Proposals for NORMAN Joint Programme of Activities 2026

Title	**WG-5 Water reuse and policy support**
Type of activity	Working Group activities
Leader	LTU/ DERAC/ EI
Topic / activities	***Background / Justification for the proposed activity:*** In response to the escalating problem of water scarcity and waste management, treated wastewater, and sewage sludge are increasingly identified as reliable alternative sources for a range of applications. More recently, interest in the potential use of urban stormwater as a locally derived alternative water source is growing. Although reuse practices are accompanied by a number of benefits, several questions are still open regarding the potential presence of a range of contaminants of emerging concern (CECs). Current open challenges include the occurrence of chemicals and biological contaminants (e.g. viral genetic material including SARS-CoV-2, antibiotic resistance genes and bacteria), the effects that these contaminants may induce on receiving ecosystems and humans exposed via the environment, the identification of technologies that are able to remove such contaminants and means and solutions to overcome these challenges and promote safe reuse practices further. ***Description of the proposed activity and expected outcomes for 2026:*** A growing interest for data on biological and chemical CECs linked to reuse practices (i.e., the use of wastewater, stormwater and associated sludge/sediments for different purposes e.g. agriculture, aquifer recharge, support public health decision-making, urban and recreational activities, construction, land restoration) has emerged with the EU circular Economy and the zero-pollution action plans. More recently, the EU water resilience strategy (2025) identifies the use of non-conventional water sources as a key measure to strengthen water resilience, as well as an area with a large potential for growth. Further t he adoption of the new EU Regulation on water reuse for agricultural irrigation and the revised EU Directive related to urban wastewater treatment, as well as, the evaluation of the sewage sludge EU Directive all promote reuse as an opportunity to increase water security, with a lack of data on CECs at a local level an identified barrier to a more widespread implementation of reuse practices. In line with the proposed activities built on the WG-5 mandate, the projects related to databases are planned to continue in 2026, with new activities focused on risk methodology development and on stormwater reuse proposed. **Task 1: The Antibiotic Resistance Bacteria and Genes Database** The NORMAN ARB&ARG database was launched in 2021 as an open-access platform for the exchange of data on the occurrence of antibiotic-resistant bacteria (ARB) and antibiotic resistance genes (ARGs), as well as related analytical methods. Since its establishment, the database has been populated with 3,741 data points from 11 countries, covering multiple environmental matrices: 1,240 wastewater, 958 surface water, 705 groundwater, 415 soil, 43 sewage sludge, and 380 other matrices. A detailed overview of the database structure, functionalities, data extraction procedures, and data contributions was presented in the publication “Making Waves: The NORMAN Antibiotic Resistant Bacteria and Resistance Genes Database (NORMAN ARB&ARG) – an invitation for collaboration to tackle antibiotic resistance.” Open-science ARG occurrence datasets have been identified in 2025. Moreover, a literature review to find indicators for ARB&ARG risk assessment has been initiated. The goal for 2026 is 1) to intensify efforts to collect, harmonize, and upload ARB&ARGs data from key scientific publications and 2) propose one or more decision flowcharts to support risk assessment of ARB&ARGs based on different protection goals. **Task 2: Scoping potential for stormwater reuse** A key impact of a warming climate is changes in rainfall patterns, with increases in the frequency of both summer droughts and winter rainfall events predicted for much of North western Europe. This is a particular challenge for urban areas, where their largely impermeable surfaces reduce recharge of water bodies (contributing to water scarcity) and enhances surface runoff volumes (exacerbating flood risks and degrading water quality). Hence the same urban areas can become a hot spot for both floods and droughts, raising the key question: can stormwater be used to meet non-potable water demands? Whilst regulations and policies are in place to facilitate wastewater reuse, the potential to collect, treat and store stormwater at an urban scale has yet to be robustly assessed. This new activity builds on the stormwater reuse component of the reuse article being developed under Task 3. Results obtained in 2025 ○ online WG meeting in March 2025 included a session on partner interests and current projects in stormwater reuse. Whilst interest in the topic was expressed, only one partner was currently monitoring stormwater. However, there is interest in carrying out an international stormwater monitoring campaign Activities planned for 2026 ● Identify partners who can collect stormwater samples located within at least 10 countries ● Develop a common sampling methodology ● Agree extraction protocol with support for partners who can collect samples but not undertake extraction Samples analysed for S21 and S65 substances as described on the NORMAN substance list exchange **Task 3: Databases for CEC risk characterisation in reused environmental matrices** The risks linked to chemicals in reused matrices like water and sewage sludge are mostly unknown and occurrence data as well as quality targets (or threshold values) are needed to characterise and prioritise

