SWIM and Horizon 2020 Support Mechanism

Working for a Sustainable Mediterranean, Caring for our Future

Sustainable Water Integrated Management and Horizon 2020 Support Mechanism

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Olive Mills environmental performance indicators and monitoring

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Presentation Outline

- Environmental Performance Indicators (EnPIs)
- Examples of key performance indicators
- EnPIs and Benchmarks of excellence
- EU Legislation on olive mills

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What are the Environmental Performance Indicators

- **Environmental key performance indicators** (KPIs or EnPIs) are quantitative measures (actual numbers) that put values on a business' **environmental performance**.
- Most businesses will already have facts and figures they can use to produce **environmental** KPIs, such as: energy bills.

Why are EnPIs important

Cost savings and productivity gains

Businesses can save costs and increase efficiency through **reducing and managing resource use**. Typical areas where cost savings are identified include the use of raw materials and supplies, reductions in waste, water and energy use and transport, travel, and packaging. By reducing environmental impacts, such as waste to landfill, businesses can significantly reduce any associated taxes or levies, or avoid the cost of compliance altogether.

Improved sales

Businesses can benefit from **improved reputation** amongst their customers (and potential customers) by reporting on relevant environmental issues in a clear and transparent way. Good reporting improves customer confidence. Informing customers of your efforts to improve your organisation's environmental performance can lead to increased confidence in your products and services.

Why are EnPIs important

Preferred supplier status

Dealers are increasingly requiring suppliers and contractors to submit environmental performance information to satisfy the expectations of their own shareholders. **Reporting on environmental information** can make you a more attractive supplier than your competitors.

Increased attractiveness to the investment community

Investors, financial analysts and brokers are asking questions about the sustainability of business operations. Reporting on environmental matters provides a good indication of what measures an organisation is taking to reduce risks and develop opportunities.

Why are EnPIs important

Product and service innovation

Measuring and managing environmental impacts drives and supports innovation in product and service development, helping to secure new markets and customers or safeguard existing ones.

Employee recruitment

Clear reporting of an organisation's efforts to manage its environmental performance helps to attract high-calibre employees as good environmental reputation and performance can be an important factor in an employee's choice of employer.

License to operate

Managing environmental impacts and minimising the organisation's impact on the environment can **reduce the exposure to fines**. It can improve relations with regulators and help ensure the company maintains its licence to operate by providing assurances about compliance with environmental legislation and conformity with other relevant laws and regulations.

Environmental Performance Indicators (EnPIs)

When choosing the set of indicators for reporting, they should take into account the significant environmental aspects identified by the organisation in its **environmental review**.

Indicators need only be taken into account where relevant to those environmental aspects that are judged as being most significant in the environmental review.

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Environmental Performance Indicators (EnPIs)

Companies should describe how relevant best environmental management practices and **benchmarks of excellence** (which provide an indication of the environmental performance level that is achieved by best performers) were used **to identify measures and actions**, and possibly to set priorities, to (further) improve their environmental performance.

Similarly to environmental performance indicators, the relevance and applicability of the best environmental management practices and benchmarks of excellence should be assessed by the organisation according to the significant **environmental aspects identified by the organisation** in its environmental review, as well as technical and financial aspects.

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Examples of Key Performance Indicators

Emissions to air

1. Greenhouse Gases
2. Acid Rain, Eutrophication and Smog Precursors
3. Dust and Particles
4. Ozone Depleting Substances
5. Volatile Organic Compounds
6. Metal emissions to air

Examples of Key Performance Indicators

Emissions to water

7. Nutrients and Organic Pollutants

8. Metal emissions to water

Examples of Key Performance Indicators

Emissions to land

9. Pesticides and Fertilisers
10. Metal emissions to land
11. Acids and Organic Pollutants
12. Waste (Landfill, Incinerated and Recycled)
13. Radioactive Waste

Examples of Key Performance Indicators

Resource use

14. Water Use and Abstraction
15. Natural Gas
16. Oil
17. Metals
18. Coal
19. Minerals
20. Aggregates
21. Forestry
22. Agriculture

