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## Living-Lab Rhine – A new approach to transboundary research along the free-flowing Rhine

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The Rhine as Europe's most important waterway is navigable for about 800 km. Over centuries, it has experienced numerous human interventions along this length, from barrage construction in the upper part, through river straightening and regulation, and implementation of flood defence measures along most of its course, to land reclamation in its delta, to name just a few. The large number of changes brought along major environmental issues, namely an overall tendency to insufficient sediment amounts, widespread loss of habitats and biodiversity, and the sensitivity to flooding. Nowadays, the Rhine is an intensively managed river with important industries along its banks and a highly cultivated and densely populated catchment and delta. It is therefore a fundamental challenge to reach an agreement between its role as a waterway, the manifold of other human uses and environmental demands, to improve its ecological condition.

From its last barrage at Iffezheim, the Rhine is free-flowing and crosses the border between Germany and the Netherlands after about 530 km, where it soon connects with the Meuse to form the Rhine-Meuse delta. In this setting, Dutch and German partners take a new approach to address urgent issues on a transboundary level. As part of the pan-European research infrastructure DANUBIUS-RI, two natural laboratories, called the Middle Rhine Supersite (GER) and the Rhine-Meuse Delta Supersite (NL), are being set up to facilitate interdisciplinary research on questions regarding system understanding and ecological improvement of the river to foster the identification of possible solutions. DANUBIUS-RI, the "International Centre for Advanced Studies on River-Sea Systems", is being developed with the goal to support interdisciplinary and integrated research on river-sea systems. It aims to enable, support and bring together research addressing the conflicts between societal demands, environmental change and environmental protection along the continuum from freshwaters to marine waters, by providing easy access to a wide range of fundamental and comparable data from a diverse set of European river-sea systems. It will also facilitate physical access to these systems through multiple supersites.

A first pilot project at the Rhine, supported by INTERREG regional funding of the Euregio Rhine-Waal, involves partners of both the Dutch and the German supersite and focuses on the comparison of sediment measurement and data processing methods in both countries. The goal of this 'Living-Lab Rhine' (LILAR) project is to enable a better transboundary use and comparison of the data to eventually improve the overall understanding of the Rhine sediment regime and to strengthen the transboundary efforts regarding sediment measurements and potentially even river management between Germany and the Netherlands.