Water Joint Programming Initiative

WATER4SDGs Knowledge Hub

'New Water' under Scarcity

Integrated Solutions to Accomplish Water Related UN SDGs

POLICY BRIEF

JULY 2020

'New Water' under Scarcity:

Integrated Solutions to Accomplish Water Related UN SDGs

Summary and the Key Messages

The effects of water scarcity are intensifying variably all over the world. Besides increasing numbers of extreme weather events, human-induced impacts on water quality and poor governance exacerbate the water scarcity problem. **This policy brief aims to illustrate briefly the extent of water scarcity problems and proposes a list of 'new water' solutions that can address the different facets of the issue**. Here, "new water concepts" refer to a range of solutions for improving water efficiency capacity; including reuse, recycling, treatment, water saving, stormwater management, rainwater harvesting, as well as tools for good governance.

Through the following pages 11 different state-of-the-art research projects implemented by the **Water4SDGs Knowledge Hub** members are introduced to the reader, which can improve the 'new water' capacity in the face of water scarcity. Based on these `new water` solutions, the policy brief also presents **key messages for supporting informed decision making in the design and implementation of sustainable water management policies**. These include;

1. Understanding interactions, challenges, trade-offs and opportunities around UN SDGs and Water Scarcity through **stakeholder mapping and engagement**.
2. Leaving no one behind without access to water, sanitation and hygiene (WASH) services by any means possible, including **cost-efficient solutions at local or household level**.
3. Give priority to **equitable, resource-efficient, demand management solutions** to decouple water use from economic growth.
4. Implement **climate-smart applications** with multiple benefits to mitigate the effects of climate change.
5. Monitor the progress and uptake the best-practices with **Living Lab applications** that allow for user centred research and innovation processes with public-private-people partnerships.

About the Water4SDGs Knowledge Hub

Motivated by providing a fresh impetus to international collaboration and knowledge dissemination activities, the second Knowledge Hub of Water JPI was launched in December 2019. Abbreviated as the **WATER4SDGs**, the new Knowledge Hub is a platform to transfer recent knowledge on water across international communities by producing outputs and organizing workshops. The Water4SDGs Knowledge Hub specifically addresses the global water challenges posed against achieving UN Sustainable Development Goals (UN SDGs) under the theme **"New Water under Water Scarcity"**. Currently fifteen water experts from eight Water JPI members countries are actively involved in the knowledge hub activities.

For more information please visit:

http://www.waterjpi.eu/implementation/thematic-activities/water-jpi-knowledge-hub-1/knowledge-hub-on-un-sdgs

The Undeniable Presence of Water Scarcity as a Major Water Crisis Issue

Water crises have been listed among the top-five global risks for eight consecutive years by the **World Economic Forum's Global Risk Report (GRR)**.[1] The latest version of the report underlines that the risks borne by water crisis are undeniably global due to their high likelihood and very high impact. Water crises can include extreme weather events such as droughts, floods and storms, as well as man-made water pollution. Water scarcity is one of the most wide-spread forms of water crisis and has an immense impact on our lives. **According to climate change projections, up to 700 million people may be displaced as a result of intense water scarcity by 2030.[2] In economic terms, droughts have cost more than US$100 billion for Europe alone over the past four decades**.[3] These figures show how imperative it is to have a comprehensive insight of water scarcity to address the challenges associated with it. Furthermore, the unintended consequences of water scarcity requires the attention of decision makers, if we are to achieve the United Nations Sustainable Development Goals (SDGs) before 2030 (see Box.1).

Box.1 Water Scarcity and UN SDG 6: Why do We Have to Take Action?

Water holds a key position in a complex web of linkages across all SDGs. Most of these linkages are mutually reinforcing, while others could involve trade-offs. As a result, the ability to achieve other SDGs may be directly dependent on achieving the SDG6 targets.