Food sector direct environmental aspects

Most significant direct environmental aspects	**Related main environmental pressures**
Industrial processes and related operations	Emissions to water
	Emissions to air (NOx, SOx, VOCs, particulate matter)
	Solid waste generation
	Water consumption
	Energy consumption, GHG emissions (CO2)
Cleaning operations	Water consumption, use of chemicals, waste water generation
Transport and logistics	Energy consumption, GHG emissions, emissions to air (CO2, CO, SO2, NOx, particulate matter etc.)
Packaging	GHG emissions, energy consumption, resource depletion (material use)

Most significant indirect environmental aspects

Most significant indirect environmental aspects	**Related main environmental pressures**
Supply chain management	GHG emissions, energy consumption, water consumption, emissions to air etc
Agriculture	GHG emissions (CO2, CH4), biodiversity loss, emissions to air, eutrophication, water consumption
Packaging	GHG emissions, energy consumption, resource depletion (material use)
Transport and logistics	Energy consumption, GHG emissions, emissions to air (CO2, CO, SO2, NOx, particulate matter etc.)
Retail	Energy consumption, food waste generation
Food preparation by consumers	Energy consumption, food waste generation

Performing an environmental sustainability assessment of products and/or operations

When undertaking an environmental sustainability assessment, food manufacturers can face a number of challenges which include the complexity of the product and the accessibility of information

It can be expensive and time-consuming to undertake LCAs, and certain environmental impacts may also be beyond the control of the manufacturer and thus very difficult to act upon, even if they can be quantified.

Performing an environmental sustainability assessment of products and/or operations

Environmental performance indicators	Benchmarks of excellence
Percentage of sites or products assessed using a recognised environmental sustainability assessment protocol (%).	A company-wide environmental sustainability assessment covering all operations is implemented
Number of sites or products assessed using a recognised environmental sustainability assessment protocol.	An environmental sustainability assessment for all new products under development is carried out.

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Improving or selecting packaging to minimise the environmental impact

Minimise the environmental impact of packaging (i.e. primary, secondary and tertiary packaging), throughout the product life cycle, for example by the use of:

— ‘lightweighting’, i.e. packaging with reduced weight but the same protective performance,

— bulk packaging of ingredients delivered by suppliers to the company,

— refills, e.g. refillable packaging to be returned to the food and beverage manufacturer,

— returnable secondary and tertiary packaging,

— packaging containing recycled material,

— packaging containing bio plastics provided that the environmental benefits of this choice can be proven.

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Improving or selecting packaging to minimise the environmental impact

Environmental performance indicators	Benchmarks of excellence
Packaging-related CO2 emissions per weight/volume unit of product manufactured (packaging g CO2eq/g or ml of product)	An eco-design tool is employed when designing packaging to identify options with a low environmental impact.
Weight of packaging per weight/volume unit of product manufactured (g of packaging/g or ml of product)	
Percentage of packaging which is recyclable (%)	
Percentage of recycled material content in packaging (%)	
Average density of net product category per volume of packaged product (kg of product/l of packaged product)	

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Environmentally friendly cleaning operations

Reduction of the amount of water, energy and chemicals used during cleaning operations by:

— implementing and optimising ‘Cleaning In Place’ (CIP) systems by optimal cleaning preparation

— optimising manual cleaning operations by raising awareness, monitoring the energy, water and chemicals used, dry clean-up and cleaning of equipment as soon as possible after use,

— minimising or avoiding the use of harmful chemicals by capturing and reusing cleaning agents and using less harmful and biological chemicals,

— better production planning in order to avoid changes in the production process that require the equipment to be cleaned,

— better plant design by improving the design of vessels, pipework, etc. so as to eliminate areas that detergent cannot reach or where fluid accumulates.

