

# Towards a follow-up of MEDUWA

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## EU Water Framework Directive (2000/60/EC)

Expects Member States to aim for:

**“good status of surface water and groundwater by progressively reducing the discharge of pollutants into water, in particular through prevention and source-based policies”.**

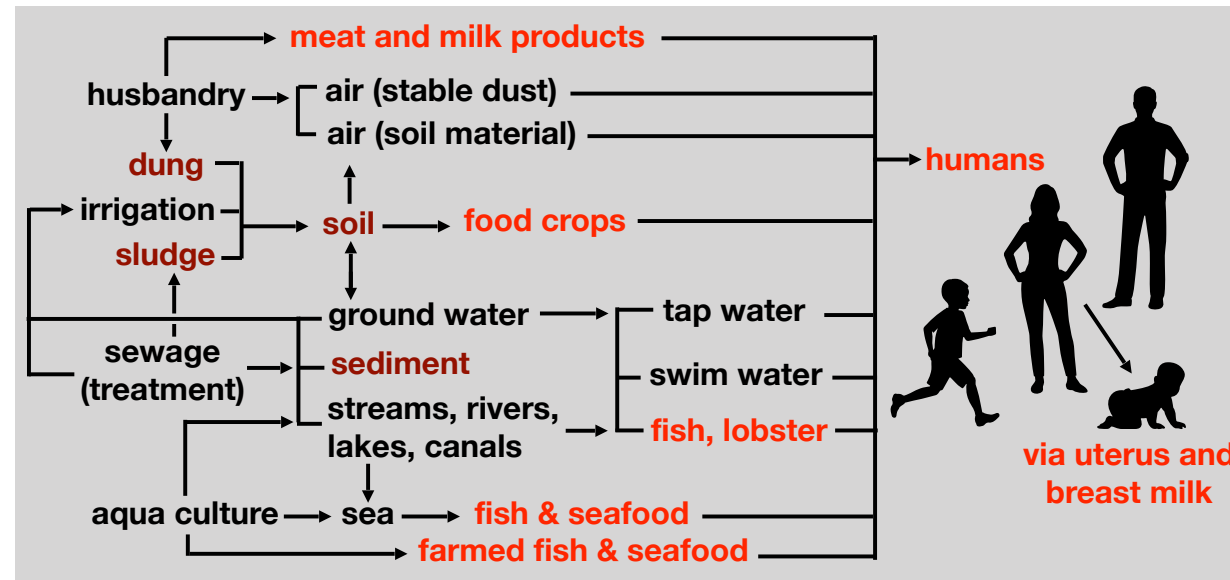


The European Water Framework Directive expects Member States to aim for good status of surface water and groundwater by progressively reducing the discharge of pollutants into water, in particular through prevention and source-based policies.



The MEDUWA project is an attempt to contribute to this societal goal. And we hope to continue with this work after MEDUWA.

# Human exposure to medicines & AMR



Legend:

