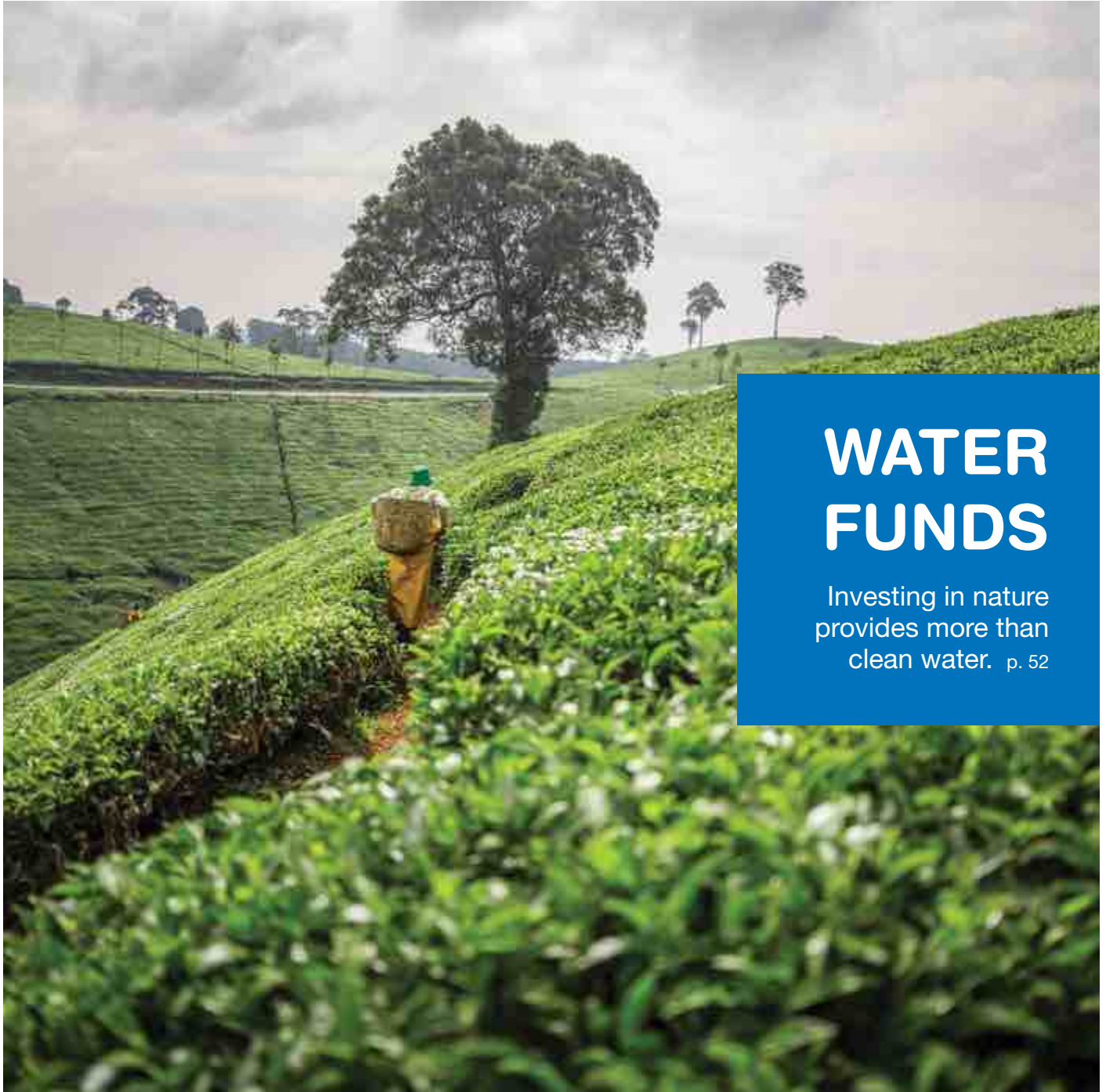


REVOLVE

QUARTERLY INSIGHTS INTO A CHANGING WORLD

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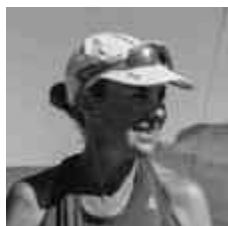
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Based in Barcelona and Brussels, REVOLVE is a communication group fostering cultures of sustainability. REVOLVE magazine (ISSN 2033-2912) is a quarterly international publication focusing on water (winter), nature (spring), energy (summer), and transport (autumn). To view all our publications, visit:
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Cover image: A young man picking tea leaves on a tea plantation in the Upper Tana Watershed, Kenya. The Nature Conservancy is working to protect the Upper Tana Watershed in Kenya and provide cleaner, more reliable water for Nairobi.
Photo: Nick Hall.

On Water Polluter Responsibility

BRUNO TISSERAND, EurEau President

Water operators have one goal: to keep water safe and clean.

European water operators spend millions of euros to remove contaminants from water resources to provide water supply. These pollutants can enter the water cycle through many means, and once there, can pose a risk to human and environmental health.

The cost of removing contaminants is passed on to the consumer when laws and common sense say that the polluters should pay. It's not just the water operators who believe this; the EU established these principles in its underlying treaties – these treaties however are not fully implemented.

The Polluter Pays, Control at Source and the Precautionary Principles constitute the underlying philosophy behind key water legislation, such as the EU Water Framework Directive. If they were implemented, we would reduce the level of contaminants entering the water cycle. When these principles are not used, Extended Producer Responsibility (EPR) should be enforced to make the polluter pay.

If approved with its initial ambition level, the EU's Single Use Plastics Directive will make a significant step towards reducing the amount of waste that can end up in the environment by combining control at source measures with awareness-raising, labelling and extended producer responsibility schemes.

We have to look beyond this. The Single Use Plastics Directive looks at end-of-life products that end up in the environment through littering and other careless behaviour. However, public attention is shifting to micro-pollutants, such as pharmaceuticals and biocides, and microplastics released by diverse products during their life cycle. A new type of EPR is needed, looking at the full-life cycle of products and effectively retracing the responsible manufacturers.

Producers must assume responsibility for the products they design and place on the market. Fewer harmful substances released to the environment will also reduce the overall exposure of the population to chemicals and will be a strong driver for product innovation.

The water that drinking water operators extract should be clean and safe enough to be consumed with a minimum of



intervention. The same goes for waste water operators: they should only have to remove pee, poo and paper and give water a minimum of treatment before returning it safely to the environment. If further action is necessary, it is clear: the polluter should pay for additional cleaning, and not the water consumer.

We need the correct implementation of EU law to ensure that domestic consumers do not pay extra to keep our water safe and clean.

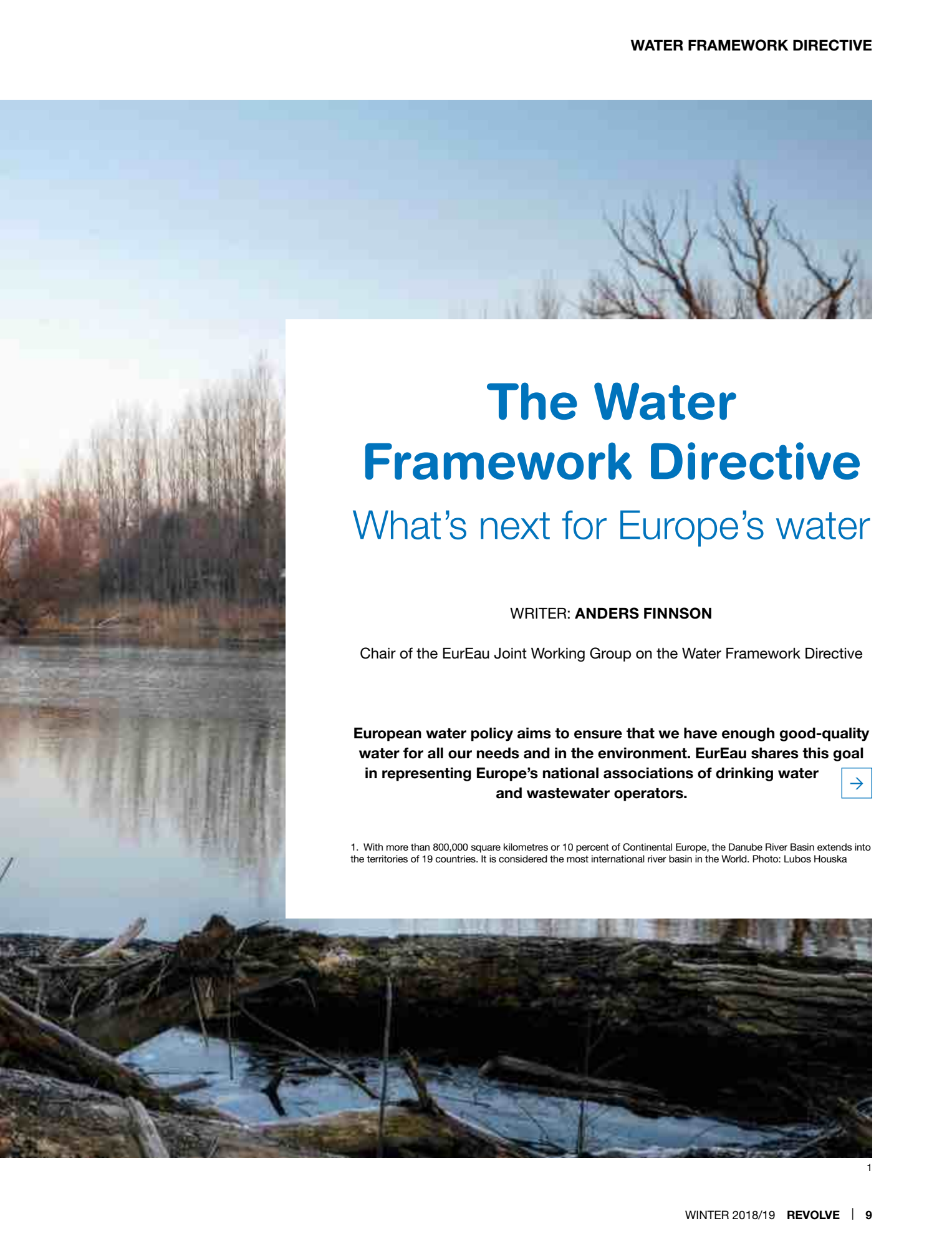
An effective source control approach makes the reuse of water and its nutrients, like nitrogen and phosphorus from sewage sludge, possible because they fulfil appropriate quality criteria. Without this, the sustainability of the application of regulations like that on Water Reuse may be compromised because it will require additional costly treatment. EPR is a financial mechanism that will allow us to address those unsustainable extra costs to the originators of the pollution, implementing the Polluter Pays Principle. The EU needs to better coordinate its own regulations to achieve this; EurEau wants the European institutions to:

- adopt a strategic approach to micropollutants, including biocides, pesticides and pharmaceuticals through making producers responsible for the products they make
- consider the life-cycle approach to substances when legislating, including the authorisation process for pesticides and medicinal products
- use the REACH authorisation process more frequently, identifying additional substances of concern and using the authorisation and restriction processes on persistent, mobile and toxic substances
- make the producer pay for damage to the environment or any measures taken down the supply chain to avoid the release of pollutants into the environment
- use eco-design and ecolabel criteria more extensively to reduce harmful components from later leaching into the environment, and
- raise awareness among citizens and encourage them to make more environmentally-conscious decisions

Fewer harmful substances in our water cycle and the environment benefits everyone. We can make this happen with existing legislation to protect human and environmental health, but the EU needs to make the three basic environmental principles more explicit. Each revision of relevant EU legislation should ensure that regulations and directives make our legislation more effective. ●

[See pages 8-15 for more on the Water Framework Directive by EurEau.](#)





The Water Framework Directive

What's next for Europe's water

WRITER: **ANDERS FINNISON**

Chair of the EurEau Joint Working Group on the Water Framework Directive

European water policy aims to ensure that we have enough good-quality water for all our needs and in the environment. EurEau shares this goal in representing Europe's national associations of drinking water and wastewater operators.



1. With more than 800,000 square kilometres or 10 percent of Continental Europe, the Danube River Basin extends into the territories of 19 countries. It is considered the most international river basin in the World. Photo: Lubos Houska



2

The Water Framework Directive (WFD) is the overarching piece of legislation which came into force in 2000 to protect the quality and quantity of water resources across Europe. It was – and still is – an innovative piece of legislation, which introduced the principle of integrated river basin management across international and national boundaries.

EU Member States must publish river basin management plans (RBMPs) on how they achieve the WFD environmental objectives. The European Commission published the study on the second RBMP cycle in December 2018.

According to the European Environment Agency's 'European Waters' 2018 report, 74% of Europe's groundwater achieves good chemical status, while 89% of the groundwater area achieved good quantitative status. Around 40% of surface waters are in good ecological status or potential, and only 38% are in good chemical status. In many cases, a few priority substances account for poor chemical status, the most common being mercury.

Since its entry into force, the WFD has shown slow, but steady, improvements, but we did not achieve the goals of “good status” for water bodies by 2015 nor did we prevent any further deterioration of our water resources. There are several reasons why this is so, including the challenges of climate change, emerging pollutants, and large-scale projects like waste water treatment plants that take years to plan, approve and build and that play an essential role in meeting WFD targets.

