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European Commission

CORDIS Results Pack on

water innovation

A thematic collection of innovative EU-funded research results

April 2020

Sustainable solutions for water management in Africa

Research and Innovation

Contents

Editorial

In March 2020, the European Commission and the High Representative for Foreign Affairs and Security Policy proposed the basis for a new strategy with Africa. The Joint Communication sets out proposals to intensify cooperation through partnerships in five key areas, one of which is the green transition. Europe will engage in discussions with African partners towards the development of a new joint strategy to be endorsed at the European Union–African Union Summit in October 2020. The CORDIS Results Pack showcases some of the cutting-edge projects in research and innovation that address water-related challenges in Africa, with a view to feedback on this and other, related joint European/African initiatives.

In general, in low-income countries, and in some countries in Africa in particular, sustainable water supply and sanitation which are vital for food security, health, survival, societal well-being and economic growth are not a given. Without water, there is no life. However, according to the World Health Organization (WHO), water scarcity affects one in three people in Africa. This situation is further aggravated by population growth, challenges to economic development, urbanisation, demographic shifts and climate change.

On top of this, contaminated water and poor sanitary conditions result in vulnerability to waterborne diseases such as diarrhoea, cholera and typhoid. This can carry grave human and economic costs and may potentially affect peace and security in the African region.

The fight for clean water and sanitation

To tackle water-related challenges in Africa, the European Union launched two Horizon 2020 Calls. Horizon 2020's Water-5b-2015 Call 'A coordination platform' aimed to increase Africa's preparedness to address water and climate change vulnerabilities, with less fragmentation of efforts, as well as improve upon monitoring and forecasting tools, and enhance knowledge sharing and technology transfer.

Then, the Water-5c-2015 Call focused on the 'Development of water supply and sanitation technology, systems and tools, and/or methodologies' to ensure the application of innovative technological approaches/solutions to local conditions. It further aimed at the operational and effective application of integrated water management and better identification of water vulnerability. Additionally, the call sought to improve the capacity-building of local actors and increase economic and social well-being at local and regional levels in non-EU Mediterranean countries and Africa.

The projects making a difference

A significant amount of research and innovation activities have been undertaken to find innovative solutions for water management in Africa while also fostering scientific cooperation between the European Union and the African continent. This pack showcases seven projects funded under the two Horizon 2020 calls detailed above.

The AfriAlliance project is bringing African and European stakeholders together to better prepare Africa for water and climate change challenges. Through the DAFNE project, 14 partners from Europe and Africa have joined forces to facilitate collaboration for sustainable and effective solutions for the management of the water-energy-food nexus. Another project, FLOWERED, followed a methodological approach for the identification of contaminated water and implemented mitigation and defluoridation measures for its treatment.

MADFORWATER worked towards developing a set of integrated technological and management solutions to improve wastewater treatment and irrigation. The SafeWaterAfrica project developed a novel water-cleaning system that purifies chemical contaminants and disinfects water from pathogens.

Then we have the VicInAqua project. It integrated innovative wastewater treatment, aquaculture and irrigation in the Lake Victoria Basin. Finally, the WATERSPOUTT project is working towards improving sustainable point-of-use solar disinfection technologies and combining them with other water treatment methods.

The joint scientific and innovation achievements of these projects are contributing towards enhancing the open-to-the-world nature of Horizon 2020 and towards reinforcing the role of Africa as a key Research & Innovation partner in the context of Horizon Europe.

Africa and Europe collaborate to enhance Africa's resilience to climate change

Climate change-related challenges are among the most pressing global threats of this millennium. Africa and Europe are working together to share and create knowledge, build partnerships and target projects that will prepare Africa to meet them.

Africa is particularly vulnerable to climate change and many African organisations and networks are working hard on solutions to mitigate impact on the continent. The EU-funded AfriAlliance project is helping them join forces with each other and with European stakeholders to share knowledge, strengthen capacity and generally accelerate innovation to better prepare Africa to meet future climate change and water security challenges.

