UNITED NATIONS UNIVERSITY

UNU-FLORES

Institute for Integrated Management of Material Fluxes and of Resources

TECHNISCHE UNIVERSITÄT DRESDEN

INOWAS

Innovative Groundwater Solutions

INTERNATIONAL WORKSHOP

Assessing the holistic impact of managed aquifer recharge (MAR) on ecosystem services

Text

Online event, 12.04.2021 17:00-19:00 (CET)

Link: https://bit.ly/2POkrU2

Workshop organised within the framework of the project
Digitally-enabled green infrastructure for sustainable water resources management (DIGIRES)"
funded through the ERANET-LAC 3rd Multi-Thematic Joint Call 2017/2018 by:

Federal Ministry of Education and Research

fnrs LA LIBERTÉ DE CHERCHER

CNPq Conselho Nacional de Desenvolvimento Científico e Tecnológico

CONCYT SENACYT Secretaría Nacional de Ciencia y Tecnología GUATEMALA

fonci Fondo Financiero de Ciencia e Innovación

ERANet LAC

WORKSHOP AGENDA

Time	Session	12 April 2021
17:00 - 17:05	Welcome and Introduction by Dr. Catalin Stefan	
17:05 - 17:25	Presentation: The impact of Managed Aquifer Recharge on ecosystem services by Mrs. Catalina Zapata	
17:25 - 17:30	Structure of the workshop and moderation by Dr. Serena Caucci	
17:30 - 18:00	Breakout room session: Discussion on intersectionality between MAR and ecosystem services	
18:00 - 18:45	Plenary discussion: Feedback and comments	
18:45 - 18:55	Final remarks	
18:55 - 19:00	Closing and follow up activities	

BACKGROUND

Water scarcity problems are rapidly increasing in many areas of the world and the unsustainable use of water resources exacerbates the pressure on hydrological systems. Synergically, the negative effect of climate change on the ecosystems makes the management of water resources more challenging due to the alteration of precipitation patterns or the increase in snow and ice melting, to name few examples.

Established engineered solutions like water reservoirs and flood barriers help in buffering unpredictable events and secure water availability for human well-being. However, these systems have been recognised as potential ecosystem functioning disruptors and not always sustainable solutions. Innovative and sustainable solutions capable of avoiding such shortcomings are required to tackle complex water scarcity scenarios in times of climate change.

Non-conventional water solutions such as the underground storage of water could offer both innovative strategies for increased water availability and maintenance of multiple ecosystem services. The underground storage technique named Managed Aquifer Recharge (MAR) is defined as a “purposeful recharge of an aquifer for later recovery or environmental benefits”. Despite the known ability of MAR for viable and sustainable water supply in urban and peri-urban areas, its implementation is limited in many regions. MAR implementation has accelerated at a fast rate in the last few decades, but has not kept pace with the increasing rate of groundwater abstraction. Worldwide, MAR volume constitutes only 1% of global groundwater use, and in Latin American and Caribbean (LAC) countries, the development is extremely low because its great potential is still unknown to most. Mostly, MAR is recognised as tool to improve the availability of water in terms of quantity either for agricultural productivity (SDG 2) or drinking water provisioning (SDG 6). But, often neglected, MAR can also contribute to the achievement of long-term groundwater sustainability by addressing multiple ecosystem services at the same time, such as supporting riparian habitats, mitigating floods, reducing runoff and erosion, controlling land subsidence, improving coastal water quality and increasing the minimum flow in rivers, among others.

With this perspective, MAR should be considered as increasingly relevant nature-based solution for future integrated water management planning in LAC with the goal of maintaining, enhancing and replenishing stressed groundwater systems and, at the same time, ensuring the maintenance of ecological processes (SDG 11) to mitigate climate change (SDG 13) and preserve biodiversity (SDG 14 and 15). This International Workshop organised by the United Nations University Institute for Integrated Management of Material Fluxes and of Resources (UNU-FLORES) and Technische Universität Dresden (TUD) in cooperation with the Latin American MAR Community of Practice (LatinMAR) aims at gaining insights on the benefits of Managed Aquifer Recharge beyond the common understanding of MAR as water volume supply systems and assessing the Ecosystem Services directly or indirectly related to its implementation.

