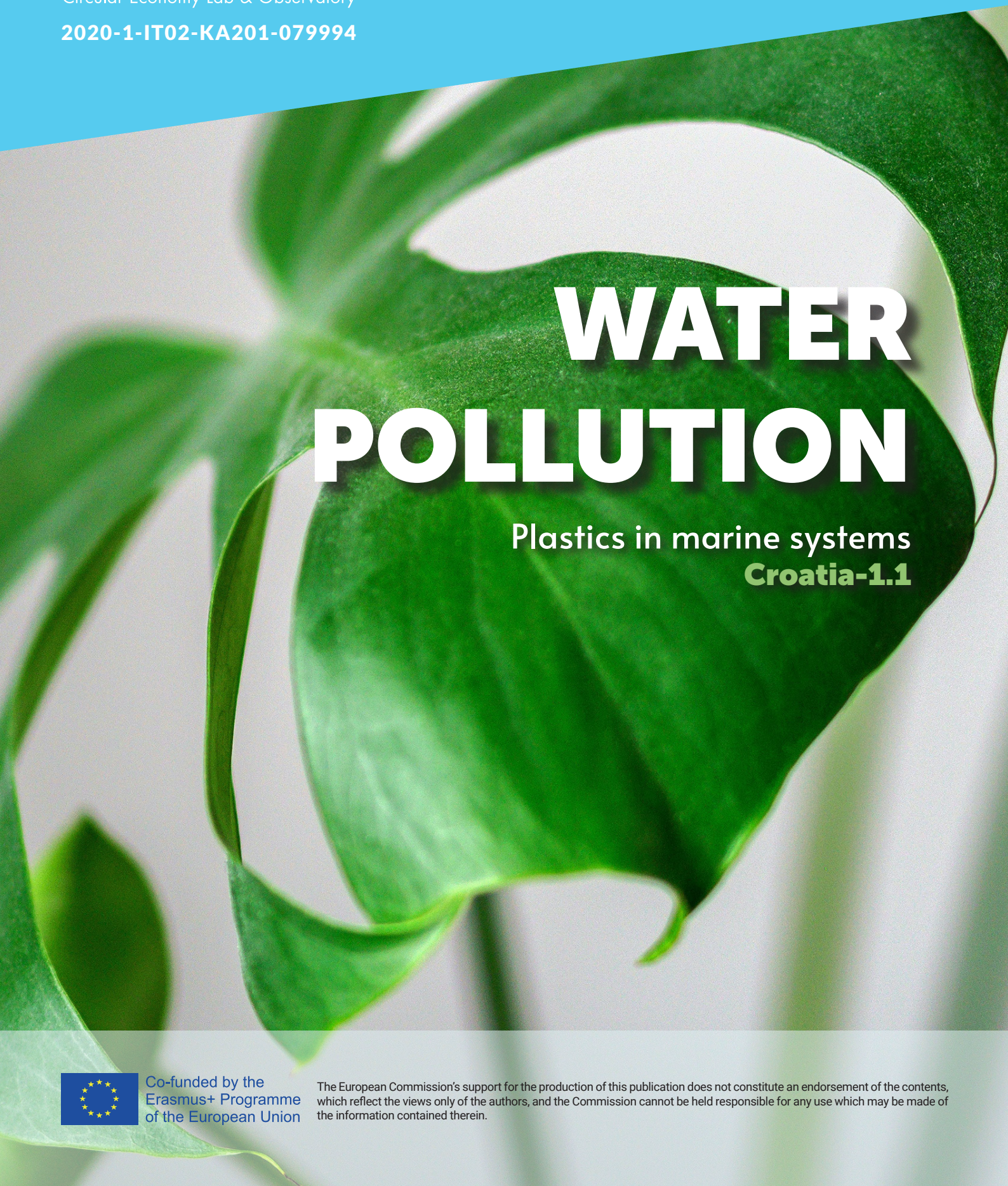
Circular Economy Lab & Observatory

2020-1-IT02-KA201-079994



WATER POLLUTION

Plastics in marine systems

Croatia-1.1

Co-funded by the Erasmus+ Programme of the European Union

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We come from Croatia, a beautiful small country with the striking Adriatic Sea. The unique nature of the Adriatic gives rise to an abundance of endemic flora and fauna. The Croatian National Biodiversity Strategy Action Plan identified more than 7,000 animal and plant species in the Adriatic Sea. We are enjoying our summers with our families and friends at our coast. The total length of Croatia's coast is 6,278 km and it is crowded with tourists; plastic pollution becoming a significant risk for ecosystems and biodiversity. Our Mission is to raise awarenessregarding plastic pollution as a big issue, and as Sir David Attenborough said: "What's so tragic about plastic pollution is that it is so totally unnecessary".

Example of sea pollution (night photo by Anja Vicković)

We need to keep in mind that plastics are in products all around us.

They are in bicycle helmets, child safety seats, and automotive airbags that protect us and the cell phones that connect us and make us young generation addicted to social media or mobile content, but could we avoid this with innovative product materials that keep us safe? Greenwashing is around us, and many industries are keeping plastic products with an advertisement that says it is recyclable, but please keep in mind that just 9% of plastic ever produced has been recycled.[1]

Reducing the use of plastic is essential because plastic production requires an enormous amount of energy and resources. We need to embed sustainability in practices and change our behaviors as plastic pollution, plastics in marine systems, is today one of the most severe environmental problems affecting the oceans and seas. Plastic can take up to 500 years to dissolve and impacts wildlife daily.

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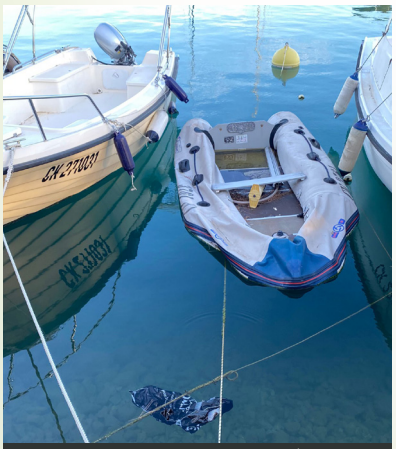