More specifically, water scarcity is a challenge that is relevant to all UN SDG6 water-related targets (*Ensure availability and sustainable management of water and sanitation for all)*. Achieving universal access to safe drinking water and sanitation services for all, as set by **SDG 6.1** and **6.2** respectively, can only be possible by mitigating the risk of water scarcity at all levels. Improving water quality by reducing pollution and increasing the proportion of safely treated wastewater as prioritized under **SDG 6.3** which will require effective measures to conserve vulnerable freshwater resources. Consequently, increasing the efficiency of water use is of vital importance to decrease the level of water stress as targeted under **SDG 6.4**. While **SDG 6.5** advises implementing integrated water resource management (IWRM) at all levels for sustainable management of scarce water resources, **SDG 6.6** highlights the importance of protecting and restoring water-related ecosystems to ensure healthy functioning of ecosystem services. Finally, complementary targets under **SDG 6.A** and **6.B** underlines the importance of international cooperation and participatory decision-making mechanisms that contribute to the progress.

The World Bank projections estimate the annual cost of achieving SDG 6.1 and 6.2 targets as US$114 billion per year. This amount seems reasonable considering the damage caused by extreme weather events, inadequate WASH services and water scarcity, which can be up to US$500 billion annually. Further studies estimate that every dollar spent on improving WASH services produces 5$ in return. These figures show that investing in efforts to accomplish SDG targets by 2030 are not only necessary, but also attractive for decision makers to develop sustainable societies and economies that are resilient to impacts of water scarcity.

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1 https://www.weforum.org/agenda/2019/03/water-is-a-growing-source-of-global-conflict-heres-what-we-need-to-do/

2 https://www.unwater.org/water-facts/scarcity/

3 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0672&from=EN

Is it possible to be Indifferent to Water Scarcity?

Water scarcity is commonly described as the physical absence of freshwater to meet the water demands for human, sectoral and ecological needs. Because water resources are distributed unevenly across regions, it is estimated that nearly one-third of the global population (2.1 billion people) living under extreme water scarcity conditions do not have access to safely managed drinking water services, whereas the number of people who do not have access to safely managed sanitation services is 4.2 billion.[4] However, assuming that "relatively less water stressed two-third of the population will be exempt from extreme scarcity risks in the future" could be a short sighted proposition.