Working together for a better future

Project coordinator Uta Wehn explains: "AfriAlliance has launched 10 demand-driven Action Groups across Africa, bringing together African and European peers working jointly towards implementable solutions. The projects focus on topics as diverse as water harvesting for agriculture, water resources management, citizen science and water stewardship." AfriAlliance now counts a community of over 500 entities, highlighted on the AfriAlliance Stakeholder Map. They comprise non-profit, business, academic and funding organisations; women's, youth and agricultural groups; public authorities; and various platforms and projects. Raising awareness and building strength in numbers will play a key role in meeting future challenges.

AfriAlliance has launched 10 demand-driven Action Groups across Africa, bringing together African and European peers working jointly towards demand-driven, implementable solutions.

Knowledge is power

In addition to bringing people together, AfriAlliance is putting information at their fingertips through its Knowledge Hub. This one-stop shop provides the policy briefs and social innovation factsheets produced by the project as well as water and climate updates and relevant scientific papers and reports.

The Knowledge Hub also hosts information about online learning opportunities offered by both AfriAlliance and other institutions. The next AfriAlliance massive open online course will run in June 2020 and focuses on social innovation for water and climate challenges in Africa. People can check out upcoming events on water and climate, funding opportunities as well as education, scholarship and career opportunities.

The team has also developed a method to collect and analyse water and climate data. Wehn continues: "AfriAlliance has created the Triple Sensor Collocation methodology for monitoring and forecasting. It enables users to validate three independent observations on water and climate – citizen-sourced, satellite and conventional ground station data – and rank their reliability." An interactive demo is available on the project website and the Demonstration Toolbox software and documentation can be downloaded from there too. The team's GeoData portal now has over 140 entries and meta-information on African water resources and climate data.

Solidifying the foundations for security and sustainability

"AfriAlliance has identified and prioritised the needs of African water managing organisations in the context of various climate change scenarios. We are evaluating solutions, both existing and new, and barriers to their uptake. AfriAlliance has developed novel ways to bridge needs and solutions, including via our Innovation Bridge Events and Roadshows. The next step is strengthening the enabling environment for water innovation in Africa. To that end, the team has put forth guiding principles and recommendations to provide direction for innovation policy for the African water sector," reports Wehn. Considered in the context of current best practices and local conditions, these will enable successful co-design, adaptation and implementation of water and climate change innovations in Africa.

Aside from building the foundations for targeted action, AfriAlliance has prepared business plans for several project outputs to ensure their sustainability beyond the project lifetime. The 5-year project runs for another year, but its impact will continue to grow, bolstering Africa's resilience to climate change.

PROJECT
Africa-EU Innovation Alliance for Water and Climate

COORDINATED BY
IHE Delft Institute for Water Education in the Netherlands

FUNDED UNDER
H2020

CORDIS FACTSHEET
cordis.europa.eu/project/id/689162

PROJECT WEBSITE
afrialliance.org/

Negotiating with a fresh perspective yields mutually beneficial solutions

Consideration of water, energy and food (WEF) in the context of their interdependencies (nexus) is necessary for sustainable and equitable management of water resources. A novel approach leveraging science and common ground is delivering results for transboundary water systems.

Rivers and river basins in Africa cut through multiple countries that often have conflicting interests. In the context of the EU-funded DAFNE project, 14 partners from Europe and Africa have joined forces to facilitate collaboration for sustainable and effective solutions to WEF nexus management.

Bringing data and people together

According to project coordinator Paolo Burlando of ETH Zurich, "DAFNE is generating a novel methodological approach to explore alternative planning and management solutions based on the cooperation of public and private stakeholders to enhance understanding of the nexus between water, energy, food, and the environment." DAFNE's decision-analytic framework (DAF) integrates local data on infrastructure and the environment with stakeholder objectives and concerns. Reflecting the varied and often competing interests in transboundary river basins, it predicts the anticipated effects of alternative scenarios. The multi-perspective visualisation tool and the Geoportal enable browsing alternative scenarios and the related interconnections among the different WEF issues as emerged from model simulations of the WEF nexus.

DAFNE is generating a novel methodological approach to explore alternative planning and management solutions based on the cooperation of public and private stakeholders to enhance understanding of the nexus between water, energy, food, and the environment.