The seriousness of this issue is stated in the European Union's Zero Pollution Action Plan that published quantified and measurable targets for protecting and restoring ecosystems and biodiversity, for zero pollution, and for decarbonization and net greenhouse gas emissions reduction toward climate-neutrality, within the EU's ocean, seas, and waters. The Mission will support the UN's Sustainable Development Goals (SDGs): restoring our ocean and waters-related actions will directly contribute to SDG 14 – Life below water and SDG 6 – Clean water and sanitation, as well as to SDG13 – Climate action.

The Resolution 73/284 of the United Nations General Assembly declared 2021–2030 as the United Nations Decade on Ecosystem Restoration ("UN Decade"). To support the implementation of the UN Decade and help achieve its goals, there is a need for a shared vision of ecosystem restoration, defined as "the process of halting and reversing degradation, resulting in improved ecosystem services, and recovered biodiversity. Ecosystem restoration encompasses a wide continuum of practices, depending on local conditions and societal choice." [2]
A shared vision means we ALL have to act, and yes, we have to stop degradation and preserve and restore our planet's diversity of life.


Plastic in water near civilization (photo by Anja Vicković)

We believe that striving to find innovative solutions and an encouraging call to action that will set targets based on scientific evidence could improve the sustainable future of our planet and its inhabitants. We as the young generation are capable of influencing positive change by engaging local communities and building public awareness and putting pressure on governments to fight for a sustainable purpose.

Although this issue is a serious one, let us finish with a sarcastic joke: "I was buying fish the other day and asked the cashier for a plastic bag... He said it was already inside."

We desperately need to and are able to build a new future in line with the UN Decade's goals.

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The never-ending cycle of plastic waste in marine food chains (https://unsplash.com/photos/40o8lXsMlcU)

Plastics cause many problems for human societies, animal ecosystems and the natural environment.