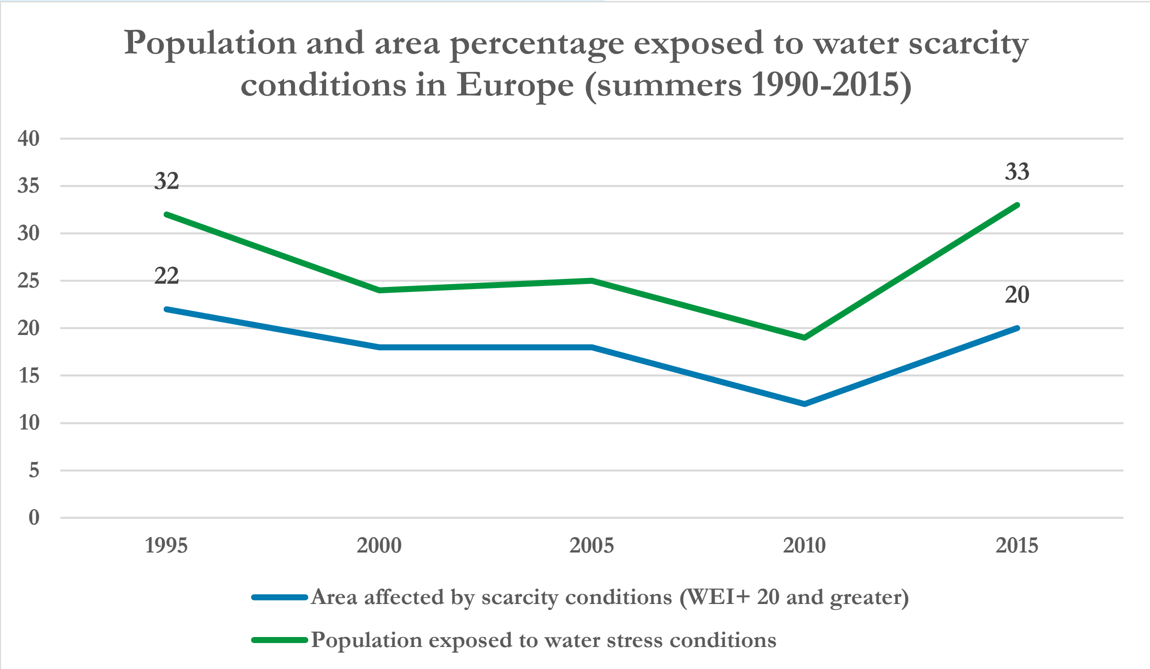

Figure 1 Water Scarcity in Europe

Even Europe with its relatively abundant freshwater resources is more frequently experiencing conditions of water scarcity. **The Water Exploitation Index (WEI+)** reveals that 20% of the European landscape is already affected by water scarcity conditions (Figure 1)[5]. **It is estimated that the number of European river basins affected by water scarcity will increase by up to 50% by 2030**.[6] In parallel to increasing frequency of water scarcity, the available water resources per inhabitant has decreased at variable levels all over the continent for the period 1990-2017. **The decrease has been larger in southern European countries such as Spain (-65%), Malta (-54%) and Cyprus (-32%)**[7]. These figures indicate that we can expect that avoiding water scarcity will become more difficult in the future.

4 https://www.who.int/news-room/detail/18-06-2019-1-in-3-people-globally-do-not-have-access-to-safe-drinking-water-unicef-who

5 https://www.eea.europa.eu/data-and-maps/indicators/use-of-freshwater-resources-3/assessment-4

6 https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52012DC0672&from=EN

7 https://www.eea.europa.eu/data-and-maps/indicators/use-of-freshwater-resources-3/assessment-4

Water Scarcity beyond Quantity Concerns: Dimensions of Quality and Good Governance

Beyond quantity concerns, water quality can also contribute to poor water availability. Globally, only around 20% of wastewater is treated properly before being returned to the environment[8]. **The percentage of untreated wastewater reaches up to 92% in low-income countries, whereas it averages at 30% for high-income countries** (Figure 2)[9]. This huge capacity gap in wastewater treatment not only means more pollution overload on ecosystems, but also means lost opportunities to reuse this water. Overexploitation of precious high-quality freshwater resources for the purposes that would normally suffice with water of lesser quality can yield scarcity problems in the long-term. Water quality requirements can vary significantly across different sectors of use. For instance, abstraction of non-renewable groundwater resources for cooling purposes in thermal power plants can mean sacrificing the future needs of ecosystem services, whereas reuse of adequately treated wastewater would suffice for this purpose.

