Circular Economy Lab & Observatory

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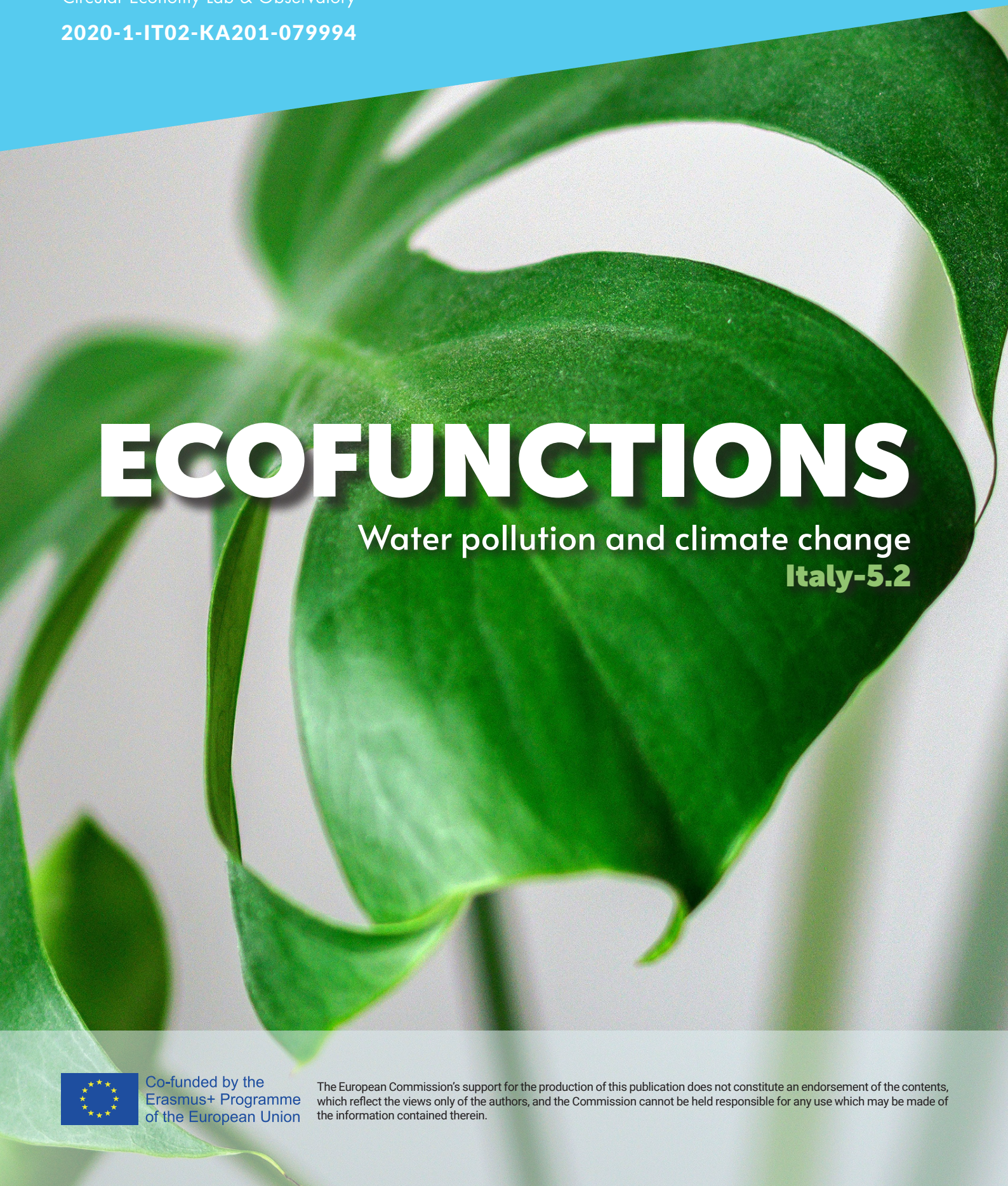

