

Zero Pollution Manifesto in the Biosphere Reserves of Portugal

Pollution is responsible for one in eight deaths in Europe annually and is a major factor behind numerous health issues. It is one of the top five drivers of biodiversity loss and threatens the survival of more than one million plant and animal species on our planet, out of an estimated total of 8 million.

In 2021, the EU launched the “Towards Zero Pollution for Air, Water, and Soil” action plan, supported by a vision of zero pollution by 2050: a healthy planet for all.

The ambition of the plan spans several ongoing initiatives contributing to the United Nations 2030 Agenda for Sustainable Development. It complements the goal of climate neutrality by 2050, aligning with the objectives of a clean and circular economy and biodiversity restoration. It is an integral part of many initiatives under the European Green Deal and other European Commission actions.

The plan presents an integrated vision for 2050 - a world where pollution is reduced to levels that are no longer harmful to human health or natural ecosystems and outlines the pathway to achieve this vision.

Some key goals of the plan include:

- Reducing by 25% the EU ecosystems where air pollution threatens biodiversity.

- Cutting nutrient losses, the use and risk of chemical pesticides, the use of the most hazardous ones, and sales of antimicrobials for livestock and aquaculture by 50%.
- Reducing plastic litter in the sea by 50% and microplastics released into the environment by 30%.
- Significantly reducing total waste generation and cutting residual municipal waste by 50%.

In Portugal's Biosphere Reserves, this plan can be translated into concrete actions to minimize localized pollution sources, protect natural ecosystems, and improve the quality of life for local communities. Its implementation can strengthen the sustainable management of these UNESCO territories, aligning regional efforts with European commitments.

Portugal has 12 Biosphere Reserves recognized by UNESCO, including insular, estuarine, and terrestrial areas, which harbor invaluable biodiversity and cultural traditions. However, pollution, especially plastic pollution, a recognized ubiquitous threat in various forms and sizes, poses a growing challenge to the integrity of these territories and remains under-assessed.

From a preliminary study revealing worrying levels of microplastics in the various lagoons of Serra da Estrela, an initial environmental awareness plan addressing this issue was developed, engaging local entities in the region to create a more ambitious plan that can be replicated across portuguese Biosphere Reserves.

Zero Pollution Manifesto in Portugal's Biosphere Reserves

The **Zero Pollution Manifesto** emerges as a strategic plan to combat pollution in Portugal's Biosphere Reserves, aligned with the European policies of the Zero Pollution Action Plan. It highlights the importance of acting in territories of high ecological and social relevance, where sustainability is a priority.

General and Specific Objectives

General Objective

Implement a Zero Pollution Action Plan in the Biosphere Reserves of Portugal, focusing on awareness, communication, monitoring, pollution reduction (particularly plastic waste), community participation, and the sustainable management of these territories.

Specific Objectives

- Evaluate and monitor pollution levels in each reserve;
- Raise awareness among communities and visitors about pollution impacts and the importance of preserving these territories;
- Implement preventive practices to minimize pollution sources;
- Promote scientific collaborations to study the impacts of pollution on biodiversity and ecosystems;

- Integrate results and best practices into local, national, and international policies.

Action Axes and Priorities

1. Monitoring Plan in Biosphere Reserves

Diagnosis: Preliminary assessment—mapping pollution levels and identifying key sources in each reserve (e.g., accumulation zones, waste types);

Citizen Science - Use digital platforms such as lixomarinho.pt to engage visitors and communities in reporting pollution hotspots and continuous monitoring;

Guidelines and Protocols - Establish clear protocols for data collection and analysis, with regular reports to guide future actions (e.g., implementing a Zero Pollution Trail – 1 km);

Local Partnerships - Create local working groups to ensure the plan's implementation and continuity.

2. Preventive Actions and Education

Environmental Education - Develop educational materials and awareness programs for visitors, local schools, and communities, emphasizing the relevance of Biosphere Reserves;

Pollution Source Reduction – Work with local stakeholders (businesses, municipalities) to identify pollution hotspots, such as river discharges and nearby urban activities;

Environmental Volunteering – Organize regular clean-ups and community activities with NGOs, schools, and other local groups;

Communication Campaigns – Leverage social media, events, and workshops to disseminate the Manifesto's practices and results.

3. Scientific Research and Innovation

Biodiversity Studies - Collaborate with academic and research institutions to assess pollution impacts on ecosystems within Biosphere Reserves;

Solution Development – Promote research into alternative materials to plastics and new technologies for waste collection and recycling;

Monitoring – Establish long-term data series to evaluate the effectiveness of implemented measures;

Roadmap

Phase 1 -Planning and Preliminary Diagnosis

- Create Zero Pollution working groups;
- Conduct diagnostics and map pollution sources in the reserves;
- Identify pilot reserves for initial action implementation;
- Define evaluation protocols and develop digital tools for citizen science;
- Establish partnerships with local stakeholders;

Phase 2 - Initial Implementation

- Launch Zero Pollution 1-km Trail;
- Initiate awareness campaigns and volunteering programs;
- Create educational materials tailored to each reserve's characteristics.

Phase 3 - Expansion and Monitoring

- Expand the manifesto's implementation to all Biosphere Reserves;
- Perform periodic reviews and adjust strategies.

Phase 4: Dissemination

- Promote the initiative's replication across all reserves and other territories;
- Integrate the manifesto's practices into local and national policies;
- Strengthen cooperation with other Biosphere Reserves in Europe.

Expected Results

1. Significant reduction of waste in Biosphere Reserves;
2. Increased societal involvement in reserve preservation through citizen science and other activities;
3. Production of relevant scientific data to inform public policies;
4. Promotion of sustainable practices among local communities and visitors;
5. International recognition of Portugal as a leader in implementing best practices under the Zero Pollution Plan in Biosphere Reserves.