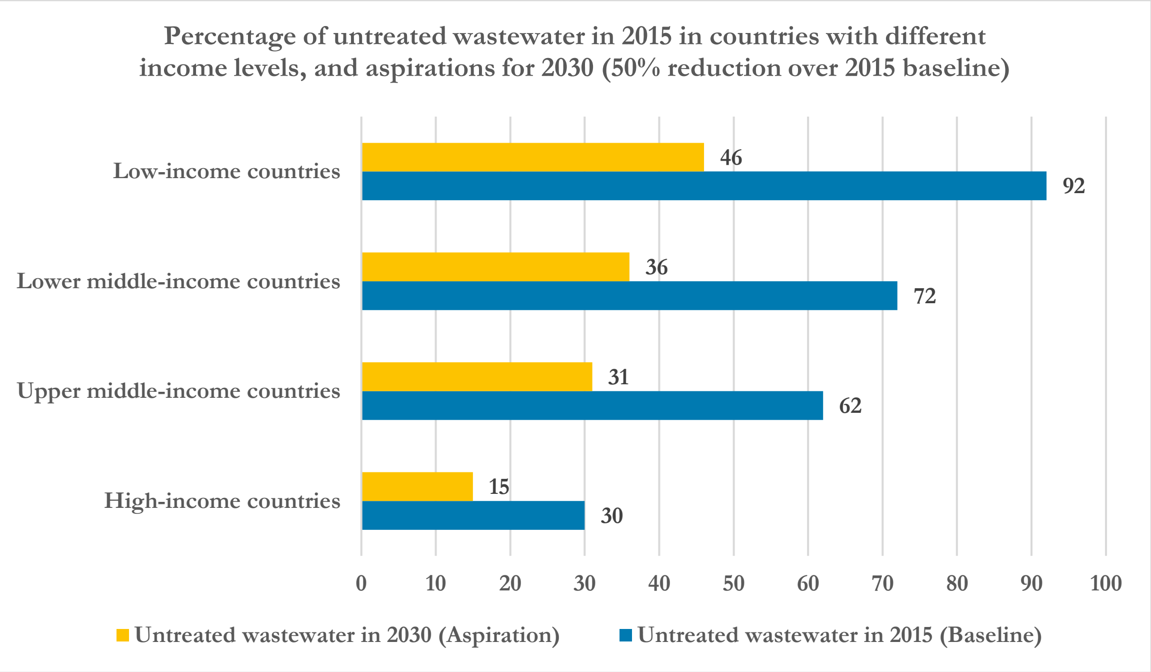

Figure 2 Rate of Untreated Wastewater Globally

Another common factor that exacerbates the problem of water scarcity is poor governance.[10] Similar to uneven geographical distribution of water resources, governance performance may vary significantly across regions due to discrepancies in economic and technical capacities. Good governance is about allocating responsibilities and resources effectively and equitably by describing who does what and how in a system. Lack of policy coherence, inclusive dialogue and stakeholder empowerment discrepancies, and institutional corruption can

[8] http://www.unesco.org/new/en/natural-sciences/environment/water/wwap/wwdr/2017-wastewater-the-untapped-resource/
[9] https://unesdoc.unesco.org/ark:/48223/pf0000247553
10 https://www.unwater.org/water-facts/scarcity/

aggravate the risks of water scarcity for certain vulnerable communities and economic sectors.[11] Good governance is vital for revealing interdependencies of end-users and potentials for trade-offs. Moreover, good governance practices can help decoupling of water consumption from economic growth in the long term[12]. Through the action of good governance, countries can increase their water efficiency by relying on smart RDI solutions, instead than investing massively in water intensive large-scale projects such as dams, canals and distribution systems. **Australia is a case in point as a country that decreased its water consumption by 40% between 2001 and 2009, while managing to grow its economy by 30% in the same period**.

In summary, water scarcity problems noticeably go beyond quantity concerns by including challenges associated with quality, accessibility and governance. This reality leaves no country and economic sector immune to water scarcity risks in the long term. Thus, it is vital to concentrate our efforts for developing integrated solutions that address water scarcity challenges in all its aspects. **This policy brief catalogues a list of solutions based on recent RDI projects contributed by the Water4SDGs Knowledge Hub experts and brings forward key messages to support decision makers in making informed decisions to overcome water scarcity challenges and implement water related UN SDGs before 2030**.

Searching for 'New Water': Integrated Solutions to Overcome Scarcity

The complex nature of water scarcity challenges does not allow for one-size-fits-all solutions. Instead, a catalogue of solutions can help building up an inventory of integrated water management options. In this section a list of 'new water' options based on novel research projects funded by national and international funds are catalogued to choose from. In this context, **'new water' concept refers to a range of solutions for improving water efficiency capacity; including water reuse, recycling, treatment, water saving, stormwater management, rainwater harvesting, as well as measures to increase governance capacity.** These are smart solutions that can be considered by decision makers at all levels, rather than grand projects that require huge investments. Since many are still in the process of development, these RDI solutions are available for further improvement and adaptation in collaboration with project coordinators. The contact information and web page links to the project coordinators are provided at the end of the document.

i. Mapping the Water Scarcity and Trade-Off Linkages with Stakeholders

The SDGs provide a unique opportunity for stakeholders across sectors, including water, to triangulate and confront pressing challenges in a coordinated and integrated manner. SDG 6 (Ensure availability and sustainable management of water and sanitation for all) is regarded as central to the achievement of many other SDGs. Given these interconnections, it is critical to

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11 https://www.water-energy-food.org/resources/resources-detail/hlpf-policy-brief-9-water-energy-food-nexus-for-the-review-sdg-7/

12 https://www.unenvironment.org/news-and-stories/press-release/half-world-face-severe-water-stress-2030-unless-water-use-decoupled

understand the full extent of the relationships and interactions among the goals and between the targets in order to enable more integrated decision-making and coherent policy approaches.

