

BONUS RETURN**Reducing Emissions by Turning Nutrients and Carbon into Benefits**

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Deliverable No: D.1.6 – Publishable Summary of Second Periodic Report 2018-2019**Ref: WP (1) Task (1.2)****Lead participant: SEI****Date: 2019-07-08****SUMMARY**

The **overall** aim of RETURN is to improve the adaptation and adoption of eco-technologies in the BSR for maximum efficiency and increased co-benefits. The **specific objectives** of the project are to 1) support innovation and market uptake of eco-technologies; 2) reduce knowledge gaps on policy performance, enabling/constraining factors, and costs and benefits of eco-technologies; 3) provide a framework for improved systematic stakeholder involvement; 4) support commercialization of eco-technologies; and 5) establish a user-driven knowledge platform and improve technology-user interface. These objectives are implemented in three river basins: The Vantaanjoki river basin in Finland, the Słupia river basin in Poland, and Fyrisån river basin in Sweden. The project is organized around six Work Packages (WPs) as follows WP1: Coordination, management, communication and dissemination; WP2: Integrated Evidence-based review of eco-technologies; WP 3: Sustainability Analyses; WP4: Environmental Modelling; WP5 Implementation Support for Eco-technologies; and WP6: Innovative Methods in Stakeholder Engagement.

This report summarizes key results from the second year of the project (May 2018- May 2019). Key activities are summarized per work package as outlined in BONUS RETURN Yearly Report 2018-2019.

Progress in comparison to the original research plan is well on track and all activities foreseen for Year 2 have been accomplished. A total of nine deliverables were submitted throughout Year 2. Four open-source scientific papers were published during this period. Deliverables and publications have been made available through the project's website www.bonusreturn.eu. Nine stakeholder meetings in the case studies as well as regional have been hosted by the project. Partners in BONUS RETURN have collaborated with other research programs and initiatives in twelve occasions, seven of these beyond the Baltic Sea Region. Beyond these outputs, BONUS RETURN contributed to the development and implementation of regulations, policies and management practices in two occasions: first through our participation in the first HELCOM SOM (Sufficiency of Measures) Platform meeting 28 February – 1 March 2019 at the HELCOM Secretariat premises in Helsinki. Second, informing the ongoing development of the River Basin Management for Fyris in the municipality of Uppsala. The project has also contributed to designing, implementing and evaluating the efficacy of relevant public policies and governance by promoting the use of pre-commercial procurement and innovation procurement as an avenue for fostering innovative circular solutions in the wastewater treatment sector. The project is also following the Swedish state's public inquiry around sludge that is going to be finalized by January 2020 and will assist as much as possible with research material to ensure a fair assessment and interpretation of available sludge management practices.

The work carried out in **WP1** focused on improving the visual identity of the project, including new logos and dissemination material. Management and communication activities have produced more

and better external outreach material, including an improved website and producing media outputs in the form of a podcast interview and a magazine article for widespread dissemination beyond academic circles. A total of 11 outputs were produced during Year 2. A main activity has been the production of the first part of the film, which has been made available through the project's website and disseminated through media channels (social media, YouTube, newsletters) and through events, including the Regional Learning Workshop in Gdansk (over 50 participants), at the yearly event of the Swedish Water and Marine Agency Forum (around 300 participants), and at the Swedish political week in Almedalen (around 35 participants).

In the second year of the project, **WP2** produces 4 major deliverables including 1) Systematic map report, database and interactive GIS (D 2.3, led by SEI) describes evidence base on ecotechnologies for reuse of carbon, phosphorus and nitrogen from wastewater (globally) and agricultural waste streams (in boreo-temperate regions). The report also highlights the knowledge gaps and clusters on the subject. 2) State of the art report on economic models in BSR (D 2.4, led by University of Copenhagen), reviews which and how selected economic models assess ecotechnologies, what are the benefits and costs of adoption of selected ecotechnologies and economic incentives that trigger or hinder their adoption. 3) Report on current policy instruments and governance structures in BSR (D 2.5, led by SEI) compiles findings from key informant interviews and the literature to understand the main facilitators and barriers to innovation in the recovery of phosphorus in the Baltic context. 4) Synthesis report on major findings from T 2.3 (D 2.6, led by SEI) provides an overview of all major findings in WP2 produced so far.

In **WP3**, sustainability assessments of different potential systems for recovering and reusing nutrients and carbon (organic matter and energy) from different wastes were carried out. The assessments were done in the three different case-studies: the Vantaanjoki catchment area in Finland, the Fyriså catchment area in Sweden and the Słupia catchment area in Poland. A sustainability analysis approach with participatory multi-criteria analysis (MCA) was used to assess different system alternatives in the three case studies. A review of sustainability criteria was used as the starting point for selection of criteria. Systematic maps of ecotechnologies for the recovery and reuse of nutrients and carbon within the Baltic Sea region produced in WP2 were used as the basis for selection of technological system components and overall system alternative design. The MCA was carried out through a workshop where stakeholders were asked to assign weights to the different criteria according to their relative importance. Each system alternative was evaluated for each sustainability criteria and the overall sustainability score was calculated as the weighted sum of criteria scores and weights. Results from this can be found in the "Report from the multi-criteria analysis from workshop 2 with comparisons of the different alternatives in each case study and selection of eco-technologies" (Deliverable 3.3)

In **WP4**, the "core" modelling work with SWAT (Soil & Water Assessment Tool - <https://swat.tamu.edu>) in the three catchments; Vantaanjoki (Finland), Fyrisån (Sweden) and Słupia (Poland) was done. This included updating existing model setups with new data, testing of various modelling options and approaches, model re-calibrations, and critical analysis of model outputs. During the second year of the project model setups, calibration and validation were finalized for all three case study catchments. For Fyrisån, WULS & SEI (with support from SLU) continued the work on model improvement using readily available data. As for Słupia, monitoring of water quality by WULS and sub-contractors in the catchment was also conducted.

During Year 2, opportunities for testing and marketing of the three innovations, awarded by BONUS RETURN, have been initiated in **WP5**. Plans for testbeds for TerraNova and Aquacare are established in Sweden and tests of the RAVITA system is planned in an enlarged pilot in the Helsinki wastewater treatment plant.

Three tasks were carried out in **WP6**. The first includes the development of the Serious Game System,

including data collections, analysis and processing in preparation for the first version of the game in a board format. The second activity was a historical review on socio cultural values influencing policy and governance. The report explores the role that societal values play, and have historically played, when it comes to acceptance of solutions for circular flows of nutrients and carbon. The third activity was the report from the 1st regional learning and exchange event held in Helsinki at the end of period 1 which highlighted clear areas of opportunity where increased targeted policies need to come into place together with the right financial incentives.