2. Vänern is the third largest lake on the European landmass, and the largest lake in Sweden and in the European Union. It supplies water for 800,000 people – approximately 10% of Sweden's total population. Photo: Mats Hansson

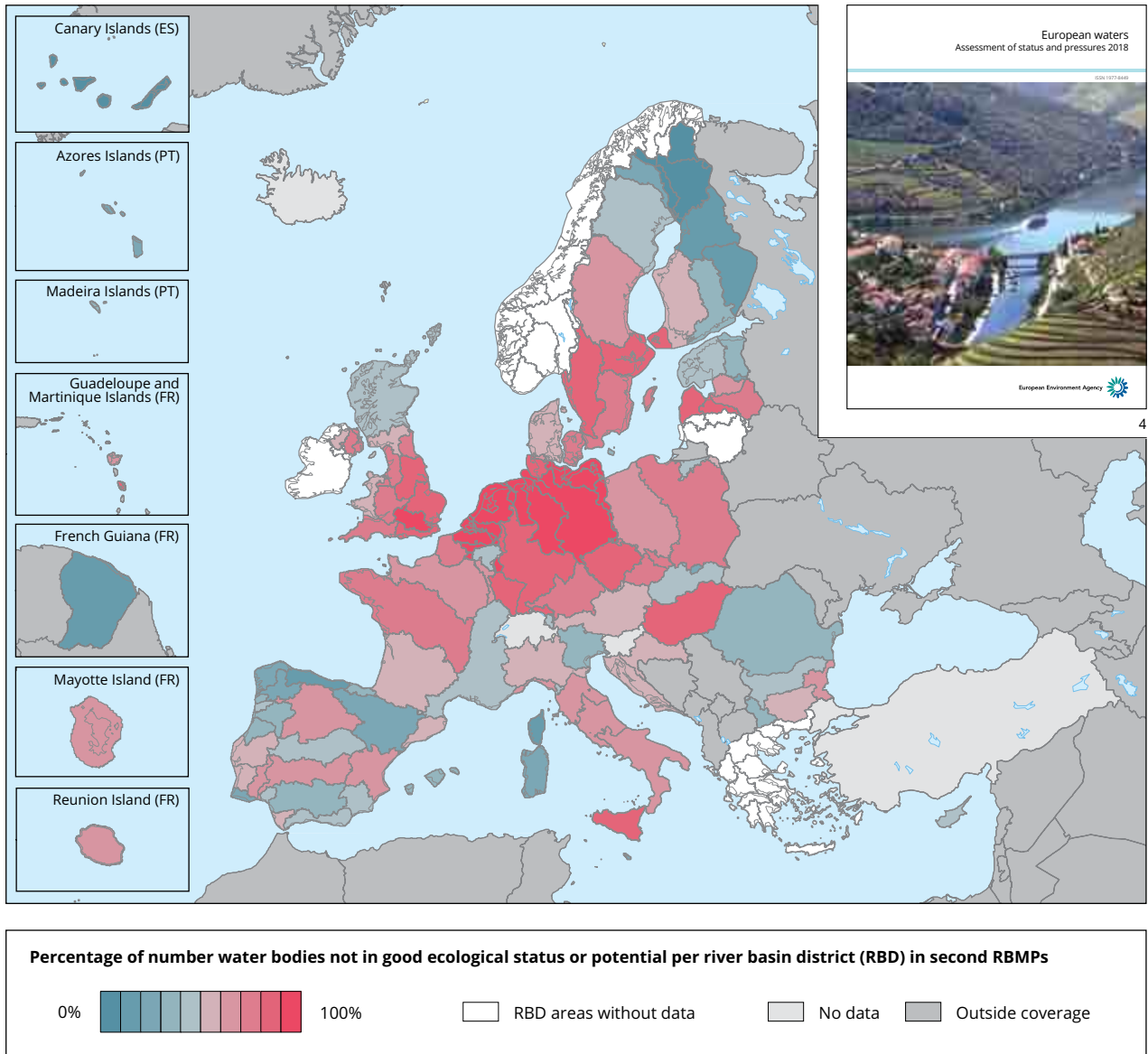
3. Hradec Králové waste water treatment plant, Czech Republic. Large-scale projects like waste water treatment plants take years to plan, approve and build, which constitutes a challenge in meeting WFD targets. Photo: Karel Jakubec

4. The main aim of EU water policy is to ensure that a sufficient quantity of good-quality water is available for both people's needs and the environment.

5. Percentage of water bodies in Europe's RBDs that are not in good ecological status/potential (2nd RBMPs). Source: European Environment Agency's 'European Waters' 2018 report.



3



**We need the correct implementation of EU law
to ensure that domestic consumers do not pay extra
to keep our water safe and clean.**





6

Applying the Source Control Principle

Whatever the reasons for not meeting the WFD goals in time, the lack of effective implementation of the source control principle in the EU can be considered as the root cause. Source control prevents contaminants from entering the water cycle in the first place; it is much easier – and cheaper – to limit pollution at the source, especially so that consumers do not have to bear the costs of further end-of-pipe treatments. At the same time, the Control at Source Principle allows for the development of a truly circular economy, as it will be easier to recover nutrients and reuse treated waste water.

We all have a role to play in this, from water operators to policy-makers to water users at all levels. Implementing the Control at Source Principle through strong legislation is a brave step and will require strong commitment and action

from powerful industrial groups. We are pleased that the European Commission uses control at source measures in its Plastics Strategy and, related to this, the Single Use Plastics Directive proposal. The EU executive also promises to deliver ‘soon’ the Strategic Approach to Pharmaceuticals in the Environment and a Strategy Towards a non-toxic Environment – both of which are likely to look at control at source measures as part of the full value chain.

Europe does not need to be reluctant. The Treaty on the Functioning of the European Union clearly enshrines the Polluter Pays, Control at Source and Precautionary Principles as basic building blocks of EU environmental legislation. Logically, these principles need to be included in EU law and effectively implemented at Member State level. And we need greater policy coordination between the WFD and other EU water and environmental legislation, such as the Urban Waste Water Treatment Directive (UWWTD),



7

The Control at Source Principle allows for the development of a truly circular economy.

the Drinking Water Directive, and the Bathing Water Directive. Sectoral policies such as agricultural, climate and pharmaceutical policies can also be better aligned to ensure that we are all reducing pollution and its effects on receiving waters.

For example, looking at nitrate pollution of drinking water resources. Several European laws refer to the threshold value of 50mg/l: the Nitrates Directive, the Groundwater Directive, the Drinking Water Directive and even the proposed

Common Agricultural Policy (CAP). Still, the threshold value is exceeded in numerous drinking water sources, with financial consequences for water consumers. In theory, the newly proposed CAP makes payments to farmers conditional on them adhering to the Nitrates Directive. In practice, this link is likely to be too weak to solve this problem.

The EU is now reviewing a lot of its water policies. It is possible that the WFD and the UWWTD will be updated over the next five years. These reviews present a wonderful opportunity for the EU to upgrade its policy coordination with the aim of protecting our water resources for the next generations.

A Common Tool for Implementation

The objective of all European water bodies reaching 'good status' by 2015 was not achieved, and all parties agree that it will not be met by 2027 either, despite increased efforts. EurEau believes that to meet the challenges of climate change and emerging pollutants to name a couple, as well as the objective of the original WFD to conserve our water resources, the ambition of the WFD should be maintained also after 2027.

The assessment of the status of water bodies, as described in Annex V of the WFD, is based on the one-out-all-out principle. This system monitors the status of all water bodies across Europe in their path to reach the 'good status' and it should not be fundamentally changed.

However, the classification system describes all the elements to be met when assessing status for surface waters and groundwater. If one fails, the 'good status' is automatically not achieved. This approach masks and distorts the

reality of the water body quality since it provides only a snapshot of its 'status' and focuses the attention on the lowest quality elements. The result is that trends and changes over time are not shown. This makes it difficult for authorities to show the improvement of the quality of water bodies and justify the investments made and those needed in the future.

There should be a commonly agreed additional tool for Member States to show improvements, such as a set of biological or chemical parameters assessed over time (some microbiological parameters are already included in the Bathing Water Directive). At the same time, hydromorphological or quantitative status could be looked

at on their own. This will clarify which sectors are successfully contributing to the improvement of water bodies and to what extent investments are producing positive outcomes. [→](#)

6. Sectoral policies such as agricultural policies can also be better aligned to ensure that we are all reducing pollution and its effects on receiving waters. Photo: Mark Plötz

7. Although plastic will not biodegrade, it will degrade into tiny particles after many years. In the process of breaking down, it releases toxic chemicals which make their way into our water supply. Photo: Peter Clarkson

8. With fresh water originating mostly in mountain areas (e.g. 40% of Europe's water comes from the Alps), changes in the snow and glacier dynamics and in precipitation patterns may lead to water shortages across Europe. These diminishing water supplies will also have a negative impact on hydroelectric power, which is the principal energy source for large areas of Europe. Photo: Martin Jernberg



**There is no
alternative
to healthy
and clean
water that
benefits both
humans and
nature.**



9. Water infrastructure in many parts of Europe is ageing due to a lack of investment. The price we pay for our water should include depreciation, renewal and maintenance costs, as well as the cost of financing long-term investment, so that the costs are sustainably shared between current and future generations. Aging cast-iron water pipe, Finland. Photo: Riikka Rajala

An undulating landscape

Member States cannot keep using investment costs as an excuse as to why they are not meeting the WFD requirements. While we recognise and accept that countries have different circumstances, the protection of water resources is paramount for sustainable development and for protecting public health.

The European Commission and Member States should carry out a critical analysis of why the objectives have not been reached. Improving water quality should be a continuous process; it is important to maintain the current level of ambition without changing the general WFD objectives, while an extension of the deadline beyond 2027 could be considered when evaluating compliance.

The WFD can develop a rolling system further under which Member States produce multi-cycle plans to contextualise improvements anticipated in individual

cycles and provide the relevant “within-Plan” milestones. This approach would also help to ensure that appropriate monitoring is identified and introduced at the right time.

Whenever timescales are extended, it must be remembered that the principle of ‘no deterioration’ continues to apply. This concept itself needs to be analysed according to those changes that are population driven, and those that relate to changing natural conditions, including climate.

Maintain the current level of ambition without changing the general WFD objectives.

From a water services point of view, exemptions that lower the ambitions towards achieving ‘good status’ should be avoided as much as possible. We should be working towards developing in line with the overall ambition of sustainability.

The environmental objectives of the WFD are ambitious and should be maintained. Many improvements have taken place but the lack of a holistic approach to water pollution has increasingly led to unsustainable end-of-pipe solutions rather than more viable source control measures, making the burden of investment fall on consumers through their water bills. This situation should result in a sound and transparent public debate.

Speaking of investment, the WFD lays down the principle of cost recovery for water services. Water infrastructure in

many parts of Europe is ageing due to a lack of investment. The price we pay for our water should include depreciation, renewal and maintenance costs, as well as the cost of financing long-term investment, so that the costs of supplying clean and safe water are shared between current and future generations in a sustainable way.

We are aware that some stakeholders would like to lower the goals of the WFD in a potential revision. We call on policy-makers to resist this pressure and continue the engagement of all actors within the Common Implementation Strategy of the WFD. There is no alternative to healthy and clean water that benefits humans and nature: all sectors should take their responsibilities and show engagement and ownership. ●



EurEau is the voice of Europe's water sector. We represent drinking and waste water service providers from 29 countries in Europe, from both the private and the public sectors. Our members are fully committed to the continuous supply of clean water and its safe return into the water cycle. We have a role in raising awareness of threats to the water environment. With a direct employment of around 476,000 people, the European water sector makes a significant contribution to the European economy.

Our members are the national associations of water services in Europe. At EurEau, we bring national water professionals together to agree European water industry positions regarding the management of water quality, resource efficiency and access to water for Europe's citizens and businesses. The EurEau secretariat is based in Brussels, from where we coordinate the work of around 200 experts from member organisations and utilities and advocate common positions with EU decision-makers.

<http://www.eureau.org>



1. Young people involved in innovative water-related projects around the Mediterranean share their messages at the 2016 Water Heroes Workshop.
Photos: Eric Chevalier

The Mediterranean Youth for Water Network (MedYWat)

Empowering, Connecting & Change-Making



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If you are wondering who is working on making a better future for water around the Mediterranean, this is how it's being done!

The Mediterranean region is a rich region in terms of culture, history, tourism and agriculture with over 20 countries hosting around 480 million people largely along 46,000 km of coastline connecting three continents: Africa, Asia and Europe (EA 2015). However, the region faces considerable challenges, notably climate change, increasing rates of water scarcity and imbalances in water distribution. The Middle East and North Africa (MENA) region is the most water scarce region in the world, with 15 countries in the region suffering



from extreme water scarcity (less than 500 m³/year of renewable water per capita).

To tackle this challenge, a spectrum of actors needs to be involved in finding mitigation possibilities and adaptation solutions. We believe youth have played and continue to play an active role in the fields of water security and better water awareness at the local, national and regional levels all around the Mediterranean. Indeed, young people are innovating on water, and their actions and ideas should be acknowledged, shared and replicated to create a more secure regional water future. One example of how Mediterranean youth is contributing to water solutions is the Mediterranean Youth for Water network (MedYWat).

What is MedYWat?

MedYWat is a network of young water professionals from around the region. Its vision is a Mediterranean region in which youth are recognized and active stakeholders at all levels of water resources management. MedYWat's mission is to engage young Mediterranean water professionals to create and share knowledge, build capacities and ultimately amplify youth's voices on the regional and global water agendas.

MedYWat is supported by the Center for Mediterranean Integration (CMI) based in Marseille, France; CMI is a multi-partner platform where development agencies, governments, local authorities and civil society from around the Mediterranean convene to exchange knowledge, discuss public policies, and identify the solutions needed to address key challenges facing the Mediterranean region. CMI notably works on water scarcity in the Mediterranean. Since youth is at the heart of the CMI's agenda, creating and supporting this regional youth network devoted specifically to water



2



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challenges is fully consistent with its strategic objectives.

The network was launched on 22 March 2017 during CMI's first World Water Day youth workshop on treated wastewater reuse and the circular economy that took place in Marseille and it has been growing ever since. In March 2018, it reconvened again at the CMI's second World Water Day regional youth workshop on "Nature-based Solutions for a Water Secure Mediterranean" at Anafora community in Egypt. Bringing together over 80 young Mediterranean water researchers, entrepreneurs and activists working on water challenges in the region, the network members

elected a coordination group which – in collaboration with all members – has been steadily developing and expanding MedYWat's activities.

2. The first group of Mediterranean Water Heroes on the day MedYWat was launched at the "Youth Innovating with Wastewater for a Sustainable Mediterranean Water Future" workshop at the Center for Mediterranean Integration in Marseille, France (March 2017) Photo: Center for Mediterranean Integration

3. World Water Day Workshop – Nature Based Solutions 2017

4. Lamis Qdemat (Palestine), founder of the Water Heroes educational game.

5. The Water Heroes educational game, which children can play on the computer or mobile phone, is a fun way to learn about water resources, water recycling, and waste management.



4



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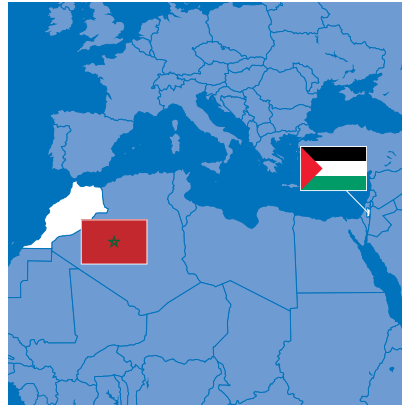
MedYWat's values are based on inclusiveness, innovation and collaboration. Its members consider water as a critical public good in the region and are determined to positively impact the fragile water situation in the region, while connecting with other young water networks around the world. Furthermore, the network identifies young water professionals seeking to interact and create positive change together with regional water institutions and policy-makers.

MedYWat has been working on six different topics related to water from the technological and educational points of view:

1. Water Education
2. Water Governance
3. Water Treatment and Reuse
4. Water Management and Planning
5. Sustainable Blue Growth
6. Water And Migration

What follows are a few examples of the projects and programs MedYWat members are developing at local and regional levels:

1. Water Education (Palestine and Morocco)

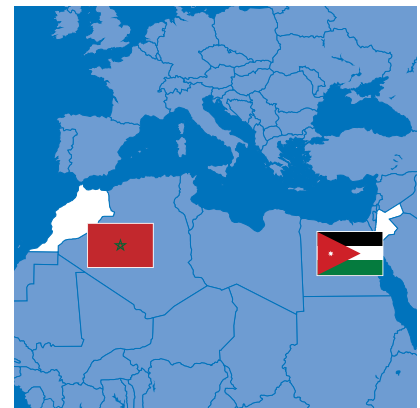


To address the region's pressing water challenges and build more sustainable societies, it is important to raise a generation that values water and other environmental resources by using innovative and effective educational means. An example of such innovation in education is Lamis Qdemat (social entrepreneur, Palestine) who founded the Water Heroes educational game. This game, which children can play on the computer or mobile phone, is a fun way to learn about water resources, water recycling, and waste management. Lamis works with schools and local communities by delivering workshops on water management in order to increase students' awareness about environmental issues and advance their skills in waste recycling.