Knowledge of how the linkages manifest at country level enables more effective national progress to attainment of the SDG goals and targets, by harnessing synergies between them while managing any potential conflicts. Within the context of the Water4SDGs Knowledge Hub theme, this is key to unlocking the full enabling potential of SDG 6, while ensuring that progress made under other SDGs is not at the expense of SDG 6 targets.

The SDG Interlinkages Project funded by **Water Research Commission (WRC)** set out to identify SDG interactions at indicator level, using water (i.e. SDG 6) as the lens to approach a qualitative and quantitative exercise, using engagement with key informants and social network analysis, within the South Africa context. **This mapping approach is however applicable to any country, with the South African case study highlighting the potential value of such a resource.**

The research provides a framework for better understanding synergies and trade-offs across SDG indicators, with water as the focus. Bringing these interlinkages to the surface highlights areas where governance can be improved, both within the water sector and beyond, in order to take advantage of synergies and minimise trade-offs.

ii. Cost Effective Solutions for Ensuring Access to Safe Drinking Water and Sanitation at Local and Household Level

By far, the most pressing challenge borne by water scarcity is to ensure safe drinking water for communities currently relying contaminated resources. It is outrageous that over two billion people still lack access to safe drinking water at household level and the ones who do not have access to sanitation doubles this number globally. Densely populated and remote areas are more likely to suffer from lack of access to WASH services at household level, due to poor infrastructure capacity.

The **PANIWATER**[13] project funded jointly by the EU and the Indian Government under H2020 aims to increase the availability of safe drinking water to the minimum level recommended by the WHO (at least 7.5 L/person/day) in the target communities, and to obtain total wastewater treatment capacity of at least 10000L /day, producing irrigation-grade, CEC-free, treated water. **PANIWATER** utilizes six different technologies including solar driven devices, oxidation processors and UV-transparent jerrycans to treat water and wastewater at household level to produce new water for drinking, sanitation and irrigation.

In another similar project; **WATERSPOUTT**[14] researchers collaborate with end-users in South Africa, Uganda, Ethiopia and Malawi to provide affordable access to safe water for remote and vulnerable communities by designing and developing a range of, sustainable point-of-use solar disinfection (SODIS) technologies. **WATERSPOUTT**'s multi-disciplinary

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13 https://paniwater.eu/services/

14 http://www.waterspoutt.eu/

consortium also relies on social-science strategies to examine the effect of gender relations, governance practices and decision-making capacity on uptake of SODIS technologies at local, regional and national levels.

Both projects are showing more than impressive results in terms of demonstrating that cost-effective, adaptable and integrated micro solutions can be effectively used in ensuring access to safe drinking water and sanitation for all at local and household level as targeted by SDG 6.1 and 6.2.

iii. Ensuring Equal Access to Water-Related Ecosystem Services with Stakeholder Dialogue

Ensuring access to water resources includes access to recreational and cultural ecosystem services as well, along with material benefits of water. Ecosystem Services approach enables us to understand the interactions between nature and human activities for sustainable utilization of natural resources for human well-being. Hence, there are many factors that can hinder the accessibility of ecosystem services for a certain group for the benefit of others. For instance, a new urban planning process with ambitious construction projects, but that is poor in terms of nature conservation may inevitably hinder the recreational value of the water ecosystem for communities who rely on the same resource. Furthermore, as highlighted by the Water JPI Thematic Annual Programming (TAP), **AQUATAP_ES,**[15] ecosystem services approach is often overlooked in national and regional legislations, thus making proactive action even more decisive. In this context, decision makers often have to compromise among competing needs of user groups in such cases.

Understanding the needs and value perceptions of stakeholders is a key step for the participation of local communities in the decision-making process (SDG 6.B). By paying attention to this, **ENJUSTEES**[16] project analysed the notion of equity in access to water areas for recreational purposes, and whether perceived benefits of cultural ecosystem services (CES) are equally distributed among urban residents in the case of Helsinki, Finland. During the period of 2012-2016, **ENJUSTESS** produced new information about the available governance mechanisms that can be used for consolidating different uses of the water-related cultural ecosystem services; and how do these governance mechanisms provide for a) the consolidation of different conflicting interests, b) equitable sharing of water-related cultural ecosystem services and; c) participation in the sharing of water-related cultural ecosystem services.