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Environmentally friendly cleaning operations

Environmental performance indicators	Benchmarks of excellence
Cleaning-related energy use per unit of production (kWh/weight, volume or number of products)	-
Cleaning-related water use per unit of production (m3/weight, volume or number of products)	
Cleaning-related water use (m3) per day	
Cleaning-related waste water generation per unit of production (m3/weight, volume or number of products)	
Cleaning-related waste water generation (m3) per clean	
Mass (kg) or volume (m3) of cleaning product used per unit of production (weight, volume or number of products)	
Share of cleaning agents (%) with an ISO Type I ecolabel (e.g. EU Ecolabel)	

Improving transport and distribution operations

Improve the environmental impact of the transport and logistics operations, from a more strategic/general level down to operational considerations, by:

— efficiency monitoring and reporting for all transport and logistic operations,

— integration of transport efficiency into sourcing decisions and packaging design,

— shift towards more efficient transport modes (e.g. rail, maritime),

— optimisation of warehousing (i.e. thermal insulation, location, management),

— route optimisation (for road transport): optimisation of route network, route planning, use of telematics and driver training,

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Improving transport and distribution operations

Environmental performance indicators	Benchmarks of excellence
Specific transport GHG emissions per product quantity. kg CO2eq emitted during transport per: tonne, m3, pallet, or case (according to relevance) or kg CO2eq per net amount (tonne, m3) of product delivered	For 100 % of transport and logistics operations (including third-party providers), the following indicators are reported: % of transport by different modes; kg CO2eq per m3/pallet etc. delivered.
Specific transport GHG emissions per product quantity and distance. CO2eq emitted during transport per tonne of product and kilometre transported (kg CO2eq/tonne/km)	For in-house transport and logistics operations, the following indicators are reported: load factor for freight transport (% weight or volume capacity); kg CO2eq per t·km.
Vehicle fuel consumption for road transport (l/100 km)	Insulation of temperature-controlled warehouses is optimised.
Total energy use of warehouses (kWh/m2) over a specific timespan (e.g. annual) normalised by relevant unit of throughput (e.g. kg net product)	Heavy goods vehicles' average fuel consumption is less than or equal to 30 l/100 km.
Percentage of transport by different modes (%)	
Load factor for freight transport (e.g. truck load factor) (% weight or volume capacity)	
Percentage of empty runs for road vehicles (%)	
Percentage of deliveries carried out via back- hauling (%)	

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Deploying energy management and improving energy efficiency throughout all operations

Manage energy use throughout all operations of the company by:

— putting in place a comprehensive energy management system (EnMS) such as ISO 50001, as part of an environmental management system such as EMAS,

— installing meters (or smart meters) at the individual process level, ensuring accurate energy monitoring,

— carrying out regular energy auditing and monitoring to identify the main drivers of energy use (at the process level),

— implementing appropriate energy efficiency solutions for all processes in a facility, in particular taking into account potential synergies in heat, cold and steam demand,

— investigating and, if possible, exploiting synergies for the production and use of electricity, heat, cold and steam with neighbouring facilities (i.e. industrial symbiosis).

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Deploying energy management and improving energy efficiency throughout all operations

Environmental performance indicators	Benchmarks of excellence
Overall energy use per product unit (kWh/weight, volume, value or number of products)	A comprehensive energy management system (EnMS) is in place (e.g. ISO 50001)
Overall energy use per facility surface area (kWh/m2)	Regular energy auditing and monitoring are deployed to identify the main drivers of energy use.
Overall energy use (kWh) for specific processes	Appropriate energy efficiency solutions are implemented for all processes in a facility.
Net energy use (i.e. overall energy use minus recovered and renewable energy) per product unit (kWh/weight, volume, value or number of products)	Synergies in heat/cold/steam demand are exploited across processes, within the facility and neighbouring ones.
Deployment of heat exchangers to recover hot/cold streams (y/n)	
Insulation of all steam pipes (y/n)	

Integrating renewable energy in the manufacturing processes

Renewable heat systems rely on the availability of a suitable local renewable energy source and the heat and temperature requirements of the production processes.

Additionally, retrofitting an already existing production facility with renewable heat requires a detailed technical feasibility analysis taking into account the current layout and the constraints of the current production processes.

Integrating renewable energy in the manufacturing processes

Environmental performance indicators	Benchmarks of excellence
Percentage of the energy use of production facilities (heat and electricity separately) met by renewable energy sources (%)	On-site or nearby renewable heat energy generation for suitable manufacturing processes is implemented.
Percentage of the energy use of production facilities (heat and electricity separately) met by on-site or nearby renewable energy sources (%)	Process technologies are adapted to better match the supply of heat from renewables.