In the fields of higher education and academic research, several MedYWat members are active researchers of water solutions. For example, Dr. Faissal Aziz (University of Cadi Ayyad, Morocco) conducts practical research on climate

change adaptation, water and wastewater treatment, treated wastewater reuse and water management in North Africa. In addition to teaching courses on water and ecosystems, Faissal supervises several PhD students whose theses focus on water treatment.

2. Water Governance (Jordan and Morocco)



Water scarcity in the region is not only a result of physical water shortages, but is also linked to the lack of good governance structures, high water demand, and low levels of trust between different parties sharing the same water resources. MedYWat members are conducting research and building practical knowledge in these fields across the region. In the field of water governance, for instance, Dr. Hussam Hussein (Jordan, based at the University of Kassel, Germany) is conducting innovative research on the role of discourses in shaping water policies in the Middle East, on transboundary water governance and critical hydro-politics, and on issues related to the political economy of water resources in arid and semi-arid regions. Another MedYWat member, Fatine Ezbakhe (Morocco, PhD researcher at the Polytechnic University of Catalunya, Spain) is studying the ways in which addressing water pollution can be a means to





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achieving the Sustainable Development Goals (SDGs) by bringing her expertise in civil engineering into the field of water governance.

3. Water Treatment and Reuse (Morocco, Egypt and Spain)



Several MedYWat members are actively involved in research in the fields of water

treatment as well as wastewater management and reuse. One example is the work of Anas Tallou (PhD Student, Sultan Moulay Slimane University, Morocco) who founded Inkol, an innovative technique for producing ink from olive mill wastewater, which is an organic waste byproduct of olive oil production. Wastewater produced by olive oil mills is phytotoxic and can therefore degrade soils and water resources. Anas is an accomplished Arabic calligrapher and an active MedYWat member who is investigating how to solve this problem using a circular economy approach, by producing natural inks from this olive mill wastewater instead of resorting to industrial inks. Another example is Ahmed Ayoub (PhD student, CIHEAM Bari, Italy) who is a MedYWat member from Egypt conducting research on water management systems and the modernization of surface irrigation systems in Egypt. In Spain, Dr. Francisco Pedrero (Irrigation Department, CEBAS-CSIC, Murcia, Spain) conducts research on the use of water from wastewater treatment plants for horticultural crop irrigation.

4. Water Management and Planning (Tunisia)



Unsustainable water use is a problem that many countries in the Mediterranean region face. Wise water management can help the region's growth and stability. Several MedYWat members work on solutions for narrowing the gap between the supply and demand of water and to find ways to ensure water security. In the field of agriculture, one example is Chahtech – a social business project

from Tunisia. Chahtech is innovating in water management systems by developing innovative irrigation solutions as well as promoting best practices for sustainable agriculture. MedYWat member and social entrepreneur Wassim Chahbani is actively involved in the "Buried Diffuser" (one of Chahtech's solutions) – an award-winning underground irrigation system that delivers water and nutrients to plants at the root level, drastically reducing water losses in irrigation, especially compared to the commonly used techniques. Also in Tunisia, MedYWat member Ines Gasmi (PhD student, Institute of Arid Regions, Medenine, Tunisia) is working on the relationship between water, agriculture, and food security by studying irrigation water management and water solutions in agriculture in relation to climate change.

6. Calligraphic art created with natural ink extracted from olive mill wastewater. Photo: Anas Tallou

7. The "Buried Diffuser" – an award-winning underground irrigation system that delivers water and nutrients to plants at the root level, drastically reducing water losses in irrigation. Photo: ICU

5. Sustainable Blue Growth (SBG) (Tunisia and Italy)



The International Maritime Organization considers shipping as one of the most important and dangerous industries in the world due to its impacts on blue growth. MedYWat aims to contribute positively in this field. Therefore, MedYWat member Baya Aissaoui (Tunisia, PhD Student, University of Trieste, Italy) is conducting research on sustainable blue growth in the Mediterranean. Baya is developing an E-Learning Online Open Course (MOOC) on Sustainable Blue Growth to raise awareness on this theme and to build a core of leading expertise in the Mediterranean on this topic. To address the challenges linked

to shipping and blue growth, Baya is also co-developing a Mediterranean Ballast Water Management system (MBWM) that will help protect marine ecosystems and limit possible negative impacts on human health as well as coastal and marine ecosystems.

6. Water and Migration (Palestine and Jordan)



In preparation for CMI's World Water Day workshop on Water and Migration, MedYWat members are currently studying how climate change and extreme weather conditions like severe floods or droughts can lead to temporary or permanent migration and displacement and are developing joint working papers to contribute to this topic and event. Moreover, several MedYWat members are active scientists and researchers working with refugee communities in the Mediterranean region. For example, Ghadir Arafeh (Water and Environment researcher at Birzeit University, Palestine) is one example. Ghadir is currently conducting a visibility study to identify solutions for water shortage problems and waste-water management in Al-Jalazoun refugee camp in Ramallah (Palestine) and Al-Yarmouk refugee camp in Jordan (in collaboration with Al-Balqa' Applied University). Ghadir has also [→](#)





8. World Water Day workshop 2017 – NBS

conducted research studies related to gender mainstreaming in water and environment in the Palestinian context. Similarly, Kholoud Al-Ajarma (PhD researcher and refugee rights advocate, Palestine) has worked for years among refugee communities in the region, not only in relation to water, but also refugee rights, conflict and displacement. Together, these members are striving to find solutions to water issues in the region in the fields of water and migration.

The projects, research activities and other accomplishments mentioned here are just a few examples of the work and knowledge of the members of the MedYWat network. Every member of the network is bringing valuable contribution in the fields of knowledge production, dissemination, awareness raising and innovation. What brings them together is a collective youth vision for a better water-secure Mediterranean region where they can play an active role in the region's future and sustainability. Of course, the network welcomes new members from the region who share its vision and passion, and who would contribute to its mission and activities!

MedYWat Activities on 3 Continents

MedYWat has been active in the three continents of the Mediterranean (Europe, Africa and Asia). Several MedYWat members represented the network in the high-level International Conference on the International Decade for Action, "Water for Sustainable Development, 2018-2028" that took place in Dushanbe, Tajikistan. MedYWat was also represented at the International Water Association Regional Conference on Water Reuse and Salinity Management (IWARESA), held in Murcia, Spain. At the conference, MedYWat members held a session under the title of "The Role of Young Water Professionals in building a more Water Secure Mediterranean: Opportunities and Challenges. In Jordan, several MedYWat members participated as key speakers at the "Women, Water and Youth: Perspectives from the MENA Region" conference organized by the Center for Mediterranean Integration (CMI) and the Arab International Women's Forum (AIWF). In October 2018, MedYWat took part in a session on "Youth, Water and Migration" at the AMWAJ Forum organized by REVOLVE in Barcelona, Spain. Through these activities, MedYWat's members hope to contribute to the emergence of a more unified water awareness in the region ready to address its most pressing water issues, catalyzed by youth engaged in creating a sustainable Mediterranean region.

Capacity-Building among MedYWat Members

MedYWat members are involved in internal peer-to-peer learning and co-operation processes that ensure the dissemination of knowledge and expertise across the region. Network members

organize monthly webinars where they discuss developments in their work and research, share knowledge on the themes and other topics of their interest and exchange ideas. MedYWat's knowledge production efforts are focusing on "Water and Migration" – the theme of World Water Day 2019. CMI and senior experts from its partner organizations are supporting and mentoring MedYWat members conducting research on "Water and Migration" in the Mediterranean through an internal MedYWat Call for Papers on this topic. CMI, MedYWat and other partners are coordinating the third Mediterranean Water Heroes Contest and subsequent World Water Day workshop in March 2019 in Marrakesh, Morocco. ●



The Center for Mediterranean Integration (CMI) is a multi-partner platform where development agencies, Governments, local authorities and civil society from around the Mediterranean convene in order to exchange knowledge, discuss public policies, and identify the solutions needed to address key challenges facing the Mediterranean region.

For more information about the MedYWat network, write to: gasmii-ines@hotmail.fr. To learn more about the Center for Mediterranean Integration or apply to the third Mediterranean Water Heroes Contest, visit: www.cmimarseille.org

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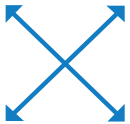
SOLAR ENERGY PRODUCTS AND TECHNOLOGIES



FAST FACTS

- The rising electricity demand will require Oman's power generation capacity to grow at an annual rate of 8.5% over the next five years.
- Oman's water sector is experiencing strong demand, which is anticipated to continue to rise at the rate of 7% through 2021.
- Solar demand in Oman is forecast to surge over the next five years.
- The strategic importance and Oman's geographical location makes it feasible to harness renewable energy technologies to further develop the economy.
- In its 9th Five-Year Plan (2016-2020), the Oman government will invest about US\$ 2.8 billion in new wastewater projects across the Sultanate.
- Oman will need to invest US\$ 5.4 billion in additional generating capacity and another US\$ 3.4 billion in transmission and distribution by 2022.

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Adaptation: a circular water-energy-food economy

WRITER: **SHANNON K. MCCARTHY**

Secretary General, International Desalination Association (IDA)

Our response to the growing global need for fresh water must balance Earth's limited natural resources with the demands of societies. Desalination and water reuse offer a non-conventional, environmentally-sound water supply that are in line with the circular economy.

What Must Be Considered

If new technologies are used effectively, the needs of our society and our economy can be met in tandem. This must not be understood as a zero-sum game, with the triumphs of the environment coming only at the cost of the economy; it is, however a zero-sum game in that environmental crises most certainly affect the economy. Climate change impacts the quality and availability of water resources. Droughts and intense rain episodes led to mass agricultural and industrial problems, to say nothing of the communal costs of affected neighborhoods and regions. Developing countries, in an effort to keep pace with heavily industrialized countries, require water not only to survive, but to adapt and keep pace with the modern world. To address the issue of climate change, then, is also to address the issues of our economy.

If new water treatments are to be considered and implemented, sustainability must be the gold standard by which to measure their effectiveness. If sustainability criteria are eschewed or deemed irrelevant, we risk worsening the very problems we seek to solve.

If new water treatments are to be considered and implemented, sustainability must be the gold standard by which to measure their effectiveness.

When considering the economy and sustainability nexus, we can see how vital water supply solutions are. Data backs the conclusions we have just reached. The World Resources Institute (WRI) has performed a study identifying 33 countries that will experience extremely high water stress or potential scarcity by 2040. By 2050, the United Nations Department of Economic and Social Affairs estimates the world's

population will increase by 2.4 billion, jumping from 7.3 billion to 9.7 billion. Such an increase will, of course, double rates of water consumption around the globe, creating a need for twice as much water. Can this need be met? Unless things change, that is doubtful.

The use of emission-neutral, desalinated water requires advanced water treatment systems fueled by renewable energy. Despite unfounded hesitations concerning high capital and maintenance costs, a careful consideration of this practice will show that it does not have the substantial fuel and pollution costs of conventional desalination practices. In fact, desalination powered by renewable energy can be considered sustainable by every relevant standard.



1. A man reading a newspaper in the Dead Sea. The high salinity of the Dead Sea (and therefore its high density) facilitates flotation. Photo: Arian Zweegers

2. The Dead Sea between Israel/Palestine/Jordan is one of the saltiest seas in the world. Photo: Aveesh Kumar



1



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Identifying Causes

We know our solutions must be sustainable for the environment and for the economy, but solutions must also operate with an understanding of how things got to be the way they are. There are two key causes that have put us in our current predicament: agricultural practices and population and urban growth.

Agricultural practices account for 70% of all global freshwater use. In fact, the agro-food sector accounts for 1/3 of total energy consumption of the world. By 2050, FAO has estimated that global food demand will have increased by 50% which obviously implies greater demands for water.

The agro-food sector accounts for 1/3 of total energy consumption of the world.

Some of the current methods of irrigation and crop growth are based upon poor infrastructure and outdated technology. Agriculture and its practices have undergone many iterations, including new ways of managing irrigation and collecting water, executed with some degree of environmental conscientiousness, but these practices still demand an unsustainable amount of water that now requires more innovation in this field.



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The second key cause is the rapid growth of population and urbanization. Logically, since our population is increasing at the fastest rate in history, the demand for water is increasing in parallel. But today, populations' demands for water do not hinge even on population survival—though it would be concerning enough if that were simply the case. Water is not just needed for survival, but also for energy production,

3. Agriculture accounts for 70% of the world's water usage. Peanut ditch irrigation, India. Photo: B. Saranraj

4. Today water is not just needed for survival, but also for energy production, industrial practices, and other pursuits intended to boost economic productivity as urbanization grows. Photo: Jim Sung

5. The second key cause is the rapid growth of population and urbanization. Photo: Fancy Crave

6. The Al-Khafji project, Khafji, Saudi Arabia, involves the design and build of a 60,000 m³/day desalination plant powered by a 15 MW solar PV plant. The plant reached full production at the end of January 2018. Photo: TAQNIA



6

industrial practices, and other pursuits intended to boost economic productivity as urbanization grows.

What Solutions Look Like

Many countries desperate for water are trying to catch up to the industrial developments of first-world countries, with the sympathetic intention of guaranteeing their citizens a higher quality of life. But most of these countries exist in water-scarce regions. There is barely enough water for populations to survive, let alone catch up to the industrial developments of first-world countries.

Now that we have identified the causes of our current crisis, the question is: what must be done?

Across-the-board innovations must be implemented to address the accelerating water crisis. Convention is the enemy of innovation therefore we must set our sights on non-conventional solutions.

Desalination and water reuse provide a circular economy solution. Circular economic strategies enact a “circular” ethos of reclaiming, reusing and recycling. They actively eschew any practice that would unnecessarily pressure the environment and are eager to implement practices that reduce pollution. Providing water resources is a

key priority and ensuring that social, economic, and environmental needs are met is absolutely central.

More and more, desalination technologies are in keeping with this strategy as the only non-conventional source for generating drinking water in areas with no other alternatives. The practice respects the water-energy-food nexus and can be used in other environmentally conscious processes alongside renewable energy.

A real-life example of the solar desalination is the Al-Khafji project: the world’s first large-scale, solar-powered desalination plant. Its solar power combats the relatively high level [→](#)

Desalination powered by renewable energy can be considered sustainable by every relevant standard.



7. Water filtration ponds. Photo: Ivan Bandura

of emission and oil consumption these types of plants typically generate. It also combines elements of reverse-osmosis desalination and an ultra-high concentrator photovoltaic system. Such a project is proof that even the internal processes of desalination prioritize sustainability. The emission-neutral desalinated water produced by plants like the Al-Khafji project is in line with the IDA's Sustainable Water Resources Foundation mission to use renewable energy to fuel advanced water treatment systems.

The International Desalination Association (IDA) champions efficient water resource management, resilient infrastructure development, and the implementation of renewable energy — all three of which can come to fruition in desalination and water reuse solutions. It is clear that advanced water treatment technologies are the way forward as we adapt to climate change.

Desalination and Water Reuse: On The Rise

Given its incredible industrial effectiveness, eco-consciousness, and economic efficiency, the world is embracing desalination and water reuse to address the water crisis across the globe. At present, according to the 31st desalination inventory (which covers July 2017 – June 2018), the total global installed desalination capacity stands at 97.4 million m³/d while the total global cumulative contracted capacity is 104.7 million m³/d. As of June 30, 2018, over 20,000 desalination plants had been contracted around the world. At the same time, water reuse has become an increasingly important part of water resources management around the world. The global contracted reuse capacity has almost doubled since 2010, with cumulative contracted capacity increasing from 59.7 million m³/d in 2009 to 118 million m³/d in 2017.