Microplastics, types of plastics less than 5 mm in diameter, are considered to be one of the greatest, because of their size and our lack of information on them.[3]

Some clothing materials, such as fleece, nylon, polyester, and spandex, release microplastics, in the form of microfibers, when they are washed.

They are also used in industries where different types of microplastic "scrubbers" are blasted at machines, motors and hulls to clean rust and paint from them. This process causes the particles to erode continuously and become smaller and smaller in size so they become more toxic and even harder to fully clean.

Those particles, now the size of nano plastics, are much more easily transported into the marine systems via air or water.

The results of tapwater analyses in different countries on five continents suggest that people may be consuming from 3,000 to 4,000 plastic microparticles each year from tap water.

Most of the particles found were fibres with a length range of 0.1–5 mm, which means there are on average 4.34 particles in a litre.

The effects of the presence of plastic in water on human health are not yet known, but if the drinking water is also impure with nanoparticle pollutants, the damaging consequences can be easily imagined.

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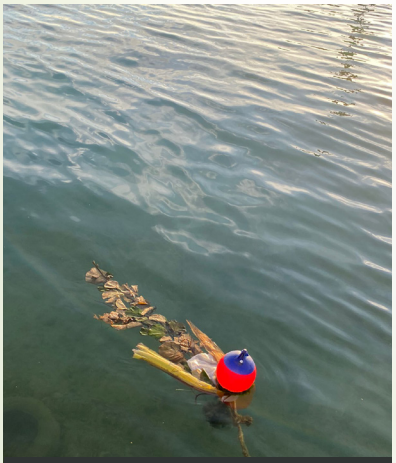
Furthermore, humans are exposed to plastics and different contaminants through ingestion, inhalation or absorption through the skin or the eye.

Such exposure is linked with infertility and other health deficiencies.[4]

As far as animals are concerned, studies have found problems in the development of frogs, such as loss of body weight and length, if they are exposed to BPA, a chemical compound used to create various plastics. The consumption of plastic doesn't only affect animals, it affects human societies as well. Global food supplies could decrease seriously since one-fifth of the world's protein intake is derived from fish. The consumption of plastic by lantern fish has been noted at the bottom of the food chain. When the top predators of marine food chains absorb microplastics, the cycle becomes never-ending.

Seabirds are also influenced by plastic, and on average, seagulls living around the North Sea have 30 pieces of plastic stuck in their stomachs, because they mistake floating debris for prey, and eat it, or feed it to their offspring. Even though minuscule types of plastics cause much trouble, larger ones do as well. Marine animals, including sea turtles, seals, seabirds, fish and whales become wrapped in or entangled by the debris and end up suffocating or drowning. Many die as a result of starvation, or because they cannot escape from predators. Abandoned fishing equipment, such as nets and ropes, is often made from longlasting, tough and resilient materials such as nylon, making them especially dangerous to animals. How can we make a change? [5]



Plastic bags and other debris found in the Adriatic Sea (photo by Anja Vicković)

Out of many ways of decreasing the amount of plastic in marine systems, there is one that is still in its initial stage of development, but is very doable. The BioNets team has the answer. Their team consists of four members, Marin Lesić, Ivan Ivaniš, Andrija Janušić, and Lovro Lesić. These Vth gymnasium students want to make a sort of biodegradable fishing net. Marin got the idea when he was in France in an educational camp and noticed that everyone's first thought that plastic bags are waters' main polluter was wrong.

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He believes that fishing nets present a bigger problem, and their use should be minimized or forbidden since they contribute to the pollution of waters and the killing of marine life. The BioNets team is aware the problem they're facing isn't that easy to fix, but their nets could noticeably decrease water pollution, since its main cause is fishing equipment. Biodegradable nets, which could fix pollution issues on a global level, as the team says, sound too good to be true. But Marin, Ivan, Andrija and Lovro already calculated how it could be put into practice.