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Olive Oil manufacturing

Minimising water consumption in olive oil separation

During the separation (also known as clarification or polishing) of the olive oil from the remaining fine particles and water, BEMP is to use a vertical centrifuge that minimises the use of water. The quantity of water used should be kept to the minimum amount required to achieve the desired final olive oil composition.

This BEMP is applicable to all olive oil manufacturers, including SMEs. The amount of water needed in the separation phase is highly dependent on the quality of the oil coming from the decanter.

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Olive Oil manufacturing

Environmental performance indicators	Benchmarks of excellence
Water use in olive oil separation (l) per weight (tonnes) of olives processed or per unit volume (l) of olive oil manufactured	Water used in olive oil separation is less than 50 l (5 %) per 1 000 l of olive oil manufactured

Olive Oil manufacturing

Reduced washing of olives upon reception, is to reduce the need for olives to be washed before being processed into olive oil. For instance, this can be achieved by harvesting the olives from the trees.

To this aim, olive oil manufacturers can establish an appropriate cooperation with the farmers providing the olives. The adoption of appropriate measures to recycle the water still needed to wash olives can deliver further water savings.

Olive Oil manufacturing

This BEMP is applicable to a broad range of olive oil mills:

— **small oil mills** (which process olives grown on their own olive trees): these companies control the whole olive oil production process (from the production of olives through to sale to the customer) and therefore can implement directly the measures to deliver clean olives to the mill,

— **industrial olive oil producers** (which process olives supplied through an appropriate contract with farmers): different prices can be offered for the olives delivered, depending (among other parameters) on the level of dirtiness of the olives,

— **cooperatives** (which process the olives of their members): these organisations establish agreements among their members and a low degree of olive dirtiness or certain harvesting practices can be included among the agreed parameters.

Olive Oil manufacturing

Environmental performance indicators	Benchmarks of excellence
Ratio between the quantity of water used to wash the olives upon reception and the quantity of olives processed (l of water per tonne of olives)	For olives delivered clean, no water (0 l) is used to wash the olives upon reception

Legislation on Waste in the EU

As far as handling the processing of olive residues, the reform of common agricultural policy in olive oil does not provide specific provisions for the management of olive mill wastes. Thus, each Member State (MS) should develop **national legislation** governing this area, which should be in line with the EU legislation.

A number of EU laws regulate waste management and the core legislative act is the **Waste Framework Directive (2008/98/EC)**, which also includes rules on hazardous waste and waste oils, which were previously covered by separate legislation. According to the WFD, waste should be dealt with first by prevention, then reuse, followed by recycling, recovery, and finally, disposal. Under the method of recovery, waste is either converted into usable forms, or is incinerated so that energy is recovered.

In the last option of landfill disposal the relevant rules are provided by **Landfill Directive 99/31/EC**