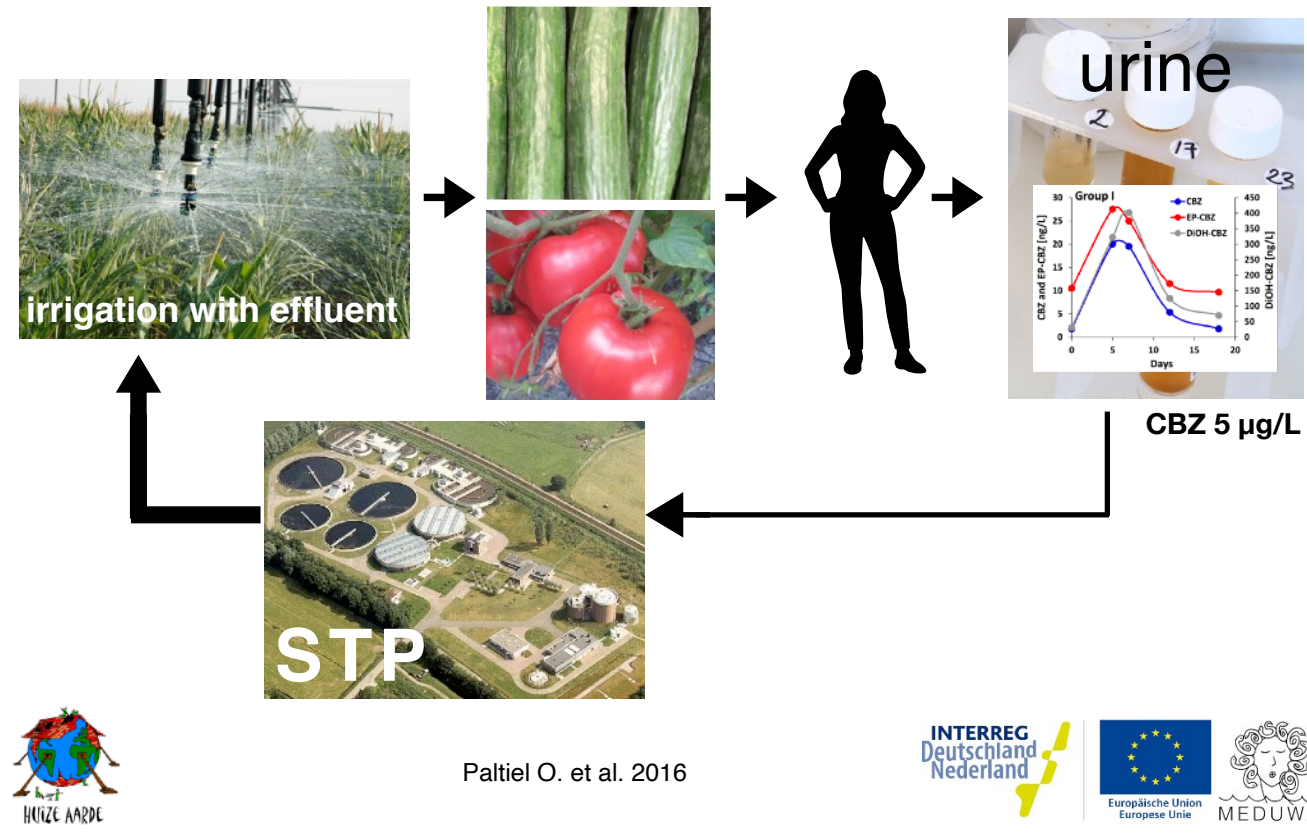
dark red = accumulation

light red = bioaccumulation and/or biomagnification



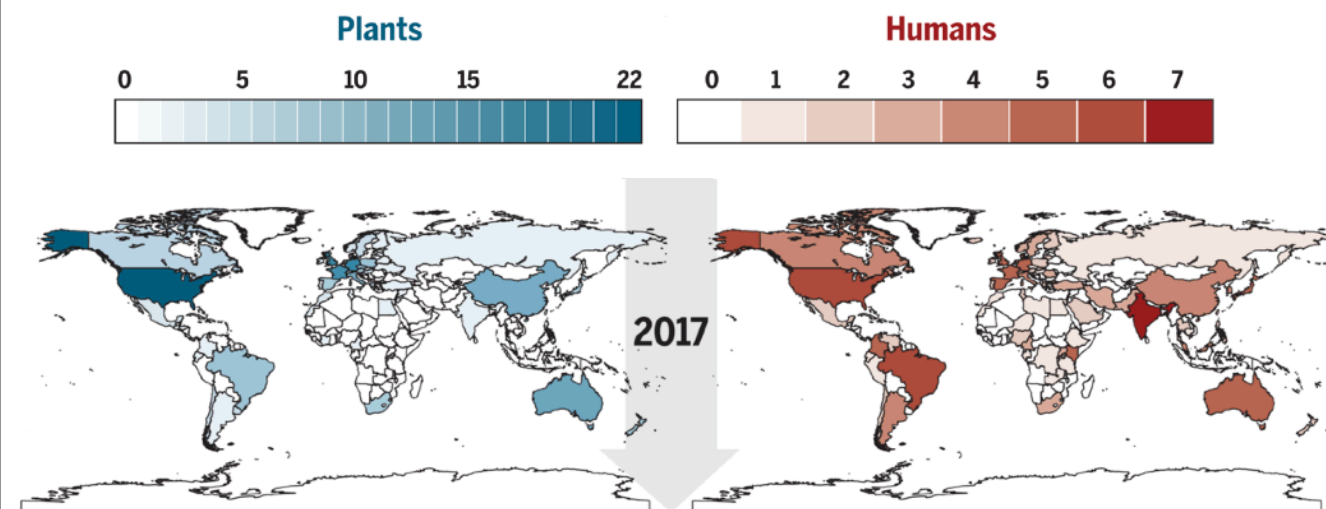
However, water is not the only medium where chemical and biological contaminants of medical origin end up and can cause damage. Little is known about the fate of these contaminants in other environmental compartments. What happens to them in the soil? How quickly or slowly do they spread via groundwater?