INTERNATIONAL TEAM OF EXPERTS

in alphabetical order

Dr. Catalin Stefan

Technische Universität Dresden (TUD)
Dresden, Germany

Catalin is the Head of the Research Group INOWAS at the Department of Hydrosciences of the Technische Universität Dresden, Germany. Together with his team, Catalin strives to achieve his research goals through a multicultural, international perspective. The research foundation of his work is based on two pillars: understanding the processes occurring during managed aquifer recharge and development of web-based simulation software for groundwater modelling applications. Catalin is the Co-Chair of the Commission on Managing Aquifer Recharge of the International Association of Hydrogeologists and member of Groundwater Solutions Initiative for Policy and Practice. His expertise includes planning, assessment and optimisation of managed aquifer recharge applications using physical models and computer-based simulations. He is the initiator and co-author of the Global MAR Portal, an inventory of over 1000 MAR case studies. Catalin has advanced experience in coordinating and managing international networks and partnerships as PI of several international projects with regional focus on Latin America, Central Asia and Southeast Asia.

Mrs. Catalina Zapata Barra B.Sc.

Technische Universität Dresden (TUD)
Dresden, Germany

Catalina is a Natural Resources Engineer from the University of Chile, where she participated in research related to strategic programs for sustainable river basins, hydroelectric development from a socio-environmental perspective and the links between snow cover and hydrological response. Later she obtained specialization diplomas in Project Evaluation and Management, and Hydrology and Watershed Management. Her core focus lies on IWRM, and sustainable environmental resources management and bridging the gap between science, policymakers, and civil society. Previously, she worked at the Superintendence of Environment in Chile, whose mission is to monitor and audit the environmental regulations established by the law. Currently she is pursuing a master's degree in Groundwater and Climate Change and is conducting her thesis in Managed Aquifer Recharge at TUD.

Mr. Jash Dharmendra Parmar M.Eng.

United Nations University UNU Institute for Integrated Management of Material Fluxes and of Resources (UNU-FLORES) [Collaborator]
Dresden, Germany

Jash Parmar is an Environmental Engineer from the University of Applied Science, Dresden. He recently completed his internship at UNU-FLORES in the waste management unit under Dr. Serena Caucci. Prior to his internship at UNU-FLORES, he worked on an independent research that addresses the interrelation between soil organic matter composition and water holding capacity at a laboratory level. Jash completed his bachelors in Mechanical engineering from the Indus University, India. During his academic journey, Jash got several opportunities to work as a research assistant, developing small scale projects, green business ideas and prototypes.

Dr. Serena Caucci

United Nations University Institute for Integrated Management of Material Fluxes and of Resources (UNU-FLORES)

Dresden, Germany

Serena Caucci is an Associate Program Officer in the Water Resource Management Unit at UNU-FLORES. Prior to joining UNU-FLORES, Serena served as a researcher and scientific project manager at the Technische Universität Dresden, Germany and at the Helmholtz-Centre for Environmental Research – UFZ in Leipzig, Germany where she elaborated and coordinated efforts on water sanitation and the impact of contaminants of emerging concern in anthropogenic-driven environments. Serena has also worked as consultant for the EIT Climate KIC where she developed curricula for innovation trainings and knowledge transition in bioeconomy. She began her career as Environmental Science Fellow at the University of Florence, Italy where her work on carbon storage mechanism by microbial community in soils was part of a LIFE project Natura 2000.

Serena's current research is geared towards sustainable development with a special interest in the impact that anthropogenic activities have on natural resources. Focusing on the sustainable management of wastewater and organic waste, Serena is working towards the development of a transdisciplinary framework that could make use of socioeconomic and environmental interlinkages to enhance sustainable natural resource management. The final goal of her activities leads to knowledge translation for evidence-based decision-making processes and its implementation at various scales.

PARTICIPATING INSTITUTIONS

United Nations University Institute for Integrated Management of Material Fluxes and of Resources (UNU-FLORES)
Dresden,Germany
https://flores.unu.edu/en/
Founded in 2012, UNU-FLORES develops strategies to resolve pressing challenges in the area of sustainable use and integrated management of environmental resources such as soil, water, and waste. Focusing on the needs of the UN and its Member States, particularly developing countries and emerging economies, the Institute engages in research, capacity development, advanced teaching and training, as well as dissemination of knowledge. In all activities, UNU-FLORES advances a Nexus Approach to the sustainable management of environmental resources.

