If not, what? The Costs of Neglecting the Nexus of Water, Food and Health

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micropollutants via pharmaceuticals:
- Iodised X-ray contrast media
- Antiepileptic carbamazepine
- Analgesic/antiphlogistic diclofenac
- Antibiotic sulfamethoxazole
- Lipid reducers
- Beta-Blockers
- Synthetic hormones

Case study 1: Health – Water – Food

Health
medical treatment

Food
soil and ground water

Water
micropollutants in wastewater

Micropollutants via pharmaceuticals

Human medicine
- excretion
- wastewater
- WWTP
- sludge
- treated sewage
- surface water
- soil/food
- groundwater
- drinking water

Animal medicine
- excretion
- manure
- soil/food
- surface water
- groundwater
- drinking water

Improper disposal


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Whose costs?

- Pharmaceutical companies
- Pharmacies
- Hospitals
- Medical doctors
- Health insurances
- Households
- Waste water treatment
- Drinking water treatment
- Farms
- Agri-food companies
- Authorities
- Politics
- Banks
Case study 2: Water–Food–Health

Water
use for cotton fields

Health
salinization

Food
water availability for fisheries
Whose costs?

Fishermen

Cotton pickers

Developers

Environmentalist

Waterworks

Regulators
Case study 3: Food – Water – Health

Food
irrigation with untreated wastewater

Water
groundwater contamination

Health
pollution
Whose costs?

Intended Activity: Water
- 50m³/s untreated wastewater from Mexico City via channel/tunnel

Intended Activity: Food
- 90,000 ha irrigated with untreated wastewater for the past 100 years

Unintended Results: Water
- Aquifer recharge as an indirect result
- Infiltration through channels and irrigation returns
- Groundwater pollution

Unintended Results: Health
- Public health/environmental issues

Unintended Results: Food
- Soil contamination
- Crop pollution
Calculating the Net Effect – ISO 14007

Costs of action for:
- avoiding
- reducing
- substituting
- recycling
- disposing

Costs shifted to or shared with:
- customers
- suppliers
- government
- insurances

Costs of inaction:
- damage costs
- legal sanctions, e.g. fees
- licences
- insurance costs
- opportunity costs
Barrier analysis

- Lack of objectives
- Lack of incentives
- Lack of knowledge
- Lack of processes
- Lack of resources

Adapted from Herrmann, Guenther, Journal of Cleaner Production, 2017