# carbamazepine in urine of healthy people



We have come to realise that exposure of humans and animals is not limited to the water chain, but also to the food chain via water and via the soil. Measurement data in food are still scarce.

## increase in azole resistant fungi in plants and humans

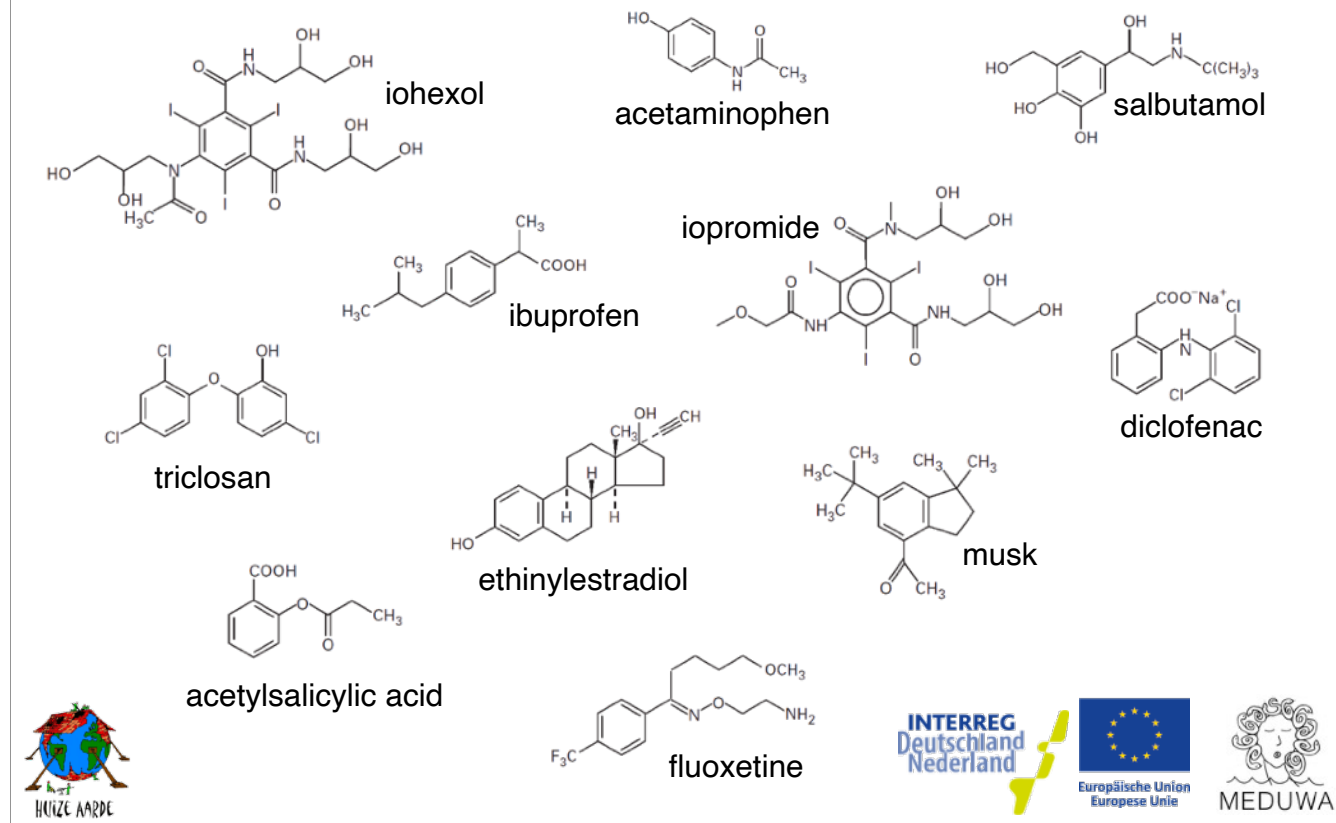


(Sources in) Fisher M. C. et al. 2018



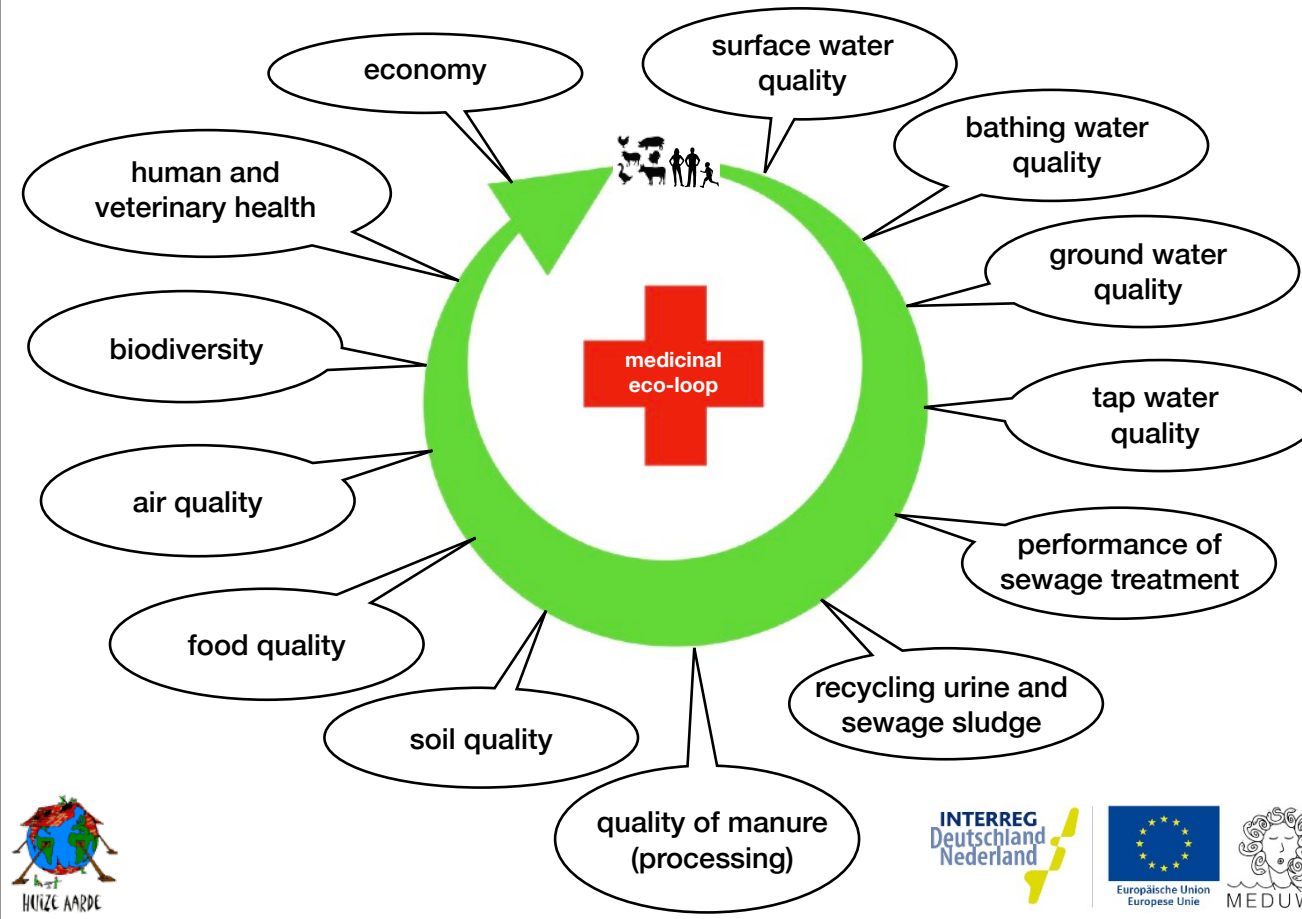
We also learned that it's not only bacteria that are becoming increasingly multi-resistant, but also fungi.

