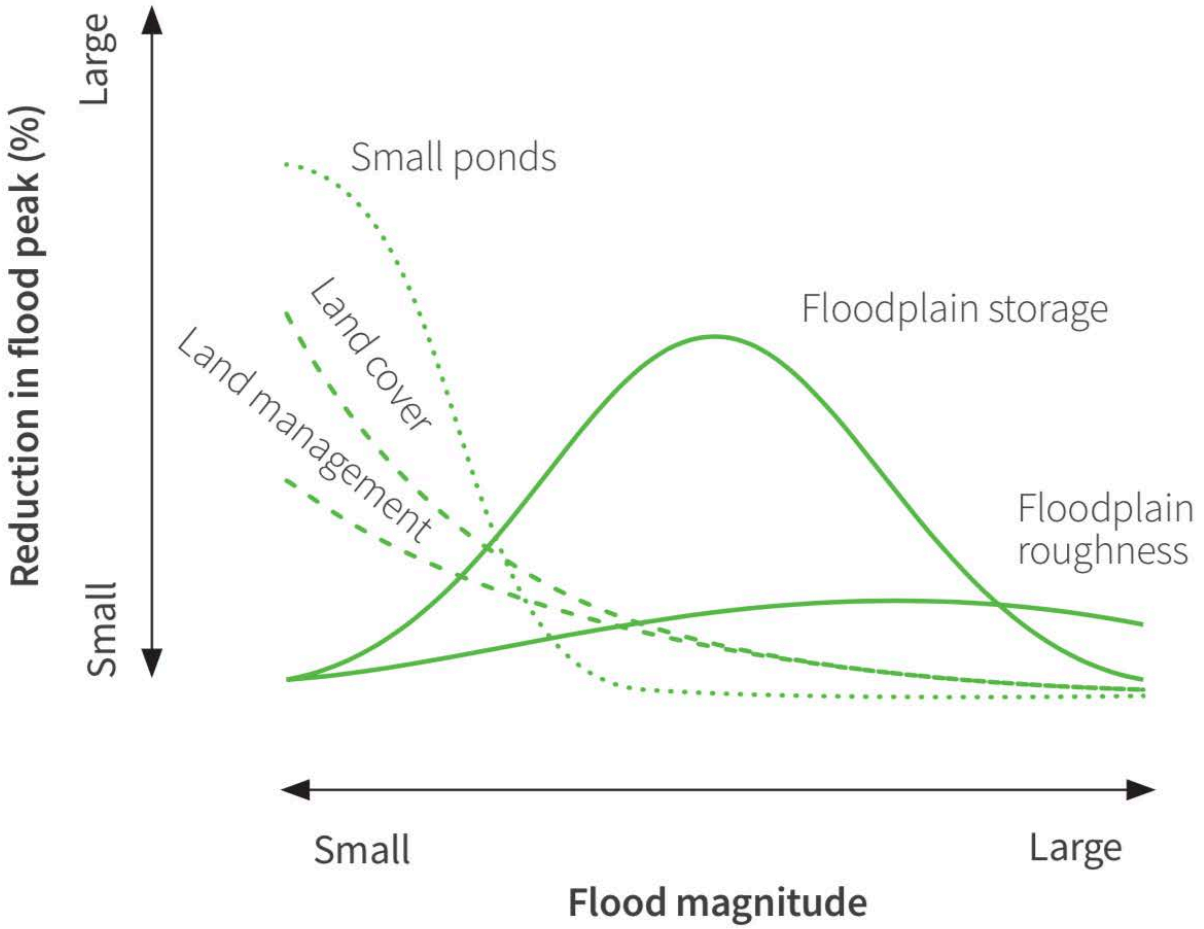
NBS for improving water quality - LIMITS