The DAF and visual tools are exploited in participatory and integrated planning via Negotiation Simulation Labs (NSLs). "The tools help stakeholders to understand the issues from the perspectives of others and thus to expand their current views on the sustainability of present and future management pathways. Ultimately, they facilitate social understanding of impacts and support negotiations," says Burlando.

Revisiting the past, focusing on the future

The Zambezi River is the longest east-flowing river, traversing six African countries with a basin that spans eight. Four large hydropower dams have been operating along the river since the 1970s with negative ecological impact. The basin is populated by almost 40 million inhabitants and the demand for WEF resources is expected to grow, setting the scene for competition for use of these resources. The Omo-Turkana basin is shared

by Ethiopia and Kenya. The Omo River in Ethiopia feeds about 85-90 % of the inflow to Lake Turkana, which is almost entirely in Kenya. Dams for hydropower production and a massive irrigation scheme at the southern part of the Omo River will affect Lake Turkana. Negotiations are ongoing; however, once again, a high level of competition exists for water use.

DAFNE tested its approach in these two case studies. Burlando reports: "The NSLs proved to be important social learning experiments in which parties that may be in conflict are gathered around a table to exchange their respective viewpoints, often discovering that they have common interests that can ultimately be translated in shared pathways."

The power in numbers of all kinds

As a result of its website and social media campaigns, scientific and other publications, and participation in conferences and stakeholder events, DAFNE has reached a large and varied audience. This includes more than 57 000 members of the scientific community, more than 18 000 organisations and individuals from industry, over 3 000 policymakers, and a potential readership of more than 1 million through mainstream media articles.

Burlando concludes: "DAFNE's procedural approach supports the involvement and empowerment of stakeholders throughout the entire process. In the digital era, numbers can facilitate a solution to the competitive use of resources, changing the perspectives of stakeholders from positions that are sometimes resolute to ones that are open to the identification of common interests. This can ultimately lead to more sustainable and mutually beneficial solutions."

PROJECT

DAFNE: Use of a Decision-Analytic Framework to explore the water-energy-food NExus in complex and trans-boundary water resources systems of fast growing developing countries

COORDINATED BY

Swiss Federal Institute of Technology in Zurich in Switzerland

FUNDED UNDER

H2020

CORDIS FACTSHEET

cordis.europa.eu/project/id/690268

PROJECT WEBSITE

dafne-project.eu/

A battery-operated, portable device for decontaminating water

Fluoride contamination in groundwater affects about 260 million people in many countries worldwide. The FLOWERED initiative followed a methodological approach for the identification of contaminated water and implemented mitigation and defluoridation measures for its treatment.

Groundwater provides the only realistic water supply option in many rural areas across the globe, providing good water quality and showing resistance to droughts. However, there is very little hydrogeological input with scientific evidence on groundwater quality, posing a risk to groundwater use.

The East African Rift Valley region is characterised by high availability of fluoride in surface water and groundwater. It is one of the regions where we record the highest fluoride concentration in the world (Ethiopia 1.3–300 mg/L; Kenya up to 180 mg/L; Tanzania up to 70 mg/L).

Geological insight into fluoride contamination

The EU-funded FLOWERED project wished to develop a sustainable water management system in areas affected by fluoride contamination in water, soils and food in specific test areas of the East African Rift Valley countries (Ethiopia, Kenya, Tanzania). "Our goal was to generate sustainable and suitable strategies for water use," explains project coordinator Giorgio Ghiglieri.

Considering that geological and hydrogeological conditions influence water contamination, project partners investigated the chemistry of the groundwater in these countries. They discovered that the fluoride level of the East African Rift Valley groundwater varied markedly from place to place. This was due to different factors that influenced fluoride mobility and concentration, including the time of interaction of groundwater with fluoride-rich minerals and other geogenic factors.

"Obtaining hydrogeological information of an area can help local or government agencies build wells that intercept good quality water," emphasises Ghiglieri. The FLOWERED scientific approach is based a detailed knowledge of the geological and hydrogeological setting that affects water contamination. Geological, hydrogeological, hydro-chemical, geophysical and hydrological investigations contributed to the localisation of safe groundwater in the study areas. This was a prerequisite for implementing sustainable water management, as well as for water sanitation and agricultural purposes.

