



Evidence Based Assessment of Nature based solutions (EviBAN)

Herman Helness

Water JPI 2018 Joint Call
12 April 2019, Stockholm



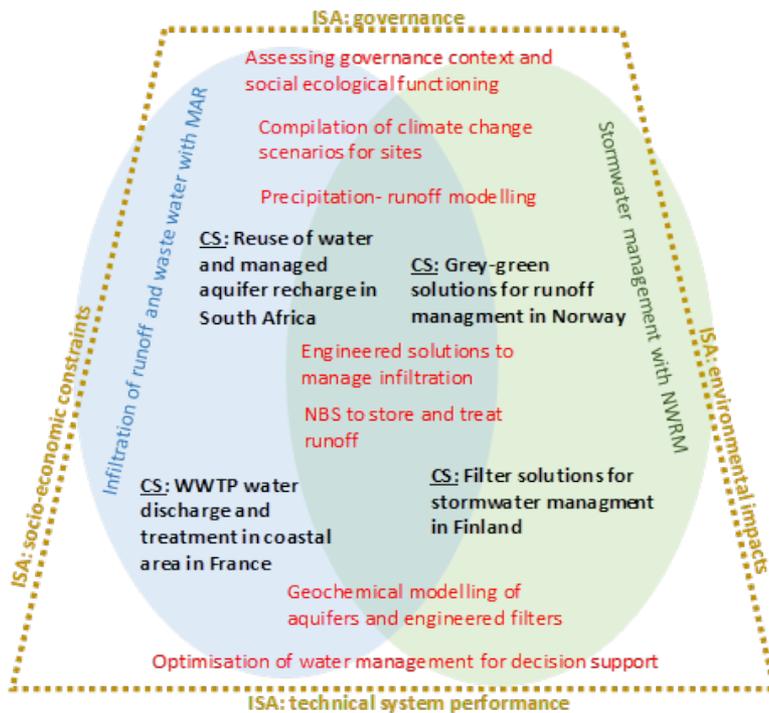
OBJECTIVES

- ▶ **Knowledge on NBS for water management to counter negative impacts** of climate change, anthropogenic activities and societal change, and **how NBS should be optimally used** under different conditions to **contribute to progress towards SDGs**.
- ▶ **Integrating results** from diverse case studies in South Africa, France, Finland and Norway, in a **toolbox for adaptive water management** - different conditions with respect to climate change, anthropogenic activities and societal change.
- ▶ **Governance assessment tool** - stakeholder perspectives and pre-existing knowledge of NBS in different regional and local contexts, including assessment of drivers and barriers to implementation and/or upscaling in the studied cases.
- ▶ **Stormwater management tool** - reactive hydrogeochemical transport; climate change scenarios; downscaling climate model results; sensitivity to climate factors; how model parameters can be optimised to assist design and maintenance of NWRM.
- ▶ **SAT/MAR ICT tool** - management of WWTP discharge in a sensitive coastal area; extend SAT/MAR practices and management; hydrogeological, hydrogeochemical and modelling expertise will be provided at meetings and trainings with local stakeholders.
- ▶ **Optimisation tool** - implementation of NBS in complex situations of water demand and supply; consider seasonality in water availability, quality, and cost of extraction and treatment.
- ▶ **Integrated Sustainability Assessment** – evaluate measures according to ESS and SDGs; range of climate, anthropogenic activity, ecosystem and societal conditions.