ECOFUNCTIONS

Water pollution and climate change

Italy-5.2

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Introduction

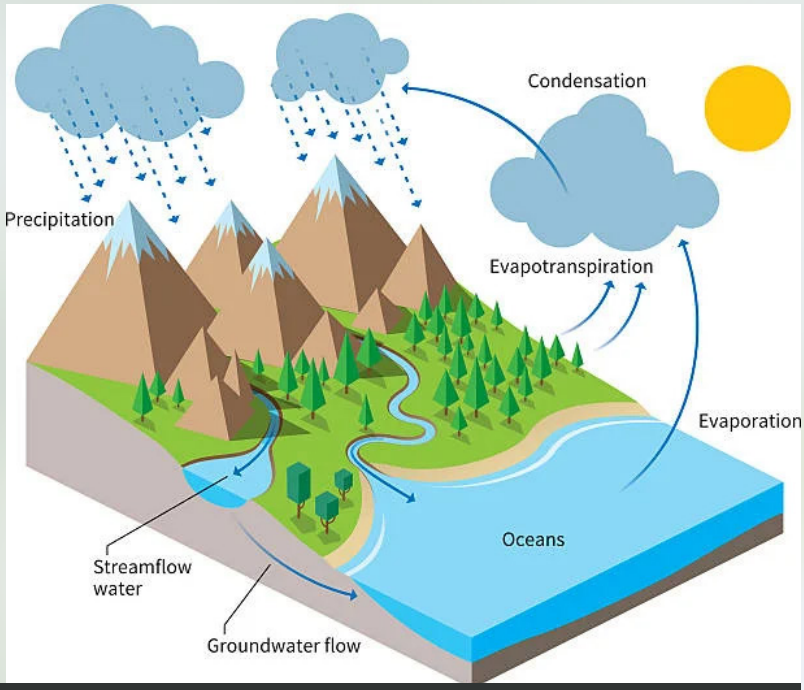
Water pollution and climate change are matters that affect the entire world as we know it. Climate change has increased the average water temperature of rivers and lakes, shortening the length of the ice cover seasons. These changes, together with the increase in river flows in winter and the reduction in summer, have important impacts on water quality and freshwater ecosystems.

Some of the changes triggered by climate change exacerbate other pressures on aquatic habitats, including pollution. For example, a reduced river flow due to decreased rainfall results in a higher concentration of pollutants, as there is less water to dilute them. Another issue caused by raising of temperature is the quality of water will decrease due to reduction of the quantity dissolved oxygen because it will reduce the water's capacity of self-purification.

There are scientific proofs about climate change. Due to climate change we will have a lesser quantity of water for humans' necessity. The water is a connection element between various sustainable development objectives.

The water is important for management of mitigation and adaption's strategies.

These strategies are important to reduce the risks of climate changes.



https://www.istockphoto.com/it/immagine/water-cycle-diagram

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The adaptation includes a set of natural, artificial and technological options, as well as social and institutional measures, with the aim of moderating the danger. The mitigation includes human intervention aimed at reducing sources or strengthening the absorption and removal of greenhouse gasses.

Mitigation options are available in all major water-related sectors. The environment and the ecosystem's change will compromise nature's stability. What are the origins of these issues? Who is responsible for the massive damage to our world?

The answers of these questions are easy to find: men pollute nature throught multiple types of mechanisms, sometimes people can pollute unconsciously but a lot of them can pollute deliberately because they don't take precautions against these issues. We'll see how people can pollute the environment and how it affects them back.

We'll also talk about water cycle and the climate change that are directly connected and how the weather alters the environment. We begin to talk about pollution caused by man's activities: every waste that we don't recycle or even we drop in nature is a lethal projectile for the enviroment.Among dangerous wastes we can find plastic components (plastic water bottles, plastic packagings and other consumables).

https://www.istockphoto.com/it/immagine/plastic-pollution-in-river

We may talk about how the industries pollute air and water with their chemicals and radioactive wastes. Obviously nature takes most of the damage but it can't resist forever if we don't change our minds and our habits. In the future we need more cooperation between the scientific community that works on water pollution and the one who works on climate change.

Problem's description

There are three types of water pollution: physical pollution, chemical pollution and biological pollution. Physical pollution refers to garbage visible. Chemical and biological pollution refers to those pollutants that can't be seen without any scientific tool like a microscope, but the presence of those means that the water isn't drinkable. Water pollution always comes from human activities.

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In fact, if we talk about pollution produced by an average person, we can think about the garbage that he produces every day, which represents physical pollution, or we can think about cosmetic and hygiene products, which can release polluting chemical agents into the water that consequently can contaminate the water.