The project highlighted that if public participation fails to identify multiple values (eg: environmental, economic and cultural), local environmental conflicts may emerge even if the aim has been to improve the quality of the environment.

15 http://www.waterjpi.eu/implementation/thematic-activities/water-jpi-tap-action/first-water-jpi-tap

16 https://www.syke.fi/en-US/Research__Development/Research_and_development_projects/Projects/Environmental_Justice_and_ecosystem_services_Access_equity_and_participation_in_the_use_and_management_of_aquatic_environments_in_the_Helsinki_region_ENJUSTESS

iv. Integrated Demand Management Solutions for Enhanced Efficiency

Handling water scarcity challenges one-sidedly, by increasing water supply at the expense of exploiting new freshwater resources can mean deferring the problem, rather than overcoming it. Supply management is key for decoupling water from economic growth by increasing water-use efficiency (SDG 6.4) and safe reuse capacity (SDG 6.5). This is particularly important for the biggest water consuming sector; agriculture. Integrated solutions of wastewater treatment, water reuse and input management activities can mitigate quantitative and qualitative impact of agricultural activities at meaningful levels.

As a promising example of integrated demand management applications, the **MADFORWATER**[17] project funded under the EU H2020 aims at developing and tailoring decision support systems by focusing on capacities of wastewater treatment (supply) and water reuse in agriculture (demand) in selected basins in Egypt, Morocco and Tunisia. On the supply side, **MADFORWATER** aims to decrease the carbon and energy footprint at wastewater treatment plants **by testing eleven new technologies including constructed wetlands, solar disinfection and bioreactors**. On the demand side, the project utilizes different irrigation technologies such as **plant growth promoting bacteria, new-generation tensiometers, low-cost mini-sprinkler, calibrated nozzle and decision support system to optimize irrigation schedules**.

In order to ensure the provision of treated wastewater of sufficient quality, it is important to monitor water quality with proper sampling technics. This is especially important for analysis of micropollutants, which are more difficult to monitor and remove from water resources compared to conventional pollutants. The **InSpect**[18] project is funded by Portugal's Foundation for Science and Technology (FCT) and **aims to design novel carbon materials as alternatives to the sorbents currently used for sample preparation**. These materials will be tested as new catalysts supported in membranes for water and wastewater treatment by oxidation processes. The **InSpect** project is highly potent in terms of analysis and removal of micropollutants from water.

v. Smart Solutions to Address Multiple Facets of Climate Change

One of the main causes of less predictable water availability in some regions is climate change. The most pressing effects of climate change can be observed through presence of too much or too less water. As more people reside in cities, urban areas are becoming the testing-grounds to implement climate change mitigation measures. Urban smart solutions can improve our capacity to protect water-related ecosystems (SDG 6.6) and availability of freshwater resources (SDG 6.4), while increasing resilience against pressures of climate change by managing storm water intelligibly.

17 https://www.madforwater.eu/

18 https://sigarra.up.pt/feup/pt/PROJECTOS_GERAL.MOSTRA_PROJECTO?P_ID=72992

Supported by the EU Climate-KIC Programme, the objective of the **POLDER ROOF**[19] project is to design, install and monitor the performance of prototype **green roofs with multiple functions including rain-water harvesting, flood management, heat reduction and urban farming that supports climate smart agriculture**. The living labs of **POLDER ROOF** in Italy and the Netherlands yield impressive results by a) creating green corridors that improve ecosystem services, b) diminishing the impact of storm waters going into sewer systems, c) hosting citizen-driven household food gardens (zero-km transportation, low pressure on potable water supply systems) and; d) saving energy with more efficient insulation of buildings.