For over 40 years now, IDA has been the global hub for desalination and water reuse industry across the globe. Advocating for H₂O – CO₂ solutions, committing to reduce the CO₂ footprint and championing the rights of the environment upon which we depend for survival is rightly understood as a privilege as well as an honor; this is work that will preserve our future and the future of our children and our children's children. When considered in this way, it becomes clear that advanced water treatment processes are desirable from humanitarian perspectives, as well as from the obvious environmental and economic viewpoint.

The continued efforts of IDA and the global discussion on water sustainability are hopeful instances of the rise of advanced water treatment solutions. There is reason to be optimistic, but there is no reason to be complacent. More industries must embrace innovations and improvements in advanced water treatment technology and commit to the adoption of sustainable practices that incorporate renewable energy. Bold and rigorous policy change is needed to achieve the proposed objectives of meeting current and future water needs. ●



Connecting people and ideas to water solutions, the International Desalination Association (IDA) is committed to develop the appropriate use of advanced water treatment technologies globally to meet water sustainability needs. IDA encourages research, promotes and exchanges knowledge, and supports education in this field. IDA is a non-profit association associated with the United Nations as part of a growing international network of (NGOs).

www.idadesal.org



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Call for Papers

Submission Deadline January 30th, 2019

The biennial IDA World Congress is the world's most anticipated and prestigious desalination and water reuse event. In 2019, the World Congress is coming to Dubai, United Arab Emirates (UAE) from 20-24 October with the Dubai Electricity & Water Authority (DEWA) set to host the Congress at the Dubai World Trade Center. The flagship event returns to Dubai after its highly successful 2009 IDA World Congress which was patronized by His Highness Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai.

For more information, please visit wc.idadesal.org/call-for-papers/



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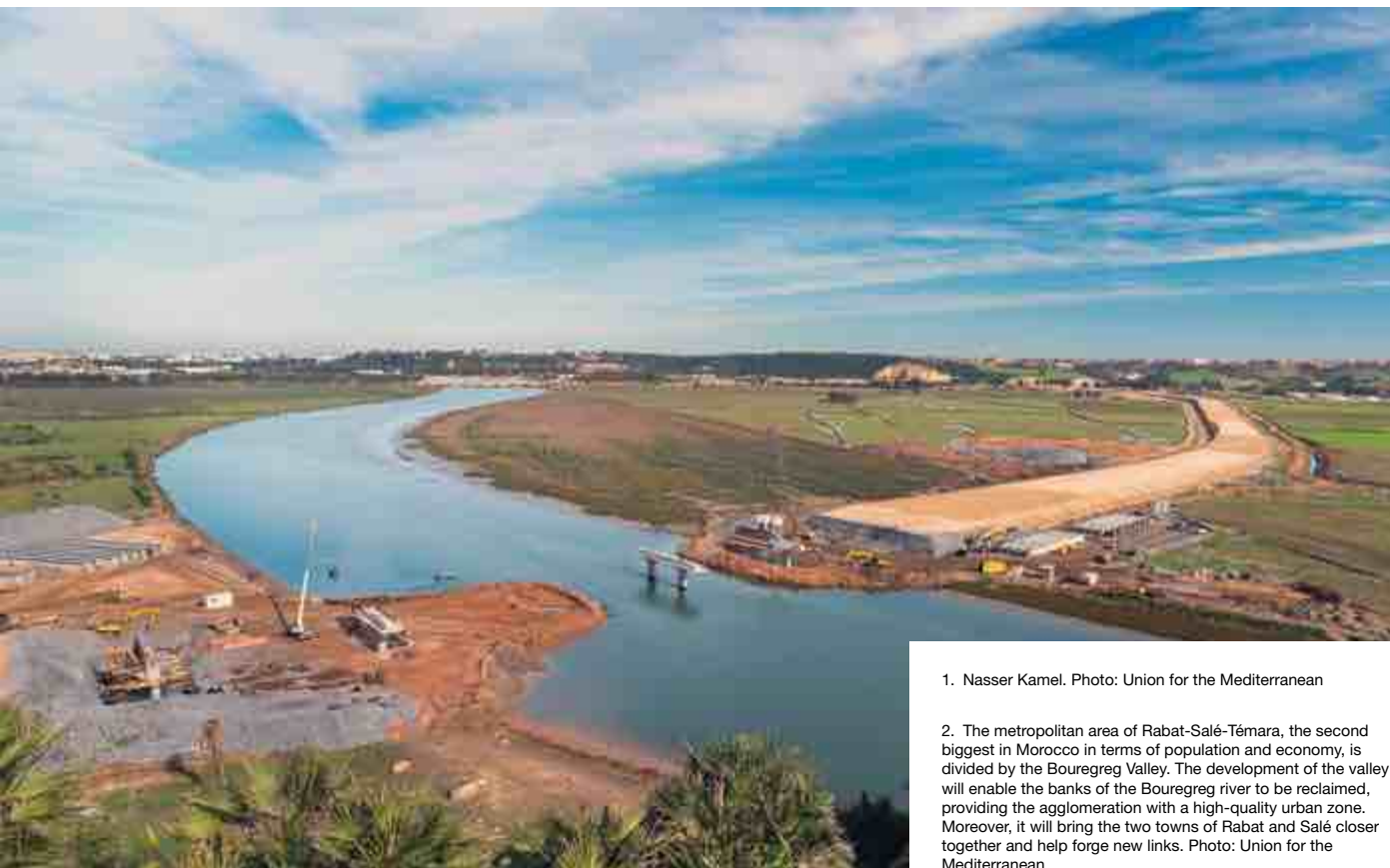
Q&A with Nasser Kamel

Secretary General
of the Union for the
Mediterranean

What are the biggest societal challenges you see when looking around the Mediterranean?

In the last decade, our region has gone through a long and difficult transition. There are many pressing challenges linked to uncontrolled migration, terrorism, radicalization, security, but also of socio-economic nature, such as unemployment and gender inequality. These challenges are not present along the southern Mediterranean shore only, but on the northern shore as well, where successive waves of migrants and refugees are posing a serious humanitarian and security dilemma. Youth unemployment exceeds 35% in some countries.

Our societies must also realize the dire consequences of uncontrolled environmental degradation and the effects of climate change in the Mediterranean and initiate the transformation to mitigate and adapt to these challenges. Despite the challenges, the story behind the figures is one of legitimate aspiration of our people for a better quality of life. As such, young people and women are at the very heart of all the UfM activities as it engages with governments, public authorities, private sector entities, academia, NGOs and other actors to streamline the regional efforts and build the needed synergies to affront the multitude of challenges, always with the firm mindset that considers regional cooperation not as a matter of choice, but rather as a matter of fact.



1. Nasser Kamel. Photo: Union for the Mediterranean

2. The metropolitan area of Rabat-Salé-Témara, the second biggest in Morocco in terms of population and economy, is divided by the Bouregreg Valley. The development of the valley will enable the banks of the Bouregreg river to be reclaimed, providing the agglomeration with a high-quality urban zone. Moreover, it will bring the two towns of Rabat and Salé closer together and help forge new links. Photo: Union for the Mediterranean

2

What are some of the biggest investment opportunities you see opening around the sea?

According to OECD forecasts, by 2030 the “blue economy” could outperform the growth of the global economy as a whole in terms of value added and employment. This explains why investors are increasingly looking at the oceans for new opportunities.

The Mediterranean Sea already generates important annual economic value, which represents a key contribution to unemployment and poverty reduction while offering attractive investment opportunities, in particular in sectors such as tourism, shipping, fishery/aquaculture and energy.

The 43 UfM member countries adopted the Ministerial Declaration on the Blue Economy in 2015.

Suffice it to say that today we have a reality to point to, as tourism already contributes to almost 5% of the current regional GDP; while sectors such as off-shore wind energy are expected to increase exponentially in the next decades. Off-shore wind energy represents a great opportunity for the southern and eastern Mediterranean regions – the production potential has been calculated to be 34 times more than in neighboring northern countries.

In this context and following the Ministerial Declaration on the Blue Economy, adopted by the 43 UfM Member countries in 2015, the UfM is working hard to make the best use of the blue economy’s potential in order to promote growth and employment as well as to facilitate investments while safeguarding healthy seas within a clear “vision” for the sustainable and integrated development of the marine and maritime sectors. [→](#)

How can water scarcity best be addressed by countries bordering the Middle/White Sea?

UfM Ministers acknowledged the regional challenge of water scarcity in the UfM Ministerial Declaration on Water in April 2017. In their declaration, Ministers called for the elaboration of “a Union for the Mediterranean Water Agenda to enhance regional cooperation towards sustainable and integrated water management in the UfM region.” There is a common agreement on the importance of regional cooperation to provide added value to national initiatives tackling this challenge. We can deploy joint efforts to learn from each other’s experiences, best practices and pilot projects in a series of important areas such as the Nexus policy approaches, Climate change adaptation and water, as well as water investments and their link to foster job creation and resilience to migration influxes. At the same time, we can work together to leverage financial resources in the region to increase financing for the water sector, thus contributing to meeting the ambitious goals set by the UN SDGs, in particular SDG 6 on “Clean Water and Sanitation.”

How could renewables and energy efficiency be more widely deployed around the sea?

The decreasing costs of renewable technologies and decarbonization policies have resulted already in an increase in clean energy technology investments on the northern shores of the Mediterranean. Eastern and southern Mediterranean countries have yet to follow this trend, as the region's electricity



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generation mix continues to be mainly based on fossil fuels. Addressing financial barriers to the deployment of renewable energies in regional energy markets would enable more investments. Regional cooperation is key to overcome these barriers and this is where the UfM Energy Platforms play a key role.

The UfM Regional Electricity Market Platform aims to integrate progressively the energy systems and markets of the Mediterranean; it

3. The “Desalination Facility for the Gaza Strip” Project will supply drinking water to 2 million Palestinian inhabitants, thereby ensuring a sustainable solution for the chronic and longstanding water shortage in the Gaza Strip, where over 95% of the water is not drinkable due to the over-pumping of a polluting Coastal Aquifer. Photo: Union for the Mediterranean

4. Children pouring drinking water, Gaza. Photo: Union for the Mediterranean



5. The UfM labelled project “Tafila Wind Farm” breaks new ground for renewable energy projects in the Mediterranean. The Jordanian project will cover 3% of the national electricity demand and will create substantial jobs for qualified workers. Photo: Union for the Mediterranean

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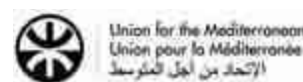
Overcoming financial barriers for the deployment of renewable energies in regional energy markets would enable more investments.

works to enhance electricity exchanges and interconnections in order to achieve a secure, affordable and sustainable electricity supply for the benefit of citizens and economies in the Euro-Mediterranean region.

The UfM Renewable Energy Market Platform aims to promote the progressive deployment of renewable energies and energy efficiency measures, in order to foster socio-economic development, contribute to ensure that all citizens and businesses of the region have access to reliable modern energy services, as well as to support mitigation and adaptation to climate change in the Euro-Mediterranean region.

Do you envision the creation of a water and energy community for regional cooperation?

Let us start by recognizing the close interdependency of the water and energy sectors. Water is required for energy production; energy is required for water distribution and sanitation, and for water production as well, through reuse and desalination. Creating an energy and water community is not a choice or something to include in an official document that needs to be endorsed and signed; it is more and more the standard practice for planning. All regional efforts undertaken to deal with this interdependency are most welcome. ●



The Union for the Mediterranean (UfM) is an intergovernmental organisation bringing together the 28 European Union Member States and 15 countries from the southern and eastern shores of the Mediterranean, providing a unique forum to enhance regional cooperation and dialogue in the Euro-Mediterranean region.

Based in Barcelona and the first permanent structure dedicated to the intergovernmental Mediterranean partnership, the Secretariat of the Union for the Mediterranean is the operational institution that empowers this regional dialogue between the UfM Member States and stakeholders, fostering synergies and promoting cooperation projects and initiatives with a direct impact on the lives of people.

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VIEWS

A wide-angle photograph of a desolate, arid landscape. The ground is a mix of light brown sand and dark, cracked mud, forming a complex network of fissures. In the far distance, a small, dark silhouette of a person is visible, walking along a path. The horizon is flat, with some distant, low-lying hills under a pale, overcast sky.

▲ South Africa

Ultra runner and water campaigner, Mina Guli walks along the empty bed of Leeu-Gamka Dam near Beaufort West, South Africa during the #RunningDry Expedition, on 31 December 2018.
Photo: Mina Guli, Kelvin Trautman

#RunningDry

The greatest contributor to raising awareness about water scarcity is by far Mina Guli from Australia who has been running 1 marathon per day since 4 November 2018 when she started this incredible feat at the iconic New York City Marathon. She has been traveling and running in cities and countrysides round the world since then, going from Europe to Asia to the Middle East to Africa with her campaign #RunningDry which is a terrific call to each of us to save water and to join together to change the way that we all use, consume and think about water.

#RUNNINGDRY

In March 2016, Mina Guli finished running 40 marathons across 7 deserts on 7 continents in 7 weeks. It was a world first... She was named on Fortune's list of the 50 greatest leaders in the world and said: "It was a strange feeling to see my name alongside the Pope, Angela Merkel and Jeff Bezos, but there I was at n° 45!". In April 2017, she completed her second 40-marathon challenge – this time in just 40 days. Now, she is on her quest to reach 100 marathons in 100 days to raise awareness about the vital importance of valuing the water of our planet.