Technische Universität Dresden (TUD)
Dresden, Germany
https://tu-dresden.de/
The Technische Universität Dresden (TUD) is one of the largest "Technische Universitäten" in Germany and one of the leading and most dynamic universities in the country. As a full-curriculum university with 17 faculties in five schools it offers a broad variety of 124 disciplines and covers a wide research spectrum. Its focuses on Health Sciences, Biomedicine & Bioengineering, Information Technology & Microelectronics, Smart Materials & Structures, Energy, Mobility & Environment as well as Culture & Societal Change are considered exemplary in Germany and throughout Europe.

COLLABORATOR

Latin American MAR Community of Practice (LatinMAR)

https://recharge.iah.org/cop-latinmar.
In May 2019, delegates from Brazil, Chile, Costa Rica, Mexico and Peru initiated the formation of a working group to establish a community of practice for managed aquifer recharge in the latin american region. The overarching goal of LatinMAR community is to establish a mechanism to promote managed aquifer recharge interdisciplinary participation focused on project development, execution and knowledge transfer in Latin America.

FUNDING INSTITUTIONS

Bundesministerium für Bildung und Forschung (BMBF)

www.bmbf.de

The Federal Ministry of Education and Research (BMBF) promotes education, science and research in Germany. It is involved in all levels of education, from basic schooling, where it shares responsibility with regional governments, to scientific research, where it emphasizes an international perspective, aiming at finding solutions to global problems and devising strategies for sustainable growth

Consejo Nacional de Ciencia y Tecnología (CONCYT)

www.concyt.gob.gt

The National Council for Science and Technology (CONCYT) is the governing body for scientific and technological development in Guatemala. CONCYT is in charge of planning, promoting and coordinating all science- and research-related activities, which are executed through the National System for Science and Technology and in line with the Nation's policies on scientific development.

Fonds de la Recherche Scientifique (FNRS)

www.frs-fnrs.be/

The purpose of the Fund for Scientific Research (F.R.S.–FNRS) is to develop fundamental scientific research within the framework of initiatives presented by researchers. It encourages the production and development of knowledge by both supporting individual researchers, and also by financing research programmes conducted in the laboratories and facilities mostly located in the universities of the Wallonia-Brussels Federation. The F.R.S.-FNRS is also responsible for informing researchers about and encouraging them to participate in the European research and innovations programmes with which the Wallonia-Brussels Federation is involved.

Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq)

www.gov.br/cnpq/pt-br

The Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) is a pioneer in granting awards in Brazil. CNPq awards have served as instruments for disseminating and valuing scientific and technological development policy, contributing to an effective articulation with partner entities from the public and private sector.Withdifferent themes, categories and audiences, the awards encourage the training and improvement of the staff of Brazilian researchers in different areas of knowledge.

Fondo Financiero de Ciencia e Innovación (FONCI)

www.citma.gob.cu/fonci/

The financial instrument for science, technology and innovation (FONCI) projects promotes scientific research. It emphasizes upon innovative projects, selected scientific technological services and research projects associated with established national priorities, aiming at food for the population and animal, renewable sources, confronting climate change, physical planning strategy, development of computerization and automation, comprehensive, development of the population, demographic changes and water management.

European Research Area Net-Latin America, Caribbean and European Union (ERANet-LAC)

https://eranet-lac.eu/

European research area net-latin america, caribbean and european union fosters the involvement of numerous national, international research and innovation funding organisations from europe, latin-america and the caribbean countries. It emphasizes to coordinate and cluster research programmes, aiming at information and communication technologies, bio-economy, bio-diversity / climate, energy and health.

