

Institute of Environment and Sustainable Development

Research cluster “Integrated Water Management”

The Institute of Environment and Sustainable Development, abbreviated in Dutch as IMDO, brings together the expertise on environment and sustainable development within the University of Antwerp, Belgium. IMDO offers multidisciplinary research and education programs that aim to support the complex challenges of society, industry and authorities on sustainability questions. This fact sheet describes the research cluster “Integrated Water Management”.



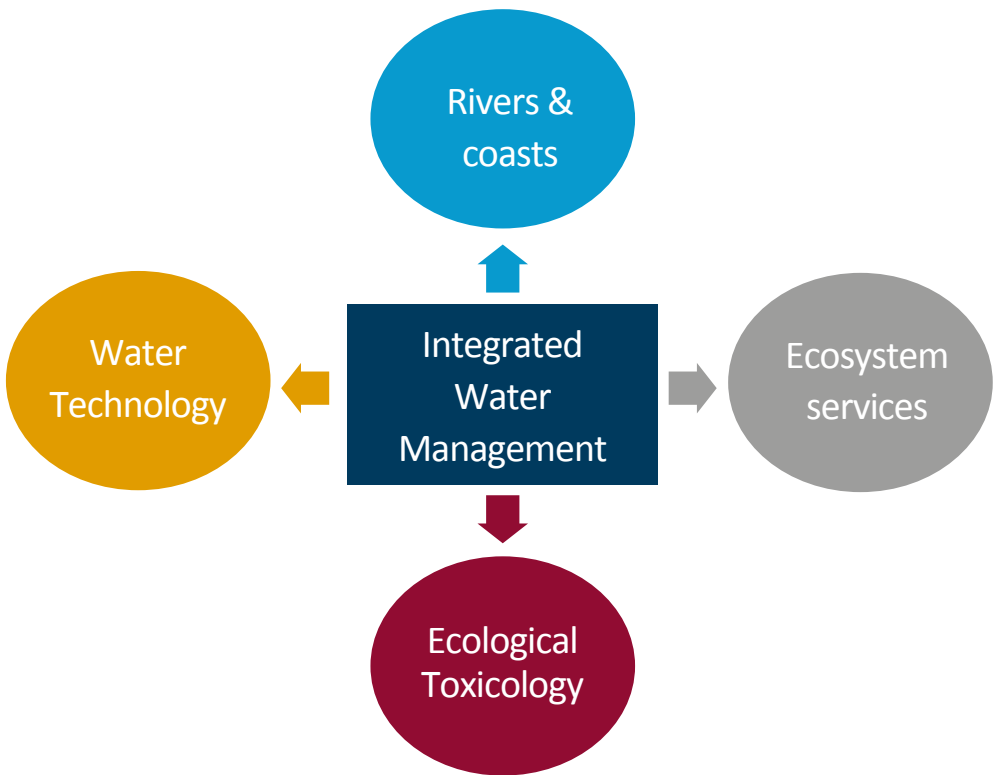
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IMDO

Institute of Environment & Sustainable Development
University of Antwerp

The IMDO research cluster 'integrated water management' focuses on research and development in 4 cross-cutting themes, with expertise across faculties, ranging from engineering, to natural and social sciences, environmental economics and urban studies. The cluster aims for solutions to mitigate the impact of human interventions on river basins, coastal zones and urban regions. Solutions are identified to improve ecosystem functionality together with sustainable economic activity while adapting to climate change.



River & Coastal Management

Long standing expertise on research of various aspects related to integrated water management for rivers and coastal areas (including estuaries), ranging from the biophysical interaction between plants, water flow, sediments, nutrients and animals to socioeconomic impact assessments, multilevel governance, policy evaluation and the multi actor approach.

Key expertise:

- Support to and evaluation of the implementation of European water legislation including the Water Framework Directive & Floods Directive
- Numerical modelling of hydrodynamics, geomorphology and ecological functioning
- Monitoring and analysis of soil and water samples: biogeochemistry and biodiversity
- Experimental 'mesocosm' infrastructure: the link between field surveys and lab conditions
- Adaptation to climate change: measures design & adaptive governance

Principal staff: Patrick Meire, Ann Crabbé, Stefaan Van Damme, Stijn Temmerman

Ecosystem services

Research on the mapping, quantification and valuation of ecosystem services, for river basins and coastal areas. Development of tools and methods to plan the delivery of ecosystem services, in view of sustainable development, ecosystem restoration and adaptation to climate change.

Key expertise:

- Spatial explicit scenario assessment tools (GIS) for the delivery of ecosystem services based on the modelling of biophysical processes including nutrient fluxes, flood attenuation, sedimentation/erosion and primary production
- Assessing performance of nature based solutions, based on economic analysis, biophysical impacts and social acceptance
- Social and economic assessments of Payments for ecosystem services (PES) schemes

Principal staff: Patrick Meire, Gert Van Hecken, Steven Van Passel

Water Technology

Development of novel cleantech for treatment and resource recovery from wastewater and other side streams from industry, cities and agriculture. Our processes are mainly microbial and photocatalytic, with a requirement for resource efficiency and cost effectiveness.

Key expertise:

- Biological nutrient recovery using purple bacteria, micro-algae and nitrifiers
- Real-time control of biological carbon and nutrient removal processes
- Energy producing sewage treatment & energy-efficient biological nutrient removal from industrial waste water based on partial nitrification/anammox or nitrification/denitrification
- Industrial application of aerobic granular sludge technology, saving space, time and energy
- Mitigation of greenhouse gas emissions (N₂O) from wastewater treatment.
- Photocatalytic degradation of dyes, drugs and medicines in wastewaters using nanotechnology

Principal staff: Siegfried Vlaeminck, Pegie Cool, Jan Dries

Ecological Toxicology

Fundamental and applied research on the adaptation of aquatic organisms to their environment and the effect of environmental pollution and other stressors on the health status of organisms, population and communities. Setting of environmental quality standards, integrated environmental monitoring and risk assessment.

Key expertise:

- Impact of environmental stressors on different levels of biological organisation: molecular, cellular, individual behaviour, population and community level.
- Development of adverse outcome pathways and mode of action characterization of toxicants.
- Analysis of inorganic and organic pollutants and risk characterization under field specific conditions.
- Development of site specific environmental quality standards and toxicity identification evaluations using advanced modelling and monitoring approaches.
- Experimental 'mesocosm' infrastructure: the link between field surveys and lab conditions

Principal staff: Ronny Blust, Lieven Bervoets, Adrian Covaci, Gudrun De Boeck, Dries Knapen, Johnny Teuchies



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