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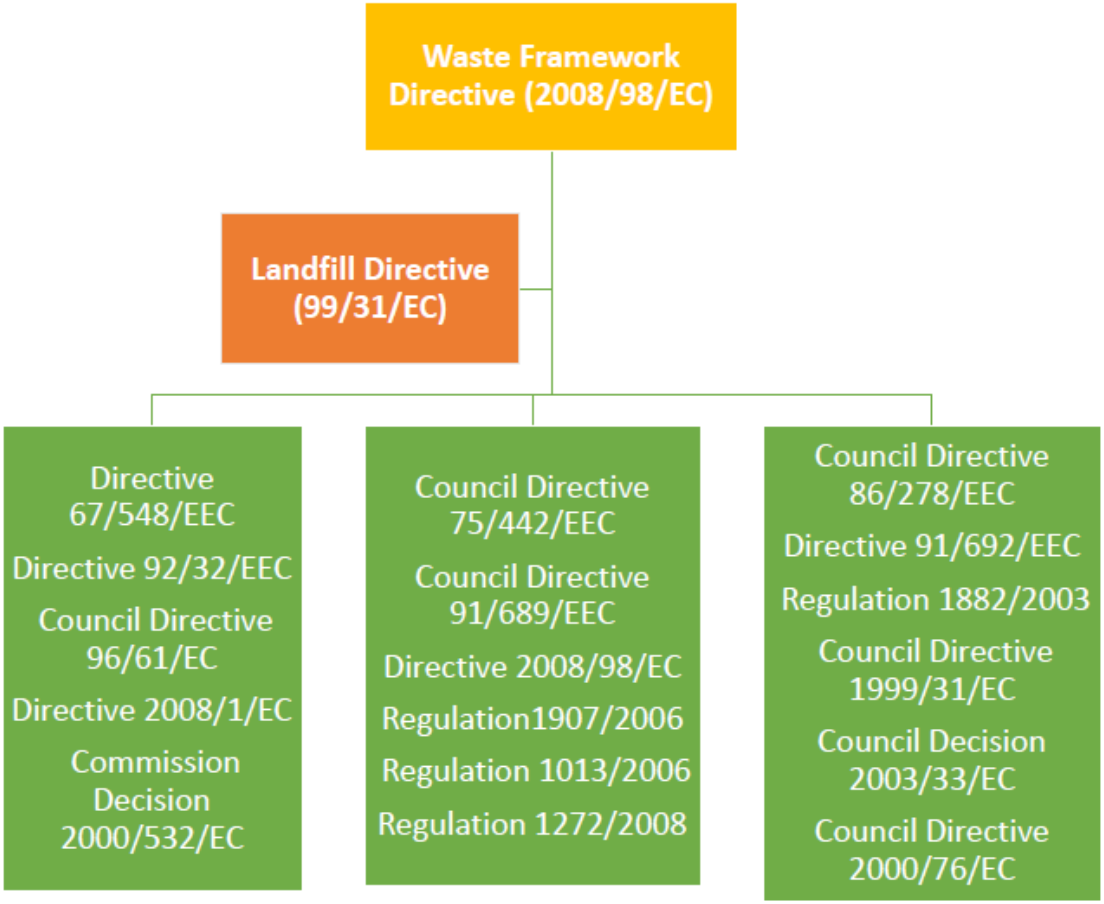
Legislation on Waste in the EU



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Legislation on Waste in the EU

Framework Legislation

- Waste Framework Directive
- Hazardous Waste Directive
- Waste Shipment Regulation

Legislation on waste treatment operation

- Waste Incineration Directive
- Landfill Directive

Legislation on specific waste streams

- Waste oil, titanium dioxide, sewage sludge, PCBs and PCTs, batteries and accumulattors, packaging wastes, end-of-life vehicles, waste electronic and electrical equipment (WEEE), Restriction of Hazardous Substances (RoHS), mining wastes

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Legislation on Waste in the EU

The mill operator, as a producer of waste, is under certain conditions responsible for proper management of such waste until recovery or disposal. Based on the WFD rules the oil mill operator has the following options:

- **On-site disposal**, or on-site recovery, by installing a suitable system at the olive mill
- Have the waste managed by **public municipal waste management services** under a specific agreement
- Deliver the waste, by means of an authorized waste collector, to **authorized recovery or disposal installations**
- Deliver the waste, by means of an authorized waste collector, to **a party authorized to handle prior blending or mixing, repackaging and storage for subsequent transfer to authorized recovery or disposal installations**
- The situation would be simplified if the olive pomace waste were treated as municipal waste, at least for smaller olive mills. In this case the producer would only need to deliver it to a **municipal waste service** without needing to stipulate an agreement and pay only the waste management tax or fees.

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Legislation on Water

The **Water Framework Directive 2000/60/EC** deals with water management in the broad sense and it requires Member States to take a strategic and integrated approach to the management of all water resources and river basins. The directive also **addresses water quality**, with the aim of achieving an appropriate ecological and chemical status for surface waters, as well as an acceptable chemical and quantitative status for groundwater.

Furthermore, the **Groundwater Directive 2006/118/EC** is a directive of the Water Framework Directive, dealing with the issue of water quality.

Wastewater from olive oil production falls under the **Urban Waste Water Treatment Directive 91/271/EEC**. This concerns the **collection, treatment and discharge** of urban wastewater and the treatment and discharge of wastewater from certain industrial sectors, including manufacture of fruit and vegetable products, under which olive oil production would fall.

Amongst other things, the Directive states that discharges of **biodegradable industrial wastewater** from certain industrial sectors that do not enter urban wastewater treatment plants **before being discharged** into receiving waters, should be subject to the appropriate treatment. **Thus, olive mill wastewater treated effluent should be released into the receiving waters only when it meets the relevant quality standards and the provisions required by this Directive**.