Furthermore, the project highlighted that protracted crop irrigation with fluoride-contaminated water considerably affects the quality of the soil and leads to fluoride uptake by crops, elevating the concentration in edible parts of maize, tomato and bean. This poses further risks to human and livestock health.

A defluoridation device

FLOWERED designed and developed a defluoridation device that consists of a 20 L tank and a recirculating pump that mixes the water and octacalcium phosphate. The device is

© Giorgio Ghiglieri

We confirmed that fluoride contamination of water requires mitigation measures that depend on scientific knowledge and evidence, political commitment and support of the population.

powered by a car battery and uses a fixed amount of octacalcium phosphate for every defluoridation cycle. Testing the prototype in rural areas of Tanzania demonstrated a decrease in fluoride to levels below the World Health Organization limit in just 2 hours. Importantly, it shows no secondary negative effects on water quality and only costs around USD 220.

To implement the FLOWERED water sanitation approach, partners conducted a survey to explore which psychological and demographic determinants influence the consumption of fluoride-free water. Results were encouraging and emphasised the importance of raising awareness via educational programmes about the danger of consuming untreated water. Therefore, international or regional interventions should aim to mitigate the defluoridation cost and ensure access to clean water as per the UN Millennium Development Goals.

Overall, FLOWERED provided important results on water contamination and its impact on human health, agriculture and livestock. "We confirmed that fluoride contamination of water requires mitigation measures that depend on scientific knowledge and evidence, political commitment and support of the population," concludes Ghiglieri. Fostering these efforts will be paramount for groundwater management in countries affected by water contamination.

PROJECT
de-FLuoridation technologies for imprOving quality of WatEr and agRo-animal products along the East African Rift Valley in the context of aDaptation to climate change

COORDINATED BY
The University of Cagliari in Italy

FUNDED UNDER
H2020

CORDIS FACTSHEET
cordis.europa.eu/project/id/690378

PROJECT WEBSITE
floweredproject.org/en/index.php

Increasing wastewater treatment and reuse will help arid regions irrigate crops

Treated wastewater from a variety of sources can now be used to irrigate crops in water-efficient ways thanks to novel technologies and management tools for some of the driest areas in the world.

Extreme weather and climate change policy failures are the greatest threats the world is facing over the next 10 years. The Middle East and North Africa (MENA) region is the driest area in the world and is already affected by desertification, groundwater over-exploitation, and seawater intrusion into aquifers. The consequences of climate change for water security in MENA will be amplified given that the expected population growth and economic growth is projected to result in a 47 % increase in water demand by 2035.

In MENA, agriculture accounts for more than 80 % of freshwater use. The EU-funded MADFORWATER project has developed integrated technologies and management tools to significantly boost the use of treated wastewater for irrigation and enhance water efficiency in agriculture. The team focused on selected hydrological basins in three Mediterranean-African countries (MACs): Egypt, Morocco, and Tunisia.

Technology and management combine for success

Project coordinator Dario Frascari explains: "MADFORWATER is based on two pillars: wastewater treatment (increasing the amount of available irrigation-quality water), and irrigation (enhancing wastewater reuse for irrigation and the efficiency of water consumption in agriculture). Solutions are adapted to be technically and culturally suitable within the environmental and socioeconomic context of the target MACs. Integration of water demand and water supply tailors wastewater treatment and irrigation to available wastewater types and crops typical of the target countries." Integration is facilitated through tailored technologies, decision support tools, and water and land management strategies.

MADFORWATER is based on two pillars: wastewater treatment (increasing the amount of available irrigation-quality water), and irrigation (enhancing wastewater reuse for irrigation and the efficiency of water consumption in agriculture).

Moving from bench to field

The technologies for wastewater treatment and irrigation developed and adapted during the first 2 years of activity are being optimised during the final half of the project. Scale-up and validation of selected technologies are taking place at four pilot plants: one in Egypt, one in Morocco, and two in Tunisia. Technologies were selected based on their technical performance, cost-benefit analysis, life-cycle assessment and feedback collected during several stakeholder consultation workshops.