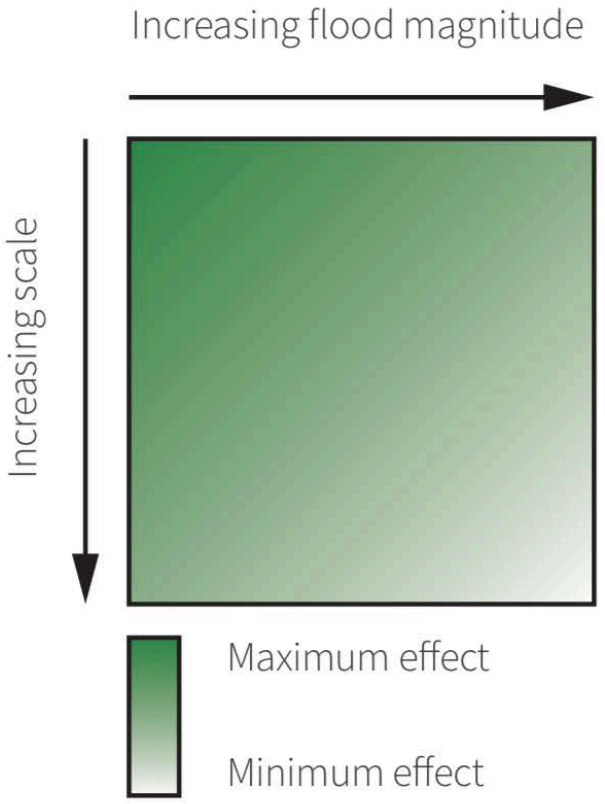
NBS, like grey infrastructure, have limits: They are **not a panacea** and must be evaluated and deployed based on locally specific conditions

NBS for reducing risks to water-related extreme events
(floods and droughts)

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.

Effect of different NBS interventions on **flood peak reduction** (left) and combined effect of **basin-wide interventions** with flood magnitude (right)



