GENESIS – Geologically Enhanced NaturE-based Solutions for climate change resiliency of critical water InfraStructure

Summary

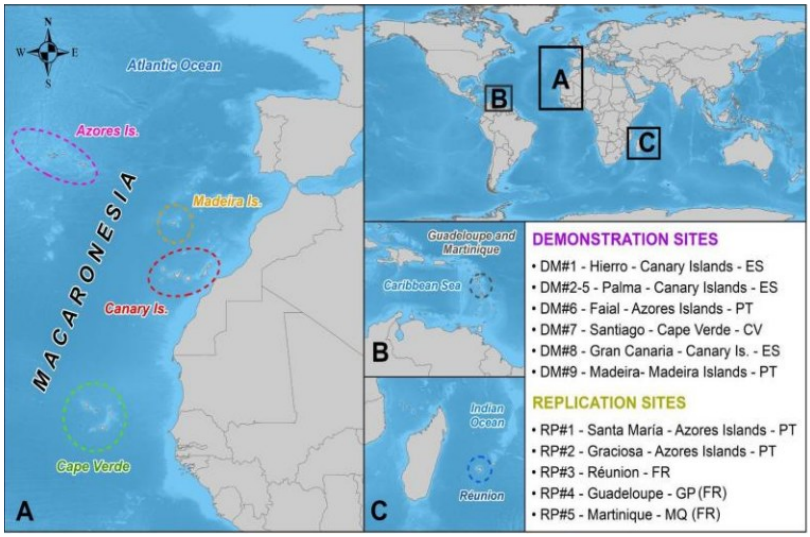

Figure 1. GENESIS demonstrator and replicator sites.

Small Islands have been acknowledged as deserving special attention in their water sector supply infrastructure due to their unique environmental and developmental circumstances that make them especially vulnerable to climate change: "Freshwater systems on small islands are exposed to dynamic climate impacts and are among the most threatened on the planet". In Macaronesia, the water infrastructure is anticipated to experience negative consequences of climate impacts.

Water critical infrastructures hold indispensable importance for human well-being, life, and public health. These infrastructures face the looming threats of climate change, which could lead to severe societal repercussions. The discourse surrounding environmental issues finds its focal point in the Water Sector, given that water is unequivocally the most vital natural resource worldwide. The complex global challenges related to water resources, including the impacts of climate change, burgeoning population, rapid urbanisation, and ageing infrastructure, continue to escalate.

The GENESIS project is testing to their limits and bringing to the table innovative Nature-Based Solutions (NbS), including dry gallery and underground dike-impounded dam systems conceived in Macaronesia (Figure 1). Macaronesian NbS combined with state-of-the-art NbS, such as rainwater harvesting, wetland restoration, and ecosystem-based approaches, will allow advances in a multiple nature-based approach that will create synergistic effects to be investigated. Understanding this non-linear interaction will provide new strategies making adaptation management policies for resilience building against the impacts of climate change on water resources and critical water infrastructure. Macaronesian NbS are conceived under extreme climate change-impacted systems and represent cases of success in practice that deserve to be investigated and further developed to future threats derived from climate change impacts in the EU mainland. How: By merging technological, community- and policy-driven actions, GENESIS is co-developing testing and investigating performance of nine innovative and large-scale NbSs demonstrators across the bioregion of Macaronesia – on the islands of La Palma, Gran Canaria, El Hierro (Canary Islands), Faial (Azores), Madeira, Santiago (Cape Verde) – that is helping to better understand how nature can be harnessed to combat climate change impacts in water critical infrastructure. Who: A multidisciplinary consortium with expertise in groundwater.

hydrogeology and water management, hydroinformatics, digitalisation, water catchment, treatment and supply, social sciences and public engagement, including stakeholders and communities from the nine regions across Macaronesia where the demonstrator sites will be deployed, having the direct support of five replicating communities (Sta. Maria and Graciosa in Azores, Martinique, Guadalupe, and La Reunion) and bringing along local governments from 8 EU regions (e.g. Figure 2), 18 associations of local authorities, 21 municipalities, and 18 geoscience organisations (through ALDA's and the EFG membership). Over a 48-month period, which includes activities such as establishing reference conditions in the areas of the nine demonstrator sites (Macaronesia), designing NbS, integrating digital solutions and services, engaging with communities, conducting operational testing and concept validation, demonstrating impacts, and scaling up and replicating these efforts across the European Union.

Project Reference

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Leading Institution

CSIC – Agencia Estatal Consejo Superior de Investigaciones Científicas (Spain)

Partners

Fédération Européenne des Géologues (Belgium), Inlecom Innovation Astiki Mi Kerdoskopiki Etaireia (Greece), Asociación para la Investigación de la Macaronesia (Spain), La Palma Research Centre SL (Spain), ALDA – Association Européenne pour la Democratie Locale (France), Consejo Insular de Aguas de La Palma (Spain), Município da Horta (Portugal), Canaragua Concesiones SA (Spain), Comunidad de Aguas Tenisca (Spain), Viajes y Prácticas Científicas GeoTenerife SL (Spain), IST-ID Associação do Instituto Superior Técnico para a Investigação e e Desenvolvimento (Portugal), Instituto Tecnológico de Canarias, S.A. (Spain), Laboratório Nacional de Energia e Geologia I.P. (Portugal), Trisolaris Advanced Technologies Lda (Portugal), Universidade de Cabo Verde (Cape Verde),Universidad de La Laguna (Spain), Universidade da Madeira (Portugal), Université de La Réunion (France), Bureau de Recherches Géologiques et Minières (France)

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Funding

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These NbS are designed to capture and recover more than 10 hm3 of runoff from stormwater, storing it underground during the initial stages of implementation. Throughout the project, the capacity for underground reservoir storage of fresh water will be expanded to more than 50 hm3 per year across the Macaronesia region, ensuring a sustainable water supply for irrigation. In total, approximately 35,000 residents will directly benefit from the provision of fresh water through the GENESIS project.

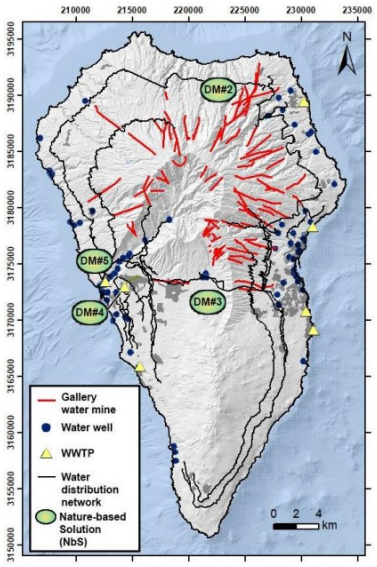

Figure 2. La Palma water infrastructure and NbSs conforming the Deep Demonstrator.

Total

10 512 440.00€

CERIS

119 375.00€

Project website

https://genesisnbs.eu/