Pilots are processing and utilising municipal wastewater, drainage canal water and textile wastewater. Frascari states: "The wastewater treatment technologies for municipal

wastewater and drainage canal water are proving effective and environmentally sustainable. We are addressing challenges in the treatment of textile wastewater with an innovative biological process. As for the irrigation pilots, all the technologies tested have proved effective to date."

No scarcity of benefits

Aside from the critical impact of enhancing water security for irrigation, the technologies are cost-effective. Low energy consumption for wastewater treatment and high water-use efficiency of irrigation technologies protect the environment.

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MADFORWATER SMEs are currently developing business plans for implementation in MENA countries as well as guidelines for adaptation in different contexts. Several patent applications are also underway. The project also includes capacity-building activities aimed at increasing the social acceptance of treated wastewater reuse in North Africa.

Frascari summarises: "We have demonstrated the ability to boost the reuse of treated wastewater for irrigation in developing countries faced with severe water scarcity. It is made possible by tight integration between technological innovation and sustainable water management tools." MADFORWATER is supporting MENA in sustainably meeting the serious challenges posed by continuing climate change, population growth, and water scarcity.

PROJECT
DevelopMent AnD application of integrated technological and management solutions FOR wasteWATER treatment and efficient reuse in agriculture tailored to the needs of Mediterranean African Countries

COORDINATED BY
Alma Mater Studiorum - University of Bologna in Italy

FUNDED UNDER
H2020

CORDIS FACTSHEET
cordis.europa.eu/project/id/688320

PROJECT WEBSITE
madforwater.eu/

New technology provides clean water in Africa

Clean water is paramount for proper nutrition, personal hygiene and overall health. A European-African alliance developed a novel water-cleansing system that purifies chemical contaminants and disinfects water by removing pathogens.

According to the World Health Organization (WHO), approximately 2 billion people around the world don't have access to clean and safe water. Contaminated water is responsible for the transmission of diseases such as diarrhoea, cholera, dysentery, typhoid and polio, with an estimated 485 000 deaths from diarrhoea alone each year.

Application of novel technology for clean water

The aim of the EU-funded SafeWaterAfrica was to disinfect water for domestic use in remote rural areas in Africa in a sustainable and affordable way. "Our key aim was to produce drinking water that doesn't cause health issues when consumed by people," explains project coordinator Lothar Schaefer. The project was a collaborative effort between academic and industrial partners from Germany, Spain and Italy who provided knowledge on new technologies for water purification as well as academic and industrial partners from Mozambique and South Africa who contributed with additional technologies and system integration.

Partners took into consideration the water quality from different sources in Mozambique and South Africa and designed a water treatment system that incorporated both existing as well as a novel pre-treatment technology. They generated an autonomous and decentralised system for efficiently removing pathogens from water and degrading harmful pollutants such as pesticides.

The cleaning process initially involves a pre-treatment step in which the organic material suspended in the water becomes separated using a salt coagulant. This converts chemical pollutants into a precipitate that is then easily removed from the water through column filtration.

The next phase involves water disinfection and is based on a new European water treatment technology called CabECO. This technology uses electrochemical oxidation to produce strong oxidants such as ozone without the need for additional chemicals. Application of low voltage between two diamond-coated electrodes causes water molecules to split into ozone and reactive OH radicals, both of which decompose microbes and organic pollutants quickly and efficiently.

This 'Made in Africa' system strongly involved African partners and will be easier to implement by local communities. This will help improve the health and social well-being of people in Africa.

Demonstrator units in operation in Africa

Partners have built and installed two demonstrator units, one in Mozambique (Ressano Garcia, Incomati River) and one in South Africa (Waterval, Klip River). Both units produce approximately 10 cubic metres of water per day, enough for 300 people. The quality of water fulfils both WHO standards and the South African National Standard for drinking water.

Importantly, the units are self-sufficient, operating through photovoltaic modules. A few hours of sunlight can power the unit in South Africa to produce 10 000 litres of clean water per day. A remote diagnosis system displays demonstrator data, measures water quality, and supports operational maintenance as well

© Fraunhofer IST, Jan Gäbler

as repair processes. Moreover, the water treatment system is easy to operate and can be implemented by local people, thus creating new jobs in the community.