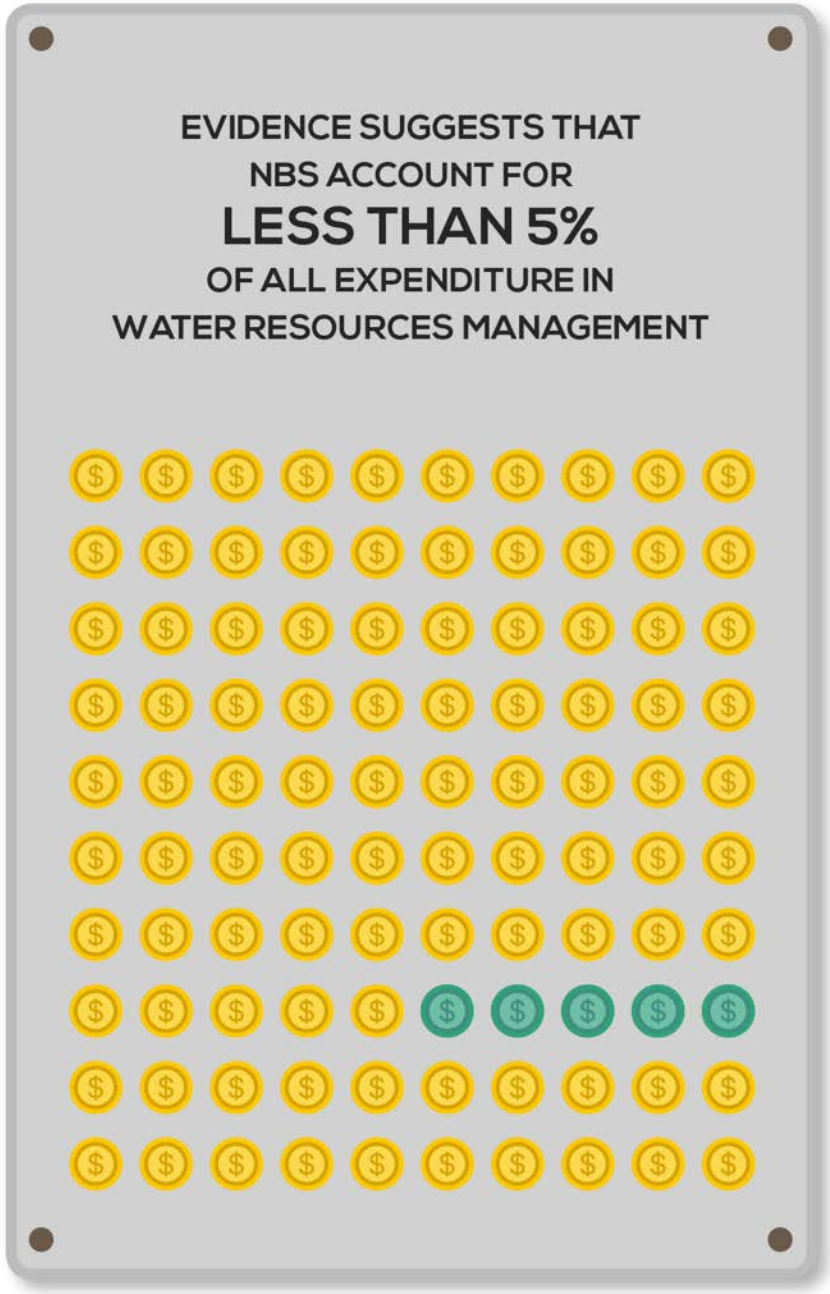


PART FOUR

The untapped potential for NBS

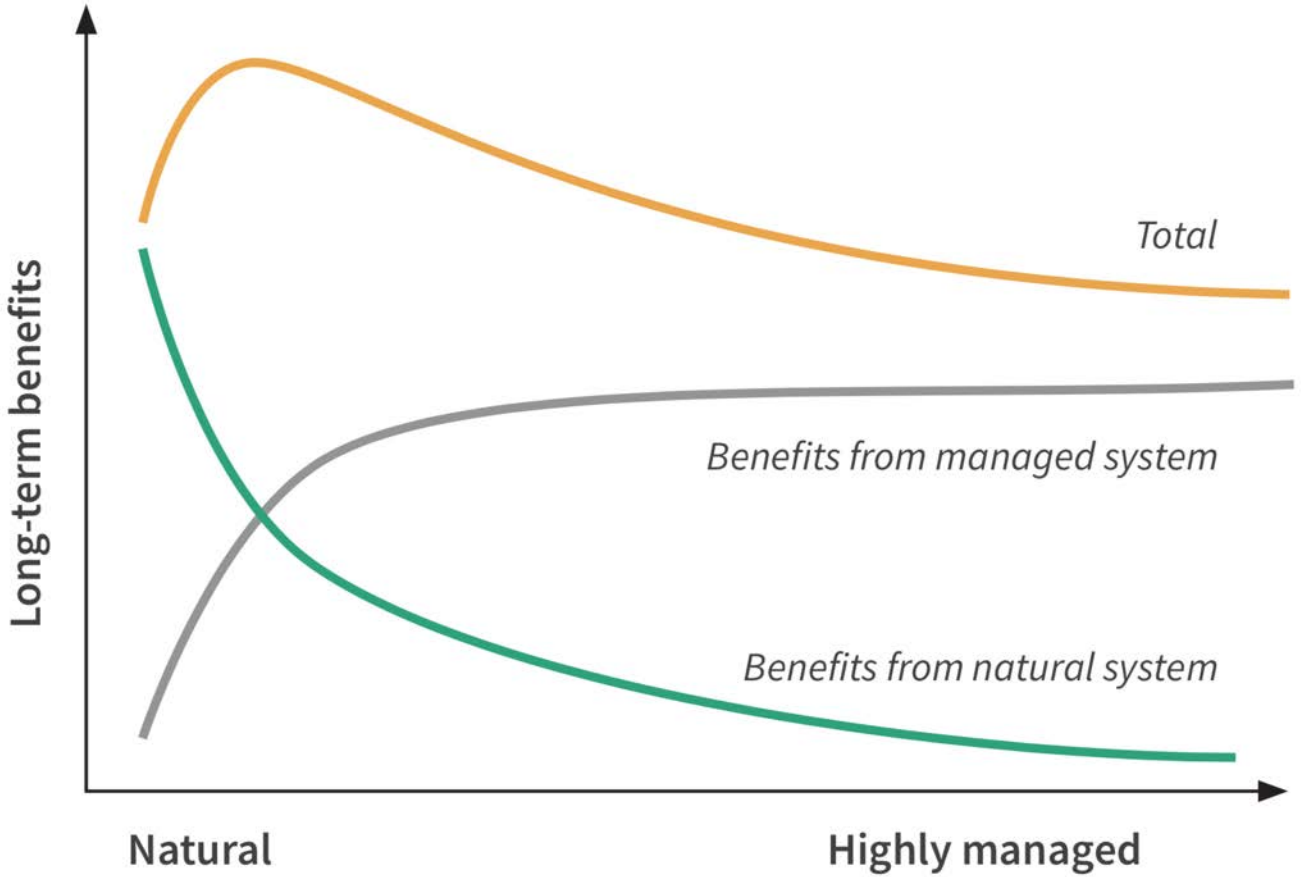
Current trends in investing in NBS

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