# In reality, there are complex mixtures



In reality, there are only complex mixtures whereas most research and legislation focuses on individual components. What we have to understand yet, is how medicinal contaminants interact with each other and with other anthropogenic contaminants of biological and chemical origin, like pathogens, pesticides, nano-materials, micro-plastics, etc.

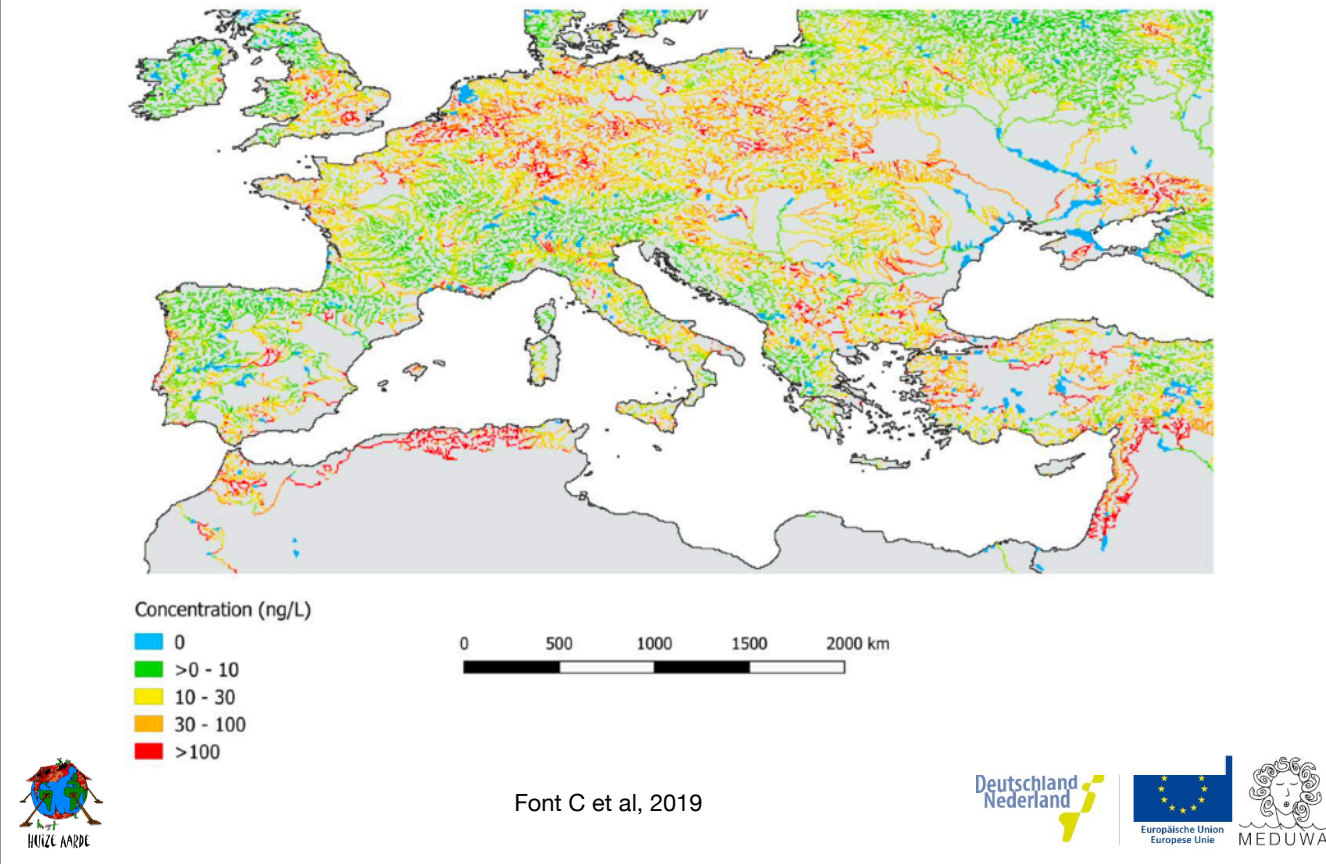
## societal consequences of medicinal environmental cycle



In addition to public health, we see that this issue touches several societal, including economic, aspects. **Possible damage depends on which societal functions are affected.** Can irrigation no longer be carried out? Is the extraction of drinking water at stake? Can recreation in uncontrolled surface water (wild swimming) still take place?