04.11 New York City, USA

05.11 New York City, USA

06.11 London, England

07.11 London, England

08.11 Paris, France

09.11 Paris, France

10.11 Beaujolais, France

11.11 Avignon, France

12.11 Cannes, France

13.11 Tortona, Italy

14.11 Florence, Italy

15.11 Lake Bracciano, Italy

16.11 Rome, Italy

17.11 Urgench, Uzbekistan

18.11 Nukus, Uzbekistan

19.11 Muynak, Uzbekistan

20.11 Aral Sea, Uzbekistan

21.11 Aral Sea, Uzbekistan

22.11 Muynak, Uzbekistan

23.11 Delhi, India

24.11 Neemrana, India

25.11 Chomu, India

26.11 Ajmer, India

27.11 Pali, India

28.11 Udaipur, India

29.11 Dungarpur, India

30.11 Garadu, India

01.12 Bhavra, India

02.12 Barwani, India

03.12 Sakri, India

04.12 Dindori, India

05.12 Jawhar, India

06.12 Mumbai, India

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11.12 Guangzhou, China

12.12 Guangzhou, China

13.12 Hangzhou, China

14.12 Shanghai, China

15.12 Shanghai, China

16.12 Amman, Jordan

17.12 Zaatari Refuge

Camp, Jordan

18.12 Wadi Araba, Jordan

19.12 Araba Desert,

Jordan

20.12 Jafir, Jordan

21.12 Qaa Jafir, Jafir,

Jordan

22.12 Israeli Arava Desert,

Israel

23.12 Hazerim, Israel

24.12 Tel Aviv, Israel

25.12 Tel Aviv, Israel

26.12 Dubai

27.12 Cape Town,
South Africa

28.12 Cape Town,
South Africa

29.12 Cape Town,
South Africa

30.12 Beaufort West,
South Africa

31.12 Beaufort West,
South Africa

01.01 George,
South Africa

02.01 George, South
Africa

03.01 George, South
Africa

04.01 Cape Town, South
Africa

MEXICO

USA

USA 4 Nov. 2018

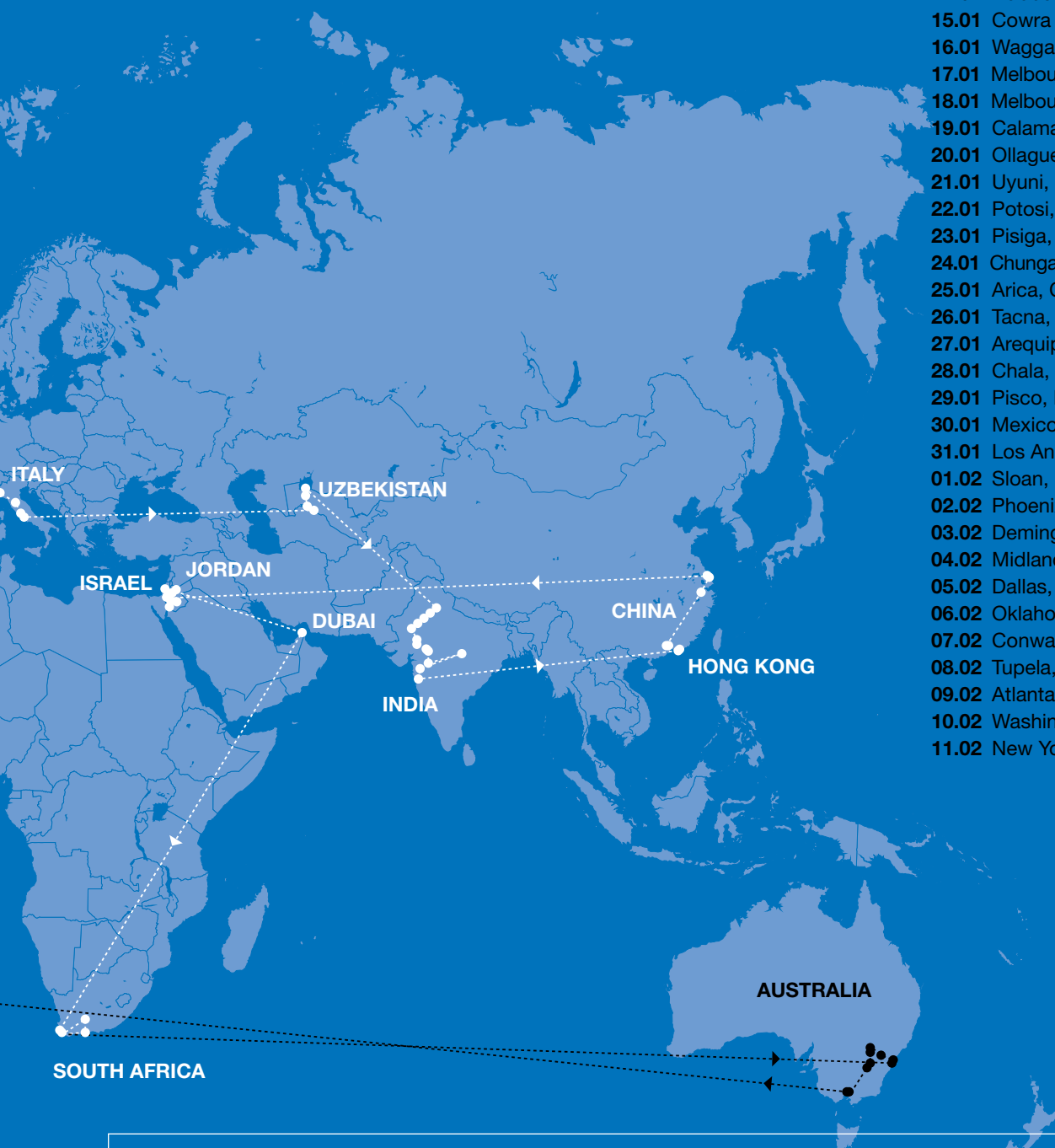
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- 11.01 Sydney, Australia
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- 14.01 Dubbo , Australia
- 15.01 Cowra , Australia
- 16.01 Wagga , Australia
- 17.01 Melbourne , Australia
- 18.01 Melbourne , Australia
- 19.01 Calama, Chile
- 20.01 Ollague, Chile
- 21.01 Uyuni, Bolivia
- 22.01 Potosi, Bolivia
- 23.01 Pisiga, Chile
- 24.01 Chungara Lake, Chile
- 25.01 Arica, Chile
- 26.01 Tacna, Peru
- 27.01 Arequipa, Peru
- 28.01 Chala, Peru
- 29.01 Pisco, Peru
- 30.01 Mexico City, Mexico
- 31.01 Los Angeles, USA
- 01.02 Sloan, Nevada
- 02.02 Phoenix, Arizona
- 03.02 Deming, NM
- 04.02 Midland, Texas
- 05.02 Dallas, Texas
- 06.02 Oklahoma City
- 07.02 Conway, AR
- 08.02 Tupela, MS
- 09.02 Atlanta, GA
- 10.02 Washington DC
- 11.02 New York City

- Marathons 1 to 62
- Marathons 63 to 100

On Marathon 62, Mina suffered multiple stress fractures to her right femur. #RunningDry will continue as a movement, as she is inviting people to help her log a marathon a day by donating kilometers. As for her, she is continuing on the journey, meeting water heroes and telling stories of people in water crisis areas around the world.



▲ **USA** Mina Guli runs in New York, USA, 5 November 2018.
Photo: Mina Guli, Kelvin Trautman

▼ **United Kingdom** Mina Guli runs across Millenium Bridge in London, United Kingdom, 7 November 2018. Photo: Mina Guli, Kelvin Trautman





▲ France Mina Guli fills up her water bottle at one of Paris's many public water fountains, France, 8 November 2018. Photo: Mina Guli, Kelvin Trautman

▼ France Mina Guli looks over the Roquefavour Aqueduct near Aix en Provence, France, 11 November 2018. Photo: Mina Guli, Kelvin Trautman





▲ **Italy** Mina Guli runs with the UNESCO World Water Assessment Programme in Perugia, Italy, 14 November 2018. Photo: Mina Guli, Kelvin Trautman

▼ **Uzbekistan** Mina Guli runs past the ship graveyard, Muynak, Uzbekistan, 22 November 2018. Photo: Mina Guli, Kelvin Trautman





▼ Uzbekistan

Mina Guli runs along the Aral Sea,
Uzbekistan, 20 November 2018.
Photo: Mina Guli, Kelvin Trautman





▲ South Africa

Mina Guli stands in a passing rain shower near Beaufort West, South Africa, 31 December 2018.
Photo: Mina Guli, Kelvin Trautman



▲ India Mina Guli checks a leaking pipe near Surat, India, 3 December 2018.
Photo: Mina Guli, Kelvin Trautman

▼ India Mina Guli chats with a local farmer in Bawal, India, 25 November 2018.
Photo: Mina Guli, Kelvin Trautman





▲ Hong Kong

Mina Guli runs near Victoria Peak,
Hong Kong, 9 December 2018.
Photo: Mina Guli, Kelvin Trautman



▼ Jordan

Mina Guli stops for a drinks break near Muraibet, Jordan, 19 December 2018.
Photo: Mina Guli, Kelvin Trautman





▲ China

Mina Guli runs with 9 year old Juanling Liu, a keen runner and local activist in Hangzhou, China, 13 December 2018.
Photo: Mina Guli, Kelvin Trautman



▲ **Israel** Mina Guli peers into a date plantation near Eliat, Israel, 22 December 2018.
Photo: Mina Guli, Kelvin Trautman

▼ **South Africa** Mina Guli and local volunteers help deliver emergency water rations to residents of Beaufort West, South Africa, 30 December 2018.
Photo: Mina Guli, Kelvin Trautman



▼ China

Mina Guli runs through Hangzhou,
China, 13 December 2018
Photo: Mina Guli, Kelvin Trautman



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Water Funds

WRITER:
ANDREA ERIKSON-QUIROZ

We should look to nature for solutions to the global water crisis.



1. Local residents cross the Magdalena river (Colombia) using a ferry boat near the town of Pinto in the Mompox Depression, where the Magdalena river meets the Cauca River, the second largest river, and continue to flow as one single river. This section of the river is so calm that a boat of this size can carry several people, motorcycles, or even cattle without the danger of capsizing. Photo: Juan Arredondo

WATER FUNDS

New York City faced a challenge in the 1990s: the city needed a new water filtration system to serve its nearly 8 million people. But the prospect of spending \$6-10 billion on a new water treatment plant, and another \$100 million on annual operating costs, was daunting... so city officials took a closer look at the source of their water: the Catskill Mountains.

Water from the Catskills flows through 120 miles (193 kilometres) of forests, farmlands and towns to reach New York City. When that landscape is healthy, it acts as a natural purifying system, but certain development and agricultural practices can result in impaired water quality. For city officials, reaching out to local farmers and landowners and compensating them to restore and conserve their lands in the watershed, combined with some land acquisition, proved to be significantly cheaper than building and operating a new treatment plant.



2

2. Aerial view of the deforested landscape surrounding the Cachoeira Reservoir which is now set to be included in a massive tree planting project. The reservoir and surrounding watershed is part of Brazil's Cantareira system (the largest system of public water supplies in Latin America) which provides fifty percent of Sao Paulo's drinking water. Photo: Scott Warren

3. Livestock grazing pastures and shoreline erosion on the banks of the Atibainha Reservoir near Nazare Paulista, Brazil. The reservoir and surrounding watershed is part of Brazil's Cantareira system (the largest system of public water supplies in Latin America) which provides fifty percent of Sao Paulo's drinking water. Photo: Scott Warren

4. Rodolfo Zuñiga Villegas and fire crew from the Santa Fe Fire Department hike to burn site past McClure Reservoir, New Mexico. Large fires not only wreak havoc on our forests but also have an impact on the health of our watersheds. The Santa Fe Water Fund will use a small amount of money from the community's water users to pay for continuing restoration efforts in the watershed. In September 2010, the Conservancy partnered with the Santa Fe National Forest to bring forest experts from Mexico, Chile and Guatemala to New Mexico, and hone their on-the-ground fire management skills. Photo: Alan W. Eckert



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4

New York's example showed the benefits of public-private partnerships in such situations, and demonstrated that unlocking nature-based solutions can be cheaper and more efficient and produce additional benefits compared to conventional built, "grey" infrastructure. This was the moment of inspiration for water funds.

Agriculture and industry – not domestic use – represents the vast majority of water consumption.

Water funds are a collective investment vehicle in which stakeholders collaborate to implement nature-based source water protection. Downstream water users invest in upstream land and water management practices, compensating upstream land managers for restoration activities and better management of agricultural land. Rural landowners and communities can benefit economically from these investments as well. Mutual benefits are the hallmark of successful water funds.

Given that more than 40% of source watersheds worldwide have been degraded by development, resulting in impaired downstream flows, nature-based source water protection can be one of the most effective ways to improve water quality and quantity for urban areas. A study by The Nature Conservancy (TNC) estimated that four out of five cities could improve water quality using nature-based solutions, and potentially 1,000 cities

globally would see a positive return on investment based on reductions in total utility expenditures. Furthermore, these solutions often deliver other forms of value, such as increased agricultural yields, improved community health and carbon sequestration.

What are Water Funds?

A Water Fund is a framework that enables cities, communities and companies to invest in the management of the landscapes where their water is sourced; so that upstream forests and wetlands are protected to continue naturally cleaning and filtering water. Upstream communities can benefit from enhanced livelihoods and improvements to health and wellbeing whilst downstream communities experience improved water quality and, in many cases, fewer disruptions and shortages. [→](#)

Degraded Watershed

In many cities worldwide, drinking-water supplies are greatly affected by how land is managed. Practices that clear forests, increase erosion and create pollution reduce both water quality and reliability.



Return on Investment?

Water users pay a significant cost for industrial treatment of dirty water when it reaches the city.



1. Deforestation

Clearing forests and other vegetation increases the erosion of soil. The sediment pollutes nearby waterways and makes filtration more difficult and expensive.

3. Soil Erosion

Livestock entering waterways trample the riverbank, contributing to sedimentation. Fecal waste in the water increases the risk of disease.

5. Reduced Flow

Agricultural soils and industrial surfaces have less ability to absorb and slowly release rain than naturally vegetated soils do. This deficiency results in less water during dry times and more flooding when it rains.

2. Agricultural Runoff

Rain washes fertilisers and other chemicals into nearby water sources, polluting the city's water supply.

4. Pollution

Some agricultural runoff drains through pipes directly into waterways. Oil and rubbish from roads wash into rivers.

6. Agricultural Runoff

Rain washes fertilisers and other chemicals into nearby water sources, polluting the city's water supply.

Healthy Watershed

Improving the health of the lands around water sources improves water quality, restores reliable water flows and brings numerous other benefits, both upstream and downstream.



Return on Investment?

Rather than pay for expensive industrial filtration, water users pay upstream landowners to use good practices and to conserve or restore natural areas that protect water at the source.



Illustrations: Steve Sanford (all)

1. Forest Protection

Protecting forests and grasslands sustains wildlife habitat, reduces erosion, and safeguards the quality and reliability of downstream water flows.

3. Smart Agriculture

Planting cover crops on fallowed fields and fencing livestock away from the river reduce erosion and prevent pollution. Adding trees around crops and pastures can also enhance farm and ranch income.

5. Reliable flow

Naturally vegetated soils hold water when it rains and release it slowly, which helps sustain more predictable river flows.

2. Reforestation

Replanting forests reduces erosion, captures carbon and expands habitat.

4. Restored Wetlands

Wetlands help filter pollutants and provide critical habitat for plant and animals.

6. Cleaner water

A well-managed watershed delivers a clean and reliable supply of water, so cities spend less on water treatment and filtration for human use.



WATER FUNDS

5. A water spigot in Nairobi used for filling up containers to deliver water to residents and businesses because Nairobi lacks reliable water supply, Kenya. The Nature Conservancy is working to protect the Upper Tana Watershed in Kenya and provide cleaner, more reliable water for Nairobi. Photo: Nick Hall

6. Stanley, fruit and vegetable farmer on his farm in the Upper Tana Watershed, Kenya. The Nature Conservancy is working to protect the Upper Tana Watershed in Kenya and provide cleaner, more reliable water for Nairobi. Photo: Nick Hall

7. Kenyan men in Nairobi delivering fresh water to residents and business because Nairobi does not have reliable fresh water delivery, Kenya. The Nature Conservancy is working to protect the Upper Tana Watershed in Kenya and provide cleaner, more reliable water for Nairobi. Photo: Nick Hall



5

What is the Water Funds Toolbox?