The lost-cost, flexibility and mobility of the SafeWaterAfrica unit make it easy to install even in remote or isolated areas across the continent. "This 'Made in Africa' system strongly involved African partners and will be easier to implement by local communities. This will help improve the health and social well-being of people in Africa," concludes Schaefer.

PROJECT
Self-Sustaining Cleaning Technology for Safe Water Supply and Management in Rural African Areas

COORDINATED BY
Fraunhofer Institute for Surface Engineering and Thin Films IST in Germany

FUNDED UNDER
H2020

CORDIS FACTSHEET
cordis.europa.eu/project/id/689925

PROJECT WEBSITE
safewaterafrica.eu/en/home

Wastewater treatment and aquaculture combine to breathe new life into the Lake Victoria region

The second largest freshwater lake in the world and the largest in Africa has historically supplied fish and water in abundance. Innovative technology developed in an Afro-European partnership addresses formidable threats to safeguard precious resources for the long term.

Shared by Kenya, Tanzania and Uganda, Lake Victoria is the largest inland fishery in the world. Its resources provide food and livelihoods for several million people and water for major urban areas. Rapidly increasing population and urbanisation are already threatening this important ecosystem, and global climate change poses additional challenges.

The EU-funded VicInAqua project addressed these pressing issues. Eleven partners from seven African and European countries developed an integrated approach to aquaculture and water management in the Lake Victoria region that will simultaneously protect the environment, enhance fish productivity and increase freshwater availability.

Fishy business

The pilot built in Kisumu, Kenya, combines an innovative membrane bioreactor (MBR), utilising commercial and custom-developed anti-fouling membranes with a RAS. The RAS, located next to a wastewater stabilisation pond, can recirculate 90-95 % of its water volume. These are integrated with smart monitoring technologies and renewable energy sources.

Lake Victoria is facing multiple threats to its fish and water supply. As the demand for food has increased, the fish processing industry has been growing, resulting in overfishing and pollution. Overfertilisation has increased the levels of nitrogen and phosphorus, resulting in rapid spread of the highly invasive water hyacinth that now covers large portions of the lake's surface, impeding fishing boats. Insufficient treatment and direct discharge of municipal and industrial wastewater have increased the quantities of living organisms competing with fish for oxygen, further decreasing fish stocks.

Aquaculture is gaining importance in providing the growing population with protein, but traditional aquaculture in ponds requires large quantities of water. Recirculating aquaculture systems (RASs) use only a fraction of the water to produce the same amount of fish. VicInAqua took this idea and made it even better, using treated domestic wastewater to supply a RAS in the Lake Victoria region.

According to project coordinator Jan Hoinkis of Karlsruhe University of Applied Sciences, "the pilot built in Kisumu, Kenya, combines an innovative membrane bioreactor (MBR), utilising commercial and custom-developed anti-fouling membranes with a RAS. The RAS, located next to a wastewater stabilisation pond, can recirculate 90-95 % of its water volume. The MBR and RAS are integrated with smart monitoring technologies and renewable energy sources." The MBR-treated water is used for irrigating a variety of local vegetables and natural by-products are used as fertilisers in agriculture.

Sustainable impact

A RAS requires little land, can be used close to home, and is perceived as far less dangerous than capture fishing in the eyes of the local community. As a result, women are much more involved. However, despite their leading role, issues concerning women and gender are largely absent from the conversation. VicInAqua conducted several roundtables and developed a roadmap to foster better integration of women in aquaculture through participatory consultations.

"Thanks to partnership with DALF (Department of Agriculture, Irrigation, Livestock and Fisheries of Kisumu County, Kenya), the pilot plant will be maintained and operated as a training and demonstration facility, constituting a sustainable legacy," says Hoinkis. The team has prepared handbooks to help stakeholders with daily use and maintenance of the technologies. Since the pilot plant has RAS capacity 4-5 times greater than originally planned, its operation will significantly reduce pollution, enhance fish production and improve food security in the region.