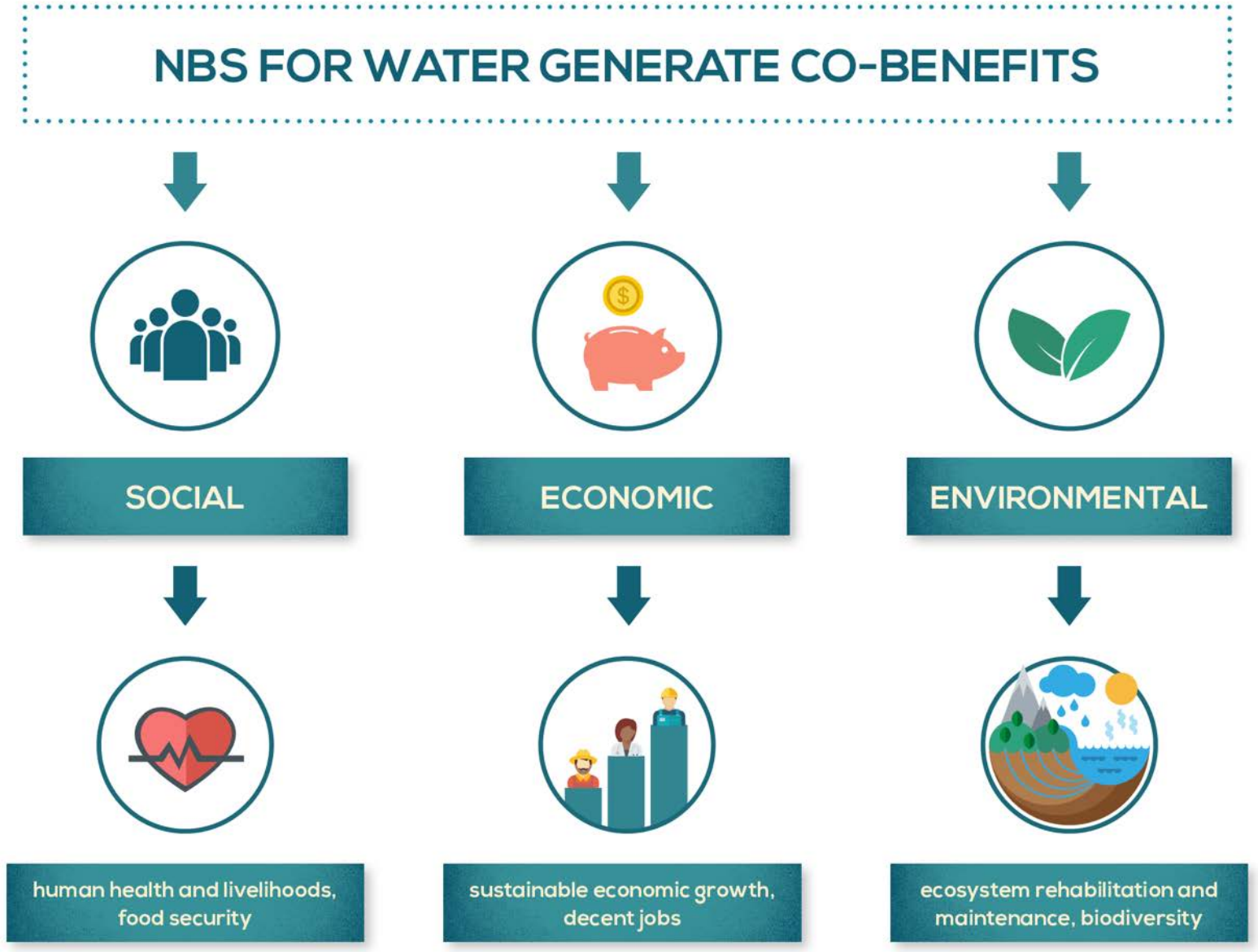
The goal is to find the most appropriate blend of green and grey infrastructure to **maximize benefits** and system efficiency while minimizing costs and trade-offs



