

InRePlast – Environmental Policy Instruments for Minimizing Plastic Discharges

Plastics in the Environment – Sources • Sinks • Solutions

Products made of plastics or plastic composites are omnipresent in our everyday lives. Accordingly, both the sources and the types of plastics that can be found in the sewage system - from where they can enter the environment - are also very diverse. How and which plastics end up in wastewater and how these inputs can be reduced with the help of environmental legislation is the focus of the joint research project InRePlast. Based on an analysis of sources, entry points and polluters, the researchers are developing and testing measures for behavioural changes. These measures are intended to motivate households and companies to reduce the amount of plastics entering water bodies. The project partners are also working on proposals to improve the legal framework.

How Do Plastics Enter Sewage Systems?

In Germany, plastics enter the sewage system via three main pathways. First, plastics end up in domestic wastewater due to the incorrect disposal of hygiene products via toilets, the washing of synthetic textiles or via the kitchen drain. A second entry point is wastewater from industry: small plastic particles (so-called pellets or granulates) are flushed into the sewage system as a result of losses incurred by plastic processing companies. Finally, plastics from litter in public spaces or from waste collection sites can be washed via rainwater into sewage systems.

The InRePlast joint research project investigates the quantity and type of plastics that are discharged into the sewage system from various sources within a year. This is carried out in four model municipalities in the urban region of Aachen. The municipalities are examples of different settlement structures: from rural communities to small and medium-sized towns to large cities.

Research in Four Model Municipalities

The plastic emissions are monitored and documented in the wastewater treatment plants of the model municipalities. The researchers examine all material flows for the plastics they contain: Screenings from rake screens, which filter larger particles out of the wastewater, the grit from the grit trap, in which heavy particles settle, the sewage sludge resulting from the biological treatment of the wastewater as well as the purified wastewater, which is finally discharged into a water body.



Small plastic particles from plastics processing companies - so-called pellets - enter the sewage system

In addition, the project partners investigate the plastic inputs from precipitation water on the streets and squares of the municipalities by installing nets in the drains of selected streets to collect solids and plastics. In addition to main roads and roads in industrial areas, the project focuses on roads where plastics industry companies are located. Based on the data collected from the wastewater treatment plants and the precipitation water collection, the scientists extrapolate a projection for Germany using material flow analysis.

Parallel to these investigations, InRePlast conducts surveys of households and plastics companies that provide information, for example, on consumer behaviour and the handling of plastic products. Authorities, environmental and industry associations as well as consumer organizations are additionally surveyed.



Plastics in a wastewater plant

Developing and Testing Measures

Based on the knowledge gained about plastic emissions and entry points as well as knowledge of the polluters and their behaviour, the researchers develop behaviour-based measures to reduce or avoid these discharges. They investigate, for example, whether the polluters can be motivated by social norms or improved information to dispose of waste properly. Furthermore, the scientists examine which legal measures can contribute to reducing plastic discharges into wastewater systems.

The joint research project uses a computer model to simulate the effect of individual environmental policy instruments on plastic emissions into the sewage system. Furthermore, selected measures will be tested by field experiments in households of the model municipalities and in companies. As a result, InRePlast will provide recommendations for legislators, associations and companies as well as households.

Research Focus

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