The Water Funds Toolbox is a step-by-step online guide for developing a Water Fund. It features videos, testimonials, templates, tools, case studies and much more. The heart of the toolbox is the Water Fund Project Cycle, which outlines the five phases that take a Water Fund from feasibility through to maturity. Discover the Water Funds Toolbox: waterfundstoolbox.org



6

**Today, 60%
of Nairobi's
residents do not
have access to
a reliable water
supply.**

The future of water security

Since TNC launched its first water fund in Quito, Ecuador, in 2000, we've established 34 water funds around the world, with 30 more in development throughout

Latin America, North America, Africa and Asia. But this is not enough. By 2025, at least two-thirds of the world's population will likely be living in water-stressed areas. The question we face now is: how do we implement these solutions at the scale needed to truly make a dent in global water insecurity?

It's not enough for TNC to keep developing water funds (though we will) – we also need more partners in the public and private sectors to invest in these practices.

Utilities are one of those key partners – especially companies such as Veolia and Suez, with an international presence.

Veolia, for example, is exploring how changing agricultural practices and ecosystem enhancements can ensure a more sustainable water supply. Suez is incorporating wetland restoration into its practices to improve water quality and reduce operating costs. In addition, there are many examples of visionary local utilities actively investing in both green and grey infrastructure to deliver sustainable water to the communities and cities they serve.

Of course, it is agriculture and industry, not domestic use, that represents the vast majority of water consumption. Businesses with high water needs have an enormous interest in ensuring they

have stable water supplies and can have an equally enormous impact on global water security. Consider the example of PepsiCo: all along its supply chain and production processes, PepsiCo depends on reliable water supplies and the company has established an integrated approach to watershed management, including partnerships with TNC to restore watersheds in Latin America and the United States.

To date, more than 100 corporations have invested more than \$38 million in water funds. Having more private-sector actors invest seriously in nature-based solutions – and having city and state regulators realize the benefits of these solutions and incorporate them into government oversight – can help us move the needle on these challenges. On top of that, we can protect ecosystems that deliver a range of other functions, including climate mitigation, increased agricultural yields and improved community health. This goes beyond providing clean water – it's about making human development fundamentally more sustainable around the world.

Nature can deliver better water security for more than a billion people. It's an ambitious goal – but with the right partnerships and stakeholders involved, we can have a measurable, positive influence on planetary health overall.

Water Funds in action – a story from Kenya

The Tana River supplies 95% of the water for Nairobi's 4 million residents, and for another 5 million people living in the watershed. It also feeds one of Kenya's most important agricultural areas and provides half of the country's hydropower output. With Nairobi contributing 60% of the country's GDP, the Tana River truly fuels Kenya's economic growth.



7

Since the 1970s, forests on steep hill-sides and areas of wetlands have been converted to agriculture, removing natural areas for storing runoff water and soil from the land. Now, as rain falls over farms, soils are washed down into the river, which reduces the productivity of farmland and sends sediment into the rivers. This increased sedimentation can choke water treatment and distribution facilities causing complete service disruptions for days or weeks at a time. Today, 60% of Nairobi's residents do not have access to a reliable water supply.

This growing challenge requires something innovative to protect the Tana River, increase downstream water quality and quantity and provide positive benefits for tens of thousands of farmers in the watershed. Enter the Upper Tana-Nairobi Water Fund. Water funds are founded on the principle that it is cheaper to prevent water problems at the source than it is to address them further downstream. Public and private donors and major water consumers downstream contribute to the Fund to support upstream water and soil conservation measures, resulting in improved water quality and supply.

The Nairobi Water Fund builds on the Conservancy's experience addressing similar issues in Latin America, where

more than 30 water funds are either underway or in development. This fund is now the first of its kind in Africa and will serve as a model as leaders across the continent look for innovative ways to solve ever-increasing water challenges. ●

The Nature Conservancy 

Since 1951, The Nature Conservancy has worked to protect the lands and waters on which all life depends. From their historic work in land acquisition to cutting-edge research that influences global policy, The Nature Conservancy is constantly adapting to take on our planet's biggest, most important challenges. Their vision is a world where the diversity of life thrives, and people act to conserve nature for its own sake and its ability to fulfill our needs and enrich our lives.

www.nature.org

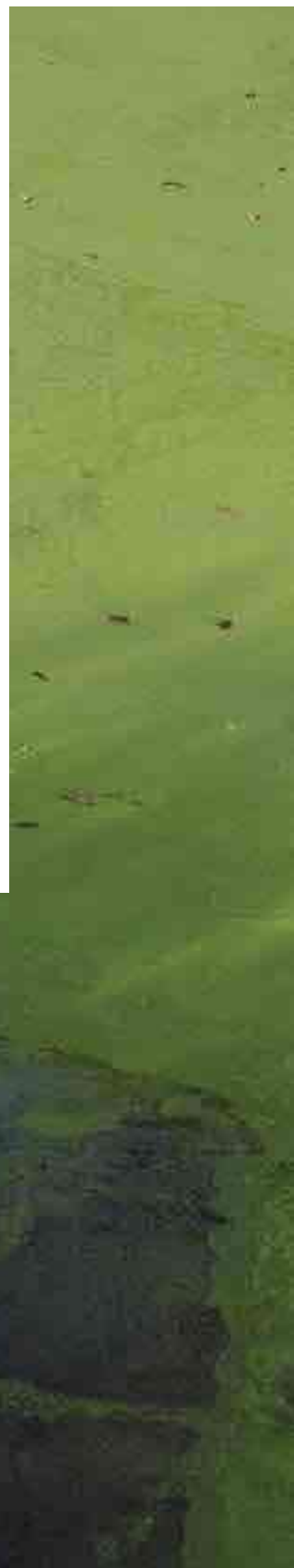
VIEWS

For more images of water funds around the world, visit revolve.media/views

Water resilience starts upstream

WRITER: CATHY P. KELLON

Over \$1 trillion is needed over the next 25 years to fix, replace, and expand drinking-, waste-, and storm-water systems in the United States of America. If done properly, such massive capital investments will set us on a more sustainable path for people, wildlife, and biodiversity. Doing it right means reframing the problem space for nature and the most vulnerable among us to be at the heart of future water resilience.



In the summer of 2018, residents in Oregon's capital city, Salem, got a cell phone alert stating: "Civil emergency. Prepare for action." People in Oregon State know that we are due for a major earthquake and thought the Big One was happening. It was a shock to many that the emergency alert was, instead, for drinking water. A toxic algae bloom had made city water undrinkable and continued to do so for nearly a month. But those who were not surprised were municipal water managers – in Salem, and in communities around Oregon. They all know it can happen to them too.

Our public health depends upon ecosystem health.

The Salem incident is a red flag for drinking water providers everywhere that rely on surface waters (streams, rivers, and lakes) which applies to hundreds of towns in Oregon alone. Toxic algae blooms are expected to increase in frequency and duration. As Oregonians witnessed over last summer, as temperatures rise, so do the threats. Longer summer droughts, more intense and prolonged fire seasons, less reliable winter snowpack, lower summer stream flows, and more frequent, extreme rain events – all are changing the face of water management and laying bare a fact we have ignored at our peril: our public health depends upon ecosystem health. But drinking water woes are also a social justice issue because the people most affected are the low income, children and the elderly.

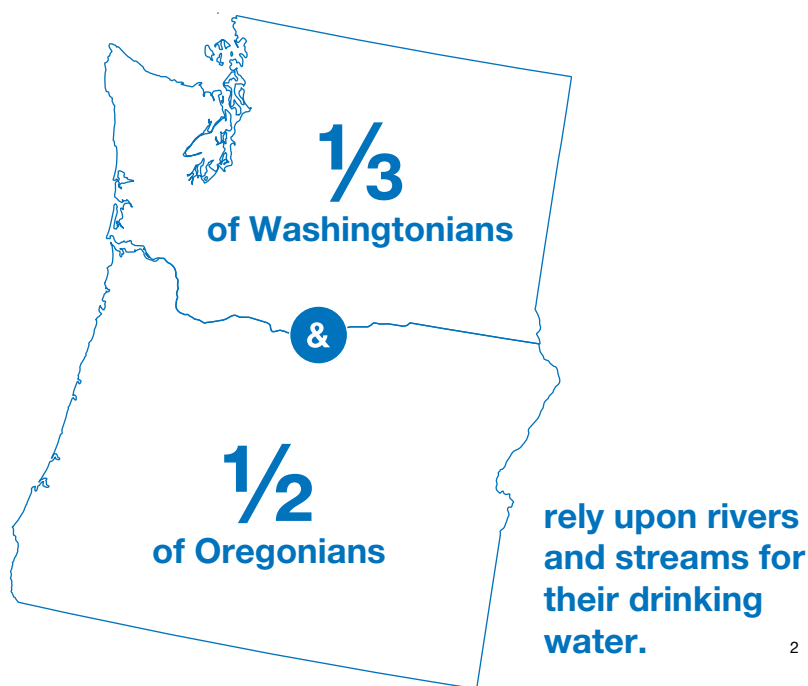
Add to these challenges the need to upgrade aging infrastructure, which includes a vast backlog of deferred maintenance on pipes and treatment plants. In Oregon and our neighbor Washington State, more than \$15 billion dollars is needed for drinking water infrastructure repairs and improvements over the next 20 years. In the same period, we also expect to add another 3-5 million residents – all of whom will need clean water.

How we approach water issues over the next decade will have far-reaching consequences. The worst thing we can do is to try to solve these problems using the same approaches that created them. It is time to invest in distributed and greener technologies along with our natural infrastructure of soils, trees, wetlands, rivers, and open spaces.

Invest in Nature: The Original Hydro-Engineer

Water infrastructure is a buzzword in every U.S. community as local governments and utilities struggle to meet current demands and plan for population growth, plus the uncertainties of a changing climate, and a host of new environmental threats such as "emerging contaminants," including pharmaceuticals, pesticides, and endocrine disrupting compounds.

Traditionally, municipal water utilities – those that provide drinking, storm, and waste-water services – have relied primarily on "grey" infrastructure solutions of concrete, steel, and chemicals. Civil-engineered approaches to



1. Warmer and longer summer temperatures contribute to the rising threat of toxic algae blooms.
Photo: Ildar Sagdejev

2. Data from Oregon Health Authority and Washington Department of Health.



3

managing water like dams and centralized water treatment facilities are expensive to build and require perpetual funding to maintain. More problematic is that they typically fail to recognize nature as an asset, thereby often degrading fish and wildlife habitat and amplifying negative changes in the local hydrologic cycle.

Nature is the original (and best) hydro-engineer. We know that when watersheds are healthy, they store and filter water more affordably than many human-designed systems while providing many other benefits for people and wildlife.

**Nature is
the original
(and best)
hydro-engineer.**

Nature-based solutions for drinking water are those that protect or recover watershed processes which mean better water quality and supplies. Examples from the Pacific Northwest include replanting river banks and unstable slopes with native vegetation and decommissioning old forest roads to reduce erosion, re-creating strategic log jams in-stream to encourage gravel deposition, and allowing beavers to repopulate places where their dams can slow flood waters and trap sediment.

No single entity can restore or protect watershed health on their own, which is why we co-founded the Drinking Water Providers Partnership. The first of its kind, this public-private coalition incentivizes watershed restoration actions that benefit native fish habitat and drinking water supplies in the Pacific Northwest.

The Partnership includes 3 federal and 2 state agencies and 2 non-profits that

direct financial and technical support for voluntary restoration projects carried out by drinking water providers, conservation practitioners, and upstream land managers. The Geos Institute's Working Water program administers the grant process that to date has awarded \$1.3 million to support 37 drinking watershed restoration projects in Oregon and Washington.

Not only have we learned about the drinking water threats that towns around the region face, our experiences have taught us that we are not going to fix what's upstream without also fixing what's downstream. Protecting and restoring rivers and uplands are a commonsense and cost-effective strategy for enhancing biodiversity, protecting public health, and saving money. However, through conversations, site visits, and research, we realized that we are not going to achieve landscape-scale conservation wins or routinize the inclusion of nature-based solutions

in drinking water management until we expand the problem space to the systems level. That means looking at:

- all municipal water management – drinking, storm-, and waste-water – within the context of its watershed
- the regulatory and institutional framework of traditional infrastructure design and investment decisions
- the social make-up and economic capacity of each community

Up-ending The Status Quo

To create meaningful change, whereby towns routinely incorporate nature and regenerative solutions into municipal water services management, we must break down the silos that limit our creativity and problem-solving prowess: rural vs urban; drinking vs waste water; markets vs philanthropy; trees vs cooling towers; concrete vs beaver dams; up- vs down-stream.

All cities and towns face the dual issues of crumbling infrastructure and environmental change. The key difference among them is that small and poor towns typically do not have the resources to go beyond the status quo. Understanding this is key to fostering resilient ecosystems and human communities everywhere.



3. Log jams – the accumulation of fallen trees in a stream – serve an important role in nature, slowing flood waters, allowing gravels and fine sediments to settle out, and creating complex habitat. After decades of removing logs, we are now returning large wood to streams, like here in Abernathy Creek, Washington, to jumpstart stream recovery. Photo: Sam Beebe

4. American beaver. Photo: Harvey Reed
5. Dexter dam, Oregon. Photo: Daily Venture

Nature-based solutions – like the reintroduction of beaver to headwater streams – recover watershed processes as opposed to disrupting or damaging them like Dexter dam and reservoir in Oregon.



4



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Innovation in the municipal water sector – whether that’s ecosystem service payment schemas for drinking water source conservation, or engineered wetlands for wastewater finishing treatment – favors places that can obtain and dedicate funding to staff and consultants to invent and advocate, shoulder labyrinthine administrative requirements, parley rule exemptions, and navigate multi-year permitting processes. As a result, innovations are incremental and nature-based solutions are limited to case studies and metropolitan areas, particularly for municipal storm- and wastewater systems.

While larger metropolitan areas serve most people, the majority of cities and towns are small; and in small and

All cities and towns face the dual issues of crumbling infrastructure and environmental change.

economically disadvantaged towns, undercapitalization takes many forms, from an inability to access the bond market to staff juggling multiple roles just to keep the town running. Basic, yet essential, activities like water asset inventorying, source water protection and holistic long-term planning often do not happen even though the water source and surrounding areas for these towns are some of the best, most intact forest and agriculture habitat.

From the deleterious impacts of high organizational burdens and transaction costs to disincentives for one-water management, it is easy to see why the most celebrated of smart, sustainable projects are associated almost exclusively with metropolitan and more

Most of Oregon's water systems are very small, which means there are fewer ratepayers to shoulder the costs of water infrastructure maintenance, repairs and upgrades.