Source: Acreman, 2011

Co-benefits of NBS

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 other SDGs and targets of the 2030 Agenda

PART FIVE

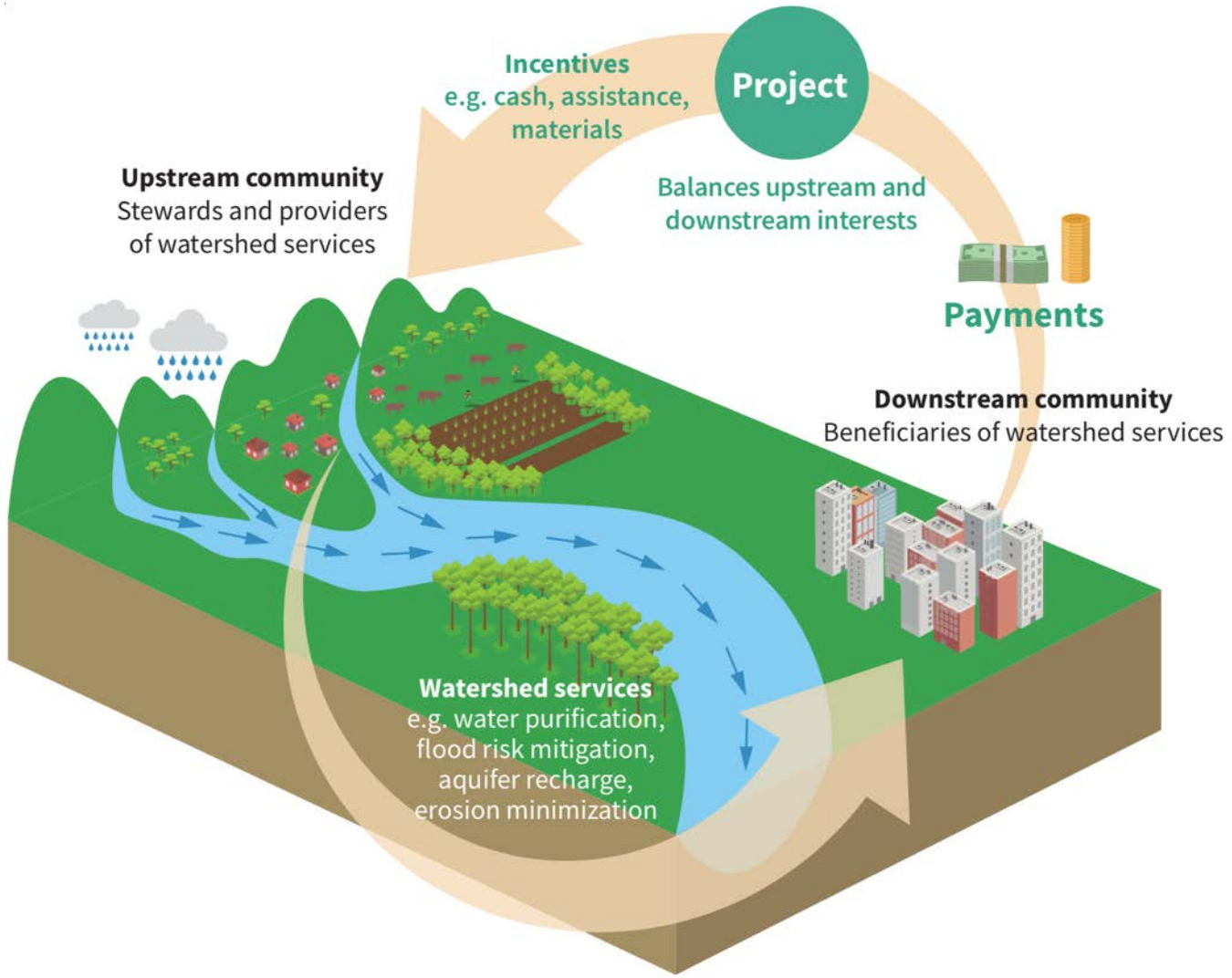
Making it happen: accelerating the uptake of NBS

Leveraging financing

NBS do not necessarily require additional financial resources but usually involve redirecting and making **more effective use** of existing financing