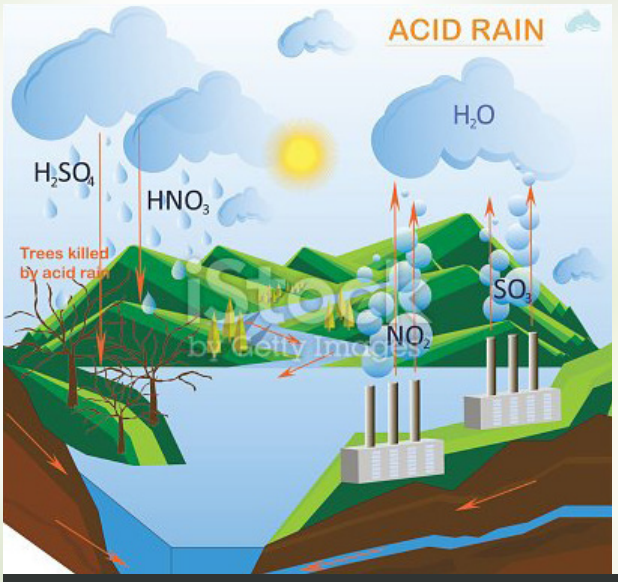
Agriculture, industry and transport are the sectors that most pollute water due to their availability of chemical and biological products and their connection with nature resources.

In fact there are other different types of classification of water pollution:

- Civil: it derives from the discharges of the cities when the water is poured without any purification treatment into the rivers or directly into the sea;
- Industrial: formed by different substances that depend on industrial production;

https://www.istockphoto.com/it/immagine/factory-water-pollution

- Agricultural: linked to the excessive and incorrect use of fertilizers and pesticides, which, being generally watersoluble, penetrate the soil and contaminate the aquifers. The only way to solve the problem of water pollution comes from three sides: reduce the use of pollutant products, increase the control of industrial wastes and clean contaminated ground and water. In this way, pollution that will end up destroying both groundwater and other water reserves can be avoided and minimized.



https://www.istockphoto.com/it/immagine/acid-rain

Some of the most important actions that can be performed in this regard are as follows:

- Reduction of chemical nutrients and pesticides.
- Reduction and treatment of wastewater.
- Reduce deforestation.
- Reduction of water consumption in agriculture and industry.
- Implementation of sustainable transport.
- Reduction of waste.
- Reduction of particularly dangerous agents: oils and batteries.
- Reduce the use of plastics.

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To mention a second effect of the industry pollution are the smokes with sulfur dioxide (SO2) and nitrogen oxides (NOX) are emitted into the atmosphere and transported by wind and air currents, all these atmospheric phenomena result in a devastating of crops and groundwater. Then we can even discuss the transports with their exhaust gas or flue gas emitted as a result of the combustion of fuels such as natural gas, gasoline (petrol), diesel fuel, fuel oil, biodiesel blends, or coal that end up in the atmosphere and in the 1993 we used the asbestos for the brakes or the liquid lead as main component in the gasoline.

Problem Solutions:
A typical API oil-water separator used in many industries is a possible solutions;
As said we have three types of pollution and many ways to solve problems, for example in the industry sector we have the "Source Control" to reduce and control the pollution:

Recycling;
Industry Site Selection;
Rebuilding Habitats and Afforestation;
Cleaning of Resources;
Stricter Laws and Enforcement;
Proper Treatment of Industrial Waste;
Regular Environmental Impact Assessments.

https://www.istockphoto.com/it/immagine/planting

Climate change and forest ecosystems are closely connected, with climate mainly affecting the rate, frequency, intensity and timing of air temperature, solar radiation and rainfall. Climate change impacts can be both positive and negative on forest structure, growth patterns, composition, productivity and functioning, depending on the location and type of forest.

For example an immense wood supply for Europe and even more oxygen or carbon cycles. The forests are known for their power to be the cradle of life at least for us terrans, for the animals and for the climate. [1]

Industrial wastewater treatment covers the mechanisms and processes used to treat waters that have been contaminated in some way by anthropogenic industrial or commercial activities prior to its release into the environment or its re-use. Most industries produce some wet waste although recent trends in the developed world have been to minimize such production or recycle such waste within the production process.