	those risks. Therefore, the WG5 has identified as a priority the collection and the dissemination of such data to support research projects, policy makers and environmental managers. In addition, the development of new methodologies to improve the risk assessment is identified as a new priority. The opportunity to upgrade the NORMAN existing databases, EMPODAT for occurrence data and Ecotoxicology for quality targets (hazards data), was identified in 2021 as the most relevant approach to collecting data related to chemical contaminants in reused matrices and to characterise their risk according to the WG1 prioritisation framework. In 2025, the following tasks has been performed to reach this objective: - the EMPODAT database has been enriched with the first data on stormwater (40 data points). - Soil thresholds with various protection targets were searched for the 54 CECs quantified by ISSeP in sewage sludges from Wallonian WWTPs (Belgium). Nine were found and converted into quality targets for sewage sludge after one application on soil for fertilisation. A risk characterisation was conducted on this case study together with another case study from 2024 including 54 substances from Sweden (SLU). Overall, the risk quotients were below one but sufficient to evoke a potential risk after several applications for certain metals, pesticides, phthalates or personal care products. - Peer review publication comparing the risk of CECs present in conventional (i.e. surface water and groundwater) and non conventional (i.e.stormwater and reclaimed water) water sources used in agriculture and aquifer recharge. Several occurrence datasets were provided by the co-authors for the different water sources and also for soil and crops irrigated with reclaimed water. In addition, reliable threshold values in water, soil and crops with various protection targets (e.g. pelagic and terrestrial species, human health) were collected to perform the risk characterisation which is planned to be finalised by the end of 2025. The activities planned for 2026 are the following: - Collection and publication of new occurrence data on stormwater, reclaimed water and/or sewage sludge in EMPODAT. - Collection and publication of new quality targets on soil and conversion in quality targets on sewage sludge for agricultural fertilisation in the Ecotoxicology database. - Develop the methodology to assess the risk of CECs in sewage sludge after several years of application on agricultural soils. - Publish the risk characterisation and prioritisation of CECs in reused waters including stormwater and reclaimed water in a peer-review journal. ***Added value / Link with other NORMAN activities and / or other projects*** ● Support the EU with the implementation of the Regulation on minimum requirements for water reuse (2020/741), the Directive on UWWTP and the sewage sludge Directive (86/278EEC) ● Action Plan and the protection of public health in accordance with the One Health approach. ● Link with WG1 Prioritisation activities for the identification of priority contaminants in environmental matrices intended for reuse in different practices and processes. ● Link with WG7 for the collection of occurrence data on soils impacted by reuse practices and threshold values to protect the soil ecosystems, the feed and the food. ● Identification of the contribution of WWTPs to the environmental spreading of biological hazards. ● Link with other projects: FORMAS Integrated stormwater and groundwater management; FORMAS *Closing the water cycle to increase Urban Resilience to Extreme Events (CUREE)* and VINOVA *Urban stormwater: from risk to resource*
Participants	WG5 members and partners from SCORE and Water Europe networks
Proposed in-kind contribution	LTU/DERAC/EI: Co-leading WG5. LTU, DERAC, EAWAG, SLU, IDAEA, UFZ, IRSA, University of Cyprus, HUJI, INERIS, IRCCS, IMDEA, Sapienza University of Rome: Manuscript preparation for the risk characterisation of chemical contaminants in reused waters i.e. stormwater, reclaimed water, WWTP effluents reused for surface water recharge and agricultural practices. LTU/DERAC/EI launch of new activity on stormwater reuse DERAC, SLU, ISSeP: Risk characterisation of chemical contaminants in sewage sludge reused in soil fertilisation. EI, IMDEA: Improve functionalities of the ARB&ARG database, quality check and import of the ARB&ARG DCTs
Contribution needed from NORMAN Association[1]	DERAC (8,500 €) Collection of occurrence data and quality targets for the NORMAN databases and risk characterisation of reused matrices. EI (4,000 €) Person time to collect, harmonize, and upload ARB&ARG data from key scientific publications.

[1] Please, provide here a transparent justification of the requested resources and of the in-kind contribution, thereby distinguishing between the costs associated with "person-months" for the organisation, the "travelling costs" for invited speakers and the costs for the logistics (e.g. meals, room rental etc.)