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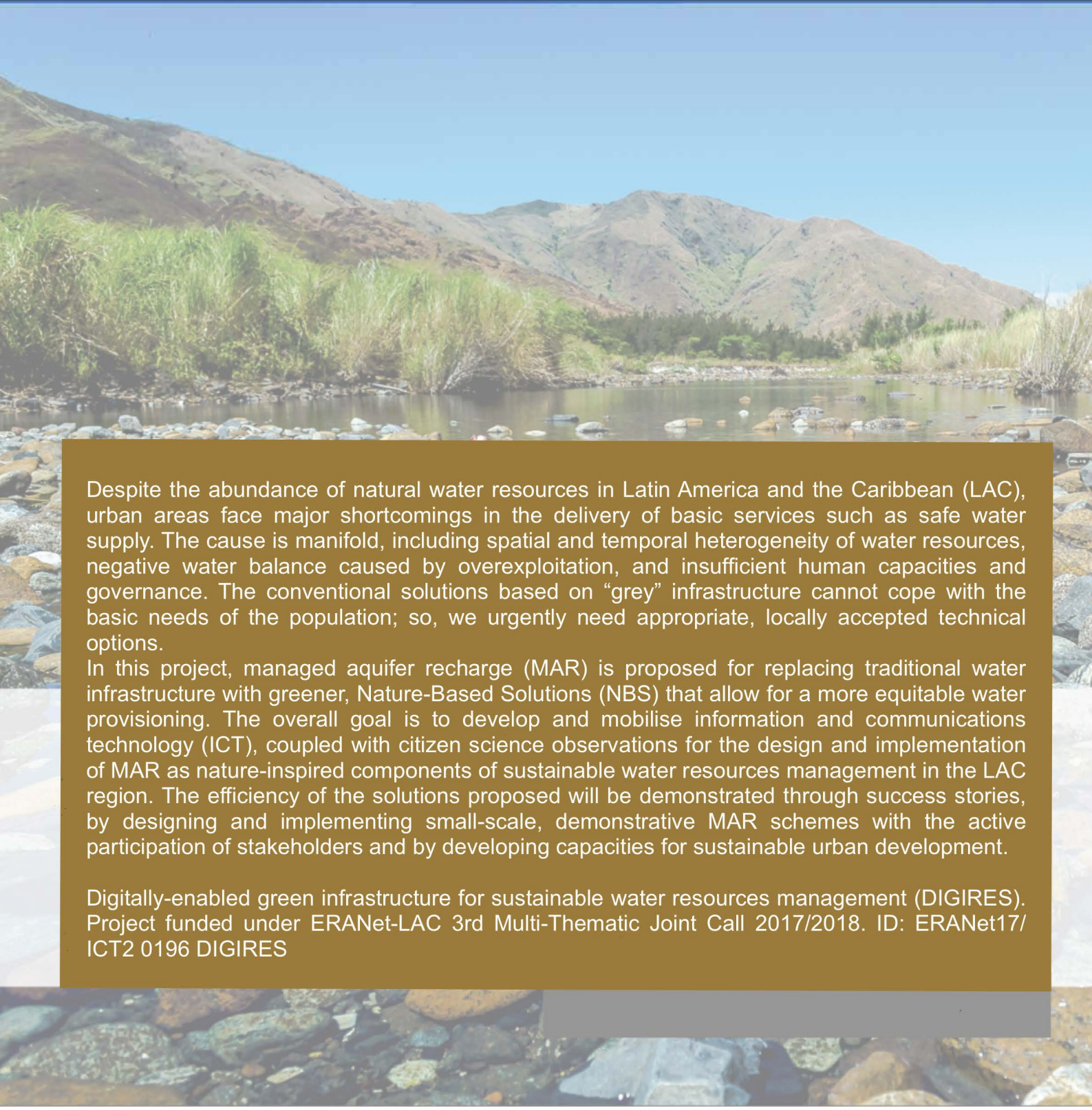

Despite the abundance of natural water resources in Latin America and the Caribbean (LAC), urban areas face major shortcomings in the delivery of basic services such as safe water supply. The cause is manifold, including spatial and temporal heterogeneity of water resources, negative water balance caused by overexploitation, and insufficient human capacities and governance. The conventional solutions based on “grey” infrastructure cannot cope with the basic needs of the population; so, we urgently need appropriate, locally accepted technical options.

In this project, managed aquifer recharge (MAR) is proposed for replacing traditional water infrastructure with greener, Nature-Based Solutions (NBS) that allow for a more equitable water provisioning. The overall goal is to develop and mobilise information and communications technology (ICT), coupled with citizen science observations for the design and implementation of MAR as nature-inspired components of sustainable water resources management in the LAC region. The efficiency of the solutions proposed will be demonstrated through success stories, by designing and implementing small-scale, demonstrative MAR schemes with the active participation of stakeholders and by developing capacities for sustainable urban development.

Digitally-enabled green infrastructure for sustainable water resources management (DIGIRES). Project funded under ERANet-LAC 3rd Multi-Thematic Joint Call 2017/2018. ID: ERANet17/ ICT2 0196 DIGIRES

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