CONSORTIUM DESCRIPTION

- ▶ **Norway:** SINTEF (coordinator), principal investigator Dr Herman Helness
- ▶ **South Africa:** Stellenbosch University Water Institute, principal investigator Dr Willem de Clercq, Senior Researcher
- ▶ **Finland:** VTT Technical Research Centre of Finland Ltd, principal investigator Dr Riitta Molarius
- ▶ **Finland:** Aalto University School of Engineering, principal investigator Dr. Harri Koivusalo, Professor
- ▶ **France:** BRGM, principal investigator Dr Marie Pettenati
- ▶ **France:** imaGeau, principal investigator Denis Neyens
- ▶ **France:** Antea Group, principal investigator Loic Thomas
- ▶ **Planned start 1st April 2019, 3 year duration, 1 490 kEUR total budget including own funding**

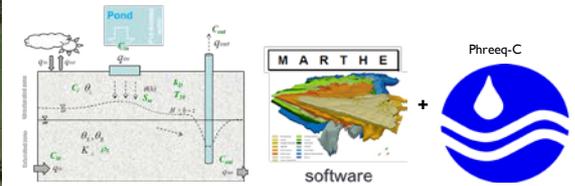
Case study approach



▶ 4 case studies

- ▶ Stormwater management with NWRM
 - ▶ Infiltration of runoff and wastewater with MAR
 - ▶ Common external pressures (e.g. climate change), shared tools (e.g., models such as SWMM, MARTHE, PHREEQC), and shared NBS, such as enhanced infiltration techniques required in MAR and pursued by NWRM
- ▶ ISA: Performance, environmental impacts, governance, and socio-economic aspects are combined in a holistic assessment

Case studies



Agon in Normandy, France:

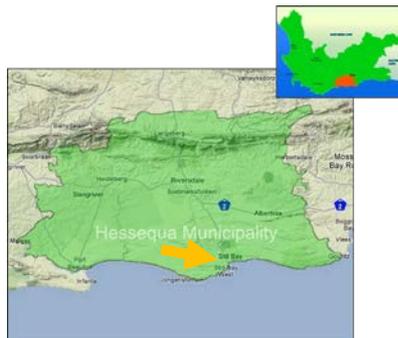
Description: Tertiary treatment of secondary WWTP effluent (33 500 inh. eq./ BOD5= 2120 kg /day) by reed bed and a sand dune filter. The MAR/SAT system has been chosen to protect the sensitive shellfish production zone on the surrounding estuary. Since 2016, the ImaGeau Subsurface Monitoring System is implemented for real time monitoring of saline intrusion. Water quality and quantity are analysed to develop an ICT tool (BRGM/Géo-Hyd) to assess efficiency of SAT in context of saline intrusion.

Stakeholders are SAUR (WWTP management for local authorities), Seine Normandy Water Agency (Public Institution with mission is to support water resources protection), ARS (Regional Agency of Health), SMEL and Agon Municipality.

Hessequa Municipal area in the Western Cape, South Africa:

Description: Water stressed areas relying partly on groundwater for water supply. Pressures on water resources due to drought. Artificial aquifer recharge (AR) in the Goukou River, using flushed water during high rain periods, is a potential water resource. Potential impacts of the AR-process on biodiversity and estuarine health will be a key parameter in the plausibility of using AR. Optimisation of best combination of water sources and NWRM to use. Optimisation tool to be customised for use by local municipal officials.

Stakeholders are Hessequa Municipality, Cape Nature, National and Provincial departments for water and environment.



Case studies



KLIMA 2050 - Høvringen, Vikaune Fabrikker - Sveberg and Storm Aqua – Sandnes, Norway:

Description: Eco-engineered grey-green solutions for rooftops and engineered pervious surface materials for runoff management with respect to quality and quantity. Høvringen consists of 3 large-scale test fields, whereas Sveberg consists of 4 large-scale test fields, hence both sites enable parallel testing of different measures. The sites are in mid Norway. In Sandnes (southern Norway), there are two full-scale installations. One site focuses on infiltration and the other on treatment. All sites are instrumented to measure the water balance and climatic conditions. **Stakeholders** are Storm Aqua and Vikaune Fabrikker (suppliers of grey-green solutions).