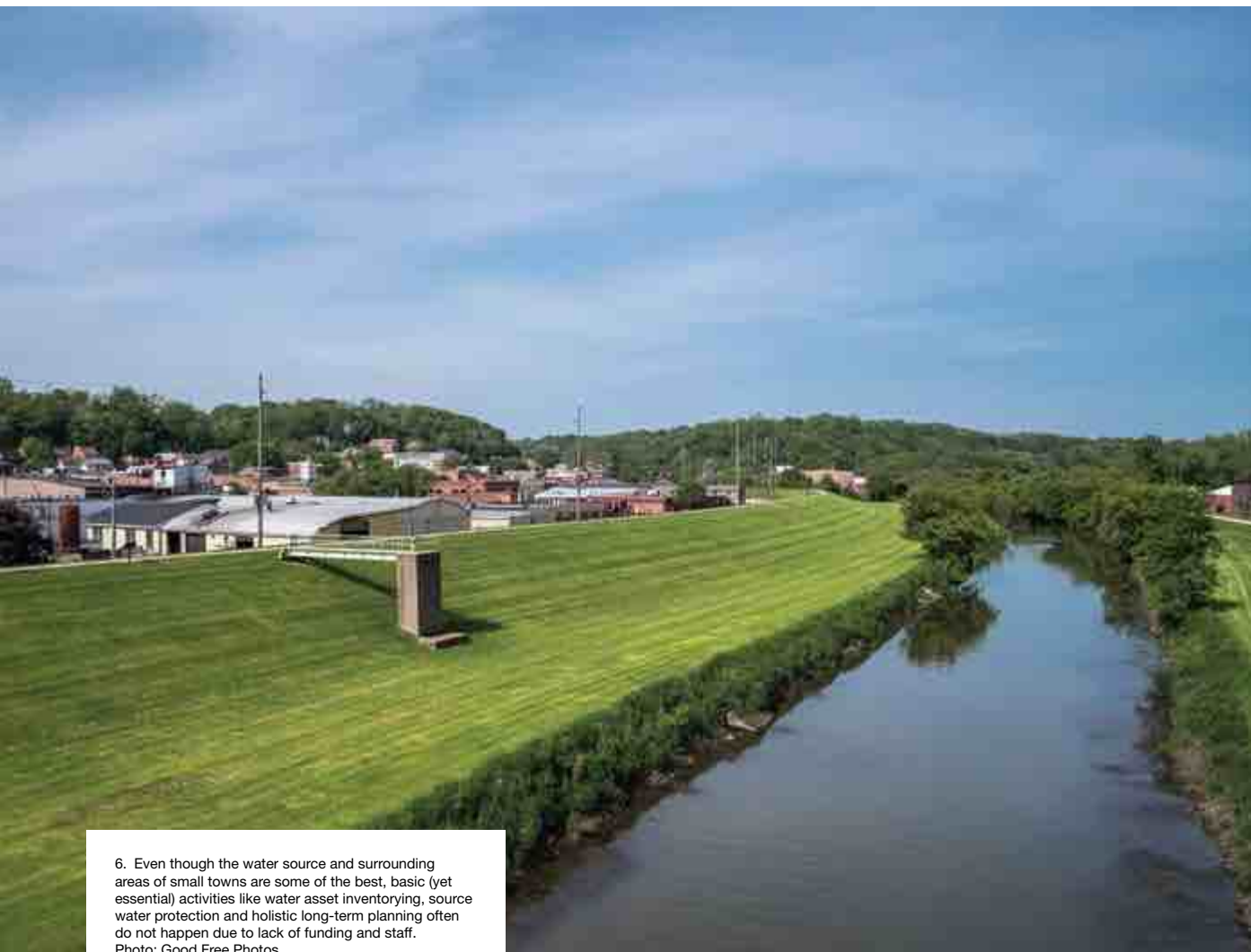


80% serve towns with fewer than 10,000 people.



50% serve towns with fewer than 1,000 people.

Data from Oregon Health Authority.



6. Even though the water source and surrounding areas of small towns are some of the best, basic (yet essential) activities like water asset inventorying, source water protection and holistic long-term planning often do not happen due to lack of funding and staff.
Photo: Good Free Photos

6

economically prosperous areas. The players and institutions involved in municipal water infrastructure decisions operate under the same forces of power and privilege that rule other sectors of society. Not surprisingly, an inefficient and inequitable system underpinning our most critical public services makes us all less effective and continually puts nature at a disadvantage.

Yet the way we define our water management and infrastructure problems is a prime determinant of what we build, how, and who funds it. Now is the time to re-define our water infrastructure and management needs with nature and equity at its heart.

A Geography of Opportunity

The resources already exist to upend the status quo. There are community leaders in towns of all sizes who are eager to do things differently. There are private investors and funders who are interested in nature-based solutions to water management challenges, but they cannot always find sufficient “ripe” projects to fund. And there are a plethora of non-profits competing for limited grant dollars to implement nature-based solutions, which need to move beyond case studies to be widely replicated. We need to merge these interests better so

that they can reach their full potential. Here are three essential changes we can start today (at least in the Pacific Northwest of the USA):

1. Address drinking water source conservation with the same rigor that we consider waste- and storm-water management, thus creating a “one water” management system.

This may require regulatory changes, but should at least include scientifically-defensible environmental vulnerability assessments for every municipality – large and small. This identifies priorities for restoration and protection [→](#) and levels the playing field so



6. Streamside restoration includes removing invasive vegetation and planting native shrubs, trees, and grasses to reduce erosion, cool streams, and increase biodiversity. Photo: Sam Beebe

7. Healthy rivers are good for people and native fish like Coho salmon. Photo: Bureau of Land Management Oregon and Washington



that smaller towns are no longer at a strategic disadvantage when they enter into a water infrastructure-management decision space. This can help vulnerable towns in the Pacific Northwest mitigate for harmful algal blooms – and other changes associated with a warming climate.

2. Adopt one-water management and community-based design processes as standard practices in every community.

One-water management facilitates resilience by considering our interconnected systems from headwaters to wastewater treatment plant outfall along with forecasted climate change impacts. For example, in an inventory of assets that includes the condition of a community's drinking water treatment facility, the scope would broaden also to consider current and anticipated environmental conditions in the source area. While this seems like commonsense, it is not currently happening. And, when capital project choices need to be made,

participatory and community-based design processes serve to elevate design criteria like adaptability, equity, affordability, and sustainability. Done early enough, these steps encourage people to look beyond only satisfying regulatory requirements and minimizing costs. It fosters the pursuit of collaborative solutions that align better with community values and offer longer-term utility. Moreover, these practices enable the creation of a pipeline of gray and nature-based infrastructure projects.

3. Aggregate high-quality gray and green projects into a regional and/or state-level infrastructure pipeline through which capital can be efficiently attracted, integrated, and deployed.

This creates a market for change. Scale matters when it comes to infrastructure and small towns have poor economies of scale. A birds-eye view of investment needs can stimulate additional innovations like the bundling of small projects to ease administrative burdens or otherwise level the playing field for

those towns that cannot compete under existing conditions.

These inter-dependent activities, in their own ways, make the problems even bigger and as a result can unlock opportunities that today are fractured. The lessons learned, and information gained, can mobilize and harmonize scores of organizations, including those that seek to bring conservation and nature-based solutions to scale; focus on social and environmental justice and public health; and develop new private and public-private infrastructure financing schemas. It's a win/win when we align public, civic, and private institutions to reward collaboration, co-production, and creativity.

The scale of our environmental and municipal water infrastructure challenges are immense, but so are the opportunities. Over \$1 trillion is needed over the next 25 years to fix, replace, and expand our country's drinking-, waste-, and storm-water systems. Capital investment of this magnitude will make a difference one way or the other, but if done right, it will set us on a more sustainable path for people, wildlife, and biodiversity.

Doing it right means reimagining the problem space whereby nature and the most vulnerable among us are at its heart in order to release the problem-solving ingenuity that exists in all communities. Only when a resilient water future is a viable option for the smallest and most economically disadvantaged towns, will it be an option for all communities. It starts upstream. ●

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Sustainable Bio-Waste Management

Q&A WITH MARC AOUN & ANTOINE ABOU-MOUSSA, CO-FOUNDERS OF COMPOST BALADI

A company in Lebanon is leading the way in replicating small-scale composting processes in the Middle East, addressing what remains a daunting global issue.

What needs in society and business does Compost Baladi address?

Compost Baladi SAL was founded as a direct response to the ongoing waste management crisis in Lebanon. We provide products and services that

promote the local recycling of solid and liquid bio-waste. We work in harmony with the UN Sustainable Development Goals (SDGs), specifically SDGs 6 and 7 through our CubeX technology, SDG 11 through our work with municipalities and local communities on sustainable projects, SDG 12 through our recycling and zero waste programs, SDG 13 through carbon-sequestration effects

of applying compost in agriculture and prevention of methane formation in conventional landfilling practices, and SDG 14 by working on reducing wild dumping of waste on river banks with local municipalities.



What are some of your favorite projects so far?

Our work with municipalities is particularly special for us because it aligns with our mission as an enterprise. We know that working with local authorities has the potential to have sustainable impacts on the local community, because the projects are done with and for the community. Some of our favorite projects with municipalities include the Zero Waste Antoura program, the compost monitoring work with Manara that enabled the municipality to start producing bagged compost from source-separated organic waste, and the work we did with

the 15,000 households of Minieh and the local municipality where we went door-to-door to raise awareness and deliver the basic tools to start sorting organic waste at home.

We also focus on working with academic institutions. We really like our work with schools and universities because we are having impact on the culture and education of future generations that are getting exposed to good practices in waste management at an early stage of their lives. One of our favorite academic projects is the first national on-campus composting site that we designed and installed in the Holy Spirit University of Kaslik, it now

is an essential component of the Zero Waste program of the university.

Are your operations specific to Lebanon and the Middle East?

We started our enterprise as a response to a local need in Lebanon. But as we grow, we are noticing that many countries in the Middle East and the world share the same needs as Lebanon for sustainable bio-waste management. So, we are planning to expand to new markets in the near future. [→](#)

What else are you working on?

Other than composting systems and solid waste management services, our enterprise is working on liquid waste management. Our approach is to provide households and communities with on-site solutions to treat and recycle their wastewater as well as solid organic waste. We developed a device, called CubeX, that could be installed in the vicinity of a dwelling and could treat all bio-wastes and recover cooking gas, irrigation water and compost. We are upgrading the design of the CubeX to become a kit that is easy to construct and deconstruct, always taking into consideration socio-economic conditions of ultimate users.

How big is the potential for clean energy & water across the MENA?

Water scarcity is a major problem all over the MENA region. With all the technical advancements in science and technology, there is a big potential to develop solutions to recover process water effectively in order to enhance food and water security of communities, especially in rural areas.

How do you see a water & energy community emerging around the Mediterranean?

We see a need to evolve towards a water and energy community based on knowledge exchange to the creation of task forces to implement innovative and scalable pilot projects. ●



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1. & 2. The CubeX could be installed in the vicinity of a dwelling and could treat all bio-wastes and recover cooking gas, irrigation water and compost.

Many countries in the Middle East and the world share the same needs as Lebanon for sustainable bio-waste management.



Compost Baladi SAL is a Lebanese social enterprise founded in early 2017, which provides products and services that promote the local recycling of solid & liquid bio-waste in households, restaurants, academic institutions, commercial establishments, municipalities, non-profit organizations, etc. The services and products of the company are a direct response to the on-going national waste management crisis.

www.compostbaladi.com

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to balancing progress and countering
fear in the world.”**

— HRH Princess Sumaya Bint El Hassan, AMWAJ 2016



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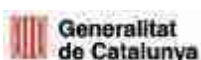
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1

Q&A with Dario Scannapieco

INSIGHTS FROM DARIO SCANNAPIECO, VICE-PRESIDENT OF THE EUROPEAN INVESTMENT BANK, INTO THE KEY INGREDIENTS FOR THE EMERGENCE OF A WATER AND ENERGY COMMUNITY AROUND THE MEDITERRANEAN.

What are the biggest challenges for the Mediterranean region in the 21st century?

Despite their differences, Mediterranean countries face the common challenges of developing strong socio-economic infrastructure, improving economic performance and creating job opportunities for their populations. They also face common environmental challenges: climate change and demographic trends are contributing to

unsustainable strains on the environment, notably on fresh water resources – in what is already the most water-scarce region of the world. Dry regions are becoming even drier and water quality is gradually being degraded by pollution and unsustainable consumption. Population movements, such as the Syrian refugee crisis, have exacerbated these strains, particularly around urban areas where they tend to concentrate. The problems are not confined to urban areas but rather, to whole catchment areas, with cities competing for water with rural areas, notably the agricultural sector.

1. Dario Scannapieco, Vice-President of the European Investment Bank.
Photo: EIB

2. Syrian Children filling drinking water in bottles at Al-Zaatari camp for Syrian refugees in Jordan. Population movements, such as the Syrian refugee crisis, have exacerbated unsustainable strains on water resources, particularly around urban areas where they tend to concentrate. Photo: Mustafa Bader

3. The Tabernas Desert in Almeria Spain. The Mediterranean region is already the most water-scarce region of the world.
Photo: Amjad Sheikh

To sustain healthy societies, it is essential that solutions are found for the appropriate management of resources. Water security can often be improved with appropriate policy measures, sound management and consumer behaviour adjustments such as through sustainable agriculture. But this is not enough. Significant investments are needed in order to upgrade obsolete or inefficient supply systems, and to provide new infrastructure altogether. In coastal areas, desalination is an option; and inland, advanced wastewater treatment for reuse in agriculture for example is better than tapping into pristine sources. However, these solutions are expensive and should be considered carefully whether they are justified.

Our investments around the Mediterranean aim to support low-carbon and climate-resilient growth and to make water security a priority.

How is EIB contributing to address these challenges?

Countries of the region are aware of these challenges and we work together with the governments to identify and develop solutions. Our investments around the Mediterranean aim to support low-carbon and climate-resilient growth and to make water security a priority. For instance, [→](#)



2



3



4

the Wadi Al-Arab Water System II will improve drinking water availability for the population of Jordan – in particular Irbid, near the Syrian border, which hosts a large number of Syrian refugees. We also provide direct technical advice and support for the preparation of investment projects in the water and environmental sectors. More specifically, such preparations involve the planning, studies and (technical) design of projects.

The EIB has been supporting southern Mediterranean countries for more than 40 years and provided over €33 billion to nearly all sectors of the economy. We have also mobilised additional resources and expertise, such as under the Economic Resilience Initiative which increased by €6 billion between 2016-2020, thereby supporting additional investment of €15 billion, in addition to the € 7.5 billion of financing already foreseen in the Mediterranean region. Alongside increased financing, the EIB will offer more concessional finance, enhanced support to the private sector and technical assistance.



5

What is needed for a water and energy community to emerge around the Mediterranean?

Water conservation, treatment and reuse, and equitable distribution are key issues around the Mediterranean. Despite some disparities, a common understating of critical water issues at large exists in the region. What is needed is to identify common targets and strengthen regional cooperation among officials, experts and scientists working in the field.

International gatherings, such as AMWAJ, the World Water Forum, and the Mediterranean Water Forum, plus intergovernmental institutions like the Union for the Mediterranean (UfM) offer good platforms for all stakeholders of the Mediterranean community to engage in dialogue and exchange of information on projects, or indeed issues in the region. The UfM is playing an important role in making

4. The Red Sea–Dead Sea Project would pipe water from the Red Sea to a desalination plant in Jordan. The desalinated water would then be piped to the Amman region, while the brine would be piped to the Dead Sea in an effort to halt its shrinkage.

Photo Photo: Rebecca Schear

5. The UfM is playing an important role in making the Gaza Desalination Plant Project a reality. Photo: UfM Secretariat

the Gaza Desalination Plant Project a reality, acting as the convenor of multiple stakeholders (and donors).

With water flowing across or in between national boundaries, there is no alternative than to cooperate between neighbours. The Red Sea–Dead Sea Project is an iconic example of an international water project between Jordan, Israel and the Palestinian Authority. Likewise, the Wadi Al-Arab Project mentioned is also possible thanks only to water delivery agreements between Jordan and Israel.