Another dimension of stormwater management in urban areas is to prevent diffuse pollution that is caused by untreated sewer discharges. Stormwater becomes highly sensitive to micro pollutants as it interacts with urban surface areas that are altered by transportation and construction activities mainly. The objective of the **CLEAN WATER**[20] project funded by Vinnova is to develop **methods for identifying sewage flows in the stormwater system and early warning systems in cases of risk**. Starting with investigations of suitable parameters for detection of sewer discharges, the project also tested sensor and alarm systems in urban areas of Sweden. These tools can be adaptable and applicable in areas where scarce water resources are under threat of excessively contaminated stormwater flows.

vi. Living-Lab Applications to Uptake New Water Solutions across Local Administrations

Improving water quality by increasing wastewater treatment capacity (SDG 6.3) and protecting the water related ecosystems (SDG 6.6) requires design and implementation solutions in collaboration with local actors (SDG 6.B). This provides opportunities to identify real challenges and capacities where further developments are possible. **User-centred and open-innovation features of Living-Lab applications are useful for demonstrating the added-value of new technologies and supporting the capacity building of end-users**. More and more RDI projects choose to work in living-lab environments in order to observe the challenges and develop solutions in place jointly with water managers.

The recently initiated **PAVITRA GANGA**[21] project is funded by the EU and the Indian Government to fulfil SDG 6, and targets at national scale by unlocking the environmental and economic potential of municipal wastewater treatment and reuse solutions for urban and peri-urban areas in India. In collaboration with local stakeholders and supported by industrial partners, **PAVITRA GANGA** sets up two pilot sites in New Delhi and Kanpur basins to apply novel wastewater treatment technologies for open drains. The project promotes **Circular Economy principles to exploit the economic opportunities of waste-to-energy, water reuse and resource recovery, while fostering participatory monitoring approaches and training activities**.

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19 https://polderroof.tudelft.nl/

20 https://www.ltu.se/research/subjects/VA-teknik/Forskningsprojekt/Rent-Vatten-2013-2015-1.144480?l=en

21 https://pavitra-ganga.eu/en

Besides providing an opportunity to test new technologies, living-labs are also perfect platforms to observe the performance of mature technologies and design improvements as needed. The **ATeNaS**[22] project aims to achieve this by capitalizing on the achievements of **Nature-Based Solutions (NBS)** financed by EU and applied worldwide for increasing urban climate and water resilience, and building a critical mass of human and social capital for nature stewardship. Funded under the Water JPI 2018 Joint Call, **ATeNaS** closely collaborates with city planners, practitioners and managers to create, evaluate, select, and suggest re-design of NBS for stormwater management and natural cycling of water for improved ecosystem services. **The NBS technologies considered under the project include water storage, infiltration, bio-filtration and stormwater retention measures in living-lab areas in Poland, France and Finland.**

In a similar fashion, **DEPCAT**[23] project aims to develop a demonstrative scale of an innovative water and wastewater treatment equipment. **The equipment combines oxidation processes aiming the degradation of organic pollutants and water disinfection to increase water reuse capacity**. The **DEPCAT** research team worked with industry partners in a living-lab structure to demonstrate the effectiveness of the project tools.

Key Messages

The following section provides a guideline of recommendations –in conjunction with the solutions described above- to support policy makers in mitigating the effects of water scarcity and fulfilling the SDG 6 targets. It is hoped that the key messages can help decision makers **(ministries, municipalities, basin managers, water operators, urban planners, irrigation associations, etc)** to make informed decisions to design and implement sustainable water management policies.

1. **Understand interactions, challenges, trade-offs and opportunities around SDGs and Water Scarcity**: As a first step, mapping the interactions across SDGs by locating SDG 6 at the centre will provide insight about different impacts of water scarcity. Communicating with competing interest groups will expose the bigger picture and make it easier to spot the areas of improvement and develop trade-off options based on priorities.

2. **Leave no one behind without access to WASH services:** Based on the mapping results, start with ensuring safe water and sanitation for all at local and household level by integrating cost-efficient, adaptable, mobile and user-friendly applications. Collaborate with researchers and SMEs in the design, development and exploitation of such tools in a cost-effective way. Besides fundamental WASH services, access to recreational and cultural ecosystem services should also be maintained equally through consolidating with stakeholder groups.

