

Scientific Institute of Public Service - ISSeP

Towards a holistic approach of risk assessment and management

Interview with Ir. Rose DETAILLE,
Managing director of ISSeP

What are ISSeP's key missions?

ISSeP (*Institut Scientifique de Service Public*) is the Walloon reference laboratory specialized in environmental monitoring (i.e. water, air, soil, sediments and waste) and risk assessment and prevention. ISSeP draws on the scientific expertise of 300 agents from various area of expertise, from field sampling, lab analysis, numerical modelling, geostatistical analysis to Earth observation.

Environmental monitoring activities rely on a 30-person team for samples collection and on 4 analytical laboratories in mineral chemistry, organic chemistry, microbiology and ecotoxicology. These monitoring activities cover ambient air quality network, the control of polluting emissions from 53 industrial facilities pollutants emissions control, the physicochemical, microbiological and ecotoxicological analysis of surface and groundwater as well as sediments, contaminated sites analysis and landfill sites monitoring.

Whilst ISSeP's missions were firstly confined to providing environmental characterization data, its missions now have evolved to run forecasts and assess accidental and chronic risks (i.e. asbestos, electromagnetic fields...). Our risk assessment studies tackle impact assessment on ecosystems, with for instance fish and invertebrates monitored in the BIOTE network, as well as human health exposure through biomonitoring projects and geostatistical approaches. ISSeP skills have also evolved, with for instance land use change monitoring by Earth observation methods. ISSeP experts are also supporting the sectors in which waste is destined to become a resource.

These different missions are based on extensive scientific research which enables us to build our expertise in environmental characterisation as well as in risk assessment and management. We are currently involved in 52 research projects, 14 of which focus on the links between health and the environment - a hot topic especially in times of health crisis. Moreover, ISSeP is incorporating more and more citizen science projects. These are most likely to raise environmental awareness since participants will both benefit from and contribute to science education.

Could you tell us about the ENVI-EHS study on exposure to electromagnetic fields?

The ENVI-EHS study will contribute to improve knowledge of hypersensitivity to electromagnetic fields, also known as idiopathic environmental intolerance attributed to electromagnetic fields (IEI-CEM). This project is a part of the Walloon environmental health plan (ENVIeS) and consists of carrying out double-blind provocation tests on volunteers. The aim is to assess whether people who self-identify as hypersensitive to electromagnetic



fields can detect exposure sessions with a significant success rate. The ENVI-EHS project uses an innovative protocol developed in the Expo-Comm project funded by Anses (France). The protocol was developed and validated with the participation of people considering themselves as hypersensitive during co-creation workshops. Recruitment of volunteers will start at the beginning of 2021. Results are expected by the end of the year.

What other examples of ongoing research projects can you give us?

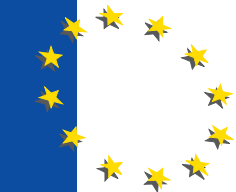
Firstly, the Antibiohub project which investigated the presence of the antibiotic resistant *E. coli* bacteria in two watercourses in Wallonia. An initial inventory of the extent of the phenomenon was established and reported to the FPS (Federal Public Service) Public Health in order to set up an action plan. In 2021 it will be complemented by the Antibiohub 2 project focusing on the presence of antibiotic resistant *E. coli* in bathing waters as they can pose a direct risk to human health. Besides we are currently working on indoor air quality in schools: 294 CO₂ and pollutants sensors were distributed to 166 schools in order to investigate the impact of outdoor pollution on indoor air, the ventilation efficiency and the presence of pollutants in the classrooms. The final results are expected in June 2021.

Could you tell us about the Walloon biomonitoring programme to measure the presence of pollutants in the human body?

Phase 1 of the Walloon biomonitoring included 828 participants, amongst which 284 new-borns, 283 teenagers and 261 young adults. It will provide reference values for new-borns, teenagers and adults exposure to a number of substances or groups of substances including certain metals, polycyclic aromatic hydrocarbons (PAHs), bisphenol and pesticides such as pyrethroids, organophosphates and glyphosate. The results are currently being analysed and are expected in the first quarter of 2021. A statistical analysis will be carried out to detect correlations between specific behaviour, socioeconomic indicators, living places, etc. In phase 2, the objective is to recruit 300 children aged 3 to 5 years old, 300 children aged 6 to 11 and 300 adults aged 40 to 59 in order to establish Walloon reference exposure values for these age categories.

Could you present us the new website www.Wallonair.be?

ISSeP manages the Walloon air quality monitoring networks and returns the data to AwAC (Walloon Air and Climate Agency). The former website that published ambient air quality data in Wallonia (<http://airquality.issep.be>) was redesigned to meet current web uses. Launched on the 11th of September 2020, the





Microbiology cell. Filtration of cooling tower samples: search for legionellae



Algal growth inhibition test at the Ecotoxicology laboratory

EOWG, ISSeP promotes Walloon competences and links together the activities of the different sectors for a better use of EO in public services.

In your opinion, what are the main future challenges for research at ISSeP?

Anticipation is key in sustainability issues. Our main goal must be to preserve our environment and prevent it from further degradation. With its multidisciplinary and complementary expertise in environment monitoring, ISSeP is ideally placed to help bring greater sustainability in environmental management.

web solution www.Wallonair.be proposed by ISSeP also presents scientifically accurate data but stands out for its adaptation to smartphones. Furthermore, new functionalities have been added: a cartographic approach to get regional or local (city) information on ambient air quality in Wallonia; didactic explanations about the measured pollutants, the used methods and health effects; and real-time viewing (24 or 48h depending on the pollutants) within an in-house developed module to simulate long-term data history.

What is ISSeP's contribution to Earth observation?

Earth observation (EO), supported by the European Copernicus programme, offers many opportunities to Walloon stakeholders for a more intelligent and dynamic monitoring of their territory. Since 2015 ISSeP Remote Sensing and Geodata Unit has developed research exploiting the potential of these new data at different levels, from satellites to UAVs. It also co-organises, with the Skywin competitiveness cluster, a joint Earth Observation Working Group (EOWG) gathering public services, private companies, universities and research centers. Eleven events have been organized since 2015 on themes such as land use mapping, agriculture, forestry, Pleiades data, thermography, air quality and atmosphere quality... and included brainstorming and networking sessions. The application-oriented topics cover scientific, technical and commercial issues. In September 2019, a position paper entitled "Towards a reinforced use of Earth observation technologies by Walloon public services for the benefit of citizens in the digital Wallonia of tomorrow" was presented to the Walloon Parliament. This paper was the result of a 3-year collective work involving nearly 140 people. It provided precise recommendations and already showed several concrete achievements. Through the

For this purpose, ISSeP must continuously work on the development of analytical techniques for lowering its quantification limits and measuring new pollutants such as endocrine disruptors (BIODIEN and CARIBOUH projects), pesticides (and its metabolites) or microplastics (Microplastsoil project). ISSeP must gather its scientific expertise and tools to adopt the necessary holistic approach of risk assessment and management. For instance, it is crucial to get the most out of the monitoring data (more than 3.000.000 data on environment quality produced each year) on local emissions and diffuse contaminations, and include this data in predictive models to assess the fate of pollutants in the environment. Including this whole range of aspects would help prioritize risk management actions and policies.

Furthermore, ISSeP is involved in understanding and mitigating the impacts of climate change and urbanization in order to preserve ecosystem services. ISSeP must pursue its efforts in studying the potential risks and opportunities of circular economy promoted for the ecological transition.

As a conclusion, ISSeP promotes a holistic approach of risk assessment in order to preserve our environment and allow its sustainable management.



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