The BioNets Team winning 3rd place at the Student DIGI awards (photo by Marin Lesić, Ivan Ivaniš, Andrija Janušić, and Lovro Lesić)

A prototype for the net should be made first, which is the most time consuming activity. After that they could expand the project in Europe and the entire world with the help of funding and banks. The prediction is that 25 machines could be made in three years, which would produce 500 tons of nets. The process itself would cost 2380 million euros, but the nets would value 3 million euros. [6] There are other examples. In cases where undegradable materials find their way into marine systems, there is nothing left to do than to try and take them out and reuse them as something enjoyable.

That's exactly what Ana Mikin and Jelena Petric did with their art installation Flower Buds. By taking unusable umbrellas and thrown away plastic bags, they decorated the tunnel Grič in Zagreb's centre with flower-motivated art in September 2022.[7]

This is not the first case of artistic expression through discarded materials. Since raising awareness in the public about water and sea pollution, many artists have used their creativity to make something that would remind the viewer of the sea and our obligation to protect it. An example would be John Dahlsen's Environmental Wallworks made from beach litter he collected himself and transformed. Yet another way of helping sea life when it comes to plastic pollution can be seen in Lastovo, an island in the Croatian Adriatic Sea.

A plastic field of flowers (photo by Anja Vicković)

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On June 14th 2022. the association Sunce alongside volunteers decided to clean the Kremena beach of undegradable waste. The location was chosen within the LIFE Artina project. The project watched the amount of waste that washed up on the beach in 2 years' time with the goal to not only clean it but educate the employees of Lastovsko otočje Nature Park so future cleaning actions could be performed. By collecting microplastics, discarded fishing equipment, household items and other plastic items, the beach was cleared of 276,98 kilograms of waste.[8]

In conclusion to everything we stated, we think that this particular problem of plastic pollution in oceans is solvable, but with a lot of hard work and money invested in it. As we said earlier, plastic is everywhere.

Plastic items gathering on the water surface (https://pixabay.com/photos/water-polluted-plastic-garbage-2655759/)

We breathe it, consume it by eating different sea food, especially fish, drinking polluted water and it is also in many objects that we use every day. Also, plastic bags are everywhere around us and can be bought in every store.

A big part of those plastic bags and trash in general ends up in the ocean. Along with plastic bags, a lot of fishing equipment, such as fishing nets and ropes, also end up in the ocean.

People on beaches contribute to sea pollution (photo by Anja Vicković)

Plastic pollution of all kinds of fresh and seawater is not only harmful for marine flora and fauna, but also for those that consume that water, and in the end, it can be harmful for human kind. Plastic in the oceans doesn't only disable seals, seabirds, sea turtles and fish as most people think. It makes those animals and many others endangered and easier to hunt down by other predators. When predators eat their prey who were disabled by plastic in the ocean, they also consume plastic with it.

The resulting problems of plastics in marine systems are bigger and more serious than we perceive them. Those problems are going to cause some permanent damage in the marine system that at one point in the future is going to become irreversible.

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The good side of this frightening scenario of our future is that if we start cleaning up polluted areas now, we can have a future without permanent damage in the marine system. There are many young people around the world who advocate for water purification and also educate other people on the issue.

Resourceful and creative young people like the students from BioNets team from Vth gymnasium who invented a sort of bio – degradable fishing net are the ones who are actually taking action instead of only putting blame on others and complaining about the problem. People who are also taking matters into their own hands are volunteers.

They are voluntarily cleaning waters from plastics, like the 150 divers and 100 volunteers that pulled out over 11 tonnes of waste from the sea in Šibenik in the Think Green activity on 24-25 September this year.[9]

It also may not be a big step, but it is a great start. People like them are making a difference and making little steps towards the final goal of cleaning the oceans of plastic. If all people on Earth were only aware of how dangerous the consequences of this problem were, it would be a great start in solving the problem entirely.

However, some of these ways of reducing plastics in oceans require a lot of money. It is hard to find investors who are ready to give large sums of money in an attempt to solve the problem that most people ignore.

The issue of plastics in marine systems is going to affect the lives of future generations if we don't start taking action now. At the end of the day, for now, Earth is the only habitable planet and home to many different species, including humans. Let's start cleaning it up so we can show future generations how beautiful Earth can be.

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GROUP

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