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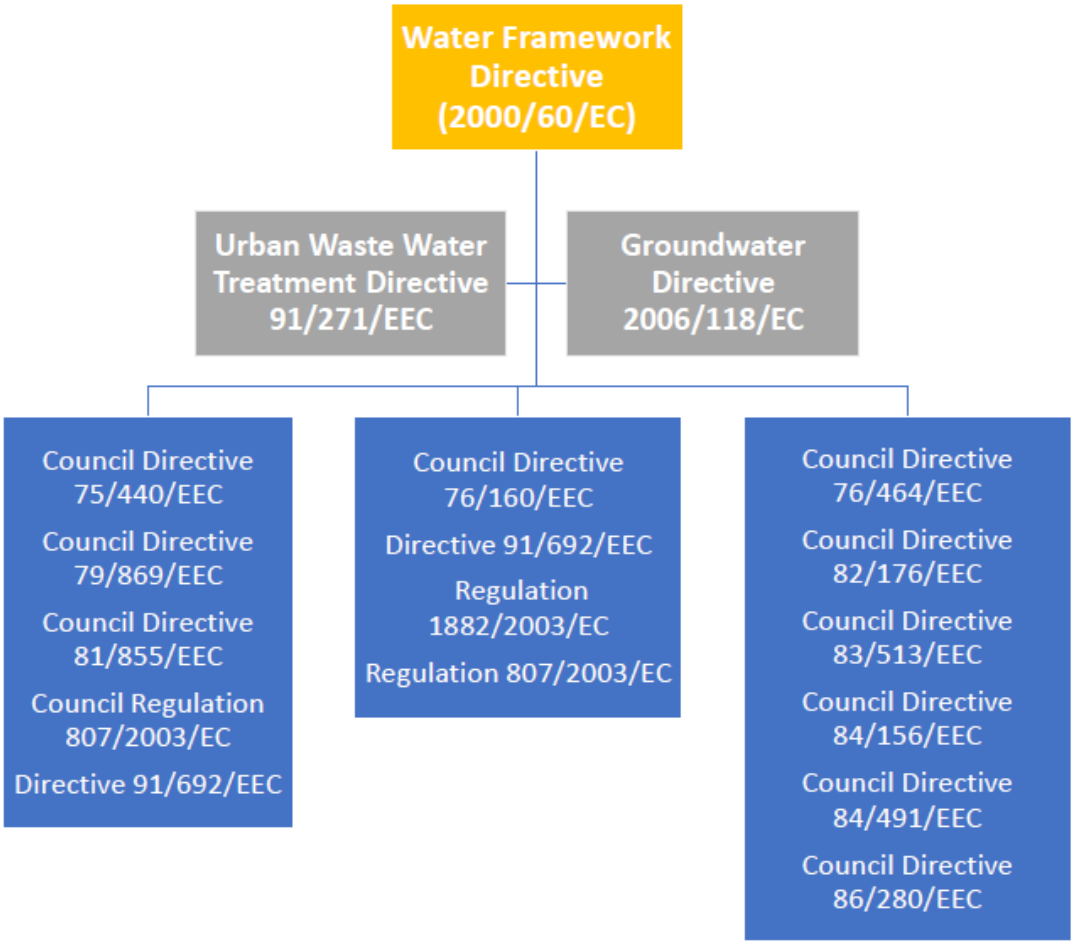
Legislation on Water



Legislation on Soil

Different Community policies contribute to soil protection, particularly environment (e.g. air and water) and agricultural (agri-environment and cross-compliance) policy. The Commission adopted a **Soil Thematic Strategy** and a proposal for a **Soil Framework Directive** with the objective to protect soils across the EU.

The overall objective is protection and sustainable use of soil, based on the following guiding principles:

- Preventing further soil degradation and preserving its functions:
- when soil is used and its functions are exploited, action has to be taken on soil use and management patterns, and
- when soil acts as a sink/receptor of the effects of human activities or environmental phenomena, action has to be taken at source.
- Restoring degraded soils to a level of functionality consistent at least with current and intended use, thus also considering the cost implications of the restoration of soil.

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Thank you for your attention.

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