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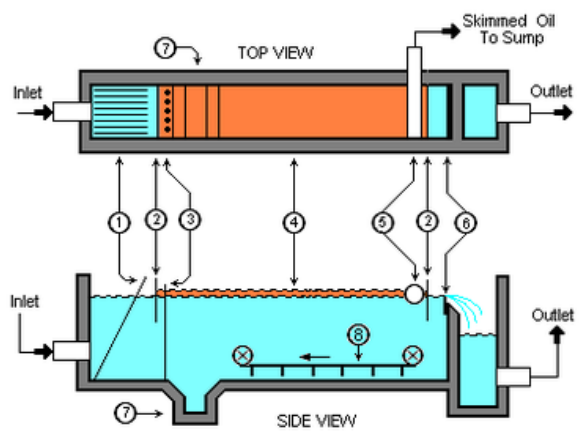
However, many industries remain dependent on processes that produce wastewaters. Water treatment for the production of drinking water is dealt with elsewhere. Many industries have a need to treat water to obtain very high quality water for demanding purposes. Water treatment produces organic and mineral sludges from filtration and sedimentation.

There are different water treatment:
-Treatment of industrial wastewater. The different types of contamination of wastewater require a variety of strategies to remove the contamination.
-Solids removal. Most solids can be removed by techniques of sedimentation with the solids recovered as slurry or sludge.



https://www.iwapublishing.com/news/industrial-wastewater-treatment#:~:text=Methods%20include%20Advanced%20Oxidation%20Processing,wastewater%20treatment%20can%20be%20used

-Oils and grease removal. Many oils can be recovered by using skimming devices. Considered as a fine solution, oil skimmers are a cheap and clean way to ensure the exact level of purity of the water. On other hand these devices are the most efficient in ways of cost and oil less consume or waste.
-Removal of biodegradable organics. Biodegradable organic material of plant or animal origin is usually possible to treat using extended conventional wastewater treatment processes such as activated sludge or trickling filter. Problems can arise if the wastewater is excessively diluted with washing water or is highly concentrated such as neat blood or milk. The presence of cleaning agents, disinfectants, pesticides, or antibiotics can have detrimental impacts on treatment processes. [2]

Conclusions

Modern life in developed countries has left traces in the aquatic environment. Industrial chemicals, drug residues and personal care products can be found in almost all areas of the water cycle, whether it is surface water or groundwater. City and industrial effluents contain pharmaceutical residues and endocrine disrupting chemicals. Groundwater can be polluted by organic compounds produced by industrial activity.

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Bio-reclamation refers to the processes that exploit microorganisms and their enzymes or any other living organism (e.g. plants, algae) to restore contaminated water, soil and air to a healthy state. For various target compounds, researchers identified or isolated suitable biocatalysts (enzymes, bacteria or a range of microorganisms) and tested them on a laboratory scale.

This also included the development of appropriate treatment procedures. [3] As said we've talked about all the problems that affect water quality but there's also the civilian pollution caused by our lifestyles and the transports. For these issues we found many solutions like treating the water with tools such as skimmers in industries for the oils and even for solid traces like sludge. Each method is experimented to be as clean and pure as possible to try to not interfere with nature and being the cheapest possible.

https://www.pexels.com/it-it/foto/climate-street-people-2990650/Photo by Markus Spiske

With the transports we studied the issue of the CO_2 or other kind of anhydrides with the eu normative for minimizing the amount of these exhaustions. There are little daily actions that everyone can do to reduce the environment pollution, for example, we could use biodegradable material, we may use a lesser quantity of plastic, we could try to produce a lesser quantity of wastes, we should give to our rubbish dump paints, solvents and medicine, we have to preserve as much water as possible; and a lot of more easy actions.

Naturally we have to improve our behavior in all circumstances like if we are attending school or if we're working in our office or if we're simply staying at home. Even if we find ways to approach the environment we must continue to keep the world clean. It will take years, maybe decades.

Who knows how long it will take to restore the purity of nature. So we have to keep improving these clean procedures and update every single information about nature to preserve and prosper. Thanks for reading.

https://www.istockphoto.com/it/search/2/image?phrase=vehicle+emissions

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GROUP

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