Leveraging financing – Payment for Environmental Services

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

Improving cross-sectoral collaboration and public participation

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.**

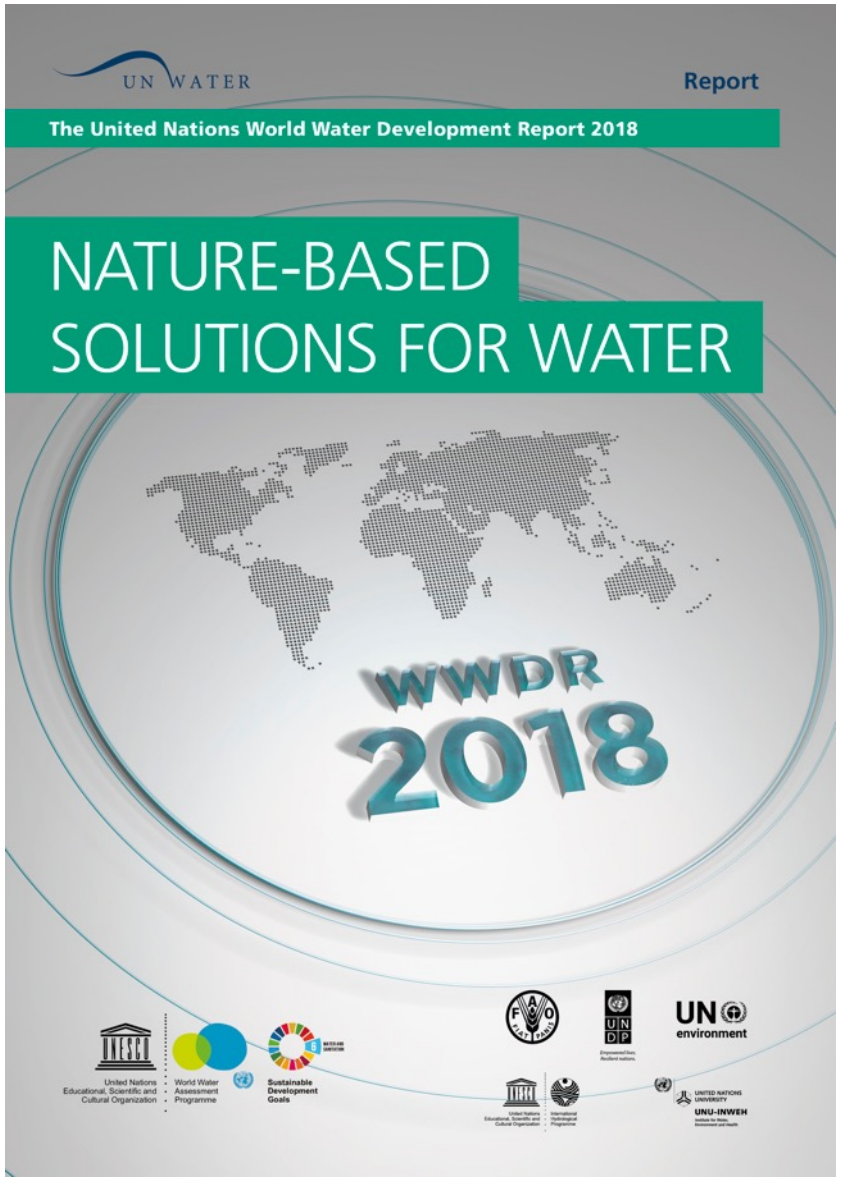
Improving the knowledge base

Traditional or **local-community knowledge** of ecosystem functioning and the nature–society interaction can be a significant asset

Closing statement

Sustainable water security will **not** be achieved through **business-as-usual.**