## Simulated mean annual diclofenac concentration



By the middle of this century, pollution by persistent medicines will have increased worldwide. For example, diclofenac will be increased by 65%. Water technologies can only solve half the problem. According to the researchers, other solutions, such as limiting the use of diclofenac, are therefore desirable (Font C et al, 2019).

# issue higher on the political agenda

## European Green Deal COM(2019) 640

### *2.1.8. A zero pollution ambition for a toxic-free environment*

**Creating a toxic-free environment requires more action to prevent pollution from being generated as well as measures to clean and remedy it.** To protect Europe's citizens and ecosystems, the EU needs to better monitor, report, prevent and remedy pollution from air, water, soil, and consumer products. To achieve this, the EU and Member States will need to look more systematically at all policies and regulations. **To address these interlinked challenges, the Commission will adopt in 2021 a zero pollution action plan for air, water and soil.**

**The natural functions of ground and surface water must be restored.** This is essential to preserve and restore biodiversity in lakes, rivers, wetlands and estuaries, and to prevent and limit damage from floods. Implementing the 'Farm to Fork' strategy will reduce pollution from excess nutrients. In addition, the Commission will propose measures to address pollution from urban runoff and from new or particularly harmful sources of pollution such as micro plastics and chemicals, including pharmaceuticals. There is also a need to address the combined effects of different pollutants.



The theme has now moved up on the political agenda (see, for example, the EU Strategy on Pharmaceuticals In the Environment and the European Green Deal, which also aims to stop the emission of medicines into the water). The next step is to develop concrete action options throughout the product chain.

# Solutions as much at the source



Solutions do not only lie in the field of mitigation, but in accordance with the EU Treaty and the Water Framework Directive, also prevention needs much attention. The general principle here is, the closer to the source, the more efficient the approach. The cost-effectiveness of source-based measures needs to be investigated. Living labs such as MEDUWA are a way to test such innovations and speed up their introduction into society. Therefore we hope to be able to follow up on MEDUWA.

# Guidelines for sub-projects I

**Working area:** INTERREG-VIA cross-border subsidy area

**Focus:** intersection environment & health

**Connect to INTERREG Strategic Initiatives:** (Cross-overs between) Health & Life Sciences; Agribusiness/Food; High Tech Systems & Materials.

**Aim:** to develop and scale up innovative sustainable methods that prevent contamination of the air-water-bottom-food-nexus with biological and chemical contaminants, such as multi-resistant bacteria and fungi, pathogens, medicines, pesticides, nano-materials, microplastics, etc.

**Variables to be considered:** increasing air, water and soil temperatures, droughts and floods.



Concerning a follow-up project, the INTERREG-VI conditions are not yet known, although probably they will not differ substantially from INTERREG-V. As far as SHA is concerned, proposals for a follow-up project should look like as follows.

# Guidelines for sub-projects II

**For whom:** cross-border, cross-sector and multidisciplinary coalitions of SME's, research institutes, (semi)governments and other organisations.

**Period:** 2021 - 2024 (maximum four years per subproject).

**Pilot area:** (if applicable) the 3780 km<sup>2</sup> Vecht basin with a total of 355 km of river (incl. Steinfurter Aa, Dinkel and Regge) and with a total of 1.15M inhabitants.

**Topics:** (examples) food quality; groundwater; risks of wild swimming; spread of multi-resistant fungi; etc.

**Budget:** (subject to change) maximum 300K for institutions etc.; 400K for research institutes with a PhD; and 500K for SMEs.

**Own contributions:** (subject to reservation) 25% research institutes and other organisations; 50% SME.

**Selection of candidates:** committee in preparation.

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