The key factors to enable an energy community to emerge around the Mediterranean involve mainly the eastern and southern shores, and include 3 pillars: 1) improve cooperation among countries – this would optimise investments and maximise the opportunity for energy exchanges; 2) create competitive electricity markets and accelerate the decarbonisation of power systems, including harmonisation with EU renewable energy source (RES) policies; and 3) political stabilisation of the region.

How important is transnational cooperation and interoperability of energy, transport and infrastructure systems?

In the Mediterranean region, the EIB supports the development of interoperable and cross-border infrastructure systems in EU Member States and those non-EU countries under current mandates. Good transnational cooperation and interoperability of infrastructure networks is essential to help reduce transport costs and improve connectivity across regions and boundaries. Better cooperation to tackle common issues together will lead to clear economic, social and environmental benefits from more efficient and resilient infrastructure systems.

For transport infrastructure, cooperation can remove technical and institutional



bottlenecks, especially at cross-border sections for roads, railways, inland waterways, airports, and maritime ports. Such investments may include physical infrastructure and the adoption of common specifications for digital traffic management and control systems. Cooperation is also key for safety and security by promoting common standards and coordination between relevant authorities and other stakeholders.

The EU is promoting cooperation and energy market integration in the Mediterranean region thanks to sector-specific organisations, such as the Association of Mediterranean Regulators (MedReg) and the Association of Mediterranean TSOs (MedTSO) – both of which are key organisations for the development of energy regulation and energy markets integration in a pragmatic way. ●



The European Investment Bank (EIB) is the European Union's nonprofit long-term lending institution established in 1958 under the Treaty of Rome. As a "policy-driven bank" whose shareholders are the Member States of the EU, the EIB uses its financing operations to bring about European integration and social cohesion. Its mission is to make a difference to the future of Europe and its partners by supporting sound investments which further EU policy goals.

www.eib.org



Perfectly Good: Austrian Start-up Gives Second Life to Waste

WRITER: **MARKUS PÜHRINGER**

Consumer waste is a global issue. In Germany alone, nearly €7 billion¹ in consumer goods are discarded every year—over one-third of which are entirely re-usable. While the problem is glaring, initiatives to address this issue are taking place, such as the Vienna-based start-up, Die Fairmittlei, which collects these products and re-distributes them to NGOs for a good cause.

In Austria, nearly 1,600 tons² of personal care, laundry, and cleaning products never make it to market every year. Errors in labeling or slight damage to the packaging are enough to make these products deemed unfit for sale. While donating these items directly from the manufacturer to charitable organizations is possible, it is often not done due to time constraints and high logistical costs.



1. Learn more in the study from Boston Consulting Group in 2010: www.innatura.org/presse/innatura-in-the-progressive-post/

2. Austrian Ecology Institute and pulswerk: www.diefairmittlei.at/das-konzept/hintergrund/

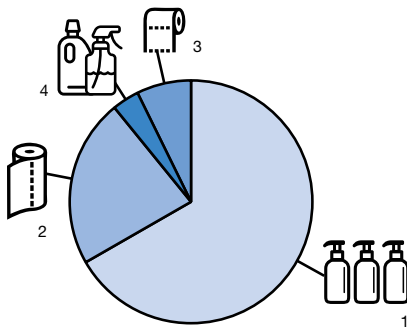
Die Fairmittlerei bridges this very gap: by developing their own network of NGOs and industry partners, they collect, store and sell these goods at a discount to NGOs through an online webshop. By not having to dispose of the goods, manufacturers and businesses save money and increase their social commitments, while NGOs benefit from saving money on the products they need to operate. The environment is

also relieved of unnecessary waste generation, making use of the resources and energy it took to manufacture the goods.

Michael K. Reiter, Founder of Die Fairmittlerei, was inspired by this concept after hearing of Innatura – a similar initiative in Germany:

"After five years working in marketing and sales, I was looking for new challenges. Some have too much while others have too little—why not close this gap?"

The main product groups* for NPOs



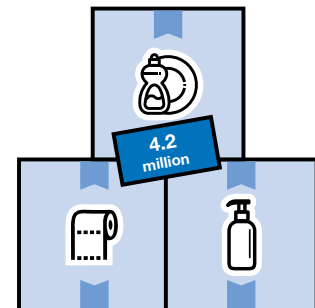
1. Personal hygiene products
2. Paper towels
3. Toilet paper
4. Cleaning supplies

* The focus of this study was on cleaning, hygiene and body care. Other areas of need were deliberately excluded.

Until now, thanks to its 17 volunteers and one part-time employee, Die Fairmittlerei has saved close to 20 tons of consumer products, including detergents, softener, liquid soap, kitchen furniture, diapers, drinking glasses, and condoms. Close to thirty NGOs already order their products from Die Fairmittlerei, resulting in initial savings of €30,000. Imagine the potential impact if there were more employees and volunteers?

That's exactly why founders Michael K. Reiter, Sabine Brunnmair, Manfred Hlina and Michael Gugenberger are working on scaling the project to have a greater impact on driving their commitment to Sustainable Development Goal (SDG) 12 to ensure sustainable consumption and production patterns: to achieve a more environmentally sound management of waste to minimize environmental impacts. ●

Demand for products in the area of hygiene, care and cleaning



Demand from NPOs:
± 4.2 million pcs/year

Purchase cost:
± €6 million



More information on Die Fairmittlerei can be found on their website (German) at www.diefairmittlerei.at or on their LinkedIn or Facebook pages. Watch their intro video here: <https://youtu.be/ItCUqhWO9KQ>

For all inquiries, contact:
michael.reiter@diefairmittlerei.at

“In Austria, nearly 1,600 tons of [...] products never make it to market every year; errors in labeling or slight damage to the packaging are enough to make these products unfit for sale...”

REPURPOSING

TURNING USED MATERIAL INTO NEW PRODUCTS.

REVOLVE transmits impactful and inspiring messages and projects from its partners to communicate sustainability more visually and effectively. One of the ways we do this is by designing and curating large-scale outdoor exhibitions at strategic locations. But we do more! — In line with the values we share with our partners we minimize waste through REPURPOSING.

We are proud to have worked with:



Empowered lives.
Resilient nations.



4 STEPS TO A NEW LIFE



PURPOSE #1

REVOLVE designs and curates large outdoor exhibitions. We support partner projects and implement communication campaigns. We work with local suppliers to print and install the exhibitions in public spaces. We have worked in Brussels, Bonn, Barcelona and New York City.

Hundreds of thousands of passersby see the messaging of our exhibitions.



2

REPURPOSING

REVOLVE recuperates the canvases after the exhibition and ships them to a small company in Germany that integrates physically-challenged people in the work force.

About 30 employees are giving each month a new life to up to 1,000 square meters of products from banners and flag fabric.

The workers clean, cut and sew the canvases into new bags and folders.

We give our partners the option to choose the product they prefer.

3



4



PURPOSE #2

The final products are messenger bags, shopping or beach bags, and document folders that are branded with the partner's logo. Partners can thereby reuse the canvases for their own events, meetings and promotion.

Repurposing has a history as long as the human kind but is today a valuable practice towards sustainable living and key to the circular economy.

Contact us today to make your zero waste exhibition: info@revolve.media | +32 2 318 39 84

#ZeroBrine



www.zerobrane.eu



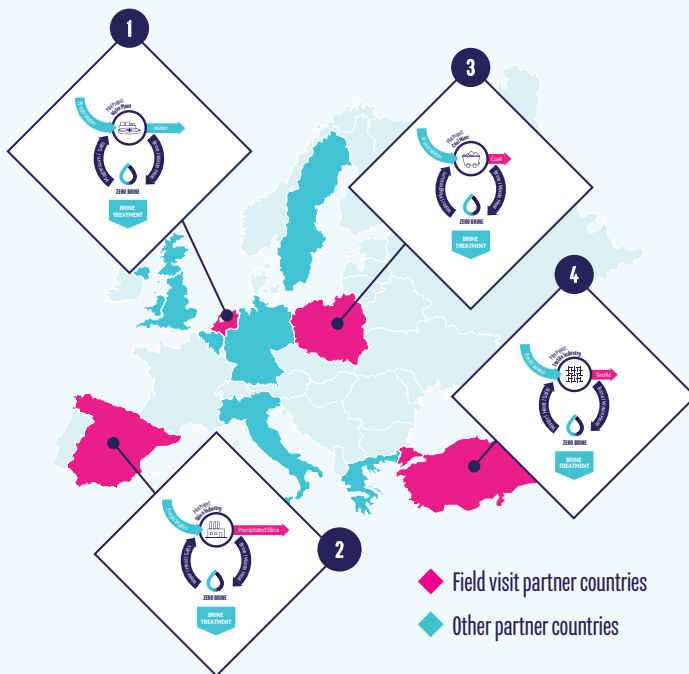
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ZERO BRINE

THE ZERO BRINE CONCEPT

INDUSTRIAL WASTEWATER ⇒ RESOURCE RECOVERY ⇒ CIRCULAR ECONOMY



PILOT PROJECTS

1 WATER PLANT (NETHERLANDS)

The Demonstration Water Plant in the Botlek area uses ion exchange, membrane technology, nanofiltration, evaporation and crystallization to recover magnesium, NaCl solution and sulphate salts.

2 SILICA FACTORY (SPAIN)

Recovering water, sodium sulphate, waste heat and alkalis by using nanofiltration, eutectic freeze crystallization and forward feed evaporation technologies.

3 COAL MINE (POLAND)

Coal mine water in Laziska Górne will be treated using nanofiltration, reverse osmosis and electrodialysis to recuperate highly valuable raw materials like magnesium.

4 TEXTILE FACTORY (TURKEY)

Recovering concentrated salt solutions to be used in the textile dyeing process using nanofiltration, oxidation and ion exchange technologies.

CONSORTIUM PARTNERS



The ZERO BRINE project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730390.

Valuable resources are being recuperated from brine!

Based on circular economy business models, ZERO BRINE provides water solutions that recover and reuse minerals, water and metals from that sludgy ultra-salty wastewater called brine.

Where is the ZERO BRINE project being tested around Europe and why were these industries highlighted?

We have four large-scale demonstrations for the project: **1) in the Netherlands**, we are working with the Technical University of Delft at the site of the Demineralized Water Plant (Evides Industriewater) in the industrial cluster Botlek area of Rotterdam Port; **2) in Zaragoza, Spain**, we are working with CTM at the site of IQE (a chemical industry) to assess the technical and economic feasibility of implementing a circular economy scheme in the silica industry to recover water, sodium sulphate, waste heat and alkalis; **3) at a coal mine in Poland** we are working with the Silesian University of Technology to demonstrate circular economy principles to decrease energy consumption by 50% and recover valuable raw materials such as concentrated brine; and **4) in Turkey**, an innovative brine treatment system is being developed for the textile industry with TÜBITAK MARMARA Research Centre to recover concentrated salt solutions for reuse in the textile dyeing process baths.



INTERVIEW WITH DIMITRIS XEVGENOS, INNOVATION MANAGER OF ZERO BRINE AND MANAGING DIRECTOR OF SEALEAU

We identified the sectors within the process industries that produce a lot of brine, selecting the most representative examples of these sectors which include the textile, mining and chemical industries. In the Netherlands, the industrial cluster involves many industries so that we have an implementation towards industrial symbiosis. The objective here is to address the large issue of wastewater and to establish collaboration between different industries that could recuperate waste heat from a neighboring factory to drive the process and thus make it more cost effective, environmentally friendly and sustainable.

Why is systemic innovation so pivotal to the transition towards a more circular economy?

To achieve circular economy solutions, we need to bring different stakeholders together – from economic, industrial and research organizations, to public authorities and civil society. We need all stakeholders working together to co-design and implement circular economy solutions, which is why it is important to bring together different disciplines to produce projects such as ZERO BRINE.

The circular economy is a rather new field, and while there has been a lot of progress in recycling, for example, it was only in 2015 when the European Union adopted its Circular Economy package to set up many initiatives like ZERO BRINE that are now in progress today.

How does ZERO BRINE contribute to implementing the circular economy?

With ZERO BRINE we aim to showcase real examples of circular economy solutions from process industries. We have identified specific industrial sectors for our case studies and have involved stakeholders throughout the relevant value and supply chains, either as project partners or as advisory board members. We are working with a wide range of partners to design and implement solutions for them [→](#)

ZERO BRINE aims to prove that with different technologies the wastewater sludge from textiles, mining, and chemicals can be recuperated and reused, thus contributing to the circular economy.

and that will help advance the project towards commercialization. This is one of the main objectives of ZERO BRINE: to effectively demonstrate technologies at our pilot project sites in order to bring the innovations to the market.

4. What are the major hurdles to deploying the technology in other industries?

The main obstacle is the same for all circular economy applications: the mind-set. We have tested the linear economy model for many years now, so the management of companies is used to this. Apart from the mindset, the fact that companies have invested a lot of money into these linear systems means they really need to be convinced that switching to a circular economy is first technically feasible, and that it makes sense for them to move from the current status quo to the circular economy model. This is a big obstacle that needs to be addressed from the financial sector and from an investment point of view as well.

The second obstacle concerns regulation: there are some hurdles, such as the EU Waste Framework Directive, where the recovery of materials from waste and wastewater streams need to be characterized through end-of-waste criteria – not as waste, but as products. This is a process that is ongoing around Europe, and as such, is not very clear yet since work still needs

to be done at the policy-making level. I also believe that legislation is coming that will put pressure on the industrial operators, meaning they will be charged for brine discharge, for example. This is something that helps circular economy business models.

5. Are policies moving in the right direction to advance circular economy solutions?

Policies are moving in the right direction. Take for example the most recent budget for circular economy projects in the final work programme for Horizon 2020, from 2018-2020; for the circular economy alone, they have foreseen almost €1 billion. This is a substantial amount to drive this research forward and bring it to the market. Apart from that I would say the European Commission, DG Research, DG ENV and others are working hard to establish collaborations outside of Europe. For example, there is a Memorandum of Understanding on Circular Economy between the EU and China, and a successful mission to Japan took place in October 2018. I was one of 69 representatives from 14 Member States who went to promote circular economy projects. So yes, it is clearly a main topic on the policy-makers' agenda.

6. How great is the potential to replicate this technology around the world?

ZERO BRINE focuses on the manufacturing sector. According to Eurostat, this sector includes a vast array of economic activities performed by 2.1 million enterprises in Europe. Although they perform different activities, they all have something in common: every industry uses water in its operations, and this is transformed into wastewater. In many cases this is brine effluent, meaning salty wastewater. In 2016, according to the European Database (2016) a total of 578 facilities released around 16 million tons of chloride in Europe. So, we have a lot of work to do.

We are also excited to bring the thinking and processes behind ZERO BRINE to a wider global audience. We are speaking with different stakeholders in South Africa from the coal mining sector, as well as China. In China many chemical plants have had to close because they are producing too much brine and they need help to address the wastewater issue. The New Environmental Law, which came into force in January 2015 in China, has put significant pressure on many industrial plants, due to the much heavier penalties. So, the problem is here and needs solutions all over the world, not only in Europe. ●

Read the full interview online:

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Founded in 2010, REVOLVE Magazine (ISSN 2033-2912). All inquiries can be sent to Revolve Media, Rue d'Arlon 63-67, 1040 Brussels, Belgium. info@revolve.media

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Gillian Tett,
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Katrin Bruebach,
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