22 http://www.waterjpi.eu/joint-calls/joint-call-2018-waterworks-2017/booklet/atenas/atenas-1

23 https://www.adventech.pt/pt/9-portugues-pt/175-projeto-depcat-publicitacao

3. **Give priority to equitable, resource-efficient, demand management solutions to decouple water use from economic growth:** Instead of investing in mega projects to increase water supply that eventually increases total water withdrawals and consumption, seek solutions for increasing water efficiency and demand management capacity. Demand management strategies can be especially useful for mitigating the impact of agriculture on water resources both quantitively and qualitatively. Investigating projects with a circular economy approach that aim at increasing wastewater treatment and reuse capacity, while decreasing input use will provide options to do this.

4. **Implement climate smart applications to mitigate climate change effects in urban areas**: Cities are under the pressure of extreme weather effects due to their lowered capacity of ecosystem services caused by human intervention. At the same time, cities provide several opportunities to mitigate climate induced water scarcity. Technologies for stormwater management often provide multiple side-benefits such as water storage to help drought management. Green infrastructure like polder roofs also help to decrease the pressures on soil and water by utilizing water recycling technologies for local food production. Furthermore, by close monitoring of stormwater flows, it is possible to prevent intrusion of micro-pollutants and other contaminants into water resources.

5. **Monitor the progress and uptake of the best-practices with Living Labs:** Living labs help transmission of knowledge faster than usual. Instead of researchers developing a product confidentially, living lab applications bring together researchers and end-users to develop solutions collectively. In this way, RDI processes get aligned with capacity development activities, as end-users get familiar with new technologies starting from the product development process. Living labs are also effective in terms of monitoring the performance of available applications and demonstrating the added-value of new technologies to spread the knowledge.

Contacts for Referenced Projects

1. ATENAS, "To Ally Technology, Nature and Society for integrated urban water management". **Contact:** Kati Vierikko, SYKE. **Email:** kati.vierikko@ymparisto.fi

2. "Clean Water (2013-2015)". **Contact:** Lena Goldkuhl, Lulea University of Technology. **Email:** lena.goldkuhl@ltu.se

3. DEPCAT, "Demonstration of new EquiPment involving integrated CATalytic processes for treatment of organic pollutants and disinfection of water". **Contact:** Ana Rita Lado Ribeiro, LSRE-LCM. **Email:** ritalado@fe.up.pt

4. ENJUSTEES, "Environmental justice and ecosystem services: Access, equity and participation in the use and management of aquatic environments in the Helsinki region". **Contact:** Kati Vierikko, SYKE. **Email:** kati.vierikko@ymparisto.fi

5. InSpeCt – "Identifying and interrupting micropollutants of EU concern by using Smart Carbon materials". **Contact:** Ana Rita Lado Ribeiro, LSRE-LCM. **Email:** ritalado@fe.up.pt

6. MADFORWATER, "DevelopMent AnD application of integrated technological and management solutions FOR wasteWATER treatment and efficient reuse in agriculture tailored to the needs of Mediterranean African Countries". **Contact:** Severine Tomas, IRSTEA. **Email:** severine.tomas@irstea.fr

7. "Mapping water and sanitation linkages across the SDGs in South Africa". **Contact:** John Dini, Water Research Commission. **Email:** Johnd@wrc.org.za

8. PANIWATER, "Photo-irradiation and Adsorption based Novel Innovations for Water-treatment". **Contact:** Kevin McGuigan, RCSI. **Email:** kmcguigan@rcsi.ie

9. PAVITRA GANGA, " Unlocking wastewater treatment, water re-use and resource recovery opportunities for urban and peri-urban areas in India". **Contact:** Antonio Lo Porto, CNR. **Email:** antonio.loporto@cnr.it

10. POLDER ROOF, "Climate-KIC Polder Roof Lab". **Contact:** Fernando Nardi, WARREDOC. **Email:** fernando.nardi@unistrapg.it

11. WATERSPOUT, "Water - Sustainable Point-Of-Use Treatment Technologies". **Contact:** Kevin McGuigan, RCSI. **Email:** kmcguigan@rcsi.ie