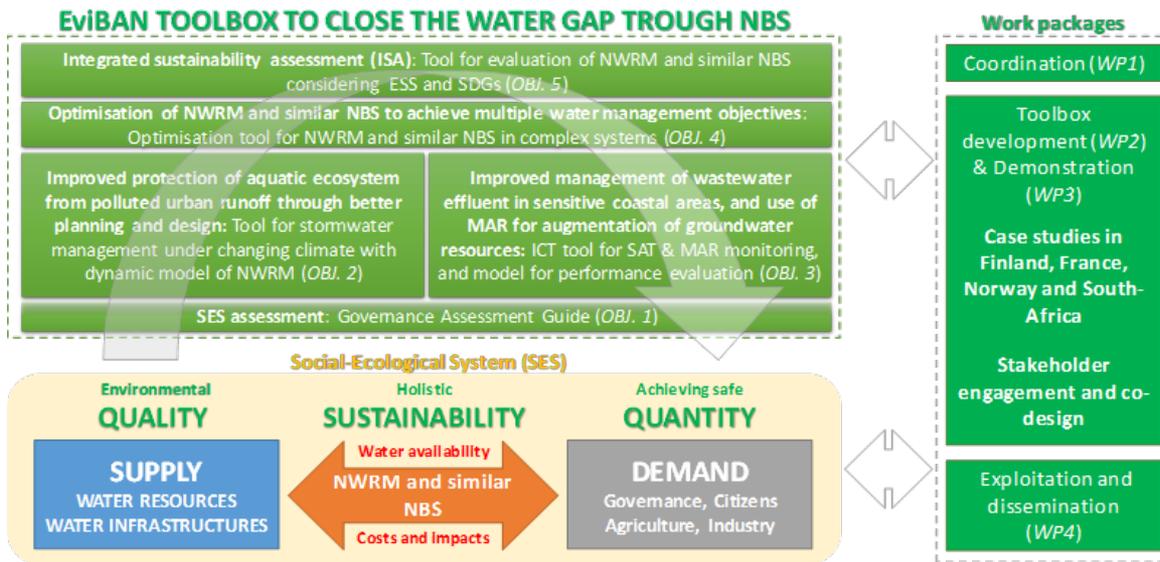
Stormwater NBS test sites in Espoo and Vantaa, Finland:

Description: Biofilters and similar NBS to capture and treat stormwater runoff from roads prior to infiltration or discharge to receiving surface waterbodies. Site monitoring and acquisition of data for hydrologic, hydraulic and geochemical performance assessment. Consecutively linked hydrological and hydrogeochemical transport modelling of NBS performance and impact during heavy rainfall/snowmelt events in cold conditions.

Stakeholders are regional and local authorities, local community, landscape designers, suppliers.



Overview of the toolbox and work packages



- ▶ Tools to be developed together with local stakeholders
- ▶ Interaction between tool development and demonstration
- ▶ Dissemination through existing platforms and project web site

EXPECTED IMPACT OF THE PROJECT

EviBAN will develop new knowledge on how NBS should be used under different conditions to contribute to progress towards SDGs and transfer the knowledge into innovative tools for adaptive water management.

- ▶ In the **short term**, case studies with committed end users and stakeholders; multidisciplinary collaboration (climate-science, water engineering, hydrogeology, ICT, water treatment, water network and quality) in four countries will bring data and open access published results.
 - ▶ The knowledge will be operationalised through the toolbox.
 - ▶ The aim is more sustainable water management by providing tools and guidelines for: inclusion of climate and stormwater model parameters in local standards for NBS design; use of NBS for reducing diffuse water pollution; evaluating optimal implementation of NBS in different situations, measuring progress towards SDGs by performing ISA on alternative measures/management options, and improving stakeholder involvement through use of ICT-tools.
- ▶ In the **intermediate term**, the toolbox will support achievement of the water related UN SDGs. The tools developed in EviBAN are responding to urgent needs to close the water gap in different socio-economic and climatic areas, and promote a sustainable way to reach a good environmental quality and to provide safe and sufficient water for the different uses.
- ▶ The **long-term** impact will be through the exploitation of the results and the commercialisation of the tools by the collaborating companies to improve the management of stormwater, wastewater, groundwater and alternative sources.



Any comments?