Hoinkis concludes: "Teamwork, openness and mutual understanding can go a long way in facing challenges and overcoming obstacles. And they are urgently needed in society today." Luckily for millions, VicInAqua is proof that he is right.

PROJECT
Integrated aquaculture based on sustainable water recirculating system for the Victoria Lake Basin (VicInAqua)

COORDINATED BY
Karlsruhe University of Applied Sciences in Germany

FUNDED UNDER
H2020

CORDIS FACTSHEET
cordis.europa.eu/project/id/689427

PROJECT WEBSITE
vicinaqua.eu/

Using the sun for water disinfection in Africa

Solar disinfection (SODIS) of water is an accepted approach in developing countries against waterborne diseases. A European initiative aimed to improve SODIS and combine it with other water treatment methods to maximise access to drinking water in rural African communities.

Rural sub-Saharan Africa has no access to a piped water system and people obtain their drinking water from open sources like ponds, rivers and streams, which are generally contaminated. This means that millions of people in local communities are at risk of contracting diseases.

The SODIS technology

The EU-funded WATERSPOUTT project focused on the technological development of SODIS technologies. The use of the sun to disinfect water is not new; Indian communities about 2000 years ago used to put water into trays under the sun. The approach is quite simple: You just put the water in a transparent container and place it in direct sunlight for 6 hours. The solar UV light damages microbes while the heat developed in the bottle inhibits any endogenous microbial repair mechanisms.

Our goal was to provide affordable access to safe water to remote and vulnerable communities in Africa and elsewhere by designing and developing sustainable SODIS technologies.

WATERSPOUTT brings together 18 partner organisations from 11 countries, including 4 African partners. "Our goal was to provide affordable access to safe water to remote and vulnerable communities in Africa and elsewhere by designing and developing sustainable SODIS technologies," explains project coordinator Kevin McGuigan.

Accumulating evidence indicates that SODIS reduces childhood diarrhoea and dysentery in rural communities and can significantly improve child development. Despite its cost-effectiveness, though, it is rarely implemented.

Advancing SODIS technologies

Harvesting rainwater is a sustainable means of meeting water demand in deprived areas, but it must be treated to avoid contamination. SODIS treatment of harvested rainwater using the WATERSPOUTT specialised reactors has the potential to treat 200 l per 5 hours. The reactor consists of an array of tubes arranged at an angle on a reflecting surface where water flows from the harvested water container. "Imagine it as a solar panel that instead of producing hot water, produces drinking water," explains project communications manager Fabio Ugolini.

People in sub-Saharan Africa commonly use opaque plastic jerrycans to collect and transport water. However, these containers can be easily contaminated, affecting the quality of the water inside. To address this issue, WATERSPOUTT developed a 20-l transparent jerrycan and a 20L transparent bucket, both of which are suitable for SODIS. These containers have been designed for household use and have been piloted in communities in Ethiopia and Malawi.

A significant part of WATERSPOUTT was devoted to activities for the social acceptance of these technologies by local African communities. Partners involved the African communities in the design process of the SODIS technologies, increasing the chances of their implementation in everyday life. The WATERSPOUTT experience and knowledge is continuing through the PANIWATER project, which is expected to further advance WATERSPOUTT systems.

McGuigan is hopeful that "WATERSPOUTT will impact on all these local communities and allow them to treat biologically contaminated water in their homes." This will result in fewer illnesses and allow children to attend school for an overall positive outcome on rural life in sub-Saharan Africa.

PROJECT
Water - Sustainable Point-Of-Use Treatment Technologies

COORDINATED BY
Royal College of Surgeons in Ireland

FUNDED UNDER
H2020

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cordis.europa.eu/project/id/688928

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RESULTS PACK ON DIGITAL TRANSITION IN WATER

Our latest Results Pack showcases how the water sector is going digital. Innovative research undertaken by projects that are members of the ICT4Water cluster and funded by the EU through the Horizon 2020 programme is increasing resource efficiency and water reuse through a more circular - rather than linear - value chain approach.

Check out the pack at
cordis.europa.eu/article/id/413408

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