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



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

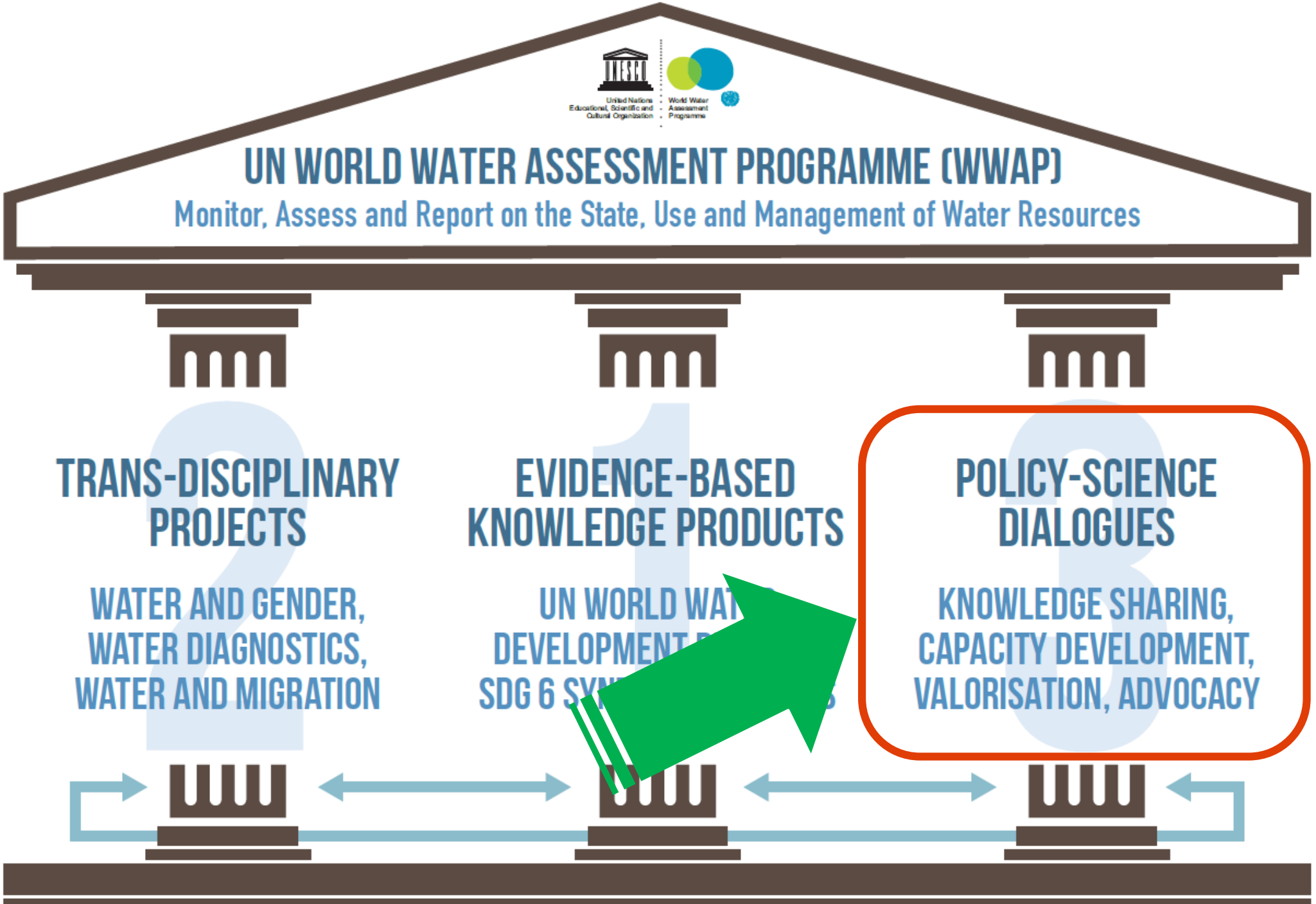
More wastewater than ever

REDUCING
REMOVING
REUSING
RECOVERING

WASTEWATER:
Not a
BURDEN
but a
VALUABLE RESOURCE

Source: Ostara, 2016

Not a BURDEN but a VALUABLE RESOURCE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UN WORLD WATER ASSESSMENT PROGRAMME (WWAP)
Monitor, Assess and Report on the State, Use and Management of Water Resources
2
TRANS-DISCIPLINARY PROJECTS
WATER AND GENDER,
WATER DIAGNOSTICS,
WATER AND MIGRATION
1
EVIDENCE-BASED KNOWLEDGE PRODUCTS
UN WORLD WAT
DEVELOPMENT
SDG 6 SY
3
POLICY-SCIENCE DIALOGUES
KNOWLEDGE SHARING,
CAPACITY DEVELOPMENT,
VALORISATION, ADVOCACY

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